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The Bronislaw Markiewicz
State Higher School of Technology
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RISK-BASED APPROACH TO COMBATING MONEY LAUNDERING

Edited by Ryszard Pukala & Iryna Chmutova

monograph

The Bronislaw Markiewicz State Higher School of Technology and Economics in Jaroslaw

Simon Kuznets Kharkiv National University of Economics

RISK-BASED APPROACH TO COMBATING MONEY LAUNDERING

MONOGRAPH

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2020

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The international project was implemented in accordance with the Cooperation Agreement between the Bronislaw Markiewicz State Higher School of Technology and Economics (Jaroslaw city, Poland) and the Simon Kuznets Kharkiv National University of Economics (Ukraine) dated November 24, 2014

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PREFACE

The "Risk-Based Approach to Combating Money Laundering" monography is based on the results of studies conducted within the framework of an international project titled "Best international Practices for Implementing a Risk-based Approach to Combating Money Laundering", executed as part of the agreement between the Bronislaw Markiewicz State Higher School of Technology and Economics in Jarosław and the Simon Kuznets Kharkiv National University of Economics – which celebrates its 90th anniversary this year.

The monograph comprises four sections exhibiting a consistent structure, corresponding to the subject matter of the study. It presents the main provisions of the FATF International Standards. The first one deals with the introduction of a risk-oriented approach. The authors presented a concept of a risk-oriented solution within the system designed to countering money laundering and financing of terrorism in Ukraine, developed in line with international recommendations and capable of being used by various countries as an example of innovative solution within the discussed scope.

Moreover, the monograph reflects changes taking place in the financial services market, including its digitalisation, that call for creating conditions that ensure stability of processes in the scope of developing financial monitoring. A separate part of the study is devoted to the processes of countering money laundering in the field of insurance. Two sections are dedicated to introducing a risk-based approach to financial monitoring in the banking system, since it is the banks that have the highest degree of risk control as part of basic financial monitoring. Practical aspects of analysing borrowers' creditworthiness for the purpose of minimising credit risk of the banks have also been presented.

A characteristic feature of the monograph is broad international literature, which is a subject of interest not only among specialists in the field of finance, but also among information processing professionals.

The execution of the international project has been successful. The project has contributed to forming a team of scientists from Poland and Ukraine and creates conditions for solving new international problems not only in the scope of financial monitoring, but also as regards the development of the financial services market as well as digitalisation of the economy and finance.

Head of the international project
Ryszard Pukala

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INTRODUCTION

The growth of economic risks aggravates the need to create an effective risk-oriented system that can prevent the legalization of money received by illegal means (money laundering), terrorist financing, and proliferation of mass destruction weapons. This purpose invokes the creation of respective international organizations that apply appropriate sanctions to those countries that commit violations in the financial monitoring sphere, and specially authorized domestic bodies for financial monitoring whose activities aim to prevent money laundering, terrorist financing, and proliferation of mass destruction weapons. Therefore, at present, implementing the international standards established by the Financial Action Task Force on Money Laundering (FATF), the norms stipulated in the EU Directives (including Directive 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing), and introducing a risk-oriented approach in the field of preventing and combating money laundering is a modern trend aimed to build the national financial monitoring system; it is in the focus of many scientists not only in the European community, but throughout the world.

Specially authorized bodies and other entities exercising regulation and supervision in the field of financial monitoring are unable to function without cooperation with the primary links of the financial monitoring system, namely the primary financial monitoring subjects. In turn, the establishing and use of risk-oriented criteria to determine their risks of being involved in money laundering schemes provide means for systematizing, generalizing these criteria, and creating a theoretical basis for increasing the efficiency of the state financial monitoring.

Today, Ukraine, like most of the developed countries of the world, is pursuing an active policy to implement international standards for combating corruption and crime in the financial sector, as defined in the FATF Recommendations. In particular, on April 28, 2020, the new Law of Ukraine “On preventing and countering the legalization of money received by illegal means (money laundering), terrorist financing, and proliferation of mass destruction weapons” came into force, which defined a transparent instrument of prosecution for money laundering and unfair withdrawal of accumulated funds, as well as introducing a risk-oriented approach by the primary financial monitoring subjects

when verifying their clients. The risk-oriented approach eliminates total control over financial transactions, which helps to reduce bureaucratic procedures for client identification and verification. However, in order to duly protect the rights and legitimate interests of citizens, society, and the state, and to ensure national security, it is necessary to determine the main provisions for the formation of a risk-oriented system for combating money laundering, terrorist financing and proliferation of mass destruction weapons. This will improve the process of detecting, verifying and investigating crimes related to money laundering and other illegal financial transactions.

Banks and other financial intermediaries hold a specific place in the financial monitoring system. The economy digitalization being one of the drivers for the developing financial relations, the expanding types and channels of the provision of their services, is marked by an increase in the risks associated both with the specifics of their activities and other risks threatening the entire financial system. In particular, the volume and complexity of financial crime have increased dramatically in the context of the economy digitalization. Money launderers use different types of services, as well as various combinations of businesses, to clean up dirty money. As a result, the regulatory requirements to prevent and combat money laundering are becoming more stringent. The evolution of the regulatory landscape, the business environment for financial intermediaries, digital and anti-money laundering technologies explains the need for research into the digital development of anti-money laundering in the financial sector.

Taking into account the peculiarities of banks' activities and their functions, the banking sector represents a financial system component with the highest vulnerability to money laundering risks. The risk of using banking institutions for money laundering is in one way or another associated with their other risks (operational risk, credit risk, strategic risk, market risk, liquidity risk, reputational risk, compliance risks, etc.). Its occurrence may result from one risk transforming into another one, or vice versa, entail additional consequences. Therefore, the comprehensive risk-oriented approach offers the foundation for identifying AML threats and developing an operational algorithm for tracking them. As part of its implementation, it is critical to consider the connection between the risks to be involved in money laundering schemes faced by financial institutions with primary and secondary factors-causes of occurrence and their consequences that may have a

recurring nature. In this respect, ensuring an increase in the efficiency of the functioning and/or adequacy of the risk management system using tools for identifying threats, assessing, controlling, monitoring and minimizing money laundering risks is a platform for eliminating and/or preventing them in further activities performed by the primary financial monitoring subjects, preventing the involvement in the money legalization processes by taking appropriate measures and preventing the facts of violating legal requirements in the relevant area.

The monograph intends to develop theoretical and methodological provisions and recommendations for the application of the risk-oriented approach to counter money laundering.

The specified goal stipulates the following tasks:

- developing the main provisions of the concept for forming a risk-oriented system applied to combat money laundering and terrorist financing based on international experience;
- systematizing the provisions for the legal regulation of the implemented risk-oriented approach in the field of combating money laundering and terrorist financing at the state level to determine risk-oriented signs indicating the possible involvement of a primary financial monitoring subject in money laundering schemes;
- exploring the specifics of defining and structuring the financial service market in the economy digitalization environment and analyzing the digital development of countering money laundering in the insurance sector;
- developing theoretical and methodological foundations and preparing recommendations for the practical implementation of the risk-oriented approach by Ukrainian banks as a crucial element of the primary financial monitoring of banks;
- determining the fundamental nature and characteristics of the banking system risks, in particular, those associated with the money legalization, and preparing recommendations for leveling these types of risks using monitoring tools;
- providing recommendations on analyzing the borrowers' creditworthiness to minimize credit risks faced by banks;
- investigating the fundamental nature of the banks' strategic risk, developing recommendations for its assessment, and analyzing the relationship

between failures in the banking strategy implementation and the compliance risk in the field of financial monitoring.

The monograph consists of three sections, which address the following problems: international standards applied to regulate and develop a risk-oriented financial monitoring system; changes in the financial monitoring in the context of the digitalized financial relations; the peculiarities of using the risk-oriented approach during the primary financial monitoring implemented by banks; and individual risks met by banks in the system of factors influencing the money laundering processes.

The monograph includes the results obtained during the fundamental research work “Risk-oriented approach to combating money laundering, terrorist financing and proliferation of mass destruction weapons” (No. 0118U000058) performed by the Simon Kuznets Kharkiv National University of Economics. The theoretical provisions and practical developments presented in the monograph constitute a part of scientific publications submitted by its authors and conceptually synthesize conclusions on the development and implementation of the risk-based approach to combating money laundering.

PART 1.
INTERNATIONAL STANDARDS AIMED TO REGULATE AND DEVELOP THE RISK-ORIENTED FINANCIAL MONITORING SYSTEM

1.1. International recommendations background for Development the Basics of Concept on Formation a Risk-based AML/CTF system

Money laundering, terrorism financing and the financing of the proliferation of weapons of mass destruction are visible threats to the global security and integrity of the financial system protected by the international standards of the FATF (FATF Recommendations [85]).

The Financial Intelligence Unit of Ukraine (SCFM) is implementing measures to adapt international FATF standards to the features of the domestic financial system [178].

To promote international standards in non-FATF countries, international groups have been established in this area, in particular, the Council of Europe Committee of Experts on the Evaluation of Anti-Money Laundering and Financing of Terrorism (MONEYVAL).

One of the main accents of the new report, published on January 30, 2018 by MONEYVAL experts [25], is that Ukraine has problems with collecting information on financial frauds and crimes: government structures are aware of the facts revealed but do not use them as the basis for criminal proceedings. Therefore, creating the basis of the concept of a risk-based system for combating money laundering, terrorist financing, and the financing of the proliferation of weapons of mass destruction is an urgent task, which will contribute to adapting the FATF International Standards for their introduction in Ukraine.

The first step was the carrying out a National Risk Assessment [25].

Despite the existence of different approaches and methods for risk assessment and risk management in the system of financial monitoring, the issue of applying a risk-oriented approach to AML/CTF, as well as evaluation its effectiveness and implementing into domestic practice, remains poorly investigated.

As far back as in 2005, the Cabinet of Ministers of Ukraine (CMU) adopted Order No. 315 “On the Approval of the Concept of Development of the System for Preventing and Countering the Legalization (Laundering) of Proceeds of Crime and Financing of Terrorism for 2005–2010” [163]. This regulatory act stipulates that the development of a AML/CTF system should be carried out in the following dimensions: averting the emergence of prerequisites for the legalization of criminal

proceeds and the financing of terrorism; preventing the use of weaknesses of the financial system to legalize criminal proceeds and the financing of terrorism; improving the mechanism for regulating and supervising reporting entities; increasing the effectiveness of law enforcement; creating an effective system for ensuring interaction among the executive authorities involved; raising the qualification level of specialists engaged and the level of their technical support; participating in international cooperation; cultivating among the population the awareness of the need for preventing and countering the legalization of criminal proceeds and the financing of terrorism.

Regulatory support for state mechanisms for ensuring the reporting of the real income of individuals was presented mainly by the adoption by the State Financial Monitoring Service of by-laws aimed at facilitating the execution of provisions of laws and legal acts issued by the highest state authorities as well as at signing memoranda and cooperation agreements with other countries.

Risk-based measures were first mentioned in regulatory documents as early as in 2015, when the Cabinet of Ministers of Ukraine adopted the Ordinance "On the Approval of the Strategy for Development of the System for Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and the Financing of Proliferation of Weapons of Mass Destruction for the period till 2020 (hereinafter referred to as the Strategy) [141], aimed at the adaptation of the FATF International Standards. The Strategy envisages measures aimed at averting the emergence of prerequisites for ML/TF; minimizing the risks of using the financial system for ML/TF; increasing effectiveness of activities of law enforcement and other authorized state bodies; developing international cooperation. To implement the provisions of the Strategy, the authors have developed a Conceptual framework for the formation of a risk-based AML/CTF system (hereinafter referred to as the Concept).

The NRA in the field of combating money laundering and terrorist financing (ML/TF) [25] distinguishes a wide range of risks associated with shortcomings of the system of state and primary financial monitoring, including: the imperfection of the system for the initial detection of suspicious financial transactions; the non-modernized (ineffective) system for analyzing information on suspicious financial transactions; the ineffective financial crime investigation system; ineffective

sanctions for violations of the law in the field of combating ML/TF; lack of staff and resources for ensuring an effective monitoring in the field of combating ML/TF; lack of sectoral assessment of risks associated with ML/TF; inefficient interaction of law enforcement bodies; improper investigation of cases of ML, tax offenses, terrorist crimes, offenses predicate to ML; disproportionate sentencing.

All these shortcomings indicate the need to develop a systems approach to applying a risk-based approach in combating ML/TF.

For the adaptation of international FATF standards to study the implementation of state approaches to the system on providing AML/CTF, existing Recommendations of international organizations on a risk- based AML/CTF system were analyzed (table 1.1) [11; 12; 17; 13; 18; 19; 20; 24; 137; 158].

Table 1.1. Generalisation of the international organizations recommendations on a risk-oriented AML/CTF system

Source (document)	Goal	Key principles	Mechanisms of implementation
1	2	3	4
Guidance for a Risk-Based Approach to Prepaid Cards, Mobile Payments and Internet-based Payment Services	Stimulating the discussion of the risk-oriented approach implementation to prepaid cards, mobile payments and online payment services	Output beyond the reach of law enforcement and other competent bodies virtual operations, which are becoming a powerful tool for transfer and storage of funds and used to finance terrorism	Conceptual basis for understanding and reducing the risks in the field of AML/CTF on the some types of online payment systems is proposed
Guidance for a Risk-Based Approach to Virtual Currencies	Explaining the application of the risk-based approach to AML/CTF measures in the VC context	The main focus is on centers that cross the different activities and provide access to a state-regulated financial system, in particular, virtual exchange services providers	The use of a risk-oriented approach to ML/TF risks on virtual currency payment products and services, rather than other types of financial services based on virtual currency, such as virtual currency securities and futures

1.1 International recommendations background for Development the Basics of Concept on Formation a Risk-based AML/CTF system

Risk-Based Approach for the Banking Sector	Encourage countries, competent authorities and banks to develop and implement a risk-oriented approach in the field of AML/CTF through providing general guidance and examples of current practice	In the situation of an increased risks of ML/TF banks should in any case take enhanced measures of due diligence, although national legislation may not always indicate how to reduce such increased risks (e.g. by increasing the level of constant enhanced monitoring)	The risk assessment should provide the bank with an understanding of how and to what extent it is vulnerable in terms of VC/FT. Development of risk classification to determine the amount of resources in the field of AML/CTF necessary to reduce risks
FATF Report on «Emerging Terrorist Financing Risks»	Assist jurisdictions and representatives the private sector in creating reliable counter-FT systems, taking into account the changing risks, trends and techniques of FT	Some new risks which were identified by members of the FATF global network have been considered and analyzed	Determining the mechanism of action of various types of terrorist organizations that receive, use and manage funds for the detection, cessation and punishment of terrorist activities and FT
Risk-based approach Guidance for the money services business sector	Support the creation of a unified concept of a risk-based approach. Developing effective principles that are used in applying a risk-based approach. Identification of best practices for the development and implementation of a risk-based approach	Implementation of a risk-based approach involves adopting a risk management process for AML/CTF that involves risk recognition, risk assessment, and development of strategies to manage and mitigate identified risks	The analysis of risks and their updating to identify the places where the risk of ML/TF is greatest, identify the main weaknesses. Money providers need to identify customers, products and services at the highest risk, including delivery channels and geographic location
FATF Guidance on the Risk-Based Approach for Real Estate Agents		Understanding and responding to threats and disadvantages: national risk assessment; a	Clear understanding of risk by brokers and their ability to conduct an objective assessment. Constant

1.1 International recommendations background for Development the Basics of Concept on Formation a Risk-based AML/CTF system

		legislative/regulatory framework that supports the application of a risk-based approach; the development of a monitoring system to support the implementation of a risk-based approach; identification of key players and ensuring compliance with international standards; information exchange between the public and private sectors	enrichment of experience, for example, through training, invitation of experts for providing professional advice and teaching in practice. It is useful to exchange information between the relevant authorities and self-regulatory organizations
FATF Guidance on the Risk-Based Approach to Combating Money Laundering and			Identification and verification of clients before establishing business relationships, for example, before accepting contractual obligations. Identification of beneficiaries and taking the necessary steps to verify
Terrorist Financing			Their identity in order to identify the trader with the true beneficiary's identity. Obtaining information on the scope of the client, including the expected type of proposed transactions
FATF Guidance «Money Laundering and Terrorist Financing Risk Assessment Strategies»	Providing information on the development of a national risk assessment system for ML/TF	The usefulness of introducing risk assessment for policy makers in defining the priorities of the ML/FT counteraction. The assessment should be related to strategic planning and special actions	Identification of high-risk clients and high-risk operations. Coordination of the National Counter-Terrorism/FT Strategy.
FATF Guidance «Money Laundering and Terrorist Financing Vulnerabilities of Commercial Websites and Internet Payment	Increasing the aware-ness of private and public sector participants about ML/TF risks associated with commercial	The various disadvantages of commercial websites and payment systems are highlighted: indirect registration,	Creating special security commands that will scan to detect fraud and abuse. The use of due diligence measures

Systems»	websites and Internet payment systems, and the world community's knowledge of ML/TF methods on using these channels	which may lead to identification problems; speed of operation; limited person interference and a large number of operations, which may cause problems with auditing, monitoring and detecting suspicious transactions, etc.	(simplified or reinforced). Determine the risk that a client makes when opening an account. Checking information provided by customers. Automatic calls, sample inspections to verify individuals

Source: formed by the authors [205]

As can be seen from the table 1.1, international organizations, in particular FATF, have summarized and developed recommendations on the implementation a risk-based approach for the use of payment cards, mobile payments and online payment services, in particular through commercial websites and Internet payment systems, the use of virtual currencies, in the work of banks, countering the financing of terrorism, providing financial services, real estate transactions, etc.

When introducing mechanisms of implementation, it is proposed to create a conceptual framework for AML/CTF with the coordination of the national strategy.

The methodological basis of the concept of forming a risk-oriented system on providing AML/CTF is systemic, institutional and functional approach. An element of the development methodological basis of the concept are hypotheses that take into account the features of the risk-oriented AML/CTF system and provide the establishment of links and assessment of the interaction between the institutional participants of this system according to their placement level in the state financial monitoring system.

As a potential hypothesis that can be considered for constructing a risk-oriented system on providing AML/CTF could be taken an argument that state regulation has an impact on its development through the development of criteria for identifying high-risk clients. The risk assessment process for ML/TF should provide an idea of whether the current legislation meets new threats and whether the current methods of control and enforcement are accurate.

On the way of realization of the concept the leading place is occupied with the principles that will be laid at the basis of the implementation of each element of

the developed concept: functional purpose, transparency – maximum openness of the system on providing AML/CTF to external users through access of consumers to the basic information-analytical and statistical information about its functioning ; unity – the existence of a single legislative and regulatory framework, a unified methodology for the formation of accounting and statistical reporting of all professional participants in the system; sustainability – a risk-oriented system is able to counteract external shocks and internal threats and eliminate them with the active involvement of regulatory and supervisory authorities; efficiency of the system participants – providing maximum profit and minimizing risks; trust – system participants are able to predict the behavior of others, forming stable scenarios regarding possible situations; social responsibility of all the system participants.

The institutional capacity and effectiveness of AML/CFT system objectively requires improvement of methodological support. It must meet the requirements of IFRS, Basel III and Solvency II, etc.

Among the priority areas is implementation of International Recommendations, reduction of asymmetry of information for the system participants, establishment of interagency coordination of state bodies in the field of AML/CTF; increasing the client's financial education level, etc.

The concept of a risk-oriented AML/CTF system development is based on a new scientific approach to finding ways to improve its functioning and development. The implementation of the proposed conceptual framework will strengthen this system, make it more stable to systemic crises, and will create a stable basis for its long-term development.

1.2. The main concepts for the formation of a risk-based AML/CTF system

The application of a **risk-based approach** to reporting entities (REs) [31] and the formation of a risk-based system for combating money laundering, terrorist financing, and the financing of the proliferation of weapons of mass destruction is a necessary requirement of the international standards set by the FATF [15].

According to the **FATF International Standards on Combating Money Laundering and the Financing of Terrorism & Proliferation** (2012) [15], the policy on and coordination of anti-money laundering and countering the financing of terrorism concern assessing relevant risks and applying the risk-based approach. A country must identify, assess, and understand the risks to its financial system to form its national policy and develop measures to counteract them.

Money laundering (ML), terrorist financing, and the financing of the proliferation of weapons of mass destruction (TF) are significant threats to the global security and integrity of the financial system, and the FATF International Standards (FATF Recommendations) are intended to protect against them [15].

The relevant areas of contemporary research carried out by Ukrainian scientists are ensuring the country's compliance with the international AML/CTF standards (N. Vnukova, O. Kolodizev, I. Chmutova, 2017 [206], Zh. Andriichenko, 2018 [33]); assessing and managing the risks of ML/TF and applying the risk-based approach (O. Hlushchenko, I. Semehen, 2014 [80]); identifying the directions for institutional changes to ensure the functioning of the risk-based approach (Zh. Andriichenko, 2017 [29]). There also observed an increased attention to theoretical justification of applying a risk-based approach to financial monitoring (N. Vnukova, 2018 [204; 207], S. Yehorycheva, 2018 [210]) as well as its practical implementation in this field (I. Chmutova, Ye. Tkacheva, 2018 [53], A. Chubenko, 2014 [54]).

Along with a significant number of scientific works on the problems of applying a risk-based approach in the field of financial monitoring, attention should be paid to the lack of a holistic conceptual approach to the implementation of a risk-based system for combating money laundering, the financing of terrorism and proliferation of weapons of mass destruction.

So, the task is to develop theoretical basis for the formation of a conceptual framework for implementing a **risk-based system** for combating money

laundering, terrorist financing, and the financing of the proliferation of weapons of mass destruction.

In recent years the State Financial Monitoring Service has achieved certain results in combating the legalization of criminal proceeds and the financing of terrorism [10]. This is primarily due to carrying out the first national risk assessment (NRA) and blocking suspicious financial transactions worth more than USD 1.5 billion, which were confiscated to the Ukrainian budget, etc.

The presence of various approaches and methodologies for assessing and managing risks in the financial monitoring system, revision of the issue of applying a risk-based approach to combating money laundering, the financing of terrorism and proliferation of weapons of mass destruction, carried out assessments of risks of financial monitoring are insufficient in terms of determining the effectiveness of a risk-based approach and applying its principles in the domestic practice, which requires developing a conceptual framework for the formation of a risk-based AML/CTF system.

The development and implementation of the Concept would intensify efforts in the field of countering ML/TF, as well as accelerate Ukraine's further integration into the global security space. Under these circumstances, it is extremely important to develop the basis of the Concept, which would define its constituent elements, problems to be solved and the main methods for their solving.

The application of a risk-based approach is aimed at achieving a balance among enhancing the requirements for sources of high risk, reducing the cost of controlling low-risk actors, and improving the practical implementation of international standards, which have been expanded with consideration for new threats, such as financing the proliferation of weapons of mass destruction, and revised in view of transparency and severity of anti-corruption measures.

The strategy for implementation of a risk-based approach to the formation of a national AML/CTF system in Ukraine involves developing a theoretical, methodological and practical toolkit for implementing the FATF international standards in the field of financial monitoring. Procedures concerning AML/CTF applied by the private sector and competent authorities can provide relevant information and instructions on which to base a national assessment of the money laundering and/or terrorist financing risks. The report on combating the financing of terrorism, which is submitted by financial institutions and other specified non-

financial institutions, draws attention to the fact that when developing international standards for AML/CTF they took steps to study their customers and kept corresponding records [204]. The importance of financial information in counter-terrorism investigations has grown significantly in recent years [137].

Examining the list of regulations that have a strategic importance for the functioning of the AML/CTF system in Ukraine, three types of documents are singled out: concept, strategy and program. Despite the fact that these strategic documents differ in their essence and purpose, in Ukraine both strategies and programs contain elements inherent in the concepts, in particular, the principles laid down in these documents [116].

Concept (from the Latin *conceptio* – a comprehending, a system) is considered as a system of thought, a system describing a particular object or phenomenon with regard to its structure, functioning, which contributes to its understanding, interpreting, studying the basic ideas [58].

Strategy (from the Ancient Greek *strategia* – "I lead the army") is a synthesis of consistent analytical measures, concepts, methods, arguments, and actions designed to find a solution to the problem which can significantly influence the situation and correct it [165].

According to K. Strelnikov, a strategy as a programming document should include an idea, indicate the ultimate goal, ways and methods to achieve it, means and resources that can be spent on its implementation [180]. The difference between a strategy and a concept is that along with the "theory" of development, it reflects the main instruments and methods for achieving the development goals.

In this study *concept* is considered as a system of views on the problem under consideration, which consists of several interrelated hypotheses and provisions that disclose them.

To develop the Concept of the formation of a risk-based AML/CTF system, a set of hypotheses is defined; the basic principles to be used for its construction are identified; a number of provisions of the concept for the formation of the system are processed using the algorithm proposed by K. Stryzhychenko [181].

The proposed sequence of developing the Concept of the formation of a risk-based AML/CTF system is presented in Figure 1.1.

1.2. The main concepts for the formation of a risk-based AML/CTF system

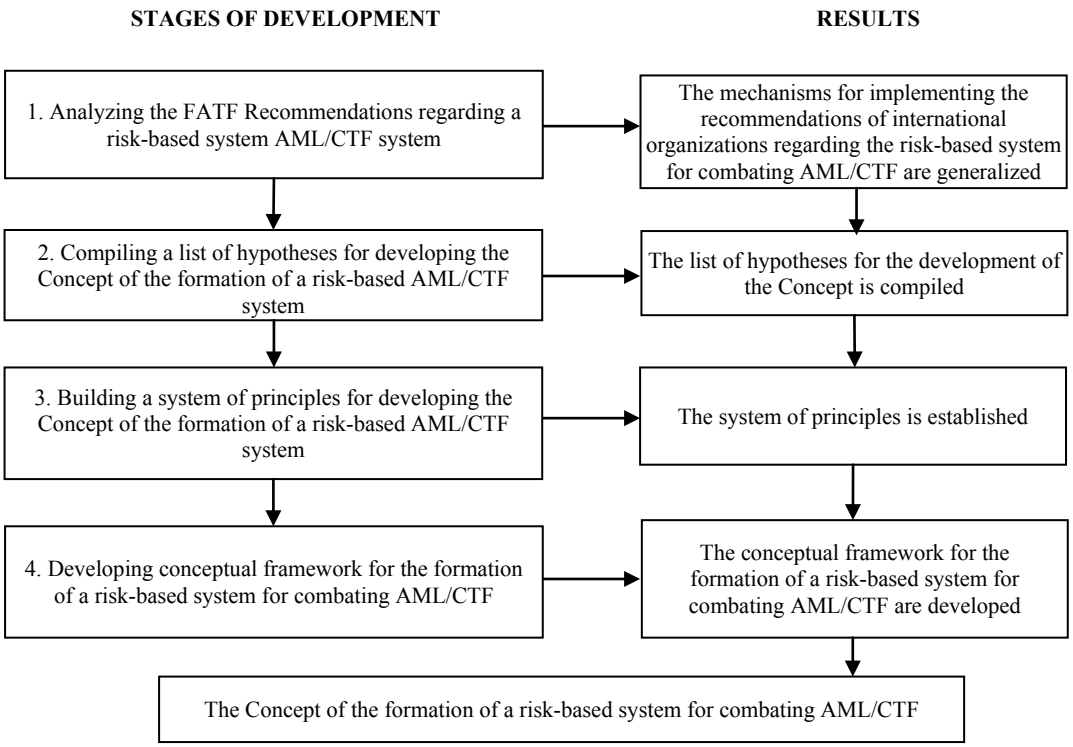


Figure 1.1. Sequence of the development of the Concept of the formation of a risk-based AML/CTF system
Source: formed by the authors [205]

Figure 1.1 demonstrates that the development of the Concept takes place in four stages, which consistently describe the process of its creation.

To ensure the functioning of the implementation mechanisms, it is proposed to create a conceptual framework for countering ML/TF, which implies coordinating the approved national strategy through the determination of possible ways for achieving the planned results.

The research carried out made it possible to formulate the following findings:

Finding 1. In the process of studying the existing regulations that have a strategic importance for the functioning of the national AML/CTF system in Ukraine, it is established that the country has no concept that would provide for a comprehensive solution to the issue of the formation of a national risk-based AML/CTF system.

1.2. The main concepts for the formation of a risk-based AML/CTF system

Based on the data in table 1.1, it can be concluded that the variety of target indicators and goals specified in the strategic documents causes certain problems.

First, the impossibility of defining such target indicators that would simultaneously meet the requirements of the most important strategic goals and acquire a specific form of manifestation (i.e., could be measured), which would allow for an objective assessment of achieving an individual target indicator.

Secondly, there is a discrepancy between the development goals and objectives, on the one hand, and the ways of their realization, on the other. Further incorrect assessment of the level of implementation of the strategies reinforces incorrect signals and only postpones the achievement of the goals, i.e., reduces the likelihood of achieving goals and target indicators.

Thirdly, there arises a problem of abstract nature (non- specificity) of goals and objectives (setting permanent common objectives that are not directly related to specific problem situations) [58].

In addition to the problems revealed, there identified the most common shortcomings of the strategic documents presented in Table 1.1, which can slow down creating the Concept of the formation of a risk-based AML/CTF system: lack of interconnection between various strategies for the development of the relevant elements comprising the national AML/CTF system in Ukraine; insufficient consideration of the existing world experience and the lack of pro-active measures to take commitments for its application in the financial monitoring system. Non-compliance of the goals and objectives of domestic strategic documents regarding the AML/CTF system with those theoretically justified and recommended by international organizations; continuous predominance of tactical objectives as opposed to measures aimed at solving strategic tasks and problems of the AML/CTF system. In the vast majority of cases the priority is given to the implementation of certain policy objectives. Specific measures aimed at ensuring the development of the AML/CTF system are the result of the need to quickly solve new problems and the setting of goals that can be achieved but in practice will not contribute to the development of the AML/CTF system.

The issue of integrated development of the AML/CTF system is not a priority. Neither state authorities nor associations of professional participants in financial markets, which are reporting entities, have proposed to discuss a ML

strategically important document that would focus on this issue. Yet the CMU adopted Ordinance No. 601-r of August 30, 2017 "On the Implementation of the Strategy for Development of the System for Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and the Financing of Proliferation of Weapons of Mass Destruction for the period till 2020" [35]. The issued document envisages measures aimed at preventing and/or mitigating negative consequences of risks related to the AML/CTF system, which include: non-transparent funding of political parties; inadequate identification and authorization of suspicious financial transactions carried out by national public figures; ineffective measures to identify the ultimate beneficial owners (controllers) and set control over them; improper identification and inadequate mitigating of factors contributing to an increase in the share of shadow economy and offshore operations in the financial system; low level of trust in the financial system; high cash flow; outflow of financial capital from the country, etc.

All the identified risks are macroeconomic ones, therefore, they require developing a conceptual framework for the formation of the AML/CTF system.

The methodological basis for the Concept of a risk-based AML/CTF system is the systems, institutional, and functional approach. The study [121] indicates that the application of the systems approach to a risk-based AML/CTF system ensures: integrity of the formation of an AML/CTF system; systematization of the transfer and receipt of information by subjects within the system, throughout the hierarchy of interrelations, as well as its external use by other reporting entities.

