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THE ECONOMICS OF UNCERTAINTY: CONTENT, EVALUATION AND REGULATION

Collective monograph edited by
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The monograph gives prominence to an important phenomenon in the economic life of society, the relevance of which has increased significantly since the beginning of the XXI century. And it is here that the term «economic uncertainty» is used. The authors of this study tried to answer questions about the content and manifestations of economic uncertainty, and how to assess and regulate it. The emphasis is made on those processes and phenomena in the economic, social, and managerial spheres that have been influential in strengthening or, conversely, weakening (limiting) economic uncertainty.

The text of this monograph can be useful for lecturers of economics, management, and academics, as well as for specialists in various markets, students, and graduate students.

The authors of the monograph are grateful to all their readers and, especially, to those who will comment on the content of the work and the validity of the ideas presented in it.

This monograph is dedicated to the 30th anniversary of the KROK University (Kyiv, Ukraine)

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INTRODUCTION

From the title of this monograph, it is clear that it discloses the issue of uncertainty in the economic sphere. The meaning of the authors of this work in the concept of «economic uncertainty» is revealed by the actual content (structure) of the monograph. A special (1st) section of the monograph is devoted to the interpretation of this content. But, despite the obvious things, there is another unobvious aspect of uncertainty in the monograph. It was mentioned by the world-renowned Ukrainian economist M.I. Tuhan-Baranovskyi in the early twentieth century. In the fundamental work «Fundamentals of Political Economy», explaining what economic activity is, he noted the following: «… Ambiguity at this ascending point should bring uncertainty to everything else». That is, uncertainty is presented here as a consequence (result) of ambiguity. The latter is synonymous with ignorance, inexplicability, and lack of recognized principles of cognition and interpretation. Ambiguity continues to produce economic uncertainty. In particular, this relationship between ambiguity and economic uncertainty is realized in the Ukrainian economy. Therefore, by seeking to understand, explain, and apply certain principles of research of the national economy, the authors of this monograph eventually help to limit uncertainty.

In fact, the construction, i.e. the structure of this work, reflects the approach developed by the authors regarding economic uncertainty content explanation. Therefore, we focus readers' attention on this construction.

First, the structure of the monograph presents two levels of manifestation, respectively, the levels of research and awareness of economic uncertainty: general and special. The general level, which concerns the economy as a whole and is related to the system of public management, is mostly presented in chapters 1-7. Instead, the special one, which is manifested in the organization of certain types of business activities and in its specific areas, is presented mainly in chapters 8-14. It is clear that such a division into general and special is quite conditional. After all, the connection, dependence and mutual penetration of these two levels are indisputable. Differentiation of such levels of uncertainty, on the other hand, becomes necessary, at least in terms of the necessity to apply a recognized ontological (cognitive) principle.

Second, the monograph is constructed in such a way that its chapters reflect the real and current manifestations of economic uncertainty, on the one hand, and the tools of its (uncertainty) research and limitations, on the other.

The following manifestations of uncertainty relevant for the Ukrainian economy are presented in the monograph:

– macro-financial imbalances for which prevention and effective response structures have yet to be built (chapter 3);

– contradictory educational policy, which does not ensure the accumulation of human capital, in accordance with the needs of the economy and society (chapter 4);

– permanent reproduction of the shadow economy with its inherent illegal proceeds of crime (chapter 7);

– unnaturally limited and, therefore, insufficient competitiveness of the entire national economy, individual industries and enterprises (chapter 9);

– excessive tax surplus, which discourages producers and taxpayers (chapter 11);

– ineffectiveness, mostly, formality of efforts to move from a traditional to an innovative model of the economy (chapter 12);

– social exclusion – the lack of necessary involvement of certain groups and strata of society in economic, social, and political life (chapter 13);

– artificially slow formation of the infrastructure of one of the most important sectoral markets in the national economy – the real estate market (chapter 14).

The following tools have been partially applied as well as the possibility of using them in the analysis and in response to scale changes have been studied:

– foresight as a way of modeling the future and implementing its individual elements in today's life of communities and society (chapter 2);

– large databases (Data Base) as a tool for making management decisions on the basis of identifying non-obvious (hidden), but actually existing significant dependencies (chapter 5);

– methods of qualitative assessment of corporate management of joint-stock companies and their combination with methods of quantitative assessment (chapter 6);

– comprehensive methods of analyzing the efficiency of enterprises with an emphasis on assessing uncertainty (risks) (chapter 8);

– relevant methods of real estate appraisal, able to ensure maximum consideration of the specifics of a particular stage of economic development (chapter10).

This study focuses on one of the industry markets. This is the real estate market, the organization of which is covered in three chapters (chapters 4, 10, 14). This emphasis is explained not only by objective, but also by subjective circumstances. The four co-authors of this monograph not only teach disciplines related to the real estate market in the educational programs of the Department of Theoretical and Applied Economics of KROK University, but also have extensive working experience in this market.

The monograph is the result of a collective study on «The national economy and the economies of sectoral markets under the conditions of institutional uncertainty» №0120U100086.

The authors of the monograph are grateful to KROK University for the opportunity to publish the research results in the form of a monograph.

We hope for the response of the scientific and student community, management specialists to the publication of this monograph. We expect a critical but fair assessment of the results of the author's team. We would appreciate such an assessment and suggestions for improving the conten.

From the authors scientific editor of the monograph,
Doctor of Economics,
Prof. Habil. Iryna Radionova

THE PLURALITY OF UNCERTAINTY ECONOMICS MEANINGS AND PUBLIC MANAGEMENT CONCEPTS AND MODELS

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The subject of analysis of this monographic study in general and this chapter in particular is the economics of uncertainty. At the initial stage of research, it is usually necessary to outline as accurately as possible the content of the concepts that will be used in the process of solving a scientific problem. It is primarily about the content and relations of at least four concepts, namely:

– economics of uncertainty as a theory – «Economics of uncertainty»;

– economic uncertainty as a fragment of the national economy – «Economic uncertainty»;

– economic uncertainty caused by government policy – «Policy-related economic uncertainty»;

– political uncertainty – «Policy uncertainty».

Economics of uncertainty as a theory, or «Economics of uncertainty», explains the phenomenon of economic uncertainty using certain theoretical and analytical tools: hypotheses, assumptions, logical constructions, generalizations, etc. The purpose of this part of economics, in our opinion, is to determine the criteria, scope, causes, forms of embodiment, consequences, and ways to reproduce economic relations with signs of uncertainty.

Economic uncertainty as a fragment (component) of the national economy, or «Economic uncertainty», is economic relations with special characteristics, properties and markers (indicators) suitable for assessment. These characteristics, properties, and markers should be studied within the part of the general economic theory, which is defined as «Economics of uncertainty».

Interpretation of the content of economic uncertainty usually begins with the identification of the states through which it is manifested [1]. These include high inflation rates and significant price volatility, low growth rates or crisis recessions, unemployment, unexpected structural changes, expectations of defaults, devaluation of the national currency, etc. When trying to quantify the level of uncertainty and its consequences, researchers often «limit» its content to a certain list of specific indicators, through which, in their view, uncertainty can be identified [2].

«Economic uncertainty related to policy» («Policy-related economic uncertainty») reflects the indisputable and econometrically proven fact that government policy affects the rate of economic growth, the depth of economic downturns, and so on. It is important to single out and identify the economic uncertainty associated with the policy itself, because there is another uncertainty. This is uncertainty caused by objectively existing economic cyclicality. The

uncertainty caused by economic cycles is manifested in the fact that, despite the awareness of the inevitability of cyclical changes, it is difficult or impossible to predict a number of economic parameters. We mean the time of passage of peak points in the ups and downs, as well as their «depth», the duration of individual phases of the cycle, etc. [3; 4]. Despite the fact that there are sufficiently perfect econometric tools for predicting changes, their technical, informational, etc. limitations also create economic uncertainty.

«Political uncertainty» («Policy uncertainty») can be interpreted primarily as actions of the government in the economic sphere, which do not have the necessary justification and organizational and legal support.

Political uncertainty should be interpreted as institutional incompleteness in the activities of policy makers (stakeholders). Institutional incompleteness can have such typical manifestations as gaps in legislation, lack of clearly defined social values, substantiated strategies and programs, as well as political will to implement them. It can be exacerbated by shortcomings in communication in the management hierarchy and in the government's relations with society. Political uncertainty, in addition to the mentioned shortcomings of institutionalization, is objectively related to political election cycles, to unpredictable political reactions of society and individual communities to the actions of the government in overcoming man-made, environmental, epidemiological, and other challenges.

The phenomenon of political uncertainty is so obvious and significant for society that there is a field of research related to the substantiation and use of methods for political uncertainty estimation. Baker S., Bloom N., and Davis S., for example, presented the design of an index of economic policy uncertainty (EPU – Economic Policy Uncertainty) [5]. The latter is used to estimate the situation in the United States and twelve other developed countries. It is significant that economic policy is interpreted in this paper as a symbiosis of fiscal, monetary, and regulatory policy. Thus, economic policy, related to which the level of uncertainty is estimated, is fragmented (structured) according to the most important instruments of government influence on the economy.

The emphasis on the relationship between economic policy and the economics of uncertainty is particularly important in our study for two reasons. First, because «public management» – a word combination used in the title of this chapter – is the implementation of a certain economic policy. Second, public authorities, represented by their central and local authorities, in pursuing a particular economic policy, can either contribute to greater economic certainty or, conversely, expand the scope of economic uncertainty.

In the relationship of two concepts (phenomena) – «economic uncertainty» and «political uncertainty» – the second becomes the cause of the first, namely: political uncertainty causes and exacerbates economic uncertainty. Some evidence suggests, however, that economic uncertainty exacerbates political uncertainty.

As already mentioned the economic theory of uncertainty – «Economics of uncertainty» – is designed to answer the fundamental question regarding the criteria

and scope of the economics of uncertainty. In fact, in this way, the content of this concept (phenomenon) can be clarified.

We assume that the economics of uncertainty is a fragment of any national economy. To identify it, certain assessment criteria (parameters) are required. The theoretical construction proposed by us to explain the scope, respectively, the content of the economics of uncertainty, is presented in Fig. 1.

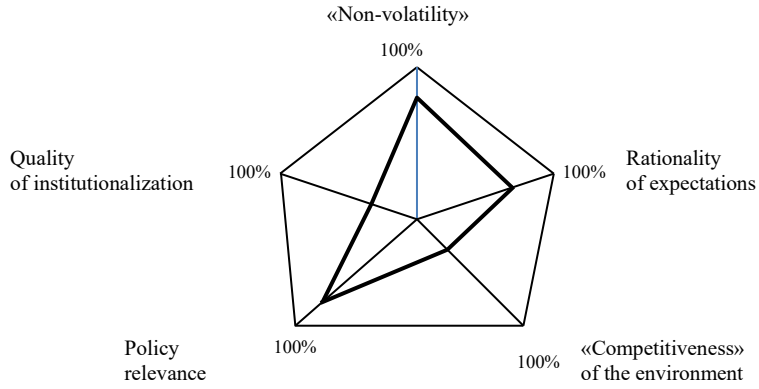

Fig. 1. Uncertainty economics parameters and scope

Source: author's own

According to the idea presented in Fig. 1, the «economics of uncertainty» is a zone outside the figure outlined in black. Inside the outlined figure there is the «zone of certainty», which forms the core of the national economy. The approximation of the actual indicators of a particular economy in five parameters to the mark «100%» means, by our logic, the approximation to full economic certainty. Instead, moving away from the «100%» mark is an increase in the zone of economic uncertainty.

We assume that the content and limits of the economics of uncertainty as a phenomenon objectively inherent in any economy can be determined by the following five parameters:

– «non-volatility» of the economy;
– rationality of expectations of economic entities;
– competitiveness of the economic environment;
– relevance of economic policy;
– public authority institutionalization quality.

Of course, there is no reason to believe that the list of proposed parameters for estimating uncertainty is exhaustive. New research in this area will reveal new parameters and contribute to their more adequate formalization. Extending and improving the list of parameters is likely to make the idea of the economics of uncertainty more substantiated.

For the practical use of the proposed theoretical construction, it is necessary to answer the question regarding determining the so-called «position» in the range from 0 to 100% for each of the five proposed parameters. Obviously, assessment

techniques through comparison, i.e. benchmarking, can be used for this purpose. The latter, as we know, involves the fulfillment of two important prerequisites for appropriate use, namely:

– the availability of a basis for comparison;

– the implementation of the procedure of indicators standardization.

The basis for comparison is formed by the so-called standard values of indicators. As such, the best indicators in the selected group of objects for comparison or the optimal values of indicators defined in domestic or international regulations and methods can be used.

The simplest rationing formulas, which can determine the point in the range from 0 to 100%, are those that fix the degree of deviation of the actual values of the parameters from the standard or the deviation of the actual values from the maximum (minimum) in the selected group of objects, namely:

1) rationing of the indicator –*stimulator*:	2) rationing of the indicator – *destimulator*:
$y_n = \frac{x_f}{x_{st}}$,	$y_n = \frac{x_{st}}{x_f}$,
$y_n = \frac{xf_{max}}{xmin_{max}}$,	$y_n = \frac{x_f - x_{min}}{xmin_{max}}$,

where y_n – the normalized value of the indicator, x_f – the actual value of the indicator, x_{st} – the standard (better for a certain group, normative, optimal, etc.) value of the indicator, $x_{\max}$, $x_{\min}$ – respectively, the maximum and minimum value of the indicator in the group of objects selected for comparison.

More complex rationing formulas provide factual substantiation and identification of certain intervals of «normality» of values within such limits as, for example, «optimal» and «satisfactory», «satisfactory» and «unsatisfactory», «unsatisfactory» and «critical», etc.

Depending on how the standard (best, normative, optimal) values are formalized and represented, either the rationing formula for the stimulator indicator or, conversely, for the destimulator indicator can be applied. For example, in management practice, the indicator of «monopoly power» is used to assess the state of a particular area (market). It is clear that the «competitiveness» and «monopolization» of the environment are opposite in content. Competitiveness narrows the area of economic certainty, i.e. is a disincentive (destimulator) for it. Instead, monopolization expands the zone of uncertainty, becoming a stimulator for it.

The suitability of the proposed theoretical construction (Fig. 1) for the use can be substantiated in the process of explaining the content and current practices (methods) of measurement on the five mentioned parameters: «non-volatility», rationality, competitiveness of the environment, relevance of assessment, and quality of institutionalization.

Volatility in the most general sense can be interpreted as the intensity of fluctuations, as an increase in the degree of deviation (variance) of the actual values from the existing trends and so on. Accordingly, *non-volatility* should mean attenuation of fluctuations and reduction of deviations. The identification of volatility at the national and global levels is mostly carried out in the form of an integrated index assessment with the determination of the percentage change (variance) of a particular index. As a rule, we mean market price indices, first of all stock. The same approach can be used to determine the variance of indicators of economic growth rate, unemployment rate, general price level, etc.

An example of estimating volatility using stock market price indices is given, for example, in a paper on the VIX index and its comparison with other volatility indices: S&P 100, S&P 500, and VSTOOX [6]. Having indicators of volatility, the relative level of volatility of the national economy can be estimated by the group of countries selected for comparison.

The rationality of expectations, as a parameter for assessing the economics of uncertainty, is based on one of the most influential economic concepts of the twentieth century – theory of rational expectations. As you know, the idea of rationality in the economic sphere was formulated by Muth J. in the 1960s. It was disseminated and implemented in macroeconomic theory and economic policy theory by prominent economists Lucas R., Sargent T., Walles N. [7], Taylor J. [8] in the 1970s-1990s.

The relation of the idea of rationality to the assessment of the economics of uncertainty is connected, in our opinion, with such a circumstance. The theory of rational expectations uses the fundamental assumption that rationality is the ability to predict what is really happening on the basis of available information. It follows that the higher the level of rationality is, the less is economic uncertainty, and, conversely, with increasing irrationality in the behavior of economic agents, the scope of uncertainty should expand. We fully agree with the generalization of the Ukrainian researcher O. Vatamaniuk, who aptly noted that the greatest number of *deviations from rationality* is recorded in situations of *uncertainty*, when people begin to simplify the task of choice, guided by certain «heuristic principles» [9].

It is important that the phenomenon of rationality is not only analyzed qualitatively, but also quantified. We have an example of assessing the rationality of the IMF and OECD forecasts for G7 budget deficits on the basis of econometric models. The conclusion about rationality is made on the basis of measuring the error of forecasts [10]. According to the error of forecasts, this approach to the quantitative assessment of rationality is quite substantiated. After all, the inability or limited ability to predict, respectively, an increase in forecast error is a manifestation of irrationality in the primary sense, which was laid by the creators of the theory of rational expectations.

The competitiveness of the economic environment is a rather controversial parameter in assessing economic uncertainty. At a first glance, competition, identified

with the element of the market, should mean increasing uncertainty. Instead, monopoly should be associated with increased certainty. From the standpoint of an individual's economy, the latter statement seems to be true. However, from the standpoint of the whole economy, the conclusion should be the opposite: the scale of the economics of uncertainty increases with the reduction of competition, the complication of business conditions, and increasing levels of monopolization. This can be substantiated at least by the fact that competitive conditions are a certain predictability of results in accordance with the laws of supply and demand. Instead, the monopolized environment generates a phenomenon that can be described as «unpredictability of dominance». This is the uncertainty associated with the impossibility of consensus of common national economic interests. The lack of consensus of interests is an urgent phenomenon of the Ukrainian economy, built on the principles of the «oligarchic model». The latter means the monopolization of economic spheres combined with the dominance of several oligarchic groups in politics.

In the arsenal of the industry markets theory, there are well-tested tools for assessing what is close in content to the «competitiveness of the economic environment» parameter. These are, in particular, a measure of the concentration of business in a particular market (Herfindahl-Hirschman index) and an indicator of the market power of the monopolist (Lerner coefficient). But these indicators, which are suitable for assessing a particular industry (market), do not meet the requirements for assessing the entire economic environment. To a greater extent, this requirement is met by the assessment and ranking of countries in the world according to the Index of Economic Freedom. The latter is known to have been developed at the initiative of The Heritage Foundation and The Wall Street Journal and has been used for 25 years in a row [11].

The Index of Economic Freedom's structure demonstrates its suitability for assessing the competitiveness of the entire economic environment. It is made up of four components, or sub-indices, that indicate key moments in the establishment of the competitive environment. These are: 1) the legal basis of entrepreneurship; 2) methods of state regulation; 3) freedoms of economic entities; 4) open markets. The method of calculating the Index of Economic Freedom refers to such terms and such content of four components:

– «Rule of law» (property rights, judicial efficiency, government integrity);

– «Scale of government» (tax burden on taxpayers, government expenditures, fiscal stability);

– «Regulatory efficiency» (freedom of enterpreneurship, freedom of labor and money market);

– «Market openness» (freedom of trade, investment and financial freedom).

It is feasible to carry out the rationing procedure by using the value of the Index of Economic Freedom calculated for all countries in the world (180 positions) for a certain year. It's possible that the best index values in the world can be regarded as a

reference. The «competitiveness of the economic environment» parameter will thus define the position on the axis from 0 to 100 percent.

We assume that the economic environment competitiveness parameter assessment can be limited to certain components of the Index of Economic Freedom. For example, these can be only two components of the index, namely: «regulation efficiency» and «market openness». In any case, it is necessary to substantiate the choice on the basis of certain assumptions.

The policy relevance is its compliance with the «nature of economic processes» and the specific conditions. The relevance of economic policy can have a qualitative (theoretical) interpretation and quantitative (factual, empirical) assessment.

On the basis of particular theoretical frameworks (models), qualitative assessment of the relevance of economic policy entails forecasting the consequences of decision-making in the fiscal, monetary, international economic and other spheres. Such model constructions are represented, in particular, in each textbook on macroeconomics. Moving from basic to higher levels of macroeconomics complicates them, because theoretical models must account for a greater range of conditions and assumptions. Thus, a comparison of the actual actions of national regulators of the economy with the logic of action, according to particular model designs, is used to assess policy relevance theoretically. In fact, given the logic of theoretical models, it is the answer to a question about the probable outcomes or losses from government economic policy, taking into account the possible instruments of influence and certain circumstances of their use.

Theoretical assessment is necessary but insufficient to determine the level of policy relevance. After all, on its (theoretical assessment) basis, only three conclusions can be drawn about the policy: it can probably be «effective», «poorly performing» or «ineffective». It is clear that only these three conclusions regarding policy limit the abilities to assess the scale of the economics of uncertainty.

Applied, or empirical, assessment of relevance can exist as a part of the so-called «economic policy implementation cycle». To do this, there must be a «policy cycle» in government activities at least. The cycle usually includes the following stages: substantiation (identification of target indicators, tools of impact on the economy, resources assessment), monitoring, adjustment, and results assessment.

The assessment, as a component of the policy cycle, is mentioned, for example, in OECD analytical materials. The materials are aimed at the development of a special guide for OECD countries' self-assessment of the public policy validity (Draft Policy Framework on Sound Public Governance OECD) [12].

If the mentioned guide for policy validity (relevance) assessment for OECD countries is difficult for other countries in its entirety, then its partial use is possible. It is, for example, an assessment due to the deviation of target indicators of fiscal, monetary, foreign economic policy of the government from the actually achieved indicators. In this case, the rationing can be based on the assumption that the standard is the *target* values of indicators. This assumption is supported, in particular, by the

fact that the achievement of goals set by the government is identified as the most important characteristic of the policy [13].

In the study of policy relevance, an approach based on the policy procedures assessment can be used. A modern example of such an approach is the international Digiwhist project [14]. Its implementation involves a relative (by comparison) assessment of the transparency of the fiscal sphere, as well as compliance with tender procedures, the successfulness of the fight against corruption in the public sector.

It is likely that the policy relevance assessment based on an empirical study of the validity of its objectives and procedures should not be alternative but complementary approaches i.e. should be used simultaneously.

The public management *institutionalization quality* is a phenomenon that reflects the process of policy implementation. Institutionalization in public management, in our assumption, covers the rules of decision-making in the public sphere, procedures, algorithms and standards of incentives and restrictions, reflected in the law and provided by certain institutions (organizational structures).

There are quite different definitions of institutionalization in scientific circulation [15]. There are different applications of this term to different areas in different countries [16]. This monograph also provides a section on institutionalization, namely: the institutional design of macrofinancial security [17]. Despite the differences in emphasis in defining the content of institutionalization, it is mostly associated with rules, procedures, law, institutions (organizational structures) of power.

The Global Competitiveness Index (GCI)* can be used to quantify the level of institutionalization. The latter is an integrated measure created under the auspices of the World Economic Forum. The index covers 103 indicators, combined into 12 groups to determine 12 sub-indices. The first of the sub-indices of the integrated GCI index is called «Institutions» and, in our opinion, can be used to assess our proposed «Quality of institutionalization» indicator.

According to the methodology proposed by the World Economic Forum, the sub-index «Institutes» covers a total of 21 indicators, 16 of which relate to public institutions, and the other 5 relate to private institutions. The actual assessment of public authority institutions, which we are interested in, involves the highlighting of five groups of indicators with the following definitions and content:

– «property rights» (protection of property rights in general and intellectual property in particular);

– «ethics and corruption» (corrupt use of public funds, trust in government, corruption payments and bribes);

– «illegal influences» (independence of the judiciary and favoritism in state decisions);

* Institutional design of macrofinancial security to stabilize the national economy.

– «effectiveness of the public sector» (waste in public spending, the burden of government regulation, the effectiveness of the legal framework for resolving disputes and appeals, transparency of public policy);

– «security» (business costs for terrorism, crime and violence, the scale of organized crime, the reliability of the police).

The use of data on the change of the country's place in the world ranking according to the article «GCI 4.0: Pillar 1: Institutions» makes it possible to carry out rationing, assuming, for example, that the standard is the value of the sub-index of the best country. For example, such a comparison should take into account the fact that the place of Ukraine, according to the sub-index «Institutes», changed in 2017, 2018 and 2019, respectively, as follows: 115th, 110th and 104th place [18].

Economic policy and models of public management cannot fail to respond to economic uncertainty. This statement is supported, in particular, by the connection observed by researchers: increasing uncertainty reduces confidence in national regulators (for example, in the central bank). This has a macroeconomic effect in the form of reduced costs for households and entrepreneurial investors [19].

The unpredictability of the Covid-19 situation has sparked a new interest in the problem of economic uncertainty. Not only are its manifestations in the economies of individual countries being studied in more detail [20], but also the reactions of public authorities to the growth of uncertainty, as well as the experience of counteracting the economic crisis by national governments [21].

The response of public authorities to increasing economic uncertainty should begin with the implementation of the security parameter in the system of priority values. It is not just about the response of national regulators to changes in certain indicators of economic security. It is likely that it is time to create a concept of public management that would reflect the fact of the new scale of the economics of uncertainty. In line with the creation of such a concept, the problem of assessing the scale of uncertainty, respectively, the selection of parameters for assessment, become a priority. Therefore, our attempt to substantiate specific parameters – «non-volatility», rationality of expectations, competitiveness of the environment, relevance of policy, and quality of institutionalization – can be considered as one of the steps towards creating such a concept.

The so-called security parameter as the value (and purpose) of public power in the context of optimizing the scale of the economics of uncertainty, taking into account our proposed parameters, should be reflected in such actions:

– preventing and counteracting *volatility* threatening the integrity of the national economy;

– formation of *rational* expectations, primarily through increasing confidence in the actions of the government and its ability to predict the course of events;

– restriction of monopoly and promotion of *competitiveness* of the economic environment;

– formation of a reasonable, i.e. *relevant*, political cycle with consistent and predictable actions of national regulators;

– observance of rules, procedures and norms set by the authorities in the economic sphere.

If security, identified as uncertainty scale optimization, becomes a priority (goal) of public authority, it can conceptually change economic policy. After all, it will be a question of forming a new alternative choice, accordingly, of taking into account the modified coordinates of the policy. In our opinion, such coordinates can be considered: «Welfare (social security)», «Development (investment and innovation)», and «Security (economic certainty)». The relationship between the mentioned alternative goals and, accordingly, the coordinates of the policy are given in Fig. 2.

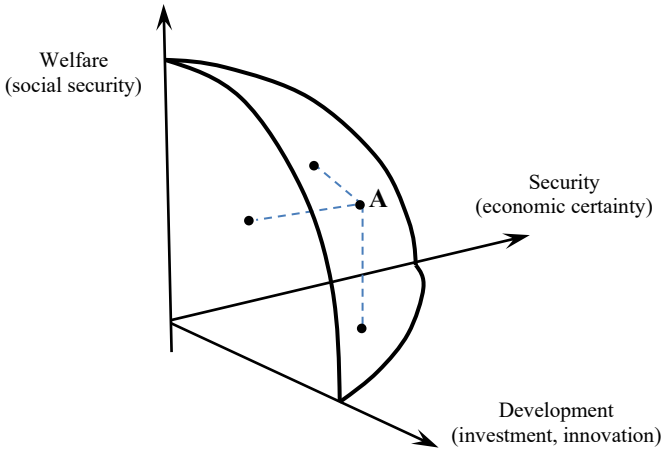

Fig. 2. The model of economic policy as a result of the choice in the coordinates of the three goals

Source: author's own

Fig. 2 presents the idea of forming economic policy taking into account three goals. Two of them – «Welfare (social security)», «Development (investment and innovation)» – can be considered «traditional». Their traditionalism is manifested in the fact that usually goods «for consumption» and goods «for investment» are considered as alternatives to illustrate the choice with limited resources. This assumption, in particular, was used in the theoretical construction called «Social welfare function» or «Community indifference curve» [22]. It is clear that «goods for consumption» correlate with the «welfare» concept, and «goods for investment» – with the «development» concept. The third goal – «Security (economic certainty)» – is not «traditional». It is not used in known theoretical constructions: a) to explain social choice, b) along with two other purposes as the third component of choice [22].

The fundamental ideas underlying the theoretical constructions – «social welfare functions» and «community indifference curve» – in our opinion, can be used to illustrate the decision-making of public authorities with due account of the three goals.

In our proposed theoretical construction (Fig. 2), each of the three curves (and functions) performs the following explanatory role:

– illustrates the limit of possibilities, the excess of which is unattainable, with regard to the available resources;

– is the geometric location of points, each of which presents one of the options of choice of two alternatives, which (options) are equally useful for participants in the political process.

According to the content of coordinates in which three curves are constructed, they could be defined as follows:

– «social opportunities function» (in the coordinates: «Welfare (social security)» – «Development (investment and innovation)»);

– «production capacity function» (in coordinates: «Development (investment and innovation)» – «Security (economic certainty)»);

– «security capability function» (in coordinates: «Security (economic certainty)» – «Welfare (social security)»).

The issue of optimal choice for the three policy goals, as illustrated in the graph of Fig. 1, is not related to the approximation to the so-called «possibility curves», but to the movement towards the plane formed by these curves. In fact, there is the task of «not going» beyond the objective scope, delineated by three curves that form a complex plane. The difficulty of finding the parameters of the selection point (point A in Fig. 2), which would be as close as possible to this plane, only illustrates the greater complexity of the choice «for three goals» compared to the choice «for two goals».

Based on the formed ideas about the content of the economics of uncertainty, it is possible to assess the concepts (models) of public management, their suitability to respond to the challenges of uncertainty. In this regard, it is advisable to distinguish between two manifestations of uncertainty, namely: uncertainty in the processes; uncertainty in the results.

In our opinion, the most adequate response of the management system to uncertainty in economic *processes* is provided by the Governance public management concept. It is likely that the closest Ukrainian equivalent of this English term is the term «концепція публічного *врядування* (concept of public *governance*)».

In fact, the concept of public Governance was historically and logically preceeded by another concept – Governvent. The Ukrainian equivalent of the latter is «public management».

Although the two concepts mentioned – Governvent and Governance – are related, they have fundamental differences. Their connection is manifested in the fact that they are both managerial, implemented in the public sphere and relate to one object – the economy – at the national (macroeconomic) level.

The differences between Governvent and Governance are primarily related to the relationship between the meanings of close but not identical concepts (phenomena), namely: «public» and «state», «governance» and «management». Since the actual clarification of the content of these concepts is beyond the scope of our study, we only represent our vision of this relationship in a concise (formalized) form. In our opinion, the ratio can be given as follows:

«public» > «state»,
«governance» > «management».

The special meaning of the concept of public Governance is best seen in its comparison with the content of the Governvent public management concept. This comparison is given in Fig. 3.

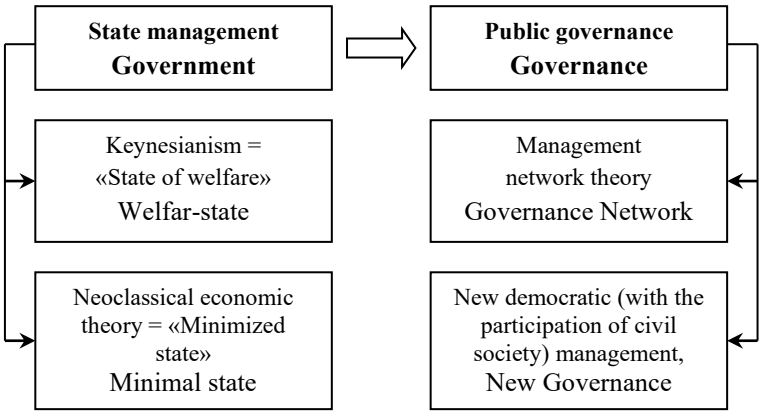

Fig. 3. The comparison of economic management concepts at the national level
Source: author's own

The transition from the concept of state management (Government) in the middle of the twentieth century to the concept of public governance (Governance) of the 1990s – early twentieth century is stimulated by the so-called «gaps» or «failures» of the state. The point is that the traditional management of the mid-twentieth century increasingly revealed the partial inability of the state to solve a number of economic and social problems. Therefore, there is a need to develop new approaches to public management at the national level and to implement new management practices.

The fundamental differences between Government and Governance can be identified through a comparative analysis of the theories that make up the main content of the two alternative concepts.

The concept of Government, despite the differences between Keynesianism and the neoclassical theory on the basis of which it was developed, in both cases provides answers to *similar* questions, namely:

– for the creation of which public goods the state should be responsible, what resources can be used, so what objective economic boundaries of the state are;

– which instruments should be used to achieve the economic policy goals set by governments, which instruments of state regulation and in which cases are most effective, and in which, on the contrary, become inappropriate;

– how fiscal, monetary and regulatory (administrative) instruments should be combined in the economic policy of governments, which policy rules should be followed.