The institutional approach [121] is aimed at forming an effective institutional structure of the risk-based AML/CTF system by including legislative, regulatory, law enforcement bodies, which will reduce the information asymmetry in the system and allow for the formation of effective internal and external institutional mechanisms based on exchange and distribution of information flows among them.

The functional approach allows considering the risk-based AML/CTF system over time, i.e., in terms of its performance.

An element of the methodological basis for the development of the Concept is hypotheses that take into account characteristics of the reform of state regulation of financial markets and their integration into the European Economic Space (EES).

1.2. The main concepts for the formation of a risk-based AML/CTF system

A hypothesis is a suggestion of a possible solution to a problem which is to be verified empirically [116]. In the scientific literature there are a number of rules of hypothesizing (figure 1.2).

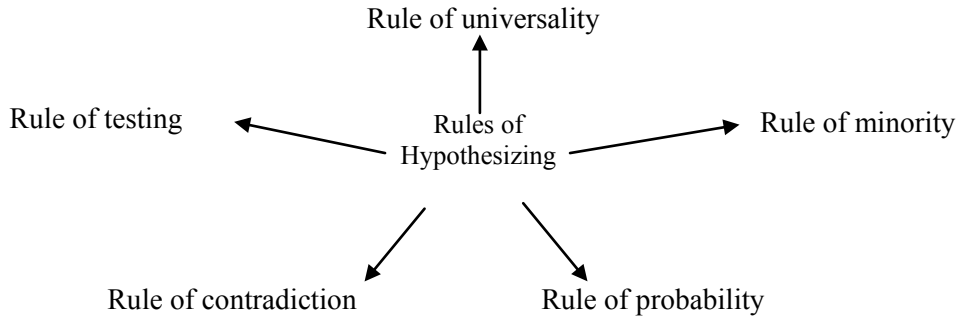


Figure 1.2. Rules of hypothesizing
Source: formed by the authors [205]

As can be seen from figure 1.2, five rules are singled out: *universality* – from a number of opposing hypotheses put forward to interpret a series of facts, the one that more universally explains the majority of them is preferable. Since each hypothesis requires proof, then, proving a uniform hypothesis provides the possibility of explaining more factors; *minority* – to explain series of related facts, fewer hypotheses should be put forward, and their connection should be as close as possible. This rule correlates with the rule of universality, i.e., considering the totality of hypotheses as a system, it is necessary to achieve a close linkage among the elements of this system but not to expand the system of hypotheses by increasing their number; *probability* – when suggesting a hypothesis, it is necessary to be aware of the nature of probability of conclusions of hypothesis testing. The nature of probability of conclusions is characterized by two aspects: first, most of the environmental conditions in which management decisions are made and hypotheses are tested are stochastic in nature; second, the external environment is a dynamic formation, therefore, hypotheses that were clearly formulated and proved under certain conditions can be irrelevant under new conditions of the functioning of economic systems; *contradiction* – it is impossible to be guided by contradictory hypotheses. If there are two hypotheses that contradict each other, then one of them is irrelevant or incorrectly proved; *testing* – a hypothesis is to be verified in the

course of a study. Any hypothesis that cannot be tested is at the stage of speculation [116].

Finding 2. Studying theoretical works on combating ML/TF has allowed to put forward and prove the following hypotheses:

The process of assessing the risks of money laundering and/or terrorist financing should give an idea whether the existing legislation is adequate for emerging threats and whether the current methods of control and enforcement of the law are equivalent. Where the law is inadequate, there is vulnerability. Where the law is equivalent, but control and verification are weak, law enforcement will prevail. Where law enforcement is weak, law has a small preventive effect [36].

The application of the risk-assessment methodology by using a combination of approaches (retrospective and prospective ones) with regard to the conditions of certainty and uncertainty. Retrospective risk assessments have the advantage of drawing on data from past events to help anticipate future problems.

An assessment of risks related to the AML/CTF system should be carried out based on assessing changes in quantitative and qualitative indicators over time. The determination of the level of risks should be carried out based on a wide range of indicators, including both quantitative and qualitative ones, which contributes to a more objective assessment. In case when little or no data is available, the process of risk assessment involves using whatever information is known to anticipate real or potential consequences. This hypothesis rests rather upon qualitative than quantitative indicators.

A national ML/TF risk assessment should be considered as “fundamental background information” to assist supervisors, law enforcement bodies, the financial intelligence unit, and financial institutions. This hypothesis requires that competent authorities periodically review their awareness of current ML/TF methods and reassess the effectiveness of the established safeguards.

The integration of the AML/CTF system into the global and European Economic Space requires strengthening protection against external influences on it. The hypothesis stems from the fact that Ukraine’s accession to the WTO, the signing of the Association Agreement between Ukraine and the EU, and the opening of relevant markets lead to possible emergence of systemic risks, and, therefore, increase in the level of financial risks. This problem requires a comprehensive solution at the relevant institutional levels.

1.2. The main concepts for the formation of a risk-based AML/CTF system

There is a need to change the model for regulation of the AML/CTF system in the context of integration of the country into the EES. The intensification of discussions on the transition to a different model of regulation of the AML/CTF system was due to the negative impact of the financial and economic crisis of 2008, which indicated the failure of government regulatory bodies to mitigate the manifestation of systemic crises in financial markets.

The intensification of the transition of the EU countries from one regulatory model to another, which started in 2009, along with an increase in protection of the rights of consumers of financial services, convincingly confirms the need to evaluate the existing regulatory models in EU countries with the possibility of implementing their practices in Ukraine.

A large number of jurisdictions, independently or in collaboration, have begun studies on global illicit cash flows (which often contain information about cash smuggling). For jurisdictions where such cases are observed (and for which such studies are sufficiently developed), the studies can be used to display incoming and outgoing flows (countries of origin/countries of destination) of funds from criminal activity.

Similar to requests for assistance, information on illicit cash flows can contribute to corresponding improvements in a jurisdiction in a particular year. The studies and information should be restricted, if not secret.

Elements of the risk-based AML/CTF system interact with each other. The hypothesis involves the establishment of links and evaluation of the interaction among institutional participants in the AML/CTF system in accordance with their place in the institutional structure which is confirmed by the function they perform in the system and their economic ties.

The level of state regulation affects the development of the risk-based AML/CTF system. Despite the fact that most scientists fully agree with this statement, there is an ambiguity of practical evidence (confirmation or refutation). Such complexity is associated with the lack of a reliable information base and consistency of indicators, which can serve as the basis for proving the hypothesis.

Testing the hypotheses (1.–8) for contradiction (the rule of contradiction, Fig. 1.2) made it possible to conclude that they do not negate each other and are not mutually exclusive. Based on the analysis of works on the methodology of

scientific cognition, the methods for proving the hypotheses are substantiated, as indicated in table 1.2.

Table 1.2. Methods of scientific cognition and the state of proving the hypotheses of the Concept of the formation of a risk-based AML/CTF system

Hypothesis	Methods of scientific cognition	State (proved/ disproved)
1	2	3
1. The process of assessing the risks of money laundering and/or terrorist financing should give an idea whether the existing legislation is adequate for emerging threats and whether the current methods of control and enforcement of the law are equivalent	Analysis and synthesis, induction and deduction, method of comparison, monographic one	Proved
2. The application of the risk assessment methodology through using a combination of approaches (retrospective and prospective ones) with regard to the conditions of certainty and uncertainty	Historical and logical method, analysis and synthesis, induction and deduction, method of comparison, method of abstraction	Proved
3. An assessment of risks related to the AML/CTF system should be carried out based on assessing changes in quantitative and qualitative indicators over time	Analysis and synthesis, induction and deduction, method of comparison	Proved
4. A national ML/TF risk assessment should be considered as “fundamental background information” to assist supervisors, law enforcement bodies, the financial intelligence unit, and financial institutions	Analysis and synthesis, induction and deduction, method of comparison, method of abstraction, historical and logical one	Proved
5. The integration of the AML/CTF system into the global and European Economic Space requires strengthening protection against external influences on it	Analysis and synthesis, induction and deduction, method of comparison	Proved

1.2. The main concepts for the formation of a risk-based AML/CTF system

1	2	3
6. Information on illicit cash flows can contribute to corresponding improvements in a jurisdiction in a particular year. The studies and information should be restricted, if not secret	Analysis and synthesis, induction and deduction, method of comparison, method of abstraction	Proved
7. Elements of the risk-based AML/CTF system interact with each other	Analysis and synthesis, induction and deduction, methods of comparison and abstraction	Proved
8. The level of state regulation affects the formation of the risk-based AML/CTF system	Analysis and synthesis, induction and deduction, method of comparison, method of abstraction, historical and logical one, analytic hierarchy process (AHP)	Proved

Source: compiled by the authors [205]

Different theories and branches of science are characterized by their own principles, which may be fundamental or specific to certain sciences. The Concept of the formation of a risk-based AML/CTF system rests upon the following key principles, defined based on the analysis of work [116]:

- functionality – concerning each element of the risk-based AML/CTF system, a special system and technological process for countering ML/TF is carried out;
- transparency – the maximum openness of the AML/CTF system to external users through providing access of consumers to basic information as well as analytical and statistical information about its operation;
- uniformity – is characterized by the presence of a unified legal/ regulatory framework, a unified methodology for the formation of financial and statistical reporting of all professional participants in the AML/CTF system;

- sustainability – the risk-based AML/CTF system is capable of counteracting external shocks and internal threats and eliminating the latter with the active participation of regulatory and supervisory authorities;
- efficiency of activities of participants in the system – each market participant maintains such behavior that ensures them maximizing profits while minimizing their risks;
- trust – participants in the system are able to predict the behavior of other participants, forming more or less stable expectations regarding the situation;
- social responsibility – a responsible attitude of participants in the system to their services, employees, consumers, owners; active social position, which is realized through coexistence, interaction, and maintaining an ongoing dialogue with representatives of business and society, government, stakeholders to effectively solve acute economic, social, humanitarian, and environmental problems.

As seen from table 1.2, all the hypotheses are proved.

The proof of the hypotheses put forward and the definition of the basic principles made it possible to form the Concept with regard to specific features of the hypotheses. The Concept for the development of a risk-based AML/CTF system is based on the following provisions:

- **Provision 1.** The supreme supervisory authority of the AML/CTF system (the State Financial Monitoring Service) should have a regulatory character [7] in order to ensure maximum institutional and personal independence. Thus, the State Financial Monitoring Service is the central executive body, whose activities are directed and coordinated by the Cabinet of Ministers of Ukraine through the Minister of Finance and implementing the national AML/CTF policy. The activity of the State Financial Monitoring Service is guided by the Constitution and laws of Ukraine, decrees of the President of Ukraine, and resolutions of the Verkhovna Rada of Ukraine adopted in accordance with the Constitution of Ukraine and laws of Ukraine, acts of the Cabinet of Ministers of Ukraine, and other legislative acts. Institutional and personal independence in exercising control can be implemented with certain restrictions.

1.2. The main concepts for the formation of a risk-based AML/CTF system

- **Provision 2.** Excessive consolidation and centralization of competencies aimed at combating ML/TF will violate the institutional isomorphism, therefore, the main tasks of the State Financial Monitoring Service are [7]: ensuring the functioning and development of a unified information system in the field of preventing and counteracting the legalization (laundering) of criminal proceeds, the financing of terrorism and proliferation of weapons of mass destruction; establishing cooperation, interaction, and information exchange with government agencies, the National Bank, competent authorities of foreign states, and international organizations in the field of preventing and countering the legalization (laundering) of criminal proceeds, the financing of terrorism and proliferation of weapons of mass destruction. The provision on the State Financial Monitoring Service is based on the following considerations [7]: centralization of powers to ensure combating ML/TF is possible only when the regulatory model is changed to a risk-based one, which is currently a promising goal, but its achievement requires significant changes in the executive power system, in particular, concerning economic regulation and law enforcement; concentration of powers related to combating ML/TF in terms of redistribution of investigation functions will mean a transition from the administrative to the police or prosecution and judicial model of organization of the financial monitoring system; excessive concentration of powers of the State Financial Monitoring Service will cause an institutional imbalance, strengthen the effect of failure to act or avoidance of responsibility for actions by financial regulators; transformation of the organizational AML/CTF system into a risk-based one in combination with the organizational transformation of the entire AML/CTF system should take place.

- **Provision 3.** To implement control, in particular, over AML/CFT, it is necessary to previously specify norms and signs of their violation, as well as provide access to relevant information. It is necessary to fundamentally decide on the direction of reforming the AML/CTF system – further division by sector or subject, or by function of the state financial policy. Based on this, it is possible to define the subject-object domain of the implementation of control functions by each AML/CTF system.

- **Provision 4.** The institutional capacity and effectiveness of the AML/CTF system objectively requires improving personnel, financial, informational, and methodological support.
- **Provision 5.** The risk-based AML/CTF system must meet the requirements of the EES. The provision is formed with regard to the European vector of development chosen by Ukraine, which involves the brining of its legislation in compliance with EU standards, including those that concern combating ML/TF.
- **Provision 6.** A prerequisite for a successful functioning of the AML/CTF system is enhancing institutional regulation and self-regulation in the domestic practice, and limiting state regulation. This is facilitated by the implementation of the Strategy for Development of the System for Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and the Financing of Proliferation of Weapons of Mass Destruction for the period till 2020 (hereinafter referred to as the Strategy) [141].
- **Provision 7.** The AML/CTF system is influenced by systemic risks due to the globalization of financial relations, which requires improving state regulation of the system by changing the regulatory model.

The final result of the development of the risk-based AML/CTF system for the medium term will be its qualitative transformation. The implementation of the Concept will contribute to the development of Ukraine as a democratic, legal state as well as protection of its national interests, improvement of socio-economic relations and formation of the foundations of a civil society.

The complex of the proposed eight hypotheses and seven provisions of the Concept (fig. 1.3), based on the established interrelations between them, will contribute to the formation of the national AML/CTF system in Ukraine in the context of changing its institutional structure. The conceptual framework for the current development of the risk-based AML/CTF system with consideration for these provisions is reflected in figure 1.4.

1.2. The main concepts for the formation of a risk-based AML/CTF system

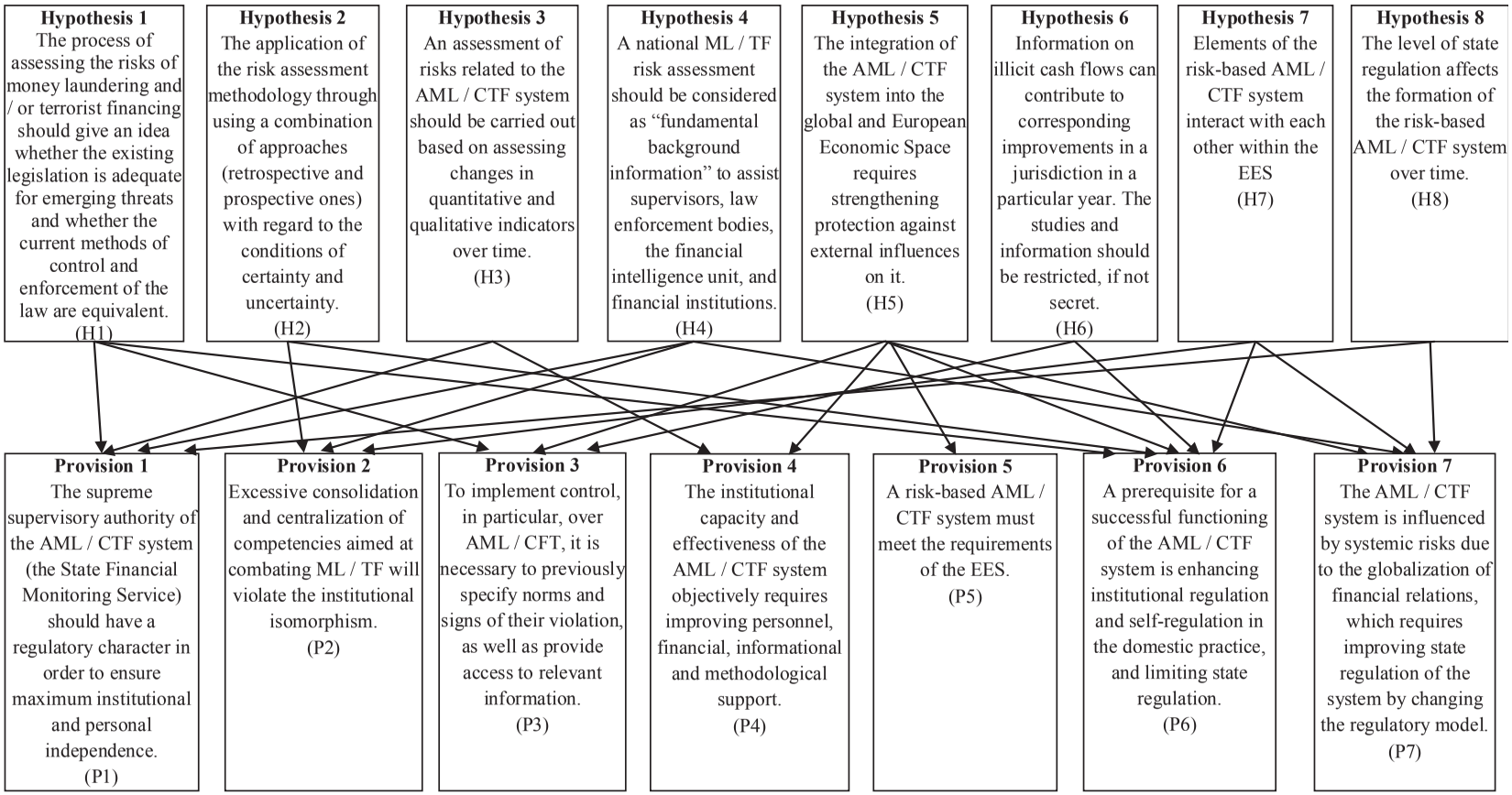


Figure 1.3. Structural and logical scheme of interconnection of the hypotheses and provisions presenting the basis of the Concept for the formation of a risk-based AML/CTF system
Source: formed by the authors [205]

1.2. The main concepts for the formation of a risk-based AML/CTF system

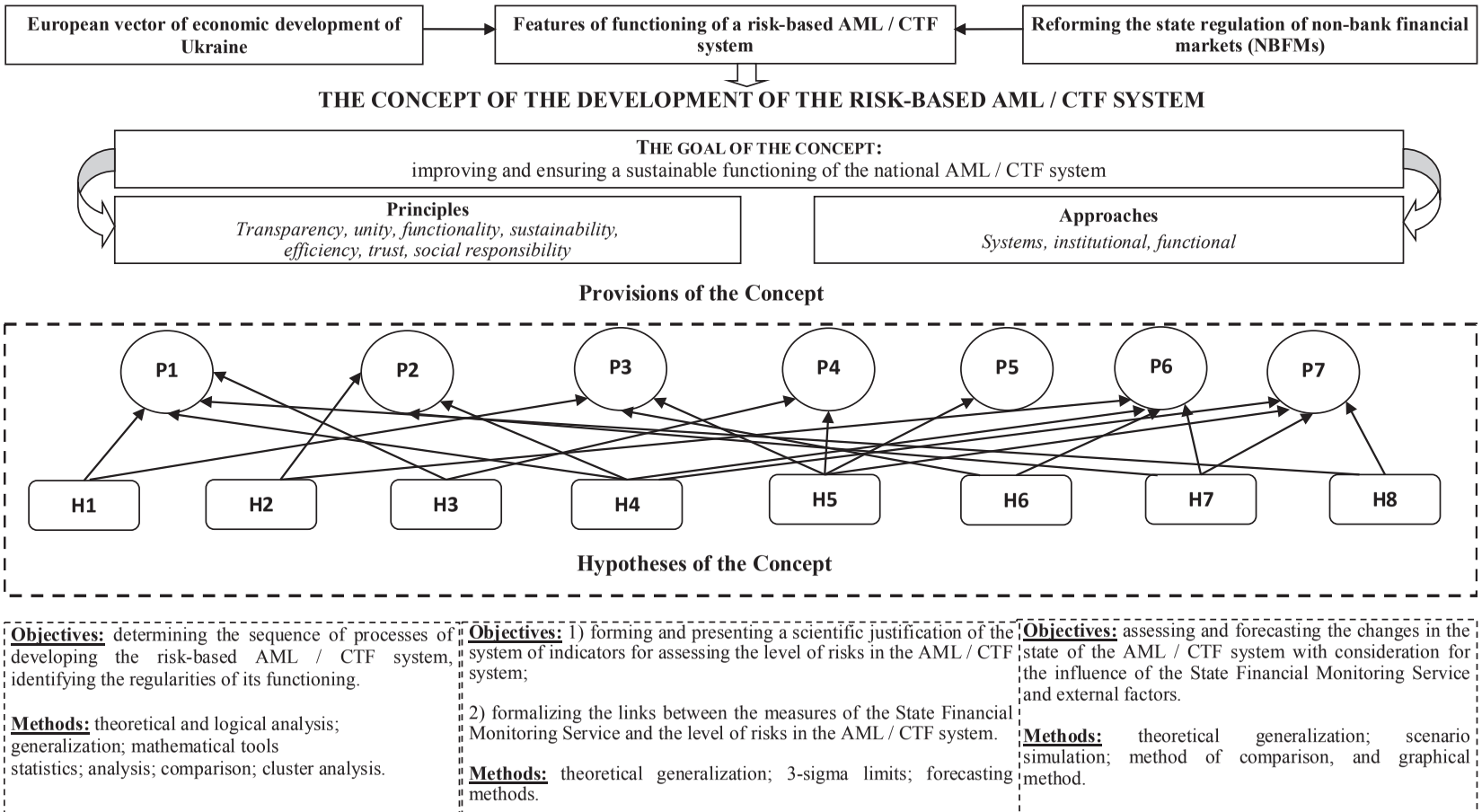


Figure 1.4. Conceptual framework of the current development of the risk-based AML/CTF system in Ukraine
Source: formed by the authors [205]

1.2. The main concepts for the formation of a risk-based AML/CTF system

The priority areas for the functioning and development of the national risk-based AML/CTF system in Ukraine, except reducing relevant risks, will be as follows [36; 141]: securing the status of Ukraine as a reliable partner of the international community in the field of preventing and combating ML/TF; averting the emergence of prerequisites for ML/TF; improving legislation in the field of AML/CTF; enhancing activities of competent authorities in the field of preventing and combating ML/TF; improving the mechanism for regulating and supervising activities of reporting entities; ensuring the development of specialists; organizing effective international cooperation; providing the public with information on measures taken to prevent and combat ML/TF; reducing the information asymmetry for participants in the national AML/CTF system in Ukraine.

It will provide a possibility for ensuring: systematic implementation of the state policy in the field of combating ML/TF; compliance of the national AML/CTF system with international legal standards; effective cooperation and constant information exchange with the executive authorities, other state bodies – reporting entities, as well as competent authorities of foreign states and international organizations in this area; compliance with and unfailing implementation of the complex of legal requirements for activities of the specified reporting entities; timely submission to authorized law enforcement bodies as well as intelligence units of Ukraine of relevant summary materials indicating suspicions of ML/TF; improvement of quality of retraining and advanced training of specialists of state authorities engaged in financial monitoring and employees of reporting entities; stimulation of investment in the national economy from economically developed countries; ability of the financial system of Ukraine to counter the threats of money laundering and possible cases of using it to finance terrorism; provision of assistance in pumping up the state budget.

Thus, the developed Concept for the formation of a risk-based AML/CTF system rests upon a new scientific approach to searching ways to improve the functioning and development of the AML/CTF system, the implementation of the proposed conceptual framework of which will allow achieving the expected results. This will strengthen the AML/CTF system, make it more resilient to systemic crises, and create a stable ground for its long-term development.

1.3. Implementation of a risk-based approach in the field of AML/CTF at the public level in Ukraine

One of the measures to improve and ensure the stable functioning of the national system of AML/CTF is to improve legislation in the area of prevention and counteraction to the legalization (laundering) of the proceeds of crime, the financing of terrorism and the financing of the proliferation of weapons of mass destruction by:

- implementation of the EU Directive 2015/849 of the European Parliament and Council for the prevention of money laundering and combating the terrorist financing (AMLD4) [60] in the national legislation;
- further implementation of the FATF Recommendations, the Council of Europe Convention on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime and on the Financing of Terrorism, as well as other international instruments.

These regulatory acts contain guidance on the need to implement a risk-based approach, as the old approaches to identifying risks in the AML/TF system in accordance with the opinions both financial sector representatives and AML bodies, became ineffective because of significant intellectualization of crime.

According to the conducted studies [31; 123], on the basis of information on Suspicious Transaction Reports (STR), that was sent to the SFMS of Ukraine on the basis of internal financial monitoring (that means with the use of RBA) which share was 12% in the total number of STR in 2015, it was formed 52% of the Case Referrals /Additional Case Referrals (CR/ACR) that were sent to law enforcement agencies. In 2018, the share of STR based on internal financial monitoring decreased to 2,5% [215]. With the saving 2015 proportions, it can be assumed that 2,5% of suspicious transaction reports, that were received on the basis of the RBA will also form 52% of the CR/ACR, and from 97,5% of the STRs on the basis of obligatory financial monitoring only 48% of the CR/ACR will be formed. Taking into account that the total number of STRs exceeded 10 million in 2018, it can be concluded that five million of the STRs were received in vain, because they did not contain real suspicious risks. Consequently, in the absence of effective measures to implement the RBA, which will significantly reduce the number of STRs coming to the SFMS, taking into account the four-year trend of growth in the total number of STRs

(annually increasing by about 30%) and the trend of reducing the share of STRs on the basis of internal financial monitoring using the RBA (for 4 years there was a decrease of 5 times), it is possible to predict a further decrease of the efficiency of the system of AML/CTF because of the diversion of resources for maintenance of unnecessary processes and excessive overloading of non-informatics transaction reports.

This paragraph aims to systematize the provisions of legal regulation of the risk-based approach implementation on the sphere of AML/CTF at the public level.

An approach based on risk assessment is not an option for competent/ supervisory authorities and obliged entities. It provides decision-making based on factual data to identify the risks associated with money laundering and terrorist financing. It was established by Directive (EU) 2015/849 that a risk-based approach should be implemented on four levels [1]:

- supranational (EU level) – at this level it is provided that the European Commission must prepare a report on identifying the spheres of the domestic market which are most at risk, and the risks associated with each relevant sector every two years;
- national (the level of member States of the EU) – it is established the need for national risk assessment (NRA);
- public (the level of the competent/supervisory authorities) – base the frequency and intensity of on-site and off-site supervision on the risk profile of obliged entities;
- private (the level of the obliged entities) – identification and assessment of the risks of money laundering and financing of terrorism, which are peculiar to their customers, countries or geographic regions, products, services, transactions or delivery channels.

In order to achieve the purpose, authors consider the implementation of a risk-based approach on the public level (the level of competent/supervisory authorities).

According to Art. 6 of the Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of the Proceeds from Crime, Terrorist Financing and Financing the Proliferation of Weapons of Mass Destruction"

(hereinafter – Law No. 361), exists a list of state financial monitoring entities which are included to the AML/CTF systems of Ukraine.

They are: the National Bank of Ukraine, the central executive body for the formation and implementation of the state policy in the field of prevention and counteraction to the legalization (laundering) of proceeds from crime or terrorist financing (the Ministry of Finance), the Ministry of Justice of Ukraine, the National Commission on Securities and Stock Market, the Ministry of Digital Transformation of Ukraine, specially authorized body (SFMS).

According to Art. 18 of the Law No. 361, which outlines the competencies of the Competent/Supervisory authorities, provides for their duty to oversee the prevention and counteraction to the legalization (laundering) of the proceeds of crime, the financing of terrorism and the financing of the proliferation of weapons of mass destruction for the activities of the relevant reporting entities, in particular by carrying out scheduled and unscheduled inspections, including off-premises, in accordance with the procedure established by the relevant entity of state financial monitoring, which in accordance with Law No. 361 serves as the control and supervision body over the reporting entities.

Competent/supervisory authorities implement a risk-based approach when planning and conducting inspections on the prevention and counteraction to the legalization (laundering) of the proceeds from crime, the financing of terrorism and the financing of the proliferation of weapons of mass destruction.

The list of reporting entities (RE), which were included in the plan of inspections, is determined by the competent/supervisory authorities on the risk-based approach, including the results of their risk assessment of using the obliged entities for the purpose of legalization (laundering) of proceeds from crime, financing terrorism and the financing of the proliferation of weapons of mass destruction.

The procedure (criteria) for assessing the risks of using the obliged entities for the purpose of legalization (laundering) of proceeds from crime, financing of terrorism and financing of the proliferation of weapons of mass destruction takes into account the peculiarities of the RE's activity and therefore have some differences. In the table 1.3 approaches of Competent/Supervisory authorities with similar criteria are located nearby.

1.3. Implementation of a risk-based approach in the field of AML/CTF at the public level in Ukraine

Table 1.3. Regulation of the risk-based approach on the public level

Criteria	RE with high-risk	RE with low-risk
1	2	3
National Securities and Stock Market Commission [102]		
Kind of professional activity on stock market	securities dealers; securities dealers + depositary institutions	1) depositary institutions; 2) stock exchanges
		3) securities dealers, securities dealers + depositary institutions (in terms of securities trading activities)
Term of realization of the RE professional activity on the stock market	< 2 years	≥5 years
Presence of violations of legislation in the field of AML/CTF	during the last 3 years there have been cases of violations of the law, including the facts of bringing certified specialists to administrative responsibility in the field	absence of violations of legislation during the last 3 years, including facts of bringing certified specialists to administrative respon-sibility in the field of AML/CTF
	of AML/CTF, detected during the preliminary inspection and for which sanctions were applied	of AML/CTF
Execution of securities transactions with the participation of non-residents registered in offshore areas	outside of the organizer of trade in the stock market for the sum of ≥150 thousand UAH/equivalent in foreign currency 150 thousand UAH	
Contracts with non-residents who have registered place (location) in the countries-aggressors	+	
Execution of securities transactions outside of the trade organizer in the stock market	for the sum of ≥1 billion UAH/ equivalent in foreign currency, 1 billion UAH	
Frequency of inspections	≤1 times per 1 year	≤1 times every 5 years

1.3. Implementation of a risk-based approach in the field of AML/CTF at the public level in Ukraine

Ministry of Finance of Ukraine [99]		
Term of realization of the RE activity	< 3 years	>5 years
Presence of violations of legislation in the field of AML/CTF	during the last year there were ≥ 2 violations of legislation in the area of AML/CTF	absence of violations of legislation in the field of AML/CTF during the last 3 years
Having separate units	>3 separate units	–
Frequency of inspections	≤1 times per 1 year	≤1 times every 3 years
SFMS (activity of rendering intermediary services during the realization of transactions on purchase and sale of real estate)[100]		
Term of realization of the RE activity	< 3 years	>5 years
Presence of violations of legislation in the field of AML/CTF	during the last year there were ≥ 2 violations of legislation in the area of AML/CTF	absence of violations of legislation in the field of AML/CTF during the last 3 years
Having separate units	>3 separate units	–
Frequency of inspections	≥1 times per 1 year	≥1 times every 3 years
Ministry of Justice [101]		
Term of realization of the RE activity	< 2 years	>5 years
Presence of violations of legislation in the field of AML/CTF	during the last year there were violations of legislation in the area of AML/CTF	absence of violations of legislation in the field of AML/CTF during the last 3 years
Presence of information on the involvement of reporting entities in financial transactions, defined in part 1 of Art. 8 of Law No. 1702	> 15 operations for 6 months	≤ 5 operations for 6 months
Frequency of inspections	≤1 times per 1 year	≤1 times every 3 years

Source: compiled by the authors

Table 1.3 is composed in the way that the full line indicates the sufficiency of any of the following criteria for assigning a reporting entity to the group with high-level risk. A dotted line means that a reporting entity can be assigned to the group with low-level risk if it performs totally all the above criteria.