The concept of Governance relates to somewhat different management emphases than the Government. Nevertheless, in the practice of implementing the

ideas of Governance, the use of the Government concept cannot be avoided. In particular, this relates to the formulated rules for the use of instruments of state regulation of the economy, as well as the prediction and assessment of governments economic performance.

The general principles of the Governance concept are reflected in EU documents. This is, for example, a report that sets out the fundamental principles of Governance management. These are the principles of openness, participation, accountability, efficiency, and coherence [23]. From this list follows the conclusion about the emphasis on the *procedural aspect of management* in the theoretical tools of the Governance concept.

The general features of the Governance concept are revealed in numerous sources [24; 25], in particular, devoted to the analysis of theories that shape its content. These are the theory of management networks (Governance Network) [26] and the theory of new democratic management with the involvement of civil society (New Governance [27]).

The most original ideas-answers to the fundamental questions of the management process organization, which were formed within the mentioned theories (Governance Network and New Governance), in our opinion, are as follows:

– *compliance with the rules, algorithms, procedures* for appropriate interaction of policymakers, as well as the democracy of procedures a priori makes it (policy) efficient;

– policy should be *judged* not so much by economic and social performance as by the *quality of compliance with the procedures;*

– the economy needs not management, but direction from the authorities, which are designed to form multilevel links (*networks*), covering and involving not only authorities but also *civil* society in the management process;

– *the democracy of procedures* is achieved through numerous tools of citizen participation – public debates, public initiatives, sociological research on possible reactions to government actions and on the expectations of communities, etc.;

– one of the efficient means of maintaining the democracy of management processes is the use of digital technologies and the formation of electronic governance (e-Governance [28]).

We suggest that the greater potential of the Governance concept to respond adequately to the challenges of the growing scope of the economics of uncertainty is due to the so-called «expansion of contents». This «expansion» is illustrated in Fig. 4.

Fig. 4 visualizes the idea that the concept (and practice) of Governance presents the management process «in a broader sense». That is, it is a question of interpretation of public sphere as a part of both state, and «third» (civil) sector. Accordingly, governance is interpreted as a combination of both the system of public management and the system of citizen participation in public management. Therefore, an additional segment and additional opportunities to respond to economic uncertainty are formed.

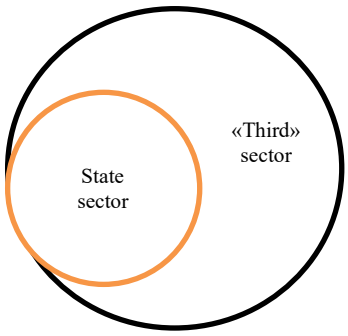

Fig. 4a. Public sphere

Fig. 4b. Governance

Fig. 4. «Expanding the content» within the concept of public Governance

Source: author's own

The substantiation of the idea of «expanding the content» can be argued based on facts and examples of limiting uncertainty in the Ukrainian economy. We mean that the economic insolvency of the Ukrainian state in the most critical moments of uncertainty is compensated by the Ukrainian society participation. Civil society permanently uses various forms of compensation for the economic insolvency of the state. These include «self-cost» for innovation and security projects, charity and volunteerism in social protection of the population, in terms of underfunding of medicine, education, and culture, as well as in the field of national security, in terms of authorities' inaction to prevent economic crimes, and so on.

Adequate response to *the results uncertainty*, in our opinion, is provided by the practical use of the ideas of the economic nationalism concept.

As it is known, the concept of economic nationalism was formed within the «historical school» of economics in the nineteenth century. To substantiate the suitability of this concept to meet the challenges of the economics of uncertainty, it is advisable to focus on two factors. First, on the historical conditions under which the «historical school» in general and the concept of economic nationalism in particular were formed. Second, it is important to look at the ideas of the founder of the concept of economic nationalism, Friedrich List, from the point of view of those conclusions that have practical value today.

The «historical school» of economics emerged in Germany in the first half of the nineteenth century just at a time when several issues of *uncertainty of the result* became relevant for the country. It is, first, about preserving the national identity and economic integrity of the country. Second, it is vital to gain a place in the world economy against the background of the industrialized imperial England's dominance. It is clear that the prevailing concept of liberalism and free trade then, proposed by the English school of classical political economy, could not meet the national interests of economically weak Germany.

In the scientific legacy of F. List (1789 – 1846), the founder of the economic nationalism concept, we can find a number of ideas that have not lost their importance, among other things, and because they were actively embodied during the twentieth century and continue to be embodied to this day. These ideas and practices have become a worthy alternative to liberal views. They were successfully used by ambitious countries that overcame the lag in socio-economic development and the consequences of economic colonialism [29]. The issue of economic colonialism, combined with a high level of economic uncertainty, remains relevant for the Ukrainian economy in the XXI century.

The ideas of the concept of economic nationalism in the works of F. List* and related generalizations about economic uncertainty, which follow from these ideas, in our opinion, can be presented as follows:

1. *Idea*: the economy of each country develops according to special laws, the implementation of which is designed to ensure the development of productive forces of a particular nation at a particular time.

Conclusion: an attempt to implement general rather than special laws in specific areas may slow down the development of national productive forces and increase economic uncertainty.

2. *Idea*: the productive forces of the nation are not limited to material components – the means of production and natural resources. They cover the additionally acquired abilities of people, as well as the system of governance, morality, art, and justice. «Spiritual knowledge» becomes an important factor of economic growth, insofar as it contributes to the formation of new productive forces.

Conclusion: the lack of material productive forces and the associated uncertainty inherent in countries with a low level of development can be offset by the use of social and public institutions potential.

3. *Idea*: the government's economic policy must be active and aggressive. «Educational protectionism», stimulation of domestic production and restriction of imports to meet national needs become an important manifestation of state activism. The task of the government should be to invest in infrastructure, to coordinate the interaction of individual parts of the national economy.

Conclusion: the national economy development, as a prerequisite for the highest level of economic certainty, is provided by the state, endowed with the functions of protection, promotion, guaranteeing the integrity of the national economy.

4. *Idea*: the theory and practice of «free trade» becomes an instrument of economic domination of more economically developed nations over those with a lower level of development. «Free competition between two civilized nations», wrote F. List 170 years ago, «can be mutually beneficial only when they are at about *the same level of industrial development ...*».*

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* Vsevolod Holubnychyi, a world-famous, but little-known in Ukraine, American professor of Ukrainian origin, was a researcher of economic colonialism in relation to Ukraine. His work «Theory of Economic Colonialism and Its Relation to Ukraine» was introduced into scientific circulation thanks to a study by Ukrainian scholars, represented in the work «Political Economy of Social Progress» by Vsevolod Holubnychyi in two volumes [30].

To present the ideas of F. List, we used the work of Zlupko S.M. [31, p. 354-372] in the part devoted to the German historical school. The mentioned work is interesting in that its author not only relies on the original work of F. List himself (List F. National System of Political Economy. St. Petersburg, 1891), but also uses the analysis of this historical heritage of German scientists and the doctoral paper of the Ukrainian scientist written in the Ukrainian Free University of Munich (Germany).

* The work of Panchenko V. [32, p. 6-12] was used in the analysis in the part «Theoretical foundations of the economic doctrine of the OUN, or F. List v. K. Marx».

Conclusion: The practical use of free trade principles by national economies with lower level of development can lead to the backlog and increase economic uncertainty.

The arguments in favor of the suitability of the concept of economic nationalism for the use in achieving higher levels of development and greater certainty of economic results are found in successful models of economic revival of individual countries.[**] The analysis of national models from the standpoint of implementing only two ideas of economic nationalism – national unity as a source for productive forces development and state activity in national economic projects implementation – is presented in the analytical Table 1.

The list of successful models of public management with components – ideas, tools, organizational practices – that correspond to the concept of economic nationalism could be extended and analyzed more deeply. In the context of the topic of our study, it is important that these facts do exist and that they relate to successful countries. The term «successful country» refers to a country that has achieved the desired socioeconomic development result. This should be viewed as the concept of economic nationalism assisting in the precise limitation of uncertainty through the criterion of *the obtained result*.

Conclusions. The concept of «economics of uncertainty» reflects the fact of the objective existence of relations with special characteristics. The latter are identified and qualitatively assessed by the «economic theory of uncertainty» – a special area of economic research. When economic uncertainty is exacerbated or, conversely, leveled by economic policy, it becomes appropriate to single out the concept of «economic uncertainty caused by policy». Economic uncertainty is caused by politics with signs of uncertainty, or «political uncertainty».

Understanding the relations between economic and political uncertainty provides a basis for drawing conclusions about public management concepts and models.

The identification of the economics of uncertainty involves the use of parameters for its qualitative definition and assessment. To this end, in our opinion, such parameters as the volatility of the economy, the rationality of expectations of economic agents, the competitiveness of the environment, the relevance of economic policy, and the level of its institutionalization can be used.

Comparative databases created to calculate the integrated indices of international organizations can be used to quantify the scale of the economics of uncertainty. These are, in particular, the sub-indices of the Index of Economic Freedom and the Index of Global Competitiveness. National statistics on economic growth, price fluctuations and employment, stock indices, etc. should also be used as a basis for assessment.

[**] Translated by V. Panchenko from List Frederik National System of Political Economy. Philadelphia: J. B. Lippincott & Co, 1856. P. 77.

Table 1. Two of the ideas of the economic nationalism concept in the models of public management of separate countries

Ideas of the economic nationalism concept	The examples of the implementation of the economic nationalism concept ideas in the successful models of national economies revival
National unity, overcoming of social exclusion as an «additional productive force» and a source of economic growth	The model of «State Socialism» in Germany in the 1880s – 1890s under Otto von Bismarck: overcoming the alienation of the working class and its opposition to the German state through the adoption and implementation of a number of social protection laws in medicine (1883), pension insurance (1889), labor protection (1891).***
	The model of «Ethical (Confucian) capitalism» of the first third of the twentieth century, under the Japanese leader E. Shibusava: overcoming alienation through the formation of a «positive identity of national business» by creating charitable organizations in cooperation with the Japanese state, implementing social programs, including school systems renewal, etc. [34].
	The model of «French Solidarity» of the Fifth Republic after the adoption of the Constitution of 1958, under the presidency of Charles de Gaulle: selective support for the most economically backward regions, overcoming alienation between social groups through the «participation system», «social elevators», including «elevators» in the civil service system, reforming the educational system in the direction of guaranteeing quality education for all [35].
An active state in the national economic interests and national production protection and promotion	The model of «building a secular national state» in Turkey in the 1920s and 1930s under Mustafa Kemal Ataturk: «state patronage» over strategic sectors of the economy with investment in production infrastructure and the highest economic growth at the time; abolition of «unequal agreements» with European countries and return of production facilities to the ownership of Turkey [36; 37].
	One variation of the Asian Tigers model under Korean leader Pak Chŏnghŭi in the 1960s: the implementation of import substitution and foreign economic expansion through government support for large corporations (Samsung, Hyndai, LG, etc.); implementation of economic (creation of almost half of the country's GDP) and social function by corporations [38].
	India's national interest protection model in 2010 under Riendra Modi's premiership: government's «Produce in India» program implementation, which builds on its own human resources, including ambitious youth, education reform, business facilitation, especially in the field of high technologies [39].
	The Rwandan Economic Miracle model, under Paul Kagame of the 2000s and 2010s: implementation of the idea of regional leadership in trade, logistics, tourism, IT and ensuring sustainable and high (7% per annum) economic growth; public investment in infrastructure (fleet, logistics facilities, roads); state stimulation of exports and restriction of imports in the part that is not related to high technologies; reduction of the share of foreign aid (as a percentage of state budget revenues) [40; 41; 42].

Source: author's own

The implementation of the security parameter in the coordinates and goals of economic policy can be considered as a probable adequate way for the theory and practice of public management to respond to the uncertainty economics scope

*** Summarizing materials on successful models based on economic nationalism are presented in the work of the Analytical Center «Ukrainian Studies of Strategic Research» [33].

increase. In this case, the security parameter should be interpreted as a limitation of economic uncertainty.

Concepts and corresponding ideas have already been developed in economic theory and in the theory of public management, which, in the case of practical implementation, can provide an adequate response to the expansion of the economics of uncertainty. This is, firstly, the concept of public governance with the idea of expanding the content of management at the expense of the «third sector» and public participation in the implementation of the «cycle of economic policy» (Governance). Secondly, it is the concept of economic nationalism with the ideas of an active state in the protection of national economic interests, in the creation of social institutions for the development of national productive forces and overcoming the economic lag.

Relevant areas of future research in the field of economics of uncertainty could include as follows: further clarification of multiple meanings of the economics of uncertainty, identification and classification of forms of its manifestation, improvement of tools for assessing its scale, and generalization of new ways to respond to economic uncertainty in different national models of public management.

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FORESIGHT IN PUBLIC MANAGEMENT AS A REGULATION TOOL UNDER THE CONDITIONS OF ECONOMIC UNCERTAINTY

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The uncertainty of the modern Ukrainian economy is growing against the background of unresolved internal political and socio-economic conflicts, rising shadowing, incomplete reforms, etc. Furthermore, external influences like as recessions, which affect almost every country on the planet, and impulses from unexpected catastrophic events, which are visible to the entire world, are included in this list. Therefore, the need for better prediction in national economy public management is growing. The foresight tools appeared to be a response to such a need by science and management practice. Foresight is better than existing tools because it creates an opportunity not only to predict the future, but also to model it. The latter is particularly significant for public management since it can act as a tool for limiting future economic uncertainty.

The *purpose* of this chapter is to identify the possibilities of foresight as a tool for strategic decisions in public management, with regard to the need to limit the uncertainty of the national economy.

The foresight tools have confidently entered management theory and practice. But the issue of their certainty, components, methods and forms of application continues to be the subject of debate. We focus on those aspects of foresight modern interpretation that are fundamentally important, with regard to the possibility of its use to manage economic uncertainty.

Due to the need to use the English term «foresight», for the sake of more accurate identification of meanings, it is advisable to find a Ukrainian equivalent. Such an appropriate term corresponding to the English «foresight», in our opinion, is «modeling the future». It is clear that in a specific context it will concern the future of a certain area. In our case, it is the national economy that becomes the object of public management.

The foresight content is best revealed when comparing (opposing – vs) with other methods of prediction. The following comparisons seem expedient to us:

– formation of *scenarios* of the future *vs* definition of the *trends* formed in the past;

– *strategic* (long-term) event planning *vs* permanent response to *current* (in the near future) events;

– understanding development *priorities vs* evaluation of the results of *critical* situations that have already occurred;

– *innovative solutions* focused on long-term effects *vs traditional solutions* focused on short-term consequences;

– *anticipation* (prevetion) of events *vs* reaction *after events* (stay in their fairway).

According to the above contrasts, foresight is a tool for modeling the future, which provides development in a particular *scenario*, the formation of *strategies* based on understanding the *priorities*, and *innovative* management decisions that allow to *anticipate* (prevent) events.

We can find confirmation of the substantiation of our identified foresight qualities in a succession of publications by recognized researchers.

According to the leading ideologist of foresight B. Martin, foresight is a technology associated with a constant effort to look into the distant future of science, technologies, the economy, and society. This glimpse into the future aims to see strategically important areas of research and new technologies that will deliver the greatest economic and social benefits [1].

The French professor of economics J. Heraud and German economist K. Kuhls interpret foresight as a process of understanding long-term trends on the basis of a system approach. [2].

The researcher of European economics P. Becker interprets foresight as a process of active knowledge of the future in the medium and long term with the aim of understanding the future of science, the economy, and society, as well as mobilizing joint efforts [3].

The researcher from Great Britain L. Gokhberg emphasizes that foresight is a system of methods of expert evaluation of long-term prospects of innovative development, technological breakthroughs that can affect the economy and society. [4].

In one of the most cited studies on foresight, it is defined as the process of systematic information collection about the future and future medium- and long-term visions development for real-time decisions and joint actions [5]. Such decisions and related actions are called «foresight projects». The peculiarity of the latter is that they combine two types of projects: research and modern practical actions with a focus on obtaining long-term results.

In a fundamental study by the United Nations Industrial Development Organization (UNIDO), foresight is defined as a systematic prediction of the long-term future of science, technology, the economy, and society to identify those areas of strategic research and technologies that will provide the greatest economic and social benefits for society [6].

The most authoritative international organization of foresight – the Foresight group – in its activities is based on the idea of limited traditional statistical forecasts and the need to expand the range of research information about society for successful

decision-making. The so-called «triangle of foresight vectors», – reflection on the future, discussion of the future and delineation of the future – substantiated by the researchers of this international organization, has become a classic of the foresight science [7].

The development of the idea of a «triangle of foresight vectors» involves the disclosure of these vectors content (Fig. 1). In particular, such an explanation of the content is contained in the materials created under the auspices of the European Commission (CORDIS – Community Research & Development Information Service).

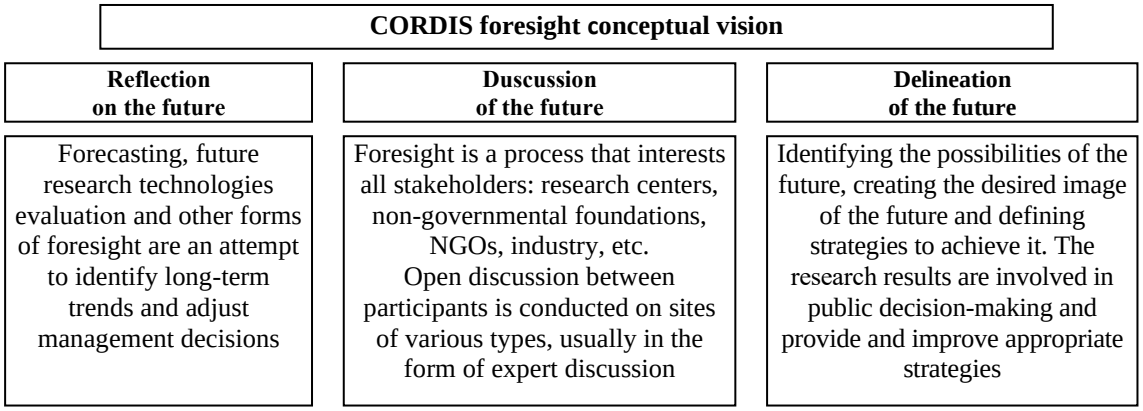

Fig. 1. The content of «the sides of the triangle of foresight vectors»

Source: [8]

In our opinion, for the successful use of foresight it is important to focus on the *procedural* approach to the interpretation of its content. According to this approach, foresight appears as a system of established algorithms, procedures and norms for the accumulation and analysis of information about changes. This enables society, represented by governing bodies, professional and other communities, to anticipate and as if to be «ahead» of the future. This advancement means: to act taking into account the innovative trends that are just being formed, to rely on reasonable alternative scenarios in the activities.

Despite the differences in emphases in our definitions of foresight, they have something in common. This is a recognition that the formation of the «desired» future depends on action today. Therefore, the following basic ideas are methodologically important for the use of foresight:

– the future is being created today;

– the future is variable: the chosen course of action for today determines the outcome of the future;

– the future is not so much forecasted as projected;

– foresight participants consciously choose the future and manage change processes.

Foresight, as a managerial phenomenon, has gone through certain stages of its formation. The study of these stages has both theoretical and applied significance. The analytical Table 1 discloses the main stages of the foresight formation.

Table 1. The stages of foresight evolution

Stage boundaries	The proposed name of the stage	Scope	Countries that systematically use foresight
I stage – 1960s – 1980s.	Technological	Technological and defense research, substantiation of governments innovation policy, projects of individual firms	The USA (RAND corporation), Japan
II stage – 1980-s – 2000-s.	Market-oriented	Evaluation of social consequences of new technologies introduction	The USA, Great Britain, Germany, Finland, Australia, Netherlands, New Zealand, Japan
III stage – 2000-s – 2020-s.	Socio-economic	Health protection, education, quality of life, national security, ecology, international politics, trade, economics	More than 30 countries, including developed and developing

Source: compiled by the author on the basis of [9-13]

As evidenced by the information presented in the analytical Table 1, foresight has undergone at least three stages of evolution. Its formation began with its episodic use in the technological sphere of the two most developed countries in the 1960s – the United States and Japan. In the early 2020s, foresight was used not only in the high technology sphere design, but also in many other areas. The number of countries using foresight as a management tool based on future modeling is growing at the expense of both developed and developing countries.

Separate stages of foresight evolution have the following defining features and characteristics.

At the first stage – *technological foresight* – the potential of science and technology was evaluated to ensure the best competitive positions of countries, regions, and companies. Economic planning techniques based on a linear model of innovation were used. The research participants were limited to experts in science and technology. The technological sphere was considered autonomously from the social and cultural ones.

At the second stage – *market-oriented foresight* – the needs for better organization of markets and certain types of entrepreneurship were emphasized. The market consequences of the introduction of new technologies were predicted. For the first time, technological forecasts began to be considered in the context of solving humanitarian problems: hunger, poverty, security, etc. Representatives of business and public authorities began to be involved as experts.

At the third stage – *socio-economic foresight* – attention is paid to social issues and unresolved problems of society. Therefore, it is an analysis of the links between new technologies, the organization of markets, on the one hand, and the life of

society, on the other. This change of emphasis affected the composition of expert groups. They began to involve not only representatives of the scientific and business communities, but also politicians, government officials, civil society activists, and local government officials. The relevance of modeling the future of communication between the government and citizens, as well as between different population segments, was recognized. The future has emerged as a result of bringing disparate interests together, settling problems, and reaching an agreement.

In the context of the issue studied in this chapter – the use of foresight to limit economic uncertainty – it is important to identify and classify the techniques and methods used by foresight projects organizers.

Foresight, as a special management tool, involves the use of such *techniques*:

• Predominant focus on the so-called «*weak*» markers of future changes.

Usually, the markers of changes are divided into «strong», which indicate the obvious occurrence of events in the near future, and «weak». «Weak» markers reveal a distant future, the outlines of which have not become obvious. Foresight is based on «weak» markers. This makes it possible, with some probability, to anticipate remote, non-obvious changes that require conceptually new, strategic management decisions.

• Identifications as objects of complex interactions and large databases research, according to the requirements of the so-called «bottom-up approach».

Information from a limited range of sources can be used to predict the future when abstracting from complex relationships. This is the «top-down approach». Foresight is based on the study of the maximum possible range of sources, as well as complex interactions between different areas.

• Participation in modeling the future of groups of people – the so-called change stakeholders – with different implementation in the actual process of changes.

To model the future, it is necessary to take into account the different visions of the creators of this future. The activity of creating the future is determined by participation in changes for the current period. The bearers of changes are groups of people who are differently involved in the process of changes. The first group – the «initiators» – is directly interested in the organization and implementation of all planned actions. The second group – the «main participants» – objectively joins the changes, according to the logic of their implementation. The third group – «indirect participants» – can hypothetically influence changes or join them through others.

• Permanent improvement of the model of the future in the process of foresight practical implementation.

«Approaching the future» requires constant updating of foresight projects. Foresight does not end as a phenomenon. It can only be a question of completing a separate stage of a foresight project. As an ongoing process, foresight can only be successful in a developed civil society. It is civil society that ensures that the future becomes not only the product of scientists and inventors, but also the result of the activity of communities and citizens.

Foresight tools cover a complex set of *methods*. It is about half a hundred methods from different fields of knowledge. These are, for example, such areas as

econometrics and statistics, economics and management, sociology and psychology, etc. Even analysis based on the artistic understanding of the future in works of science fiction, etc. is used.

The most perfect visualization of foresight methods is made through the so-called «Popper's diamond». It reflects the classification of foresight methods by the criterion of the source of knowledge. The idea of the existence of four sources of knowledge is used, namely:

– *creativity* with methods based on cognitive and creative abilities of change management participants;

– *expertise* with appropriate methods of expert evaluation by specialists with knowledge, experience and intuition in certain fields;

– *evidence*, which involves the use of methods of scientific analysis of data and facts;

– *interaction,* which is implemented by using methods of identification of collective (joint) vision of future prospects and the course of events.

Foresight methods, according to «Popper's diamond», are given in Fig. 2.

Fig. 2. «Foresight diamond» of R. Popper

Source: [14]

«Foresight diamond», illustrated in Fig. 2, covers more than 30 methods of research and future modeling. With regard to their content, they can be divided into four groups, namely: creativity, expertise, interaction and evidence.

It is clear that not all of these methods can be used in each of the foresight projects. The selection of methods in each case will be influenced by the nature of the research subject area, available resources for research, qualification and interest of research participants and future modeling, etc.

The analysis of the practice of using foresight provides grounds for identifying the following current trends:

– the arsenal of foresight methods is constantly expanding;

– in some periods certain methods are considered more appropriate and therefore begin to be used more actively;

– in some countries, preference is given to certain sets of foresight methods.

To confirm mentioned trends, we will use the following facts:

First. Modern methods of qualitative and quantitative analysis used in foresight projects cover what was not previously an arsenal of foresight. In particular, systematic reviews of science and science fiction literature, morphological analysis, the so-called «trees of correspondence», script and role-playing games etc. are common methods of qualitative analysis today. Methods of quantitative analysis include: cross-impact analysis, multicriteria (cluster) analysis, construction of integrated evaluation indices, etc. It is recognized that, despite the expansion of the arsenal of methods, in each period only 10-15 of them are used most actively.

Second. The following examples of countries' priorities in using foresight methods have been recorded. In Japan, the Delphi method was mainly used during the scientific and technological foresight. In the UK and Germany, the emphasis is on combining different methods. In the United States and France, methods of substantiating lists of critical technologies are preferred.

Third. The World Review of Foresight Methods [15] states that in most of the studied foresight projects, the leading position is occupied by three methods: literature reviews, expert panels, and scenario modeling. Game scenarios, bibliometrics and multicriteria analysis were rarely used. Examples of the involvement of various representatives of public-private partnerships, civil society, and people from different segments of life have become more frequent in foresight projects. This enhances the effect of interaction.

The approach to foresight as a permanently repetitive process provides grounds for distinguishing regular *stages of implementation*. One of the variants of such delimitation of implementation stages is illustrated in Fig. 3.

The represented in Fig. 3 approach provides for the selection of such stages in the foresight implementation as preparation, involvement of participants, development, execution, and upgrade (in the sense of adjustment). Each of the five stages involves a series of specific actions to implement foresight.

Since foresight has a long history, beginning in the middle of the twentieth century, it is already possible to make generalizations about the general approaches and the peculiarities of its organization in different countries.

The first generalization about the peculiarities of foresight organization concerns its *institutional support*. It is usually carried out by national foresight organizations and within national target programs. In particular, such national organizational structures for the foresight implementation have been established in OECD countries. The corresponding information is presented in the analytical Table 2.

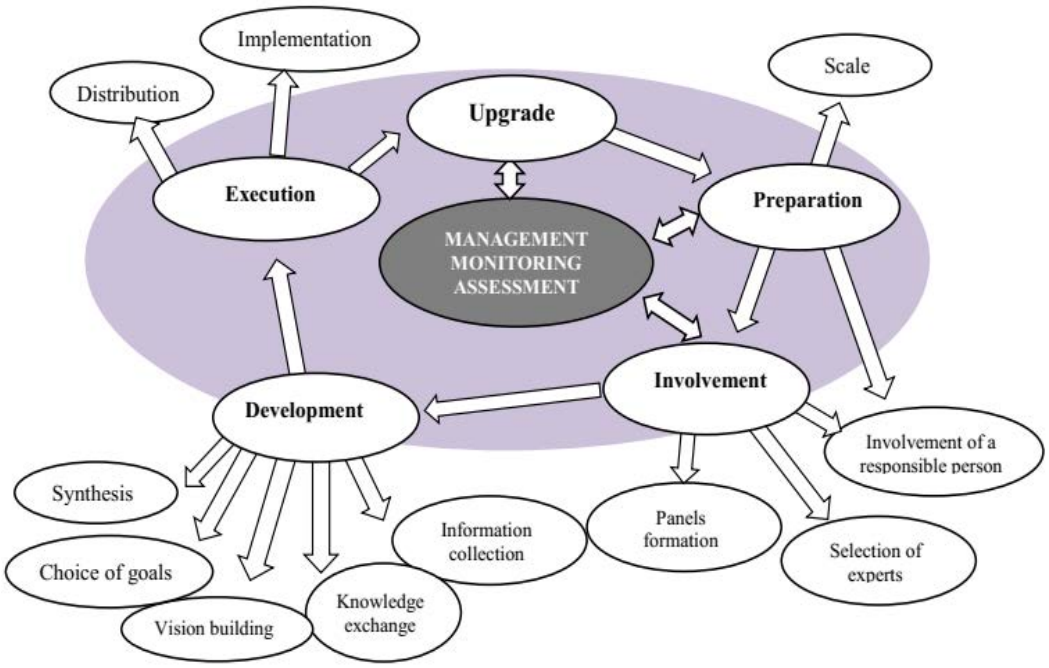

Fig. 3. Foresight process organization

Source: [16]

Table 2. Foresight support institutions in some countries

Country	The name of a foresight organization / program
Austria	Institute of Technology Assessment Delphy and 2013 Report
Belgium	Foresight at Federal level
Bulgaria	Applied Research and Communications Fund
Great Britain	The Foresight initiative
Greece	The Greek Foresight Programme
Estonia	Institute for Baltic Studies
Ireland	Irish Council for Science, Technology and Innovation
Spain	Observatorio de Prospectiva Tecnologica Industrial (OPTI)
Italy	Fondazione Rosselli
Cyprus	The Agricultural Research Institute
Malta	Malta Council for Science and Technology
The Netherlands	Consultative Committee of Sector Councils for R&D Royal Netherlands Academy of Arts and Science for research foresight
Germany	The FUTUR initiative
Norway	Norway 2030
Poland	KBN, of the Ministry of Scientific Research and Information Technology
Portugal	Engineering and Technology 2000
Hungary	National Office of Research and Technology
Finland	Ministry of Trade and Industry FinnSight 2015
France	Technologies-cles 2005
Czech Republic	Technology center of Academy of Sciences
Sweden	Teknisk Framsyn for Sverige

Source: developed by the authors based on [17-20]

The information presented in Table 2 illustrates the existence of special national centers and programs that provide foresight research in OECD countries. They form

the basis for making management decisions designed for the long term. This is embodied in national development strategies and in the formation of current socio-economic policy focused on future changes.

The second generalization based on the foresight organization experience concerns the areas of its application, methods, and results. The corresponding information is presented in the analytical Table 3.

Table 3. Examples of foresight projects in countries which have experience in systematic foresight research

Country/ period	Foresight-project goal	Time horizon	Organizational forms	Methods	Results
The USA critical technologies since the 1960s	Defining priorities for technological development	10 years	Thematic panels (groups)	Survey of experts, expert panels	Identification of critically important technologies
Japan Technological foresight since the 1960s	Outlining the main problems of technological development	30 years	Expert panels	Delphi survey, bibliometric analysis, expert panels, scenarios	Recommendations regarding areas of technological development and scientific policy
Great Britain the second half of 1990s	Improving well-being and quality of life	10-20 years	16 industry panels	Delphi survey, expert panels	360 recommendations regarding government decisions
Great Britain the end of 1990s – beginning of 2000s	Strengthening the science innovative potential	10-20 years	11 industry and 3 thematic panels	Seminars, open discussions, panels, knowledge bank (internet platform)	Creation of foresight training centers, support of the national innovation system
Great Britain beginning of 2000s	Growth of science innovative potential, ensuring sustainable development	10-20 years	A comprehensive program of projects that run simultaneously	Expert groups, scenarios, technologies scanning	Concentration of resources on the practical use of scientific results
France beginning of 2000s	Critically important technologies and competitive advantages identification	5 years	Thematic panels to substantiate priority technologies	Expert evaluation by the national competitiveness strengthening criterion	List of 119 key technologies of the future
Germany Beginning of 2000s	Development of a strategic development vision for the Ministry of Education and Science	20 years	Evaluation groups for directions of scientific and technological development and areas of technologies use	Seminars, open discussion, expert panels, scripts, online surveys	Strategic directions of development, priorities for future research programs
Hungary Beginning of 2000s	Definition of technological priorities, legal regulation directions and state policy	15-20 years	Thematic panels	Expert panels	Creating and strengthening horizontal relationships between science, education, and business

Source: developed by the authors based on [21-23]

The experience of the five countries represented in the table shows that foresight is used mainly to model changes in science, education, and public policy to ensure technological breakthroughs, the outlines of which have already been described. Despite the differences in individual countries, the foresight horizon was mostly 10-20 years. There was a noticeable diversification of forms of foresight during the 1960s – early XXI century. The results of foresight were embodied in substantiated lists of promising areas of technological changes, and in strategic programs of national development.