1.3. Implementation of a risk-based approach in the field of AML/CTF at the public level in Ukraine

Reporting entities not belonging to a high-risk group or a low risk group are medium-risk reporting entities and should be inspected with a frequency not exceeding 1 time every 2 years (except realtors for which SFMS has set other requirements).

And only the National Bank of Ukraine as the most progressive and experienced regulator has already changed approaches to the evaluation risk of its obeyed RE to be involved in legalization schemes in accordance with the new Law № 361 and introduced a new, risk-based approach to establishing new criteria, unifying the requirements for banks and non-bank financial institutions [30].

From now, financial institutions must create an appropriate ML/FT risk management system, which provides using of a risk-oriented approach on an ongoing basis and ensures identification, assessment of all existing and potential ML/FT risks inherent in the institution (risk profile of the institution) and its clients, as well as provide for the timely development of measures to manage the risks of ML/FT and their minimization. In accordance with the requirements of AMLD4, set out in the NBU Regulation, a financial institution when using a risk-oriented approach should avoid unreasonable use of derisk, i.e. refusal to establish or maintain business relationships with customers to avoid risks, rather than managing them. Such unjustified refusals run counter to the risk-based approach and do not ensure financial inclusion.

The risk-based approach should be based on risk assessment and include [144]:

- assessment of the risk profile of the institution (identification and assessment of ML/FT risks specific to the institution's activities; analysis of existing ML/FT risk management measures to reduce (minimize) them; determination of the risk-appetite of the institution in the field of AML/CTF (acceptable for the institution level of risk ML/FT);
- assessment of the client's risk-profile (identification and assessment of the risk of business relations (financial transaction without establishing a business relationship) with the client; analysis of existing measures to manage ML/FT risks

to reduce (minimize) to an acceptable level of ML/FT risk (within the risk-appetite of the institution in the field of AML/CTF).

This two-tier approach to the implementation of risk-based regulation is an innovation in Ukrainian legislation. Previously, RE realised risk-oriented approach to risk management of their clients, and the state regulators, taking into account the risk-based approach, controlled the activities of subordinated RE on the basis of formal risk criteria, that are described on the table 1.3.

Now the financial institution must manage by itself both customer risks and its own risks, creating its own risk-profile, which will be the information base for the state regulator.

The new approach allowed state regulator to move away from the ineffective three criteria for assessing the risk of RE and to create a detailed list of risk-oriented features that will be assessed by the financial institution in forming its risk-profile. Taking into account that banks and non-bank financial institutions now have one regulator – the NBU, this list is unified and differs only in two positions due to the specifics of their activities and the lack of strict regulatory requirements for the structure of non-bank financial institutions capital [9].

Thus, if we compare the past (which are still valid for financial institutions – professional stock market participants and other RE) and current (which are introduced in 2020 for banking and non-banking financial institutions) criteria for the risk of RE to be involved in the ML/FT, it is clear that the criteria for the existence of separate units and the facts of violations of legislation in the field of AML/CTF– are almost identical, while the criterion of the term of RE professional activity in the new risk-based features are absent. Excluding the term from the list of risk criteria is a completely appropriate step, because it is subjective and useless for determining whether it plays a positive or negative role (because it depends on the presence or absence of RE goodwill) [30].

Thus, as it is evident from the current table 1.3, in Ukraine, the risk-based approach to financial monitoring at the public level by most regulators is carried out according to quite formal criteria: the term of activity, the number of separate units and the number of violations. In addition, this approach implies the existence

of goodwill and conscientious behavior of the reporting entities, it seeks to identify involvement of reporting entities to the ML/TF behind their back or willing. If we assume the possibility of conscious participation of the reporting entities in the schemes of AML/CTF, then such an approach at all does not make sense, since the criteria, which was formally established and published, can easily be bypassed.

Therefore, in order to ensure the introduction of a qualitative, real risk-based approach to the detection and assessment of risks at the public level, it is necessary to switch from formal risk assessment to its objective measurement based on the processing and analysis of a big number of performance indicators of the reporting entities in order to identify the ML/TF network schemes.

So, the current regulation of a risk-based approach on the level of Competent/Supervisory authorities in Ukraine is not fully effective, since it is based on the formal criteria for the identification and assessment of risks. In order to ensure the implementation of an effective risk-based approach, objective measurement of the risks of reporting entities, that could be involved to the ML/FT, should be implemented on the basis of processing and analysis of a big number of their performance indicators for identifying the ML/TF network schemes. It is advisable to unify the risk criteria of professional securities market participants to be involved in ML/FT schemes with risk-based features to assess risk-profile banks and non-bank financial institutions, by implementing the mechanisms developed by the NBU in the regulations of the NSSMC.

PART 2.
TRANSFORMATIONAL CHANGES IN FINANCIAL MONITORING IN THE CONTEXT OF DIGITALIZED FINANCIAL RELATIONS

2.1. Features of defining and structuring the financial service market in the economy digitalization environment

The economy digitalization processes have significantly influenced all aspects of the financial service market functioning; its objects and entities, as well as its structure and essential characteristics, have undergone changes. The introduction and development of FinTech innovations notably transformed the financial service parameters, which in turn resulted in qualitatively new forms of interaction between owners and users of financial services, as well as financial intermediaries. Digital technologies have in a certain way influenced the change in the state's role in the financial service market, the approaches and tools in the work performed by financial institutions, the customers' expectations and habits, and conditioned the developing financial service democratization and growing financial inclusion. All this actualizes the need to clarify the concept content and determine the structure of the financial service market in the economy digitalization settings.

The essence and structure of the financial service market was studied by N. M. Vnukova, D. I. Dema, I. V. Abramova, I. A. Shubenko, I. V. Nedilska, V. M. Trokoz, Yu. M. Kovalenko, O. R. Shevchuk, L. M. Horbach, O. B. Kaun, I. O. Shkolnyk, Ye. P. Bondarenko, V. P. Khodakivska, B. M. Vyshyvana, I. V. Soloshkina, V. V. Zymovets, O. A. Osadcha, R. Y. Bacho, M. S. Rakhman, V. V. Shevtsova and others. The relationship between the components of the financial service market and the financial market was investigated by M. V. Dubyna, Yu. M. Kovalenko, R. Y. Bacho and I. I. Blahun. Among the scientist who dedicated their works to studying the impact exerted on the financial service market by economy digitalization there were H. V. Belinska, M. I. Dyba, L. V. Zherdetska, V. V. Kovalenko, A. A. Mazaraki, V. I. Mishchenko, H. M. Pochenchuk, A. Yu. Semenoh, M. V. Tarasyuk, A. Ya. Kuznyetsova, H. H. Chmeruk, P. M. Rubanov, N. M. Pantyelyeyeva, L. O. Haryaha and others. But the systemic impact of the economy digitalization on the financial service market remains not fully explored both in theoretical and methodological aspects.

Various aspects are considered by the authors while peering into the essence of the financial service market concept, in particular, it is described through the prism of correlation with the financial market, through the legal aspects of relations among financial service market participants, as economic relations of the benefit

exchange, as a sphere of the financial service market participants' activity (table 2.1).

Table 2.1. Generalization of approaches aimed to define the financial service market concept

No.	Concept definition by scientists	Author, source	Key definition aspect
1	2	3	4
1	Financial service markets represent **a sphere of activity conducted by financial service market participants** with a view to providing and consuming certain financial services. Financial service markets include professional services in the markets of banking services, insurance services, investment services, securities trading and other market types that ensure **the financial asset turnover**	The Law of Ukraine "On Financial Services and State Regulation of Financial Service Markets" [214]	The participants' activity sphere, a mechanism for financial resource allocation
2	By its economic nature, the financial service market is **the economic relations that arise between financial intermediaries and other economic agents** regarding **the financial resource allocation**, sale and purchase of temporarily available funds and securities	D. I. Dema, I. V. Abramova, I. A. Shubenko, I. V. Nedilska, V. M. Trokoz [59]	Economic relations, a mechanism for financial resource allocation
3	**An aggregate wide range of relations to meet the existing need for various financial services** (insurance, banking, investment, etc.) **and to form a prospective one in order** to generate income for institutional units representing the financial economy sector, to meet consumer demand, where the subject of sale and purchase is a specific product, namely a financial service. If such a service is understood as a benefit, then the financial service market is meant to be **a system of regular, mainly monetary, mutually beneficial, voluntary and competitive benefit exchange**	Yu. M. Kovalenko [95]	A system of regular benefit exchange, a part of the financial system

1	2	3	4
4	**Aggregate mandatory legal relations with respect to regulation and supervision over the activities of financial institutions** by public authorities and local governments, in order to ensure appropriate conditions for implementing financial transactions, making a profit, protecting the depositors' property interests and creating a favorable investment climate	O. R. Shevchuk [173]	Aggregate legal relations
5	**Economic relations** arising between financial intermediaries and other economic agents regarding **the financial resource allocation, sale and purchase of temporarily available monetary funds and securities**	L. M. Horbach, O. B. Kaun [82]	Economic relations, a mechanism for financial resource allocation
6	**The financial market includes the money market, the credit resource market, the securities market and the financial service market**	I. O. Shkolnyk [174]	A financial market segment
7	**Financial service markets cover legal relationships established among financial service market participants,** with the formation, development and termination of such relationships determined directly by the financial service	I. V. Soloshkina [175]	Legal relations among financial service market participants

Source: compiled by the author

In order to more deeply analyze the financial service market concept, it is advisable to consider it in conjunction with the financial market concept. In their works [48; 64; 174], scientists distinguish the following correlations between these concepts:

- they are completely identical;
- they are completely independent and not identical;
- the financial market concept is broader than the financial service market concept; it includes the latter as a component (segment);
- the financial service market concept is broader and includes the financial market concept.

We believe that all these statements are quite correct, depending on which theoretical aspect is considered as the main one while defining the concepts in question.

2.1. Features of defining and structuring the financial service market in the economy digitalization environment

According to the main theoretical aspects of the "financial service market" concept, it is advisable to highlight the following (see table 2.2):

- the institutional aspect – financial service markets are a sphere of activity conducted by financial service market participants [214];
- the economic aspect – the financial service market is the economic relations that arise between financial intermediaries and other economic agents [82];
- the financial aspect (1) with the financial service market seen as a part of the financial system that is an aggregate wide range of relations formed in order to generate income for institutional units representing the financial economy sector, to meet consumer demand, where the subject of sale and purchase is a specific product, namely a financial service [95];
- the financial aspect (2) with the financial service market seen as a mechanism for financial resource allocation [214; 59; 82].

Table 2.2. Theoretical approaches to defining the essence and correlation of the "financial market" and "financial service market" concepts (compiled by the authors in reliance upon generalization)

Correlation between the concepts / Theoretical aspects of the concepts	The financial service market and the financial market are identical concepts	The financial service market and the financial market differ from each other and are equivalent markets within the financial system of the state	The financial market contains the financial service market in its structure	The financial service market is a more meaningful concept by its nature and includes the financial market in its structure
Aggregate markets and institutions	+	+	+	+
A system of economic relations	+	+	+	+
A mechanism for financial resource allocation	+	+	+	–
A part of the financial system	+	+	–	–

Source: developed by the author based on [42; 43; 48; 82; 64; 214; 95; 129; 156; 59; 161; 175; 90; 173; 174])

It should be noted that the specified theoretical aspects of the "financial service market" concept coincide with the key approaches to defining the "financial market" concept selected by I. I. Blahun [42]:

- the financial market as a mechanism for financial resource allocation;
- as a system of economic relations;
- as a system of institutions and markets.

Let us consider the results obtained during a comparative analysis referring to the correlation between the concepts of "financial service market" and "financial market" with reference to the key theoretical aspects/approaches (see table 2.2):

- these concepts are identical. For instance, V. P. Khodakivska [90] regards these two concepts as identical in the institutional context, since they communicate the general name for those markets which are distinguished by the existing supply and demand for various financial assets. M. V. Dubyna [64] also shares this view and emphasizes the complexly structured institutional nature of both markets. M. V. Dubyna [64], B. M. Vyshyvana [208] and V. V. Zymovets [217] describe these two markets as mechanisms that ensure the interaction with financial assets, as well as the formation of supply and demand for financial resources. M. V. Dubyna also believes that both markets represent aggregate economic relations in the economic area and belong to the financial system designed to serve the real economy sector;
- the concept is completely independent and not identical. In Ye. P. Bondarenko's [48] understanding the institutions of the financial market and the financial service market perform different functions and take on different roles; the markets are independent and exist independently of each other. When it comes to defining the financial market and the financial service market considering the mechanism for financial resource allocation, Ye. P. Bondarenko [48] emphasizes the presence of various objects: if the object of financial relations in the financial market is financial assets, then in the financial service market the same applies to financial services. N. S. Ryazanova [161] points out the simultaneous existence of both markets – the financial market and the financial service market – and lays stress on the fact that they are yet different; the author remarks that both markets represent a system of economic relations, but technically, the trade articles are different, they may refer to some financial service, or money capital. I. V. Soloshkina [175] draws attention to the self-reliance and independence of both markets as the financial system components, arguing that the financial service markets, like the financial market, form a separate segment of the financial system.

2.1. Features of defining and structuring the financial service market in the economy digitalization environment

According to Ye. P. Bondarenko [48], the financial service market and the financial market are equivalent with relation to a part of the financial system; this is due to the fact that the availability of financial services is attributable to the financial resources circulating while the economic system is functioning; they efficiently complement the mobilization and use of financial resources in other subsystems constituting a part of the financial system in force within the state;

- the financial market concept is broader than the financial service market concept; it includes the latter as a component (segment); When it comes down to analyzing the financial market, I. O. Blank [43] states that its sale and purchase object involves various financial instruments and financial services, which means the inclusion of the financial service market into the financial market as its component. In the terms of defining markets as mechanisms for financial resource allocation, Ye. P. Bondarenko [48] also recognizes the subordination of the financial service market to the financial market and indicates that, although financial services are very different in their structure, they all share the features of creating and using financial resource funds aimed at performing economic activities. Notably, while defining markets as a system of economic relations, Ye. P. Bondarenko [48] also considers the "financial market" concept broader than the "financial service market" concept, as it covers not only financial relations (the inclusion of the financial service market as a component is emphasized), but also various forms of ownership relations and reallocation (transformation);
- the financial service market concept is broader and includes the financial market concept. For instance, taking into consideration the institutional aspect, O. A. Osadcha [129] declares the financial service market more generalized due to the fact that a large part of the financial market belongs to it. In keeping with the approach to defining markets as a system of economic relations, M. V. Dubyna [64] draws attention to the financial service market as a broader concept than the financial market, since the provision of financial services among individual entities, in particular, ensures the financial resource movement and satisfying the needs of both parties: the need for monetary funds and the desire to derive additional income from their allocation, that is, the financial market functions as part of the financial service market.

Proceeding from generalizing the theoretical approaches to defining the

essence and correlation of the "financial market" and "financial service market" concepts, it is necessary to recognize their close interaction, variety of aspects and ambiguity of their interpretation by most scientists. At the same time, it should be noted that the equivalence of the financial market and the financial service market as the financial system components, and the priority role of the financial market as a mechanism for financial resource allocation form the prevailing point of view. Taking into account the peculiarities attributable to functioning of the studied markets under the economy digitalization conditions, the authors bring a focus on the need to reflect the changes that are manifested in the use of the appropriate infrastructure and innovative financial technologies [42].

From this perspective, the generalized interpretations of the financial service market afford grounds for the following definition: **the financial service market** is a component of the financial system, which involves the use of appropriate infrastructure and innovative financial technologies and is designed to serve the real economy sector, represents a system of markets, institutions and economic relations among individual entities that are intended for the purchase and sale of financial services; this results in the financial resource movement and satisfying the participants' needs for the necessary monetary funds and deriving additional income from their allocation.

The priority of this wording lies in considering all four theoretical aspects applied to define the "financial service market" concept, as well as focusing on the specifics of the financial service market functioning under the economy digitalization conditions.

The economy digitalization significantly affects all aspects of the financial service market functioning, changes its institutional structure, financial technologies and instruments, influences the specifics of relationships among market entities and puts forward new tasks to be solved as part of the country's financial system. In the current digitalization of the financial economy, the greatest importance is attached to FinTech innovations, which, while competing with traditional financial services, provide customers with a prospect to obtain high quality at the best price, ensure a high level of motivation and financial inclusion. The FinTech innovations have a particularly massive impact on the overall structure of the financial service market. This is considered as a reason to recognize

the expediency of singling out the specific FinTech innovative structure, along with the market and institutional structure of the market.

The market structure with regard to the FinTech innovations can be determined by studying their directions [94; 134], subsystem components [105; 113], categories [70], types [198; 169; 171], and classification [34; 188; 164] (table 2.3).

Table 2.3. Market structure and FinTech innovation ranking*

The types of FinTech innovations	Authors													Number of mentions	Rank
	V. V. Kovalenko	A. A. Mazaraki, S. V. Volosovych	L. O. Haryaha	Strategy of Ukrainian financial sector development until 2025	H. M. Pochenchuk	A. Ya. Kuznyetsova, H. H. Chmeruk	A. Yu. Semenoh, S. V. Tsyrulyk	D. W. Arner	Financial Stability Board	PwC	World Economic Forum	C. Tsai, K.-J. Peng	UK Fintech Focus Report		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Financial management: - personal finance (Personal Finance, Wealth Tech, Deposits & Lending); - institutional finance - alternative financing and crediting (Crowdfunding, P2P, P2B, Robots-Consultants) -crediting without intermediaries - G2G, B2B crediting.	+	+	+	+	+	+	+	+	+	+	+	+	+	13	1
Payments, money transfers, clearing, settlements	+		+	+	+	+	+	+	+	+	+	+	+	12	2
Inshurtech	+	+	+	+	+	+	+		+	+	+		+	11	3
Digital and neobanks, digital banks (Internet Banking, Mobile Banking, Mobile	+		+	+		+		+				+	+	7	4

Wallets, Contactless Payment)														
Investment activity of banks and capital markets (Investment Banking/Capital +Market, Investment Management, Capital Raising)		+				+	+		+	+	+			6	5
Marketplaces, market support (Market Provisioning, Internet Marketing, Smart Contracts, E-Commerce, Interaction "Business Entity-State (BE2S)", Interaction "Business Entity-Business (BE2B)", Interaction "Business Entity Financial Institutions (BE2FI)", Interaction "Business Entity-Individuals (BE2I)"	+			+		+			+	+	+			6	5
Technologies and infrastructure (NFC Technologies, Internet Trading, Internet Brokerage, "Cloud" Technologies, Paperless Technologies, Machine Learning, Artificial Intelligence, E-Governance)	+		+	+	+	+		+						6	5
Regulatory technologies (RegTech, SupTech)		+		+	+			+						5	6
Analytics and data security (BigData, Analytics, Security, Smart Identification, Personal Financial Assistants, NBU's BankID)				+	+	+		+				+		5	6
Cybercurrency, cryptocurrency (Blockchain and Bitcoin), digital currency market,	+	+	+	+										4	7

currency exchange platforms, e-hryvnia (CBDC – Central Bank Digital Currency)															
Operation and risk management (Human Resource Management (HRM), Business Intelligence (BI), Enterprise Content Management (ECM))					+	+		+						3	8
Consumer interface					+	+		+						3	8
Gamification (games and quests for customers)						+								1	9

***Note**: the ranking is consistent with the frequency of mention in literary sources
Source: developed by the author based on [34; 78; 94; 105; 113; 134; 164; 169; 171; 179; 188; 198]

As can be seen from the above, in most cases the authors identify the FinTech innovations as those involving innovations in managing personal and corporate finances, which include alternative finance; payments, money transfers, settlements and clearing; as well as inshurtech.

The existing large number of FinTech innovations suggests the need to classify them. In our opinion, P. M. Rubanov [164] presented a classification of FinTech innovations, which becomes viable in this aspect; the author proposes to highlight their following classification features:

- the institutional feature;
- the financial service type;
- the innovative technology type;
- the fintech service user.

If seen from **the marketing approach** to determining the structure of the FinTech innovation market, the most perspective is the classification feature "the fintech service user" according to which services are allocated specifically for [164]:

- individuals (households);

- small and medium business;
- big business;
- financial institutions;
- regulators, audit companies;
- technology companies.

Taking all the foregoing into account, it may be concluded that considering the financial service market concept made it possible to reveal the complexity and variety of aspects found in this concept, its dialectical connection with the financial market concept. The results obtained during the in-depth analysis of the interaction between these concepts provided means for defining the financial service market concept following on from the peculiarities of its functioning under the economy digitalization conditions and considering it as part of the financial system in effect within the state, as aggregate economic relations, as aggregate markets and institutions, and as a mechanism for financial resource allocation. The significant impact of economy digitalization on the financial service market made it necessary to observe its structural changes caused by the introduction and dynamic development of FinTech innovations.

2.2. Digital Development of Anti-Money Laundering in the Insurance Industry

A few years ago, the insurance industry was not considered to be risky of money laundering compared with other industries of financial services. Even now, according to the FATF, "the ML/TF risks associated with the insurance sector are generally lower than those associated with other financial products (such as loans or payment services) or other sectors (such as banking)" [138]. But recently financial crime has risen sharply. Money launderers use different types of business and their combinations to "clean up" dirty money. Insurance companies are also used for this purpose.

Insurance are particularly vulnerable to money laundering risk when insurance contracts are concluded through agents and brokers. Insurance intermediaries do not always understand the need of customer due diligence and the identify higher risk services. In addition to this problem, intermediaries can participate in criminal schemes.

Insurers, like all financial institutions, have to comply with anti-money laundering regulations. Now, FATF, International Association of Insurance Supervisors (IAIS) and other international regulators are updating global financial rules on anti-money laundering and counter-terrorist financing for the insurance industry. According to international regulatory policy and standards legislation to fight against money laundering and terrorist financing in each country is changing.

A new generation of creative criminals is creating frauds and crimes in the context of the rapid evolution and spread of cyber technologies. It is a globalized and complex problem.

Due to the increasing sophistication of crimes, legal requirements are becoming more stringent. Insurance companies must develop and implement processes and systems for AML/CTF. Insurers are obliged to regularly assess areas of their business vulnerable to financial crimes and mitigate risks of money laundering [182]. Particular attention risk-based approach in AML/CTF is paid to the life insurance sector [67].

Today, the insurance industry is undergoing a period of significant transformation [148; 149; 150; 151]. The conditions of the insurance business are changing rapidly [93]: digitalization of the economy, increased competition in insurance markets, strengthening of regulatory requirements for the insurance

business, instability of consumer behavior, rising claims due to increased disasters and cataclysms. The rise of fraud and financial crime is driving the evolution of the regulatory landscape and technology of AML.

Entities of primary financial monitoring often have a negative perception of increasing regulatory pressure and do not always have time to adapt to regulatory requirements [96]. Enforcement measures against companies which have failed to comply with shifting regulatory standards have intensified in recent years. According to Encompass Group [182], 2019 was a record year for anti-money laundering fines.

Digitalization of insurance activity allows reducing the growing costs, including compliance costs, as well as accelerate the speed and improve the quality of operational processes of insurers. Information and communications technologies can be used to AML/CTF in insurance. The purpose of this research is to analyze the digital development of anti-money laundering in the insurance industry.

Currently, traditional insurers still rely on traditional channels to sell insurance products [97] and lag behind InsurTech start-ups in digitalization [109]. Insurance companies have relatively weak control over channels of sales, including agents, brokers and third-parties such as banks, online platforms. It leads to high acquisition costs and high compliance risks [97]. To achieve sustainable development of the insurance industry, insurers need to accelerate the implementation of innovations, new ways to acquire customers and modern methods of cooperation with different channels.

Insurance digital technologies have been driving development throughout the entire insurance industry. Technologies such as cloud computing, big data, artificial intelligence, the Internet of Things and blockchain will continue to evolve. New applications of these technologies will lead to significant improvements in operations of insurers – in areas such as product development, sales, cost control, risk management, customer service, AML/CTF and others.

The spectrum of digital financial technologies can be divided into three sectors [192; 197]: FinTech, RegTech and SupTech. The Financial technologies (FinTech) aims to compete with the traditional financial methods in the financial services and delivery of financial products in means of improvements, automatization and optimization of processes and operations, by utilizing special software, algorithms, telecoms, smartphones and networks. Financial technologies

in insurance are called Insurance technology (InsurTech). The Regulatory technologies (RegTech) are technologies of financial institutions that focuses on automates processes to ensure regulatory compliance, monitoring and reporting. There is also a RegTech for supervisors, called Supervisory technologies (SupTech). The advances of all three sectors of digital financial technologies are intertwined.

Key digital technologies of financial sphere are application program interface (API), artificial intelligence (AI), machine learning, Internet of Things (IoT), Big Data analytics, distributed ledger technology (DLT), smart contracts, cloud computing, cryptography, biometrics [197].

At present, compliance with regulatory requirements of financial monitoring is costly for insurance companies. Most processes and operations of AML/CTF in insurance industry are still paper-based.

When establishing relations with a customer (policyholder, insured or beneficiary) an insurer is required to identify this customer and verify his identity, using reliable and independent information. In addition, the insurer's specialist must check the client's financial transaction. Some of the red flags which may indicate, that insurance product is used for money laundering, include [106; 185; 189]:

- a large paying into an existing life insurance contract;
- concluding a contract of general insurance, then making a claim soon after;
- payment of a large premium with foreign currency or by wire transfer;
- a payments of insurance contract from a third party;
- insurance premiums being paid into one contract from different sources;
- unusual relationship between the insured and beneficiary;
- customer interest in learning more about terms of cancellation of contract than about insurance benefits;
- unusually large payments using cash, money order or travelers' cheques;
- redemption of a contract of life insurance which is unusually early or does not make economic sense.

During AML/CTF insurers deal with suspicious financial actions alerts identified through analysis of information. Supervisors should monitor ML/TF risks based on the reports received from entities of primary financial monitoring.

To detect high ML/TF risk, different alerts must be classified.

Process of transaction monitoring apply rules-based conditions to identify suspicious transaction. But over 95 per cent of alerts are closed as "false positives"; approximately 98 per cent of alerts never result in a suspicious transaction report [110]. Reviewing false positive alerts is expensive. Growing number of false positives increases the cost of process payments and negatively effects on reputational risk of financial institutions. However, if a machine learning solution was used to analyze the totality of customer and transactional data, entities could begin to identify unusual patterns worth investigating before they become known red flags [110].

Now, insurers' and supervisors' staff forced to make routine control operations of AML/CTF. Should agree that "repetitive processes are prone to errors, as employees become tired and less able to concentrate over time" [109].

In fact, that "technology plays a crucial role in the fight against financial crime" [182]. Analysis of modern digital technologies [192; 97; 73; 197] and Anti-Money Laundering processes and operations [185; 138; 189 190; 106; 193; 67; 69; 66] allowed to structure the directions of digitalization of AML/CTF in the insurance industry (table 2.4).

Table 2.4. Directions of digitalization of Anti-Money Laundering processes and operations in the insurance industry

Direction of digitalization	Sector of digital technologies		
	InsurTech	**RegTech**	**SupTech**
Processes and operations of AML/CTF	Analysis of digital customer experience Identification policyholders and beneficiaries	Customer due diligence **Identifying ultimate beneficial owners** **Transaction monitoring** Control for ML/TF risk situations AML risk management Suspicious transaction reporting Reporting large cash Staff training	Reports analysis Control for identifying ultimate beneficial owners Supervision monitoring of customers and transactions ML/TF risk supervision National risk assessment Sanctions, remedial, corrective measures Comprehensive administrative reporting National cooperation and coordination International cooperation

Source: compiled by the author

Thus, the potential for the use digital technologies is huge: many processes of AML/CTF (table 2.4) could be standardized and automated. In particular, key components of digital ID systems are relevant to requirements of customer's identification and verification of under FATF's recommendations.

FATF developed the Guidance on Digital Identity [69] that draws links between frameworks and standards of digital ID assurance and the FATF's customer due diligence requirements. Accordingly this Guidance [69], the digital ID assurance frameworks and technical standards provide a highly useful tool for assessing the reliability and independence of digital ID systems for AML/CTF purposes.

New innovations are helping insurers achieve compliance. The blockchain and distributed ledger technologies (DLT), for example, have potential applications around data sharing, know your customer (KYC), AML and fraud prevention [182]. The automation of processes and operations is an important trend in AML [133; 196; 110]. Financial businesses and supervisors are adopting digital solutions for AML to reduce time and efficiency.

However, the implementation of innovations in activity must comply with the principles for digital development. It is a set of nine guidelines for integrating best practices into technology-enabled development programs for international development and cooperation [209; 138]:

- design with user;
- understand the existing ecosystem;
- design for scale;
- build for sustainability;
- be data driven;
- use open standards, open source and open innovation;
- reuse and improve;
- address privacy & security;
- be collaborative.

Summing up, the result of evolving of digital technologies is competitive FinTech climate, new spectrum of money laundering opportunities, the more

stringent regulations of AML/CTF. Traditional insurance company are poorly prepared to digital activities in the markets of the future and to comply with regulatory requirements of AML/CTF. For the continuation of insurance activities, internal processes of functioning of insurer, including AML/CTF, are subject to digital development. Supervisors have begun coordinating efforts to apply digital technology to improve the ability of financial institutions to conduct customer due diligence, as well as to detect and monitor suspicious transactions. The digital development of AML/CTF also involves the development of partnerships between insurers, supervisors and other institutions for the exchange of information, which allows a more comprehensive compliance efforts.

PART 3.
IMPLEMENTING THE RISK-BACED APPROACH TO FINANCIAL MONITORING IN THE BANKING SYSTEM

3.1. Risk-based approach to the formation of the financial monitoring system in Ukrainian banks

Within a context of growing economic shadowing and the spread of illegal money laundering (ML) and capital laundering schemes, most countries have committed themselves to combating money laundering through international FATF (2012) standards, which contain provisions on precautionary measures: data retention, notification of suspicious transactions, control measures, additional measures for specific clients and activities, measures of proper client verification.

According to FATF International Standards [29th Recommendation] and the Council of Europe Convention on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime and on the Financing of Terrorism [Article 12], ratified by Ukraine on 17 November 2010, in each country there should be a Financial Intelligence Unit (FIU), which is the national center for receiving and analyzing notifications of suspicious transactions and other information related to ML, predicate offenses and financing of terrorism (FT), and for disseminating the results of this analysis [177].

Participation in the FATF requires the introduction of the CRS (an automatic financial information exchange standard), which requires banks, insurance companies and brokers to provide information about their clients that is subject to financial monitoring.

Countries must take immediate steps to become a participant of the following conventions to fully implement them:

- the Vienna Convention (1988);
- the Palermo Convention (2000);
- the United Nations Convention against Corruption (2003);
- the Terrorist Financing Convention (1999).