The third generalization concerns the conclusion on the formation of special foresight models in countries with their own national accents. Special research may be needed to answer the question of why governments chose such priorities above others when implementing foresight projects. Information on the defining features of foresight models in some countries is presented in the analytical Table 4.

Table 4. The peculiarities of national foresight models in some countries

Country	Accents and defining features of foresight models
The USA	– Corporate foresight for certain sectors, especially energy and high technology spheres. – Anticipation of technological changes and related decisions in domestic policy and in the field of foreign relations.
Japan	– Forecasting of science and high technology development. – Modeling of the ways of new technologies practical use in production and in everyday life of citizens.
Great Britain	Focusing on the model of the future for certain components of the economy and society, namely for: – individual regions – «regional foresight»; – small and medium business; – certain social groups, in particular young people – «youth foresight».
Austria	– Initiated «from the top», when the content of foresight projects is determined by the central government. – Mainly focused on identifying the country's innovation potential.
Sweden	– Initiated «from the bottom», when the content of foresight projects is determined by communities of citizens, so it is based on numerous methods of public opinion research and citizen participation in shaping the vision of the future. – Focused on meeting the priority needs of citizens: medicine and health care, bioresources, social infrastructure, information channels and communications, service industry, education.

Source: developed by the authors based on [24-26]

The information presented in the analytical Table 4, gives grounds to conclude that the national foresight model depends not only on the resource capabilities of countries to organize research. After all, the considered countries are countries with a high level of development. It is likely that the defining features of the foresight model depend mostly on the values of society. These values, as evidenced by the facts, can be different: dominance in the world economy, ensuring the advanced development of individual regions or communities, the quality of life of citizens, and so on.

It is significant that foresight projects at the beginning of the XXI century already related to modeling the future for the unification of countries. In particular, in

2004 – 2005 the project of technological foresight for 2015 – 2030 for the EU countries was implemented. As a result the project determined:

– 40 priority innovation technologies;

– 4 priority areas in the fields of:

• nanotechnologies and new materials;

• information society technologies;

• technologies in life sciences, genomics, and biotechnology;

• technologies for sustainable development, global climate and ecosystems change [28].

The results of the foresight project for the EU countries are used in the development of EU innovation policy.

To study the role of foresight in the Ukrainian economy public management, it is important to summarize the experience of foresight projects. At the same time, it is advisable to distinguish between foresight projects at the national level, at the level of individual sectors, and at the local level. The latter have become especially important in Ukraine in connection with the ongoing reform of decentralization and the development of local self-government.

In Ukraine, national-*level* foresight projects are implemented, which are characterized by such features.

During foresight research of 2004 – 2006 under the «Ukrainian Science, Technology and Innovation 2025» National Program (Ukrainian STI 2025):

– the following methods were used: Delphi surveys, conferences, seminars, round tables;

– scientific and technical development priority directions were formulated, recommendations to the government on state budget use were prepared, and requirements for the system of foresight designing training were defined [29].

During foresight research in 2007 for the implementation of the State program for forecasting scientific and technological development in Ukraine for 2008-2012 [30]:

– methods of scenario forecasting of scientific and technological development, expert panels, seminars and round tables were used;

– the list of critically important technologies in priority areas of science and technology was specified;

– the Ukrainian Institute of Scientific, Technical and Economic Information (UkrISTEI) was acknowledged as the leading organization for project implementation support.

During «Human Capital of Ukraine 2025» foresight research, conducted in 2012 [31]:

– methods of expert evaluation with the involvement of a wide range of entrepreneurs and senior managers were used;

– the main trends of changes in human capital of Ukraine and probable scenarios of its development were identified, as well as strategic initiatives of Ukrainian business in the labor market were outlined;

– the study was initiated by WikiCityNomica, the Human Capital Forum organizing team, and the Kyiv Business School.

In 2015, the project «Foresight of the Ukrainian Economy: Medium-term and Long-term Time Horizons (2020 – 2030)» [32] was presented with the following characteristics:

– literature reviews, trend extrapolation, Delphi method, SWOT analysis, and scenario development methods were used;

– the result of projecting the future was the separation of clusters, which, according to experts, will make the largest contribution to the economy of Ukraine in 2020 – 2030, namely to: the agricultural sector (expected share of the economy will be 17%), military-industrial complex (15%), information and communication technologies (12%), creation of new substances and materials, nanotechnologies (12%), energy (11%), high-tech engineering (8%), other clusters of the economy (25%);

– the project was initiated by scientists from the World Data Center for Geoinformatics and Sustainable Development of the International Council for Science (ICSU) and the Institute of Applied System Analysis at the Kyiv Polytechnic Institute named after Ihor Sikorskyi National Technical University of Ukraine.

In terms of «Doctrine of Balanced Development: UKRAINE-2030» foresight study in 2017 [33]:

– methods of trend research, ranking assessment, and scenario forecasting were used;

– strategic priorities were identified and for the first time a new socially oriented model of Ukraine's development was outlined with the nation's creative potential as the main driving force;

– the initiators of the project were scientists of Kyiv Polytechnic Institute named after Ihor Sikorskyi National Technical University of Ukraine, Kyiv National University named after Taras Shevchenko, Kyiv National Economic University named after Vadym Hetman, National University of Life and Environmental Sciences of Ukraine, and Kyiv-Mohyla Academy National University.

Within the framework of the foresight project implemented by the Fund named after F. Ebert and initiated both by the Fund foreign experts and Ukrainian specialists of the Ministry of Economic Development and Trade of Ukraine in 2018 with the definition of the future until 2027 [34; 35]:

– emphasis on the scenario forecasting method was made;

– four scenarios of Ukraine's development until 2027 were identified, taking into account the determining factors influencing the future of Ukraine, including international factors.

In Ukraine, forecasting and analytical research was carried out by individual sectors and activities, such as energy, biotechnology, new materials, information, and communication technologies [36]. Sectoral foresight research included, in particular, the project in 2018. The aim of the project was to create a system of training and retraining of specialists in natural and technical fields, based on the goals of sustainable socio-economic development of Ukraine by 2025 [37].

A series of *local (municipal)* foresight projects have been launched in Ukraine. The most promising projects are related to the strategy of development of united territorial communities (UTC). The features of foresight projects at the local level can be illustrated by the following examples.

Foresight research for Zelenodolska and Pischanska UTC of Dnipropetrovsk region in 2018 [38]:

– the method of expert panels was used to make predictions in the near future for the purpose of the so-called «fast foresight»;

– promising areas (spheres) of changes that can ensure success in the future were identified, namely:

1) the use of modern technologies of waste processing of industrial enterprises and improvement of the ecology in the district;

2) creation of a system of local agricultural goods production, processing and trade;

3) improvement of settlements in terms of transport, water supply, etc.;

4) implementation of the right youth policy, including the creation of places of attractive employment, places of cultural recreation, etc.;

– the project was initiated by representatives of local businesses, local educational and health care institutions, active members of sports and cultural NGOs.

In terms of the «Youth in local community development» foresight study in 2018 within the «Integrated Urban Development of Ukraine» project [39], implemented by the «Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH» German government company:

– the method of discussion panels was used to discuss and clarify the concept of development of the city of Poltava;

– a «road map» of joint actions of local authorities, public organizations, educational institutions and business was created to achieve the goals of the Concept «Poltava 2030»;

– the initiators were the Poltava City Council and the «Institute of Urban Development» municipal organization within the «Integrated Urban Development of Ukraine» all-Ukrainian project.

To substantiate the importance of predictions and creation of a vision of the future in all areas, we consider an example related to the formation of a competitive environment of the Ukrainian economy. It is clear that the leading participant in this process should be a public authority – the Antimonopoly Committee of Ukraine (ACU). Despite the natural functions of competition protection entrusted to this body,

its actions give rise to accusations of impeding competition. If such accusations are justified, it is a negative trend that will distort the attractive model of the future.

Given that the current economic situation contains negative trends, in particular in the formation of a competitive environment, foresight research should be based on the awareness of these trends. What trends do the facts testify to?

First, the share of Ukrainian markets with the so-called «competitive structure» is declining. In 2000, 90% of markets with a competitive structure were recorded. In 2015, this share was only 64%. Therefore, there is a tendency to reduce the competitive environment [40].

Second, the general reduction of the competitive environment occurs against the background of a growing share of oligopolistic markets. In 2000, this share was 8%, and in 2015 it increased to 33%. With the domination of «hard oligopolistic core» at the market, the business conditions for companies of the so-called «competitive periphery» cease to be actually competitive. This, in particular, is the focus of Ukrainian researchers. If the oligopolization of markets becomes an objective fact, then anticipation of strategic decisions of firms in such markets should become the main task of the Antimonopoly Committee of Ukraine.

Third, since 2010 there has been a gradual increase in the share of markets with signs of individual dominance, i.e. monopolized markets. In such markets, competition ceases to exist permanently. For example, in 2015 the level of competition in commodity markets decreased to a historic low and amounted to 42,7% [41].

Fourth, the reduction of competition is intensified by the lack of uniform rules for economic entities on tax regime, subsidies, privileges of preferential use of land, infrastructure, etc. [42]. Therefore, it is possible to record the tendency to curtail competition under the influence of government action.

Scenarios of the future should be formed in Ukrainian foresight studies, with regard to the objective consequences of competition reduction under the influence of erroneous antimonopoly policy. The image of such a future could be modeled as follows (Fig. 4):

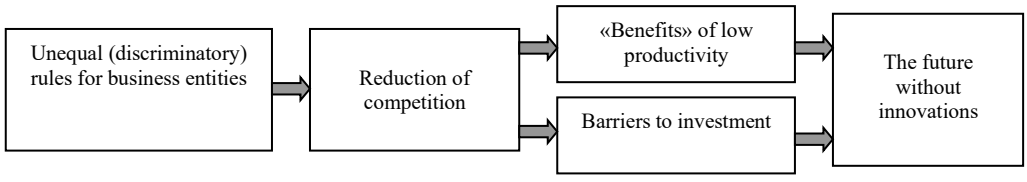

Fig. 4. Possible consequences for the future from the reduction of competition
Source: authors' own

Fig. 4 illustrates the idea of forming a «future without innovations» under the influence of discriminatory rules and reducing competition in the current period. The reduction of competition has at least two rather obvious consequences in the Ukrainian economy, namely:

– unnatural advantages for economic entities which do not care about productivity, because they achieve higher incomes due to the monopoly position;

– unattractiveness of the national economy for investors.

The results of a sociological study testify to the unattractiveness of the Ukrainian economy for foreign investors precisely because of the reduction of competition against the background of an unfavorable institutional environment. It is significant that 92% of the foreign investors surveyed in the study we are referring to already had experience in investing in the Ukrainian economy. The research by the European Business Association, the Dragon Capital investment company, and the Center for Economic Strategy [43] yielded the following results:

– the spread of corruption and distrust of the judiciary are regarded as the two main obstacles to foreign investment;

– prolonged military conflict is recognized as a less threatening phenomenon to investment than the monopolization of markets and the dominance of oligarchic capital.

Based on the results of the foresight research, we are able to draw the following general ***conclusions***.

Foresight, as the formation of the image of the future in modern reality, has become a tool of public management at the national and local levels in many countries. Successful examples of foresight research and foresight projects should be analyzed for making generalization and used by public authorities in all countries.

Despite the foresight research experience, the Ukrainian foresight is in its early stage of development as a tool of public management. This is evidenced, in particular, by the following:

– a limited range – no more than three or four – of methods are used in the development of each foresight project. Instead, one of the requirements of a foresight is to use at least six methods to ensure the required level of reliability of predictions;

– the results of foresight research are mostly limited to general conclusions about the general vision of the possible future of the country. The initiators of such studies are scientific university communities. Instead, they should be conducted by central and local authorities interested in specifying the goals of individual stages of creating the future, the time intervals for their implementation, and the tools used to achieve the goals;

– there is a lack of research on the future of certain sectors of the national economy, certain regions and territorial entities, as well as on specific actions to shape the future in the present;

– the results of foresight research are used only as a source of certain information that is likely to be taken into account. No foresight institutionalization system has been created. This system should determine the algorithms for taking into account the results of foresight research in the target programs of the government, in development strategies, in the economic policy of a particular period;

– there is a lack of a system of constant interaction to form a vision of the future between central authorities, on the one hand, and local authorities, local governments, civil society, on the other;

– the creation of an image of the future, under the conditions of unnatural actions of public authorities, should be based on the evaluation of not only positive trends but also negative trends that distort the future.

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INSTITUTIONAL DESIGN OF MACRO-FINANCIAL SECURITY FOR THE NATIONAL ECONOMY STABILIZATION

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The *relevance* of the study as regards macrofinancial security institutional design for the Ukrainian economy and society is explained by at least two circumstances. First, the macrofinancial sphere of the national economy lacks stability, and the accumulated imbalances threaten its integrity. Second, macro-financial imbalances have not been the object of special monitoring, analysis, correction, and prevention by public (state) authorities. This is manifested in the lack of rules, algorithms, procedures, incentives, sanctions, channels of interaction between governments and communities and society, and so on. Thus, there is a lack of what is called institutional design. The latter is designed to evaluate, prevent, and correct macrofinancial imbalances. And macrofinancial stability in this way, at the request of governments, becomes an economic reality.

The *purpose* of this study is to substantiate a certain algorithm of actions for the formation of institutional design, intended to counteract the formation and deepening of macrofinancial imbalances in the Ukrainian economy.

The scientific and managerial *issue* regarding macrofinancial security institutional design formation provides answers to several questions. First of all, the question about the actual meaning of the «macro-financial security» concept arises. This follows from a clear logic of reasoning: since macrofinancial security is the content (and purpose) of institutional design, there should be a correspondence between content and form. The latter involves the most accurate identification of the content. Also equally important is the question of the content of the «institutional design» concept, the necessary components (elements) of the existing design and the features of institutional design in the Ukrainian economy, with regard to the existing economic imbalances and the current system of public management. Exploring the main issue, we will try to partially answer these questions.

Our research logic is based on the following two *assumptions*.

First, the macrofinancial sphere can and should be singled out as a certain segment of the national economy with its inherent proportions (balances), respectively – indicators for evaluation and public authorities for monitoring, control, and adjustment.

Second, the concepts of «stability» and «security» are closely related and possibly synonymous. We mean the indisputable fact that the existence of macro-

financial stability means that the economy is in a safe state. Conversely, macrofinancial security, which is manifested in the absence of excessive imbalances, also testifies to macrofinancial stability. If the concepts of «macrofinancial stability» and «macrofinancial security» have differences, they are not fundamentally important for our study.

The term «macrofinancial» is used not only in the context of security, but also in other contexts, namely: «macrofinancial disproportions» [1], «macrofinancial stability» [2], «macrofinancial analysis» [3], etc. The activity of using these terms increased after the global financial crisis of 2008-2010.

The analysis of the use of the mentioned related concepts gives grounds to conclude that there are two interpretations, respectively, of two applications of the term «macrofinancial»: simplified (general) and more complex (concretized).

A simplified variant of the use of the term «macrofinancial», for example, is found in the fundamental work of British and American researchers on policy optimization. The study deals with macrofinancial stability as one that assumes compliance of the financial system with the general state of the whole economy [4]. In fact, «macrofinancial» is interpreted as the interaction (coordination) of financial and macroeconomic.

A more complex (more specific) variant of the term «macrofinancial» is associated with various algorithms (methods) for evaluating the imbalances of national economies. This is primarily a list (scoreboard) of indicators set for the EU countries and their reference threshold values for evaluating imbalances and applying the procedure for overcoming them («MIP Scoreboard»). Although imbalances are referred to as macroeconomic (Macroeconomic imbalances procedure – MIP) in the official EU document, many of them undoubtedly have a «dual» macrofinancial nature. This is evidenced by the actual content of indicators for evaluating the state of the EU national economies, presented in Table 1.

The given analytical Table reflects the information on indicators for evaluating the stability of national economies and standards for determining the degree of deviation from safe limits. If the documents of 2011 provided 10 indicators for the use, 6 of which had an obvious macrofinancial nature, now their total number has increased to 14, 7 of which can be interpreted as macrofinancial. The indicators of the «double» – macroeconomic and, at the same time, financial content – include, in our opinion, the following:

- the average value of the current account balance over the last 3 years (in% to GDP);
- net international investment position (% to GDP);
- change of the real effective exchange rate (REER), calculated on the basis of the GDP deflator against the currencies of developed countries over the last 3 years;
- private sector loan financing, estimated on a consolidated basis (% of GDP);
- private sector debt calculated on a consolidated basis (% of GDP);
- total public debt (% of GDP);

– annual change in financial sector debt on an unconsolidated basis (%).

Table 1. The indicators for detecting macroeconomic imbalances in the EU countries in 2011 and 2018

Sphere of imbalances	Key indicators	Recommended threshold values
Common for MIP Scoreboard in 2011 and 2018.		
External/ country competitive capability implementation	1. *Average current account balance for the last 3 years (in% to GDP)*	from -4% to +6% GDP
	2. *Net international investment position (% to GDP)*	-35% GDP
	3. *Change over the last 3 years of the real effective exchange rate (REER), calculated on the basis of the GDP deflator against the currencies of 35 (in MIP 2011) / 42 (in MIP 2018) developed countries*	from +5% to -5% for the Eurozone member-states; from +11% to -11% for all other EU countries
	4. Change of the country's export share in the world export over the last 5 years (in%)	6%
	5. Change of the nominal value of labour force per unit of output over the last 3 years (%)	+9% for the Eurozone member-states; +12% for all other EU countries
Internal	6. Annual deflated (real) change in the harmonized housing price index (%)	+6%
	7. *Loan financing to the private sector (non-financial corporations, households, non-profit organizations) on a consolidated basis (% of GDP)*	15% (in MIP 2011) / 14% GDP (in MIP 2018)
	8. *Private sector debt (value of loans and securities other than shares), calculated on a consolidated basis (% of GDP)*	160% (in MIP 2011) / 133% GDP (in MIP 2018)
	9. *Total public debt (% of GDP)*	60% GDP
	10. The average unemployment rate for the last 3 years (%)	10%
Special (additional) in MIP Scoreboard in 2018		
Internal	*Annual change in financial sector debt on an unconsolidated basis (%)*	16,5%
Sphere of employment	The change in the level of activity of the population aged 15 to 64 over the last 3 years	-0,2 point
	The change in the level of long-term unemployment (in%) of the active population aged 15 to 74 over the last 3 years	0,5 point
	The change in the unemployment rate of young people aged 15 to 24 over the last 3 years	2 points

Source: authors' own based on [5; 6]

These 7 indicators are financial, as they relate to the general condition of financial assets and liabilities, namely: investments, loans, debt obligations, and national currency. At the same time, they are macroeconomic, given that they reflect the proportions of the entire national economy. Therefore, they are designed to provide representations and evaluations against the background of such macroeconomic variables as: achieved GDP, overall price level, the interaction of institutional sectors, etc.

The analysis of changes in the evaluation of imbalances – from the Maastricht criteria 1992 [7] to the MIP Scoreboard 2011 and the MIP Scoreboard 2018 – provides grounds for important generalizations about the evolution of the content of

the «macrofinancial» concept. In particular, it is impossible not to notice the fact of shifting the emphasis in the scoreboard from indicators, mainly with the financial content in favor of indicators that characterize the state of the real sector of the economy. This change is a reaction to the events related to the financial crisis of 2008 – 2010 and the realization of the unjustified overestimation of the role of the financial sector in the development of national and world economies. It is significant that the Scoreboard 2018 presents 4 new indicators, 3 of which relate to the employment of the active population, youth employment, and the duration of unemployment. Thus, it is a matter of shifting the emphasis on the labor potential of the real sector of the economy.

We conclude that processes (phenomena) should be considered as macrofinancial, respectively, a set of indicators, the core of which is made by those related to the movement of financial assets / liabilities. However, this list should also cover (implement) those indicators of the real economy that are directly related to and determine this movement. These are, for example, the indicators, among which there are:

- total costs in general and net exports in particular;
- general price level;
- the ratio of wages and overall productivity;
- unemployment and employment.

An important point in interpreting the meaning of the «macrofinancial» concept is the recognition that the set of indicators for assessing macrofinancial imbalances cannot remain unchanged. It is significant, for example, that in the early 1990s, as a part of the 4 Maastricht criteria, one concerned *the general price level* determined by the inflation rate. In terms of modern criteria – the MIP Scoreboard – it is only about *the housing price index*. The reason for this change of emphasis is probably the loss of the urgency of the problem of excessive inflation for the EU countries in the 2010s. Instead, in the early 1990s, this problem was relevant to them as a threat to macroeconomic stability. Nevertheless, the general level of prices, in whatever way it is reflected, – through various forms of assessing inflation, through deflation of nominal indicators on the price index, etc. – is a part of the «macrofinancial» phenomenon.

In our opinion, indicators from the EU MIP Scoreboard should be used to assess imbalances to more accurately identify the content of the concept of macrofinancial security institutional design. It is undeniable that under the specific conditions of individual countries, in particular in Ukraine, these indicators will need some modification with the aim of better adaptation. For example, permanent threats of dangerous levels of the Ukrainian inflation will necessitate the implementation of its direct indicators in a special «Scoreboard of Ukrainian imbalances». It is probable that the «specifically Ukrainian» indicator of imbalances should be an indicator of the level of shadowing of the economy, given the current incomparably significant share

of the shadow economy in the structure of the national economy compared to other countries.

A positive answer to the question about the value of the EU countries experience to clarify the meaning of the concept of «macrofinancial» can be based on the following arguments. Firstly, the accumulated database on the quantitative values of the constructed indicators provides a basis for an objective assessment of the advantages and limitations of the approach. Secondly, the used indicators have a fairly clear meaning, which can be interpreted as macrofinancial.

The analysis of the experience of countries outside the EU is also important to substantiate changes in the institutional design of macrofinancial security. First of all, the Ukrainian application of the concept of «macrofinancial» is important for us. From the analysis of the regulatory framework, the following generalizations follow in the first place.

First, the term «macrofinancial» is absent in the laws of Ukraine, but is used by public authorities in documents of a lower (than laws) level. The most active user of this term is the National Bank of Ukraine (NBU). In modern NBU documents, the term «macrofinancial» is used in such contexts:

- «minimization of threats to macrofinancial stability» [8];
- «intensification of threats to macrofinancial stability» [9];
- «ensuring macrofinancial stability» [10].

Analysis of the content of the mentioned documents of the NBU gives grounds for the conclusion of such a general interpretation of «macrofinancial stability». This is what depends on:

- the consistency of budget filling and inflation-related budget deficits;
- the implementation of the programs regarding cooperation with the IMF;
- the economic growth;
- the coherence of actions of the NBU, the Ministry of Finance of Ukraine and other related institutions.

In the resolutions of another institution – the Verkhovna Rada of Ukraine (VRU) – the term «macrofinancial» is used, in particular, in such contexts:

- «conditions for macrofinancial stabilization» [11];
- additional macrofinancial assistance [12].

From the analysis of the content of the mentioned documents (resolutions of the Verkhovna Rada) the term «macrofinancial» is interpreted as a phenomenon related to investments, mainly foreign, and a phenomenon that significantly depends on the international financial organizations assistance.

The analysis of the NBU documents also suggests a rather skeptical attitude to the possibility of assessing stability. In particular, this skepticism is manifested in the mention of «macroprudential policy aimed at ensuring financial stability» [13]. The publication of the chief expert of the Department of Financial Stability [14], posted on the website of the Expert Platform – the NBU staff – states that there are no universal measurement indicators and a series of indicators combined into integrated

indices can be used. The latter create an opportunity to assess the current state, but, as the author of the document notes, do not provide an opportunity to predict.

Instead, we consider it expedient, from a scientific and applied point of view, to find ways to assess macrofinancial security, which would be based on a sound interpretation of the term «macrofinancial».

In our opinion, a more specific interpretation of the analyzed term by the institutions of public power – stakeholders of Ukrainian economic policy – can be found in the official assessment methods. This, in particular, is the current methodology for assessing the level of economic security, approved in 2013 by the Ministry of Economic Development and Trade of Ukraine [15].

The mentioned methodology does not contain the «macrofinancial» concept, but it provides a detailed and concretized interpretation of «macroeconomic» and «financial». A brief list of indicators is given in the analytical Table 2.

Table 2. The indicators for assessing macroeconomic and financial security, according to the official methodology in force in Ukraine in 2013

Indicators	Number of indicators
Macroeconomic security	
The difference between the values of the labor productivity index and wages (p.p.)	1
The level of shadowing of the economy (% of GDP)	1
Current account balance (% of GDP)	1
Unemployment rate, according to the ILO methodology (%)	1
Unemployment rate – the share of unemployed for more than 12 months (%)	1
The difference between the country's economic growth rate and the corresponding average indicator for developing countries (p. p.)	1
Consumer price index (December to December) (times)	1
Population disposable income in GDP (%)	1
Propensity to save (%)	1
The correlation between the average wage and all types of assistance and social transfers (times)	1
The correlation between GDP per capita in Ukraine and in EU countries (%)	
Employment in the informal sector of the economy (%)	1
	1
Total	**12**
Financial security	
The group of banking security indicators	7
The group of indicators of the non-banking financial market	4
The group of debt security indicators	5
The group of budget security indicators	4
The group of currency security indicators	6
The group of monetary security indicators	6
Together	**32**
Total	***44***

Source: compiled by the authors based on the official guidelines for calculating the level of economic security of Ukraine as from 2013

The indicators in Table 2 are a form of current «Ukrainian scoreboard» for measuring the level of macroeconomic and financial security, similar to the EU countries' scoreboard. The fact that there is a list of such indicators and fairly clear

calculation algorithms, in our opinion, is a significant achievement of the Ukrainian system of public management. A comparative analysis of the «Ukrainian scoreboard» against the background of the scoreboard of the EU countries gives grounds for such generalizations:

– some of the indicators identified in the Ukrainian assessment methodology as macroeconomic have, mainly, *socio-economic «burden»*, as they relate to the state of the social sphere. They reflect not so much the actual macroeconomic proportions as the proportions in the social sphere. This, in particular, applies to the following indicators: redistribution of income through taxes, contribution of various types of social assistance and transfers to total income, and comparative (relative) welfare of citizens. These are indicators from the list of indicators of the Ukrainian assessment methodology (Table 2), such as: the share of available (after tax) income in GDP; the correlation between the average wage and all types of benefits and social transfers; the degree of approximation of GDP per capita in Ukraine to the EU indicators (%); the share of the employed population in the informal sector of the economy;

– the level of financial indicators detailed elaboration (their number is 32) can be considered excessive. The division of financial indicators into 6 groups involves the calculation of 6 sub-indices: banking, non-bank financial intermediaries, debt, budget, currency, and monetary security. This significantly complicates the assessment of this sphere and the interpretation of results, as well as making management decisions based on this interpretation.

Despite these features, the so-called «Ukrainian scoreboard» in its current interpretation is quite applicable. Long-term application over many years (the 2013 methodology was based on a similar methodology in 2007 [16]) has created a significant information base. The current methodology, in our opinion, is suitable not only for assessing the current state and substantiation of current decisions, but also for predictions and substantiation of management decisions for the future.

Let us use the calculation data for analysis, according to the «Ukrainian scoreboard», the integrated indicator (index) of national economic security and two indicators (sub-indices) of macroeconomic and financial security (Table 3).

Table 3. The dynamics of safety level indicators, according to the Ukrainian data and the official methodology of 2013, for the period 2007 – 2018 (%)

Security indicators	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Macroeconomic	48	38	44	38	48	38	39	32	31	35	37	41
Financial	64	51	42	44	47	46	50	38	36	40	42	46
General economic	52	48	46	47	50	46	48	45	44	48	48	50

Source: developed by the authors based on [17]

The Table represents the indicators of 3 security levels: general economic and its components – macroeconomic and financial. Indicators of the level of security were assessed using the statistical tools of integrated indices according to the algorithm

defined in the methodology approved by the Ministry of Economic Development and Trade in 2013.

Procedures for indicator normalization and weights application were used in calculations in line with the general statistical rules for the creation of integrated indices. In fact, this is a typical formula for integral indices:

$$I_S = \sum_{i=1}^{m} k_m n_m,$$

where I_S – integral index, in our case – security index, which is formed from m indicators; k_m – weights of variables (indicators) used to determine the index; n_m – normalized values of variables (indicators) used in index calculations.

For better visualization, the data in Table 3 has been presented by us in Fig. 1, which, in addition to the actual values of indicators (indices) of the security level, reflects five more safety zones: critical, dangerous, unsatisfactory, satisfactory, and optimal.

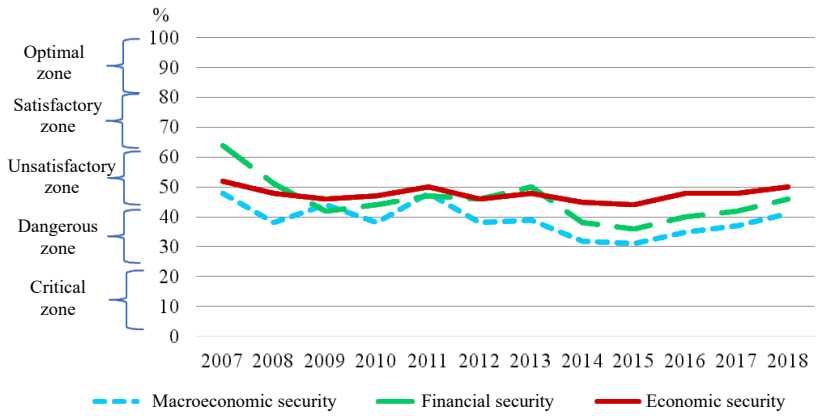

Fig. 1. The dynamics of indicators of general economic, macroeconomic and financial security within safety zones in 2007 – 2018

Source: developed independently on the basis of information from Table 3

The analysis of the information presented in Fig. 1, gives grounds for such generalizations:

– during the analyzed period, all indicators – general economic, macroeconomic and financial security – were mostly in the zone of unsatisfactory condition. The only exceptions are the financial security indicator in 2007, which fell into the zone of satisfactory condition, and the indicators of financial and macroeconomic security, which in the initial period of the Russian-Ukrainian war of 2014 – 2017 were in the dangerous zone;

– the levels of macroeconomic and financial security for all 12 studied years were lower than the level of general economic security, assessed using an integrated index with 7 more sub-indices provided by the methodology of 2013, namely: demographic, social, food, production, energy, foreign economic and investment, and innovation security;

– the level of macroeconomic security was usually lower than the level of financial security.

Assuming that the information presented in Fig. 1, is objective and relevant, it implies at least the following *predictions (prognostic conclusions):*

– indicators of the macroeconomic and financial security level should be more in the center of attention – monitoring, analysis, public discussion, use of instruments of influence – of national regulators, than other components of security;

– under the conditions of the actual absolute decline of the Ukrainian economy in 2019 – 2020, macroeconomic and financial security indicators may decrease to the level observed in 2015, when the deepest economic downturn in the research period occurred.

Our intermediate conclusion regarding clarifying the meaning of the «macrofinancial stability (security)» concept for the formation of the appropriate institutional design is embodied in such interpretation of the «macrofinancial» concept. «Macrofinancial» is a combination of macroeconomic (primarily related to the movement of tangible assets) and financial (related to national financial assets). The criterion for the organic nature of such a combination is a compliance, in which the state of the financial sector does not pose a threat to the real sector of the economy, and the state of the real sector – threats to the financial sphere.

Based on the experience of using the EU countries Scoreboard and the practice of assessing economic security in Ukraine, we assume the possibility of creating an updated «Ukrainian scoreboard». It is probable that the Ukrainian design of macrofinancial security could be formed around it. If we proceed from the expediency of determining a limited range of 10 indicators, they, in our opinion, could be as follows:

1. Annual current account balance of the payments (in % to GDP).
2. Annual change in the real exchange rate (p. p.).
3. Annual inflation rate (%).
4. Sufficiency of official foreign exchange reserves (in months of import).
5. Net international investment position (in% of GDP).
6. Public debt (in% of GDP).
7. The ratio of total payments for servicing and repayment of public debt to state budget revenues, interest (%).
8. Unemployment rate, according to the ILO methodology (%).
9. Correlation between labor productivity index and real wage index (times).
10. The level of the economy shadowing (the share of the shadow economy in% of GDP).

The proposed list of indicators of the so-called «Ukrainian scoreboard» is shortened compared to the list of dozens of indicators provided by the current Ukrainian methodology for assessing macroeconomic and financial security.