Where applicable, countries are also encouraged to ratify and implement other relevant international conventions, such as:

- the Council of Europe Convention on Cybercrime (2001);
- the Inter-American Convention against Terrorism (2002);

- the Council of Europe Convention on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime and on the Financing of Terrorism (2005).

The growth of the shadowing of the banking sector and the inclusion of Ukraine in the "black list" (list of countries that do not cooperate in the field of anti-money laundering (AML) of Financial Action Task Force on Money Laundering (FATF) and the introduction of FATF economic sanctions against Ukraine on 20 December 2002 necessitated relevant legal field within financial monitoring (The Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime or Financing of Terrorism" №249-IV of 28 November 2002; Resolution of the NBU Board "Regulations on Financial Monitoring by Banks" №189 dated 14 May 2003) and creating of an authorized body. The established legal field allowed to establish requirements for banks as subjects of primary financial monitoring in the field of combating legalization (laundering) of proceeds from crime. Also during this period, the most common schemes of ML through the banking sector were identified, such as: withdrawal of capital through offshore zones, corruption schemes and fraud in the field of credit operations, raising funds of individuals and legal entities, etc. This allowed the FATF to lift economic sanctions against Ukraine in 2004.

Today, the regulation of banks in the field of financial monitoring is carried out on the basis of the following regulations:

- The Civil Code of Ukraine 435-IV [186];
- The Law of Ukraine 361-IX «On prevention and counteraction to legalization (laundering) of proceeds obtained by criminal means, financing of terrorism and financing the proliferation of weapons of mass destruction» [191];
- The Law of Ukraine 2121-III «On Banks and Banking»;
- Regulation 65 «On the implementation of financial monitoring by banks», approved by the Resolution of the Board of the National Bank of Ukraine (NBU) [159];
- Instruction 373 «On the formation of information exchange files between the central executive body implementing the state policy in the field of prevention and counteraction to legalization (laundering) of proceeds obtained by criminal

means, financing of terrorism and financing the proliferation of weapons of mass destruction, and banks (branches)», approved by Resolution of the NBU Board;

- Order of the Ministry of Finance of Ukraine 584 «On approving the risk criteria for legalization (laundering) of proceeds obtained by criminal means, financing of terrorism and financing the proliferation of weapons of mass destruction» [128].

The legislation of Ukraine defines: «financial monitoring is a set of measures taken by the entities of financial monitoring in the field of prevention and counteraction, including state financial monitoring and primary financial monitoring» [191].

In their activities, banks are guided by Regulation 65 «On the implementation of financial monitoring by banks», which sets requirements for:

- proper organization of the AML/CTF interbank system;
- internal documents of the bank on AML/CTF issues;
- proper risk management system;
- the procedure for approving the appointment and dismissal of a responsible employee of the bank;
- proper customer due diligence;
- the order of identification, verification of the client (the client's representative);
- the procedure for video verification;
- establishment of ultimate beneficial owners;
- simplified and enhanced customer due diligence measures;
- measures for non-profit organizations;
- the procedure for implementing measures against foreign financial institutions during the establishment (maintenance) of correspondent relations;
- additional measures for clients who (whose UBOs) are politically significant persons, members of their families and persons related to politically significant persons;
- use of agents;
- use of customer due diligence information obtained from a third party;

- the procedure for the bank's refusal to establish (maintain) business relations/conduct a financial transaction;
- the procedure for suspension, resumption of financial transactions and execution of decisions (instructions) of the specially authorized body;
- the order of freezing/unfreezing of assets;
- the procedure for monitoring financial transactions, their registration and information exchange with a specially authorized body;
- measures to transfer funds;
- the procedure for providing individuals with reports of violations in the field of AML/CTF, the procedure for their consideration;
- ML/FT risk criteria;
- indicators of suspicion of financial transactions [159].

Implementation of financial monitoring in the banking sector is carried out at several levels (figure 3.1). The subjects of financial monitoring in the bank are NBU – state financial monitoring, banks – primary financial monitoring. In Art. 28 it is noted that a specially empowered body SFMSU conducts national risk assessment systematically, at least once every three years.

At the stage of identification and/or in the course of servicing a customer, the bank assesses information about the customer's financial condition, nature of activity, affiliation of the client or person acting on his behalf to national or foreign public figures, political figures in international organizations, or their related persons, etc. that will identify potential threats of emerging of customer risk. In case of doubt about the accuracy or completeness of the information provided by the customer, the bank is obliged to conduct an in-depth audit of the client, which includes the implementation by the subject of initial financial monitoring of measures to obtain (in particular from public authorities, state registrars, official or public sources) information on the customer (the customer's representative) to confirm or refute the information provided by him (her), which is doubtful.

3.1. Risk-based approach to the formation of the financial monitoring system in Ukrainian banks

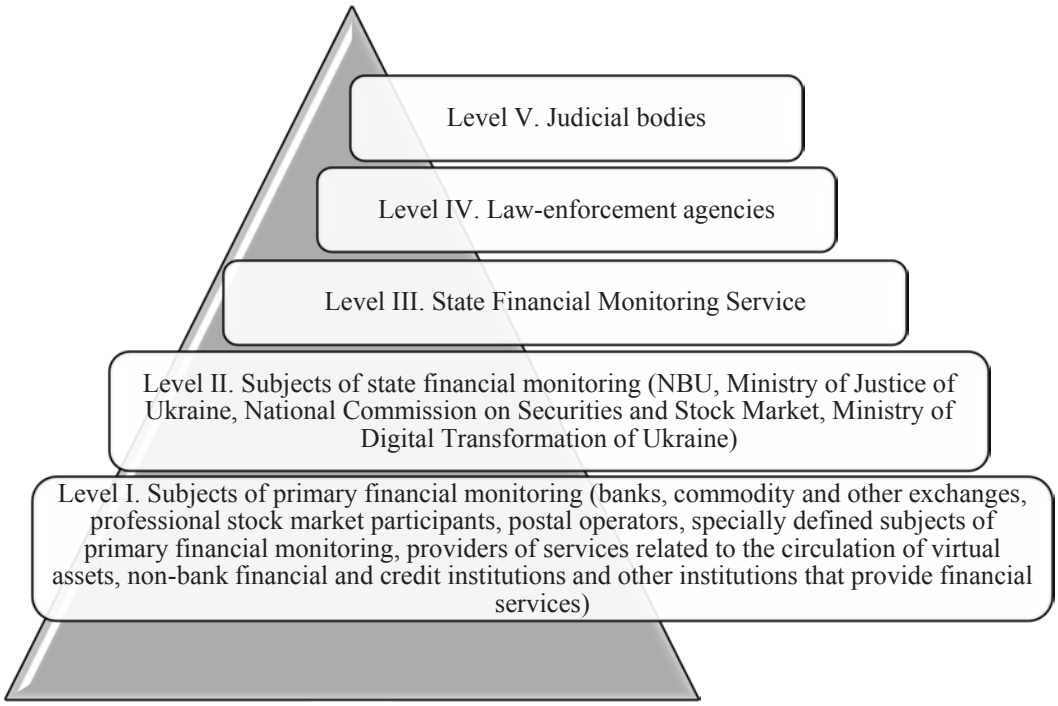


Figure 3.1. Levels of financial monitoring in Ukraine
Source: visualized by the authors

Art. 7 states that: «a subject of the initial financial monitoring is required to apply a RBA in its activities, taking into account the relevant risk criteria, in particular those related to its customers, the geographical location of the country of registration of the client or the institution through which it carries out the transfer (receipt) of assets, the type of goods and services that the client receives from the subject of the initial financial monitoring, the method of rendering (receiving) services. The RBA should be proportionate to the nature and scale of the activity of the subject of the initial financial monitoring» [191].

The fact that the risk management system of the respective financial monitoring entity is inadequate is established in the presence of the features identified by the relevant state financial monitoring entity in the manner established by that state financial monitoring entity.

Financial transactions subject to financial monitoring are defined in Art. 20, Art. 21 of The Law of Ukraine 361-IX (figure 3.2).

3.1. Risk-based approach to the formation of the financial monitoring system in Ukrainian banks

The establishment of thresholds for financial transactions subject to financial monitoring has led to the emergence of new schemes in the field of ML, in particular, persons interested in legalization of funds began to deposit such funds in amounts not exceeding the set thresholds into accounts opened with different banks, or even into accounts opened in different units of the same bank. Another example AML/CTF is gaining full control of the bank, in particular through its acquisition, by persons involved in laundering of proceeds obtained by criminal means.

Threshold financial transactions

- equal to exceeding UAH 400,000 (in the field of lotteries and / or gambling, equal to exceeding UAH 30,000);
- crediting or transferring funds, granting or obtaining a loan, carrying out other financial transactions if at least one of the participants in the financial transaction has the appropriate registration, place of residence or location in the state (jurisdiction) that does not implement or improperly implements the recommendations of international, intergovernmental organizations involved in the fight against legalization (laundering) of proceeds from crime, terrorist financing or financing the proliferation of weapons of mass destruction;
- financial transactions of politically significant persons, their family members and / or persons related to politically significant persons;
- financial operations on the transfer of funds abroad (including to the states referred by the Cabinet of Ministers of Ukraine to offshore zones);
- financial transactions with cash (deposit, transfer, receipt of funds).

Suspicious financial transactions (activities)

- the subject of primary financial monitoring suspects or has reasonable grounds for suspecting that they are the result of criminal activity or related to or involved in the financing of terrorism or the financing of the proliferation of weapons of mass destruction

Figure 3.2. Financial transactions subject to financial monitoring
Source: compiled by the authors

Based on this, banks as subjects of primary financial monitoring are required to identify customers who: open bank accounts; carry out operations subject to financial monitoring; carry out cash transactions without opening an account for an amount equal to or exceeding UAH 400,000, or the equivalent of this amount in foreign currency; carry out transactions on the account to which the

electronic means of payment is issued; persons acting on behalf of these clients [159; 160].

The bank is provided with certificates on received dividends, royalties and/or account statements on their receipt as documents confirming the origin of funds of individuals. In each case, the bank independently, decides on the list of documents confirming the source of origin of the funds.

In case of doubt about the accuracy or completeness of the information provided by the customer, the bank is obliged to conduct an in-depth audit of the client, which includes the implementation by the subject of initial financial monitoring of measures to obtain (in particular from public authorities, state registrars, official or public sources) information on the customer (the customer's representative) to confirm or refute the information provided by him (her), which is doubtful.

According to Art. 1074 of the Civil Code of Ukraine: "restriction of the client's rights to dispose of funds in his/her account is not allowed, except in cases of restriction of the right to dispose the account by court decision or in other cases established by law or encumbrance, the subject of which are property rights to funds in an account, as well as in the event of suspension of financial transactions that may be related to the legalization (laundering) of proceeds from crime, or terrorist financing and financing the proliferation of weapons of mass destruction, freezing of assets related to terrorism and its financing, proliferation of weapons of mass destruction and their financing provided by law" (The Civil Code of Ukraine).

Under the terms of the agreement on the use of electronic means of payment, the bank must specify its right to suspend payment transactions that may be related to legalization (laundering) of proceeds from crime, terrorist financing and financing the proliferation of weapons of mass destruction [160]. Electronic means of payment, which are limited to transactions, are included in the electronic and/or paper stop list, compiled according to certain details.

The major national risks in Ukraine identified by experts MONEYVAL:

- corruption;

- illegal economic activity (fictitious entrepreneurship, tax evasion, fraud, etc.);
- shadow economy;
- organized crime expansion;
- activity of conversion centers;
- high cash circulation;
- terrorism financing risk;
- non-profit organizations that can be used to transfer funds to terrorists and terrorist organizations [168].

According to the first FATF Recommendation, for the purpose of AML/CTF, the application of a risk-based approach requires that countries, competent authorities and obliged entities must identify, evaluate and understand the risks they face and take appropriate measures for their effective reduction [68].

In turn, in subparagraph 53, paragraph 1, article 1, chapter 1 of the Law of Ukraine 361-IX a broader definition is given: "a risk-oriented approach is the identification (detection), assessment (reassessment) and understanding of the risks of legalization (laundering) of proceeds of crime, financing of terrorism and financing the proliferation of weapons of mass destruction, and taking appropriate risk management measures in a manner and to the extent that minimize such risks depending on their level" [191].

The risk of involving a bank to ML/FT has two major components: the risk of conducting transactions of a doubtful nature; the risk of violation of requirements of the relevant legislation. Figure 3.3 shows the place of the risk of involving a bank to ML/FT in the banking risk system [40]. Each bank develops its own risk assessment system, which should take into account the specific weight of each type of risk in the aggregate potential ML/FT risk, the orientation of the banking business and legislative aspects of regulation.

3.1. Risk-based approach to the formation of the financial monitoring system in Ukrainian banks

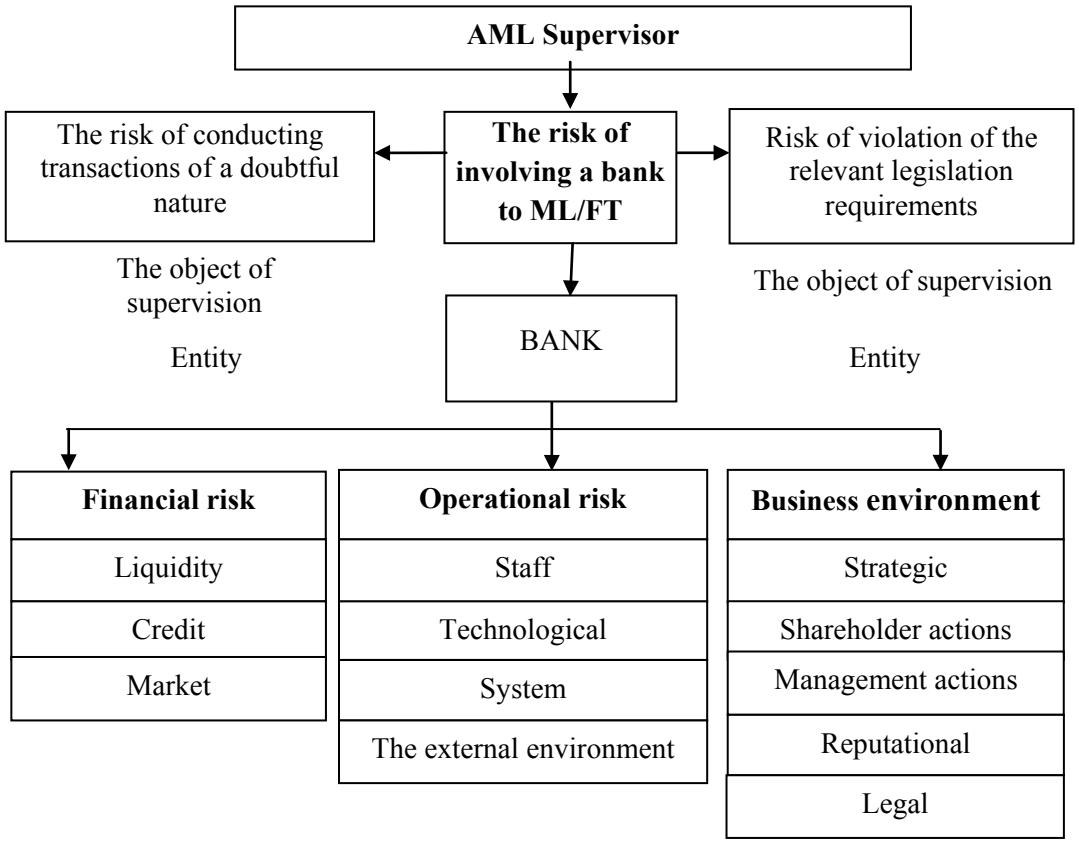


Figure 3.3. The place of the risk of involving a bank to ML/FT in the banking risk system
Source: Berezhnyi, O.M. (2010) [40]

In 2019, the NBU conducted an assessment of the level of risk of ML/FT of the banking sector, the results are shown in figure 3.4.

Due to the availability of effective mitigating measures, including proper regulatory and supervisory activities of the NBU, the level of net risk of the banking sector is assessed as "MEDIUM" for ML and "LOW" for FT.

When considering possible losses for the bank, in case of accusation of non-compliance with the requirements of financial monitoring, the risk of revocation of the NBU banking license and the risk of loss of reputation are especially dangerous from the point of view of financial losses.

	ML	FT
PROBABILITY OF USING BANKS FOR ML/FT	• operations with highly liquid assets • cross-border nature of operations • online access to services • instantaneous operations • the possibility of anonymous use of products	• conducting hostilities in eastern Ukraine • political instability; • high level of circulation and use of cash • significant level of corruption
LEVEL OF CONSEQUENCES	The supervision revealed financial transactions that contained signs of ML: • using nominal ultimate beneficial owners (controllers) • fictitious entrepreneurship • illegal withdrawal of capital	The consequences of using banks in FT schemes can occur at all levels, including negative impacts on the reputation, financial performance, bank owners, as well as national and international security
MITIGATING MEASURES	• proper performance of the NBU functions of AML/CTF • NBU measures to improve ROA during supervision • updating the methods of conducting NBU inspections taking into account international standards	

Figure 3.4. The results of the risk assessment of the ML/FT risk of the banking sector
Source: OSCE (2019)

The management of customers' income legalization risk is aimed at ensuring that banks carry out transactions within acceptable risk parameters and in such a way that will protect the interests of depositors, creditors and bank owners.

B Regulation 417 lists the risk components of the bank's customers, namely: geographical risk, customer type risk and service risk (figure 3.5).

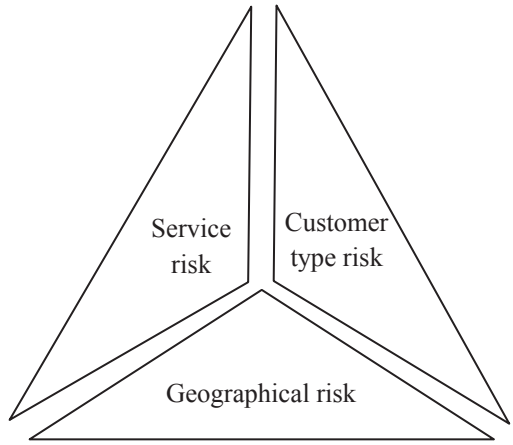


Figure 3.5. Risk components of the bank's customers
Source: visualized by the authors

It should be noted that in most cases, country risk factors are appropriate for both parties of a money transfer. The list of countries having strategic shortcomings in the construction of the AML/CTF system, that poses a risk to the international financial system is contained in the FATF Public Statements, which have been published since October 2009, taking into account the degree of risk and the level of cooperation of those countries with the FATF, as well as FATF-type regional organizations, their list is divided into three groups:

- the group of countries to which countermeasures are being applied (restrictions and, in some cases, prohibition of business relations or transactions);
- the group of countries that have strategic shortcomings in AML/CTF and do not implement FATF action plans to address identified weaknesses;
- the group of countries that have strategic shortcomings in AML/CTF, but have pledged at a high political level to eliminate them in the process of implementing the FATF Action Plan.

When a bank determines the level of customer-type risk, it takes into account the criteria shown in figure 3.6. Areas of highest risk are public figures and their related persons, public and non-profit organizations, etc., and the least risk areas are the public authorities of Ukraine, International institutions or organizations.

3.1. Risk-based approach to the formation of the financial monitoring system in Ukrainian banks

Risk assessment by type of goods and services is carried out if it is:

- international transfer services that amount to or exceed UAH 400 000 (UAH 30000 – for business entities providing services in the field of lotteries and/or gambling), equal or exceed the amount in foreign currency, bank metals, other assets, equivalent to the official hryvnia to foreign currencies [191];
- distance services;
- goods (services), the cost of which is difficult or impossible to define, including intellectual property, some services that do not have a constant market value, consulting, legal, auditing services;
- other subjects, services, operations or methods of their carrying out that are determined by the entity [128].
- Such risk assessment should take place before the introduction of new products, business practices or the use of new or developing technologies.

It should be noted that the risk of using cash for ML purposes in Ukraine is estimated to be high, since the level of penetration of non-cash payments in comparison with EU countries is low. Taxes, penalties and other mandatory payments, social/pension payments account maintenance, etc. are less risky.

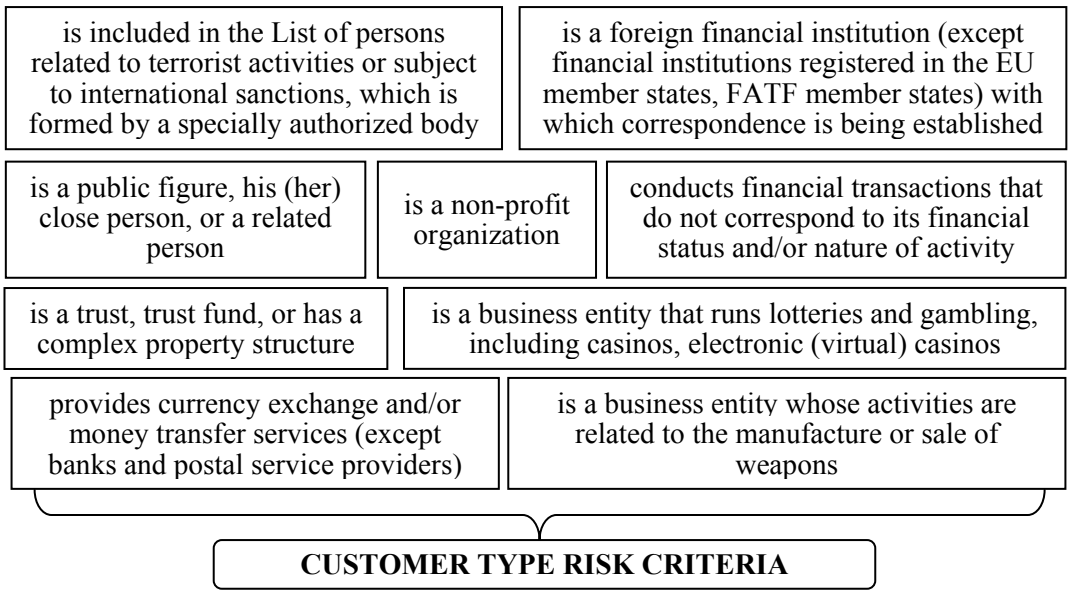


Figure 3.6. Customer type risk criteria used by banks
Source: formed by the authors

3.1. Risk-based approach to the formation of the financial monitoring system in Ukrainian banks

To assess customer risk, a bank may expand the list of criteria for each component of the bank's customer risk and set indicators, including quantitative and/or qualitative characteristics of each criterion, to identify one of the risk criteria and assess the level of threat. All levels of risk are displayed in the customer's questionnaire, indicating the date of assessment/reassessment.

Equally important in the process of financial monitoring is the issue of qualified staff. In order to provide the financial monitoring process with such staff, it is important to develop and continually improve employee training programs, and the staff must adhere to the established internal financial monitoring regulations.

Taking into account all the above positions, let us build a scheme of improving the procedure of financial monitoring in a bank (figure 3.7).

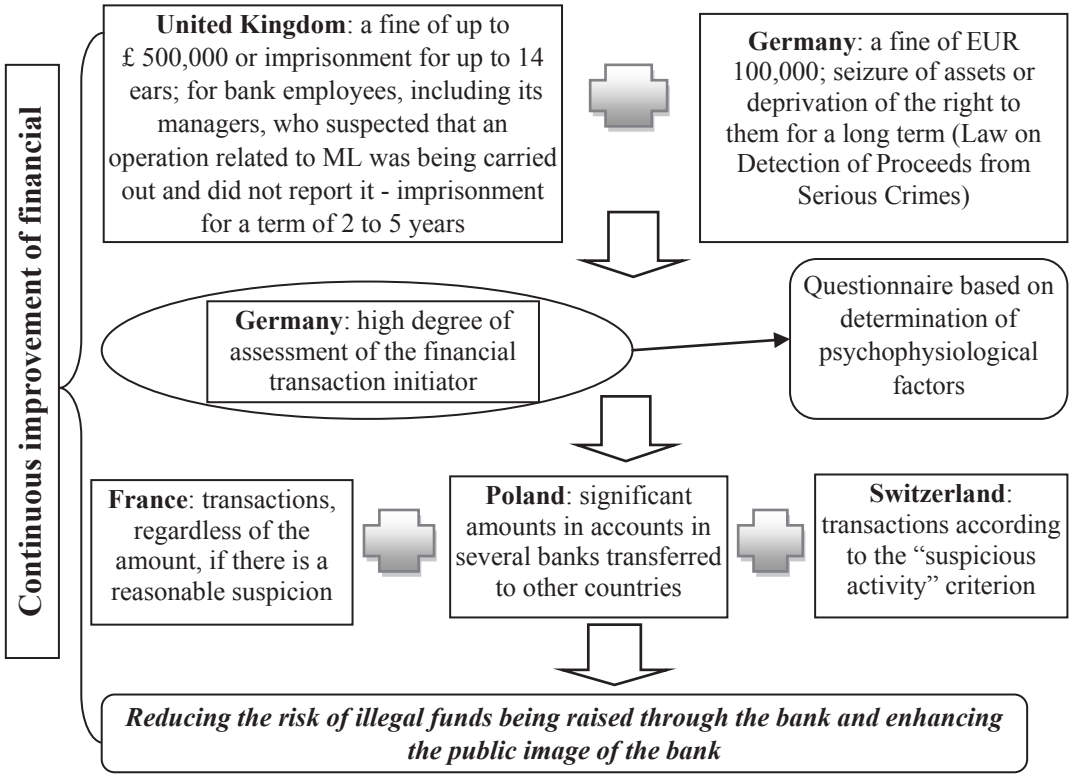


Figure 3.7. Scheme of improving the procedure of financial monitoring in a bank based on the implementation of the positive experience of European countries
Source: formed by the authors

3.1. Risk-based approach to the formation of the financial monitoring system in Ukrainian banks

Of particular note is the experience of the United Kingdom and Germany in the context of penalties, seizure of assets and imprisonment for non-compliance with financial monitoring legislation. Basing on the experience of Germany, it is advisable to carry out a high degree of assessment of the initiator of a financial transaction, while conducting a survey that will identify his/her psycho-physiological characteristics to the ability to conduct illegal transactions. In the future, according to the experience of France, Poland and Switzerland, it is necessary to constantly monitor the "suspicious activity" of the operations of such a client. At all times, it is important to constantly improve the rules of financial monitoring.

Therefore, the risks arising from the activities of banks are quite significant. Liability for violations of legislation and regulations in the field of money laundering is regulated by articles of both the Criminal Code and the Administrative Code of Ukraine. Taking into account the fact that banking institutions are the main subjects of financial monitoring, it is necessary to ensure close cooperation of banking institutions with the NBU, the state financial monitoring service, and it is also necessary to establish a system of information and close cooperation of banking institutions with law enforcement agencies.

Banks are the main entities that detect 99% of all suspicious financial transactions that pass through the financial system of Ukraine and contain signs that indicate the possible conduct of these operations in order to launder criminal proceeds. Implementation of the European integration vector of foreign policy requires further work towards harmonization of domestic legislation in the field of prevention and counteraction to legalization (laundering) of proceeds from crime or terrorist financing with EU legal norms and requirements, as well as improvement of financial monitoring system in Ukraine. This task can be implemented by improving the identification procedures for persons who are customers of banks, as proper identification of the client is the basis for assessing the risk of atypical, suspicious, uncharacteristic, dubious financial transactions; establishing coordination and interaction between various authorized bodies of state power and foreign states, or other entities responsible for combating crimes related to the legalization (laundering) of proceeds from crime or terrorist financing. Improving the efficiency of the financial monitoring system is one of the areas of state policy in the field of combating money laundering, aimed at ensuring transparency, openness of financial relations in Ukraine, and is an important and integral part of economic integration of Ukraine into the global financial system.

3.2. Applying the risk-based approach to banks' primary financial monitoring

The issue of combating money laundering (anti-money laundering)/terrorist financing (ML/TF) is recognized worldwide. Its solution is based on implementing the recommendations provided by *the Financial Action Task Force on Money Laundering (FATF)* in the domestic practice [187].

Banking institutions credited as primary financial monitoring subjects (PFMS) are empowered to identify financial transactions bearing ML/TF signs and report on them to the state financial monitoring subjects. At the same time, the Basel Committee's recommendations on the ML/TF risk management [176] lay an emphasis on the fact that banks' neglect of a high-quality and effective ML/TF risk management system exposes them to negative consequences due to reputational, operational, compliance and concentration risks, which may lead to significant financial costs met by the bank. Changes in the legal regulations for banks to conduct financial monitoring, represented in the Resolution adopted by the Board of the National Bank No.65 as of 19/05/2020 [143], highlight the need for further research on the risk-oriented approach implementation in the Ukrainian banking sector.

ML/TF risks in the banking sector belong to the sectoral risks of the national system governed by laws and regulations. The *FATF* Guidance for a Risk-Based Approach for the Banking Sector [162] establishes its binding nature and provides basic principles and implementation examples on a country-by-country basis. In particular, it is suggested to substantiate the factor analysis in determining the ML/TF risk through banks relying upon the assessment of the geographical activity area and customer database, structure and type of bank customers, structure of products and services, channels for their provision by financial institutions, which are divided into high, middle and low risks.

The domestic regulatory framework for combating ML/TF using banks comprises the provisions set out in the Law of Ukraine "On the National Bank of Ukraine" (Articles 7, 15, 55, 56) [140], the Law of Ukraine "On Banks and Banking" (Article 63) [139], the Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and Financing the Proliferation of Mass Destruction Weapons" [142] and the Resolution adopted by the Board of the National Bank "On Approval of the

Regulations on Financial Monitoring by Banks" [143].

In recent years, the risk-oriented approach to financial monitoring in the banking sector has been considered in the scientific literature by the following scientists: Zh. Andrijchenko and N. Vnukova [32], O. Ghlushhenko and I. Semeghen [74], S. Jeghorycheva [86], O. Kolodiziev, O. Lebidj, O. Vejc [135], B. Samorodov [167], O. Utkina [201; 202].

While positively noting the domestic scientists' work, as well as the statistics provided in the report by the State Financial Monitoring Service of Ukraine [216] concerning the increased amount of information from banks on financial transactions showing the financial monitoring signs, the declining share of information bearing the signs of internal financial monitoring in the total amount of information provided by banks highlights the need to further improve the methods used to assess suspicious financial transactions conducted by banks and the risks associated with them, given the effectiveness of their detection and depth of consequences.

The article is aimed to improve the risk-oriented approach in the primary financial monitoring by banks through the substantiated elements composing the system of significant risks associated with ML/TF.

The methodology used to assess the risks of money laundering and terrorist financing in Ukraine [117] at a nationwide scale is based on the international risk management standards. The probable negative events (risks) are determined with respect to the assessment of threats, vulnerability to threats and their consequences.

Applying these provisions to the ML/TF risks using banks allows defining the sectoral risk function as follows [136]:

$$R_б = f[(T_б),(V_б)] \times C,$$

where $R_б$ – the ML/TF risk function using banks; $T_б$ – the identified ML/TF threats using banks; $V_б$ – the identified vulnerability to threats; C – the level of negative consequences caused by threats and vulnerabilities of the bank.

The first step in determining the ML/TF risk through banking institutions should be the threat identification. It is proposed to consider the type and jurisdiction of customers and types of financial transactions and channels for their

implementation during such an assessment.

The Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and Financing the Proliferation of Mass Destruction Weapons" establishes an unacceptable risk for transactions in which it is impossible to identify and/or verify the transaction participant, identify the participants' ultimate beneficial owners, unreliable information submitted by customers, the existing reasonable suspicions/grounds testifying to the fact of accomplishing the ML/TF transactions by customers, their affiliation to "shell companies", and if the bank with which the correspondent relationship is established is a shell bank and/or maintains correspondent relations with a shell bank [142]. Provided the above circumstances exist, the assets involved in the transaction are blocked and the bank must abandon it.

High-risk zones include four types of threshold financial transactions, which are subject to mandatory monitoring: transactions performed by PEPs (PEP – *Politically Exposed Person*), their family members and/or persons related to a politically exposed person; transfers abroad, including offshore zones; cash transactions; transactions where the participant/bank is from a country that fails to comply with the FATF recommendations if the transaction amount is equal to or exceeds UAH 400 thous. (UAH 30 thous. for business entities that provide services in the field of lotteries and/or gambling) [142]. Article 5 of the Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and Financing the Proliferation of Mass Destruction Weapons" also defines a high risk for transactions with: foreign financial institutions; foreign politically exposed persons and members of their families; customers subject to sanctions and customers whose place of residence (stay, registration) is a state enlisted as an offshore zone [142]. According to the Resolution adopted by the Board of the National Bank "On Approval of the Regulations on Financial Monitoring by Banks" the high-risk zone also applies to: transactions performed by customers operating with virtual assets; customers in respect of whom the bank suspects ML/TF transactions, committing other crimes or their affiliation to shell companies [143]. The existence of such bank's transactions requires enhanced identification and verification.

Annex 19 to the Regulations on Financial Monitoring by Banks specifies risky types of customers that fall into the middle risk category: based on the

commercial or personal activities performed by the customer or its UBOs (ultimate beneficial owners) when cash settlements predominate in the activities, in particular, the transactions associated with a high corruption risk; the term and legal form of establishment, complicated customer's ownership structure; the reputation of the customer or its UBOs; citizenship, registration, location, business activities of the customer, its UBOs and the customer's key counterparties in the countries where the ML/TF combating regimes are poor or countries characterized by an increased corruption risk [143]. The existence of such bank's transactions also requires enhanced identification and verification and an effective system of internal risk management.

The low-risk zone includes transactions performed by companies that effect simple transactions and individuals who are not suspected of ML/TF. Minimum requirements for identification and verification apply to such transactions.

The minimum risk zone is associated with financial transactions involving public authorities, diplomatic missions of foreign countries, public legal entities with shares listed on internationally recognized exchanges, persons who have accounts for wages and social benefits, housing and utilities infrastructure.

Identification of bank threats in the two-dimensional plane "type of transaction participant/nature of banking products, services and their supply channels" requires to consider the volume of risky transactions addressed in Annex 19 to the Regulations on Financial Monitoring by Banks as those including: private banking services, obtaining loans secured by financial tools or other bank guarantees, customer's use of asset management services, complexity of a transaction due to its multi-stage nature, anonymity and presence of numerous participants, cash transactions, international transfers, e-commerce [143].

In our opinion, cash transactions should be included in the high-risk zone. Thus, the State Financial Monitoring Service emphasizes that "cash used as the main facilitator (a tool that facilitates achievement of a goal) in the money laundering cycle is a problematic issue, the relevance of which is monitored at both levels – highly developed countries and developing countries" [166]. According to the NBU, in recent years the amount of cash transactions through the banks' cash departments has been increasing, and their amount for the period January-March 2020 is UAH 531.7 billion by revenue and UAH 536.6 billion as issued [124].

Money transfers without opening a bank account also pose a high risk of

3.2. Applying the risk-based approach to banks' primary financial monitoring

ML/TF, in particular, recognizing the tendency to increase the dynamics of transfers from abroad to Ukraine through banking institutions (Fig. 3.8).

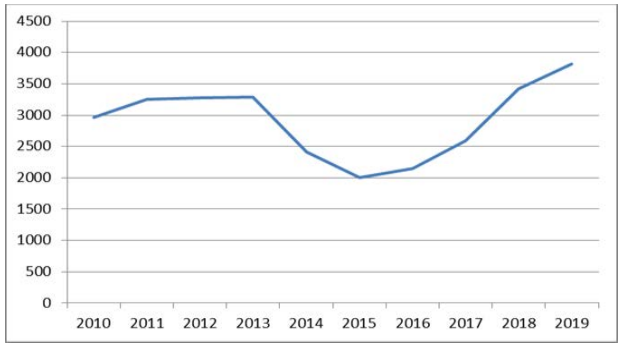


Figure 3.8. Dynamics of money transfers from abroad to Ukraine through banks, USD mln.
Source: formed according to the NBU [124]

The high risk of using electronic money in Ukraine is associated with the complexity of customer identification, easy and fast cross-border movement of funds, which makes this tool attractive especially for TF. The tendency to intensify this direction (figure 3.9) necessitates increased attention considering the banking institution's risk.

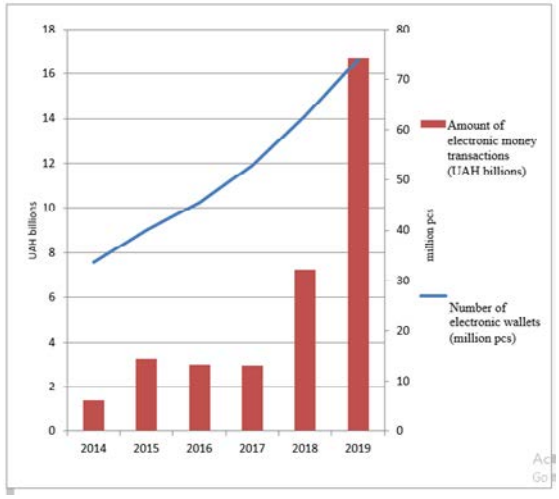


Figure 3.9. Dynamics of electronic money development in Ukraine
Source: formed according to the NBU [18]

3.2. Applying the risk-based approach to banks' primary financial monitoring

Securities transactions can be considered high-risk in the field of financial monitoring due to the possible facts of their fictitiousness.

It is proposed to include financial transactions related to servicing deposit and credit accounts in the middle risk zone due to the difficulty faced by the bank while verifying the sources of deposit funds and credit expenditure directions.

Currency exchange involving insignificant amounts (up to UAH 30 thous.) represents a transaction where the customer identification is not necessary and thus it belongs to the zone of low ML/TF risk. The same zone includes cash and transfer transactions with insignificant amounts.

Transactions in the amount of up to UAH 5 thous. or maintenance of accounts for social/pension payments, payments of wages, fines, taxes by customers will be assigned to the minimum risk zone.

In this respect, financial transactions can be grouped according to the risk level as follows (table 3.1).

Table 3.1. Risk zones formed by the nature of banking products, services and their supply channels

Risk zone	Transaction characteristics
Unacceptable risk	Any transaction in any amount based on the customer's features listed in [143; 142]
High risk	Any transactions in the amount over UAH 400 thous. or transactions in the amount of UAH 30 thous. and more up to UAH 399.999 thous. regarding: cash withdrawals from customers' accounts; acceptance of cash for transfer or transfer payments without opening an account; transactions using electronic means, with securities
Middle risk	Any transactions in the amount of UAH 30 thous. and more up to UAH 399.999 thous. or: servicing deposit and credit accounts, renting out an individual safe without a list of values
Low risk	Transactions up to UAH 30 thous. including currency exchange and cash transactions and transfers
Minimum risk	Transactions in the amount of up to UAH 5 thous. or maintaining accounts for social/pension payments, payments of wages, payments of fines and taxes by customers

Source: compiled by the authors [136]

Further we will form a threat matrix according to the given risk parameters for the customer type and the nature of banking services/transactions (fig. 3.10).

3.2. Applying the risk-based approach to banks' primary financial monitoring

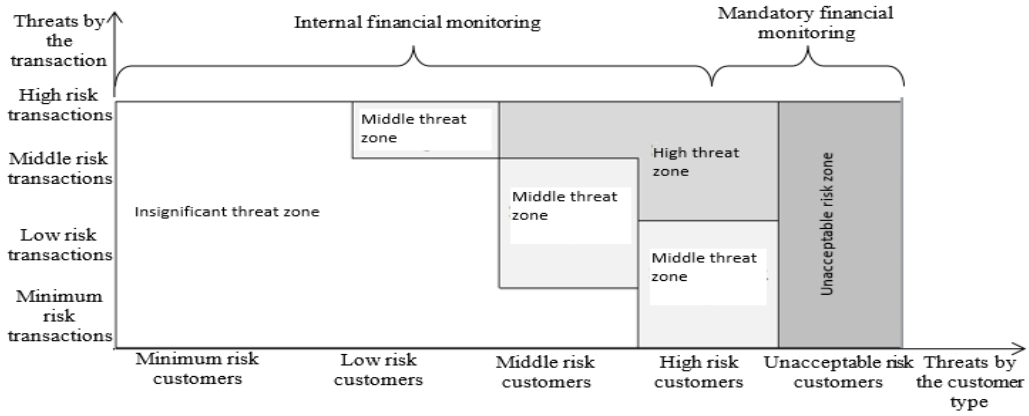


Figure 3.10 Bank's threat zones in the field of financial monitoring associated with ML/TF
Source: formed by the authors [136]

It can be stated that the unacceptable risk and part of the high risk shall be subject to mandatory financial monitoring as it follows from the features of unacceptable risk customers and threshold transactions. At the same time, internal financial monitoring includes a number of middle and high threats detected by the bank.

As can be seen from the report produced by the State Financial Monitoring Service of Ukraine [216] (table 3.2), the share of identified financial transactions bearing the signs of internal financial monitoring was 41.56% in total in 2005, and it amounted to only 2.55% in 2018. Such a state of affairs may testify to the vulnerability of the banking system to the ML/TF risk if put beyond the established mandatory norms.

Table 3.2. Structure of PFMS' financial transactions registered by the State Financial Monitoring Service, %

Financial transactions/year	2005	2006	2007	2008	2009	2010	2011
1	2	3	4	5	6	7	8
Share of financial transactions bearing the signs of mandatory financial monitoring	55.43	61.96	67.94	72.89	74.24	70.08	43.12
Share of financial transactions bearing the signs of internal financial monitoring	41.66	35.49	30.74	26.24	25.00	28.62	37.81
Share of financial transactions bearing the signs of mandatory and internal financial monitoring	2.91	2.55	1.32	0.87	0.76	0.78	0.37
Share of financial transactions bearing tracking features	-	-	-	-	-	0.52	18.70

3.2. Applying the risk-based approach to banks' primary financial monitoring

Financial transactions/year	2012	2013	2014	2015	2016	2017	2018
Share of financial transactions bearing the signs of mandatory financial monitoring	64.16	66.56	60.61	88.91	93.76	95.24	96.93
Share of financial transactions bearing the signs of internal financial monitoring	28.7	31.86	38.10	9.35	4.99	3.72	2.55
Share of financial transactions bearing the signs of mandatory and internal financial monitoring	0.71	0.87	0.90	1.39	1.25	0.94	0.52
Share of financial transactions bearing tracking features	6.43	0.71	0.39	0.35	-	0.10	-

Source: formed according to the State Financial Monitoring Service of Ukraine [216]

Vulnerabilities of banking institutions were identified with reference to the analyzed statistics on the revealed violations due to non-compliance with the financial monitoring requirements by domestic banks for the period of 2018 – 5 month of 2020 published by the NBU [124] (figure 3.11).

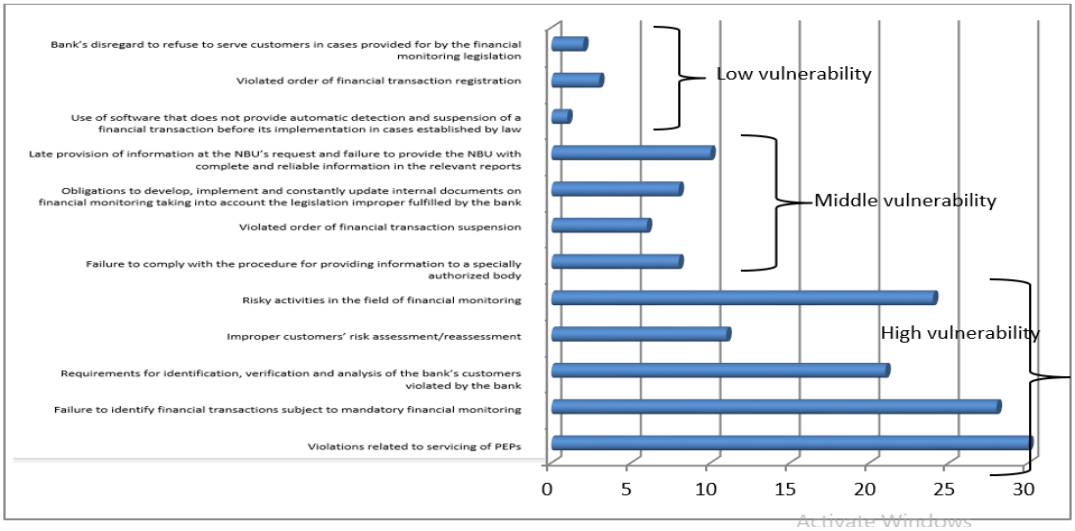


Figure 3.11. The number of revealed violations due to non-compliance with the financial monitoring requirements by domestic banks for the period of 2018 – 5 months of 2020
Source: formed according to the NBU [124]

As expected above, high vulnerability zones for banks include violations of transactions bearing the signs of internal or internal and mandatory monitoring. Accordingly, the vulnerability is high if the bank applies imperfect systems and

procedures to identifying and verifying customers and financial transactions, in particular, when the bank's internal monitoring fails to detect the mandatory monitoring signs, threshold transactions and take the appropriate measures.

The middle vulnerability zone includes organizational aspects of financial monitoring. That is, banks, even those with a well-established system applied to identify and verify customers and financial transactions, may be at ML/TF risk due to improper information and communication relations with the NBU and the authorized state financial monitoring body, failure to keep up with the updated legislation norms and the need for harmonizing the internal financial monitoring with regulatory changes.

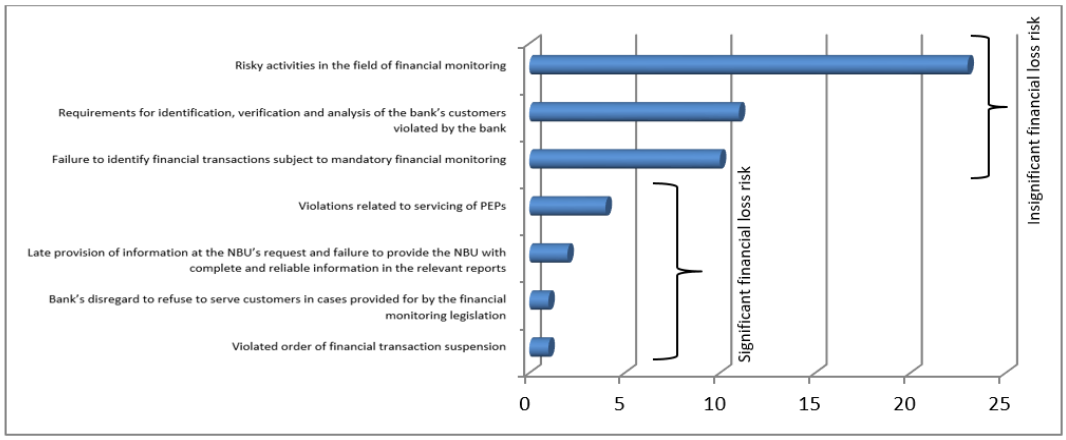
Only a few violations are associated with the bank's disregard to refuse to serve customers in cases provided for by the financial monitoring legislation (unacceptable risk). Therefore, the low vulnerability zone should include threats related to the clearly statutory defined inability to identify and/or verify the transaction participant, identify the participants' ultimate beneficial owners, unreliable information submitted by customers, the existing reasonable suspicions/grounds testifying to the fact of accomplishing the ML/TF transactions by customers, their affiliation to "shell companies", and if the bank with which the correspondent relationship is established is a shell bank [142].

The bank's vulnerability can be considered minimum if it applies an effective system to identifying and verifying customers and financial transactions and strictly adheres to the financial monitoring legislation rules.

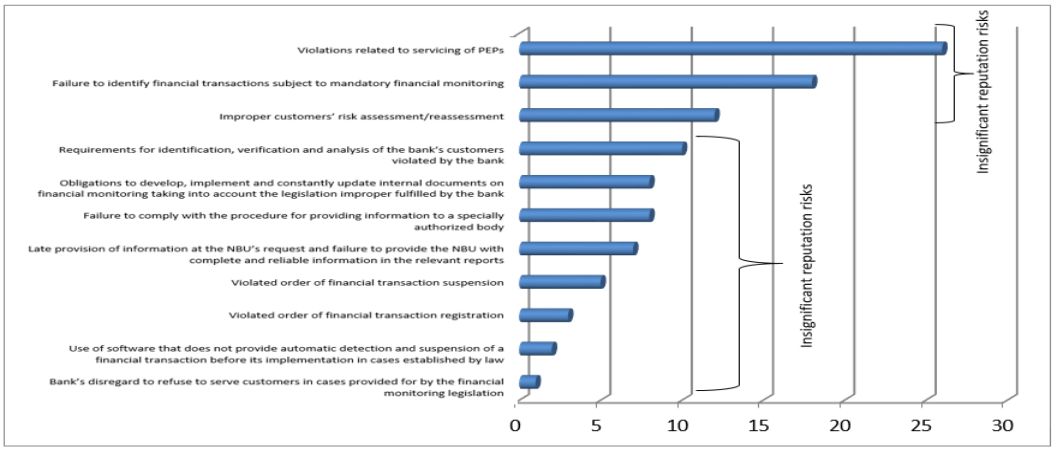
The ML/TF risk consequences (the third step of the risk-oriented approach) afford grounds for distinguishing the following groups:

- risks that have a significant impact on the national and international security. These include the unacceptable risk transactions and transactions performed by politically exposed persons (*PEPs*), their family members and/or related persons, participants/banks from a country that fails to comply with the FATF recommendations, which effect any transactions in the amount of UAH 400 thous. and more;
- risks that lead to significant financial losses suffered by banks due to fines for violated transactions bearing the ML/TF signs detected by the State Financial Monitoring Service (figure 3.12a);

- risks that expose banks to reputational risks due to the use of written warnings for violated ML/TF transactions detected by the State Financial Monitoring Service (figure 3.12b).



a) the number of fines



b) the number of written warnings

Figure 3.12. The number of fines and written warnings for non-compliance with the financial monitoring requirements by domestic banks for the period of 2018 – 5 months of 2020
Source: formed according to the NBU [124]

Thus, focusing on zones of middle and high threats, middle and high vulnerability of banks, significant consequences of the ML/TF risks makes it

possible to present in detail the areas of interest for the bank risk management (table 3.3).

The proposed banks' prudence areas built in reliance on the analysis of the legal framework for combating ML/TF and the statistics provided by the State Financial Monitoring Service and the NBU allow banking institutions to focus on the risks posed by ML/TF, which have a significant impact on their activities.

Table 3.3. Areas of the banks' interest during financial monitoring

Bank's prudence area	Transactions recommended as subject to application
1	2
High prudence areas related to identification and verification of transactions	Transactions performed by politically exposed persons (*PEPs*), their family members and/or related persons/participants/banks from a country that fails to comply with the recommendations provided by *FATF*/foreign financial institutions/foreign public persons and members of their families/customers subject to sanctions/customers whose place of residence (stay, registration) is the state enlisted as an offshore zone/customers operating with virtual assets/customers in respect of whom the bank suspects ML/TF transactions, committing other crimes or their affiliation to shell companies, for which the bank effects transactions amounting to UAH 400 thous.
Increased prudence areas related to identification and verification of transactions	Transactions performed by politically exposed persons (*PEPs*), their family members and/or related persons/participants/banks from a country that fails to comply with the recommendations provided by *FATF*/foreign financial institutions/foreign public persons and members of their families/customers subject to sanctions/customers whose place of residence (stay, registration) is the state enlisted as an offshore zone/customers operating with virtual assets/customers in respect of whom the bank suspects ML/TF transactions, committing other crimes or their affiliation to shell companies/companies or their UBOs whose activities are characterized by predominant cash settlements/associated with a high corruption risk/incorporated recently or with a complicated ownership structure/with a low reputation/with a citizenship, registration, location, business activities (as well as their key counterparties) in the countries where the ML/TF combating regimes are poor or countries characterized by an increased corruption risk, for which the bank effects transactions amounting to over UAH 30 thous. for servicing deposit and credit accounts/cash withdrawals from customers' accounts; acceptance of cash for transfer or transfer payments without opening an account; transactions using electronic means, with securities/renting out an individual safe without a list of values

Traditional prudence areas related to identification and verification of transactions	Transactions performed by companies that effect simple transactions and individuals who are not suspected of ML/TF, for which the bank effects any transactions amounting to over UAH 400 thous. or transactions amounting to UAH 30 thous. and more up to UAH 399,999 thous. regarding: cash withdrawals from customers' accounts; acceptance of cash for transfer or transfer payments without opening an account; transactions using electronic means, with securities	Transactions performed by politically exposed persons (*PEPs*), their family members and/or related persons/participants/banks from a country that fails to comply with the recommendations provided by *FATF*/foreign financial institutions/ foreign public persons and members of their families/customers subject to sanctions/customers whose place of residence (stay, registration) is the state enlisted as an offshore zone/ customers operating with virtual assets/customers in respect of whom the bank suspects ML/TF transactions, committing other crimes or their affiliation to shell companies/ companies or their UBOs whose activities are characterized by predominant cash settlements/ associated with a high corruption risk/ incorporated recently or with a complicated ownership structure/with a low reputation/with a citizenship, registration, location, business activities (as well as their key counterparties) in the countries where the ML/TF combating regimes are poor or countries characterized by an increased corruption risk, for which the bank effects currency exchange and cash transactions and transfers up to UAH 30 thous.

Source: compiled by the authors [136]

The declining share of information bearing the signs of internal financial monitoring in the total amount of information provided by banks highlights the need to further improve the methods used to assess suspicious financial transactions conducted by banks and the risks associated with them, given the effectiveness of their detection and depth of consequences.

While substantiating the elements composing the system of significant risks associated with ML/TF, it is crucial to consider the international risk management standards based on the assessment of threats, vulnerability to threats and their consequences for the bank and national security at all levels. Implementing the following steps: threat identification considering the type and jurisdiction of

customers and types of financial transactions and channels for their implementation, justification of banks' vulnerability to middle and high level threats, significant consequences of ML/TF risks allowed presenting in detail the areas of interest for the bank risk management. The research determined financial transactions subject to the recommendation to use high, increased and traditional prudence while identifying and verifying transactions.

The proposed banks' prudence areas built in reliance on the analysis of the legal framework for combating ML/TF and the statistics provided by the State Financial Monitoring Service and the NBU allow banking institutions to focus on the risks posed by ML/TF, which have a significant impact on their activities.

Further research should focus on forming a mathematical tool for assessing the bank's risks in the financial monitoring of ML/TF.

PART 4.
RISKS MET BY BANKS IN THE SYSTEM OF FACTORS INFLUENCING THE MONEY LAUNDERING PROCESSES

4.1. Use of monitoring to reduce bank risk in the area of money laundering and terrorist financing

In the process of the development of the modern market environment, the competition in the internal and external markets is intensifying, which results in the emergence of factors affecting efficiency of banking activity. Under these conditions, the issues of increasing efficiency of risk management in the banking sector remain urgent.

The globalization of financial markets and the change in the system of financial and economic relations with all the corresponding positive and negative consequences for the subjects of this system is a characteristic feature of modern economic processes. Under such conditions, the increase in banking operations occurs at a qualitatively new level, through the implementation of international standards of banking and resource support for the implementation of active transactions. As a negative consequence, the system of banking risks has also changed, especially under the influence of the growth of economic forms exceeding the officially recognized social norm in the context of money laundering. Banking activity is considered as one of the key instruments for the legalization of proceeds from crime, which gives rise to the probability of financial losses under the influence of a money laundering risk. Thus, at the macro and micro level, solving this problem is an extremely topical issue.

Such outstanding scientists as V. Bobyl [45], L. Bondarenko [47], O. Burbelo, L. Chunikhina [49], O. Krykliy [98], L. Kryvonos [103], L. Prymostka [145], and many others have paid considerable attention to studying the problems of management of banking risk of money laundering and terrorist financing. However, despite the significant scientific results obtained by the above mentioned and other scientists, measures to reduce banking risks in the field of money laundering remain insufficiently studied.

The aim of the work is to study the essence and specifics of risks in the banking system, in particular those related to money laundering, and the formation of recommendations for mitigating such types of risks by monitoring tools.

Risk is inherent in all types of business activity and it cannot be avoided

when making decisions about placing money in a bank, buying shares and other securities, investing in new production, etc. In most cases it is impossible to make an absolutely accurate forecast for a whole range of characteristics of economic objects, projects, processes that are being analyzed (inflation rates, market conditions, etc.). The use of innovative ideas and new technologies is always accompanied by risk, but attempts to avoid innovation can stop the progress of society [195].

When studying the concept "banking risk", in most cases scientists are trying to adapt the definition of the category "risk" to specific conditions of its emergence in banking activity. In view of this, there can be no significant differences in the approaches used in both cases. Thus, for example, S. Dmytrov singles out six approaches to the definition of the concept "banking risk" [61]: as probability of deviation from the expected result; threat of loss; probability of both incurring losses and receiving profits; uncertainty in forecasting the result; a situational characteristic of a bank's activity, reflecting the uncertainty of its result; banking activity related to overcoming uncertainty.

The carried out analysis of the definitions of the concept "banking risk" presented in literary sources indicates that most of them are similar, and the differences lie mainly in the chosen approach to understanding the essence of risk in general. In interpretations of the concept "banking risk", as a rule, attention is focused on its financial nature, which manifests itself in the form of possible consequences of a risk situation. Thus, the National Bank determines a banking risk by its effect on capital and revenue [22].

Thus, an overwhelming majority of researchers distinguish the financial component of banking risks and tend to think that banking risks are financial risks that result in losses. This conclusion is confirmed by the fact that when considering individual banking risks researchers once again emphasize, first of all, the financial component.

With the help of morphological analysis, the key aspects of the essence of banking risks are identified and their systematization carried out (table 4.1).

4.1. Use of monitoring to reduce bank risk in the area of money laundering and terrorist financing

Table 4.1. Results of the clarification of the essence of banking risk

Key aspect	Detailization of the key aspect	Clarification of the definition
Probability	of deviation of the volume, spatial and temporal parameters of a bank's financial flows from the expected ones	due to implementation of active–passive operations, their organization, the state of corporate governance and the influence of environmental factors
		which results from a purposeful action or inaction of interested stakeholders
	of an expected or unexpected event	which can have a negative impact on a bank's capital and / or revenue
	of loss of income or decrease in the market value of a bank	due to adverse effects of external or internal factors
Possibility	of losses incurred by a credit institution or deterioration in its liquidity	due to occurrence of adverse events related to internal or external factors
		in case of occurrence of unfavorable for the bank circumstances
	of occurrence of an adverse event	which can cause losses by a banking institution of some of its resources, lack of income, or additional costs resulting from its activities
	of lack of income or reduction in the market value of a bank's capital	due to adverse effects of external or internal factors
Threat	of losing by a bank its resources, lack of income, incurring additional expenditures	which can result from carrying out financial transactions
		which can result from rendering services to customer
Characteristics	of a bank's activity	which reflect the uncertainty of its (activity) result
Danger	of losses arising from the specifics of operations	which are carried out by credit institutions
Uncertainty	of the result of a bank's activity	which can cause adverse consequences in case of failure
Value	of a possible event	which can cause financial, or reputational losses

Source: compiled by the authors [126]

4.1. Use of monitoring to reduce bank risk in the area of money laundering and terrorist financing

As can be seen from table 4.1, banking risk can be considered as probability of deviation of the volume, spatial, and temporal parameters of a bank's cash flows from the expected ones, ability of a credit organization to experience losses or deterioration in liquidity, threat of loss of its resources, uncertainty of the result of its activity, risk of loss, event which can cause losses expressed in monetary terms, and characteristics which reflect its uncertainty.

Taking into account the results obtained, banking risk in the field of money laundering and terrorist financing can be interpreted as an action or inaction of authorized persons or clients which can lead to financial, operational, or reputational losses.

The most common in the economic literature is the classification of banking risks which distinguishes external risks, including: natural disasters, political, economic ones, etc., and internal risks, including: risks of management, organization and implementation of banking operations, financial risks [98; 145; 212]. Therefore, external risks are related to changes in the external environment of a bank and are not directly dependent on its activities. The impact of external risks on the performance of a bank is extremely high. Management of these risks is most difficult and sometimes impossible. For their evaluation, basically logical methods of analysis are used. Internal risks include those arising directly from activities of a particular bank. The existing risks are diverse and can be divided into corresponding categories. The versatility of the concept "risk" is due to the variety of factors that characterize both the features of a particular type of activity and specific features of uncertainty in the context of which banking activity takes place.

It should be noted that irrespective of the types and classes of banking risks, their influence is mainly manifested in financial losses of a bank due to disruption of the cyclicity and balance of inflows and expenditures in the structure of its financial flows at carrying out all types of its operations.

Considering the existence of the money laundering risk, the classification of banking risks can be generalized as follows (figure 4.1).

4.1. Use of monitoring to reduce bank risk in the area of money laundering and terrorist financing

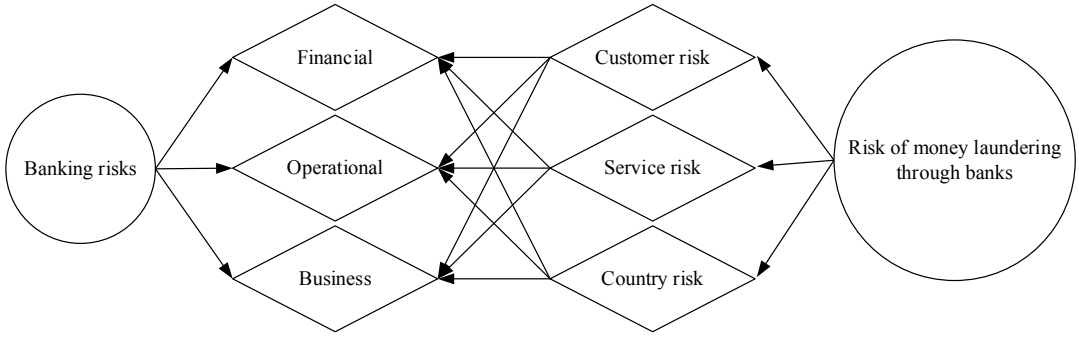


Figure 4.1. Classification of banking risks with consideration for the risk of money laundering
Source: formed by the authors [126]

Banking business is inherently related to risks which are generated by numerous factors (external environment, structure of assets and liabilities, other financial and functional factors) affecting their level and, consequently, the way of their analysis and methods for their measurement and mitigation. Understanding the nature of these risks, their correct evaluation and management allows to avoid or significantly reduce possible losses for banking institution, especially as a result of the impact of the current global financial crisis, the depth and duration of which turned out to be much stronger than expected. The importance of banks in the functioning market system, as well as the current crisis phenomena, necessitate an adequate evaluation of risks, their analysis and reflection in managerial information to ensure conscious management and control. The risk management process is continuous in nature, its stages alternating with each other. Mechanisms for protecting banks against risks consist of current risk management and methods for risk minimization.