The list of indicators of the proposed «shortened Ukrainian scoreboard» for assessing the level of macrofinancial security has the following features caused by the peculiarities of the current state of the Ukrainian economy and society:

– contains 7 relative indicators of the state of national financial assets and 3 indicators (unemployment, the correlation of changes in total labor productivity and

wages, the share of the shadow economy), which characterize the state of the real sector. A significant share of the total number of indicators (30%) directly related to the state of the real sector can be explained by the permanent and long stay of the Ukrainian economy in the descending part of *the real economic cycle*. Consequently, the weight of such indicators as employment of resources, productivity, and the share of the economy in the shadows is growing;

– provides for the use of annual (rather than average for a certain period, as in the EU Scoreboard) indicators, with regard to the significant economic volatility, the lack of sufficiently long periods of stable dynamics. Therefore, it becomes objectively necessary to monitor and control short-term (annual) changes;

– consists of a limited range of indicators to simplify the procedure for identifying functions and the division of powers between public authorities within the institutional design. After all, the formation of the design of public management is objectively complicated by a larger list of indicators.

In the context of the issue we are studying, after having outlined the processes, phenomena, and, accordingly, indicators around which institutional design should be formed, it is important to clarify the actual meaning of the concept of institutional design. Modern political science offers many approaches to its interpretation. Let us focus on just a few, namely those, that, in our opinion, may have the greatest practical application.

In Robert E. Goodin's book on the theory of institutional design [18], the latter is interpreted as an effective *form of promoting value outcomes* in a specific context. The practicality of this emphasis in determining the content of institutional design, in our opinion, is associated with the recognition of the importance of understanding the objective values of society and creating an effective form of their implementation.

Josep M. Colomer [19] defines institutional design as «*the choice of rules* for collective decision-making». It emphasizes the fact that institutions can create constraints on collective decisions and therefore reduce uncertainty. Instead, design, according to the author, has to create a harmonious environment for interaction in society.

In David L. Weimer's book [20] on institutional design, given the problems of public policy implementation, institutional design is defined as a relatively stable *set of interrelated rules and incentives* that form coherent *procedures* designed to achieve substantive goals.

Among the definitions of institutional design proposed by Ukrainian researchers, at least the following are important for our study:

– «purposeful combination of institutions with the aim to order the rules regulating the relationships between people in the intended direction with the aim to meet existing needs and changes» [21];

– «the dynamic process of transformational changes of existing traditional institutions into new ones» [22].

The practical value of the last two definitions by Ukrainian researchers is explained by the emphasis on the need to change forms and rules insofar as the needs

of design users change. In fact, it is a dynamic approach to determining the institutional design content.

The current legislation of Ukraine does not contain a definition of the «design» term either in the general sense or in the sense of design for national macro-financial security. But it uses the concept of «product design». It is «a set of processes that convert legal, technical, functional, market, security, or other requirements, that a product must meet, into a technical specification for such a product» [23]. The practical orientation of this definition is that it recognizes the need for compliance between design and objective requirements, including safety, and that the design provides for certain standards (specifications).

In view of all the above, in the future we will use the following definition as a working hypothesis: *«Institutional design is a form of implementation of designed procedures, algorithms of interaction, rules, incentives and restrictions that provide value orientations of society (communities) in certain spheres».* It is clear that the institutional design in the public sphere, which is the sphere of national economic security, should be based on the institutions of power, in the relationship between which and between which and society there is a normalized distribution of powers and responsibilities.

The generalizations about the appropriateness or, conversely, the inexpediency of a particular institutional design of macrofinancial security can currently be based on the analysis of the EU institutions activities. This is primarily the Macroeconomic Imbalance Procedure (MIP) we have already mentioned and related documents and regulatory practices [23-32].

The main relationships in the formation of the institutional design of macrofinancial security, according to the EU regulations, are formed between such institutions of this entity:

- the European Commission;
- the European Council;
- the Council of the EU (Council);
- Member States;
- the European Parliament.

The institutional design of the EU macrofinancial security is quite complex. It is extremely simplified and presented by us in the form of the so-called «matrix of the EU institutions interaction». Moreover, these are two stages of the general procedure, namely the detection of imbalances and response (actions after diagnosing excessive imbalances). These two stages, respectively, the two interaction matrices, are represented in Table 4 and Table 5.

The implementation of the functions of the EU institutions represented in the analytical Table 4, ends with the establishment of the fact of excessive imbalances. Further actions of the institutions are aimed directly at correcting the situation (Table 5).

Table 4. The matrix of special functions of the EU institutions to identify macro-financial imbalances

The European Commission	The European Council	The Council of the EU (Council)	Member States	The European Parliament
November **The annual strategy of sustainable growth**: priorities for the EU governments **The notification mechanism report**: monitoring of the situation, according to the Table of Indicators, to identify countries for **in-depth review** and application of **the Excessive Imbalance Procedure** **The assessment of draft budgets** of the Eurozone countries for compliance with the Stability and Growth Pact. ***February*** **The reports of countries on general economic and social changes**: progress assessment in structural reforms, preventing and correcting imbalances and the results of in-depth reviews on the possible application of the **Excessive Imbalances procedure regarding** **Informing** the European Parliament and the Council of the EU ***May*** **Recommendations for countries** based on the analysis of national programs and plans	***November*** **The organization of a discussion** on the Annual Sustainable Growth Strategy and the Notification Mechanism Report for the Coordination of the EU Economic Policies ***March*** **The guidelines** on the priorities of national reforms in programs and budget plans. ***June-July*** **Approval of the final Recommendations for each country**	***November*** **The participation in the discussion** on the Annual Sustainable Growth Strategy **The discussion** of the European Commission's assessment of the draft budgets of the Eurozone countries ***December-January*** **Approves Recommendations for the Eurozone** based on the November discussions of the EU documents, the Annual Sustainable Development Strategy and the Notification Mechanism Report ***June-July*** **The Participation in the discussion** on the implementation of the Recommendations for the Eurozone in individual EU countries	***October*** **Draft budgets** for the next year **The participation in bilateral negotiations** with the European Commission on budgetary issues and development priorities ***December*** **The adoption** of budget plans ***April*** **The National** Reform and Stability / Convergence **Programs**, identifying ways to prevent / correct imbalances, adhere to fiscal rules and development priorities ***August-September*** **The Implementation** of the Recommendations recognized by the EU institutions into national legislation and annual budgets	***November*** **The organization of a discussion** on the priorities outlined in the Annual Sustainable Growth Strategy **Participation** in the discussion of the Notification Mechanism Report ***February*** Adopts the Annual Sustainable Development Strategy and the Notification Mechanism Report ***May*** **The Discussion on the Recommendations** published by the European Commission for the EU member states

Source: authors' own

Table 5. The matrix of special functions of the EU institutions, which are implemented after the detection of excessive macro-financial imbalances

The European Commission	The European Council	The Council of the EU (Council)	Member States	The European Parliament
June **Decision** to initiate Procedures for limiting excessive imbalances, informing other EU institutions about systemic risks and **Report** on the acceptability of the Action Plan **Recommendations** on the application of sanctions, their planned or early cancellation		***June*** **Recommendations to countries** on measures for the Corrective Action Plan **Recommendations** for the elimination of excessive imbalances in case of acceptability of the **Plan** and **Recommendations** for changes to the Corrective Action Plan, based on the findings of the **monitoring missions** **Decision** on the application of sanctions to countries and their cancellation	***June*** **Development** of Specific Action Plans with deadlines and their submission for analysis by the European Commission **Development** of updated Corrective Action Plans (if required) **Execution of sanctions** in case the Council declares the Plans inadmissible or when Eurozone country does not follow them. **Reporting** to the European Commission and the Council on progress in overcoming imbalances	

Source: authors' own

From the analysis of the information presented in the tables, the following generalizations can be made regarding the content of the institutional design of EU macro-financial security:

1. Instruments for influencing the situation on the part of the main EU institutions, through which macro-financial stability (security) is supported, can become:

– general development strategy with outlining priorities;

– general rules, represented primarily by certain macro-financial indicators;

– permanent monitoring of events and risk assessment;

– public discussion of monitoring results;

– analysis of national programs and countries development results to identify deviations (imbalances);

– official recommendations for corrective action plans to limit imbalances identified in the monitoring process;

– reports on the results of the approved corrective action plans implementation;

– identification, application and cancellation of sanctions against countries violating the established rules.

2. Institutional design provides for clearly defined powers and responsibilities of government institutions. Institutions are involved in certain stages of the procedure of limiting imbalances, only on the basis of the purpose (goals, powers) of each of them.

Therefore, two of the five EU institutions – the European Council and the European Parliament – are not directly involved in the implementation of the final stage of sanctions application to eliminate imbalances.

3. The use of imbalance regulation tools is clearly fixed and agreed over time throughout each year. Therefore, compliance with time limits is an important rule for regulating imbalances.

To substantiate the proposals on the formation of the institutional design of macro-financial security in Ukraine, in particular in the application of the EU experience, it is necessary to objectively assess the existing design.

It is primarily about fixing gains and problems in the organization of the public security management system.

In our opinion, the main *achievements* in the Ukrainian institutional design formation include the following:

– the existence of official methods for assessing the level of economic security, developed at the initiative of the Ministry of Economic Development of Ukraine in 2007 and in 2013, and the availability of primary information sources for calculations and official results of calculations;

– creation of two Draft Decrees of the President of Ukraine in 2015 and 2018, which laid the foundation for a clearer outline of the content of government institutions activity, delineation of their functions and responsibilities for the formation of information base, monitoring, results publication, and action plans [33].

In our opinion, the main *disadvantages (limitations)* in the formation of the Ukrainian institutional design of macrofinancial security include the following:

– lack of safeguards to stop publishing the results of calculations of economic security levels in free access and transition to limited availability of information in the form of official requests to the relevant ministry;

– complication of own calculations, according to the official method, due to partial lack of official information;

– discreteness (inconsistency) of design formation processes, in particular, due to non-approval of drafts of the two mentioned (2015 and 2018) Decrees of the President of Ukraine, which were aimed at creating a basis for normalization of interaction of public authorities in ensuring economic (macrofinancial) security.

Some fragments of the potential institutional design of macro-financial security can be found in the legislation on the activities of certain institutions of the Ukrainian government. They can hardly be interpreted as elements of the existing design of macro-financial security due to the fact that they are built into other algorithms. In particular, it is an algorithm for adopting the annual state budget or an algorithm for controlling debt indicators. Some fragments that may form the basis of the future institutional design of macrofinancial security are presented in the Matrix of special functions (Table 6).

Table 6. The matrix of special functions of the Ukrainian public authority institutions potentially related to macrofinancial security

Public authority institutions of Ukraine	Functions related to the regulation of macrofinancial imbalances
The Verkhovna Rada of Ukraine (including profile committees) (VRU)	1. Participates in the preparation of proposals for the annual budget plan. 2. By December 1: approves the budget for the next year. 3. Until July 15: considers the Budget Declaration. 4. Approves changes to the budget during the year.
The Cabinet of Ministers of Ukraine (CMU)	1. By September 15: approves the draft state budget and its submission to the Verkhovna Rada and the President, taking into account the limit requirements of the Budget Code. 2. By June 1: approves the Budget Declaration (local budget forecasts). 3. Approves the Average Annual Public Debt Management Strategy.
The President of Ukraine	By December 15: can submit proposals to the approved draft budget.
The Ministry of Finance of Ukraine (Ministry of Finance)	1. Draws up the draft state budget and makes proposals on the terms and procedure for its consideration. 2. By May 5: submits the Budget Declaration (forecast of local budgets) for consideration to the Cabinet of Ministers for the next two periods. 3. Develops the Average Annual Public Debt Management Strategy. 4. Monitors and analyzes the implementation of the strategy, determines priorities. 5. Formulates recommendations (without deadlines, specification of performers).
The Debt Agency of Ukraine	Implements a policy in the field of debt management, taking into account the medium-term strategy of public debt management and the conditions of compliance with the maximum amount of public debt at the end of the budget period.
The National Bank of Ukraine (NBU)	1. By March 1: develops and submits a macroeconomic forecast to the Ministry of Finance for budget policy approval. 2. Within the limits of the powers analyzes the financial system condition. 3. Develops and publishes the annual Financial Stability Report.
The National Security and Defense Council of Ukraine (NSDC)	1. By April 15: on the basis of the volume of expenditures and the provision of loans for national security and defense for the medium term prepares and submits reasonable proposals for their distribution among the main managers of the state budget to the Ministry of Finance. 2. Prepares proposals for the draft Law on the State Budget of Ukraine for its approval by the Cabinet of Ministers of Ukraine on articles related to national security and defense of Ukraine (with a reasoned justification).
The Ministry of Economic Development of Ukraine (Ministry of Economic Development)	1. By March 1: develops and submits a macroeconomic forecast to the Ministry of Finance for approval of budget policy for the following periods. 2. Develops a mechanism to ensure the economic security of the state. Twice a year it calculates the level of economic security, but does not publish it in free access.
The Financial Stability Council of Ukraine	Identifies threats to financial stability and develops recommendations.
The Ministry of Social Policy of Ukraine (Ministry of Social Policy)	By March 1: Develops and submits a forecast of social indicators to the Ministry of Finance for approval of budget policy for future periods.

Source: developed by the authors based on [34]

From the analysis of the information represented in the form of the analytical Table 6, it is possible to draw a conclusion about the lack of temporal and semantic coherence of actions between separate institutions of public power. This, in fact, gives grounds for concluding that there is a lack of integrity in shaping the design of economic security. Nor is it about the integrity of the institutional design of macro-financial security, or the security formed around the so-called «Ukrainian scoreboard».

Given all the above about the content of the «macrofinancial security» concept (phenomenon), the scoreboard for its assessment, as well as about the institutional design in general and its current Ukrainian implementation, we conclude that such an approach to Ukrainian institutional design can be substantiated (Fig. 1).

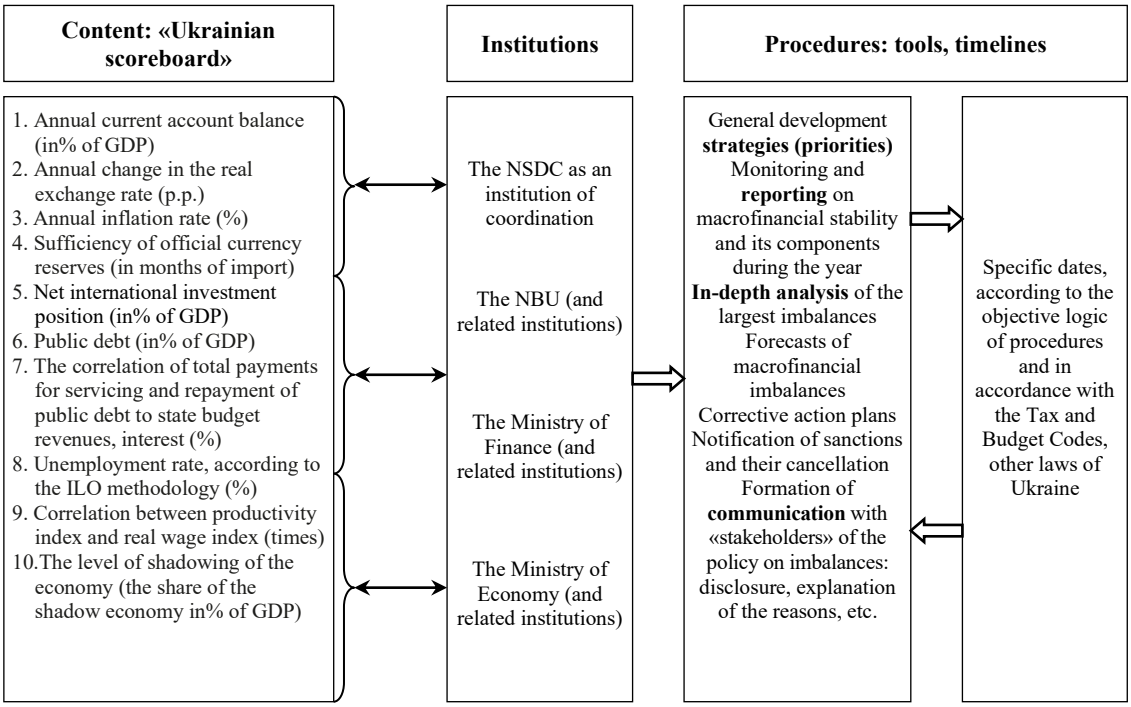

Fig. 1. The fundamentals of the Ukrainian institutional design of macrofinancial security