In order to regulate banking activity on the basis of off-site surveillance to monitor activities of individual banks and the banking system as a whole, the NBU establishes prudential standards [124].

Table 4.2 presents the values of the main indicators of the prudential standards for the banking system of Ukraine in recent years [124].

The size of the regulatory capital of a bank should not be less than the minimum size of the regulatory capital of a bank (H1) established by the National

Bank of Ukraine. If the RC has a negative or zero value, then in the calculation of the ratios its conditional value – one hryvnia – is taken.

Table 4.2.Values of the prudential indicators for the banking system of Ukraine for 2015–2018

Indicator		2015	2016	2017	2018
H1	Regulatory capital (UAH million)	169 492,5	99 305,4	138 526,0	115 817,6
H2	Regulatory capital adequacy ratio (not less than 10%)	14,03	8,92	13,34	16,10
H4	Quick ratio (not less than 20%)	44,94	72,25	59,30	55,55
H5	Current ratio (not less than 40%)	81,38	78,76	87,40	108,08
H6	Short-term liquidity ratio (not less than 60%)	83,85	88,82	91,01	98,37
H7	Ratio of maximum credit risk exposure per counterparty (not more than 25%)	22,64	23,13	21,37	20,29
H8	Ratio of large credit risks (no more than 8 times the regulatory capital)	306,58	551,47	321,28	208,31
H9	Ratio of maximum credit risk associated with transactions with insiders (no more than 25%)	-	63,72	28,80	17,89
H11	Ratio of investment in securities for each individual institution (not more than 15%)	0,01	0,002	0,001	0,0001
H12	Ratio of total investment (no more than 60%)	3,17	1,39	0,64	0,22

Source: summarized by the authors [126]

From table 4.2 it is obvious that in recent years Ukrainian banks have observed almost all of the prudential standards, except for:

the ratio of adequacy of regulatory capital (H2), which as of January 1, 2017 amounted to 8.92, i. e., was less than 10%. The obtained result indicates that banks do not cover the negative consequences of various risks that they assume in the course of their activities and ensuring the protection of deposits, financial stability and stability of their banking operations;

the ratio of maximum credit risk associated with transactions with insiders (H9), which must not exceed 25%, was 63.72% as of January 1, 2017 and 28.80% as of January 1, 2018. The results indicate that the risk which arises in the course of

transactions with insiders may lead to direct or indirect impact on banking activity.

In general, it should be noted that during 2015–2018 all of the indicators demonstrate volatile behavior, which testifies to instability in the banking sector. To assess the degree of variation of the prudential indicators, the coefficient of variation [125] was used.

According to the scale for assessing the degree of variation, in the period 2015–2018 the indicators were grouped as shown in table 4.3.

Table 4.3. Scale for assessing the degree of variation of prudential indicators using the coefficient of variation (CV)

Coefficient of variation	Assessment of variation	Prudential indicators ranked by degree of variation
CV ≤ 10%	The aggregate of indicators is relatively homogeneous, and the degree of variation is low	H6 (6%), H7 (5%)
10% < CV ≤ 25%	The aggregate of indicators has an average degree of heterogeneity and variation	H1 (20%) H2 (20%) H4 (17%) H5 (13%)
25% < CV ≤ 50%	The aggregate of indicators has a high degree of heterogeneity and variation	H8 (36%)
CV > 50%	The aggregate of indicators has a very high degree of heterogeneity and variation	H9 (5 %) H10 (120%) H11 (83%)

Source: calculated by the authors [126]

From the results obtained, it is possible to conclude that the highest degree of volatility is observed with the ratios of short-term liquidity and maximum credit risk exposure per counterparty. In addition, the indicators demonstrate a positive trend, their values approximating those recommended by the standard. Taking into account the results of the study presented in [125], it should be noted that this trend has stayed stable since 2003.

The regulatory capital, the regulatory capital adequacy ratio, the quick and current ratios (H4 and H5) have an average degree of heterogeneity and variation, which is also a continuation of the trend which has been observed since 2003.

The ratio of large credit risks (H8) has a high level of variation, but during the period under review its value remains within the limits established by the standard.

4.1. Use of monitoring to reduce bank risk in the area of money laundering and terrorist financing

A very high degree of variation is characteristic for prudential indicators concerning investment (H11 and H12) and regulation of banks' operations with insiders (H9). Since during the period under review their values are within the established limits, such variations are an evidence of the reaction of the banking sector to changes in the economic environment and do not present a threat to its functioning, besides this situation has been observed since 2003 and is shifting towards improving the values of the indicators.

In accordance with the concept of monitoring based on risk evaluation, responsibility for controlling risks lies with the management of a bank and the supervisory board of the bank. And the system for assessing the money laundering risk is part of the system of risk-based financial monitoring. Such monitoring ensures quality management of the development of all the most important economic and financial parameters of banking activity and is extremely relevant under present crisis conditions. The system includes mechanisms for risk identification by the key areas: KYC – Know Your Customer, KTYC – Know Transactions of Your Customer, KCYC – Know Customer of Your Customer, KYBP – Know Your Business Partners, KYE – Know Your Employees, which are the practice of international standards of managing risks related to money laundering through the banking system.

Most definitions of the concept "financial monitoring", which have been proposed in recent years in works of domestic and foreign economists, comprise the following main components: presence of a complex of actions, determination of funds and goals. Based on the results obtained, it can be concluded that financial monitoring is a persistent and continuous process that includes observation, analysis, evaluation, and forecast of financial transactions which reveal signs of laundering of criminal proceeds or terrorist financing. Only after that appropriate measures are taken regarding the assets and participants in the financial transactions they carry out.

In accordance with Article 5 of the Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, or Financing of Terrorism", the system of financial monitoring consists of two levels: primary and state one [22].

4.1. Use of monitoring to reduce bank risk in the area of money laundering and terrorist financing

A bank which has separate divisions can create an intra-bank system for preventing the legalization of criminal proceeds and financing of terrorism, in accordance with which certain powers to maintain the register of financial transactions, make decisions on reporting to the State Financial Monitoring Service of Ukraine on financial operations in a certain region will be exercised by authorized by the bank separate divisions and their responsible officers.

Among financial transactions that fall under the criteria of financial monitoring, there are the following:

- transfer of funds in cash to an account with their subsequent transferring to another person on the same business day;
- transfer of funds to or their withdrawal from the current account of a legal entity or a sole proprietor if the operations on the specified account have not been carried out since the day of its opening;
- transfer of funds abroad in the absence of a foreign economic agreement (contract);
- transfer of funds to the current account of a legal entity whose period of activity does not exceed three months from the date of registration;
- withdrawal of funds from the current account of a legal entity whose period of activity does not exceed three months from the date of registration.

The consideration of the main subsystems of financial control organizations in the monitoring structure allows to conclude that Ukraine is implementing a mixed model of financial monitoring. For its part, the NBU in terms of legal support develops proposals for improving the legislation of Ukraine, makes amendments to the existing legal acts and adopts new ones; in terms of methodological support provides recommendations on the application of certain norms of legislation, responds to questions of banks, places relevant information on the official website of the NBU.

It should be noted that significant work has been done in Ukraine in the direction of ensuring legal support for the prevention, detection, and suppression of such unlawful activities.

The current legislation regulates the administrative and legal status of subjects of such countering, the order of their coordination and interaction, the

main measures that they take in this area, the order of bringing perpetrators to justice. A further reform of the domestic legislation should be carried out with regard to the international efforts taken. Thus, at the international level, the Financial Stability Board (2009) and the European Systemic Risk Board (ESRB) (2010) were created. Moreover, in 2010 the Basel Committee on Banking Supervision approved the Basel III, and in 2013 the Capital Requirements Regulations (CRR) and the Capital Requirements Directive (CRD IV) were adopted. The above mentioned documents, among other things, introduce macroprudential instruments. The ESRB has published recommendations for macro-prudential policies, which include expanding the mandates of central banks to ensure financial stability, and setting up inter-agency councils/committees on financial stability.

After the economic crises, the banking system of Ukraine demonstrates stable trends, functioning under conditions of tighter regulation by the state. In 2017–2018, with the aim of ensuring financial stability, the NBU continued to improve its approaches to banking regulation and the relevant regulatory framework.

The fundamental changes in the field of banking regulation are as follows:

- Change in the procedure for evaluating credit risks, which makes it possible to qualitatively update the processes of formation of reserves and identify the imbalances in their evaluation.
- Change in approaches to measuring the size of bank capital based on stress testing, which in the future will facilitate the capitalization of banks.
- Transformation of the standard regulating the restrictions on insider transactions by introducing new criteria to define insiders and increasing the transparency of the ownership structure and the identification of final beneficiaries.
- Change in the method for identifying non-performing assets, which allows to more objectively determine the quality indicators of banks.
- Preparation for introducing and testing the new prudential standards, in particular, the indicator LCR – a new tool for regulating bank liquidity, the new requirements for the structure of bank capital, etc.

- Systematic conduct of stress testing, which makes it possible to identify the vulnerability of banks to economic shocks.

Thus, the NBU constantly monitors and conducts a comprehensive analysis of risks in the banking sector, as well as informs about them all market participants. In our opinion, further improvement of the system of financial monitoring of banking activity should include the following:

- constant use of a risk-based approach to analyze financial transactions of banking institutions;
- gradual achievement of objectives of the macroprudential policy, in particular: preventing excessive lending growth; preventing liquidity shortages; restricting risk concentration; limiting the effects of distorted incentives; increasing stability of financial infrastructure; lowering the dollarization level in the banking sector;
- improvement of organizational support for managing banking risks at both micro and macro levels;
- perfection of the systems for assessing the resilience of banks and the banking system to the volatility and unpredictability of the external environment;
- improvement of assessing quality of internal control and corporate governance.

Thus, the effective use of the tools for regulating financial risks of the domestic banking system will prevent their accumulation, as well as increase the resilience of banks to possible crises.

4.2. Tools for assessing the strategic risk faced by banks, and its relation to the compliance with legal requirements in the field of combating money laundering

Today, the risk-based approach has become a world standard, its implementation in the banking sector was initiated by the Basel Committee on Banking Supervision (in particular, in the format of Basel II and Basel III recommendations) as a response to the devastating consequences of the recent global financial crisis in order to further minimize risks associated with banking activities. In view of this, it is important not only to harmonize the banking legislation of Ukraine with the international standards and create the necessary regulatory framework for implementing risk-based supervision but to improve internal systems of bank risk management as well. In particular, we are talking about assessment methods aimed at timely identification and neutralization of risks as well as prevention of the occurrence of chain risk events, taking into account the inter-connectedness of bank risks. Therefore, the development of a procedure for assessing strategic risk of a bank and the justification of its interrelation with the compliance risk, which are defined as the aim of the article, can be considered relevant and promising areas of research.

It is generally accepted in banking practice that strategic risk is not quantifiable, and, in this regard, the issues of finding alternative approaches to assessing it (compared with financial risks) are not well developed and has not been widely considered by scientists. But the scientific literature more often highlights theoretical aspects concerning strategic risk of a bank (its essence, features of manifestation and consequences) [46; 203; 81; 91; 152; 183; 211], considers its interrelation or causal relationship with other components of risk profile of the bank and individual banking processes [89; 104; 146; 170; 183; 211]. For example, A. O. Yepifanov, T. A. Vasylieva, S. M. Kozmenko et al. [211] provide an explanation of the interrelation of the strategic risk with the interest rate risk of a bank, while A. M. Kuznetsov and Yu. B. Derkach [104] investigate its connection with the currency risk. V. D. Sekerin and S. S. Golubev [170] highlight hierarchical relationships between individual banking risks that, in their opinion,

are prevailing. According to the authors, these risks, along with the strategic one, include market, compliance, credit, operational and liquidity risk, while at the same time note that the strategic risk is the most global one.

Work [183] also focuses on the interconnectedness of bank risks; in particular, this is demonstrated using the example of the partial intersection of the strategic, reputational and transfer risks, business risk, credit, market and operational risks. The influence of innovative systems of remote banking services on the strategic and other bank risks are considered by L. O. Prymostka [146] and G. T. Karcheva [89]. According to G. T. Karcheva [89], this relationship is explained as follows: the application of electronic banking technologies leads to changes in the "bank-client" interaction, which in turn can have a negative influence on effectiveness of the implementation of financial monitoring procedures and result in an increase in the strategic, reputational and compliance risks.

Among the scientific works that deal with the formation of guidelines for assessing strategic risk of a bank and the development of methodological support for managing it as a whole, researches of I. M. Rabyko [152; 153] and N. P. Verkhusha [203] should be noted. I. M. Rabyko [153] proposes a methodology for measuring strategic risk of a bank, which implies its assessment according to criteria that summarize information regarding: existence of the bank's strategic plan and its adjustment (including when the bank moves to another stage of its life cycle); consideration in the strategy of the risks to which the bank is exposed in its activities; compliance with the relevant regulations and the principles of the International Accounting Standards; existence of plans for increasing revenues and optimizing expenses, carrying out recapitalization and ensuring liquidity; availability of methods for conducting stress testing for profitability; division of functions among persons responsible for elaborating and implementing the strategic development plan, control and monitoring of the strategic risk; monitoring of and stress testing for strategic risk, formalization and presentation of their results on a regular basis, etc.

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Using scoring (from 1 to 4 scores: 4 – the lowest score, 1 – the highest score) and weights for each of the specific criteria for strategic risk assessment, the author offers the following interpretation of the results: ≤ 1.0 – the component of the risk management system is highly effective; > 1.1 and ≤ 2.0 – the component of the risk management system is sufficiently effective; > 2.1 and ≤ 3.0 – the component of the risk management system is not sufficiently effective; > 3.1 – the component of the risk management system is ineffective. Following the recommendations of N. P. Verkhusha, the level of strategic risk should be measured from with regard to reliably assessed data on errors associated with the implementation of strategic decisions of the bank and any other information about changes in its strategy [203].

The presented proposals of researchers to a greater extent cover issues related to applying the corporate (general) strategy, in particular, those managerial errors that are committed in the process of its implementation. However, reasons of emergence of strategic risk at the stage of strategy formation, in our opinion, are not fully covered. To clarify and generalize them, we will consider the definitions of the concept “strategic risk of a bank” given in relevant regulatory legal acts and the scientific literature (table 4.4). For example, the Guidelines for the inspection of banks Risk Assessment System [2] and the Guidelines on the Organization and Functioning of Risk Management Systems in Banks of Ukraine [99], define strategic risk as “the existing or potential threat to income and capital arising due to incorrect managerial decisions, inappropriate implementation of the decisions and inadequate response to changes in the business environment. This risk arises from the inconsistency of: strategic goals of the bank; business strategies designed to achieve the goals; resources involved in achieving the goals; quality of their implementation”.

4.2. Tools for assessing the strategic risk faced by banks, and its relation to the compliance with legal requirements in the field of combating money laundering

Table 4.4. Definition of the concept "strategic risk of a bank" in the scientific literature

Author(–s), source	Definition of the concept "strategic risk of a bank"
V. V. Bobyl [46]	The likelihood of deviation from the target figures due to inadequate response to changes in the business environment of the bank
V. V. Kovalenko [183]	Risk of an incorrectly chosen managerial decision.
A. O. Yepifanov, T. A. Vasylieva, S. M. Kozmenko et al. [211]	A potential threat to a bank's financial condition as a result of incorrect determination of its development strategy and ways for achieving it, which is manifested in changes in the bank's net profit and/or equity
N. P. Verkhusha [203]; I. M. Rabyko [152]; Ye. G. Knyazeva, N. I. Parusimova [91]	Risk associated with the occurrence of debts and financial losses in a bank, with the non-receipt of the target revenues as a result of mistakes and omissions made in making decisions that determine the strategy of the bank's activities and development and are manifested in: neglecting possible dangers that threaten the bank's activities; incorrect or insufficiently justified identification of promising activities in which the bank can achieve advantages over its competitors; lack or insufficient provision of necessary resources (financial, material and technical, human ones) or adequate organizational and control measures to achieve the goals of the bank's activities
V. P. Gmyria [81]	Risk arising from incorrect or insufficiently justified identification of promising activities of the bank; lack or insufficient provision of necessary resources or adequate organizational measures to achieve the strategic goals of banking organizations

Source: summarized by the author [41]

Studying the essence of the strategic risk leads to the conclusion that the reasons for its occurrence may be insufficiently justified in the process of forming the general strategy strategic goals or strategic measures and failure to implement them, as well as incorrectly set target values of indicators used to measure the strategic goals. Therefore, it is necessary to distinguish between primary and secondary strategic risk, which should be considered as risk of incorrect setting of target parameters and risk of failure of management decisions respectively. In this case, the secondary strategic risk is produced as a result of management failures, in particular: inconsistencies of the strategic goals, the strategic goals and resources necessary for their achievement by the bank, the strategic goals and activities; inconsistency of strategic decisions, etc. In view of this, recommendations on differentiation of the types of strategic risk of a bank are proposed to be taken into account when assessing its overall level.

4.2. Tools for assessing the strategic risk faced by banks, and its relation to the compliance with legal requirements in the field of combating money laundering

Within the established procedure for measuring strategic risk of a bank, the level of primary strategic risk is determined by summarizing information on the comparison of the actual values of the bank's performance indicators with the desired target priorities, which are declared in the strategic plan, the level of the secondary strategic risk – by evaluating the organizational and economic support for strategic bank management.

Since strategic risk of a bank arises directly in the strategic management process, the implementation of which is characterized by certain features in different banks (in terms of choosing tools for the formation of analytical support for the development and implementation of the strategy), it is proposed to assess the primary strategic risk using indicators that are grouped within the subsystems of the Balanced Scorecard (BSC).

The idea of forming a balanced set of indicators belongs to the American researchers R. Kaplan and D. Norton [88] and is highlighted in many scientific works on development of analytical systems (in particular, [35; 112; 157] and others). The main feature of the BSC proposed by D. Norton and R. Kaplan, in comparison with derivatives and analogous tools, is the possibility of its using not only as a system for evaluating performance but as a strategic management tool as well. Moreover, if we consider BSC as a tool for strategic management of the bank as a whole, the logic of its using is as follows: it allows 1) carrying out a comprehensive assessment of the bank's activities due to a balanced combination of financial and non-financial indicators (Key Performance Indicators or KPIs), which re grouped within four subsystems (Finance, Customer, Internal Processes, Learning and Growth); 2) based on the results of the assessment, formulating strategic goals united by cause and effect relationship; 3) determining and formalizing the general development strategy, monitoring the implementation of the strategy and evaluating its effectiveness.

Thus, it can be concluded that, encompassing the strategic management cycle, the BSC provides the management of the bank with complete information on its financial activities and factors that influence it; allows checking the current corporate strategy for completeness, consistency and relevance; contributes to concentration of efforts on the bank's strategic activities; provides for

communication at all levels of the bank's management; aims to optimize the bank's business processes and innovation; ensures increased strategic efficiency and can be successfully integrated into the controlling system; allows to predict appearance of problems and timely respond to risks. Moreover, it is critical that the requirements for the strategy (from the point of view of its balance), which must be met for a successful implementation of the BSC, are quite closely correlated with factors influencing the secondary strategic risk.

The developed procedure for assessing a bank's strategic risk includes three stages (fig. 4.2) [41]: at the first stage, a quantitative assessment of the primary strategic risk is carried out (based on the approximation of the actual values of financial and non-financial parameters for measuring strategic goals to the target values, the indicator $StRI_1$ is calculated); at the second stage, by interviewing internal experts (heads of functional departments of the bank), an assessment of the secondary strategic risk is provided (using the Rasch model [63], with the help of the criteria presented in [92] and supplemented by the criterion "incoherence and inconsistency of the adopted strategic decisions", the indicator $StRI_2$ is calculated); at the third stage – the general level of the strategic risk is determined.

At the final stage of the procedure for assessing strategic risk of a bank, the results of determining the quantitative levels of the primary and secondary strategic risk are synthesized (with regard to the need to bring the secondary strategic risk indicator to the measurement system – from 0 to 1). After that, the arithmetic mean value of the indicators $StRI_1$ and $StRI_2$ is calculated and the level of the total strategic risk is determined.

To provide a qualitative interpretation of the results of the quantitative assessment of strategic risk of a bank, an interval scale constructed using the golden section can be applied. According to this scale, if the quantitative value of the indicator of the total strategic risk falls within the range from 0 to 0.382, it indicates a low (acceptable) level of risk; within the range from 0.383 to 0.618 – a medium (moderate) level of risk; within the range from 0.619 to 1 – a high level of risk.

4.2. Tools for assessing the strategic risk faced by banks, and its relation to the compliance with legal requirements in the field of combating money laundering

Stage 1: Assessment of the primary strategic risk of the bank

1.1. Determination of actual values of indicators for measuring the degree of achievement of strategic goals, which are grouped within the subsystems of the BSC:

Subsystem "Finance": indicators of liquidity, profitability, financial stability and business activities of the bank;
Subsystem "Customer": indicators of customer relationship, customer profitability and customer retention;
Subsystem "Internal Processes": indicators of operating expenses and innovative activities of the bank; Subsystem "Learning and Growth": indicators of staff efficiency, qualifications and competence, motivation level

1.2. Calculation of $StRI_1$:

$$StRI_1 = 1 - \frac{1}{n} \cdot \sum_{i=1}^{n} \frac{x_{fact}}{x_{plan}},$$

where *xfact* – is actual values of financial and non-financial indicators of the bank's performance; *xplan* – is target values of financial and non-financial indicators of the bank's performance, which are justified in accordance with the chosen strategy; n – number of indicators analyzed

Stage 2: Assessment of the secondary strategic risk of the bank

1. Calculation of $StRI_2$ using the Rasch model:

$$StRI_2 = ln\left(\frac{p}{1-p}\right),$$

where p – is the ratio of the total number of positive responses from experts on the criteria for assessing the level of strategic risk ($K1 - K7$) to their maximum possible number;
$K1$ – inconsistency of the goals of the bank and the resources necessary to achieve them;
$K2$ – inconsistency of the stakeholders' interests;
$K3$ – inconsistency of goals of all levels of management;
$K4$ – inconsistency of the strategic goals of the bank and personal goals of its employees;
$K5$ – inconsistency of duties and responsibilities of the bank's employees;
$K6$ – inconsistency of the strategic goals and measures;
$K7$ – inconsistency and incoherence of strategic decisions

2.2. Reducing the results of assessing the secondary strategic risk of the bank to the range of values from 0 to 1.
It is performed by comparing the value of $StRI_2$ with its maximum possible value, which, according to the Rasch model, equals 2.94 logits (the upper limit of the interval [2.2; 2.94], which corresponds to a high level of the secondary strategic risk of the bank)

Stage 3: Assessment of the general level of the bank's strategic risk
(as the arithmetic mean of the indicators $StRI_1$ and $StRI_2$)

Figure. 4.2. Stages of the procedure for qualitative assessment of the strategic risk of the bank
Source: formed by the author [41]

4.2. Tools for assessing the strategic risk faced by banks, and its relation to the compliance with legal requirements in the field of combating money laundering

Given the content-related characteristics of the components of a bank's strategic risk (primary and secondary strategic risk), it is possible to streamline the chain of cause and effect links not only with financial risks but also with non-financial risks of banks. In particular, with the compliance risk, which in the Regulation on Implementing the Financial Monitoring by Banks [99] is defined as "the risk of legal liability or the risk of application of enforcement measures by the NBU, financial losses and reputational losses that the bank may incur due to non-provision of the appropriate level of compliance with all requirements of the laws of Ukraine, regulations, rules, internal documents of the bank, rules of conduct that can be applied when the bank fulfills its obligation as a reporting entity". The necessity of studying this risk under modern conditions is gaining importance due to the intensification of implementing the International Standards on Combating Money Laundering and the Financing of Terrorism and Proliferation (the FATF standards) and, accordingly, an increased attention to the banking system as a link in criminal money laundering schemes.

In the annual reports of the NBU for 2017–2018 [21], it was noted that to ensure proper supervision over bank's compliance with legislation requirements in the field of financial monitoring during this period, NBU specialists conducted 53 scheduled and 3 unscheduled field inspections of Ukrainian banks as well as 86 desk inspections. Based on the results of inspections, for violation of the law on financial monitoring, the following measures were applied: in 2017 – 37 banks received written warnings, and 15 decisions on imposing fines for the total amount of UAH67 552 001 were approved; in 2018 – 22 banks received written warnings, and 14 decisions regarding penalties for the total amount of UAH 152 072 978.26 were recorded.

The data on the results of inspections of individual Ukrainian banks, aimed at prevention and counteraction to legalization (laundering) of proceeds from crime, terrorist financing and the financing of proliferation of weapons of mass destruction, for January – November 2019 are presented in table 4.5.

4.2. Tools for assessing the strategic risk faced by banks, and its relation to the compliance with legal requirements in the field of combating money laundering

Table 4.5. Enforcement measures of the NBU applied to the banks of Ukraine that violated legislation in the field of financial monitoring (January – November 2019)

Month	nks to which the enforcement measures were applied for violation of the legislation	Types of enforcement measures applied	
		Penalties, hrn	Warning letters
January	Pravex Bank JSC	200 000	+
	JSC "Unex bank"	–	+
	Universal Bank JSC	14382472.28	+
February	Megabank JSC	6 200 000	–
	Commercial Bank "Land Capital"	–	+
March	OTP Bank	7142125.42	+
April	Bank Vostok PJSC	300 000	+
	JSC "Alpari Bank"	2 000 000	–
	PJSC "MTB Bank"	4350000.50	–
	"RwS bank"	3000390.52	–
	PJSC"Settlement Center for Servicing Contracts in the Financial Markets"	200 000	–
May	JSC CB PrivatBank	–	+
June	JSCB Industrialbank	6852526.49	–
July	JSB Pivdennyi	–	+
	JSC "Misto Bank"	–	+
	Bank Credit Dnipro JSC	300 000	+
August	JSC Bank Alliance	2 600 000	–
	"Sberbank" JSC	–	+
	Ukrgasbank JSB	300 000	+
	JSC "CIB"	200 000	–
September – October	NBU did not apply any enforcement measures to the banks		
November	JSC "EPB"	400 000	–
	Megabank JSC	200 000	–
	JSC "AB "Radabank"	300 000	–
	JSC "Oschadbank"	200 000	–

Source: formed by the author according to the NBU [41]

According to the data in table 4.5, in January – November 2019, the NBU made a decision on applying enforcement measures to 23 banks (to Megabank JSC – twice (in February and November). To 6 of them (Pravex Bank JSC, Universal

Bank JSC, OTP Bank, Bank Vostok PJSC, Bank Credit Dnipro JSC and Ukrgasbank JSB) both penalties and written warnings were applied as enforcement measures.

The total amount of fines for banks that violated legislation in the field of financial monitoring for the corresponding period is UAH 49127515.21, and the main reason for applying fines to most of them is an inappropriate analysis of financial transactions of their clients in view of the risk-based approach. Moreover, for these banks, the amount of fines was much less than for those that carried out risk related activities in the field of financial monitoring.

For example, financial schemes the nature and consequences of which give reason to believe that they are related to legalization of criminal proceeds were found in the activity of 8 banks. In particular, the schemes implemented through the so-called layering and imply the conversion of non-cash resources into cash. In the explanations of the NBU [23] on the implementation of risk-taking activities in the field of financial monitoring by these banks, the following schemes were identified: the issuance of cash which came to the accounts of a group of individuals from a legal entity – the bank client – as loans and the repayment of these loan obligations by two other legal entities with signs of fictitiousness (Megabank JSC in the amount of UAH211.8 million); transferring funds from customer accounts to accounts with other banks and the delivery of these funds by means of cash-in transit services of other banking institutions to the business units of these customer (JSCB Industrialbank – in the amount of about UAH906 million, PJSC "MTB BANK" – UAH1.18 billion, OTP BANK – more than UAH700 million, JSC "Alpari bank" – UAH400 million); crediting of funds to customer accounts with signs of fictitious activity (transfer from counterparties, some of which are clients of other banks) with their subsequent transfer to other companies (Universal Bank JSC – in the amount of UAH 2.8 billion) within the following few days; conducting cyclical financial transactions with government bonds on behalf of individual customers, including public figures or persons close to them (JSC Bank Alliance and "RwS bank").

It should be noted that the main reasons for the emergence of compliance risk are inefficient work of the compliance control department, imperfect internal bank

systems for financial monitoring and insufficient experience of banks in these areas.

However, an increase in strategic risk resulting from incorrect determination (in this case – overestimation) of the values of target indicators for measuring strategic goals as well as from inefficiency of the strategic management mechanism also makes it possible for banks to use a formal approach to meeting the requirements of legislation in the field of financial monitoring. This means that due to the failures to reduce the level of strategic risk through using internal drivers (managerial decisions to improve strategic plans) and the reluctance to adjust target parameters, in order to obtain financial benefits and achieve strategic financial goals, banks face a risk of being involved in legalizing criminal proceeds and, accordingly, compliance risk. As an example of using a formal approach to meeting the requirements of legislation in the field of financial monitoring, we can consider the information published by the NBU [23] about Universal Bank JSC. In particular, the fact that within a month after making the decision to terminate business relations with customers who were posing an unacceptably high risk, the bank continued to service them and conducted financial transactions in the amount of about UAH 266 million.

From a practical point of view, the significance of the presented procedure for assessing strategic risk of a bank is that the results of its implementation can be used: firstly, for justifying decisions to minimize strategic risk by adjusting the strategy (clarifying and changing strategic measures, reviewing strategic goals and parameters, measuring their achievements) and optimizing managerial decisions in general; secondly, in the context of managing the compliance risk, organizing the work of the bank's compliance control department and its internal financial monitoring system. It is also advisable to note that the occurrence of compliance risk initiates the growth of strategic risk. In particular, due to the application of financial sanctions to the bank, it leads to the emergence of reputational risk, the strengthening of which may negatively affect the level of effectiveness of the strategy implemented by the bank.

4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

In conditions of transformations of the world economy, one of the main tasks of the banking system is the creation of favorable conditions for the stable reproduction process and entrepreneurial activity development because the prospects for further growth of economic entities largely depend on the ability of banks to meet their needs by necessary financial resources. Research the directions of activization of economic entities credit activity and bank's activity as a powerful lever of influence and ensuring the development of entrepreneurship are actualized in terms of lack of own funds to finance the production. In its turn, the complex system of management of credit portfolio on the basis of grounded analysis and assessment of its quality is essential for increasing the capacity of the banking system and development the credit relations.

Today banks as one of the main parts of the economic system of the state are often faced with borrowers who cannot repay the loan. And a lot of bad loans in the total bank assets are the cause of the banking system losses.

The credit activity of banks is complicated by the absence of grounded methods of assessing the creditworthiness of the borrower, lack of information base for a full analysis of financial standing of customers, also modern economic conditions require the use of new information technologies and computerized tools for collecting, processing and providing information. Therefore, solving the problem of assessing the creditworthiness of customers is one of priority for the bank. That is why it is reasonable to determine the ways of improving the assessment of the creditworthiness of borrowers by the justification the appropriate methodical approach and forming the model of assessment of the creditworthiness of potential borrowers of the bank.

It should be noted that in the scientific literature researchers pay much attention to the investigation of the mechanism of bank's participation in the monetary relations both at the macro level [108; 84; 79; 114; 65; 39; 44; 55; 132; 155; 172] and micro level [57; 65; 194; 56; 120].

However, the analysis of existing viewpoints showed that depending on economic conditions and goals of research, approaches to management of the bank

credit portfolio quality based on the assessment of the creditworthiness of potential borrowers are formulated by scientists controversial. The assessing the creditworthiness of potential borrowers of the bank is the subject of many scientists' research. Despite the significant contribution of scientists to study the ways of effective formation and evaluation of the credit portfolio this issue is still important today and needs further study in both theoretical and in practical terms.

It should be noted that most scientific works devoted to the research of separate aspects of credit activity of banks. Thus, according to the work [172] the impact of the monetary policy of banks is essential to the development of production, is especially noticeable with changes in interest rates on loans, which reduction increases the industrial growth in the country.

F. Ali-Shawtari, M. Ariff and S. Abdul-Razak [27] assessed the viability of the banking sector and proposed policy concerning the restructuring the industry in order to increase its effectiveness. In other words, there were identified common directions of intensification of bank's work.

C. Carvajal [50] investigated the impact of the credit restriction on macroeconomic instability and emphasized the importance of credit facilities for business entities. Rad (2016) studied the link between risk management and system of management in banks, in particular, studied the management intent underlying the forming of bank's activity control system.

Ch. Mertzanis [115] emphasized the importance of developing a risk management system and grounded analysis in the process of regulating the bank's activity. E. Osei-Assibey and J. Asenso [131] presented the results of modeling interconnection between indicators of bank's activity, industrial and macroeconomic changes, examined in detail the regulatory capital and its impact on credit expansion, the role of credit and credit debt impact on the efficiency of the bank. N. Gaillard [72] investigated the lack of clear and reliable information about potential borrowers and the impact of limited information on the activity of banks.

W. Hsu-Che, H. Ya-Han, and H. Yen-Hao [83] analyzed credit ratings for assessing credit risk. Ordinary credit rating approaches mainly focus on two classes classification (good or bad credit), which leads to a lack of adequate accuracy for

assessment of credit risk in practice. Scientists had proved that most previous studies focused on the use of different methods of data analysis, but the issue of selection and data processing are still remained scarcely explored.

Acknowledging the importance and practical significance of these results, we emphasize that the overall there is a lack of deep theoretical research and practical recommendations for solving the problem of improving and managing exactly the process of assessing the creditworthiness of the borrowers based on advanced information technologies.

The purpose of this work is the examining of existing approaches to determine the creditworthiness of the borrower, analyzing characteristics of such approaches and justification the methodology of evaluating the creditworthiness of the borrower – individual, that let's decide most effectively in the specific conditions of activity of banks.

Each bank uses its own procedures and criteria for assessing the creditworthiness and financial position of the borrower based on analysis of financial statements, following the recommendations of the central bank. For this purpose, there are used advanced applications of express-analysis of the financial standing of companies and dynamic of cash flow. However, there is a lack of recommendations for determining the validity and normative values of some parameters. In the absence of powerful analytical tools in most banks, this problem remains unresolved or solved subjectively in practice.

The main problem of assessing the creditworthiness of borrowers, both individuals and legal entities in banks, there is a great complexity of this work. The process of assessing the creditworthiness is mostly not automated, so there are plenty of busy workers. In addition to the above, search for the required information about the client and its documents is often difficult, because several departments and workers are engaged simultaneously in the assessment of the creditworthiness of the borrower. The main problem with the bank credit process is the inherent uncertainty of it. Not having full information about potential borrowers and changes in the environment, banks have to deal with credit risk almost every day. The development of information technology and information systems allows

solving almost no limited number of tasks related to decision-making under uncertainty.

Most frequently to assess the creditworthiness of the borrower used: statistical methods; decision tree; genetic algorithms; neural networks.

Statistical methods based on discriminant analysis are used in solving problems of classification. Thus, the famous Altman model using for analyzing the creditworthiness of entities is based on multiple discriminant analysis. Linear or logistic regression is used to analyze the creditworthiness of individuals. All regression methods are sensitive to the correlation between characteristics, so there should not be strongly correlated characteristics of the borrower in the model.

Statistical methods are based on averaging indicators, but during the study of real difficult phenomena of life, these characteristics may be inapplicable. Assessment of creditworthiness of the borrower through these methods requires a lot of data about the credit history, that is not always possible. Also typical is the problem of lack of examples of borrowers that were unable to repay their debts. A significant drawback of statistical methods is the requirements for special training of the user.

The method of decision trees is high-speed processing and training while maintaining the properties of fuzzy inference. When using the method of decision trees for classification of loan applications a set of rules is used that formed in the construction the tree based on the training set. The tree includes interrelated initial (root), intermediate and end nodes. Each node meets the condition (rule) of the classification of objects. To build a tree at each internal node you need to find a condition that would break the set associated with this node in the subset.

With selected characteristic, the set is divided. As result, the obtained subset is consisted of objects belonging to the same class, or is as close as possible to this. The number of objects from other classes in each of these sets should be as less as possible.

But the method of decision trees has significant drawbacks. It is not suitable for tasks with a large number of possible links and when the condition (rule) can be formulated only in terms of "more/less". That hinders its application to tasks where the class is determined by a complex combination of variables.

4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

Genetic algorithms are based on a stochastic search of a global optimum objective function. The idea of genetic algorithms is borrowed from nature and means an organization the process of evolution, the ultimate objective of which is the optimal solution. Such algorithms have a lot of drawbacks. The criterion of selection the indicators does not guarantee finding the "best" solution. You must also have available a fairly large amount of input data to complete the procedure.

Neural networks are the computational structures that model simple biological processes commonly associated with processes in the human brain. According to D. Michie et al. [118], neural networks are a set of elements (artificial neurons) connected by synoptic links. The disadvantage of using neural networks is that they are a "black box". It means that they work on the principle of transferring information from one level of neurons to others, certain input signal corresponds to a certain output and the mechanism of such work is still unknown. Knowledge recorded as the weight of several hundred interneuronal relationships and it is difficult for a person to analyze and interpret them. Also, there is a lack of hard rules of the choice of network speed training for solving specific problems.

There are many architectures of neural networks. For example, to classify clients of German and Australian banks use the following networks: network of Kohonen, Back Propagation network, radial basis network, cascading network.

General disadvantages for practical application of the above methods are requirements to the volume of input and stringent requirements for characteristics and selection criteria for the borrower. In real life borrower's environment is constantly changing, as a result his marital and financial status is changing too. This brings uncertainty to the information about the client. Incorrect assessment of the borrower in these conditions can increase the risk of bank or loss potentially reliable customers.

Turtle, G. Friedlob and L.Schleifer [71], J. Allen, S. Bhattacharya and F. Smarandache [28], E. Chi-Man-Hui, O. Muk-Fai-Lau and T. Kak-Keung-Lo [52], C. Kahraman [87] and others show that the most effective methods are the combined methods of intelligence that combines the benefits of natural and artificial intelligence (for example, methods of fuzzy sets theory).

4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

Based on this theory, methods of building information models significantly expand the traditional areas of application computer and create an independent direction of scientific and applied research. Recently, fuzzy modeling is one of the most active and perspective directions of modeling in management and decision-making. In the management of technical facilities, fuzzy modeling allows obtaining more adequate results, compared with the results based on the use of traditional analytical models and control algorithms.

Fuzzy modeling process can be represented in the form of interconnected stages, at each stage, there are carried out specific actions directed to building and further using of information and logical models of systems. In addition, each stage is performed in order to build and use the fuzzy model system to solve the initial problem.

Separate stages of the process fuzzy modeling are: analysis of the problem situation; structuring of the subject area and building a fuzzy model; execution of computing experiments with the fuzzy model; application of the results of computational experiments; correction or completion fuzzy model.

Thus, a fuzzy model of the original or a fuzzy system is first of all characterized by uncertainties type of ambiguity (fuzziness) of the system's limits and its individual states, input and output impacts.

The task of assessing the creditworthiness can be formulated as follows. Every credit application is given by the vector, another word by formalized in a certain way data from the borrower's questionnaire and chosen loan parameters. Then according to the chosen vector, it is necessary to make a decision on the loan, the borrower should be classified as "reliable" or as "not reliable."

In world practice, still there is no single standardized system of assessing the creditworthiness of borrowers, that's way banks use different methods that are complemented each other. At present sector of loans to individuals is the most sensitive to changes in the socio-economic sphere and many existing methods for assessing the creditworthiness of clients has appeared inefficient. Because of growing competition in the market of credit services and unsatisfied demand for different banking products, credit institutions have to look for ways to attract

creditworthy customers with saving the possibility of control losses. So there is a need for better selection of borrowers.

Assessment of the creditworthiness of the borrower – individual based on the ratio of the requested loan and its personal income, overall assessment of the financial situation of the borrower and the cost of its property, on the results of studying personal characteristics and credit history. Lending to borrowers – individuals allows banks, on the one hand, to increase their income in a short period of time, and on the other hand, it is always associated with the risk of late payment or no repayment of the loan in full. Accurate assessment of the ability of borrowers to meet their loan obligations allows reducing possible losses. Therefore, a competent organization of assessing the creditworthiness of borrowers very is important.

Permanent improvement of the lending system in the face of rising interbank competition is a necessary condition for the bank for forming its public image as a universal credit institution and serves as an additional source of income of credit operations with individuals. Despite intense development in recent years this area of banking business still has huge reserves of growth. Assessment of the creditworthiness of a potential borrower is carried out to determine its class of reliability and financial ability to timely and fully implement repayment in terms and conditions established by the credit agreement.

The periodicity of assessment of the financial condition of borrowers – individuals is defined by the bank based on the state of debt servicing and maturity of the loan. If the credit debt service is characterized by delay or prolongation, then an assessment of the financial condition of borrowers – individuals should be constant for a period of delayed repayment of debt, except when it is related to valid reasons. The world banking practice distinguishes a number of components that together allow determining the level of creditworthiness of the borrower. In order to create an effective methodology of the complex system of assessment the creditworthiness of borrowers in indicators of creditworthiness should be included not only the value that is relatively easily calculated using quantitative data but also those that may be described by the evaluative judgments.

4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

Yue Jiao, Yu-Ru Syau, and E. Stanley Lee [213] in their work presented a model for assessing the credit rating of small financial enterprises based on the fuzzy adaptive network. There are deep mathematical calculations and a lot of specification of the neural network. The authors use a set of specific indicators taking into account the object of their research.

Based on the research work of scientists there were generalized main qualitative and quantitative characteristics of the borrower, that should be taken into account in assessing the creditworthiness of the borrower – individual. Particular attention is paid on considering the quality indicators of the creditworthiness of borrowers in the regulation of credit activity of banks. This question was so emphasized by Tammi [184] in his works. Also, questions of security of credit were investigated by A. Ghosh [75] by the example of specialized banks.

For the proposed model of the creditworthiness assessments of bank's potential borrowers (individuals) on the basis of fuzzy logic the input indicators were selected taking into account the recommendations of the central bank, internal instructions of Ukrainian banks, the experience of using the system of indicators in domestic banking practice by an expert survey of employees of the largest banks in Ukraine.

The authors constructed a model assessing the creditworthiness of the borrower based on fuzzy logic taking into account selected indicators with further the possibility of expanding the list of assessment criteria. According to these indicators, we make a linguistic score for generalizing indicator of creditworthiness.

General indicator (R) is a three-level convolution where partial indicators (a1, a2, a3, b1, b2, b3, c1, c2, c3, d1, d2, d3) combined in the components of evaluation (A, B, C, D), and the components in their turn – in the resulting indicator. Model of assessment of the creditworthiness of the borrower – individual is based on predefined parameters and the chosen method (figure 4.3).

4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

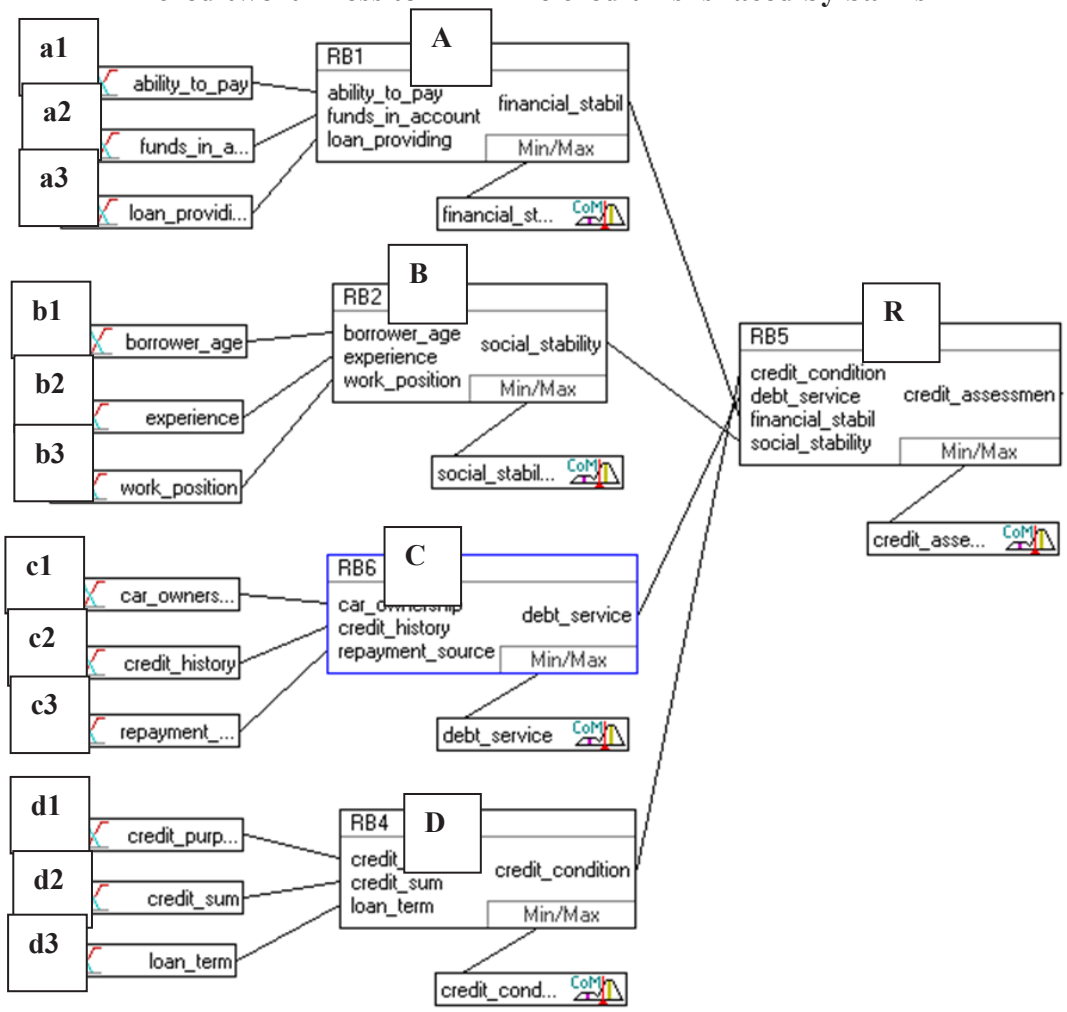


Figure 4.3. The structure of the model of assessing the creditworthiness of potential borrower-individual (realization in FuzzyTech program tool)
Source: formed by the authors [127]

Thus, input and output options were identified and each of them is characterized by a set of linguistic terms of linear (triangular and trapezoidal) membership function.

On the upper level, the input parameters are the borrower's financial stability, social stability, debt service, credit conditions. They are also output parameters of the lower level. For each input parameter has constructed membership function depending on the deviation from the schedule of passing

control points (table 4.6).

Intervals of changes of such components as the financial stability of the borrower, debt service of the borrower, credit conditions are based on the "golden ratio" or Fibonacci numbers as the basis of harmonious division.

Table 4.6. The components (characteristics of membership functions) for assessing creditworthiness of borrower (R)

Symbol	Name	Symbol	Linguistic assessment	The trapezoidal numbers for the values of linguistic variable				Interval
A	Financial stability of the borrower	A1	weak	0	0,118	0,382		0 – 0,382
		A2	enough	0,375	0,499	0,558	0,618	0,382 – 0,618
		A3	strong	0,600	0,735	0,853	1	0,618 – 1
B	Social stability of the borrower	B1	weak	0	0,12	0,25		0 – 0,25
		B2	enough	0,20	0,35	0,5	0,75	0,25 – 0,75
		B3	strong	0,65	0,85	0,95	1	0,75 – 1
C	Debt service	C1	satisfactory	0	0,236	0,382		0 – 0,382
		C2	good	0,370	0,499	0,618		0,382 – 0,618
		C3	excellent	0,550	0,735	1		0,618 – 1
D	Credit conditions	D1	low risky	0	0,127	0,254	0,382	0 – 0,382
		D2	risky	0,375	0,508	0,618		0,382 – 0,618
		D3	very risky	0,500	0,744	1		0,618 – 1

Source: formed by the authors [127]

As already noted general indicator of assessment of the creditworthiness of the borrower – individual (R) consists of four components, which have three terms in accordance with the range of variation: financial stability of the borrower, social stability of the borrower, debt service and credit conditions.

In table 4.7 terms and intervals of an overall assessment of the creditworthiness of the borrower for the model are given. Intervals of changes of the assessment of the creditworthiness of the borrower and its linguistic assessment are based on Harrington's Desirability Function (Harrington, 1965).

Table 4.7. Overall assessment of creditworthiness of the borrower for the model

Indicator	Intervals	Linguistic assessment
R1	0 – 0,37	Low
R2	0,30 – 0,65	Satisfactory
R3	0,55 – 0,80	Good
R4	0,70 – 1	very good

Source: formed by the authors [127]

Each of the components of an overall assessment of the creditworthiness of the borrower combines a number of partial indicators. In annex 1–4 the structure of each component in the context of the partial indicators is given. The intervals of changing of the indicator of the current ability to pay are selected in accordance with the generally accepted practice of its use in the bank's work, as well as the intervals for the indicator of ensuring the credit, the loan term, lending amount.

For indicators funds on accounts in banks, sources of debt repayment and purpose of lending intervals are based on the results of a survey of experts of the banking sector. The "age of the borrower" and "work experience" are broken at intervals, taking into account the logic and objective trends of the labor market in Ukraine.

Intervals for the indicator "place of work (position)" correspond to the logic of construction the Unified Tariff Grid in Ukraine. The intervals of the indicator "Automobile ownership" (the cost of cars) are due to the general tendency of prices in the car market and the purchasing power of Ukrainian citizens.

Depending on the input variables and possible options of its combination (rules for assessing the creditworthiness of the borrower) we received general characteristics R (table 4.8). The full set of rules is given in annex 5–9.

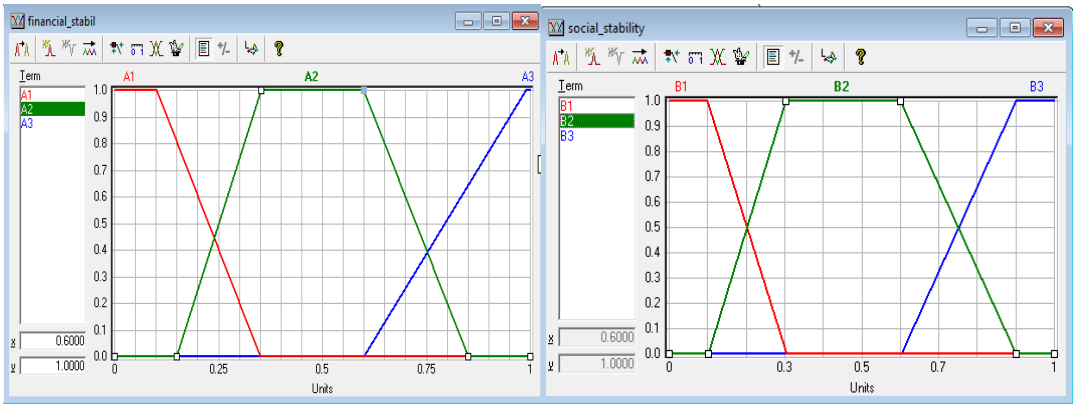
Computer representation of membership functions for input component (A, B, C, D) of the general indicator of the creditworthiness of the borrower (R) is shown on figure 4.4. Computer representation of membership functions for input variables of the structural components (A, B, C, D) is given in annex 10.

Table 4.8. Rules for assessing the creditworthiness of the borrower (fragment)

Rule	Financial stability	Social stability	Debt service	Credit conditions	Overall assessment of creditworthiness
1	2	3	4	5	6
1	weak	weak	satisfactory	low risk	low
2	weak	weak	satisfactory	risk	low
…..					
15	enough	enough	satisfactory	risk	satisfactory
16	enough	weak	satisfactory	risk	low
…..					
81	enough	strong	excellent	low risk	very good

Source: formed by the authors [127]

For effective practical use of the model following steps should be done on the stage of implementation of the model: accumulating a sufficient base for each of the input parameters; conducting adaptation; clarification and correction the model (look and membership functions parameters, decision-making rules). Based on data about individuals an approbation of the model of the assessing the creditworthiness of borrowers has been conducted.



4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

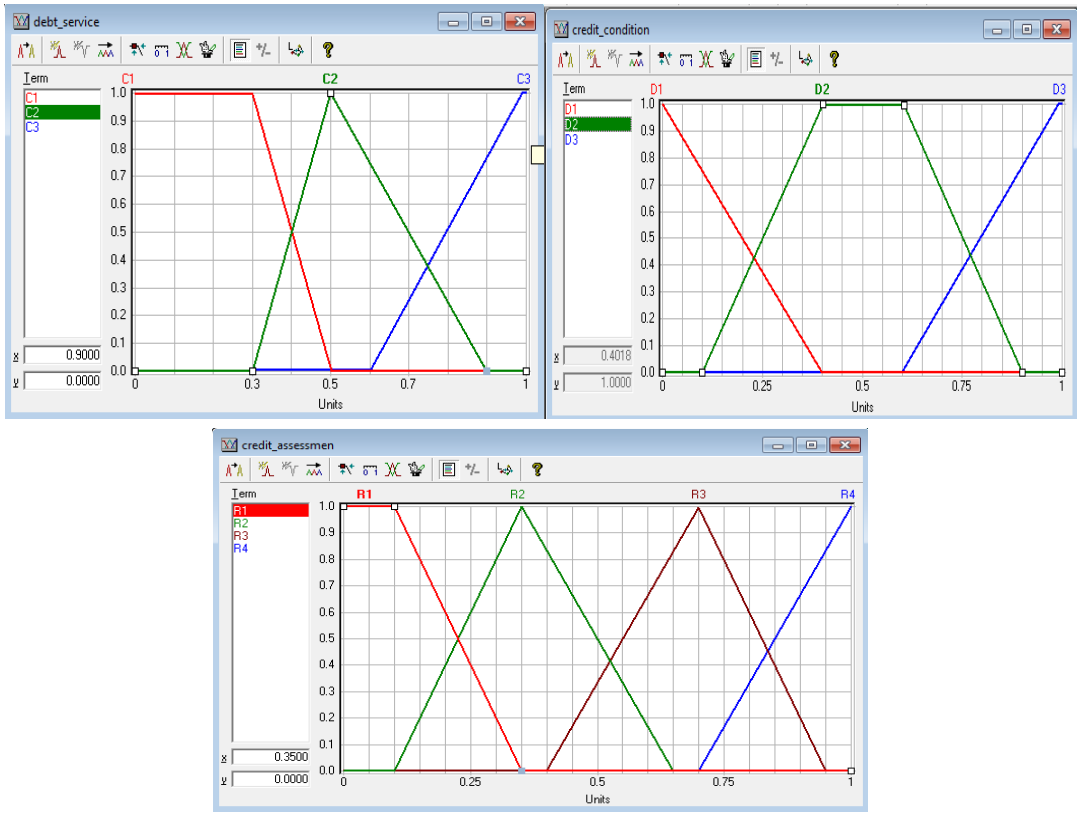
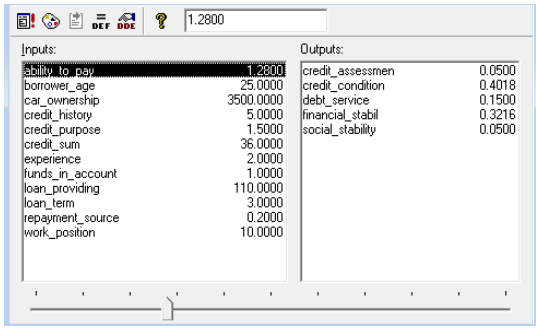


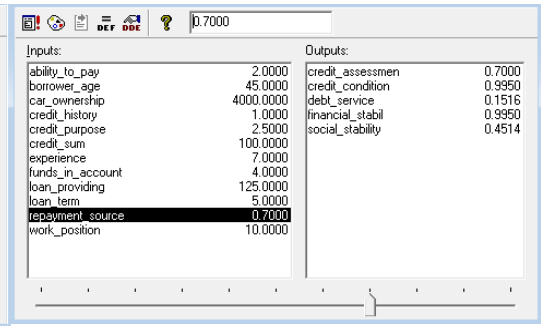
Figure. 4.4. Computer representation of membership functions for input components (A, B, C, D) of the general indicator of the creditworthiness of the borrower (R)
Source: formed by the authors [127]

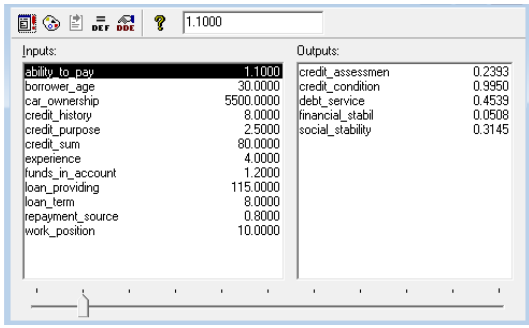
The results of assessing the creditworthiness of borrowers are given on figure 4.5, for all potential clients we have received a summary assessment of creditworthiness.

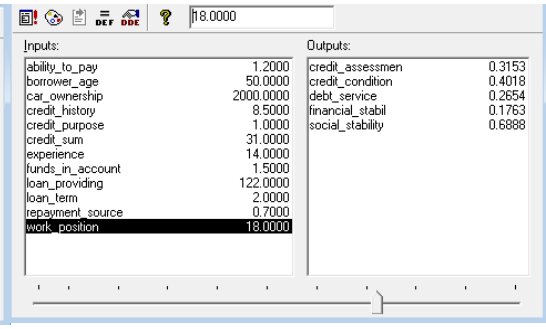
On the left side of each interactive window while working in the program user enters a numerical value (assessment) of input parameters, and on the right side, the program displays the results of calculations for all output parameters (interim and final).

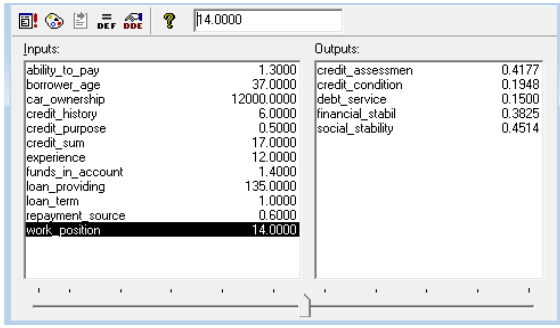
4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

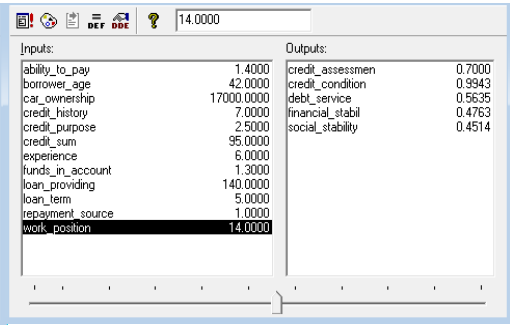


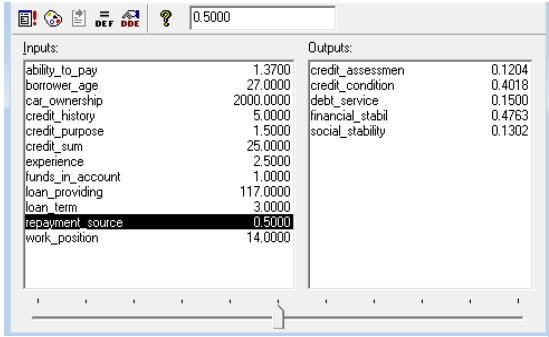


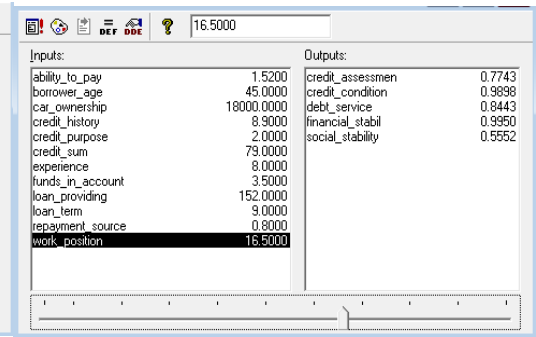












4.3. Methodological and practical aspects of analyzing the borrowers' creditworthiness to minimize credit risks faced by banks

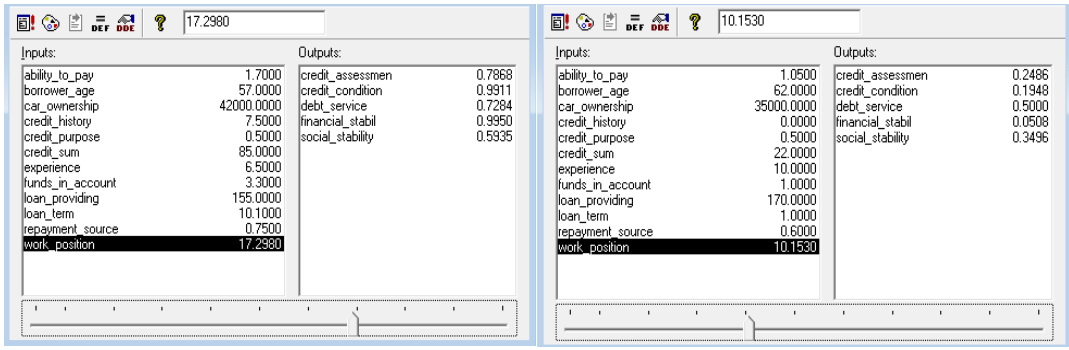


Figure 4.5. Computer representation of the results of assessing the creditworthiness of borrowers
Source: formed by the authors [127]

There are input variables of the model and the results of assessing the creditworthiness of borrowers in table 4.9.

Table 4.9. Input numerical data for each client and the results of assessing the creditworthiness of borrowers

Client	Creditworthiness of the borrower												
	Financial stability (A)			Social stability (B)			Debt service (C)			Credit conditions (D)			Creditworthiness assessment R
	ability to pay	funds in account	loan providing	experience	borrower age	work position	repayment sources	credit history	car ownership	credit purpose	loan term	credit sum	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1,28	1	110	2	25	0,5	0,2	5	3500	1,5	3	36000	0,05
2	2	4	125	7	45	1	0,7	1	4000	2,5	5	100000	0,7
3	1,1	1,2	115	4	30	0,5	0,8	8	5500	2,5	8	80000	0,239
4	1,2	1,5	122	14	50	2	0,7	8,5	2000	1	2	31000	0,315
5	1,3	1,4	135	12	37	3	0,6	6	12000	0,5	1	17000	0,418
6	1,4	1,3	140	6	42	1,5	1	7	17000	2,5	5	95000	0,7
7	1,37	1	117	3	27	1,5	0,5	5	2000	1,5	3	25000	0,12

1	2	3	4	5	6	7	8	9	10	11	12	13	14
8	1,52	3,5	152	8	45	2	0,8	8,9	18000	2	9	79000	0,774
9	1,7	3,3	155	7	57	2,7	0,8	7,5	42000	2	12	85000	0,787
10	1,05	1	170	10	62	1	0,6	0	35000	0,5	1	22000	0,249

Source: calculated by the authors [127]

There are grouped assess of the creditworthiness of clients and their linguistic assessment in table. 4.10. Of course, these recommendations are not exhaustive, they are carefully developed by employees of the bank, approved by the credit committee, and then provided to credit manager for further work. Also, a more detailed analysis of direct numerical modeling of our model is the subject of further research.

We assume, in particular, consider such questions as construction of membership functions based on statistical analysis of expert interviews; the use of more complex forms of membership functions, including non-standard; opportunities for learning and adjustments constructed system fuzzy inference using the neural network; increasing the number of initial model parameters; determine the weights of parameters; development model using different values of weighting coefficients for different initial, intermediate parameters and appropriate decision-making; creation the modules by adding models in the programming language C.

Table 4.10. Summary results of the assessment creditworthiness of clients

Linguistic assessment of the creditworthiness of client: «low»	**Recommended actions by the bank**	**Linguistic assessment of the creditworthiness of client: «satisfactory»**	**Recommended actions by the bank**
1	2	3	4
client 1 client 3 client 4 client 7 client 10	Refuse to provide credit	client 5	Refuse to provide credit, but provide recommendations for correct deficiencies and improve indicators

1	2	3	4
Linguistic assessment of the creditworthiness of client: «good»	Recommended actions by the bank	Linguistic assessment of the creditworthiness of client: «very good»	Recommended actions by the bank
client 2 client 6	Satisfy an application for credit, but on a lower amount	client 8 client 9	Satisfy an application for credit

Source: formed by the authors [127]

The main problem in the analysis of the creditworthiness of borrower – individual is the inaccuracy of data, lack of a base of knowledge of customers' past and the necessity to work with linguistic characteristics that are difficult to mathematical processing. In specific terms of banks functioning methods based on fuzzy logic, including methods based on fuzzy neural network and Mamdani controller give good results. They allow getting grounded decision considering the fuzzy evaluation, fuzzy information about the object, initial settings, that are characterized by fuzzy criteria.

Thus, the work provided practical recommendations for improving the approach to evaluating the quality of the credit portfolio of the bank and ensure its quality on the basis of the model of assessment creditworthiness of borrower – individual. Implementation of advanced methodical tools of modeling the analysis of the creditworthiness of borrower based on fuzzy logic allows the bank's management to implement grounded decisions at the stage of customer service more effectively.

Because complex automation of processing parameters, calculations of results based on these parameters is becoming increasingly important for modern banking systems, the model for evaluating the creditworthiness of borrowers – individuals based on fuzzy logic was developed based on specified parameters and offered to practical use. It is timely to ensure the quality of banks' activity.

The results of research can be used in practical activities of banks to assess the financial status of bank's client according to the established criteria and make a decision by bank's managers concerning expediency granting credit in each case. Formulated theoretical-methodological and practical arrangements may be used for

further research in evaluating the quality of the credit portfolio and credit risk management.

Of course, there is certain subjectivity about building a model. It manifests itself at the initial stage, when on the basis of expert assessments (groups or even one specialist) sets of membership functions, numerical characteristics and the form of sets of terms of linguistic variables.

Therefore, the example given in the article only shows the possibility of developing and using such models on the basis of fuzzy sets theory and fuzzy modeling. Therefore, in practical use, a preliminary adjustment, adaptation of the model, based on specific loan conditions and other features, is required, which can only be identified and accounted for in the practical application of the model.

Considering the interaction of the proposed approach with other existing ones, two main points should be noted.

The first is that in practice it is advisable to simultaneously use several different approaches to solve this problem. And if the results obtained by different methods are the same or almost the same, the decision to lend the borrower can be considered correct. That is, the results confirm each other. Otherwise, additional calculations or use of other methods of developing and making decisions, including, possibly, correcting the calculation models themselves are necessary.

The second point to be noted is that the proposed fuzzy modeling approach requires good statistical preparation at the stage of initial model development. This concerns the definition of a set of evaluation parameters, the numerical values of their individual levels, the nature (kind) of membership functions and linguistic variables. At this stage it is necessary to make maximum use of methods of expert evaluation and statistical processing of their data.

The practical value of the results investigation confirmed the real trends and existing needs of the banking system of Ukraine. Proposed analytical tools can be used by banks in practice. The competitive advantages of it include the flexibility to expand the base of input parameters and the ability to adapt according to the requirements that can permanently change.

CONCLUSIONS

The economy development and the success of implementing the integration vector are largely determined by the effectiveness of the state financial monitoring system, which is primarily oriented at counteracting such a social phenomenon as the legalization of money received by illegal means and terrorist financing.

The monograph elaborates the main provisions for building a risk-oriented system aimed to combat money laundering, terrorist financing, and proliferation of mass destruction weapons; their application will contribute to implementing the state policy in the fight against these negative phenomena. It has been established that four out of six regulators in the Ukrainian financial service market (namely, the National Securities and Stock Market Commission, the Ministry of Finance, the Ministry of Justice, and a specially authorized body) still use outdated, formal, and ineffective criteria for assessing the risks to be involved in the money legalization faced by primary financial monitoring subjects. The Ministry of Digital Transformation, as a newly created regulator, has not yet developed such criteria. And only the National Bank of Ukraine has already considered the requirements of FATF, AMLD4, and the new Law on Financial Monitoring in its criteria. The National Securities and Stock Market Commission received a proposition to unify risk-oriented signs identifying the possible involvement of a primary financial monitoring subject in money laundering schemes, and to introduce its own procedures, which will be identical to the mechanisms implemented by the National Bank of Ukraine, aimed at the state financial monitoring for professional participants in stock markets, taking into account the specifics of their activities.

The research also addressed the features of the financial service market functioning in the digitalized economy environment. It was determined that traditional insurers are ill-prepared for digital activities in the digital markets of the future and, accordingly, for combating money laundering and terrorist financing in the digital economy. However, online market conditions force insurance companies to implement digital technologies in this area, in particular, digital identification of policyholders. As it was identified while analyzing the digital development of anti-money laundering in insurance, the digitalization process comprises three directions: InsurTech, RegTech, and SupTech. Insurance companies are implementing digital client identification procedures for online sales and claim

settlement, as well as analyzing clients' digital experiences. Automation is seen in the processes related to insurers' compliance with anti-money laundering regulations, including the submission of reports to financial monitoring bodies. Supervisors digitize and improve control and analysis of anti-money laundering operations. The integrated application of digital technologies will provide means for improving the insurers' ability to duly verify clients, identify, and monitor suspicious transactions through joint efforts.

Acting as intermediaries between the owners of temporarily free funds and those who need them, banks quite often underestimate the risks of being attracted to money laundering and terrorist financing schemes. The research determined that the crucial element that provides banks, as primary financial monitoring subjects, with the ability to counter money laundering, is a risk-oriented approach. The risk-oriented approach provides for the formation of money laundering risk management system and the adoption of appropriate measures in a manner and volume that ensure the effective minimization of these risks.

The researchers investigated the legal regulation of the financial monitoring system in European countries and Ukraine, considered the main risks associated with the legalization of money received by illegal means (money laundering), terrorist financing, and/or proliferation of mass destruction weapons, their types, and evaluation criteria, which allowed determining the specifics of the risk-oriented approach in the banking sector for Ukraine and developing recommendations aimed to improve the procedure for financial monitoring based on the implementation of the positive experience acquired by European countries. It was proposed to identify threats subject to the type and jurisdiction of clients, as well as the financial transaction types and channels for their implementation, which intends to effectively manage the ML/TF risks with a focus on minimizing and/or avoiding them.

Proceeding from the relation between the risks of being involved in money laundering processes faced by banks and other banking risks, the researchers suggest recommendations concerning the following: improving the efficiency of credit risk and strategic risk management; application of monitoring tools to identify potential threats in the banks' activities.

Taking into account the lack of recommendations for solving the problem of the significance and normative values of individual indicators when assessing the

bank borrowers' (individuals') creditworthiness, the work presents a toolkit to solve this problem. The module for assessing the individual borrowers' creditworthiness, developed using fuzzy logic, addresses such parameters as the borrower's financial stability, social stability, sources and servicing of the borrower's debt, and credit conditions. The input and output parameters are investigated as a set of linguistic terms with a linear (triangular and trapezoidal) membership function. The use of the proposed tools will ensure the quality of banking institutions' work with regard to preventing the growth of distressed assets and minimizing credit risks.

To assess the bank's strategic risk, it is proposed to consider the ratio of the actual and planned values of the parameters for measuring the degree of achieving the financial and non-financial strategic goals set by the bank and the development level identified for the system of organizational and economic support for the bank's strategic management. The synthesis of results in certain assessment areas characterizing the primary and secondary strategic risk, respectively, provides means for determining its generalizing level (high, medium, or low) and foreseeing the emergence of other risks associated with it, including the money laundering risk and compliance risk. It is concluded that the overestimation of the planned values calculated based on the indicators for measuring strategic goals, in particular, the bank's performance parameters, increases the possible realization of the strategic risk and may induce banks to fail to comply with the legislation requirements in the field of financial monitoring in order to obtain financial benefits.

In general, the conclusions and proposals presented in this monograph aim to develop theoretical and methodological tools and practical recommendations for the implementation of the risk-oriented approach to combating money laundering.

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APPENDIX

Annex 1

Indicators (characteristics of membership functions) for assessing of the borrower financial stability (A).

Symbol	Name	Symbol	Linguistic assessment	Triangular and trapezoidal numbers for the value of linguistic variable				Interval
a1	The current ability to pay (CAP)	a11	low	1	1,25			1< CAP <1,25
		a12	middle	1,20	1,3	1,40	1,5	1,25< CAP <1,5
		a13	high	1,45	2			CAP >1,5
a2	Funds on accounts in banks	a21	absent	0	1			No funds on accounts in banks (1 point)
		a22	insufficient	0,75	1,5	2		Funds on accounts in the amount less than the loan amount (2 points)
		a23	sufficient	1,7	3	4		Funds on accounts that exceed the amount of the loan (4 points)
a3	Ensuring the credit (EC)	a31	sufficient	100	110	125		The collateral value of the property less than 25% higher than the amount of credit debt 100%< EC <125%
		a32	middle	120	130	140	150	The collateral value of the property at least 25% higher than the amount of credit debt 125%< EC <150%
		a33	high	145	200	250		The collateral value of the property at least 50% higher than the amount of credit debt EC >150%

Appendix

Annex 2

Indicators (characteristics of membership functions) for assessing of the borrower social stability (B).

Symbol	Name	Symbol	Linguistic assessment	Triangular and trapezoidal numbers for the value of linguistic variable				Interval
b1	Work experience	b11	low	0	1	3		To 3 years;
		b12	middle	2,5	3,5	7	10	From 3 to 10 years;
		b13	high	8,5	15			More than 10 years
b2	Age borrower	b21	young	20	25	35		20-35 years;
		b22	adult	30	35	45	55	35-55 years
		b23	old	50	65	70		55-70 years ;
b3	Place of work (position)	b31	low	0,5	1			The worker or employee (0.5 or 1 point)
		b32	middle	0,75	1,5	2		Specialist, top manager of the company (2 points)
		b33	high	1,75	2,5	3		Own businessor the head (3 points)

Appendix

Annex 3

Indicators (characteristics of membership functions) for assessing of the borrower social stability (C).

Symbol	Name	Symbol	Linguistic assessment	Triangular and trapezoidal numbers for the value of linguistic variable				Interval
c1	Sources of debt repayment	c11	unstable	0	0,1	0,2		Unstable additional income (0.2 points)
		c12	stable	0,15	0,4	0,6		Stable additional income (0.6 points)
		c13	stable and reliable	0,50	0,7	0,8	1	The official salary and other confirmed income (1 point)
c2	Credit history	c21	sufficient	0	5			There is a breach of contract (0 points) Not used (5 points);
		c22	good	4	6	8		Systematic delay payments over 7 days (4 points) Systematic delay payments to 7 days (6 points) Delay payments not systematically to 7 days (8 points)
		c23	excellent	7	10			Individual cases of overdue payments (7.5 points) Debt service is good without violations (9 points)
c3	Auto-mobile ownership	c31	cheap	300	1000	2000	3000	Cost up to USD 3,000
		c32	budget	2500	5000	7000	10000	Cost from 3 000 to 10 000 USD.
		c33	medium	9000	15000	25000	30000	Cost from 10 000 to 30 000 USD
		c34	expensive	27000	50000	75000	100000	Cost from 30 000 USD.

Appendix

Annex 4

Indicators (characteristics of membership functions) for credit conditions (D).

Symbol	Name	Symbol	Linguistic assessment	Triangular and trapezoidal numbers for the value of linguistic variable				Interval
d1	The purpose of lending	d11	Consumer lending	0	0,5			Purchases of consumer goods (0.5 points)
		d12	Auto Loans	0,4	1	1,5	2	Purchase of cars (1 point-domestic, 2 points-import)
		d13	Mortgage Lending	1,75	2	2,5		Purchase of house (2 points - secondary market, construction - 2.5 points)
d2	Loan term	d21	Short	0,1	1			To 1 year
		d22	Medium	0,75	2	3	5	From 1 to 5
		d23	Long	4	10	15		From 5 to 15
d3	Lending amount	d31	Small	1000	5000	10000	20000	To 20 000 UAH
		d32	Medium	18000	25000	35000	50000	From 20 000 to 50 000 UAH
		d33	Big	48000	70000	100000		Over 50 000 UAH

Appendix

Annex 5

The rules for forming assess of the financial stability of the borrower (A) (A1 weak; A2 sufficient; A3 strong).

The combination of components			Financial stability A
a11	a21	a31	A1
a11	a22	a31	A1
a11	a23	a31	A2
a11	a22	a32	A1
a11	a21	a32	A1
a11	a23	a33	A2
a11	a22	a33	A1
a11	a21	a33	A1
a11	a23	a32	A2
a12	a21	a31	A2
a12	a22	a31	A2
a12	a23	a31	A3
a12	a22	a32	A2
a12	a21	a32	A2

The combination of components			Financial stability A
a12	a23	a33	A3
a12	a22	a33	A3
a12	a21	a33	A2
a12	a23	a32	A3
a13	a21	a31	A2
a13	a22	a31	A2
a13	a23	a31	A3
a13	a22	a32	A2
a13	a21	a32	A2
a13	a23	a33	A3
a13	a22	a33	A3
a13	a21	a33	A2
a13	a23	a32	A3

Appendix

Annex 6

The rules for forming assess of the social stability of the borrower (B) (B1 weak; B2 sufficient; B3 strong).

The combination of components			Social stability B
b11	b21	b31	B1
b11	b22	b31	B1
b11	b23	b31	B1
b11	b22	b32	B2
b11	b21	b32	B1
b11	b23	b33	B2
b11	b22	b33	B2
b11	b21	b33	B1
b11	b23	b32	B1
b12	b21	b31	B1
b12	b22	b31	B2
b12	b23	b31	B1
b12	b22	b32	B2
b12	b21	b32	B2

The combination of components			Social stability B
b12	b23	b33	B2
b12	b22	b33	B3
b12	b21	b33	B3
b12	b23	b32	B2
b13	b21	b31	B2
b13	b22	b31	B2
b13	b23	b31	B1
b13	b22	b32	B2
b13	b21	b32	B2
b13	b23	b33	B3
b13	b22	b33	B3
b13	b21	b33	B3
b13	b23	b32	B2

Appendix

Annex 7

The rules for forming assess of the debt service of the borrower (C) (C1 satisfactory; C2 good; C3 excellent).

The combination of components			Debt service C
c11	c21	c31	C1
c11	c22	c31	C1
c11	c23	c31	C1
c11	c22	c32	C1
c11	c21	c32	C1
c11	c23	c33	C1
c11	c22	c33	C1
c11	c21	c33	C1
c11	c23	c32	C1
c12	c21	c31	C1
c12	c22	c31	C1
c12	c23	c31	C1
c12	c22	c32	C1
c12	c21	c32	C1
c12	c23	c33	C2
c12	c22	c33	C2
c12	c21	c33	C2
c12	c23	c32	C2

The combination of components			Debt service C
c13	c21	c31	C1
c13	c22	c31	C2
c13	c23	c31	C2
c13	c22	c32	C2
c13	c21	c32	C2
c13	c23	c33	C3
c13	c22	c33	C3
c13	c21	c33	C2
c13	c23	c32	C3
c11	c21	c34	C2
c11	c22	c34	C2
c11	c23	c34	C2
c12	c21	c34	C2
c12	c22	c34	C2
c12	c23	c34	C3
c13	c21	c34	C2
c13	c22	c34	C3
c13	c23	c34	C3

Annex 8

The rules for forming assess the credit conditions (D) (D1 low risky; D2 risky; D3 very risky).

The combination of components			Credit conditions D
d11	d21	d31	D1
d11	d22	d31	D1
d11	d23	d31	D1
d11	d22	d32	D2
d11	d21	d32	D1
d11	d23	d33	D3
d11	d22	d33	D3
d11	d21	d33	D2
d11	d23	d32	D2
d12	d21	d31	D1
d12	d22	d31	D2
d12	d23	d31	D2
d12	d22	d32	D2
d12	d21	d32	D2

The combination of components			Credit conditions D
d12	d23	d33	D3
d12	d22	d33	D3
d12	d21	d33	D2
d12	d23	d32	D2
d13	d21	d31	D2
d13	d22	d31	D2
d13	d23	d31	D3
d13	d22	d32	D2
d13	d21	d32	D3
d13	d23	d33	D3
d13	d22	d33	D3
d13	d21	d33	D3
d13	d23	d32	D3

Appendix

Annex 9

The rules for forming assess of the creditworthiness of borrowers (R) (R1 low; R2 satisfactory; R3 good; R4 very good).

The combination of components				Creditworthiness of borrowers
A1	B1	C1	D1	R1
A1	B1	C1	D2	R1
A1	B2	C1	D2	R1
A1	B2	C1	D3	R1
A2	B2	C1	D2	R2
A2	B1	C1	D2	R1
A2	B2	C1	D3	R2
A3	B1	C1	D1	R2
A1	B2	C1	D1	R1
A1	B3	C1	D1	R2
A1	B1	C1	D3	R1
A1	B3	C1	D3	R1
A2	B1	C1	D1	R2
A2	B2	C1	D1	R3
A2	B3	C1	D1	R3
A2	B1	C1	D3	R2
A2	B3	C1	D3	R2
A2	B3	C1	D2	R2
A3	B3	C1	D3	R3
A3	B1	C1	D3	R2
A3	B2	C1	D1	R3
A3	B2	C1	D3	R3
A3	B3	C1	D2	R3
A1	B2	C2	D2	R2
A1	B1	C2	D1	R1
A1	B1	C2	D3	R1
A1	B2	C2	D3	R2
A1	B3	C3	D1	R2
A1	B2	C3	D1	R2
A2	B3	C3	D1	R4
A1	B3	C1	D2	R2
A3	B3	C1	D1	R3
A3	B1	C1	D2	R2
A3	B2	C1	D2	R3
A1	B2	C2	D1	R2
A1	B1	C2	D2	R1
A1	B3	C2	D1	R2
A1	B3	C2	D2	R2
A1	B3	C2	D3	R2
A2	B2	C2	D2	R3
A2	B1	C2	D2	R3

The combination of components				Creditworthiness of borrowers
A2	B2	C2	D1	R3
A2	B3	C2	D2	R3
A2	B2	C2	D3	R3
A2	B1	C2	D1	R3
A2	B3	C2	D3	R3
A2	B3	C2	D1	R3
A2	B1	C2	D3	R2
A3	B3	C2	D3	R3
A3	B2	C2	D2	R3
A3	B3	C2	D2	R3
A3	B1	C2	D1	R3
A3	B3	C2	D1	R4
A3	B1	C2	D3	R3
A3	B1	C2	D2	R2
A3	B2	C2	D1	R3
A1	B3	C3	D3	R2
A1	B1	C3	D1	R2
A1	B1	C3	D3	R1
A1	B1	C3	D2	R1
A1	B2	C3	D2	R2
A1	B3	C3	D2	R2
A2	B3	C3	D3	R3
A2	B2	C3	D2	R3
A2	B3	C3	D2	R3
A2	B1	C3	D1	R3
A2	B1	C3	D2	R2
A2	B2	C3	D1	R4
A2	B1	C3	D3	R2
A3	B3	C3	D3	R4
A3	B3	C3	D1	R4
A3	B3	C3	D2	R4
A3	B1	C3	D1	R3
A3	B1	C3	D2	R3
A3	B2	C2	D3	R3
A1	B2	C3	D3	R2
A2	B2	C3	D3	R3
A3	B1	C3	D3	R3
A3	B2	C3	D3	R3
A3	B2	C3	D2	R3
A3	B2	C3	D1	R4

Annex 10

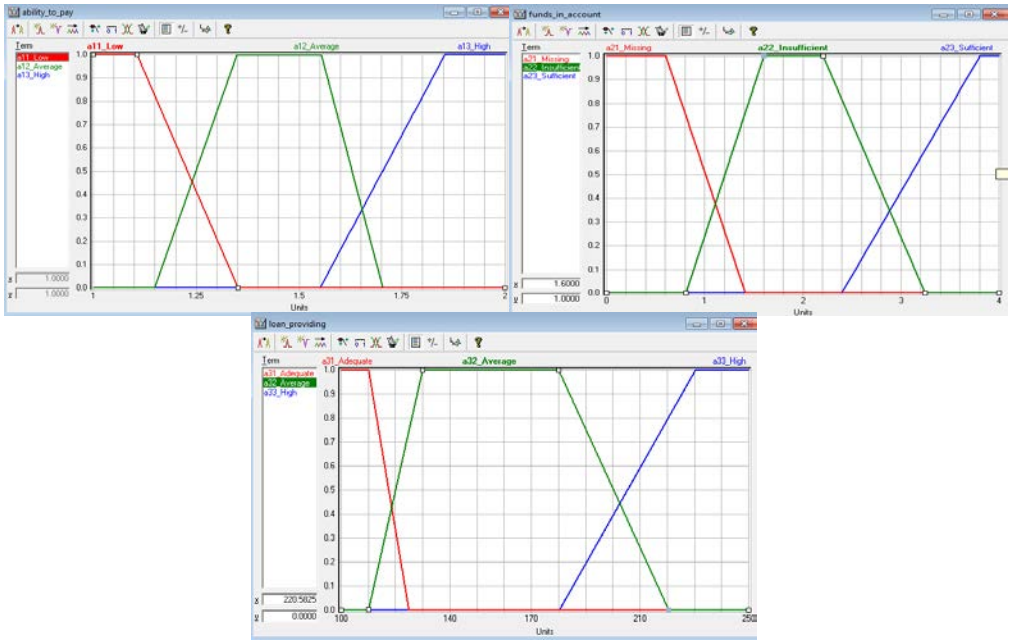

Figure 1. Computer representation of membership functions for input variables (a1, a2, a3) of the component "financial stability of the borrower" (A)

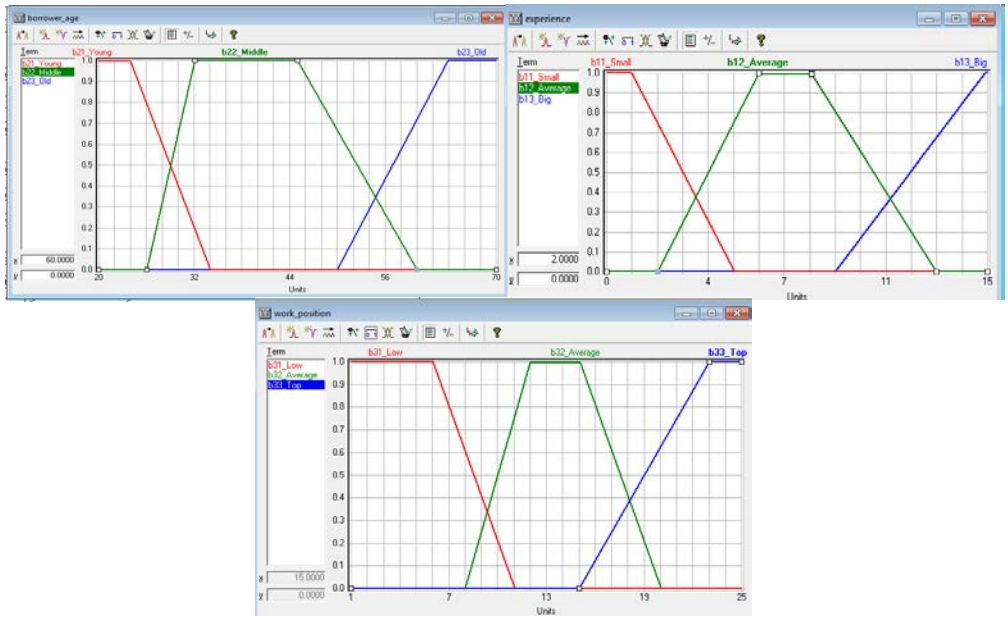

Figure 2. Computer representation of membership functions for input variables (b1, b2, b3) of the component "social stability of the borrower" (B)

End of annex 10

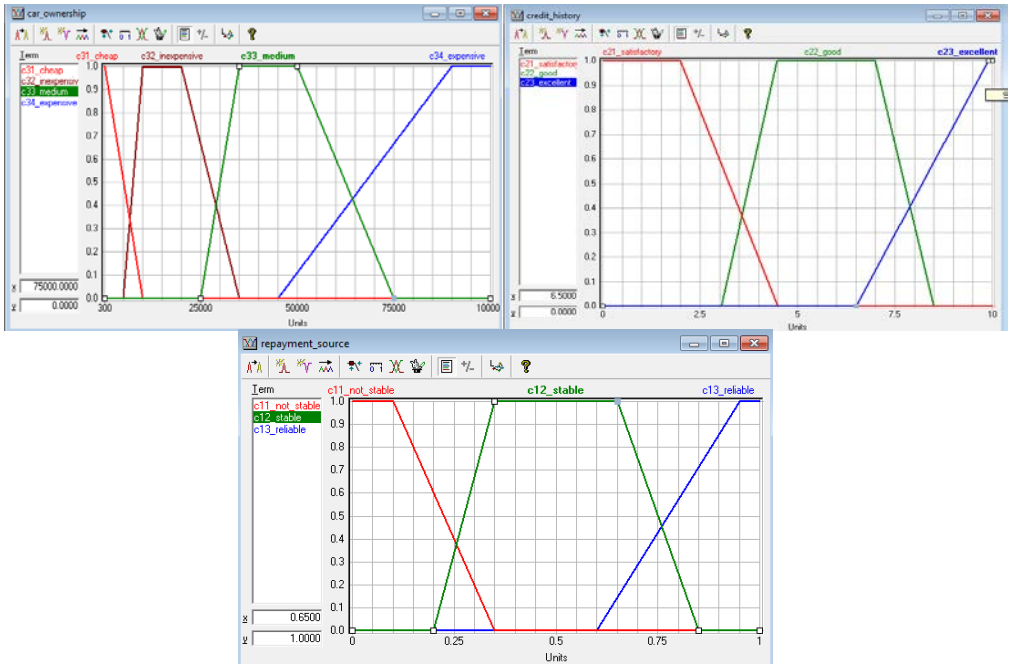

Figure 3. Computer representation of membership functions for input variables (c1, c2, c3) of the component "debt service" (C)

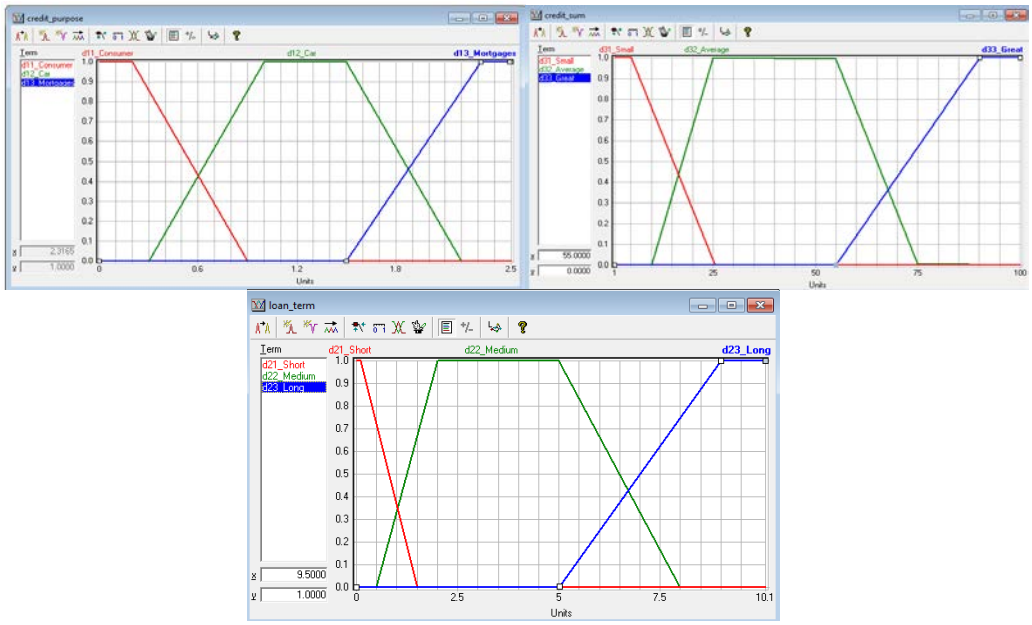

Figure 4. Computer representation of membership functions for input variables d1, d2, d3) of the component "credit condition" (D)

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We are pleased to present to readers the work that is a result of cooperation between the Bronislaw Markiewicz State Higher School of Technology and Economics in Jaroslaw (Poland) and Simon Kuznets Kharkiv National University of Economics (Ukraine).

The monograph is dedicated to the 90th anniversary of the Simon Kuznets Kharkiv National University of Economics.

The findings provided herein address the development aspects of the risk-based approach to combating money laundering. The analysis includes international standards applied to regulate and develop the risk-oriented financial monitoring system; financial intermediaries´ functioning peculiarities under the economy digitalization conditions and the peculiarities of primary financial monitoring conducted in the insurance industry and by banks; theoretical and methodological provisions for assessment and banks´ risk management from the standpoint of the factors influencing the money laundering processes.

The monograph is intended for lecturers, scientists, students of economic universities, specialists of public authorities, financial institutions and businesses.

KhNUE Simon Kuznets

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