Source: authors' own

Fig. 1 presents the following ideas for the formation of the foundations of an integral design of macrofinancial security of the Ukrainian economy:

– among the key components of institutional design there are three elements: the content of activities (economic parameters, respectively, indicators through which macrofinancial stability and security are revealed), ***institutions*** (public authorities whose activities and interaction ensure macrofinancial stability), **procedures** (tools and timelines, using which institutions provide macrofinancial stability);

– the main content of the institutional design should form a limited range of indicators, which, in our case, is offered as a part of 10 positions. This list covers

most of the indicators used by the EU countries, but also contains special indicators that reflect the peculiarities of the Ukrainian economy (9th and 10th positions). It is possible that the range of 10 indicators may expand due to additional specific measuring tools of macro-financial stability and security spheres;

– the core of macrofinancial security design is formed around the activities and interaction of three institutions of public power – the NBU, the Ministry of Finance and the Ministry of Economy. This follows from the natural functions of these institutions, given the spheres in which they act as national regulators. According to the content of the activities of the three mentioned institutions, reflected in the current regulatory framework and existing practice, they are objectively related to specific indicators of the «Ukrainian scoreboard». Accordingly, the content of balance (imbalance) sheet management activities should be distributed as follows: the NBU – 1st, 2nd, 3rd, 4th, 5th indicators, the Ministry of Finance of Ukraine – 5th, 6th and 7th indicators, the Ministry of Economy of Ukraine – 8th, 9th and 10th indicators. The «cross-responsibility» or co-responsibility of the NBU and the Ministry of Finance regarding the «Net international investment position» (in % to GDP) indicator is probable. If such an assumption is justified, it would involve the formulation of additional requirements for delimitation of liability, and therefore – for the coordination of procedures;

– state agencies, committees, special commissions (interaction centers), etc. can act as «connected» with the main institutions that are in this institutional design – the NBU, the Ministry of Finance of Ukraine and the Ministry of Economy of Ukraine. It is likely that «related institutions» may include either existing or newly created ones with new powers, subordination, competencies, etc.;

– the formation of a relevant institutional design of macrofinancial security could include the following tools tested in the practice of public management: strategies with corresponding priorities for the development of the economy and its individual spheres, scoreboard reports, in-depth analysis of imbalances with the largest deviations from the normative values, short-term forecasts of imbalances, corrective action plans, notification of sanctions, communication with stakeholders and beneficiaries of government monetary, financial, innovation, employment, etc. policies;

– the terms regarding the application of tools by individual institutions requires a deeper analysis, with regard to the current legal documents, to justify the necessary changes, as well as to justify the algorithms of interaction of these institutions;

– in our opinion, the subjects to which institutional design tools should be applied – reports, performance analysis, performance forecasts, notification of sanctions, etc. – should be not only direct subjects of economic (macrofinancial) sphere, local authorities, but also the actual institutions of public management in the person of specific managers, units of related government institutions, etc.

As a result of the research of the defined scientific issue according to the outlined purpose, such ***conclusions*** can be drawn:

– the following interpretation of the «microfinancial sphere» concept content corresponds to the task of forming the institutional design of macrofinancial security to the greatest extent: «This is a segment of the national economy, within which the interconnectedness (consistency) of financial and real assets is realized»;

– macrofinancial stability (security) of the national economy can be represented by the actual values of the expedient (substantiated) range of indicators, the use of which helps to identify imbalances in the relationship between the financial and real sectors, which may threaten the integrity of the national economy. The range of these indicators and the algorithms for their calculation may partially change due to new economic circumstances and challenges facing society and national regulators;

– currently, it is advisable to use 10 indicators to assess macrofinancial stability (security) in the composition of: the annual balance of the current account, the annual change in the real exchange rate, the annual inflation rate, the sufficiency of official currency reserves, public debt to GDP, net international investment position, state budget deficit, unemployment rate, the correlation between the productivity index and the real wage index;

– the most acceptable for the formation of institutional design is the following interpretation of its content: «It is a system of designed algorithms, rules, incentives and constraints that provide the values of society (communities) in certain spheres»;

– the main elements of the institutional design of macro-financial security can be considered: 1) the actual indicators for assessing macro-financial security, 2) public authority institutions, 3) procedures – tools and timelines – using which it is possible to identify and correct excessive imbalances;

– the three main national regulators – the NBU, the Ministry of Finance and the Ministry of Economic Development of Ukraine, as well as related public authorities are objectively involved in the regulation of the macrofinancial sphere, with regard to its content. Development strategies, monitoring and assessment, general and special reports, imbalance forecasts, corrective action plans, notification of sanctions application and cancellation, communication between national regulators and society (communities) on excessive imbalances should be the main tools for the formation of macrofinancial security within the established institutional design;

– further research in the field of macrofinancial stability (security) institutional design formation should be carried out in the following directions: improvement of methods (techniques) for macrofinancial imbalances assessment, content analysis of legal documents on the regulation of functions, tools, timelines, division of powers and responsibilities between government institutions, qualitative and quantitative analysis of the efficiency of the existing system of public management based on the results of macrofinancial stability, designing the necessary changes in all elements of institutional design.

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EDUCATION AND ECONOMIC CERTAINTY: THE RELATIONSHIP OF THE PHENOMENA AND IMPLEMENTATION PECULUARITIES REGARDING THE REAL ESTATE MARKET

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The relevance of the research on *education influence on achieving a higher level of economic certainty* is primarily explained by education significant stabilizing potential. The existence of such a potential has been proven by many econometric studies and events in the history of many countries. With limited opportunities and resources for economic and social development, education has repeatedly become a decisive factor in stabilization. It is important that education does not appear automatically as a factor of stabilization. There is a certain transfer mechanism of the influence of education on economic certainty. In our opinion, this mechanism should be the subject of special research. The applied value of such a research is the substantiation of ways and forms of education modernization, taking into account the needs of a higher level of economic stability and certainty.

This study is based on the *hypothesis* that the content of education, the forms in which it is carried out, can create a basis for a higher level of economic stability.

The connection between education and economic certainty is not direct. It is mediated by certain units (elements) of a special transmission mechanism. Only under certain conditions will these units transmit the impulses received from education towards greater economic certainty. Under other conditions, education can be a factor of uncertainty. The idea of the transfer elements and the logic of the connection between education and economic certainty are given in Fig. 1.

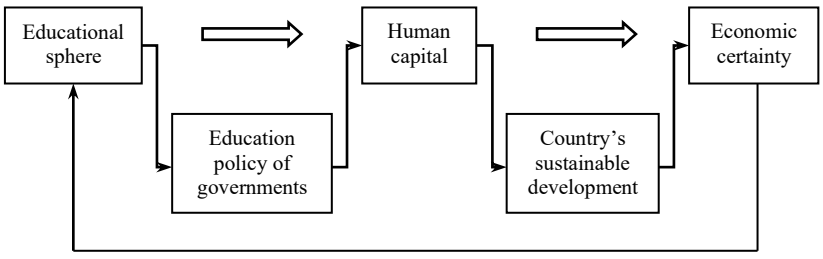

Fig. 1. Education and economic certainty connection

Source: authors' own

Fig. 1 visualizes the idea that education influences the level of economic certainty, primarily through **human capital**. The statement about the formation of

human capital under the influence of education is traditional, widespread, and indisputable. The facts about the impact of education on economic growth through human capital have also been tested many times. The novelty of the proposed approach, illustrated in Fig. 1, is related to two additional ideas, namely:

– that the connection between education and the formation and accumulation of human capital is mediated by *the policies of governments* which they implement in the field of education (educational policy);

– that human capital provides economic certainty when used by society as a resource for *sustainable development*.

To conclude about an educational system capable of providing a higher level of economic certainty, it is necessary to rely on the idea of the content of economic certainty / uncertainty [1]. At least the following characteristics (signs) of economic certainty are important for our research:

– economic certainty is associated with *volatility*, i.e. deviations of economic parameters from certain equilibrium values of such economic variables as economic growth rates, the level of resources application, the level of prices, etc.;

– economic certainty is derived from the nature of the expectations of economic agents, therefore, it depends significantly on the awareness and education of citizens, on trust in public authorities, individual communities, etc.;

– economic certainty is ensured by *institutionalization*, i.e. the normalization of economic processes, compliance with these norms, as well as the compliance of established norms with the objective needs of a developing society.

If the higher level of economic certainty depends on education, it is logical to substantiate the priorities of changes in education precisely from the needs of achieving such certainty.

By the logic of the connections represented in Fig. 1, economic certainty, formed under the influence of education, is achieved when the country's development acquires signs of **sustainable development**.

As it is known, the term «sustainable development» is the official Ukrainian equivalent of the English term «sustainable development». The latter, given the context, can be interpreted as «viable development», «internally supported development», «balanced development», etc.

According to the definition of the UN Commission on Sustainable Development, the goal of the latter is to meet the needs of modern generations without creating threats to future generations' ability to meet future needs. The theory of sustainable development is an alternative to the theory of economic growth on the basis of an extensive model. The latter, in particular, does not focus on environmental danger, the exhaustibility of non-renewable natural resources which provide economic growth. The terms «sustainable development» and «sustainable growth» are used as close in meaning.

The very concept of sustainable development has allowed us to look at economic growth, among other things, from the point of view of economic uncertainty. In

particular, this happened because sustainable development is explained as one that balances the economic, social, and environmental aspects of society [2]. And decent working conditions for the entire working age population, the availability of financial assets, developed banking and production infrastructure, etc. are regarded as conditions for sustainable economic growth [3].

Relevant signs of economic growth, identified in the priorities of the EU strategy «Europe 2020», are related to the issues of the economics of uncertainty. The document discloses reasonable growth (with more efficient investments in education, research and innovation), sustainable growth (in a low-carbon economy), and inclusive growth (in creating new jobs and overcoming poverty) [4]. The document «Agenda for Sustainable Development until 2030» contains even more important ideas for our research. It sets out the goal of sustainable development related to education, namely: «… to provide all learners with the knowledge and skills necessary to promote sustainable development…» [5].

In total, the concept of sustainable development envisages the achievement of 17 goals, each of which is in some way related to **human capital**. Therefore, according to the popular belief in science, the implementation of sustainable development is ensured by the accumulation of human capital. It has been proven that those countries which invest in human capital can significantly increase their competitiveness, especially in the face of rapid changes. Therefore, the adaptation of the economy and society to these changes, and hence a higher level of certainty, is ensured by the accumulation of human capital.

Despite some differences in approaches to the definition of «human capital», science has already proven the fact:

– human capital is created on the basis of «formal learning, education, and practical experience» [6], it, like any other capital, involves investment, especially investment in education;

– a higher level of knowledge and skills creates benefits both for individual carriers of human capital (each additional year of study significantly increases a person's income [7; 8]) and for the national economy as a whole. In particular, the excess of a certain country by 1 percentage point of the world average level of human capital correlates with 2.5 percentage points of relative growth in labor productivity and 1.5 percentage points of growth in gross national income per capita;

– investments in human capital are funding for health, education and culture that help to better adapt to new conditions in a rapidly changing world [9], and thus, these investments contribute to greater inclusiveness – the involvement of citizens in the lives of individual communities and society [10].

The connection between education itself and human capital, by our logic, is mediated by **educational policy**. Like any other, educational policy encompasses *goals* that reflect societal values and priorities. Educational policy involves the use of *tools* to achieve goals and certain *institutions* that provide a combination of goals and tools. Ukrainian researchers of educational policy usually focus on the goals of educational policy [11; 12]. It is likely that this emphasis is due to the fact that the

Ukrainian government does not demonstrate a deep understanding of the true current goals of educational policy.

To achieve the defined goals, educational policy must be based on certain rules – conscious and institutionally secured requirements for activity. The rules apply both to the actual procedure for providing educational services by educational institutions and to education state funding. In our opinion, the rules of policy in general and education policy in particular are a necessary condition for a higher level of economic certainty.

The assessment of the current policy influences on macroeconomic stability when comparing the two groups of countries – with implemented and non-implemented financial rules – yielded important results. This is the conclusion that countries with a tradition of following the rules usually achieve a higher level of economic stability.

The government's educational policy, which is primarily reflected in the level and methods of financing education, becomes the subject of many international studies. In particular, the report of the European Association of Universities for 2020 singled out five groups of countries according to the criterion of the connection between education funding and economic growth [13] (analytical Table 1).

Table 1. The connection between education financing and economic growth indicators

Indicator	Description	Country
Education financing ↑ > GDP ↑	The rate of financing education is higher than the rate of economic growth	Austria, Germany, Iceland, Luxembourg, Denmark, Croatia, Sweden, Norway, Switzerland, Portugal, Netherlands, Turkey
Education financing ↑ < GDP ↑	The rate of financing education is lower than the rate of economic growth	France, Poland, Hungary, Slovenia
Education financing ↓ / GDP ↑	The rate of financing education is declining, despite the economic growth	Czech Republic, Slovakia, Finland, Romania, Lithuania, Ireland, Estonia, Spain, Serbia
Education financing ↓ > GDP ↓	The rate of financing education is declining faster than the economic downturn	Italy

Source: developed based on [14]

According to the information presented in the Table, three (first, second, fourth) groups of countries showed a direct connection between higher education spending and economic growth rate. That is, in these three groups of countries, GDP growth increased against the background of increased investment in education and vice versa. These three groups covered approximately 65% of the total number of countries studied. Instead, the third group demonstrated the inverse relationship. Such countries account for approximately 35% of the number of countries analyzed.

The educational policy of the governments of countries is determined not only by the achieved economic potential, respectively, by the possibilities of education state financing, but also by the demographic situation.

For example, the study of the European Association of Universities represents different models of education, formed under the influence of the two mentioned factors – financial and demographic – in the period 2008 – 2017 (Fig. 2).

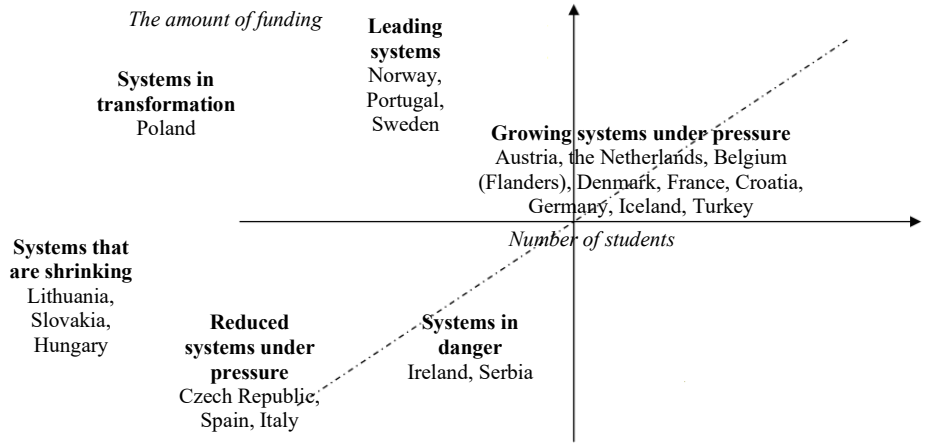

Fig. 2. The models of the EU countries educational policy, taking into account financial and demographic factors

Source: author's own [15]

The evaluation of educational policy in two coordinates – state funding of education and the number of students – provides grounds for the selection of a group of leading countries. As illustrated in Fig. 2, the group of leaders includes Norway, Portugal, and Sweden. It is the universities of these countries that rank high in international rankings and have stable and sufficient funding, with regard to the growing number of students. Austria, the Netherlands, Flanders (region in Belgium), Denmark, France, Croatia, Germany, Iceland, and Turkey are among the «growing systems», but those which are «under pressure» because they have a faster increase in the number of students. The educational system of Poland functions under special conditions. It has been identified as being «transformed» and operating with increasing public investment in universities to stop the outflow of young people from educational institutions. In all other analyzed countries, the educational systems are *at threat* with a tendency to decrease in number.

An important component of educational policy is estimating the expenditures for education. According to the results of the study under the auspices of the European Commission, an important regularity has been found. It turned out that the efficiency of the policy, which was assessed by the number of graduates and scientific publications, was higher with *greater autonomy of universities* [16]. Another interesting regularity was discovered in the fundamental study on public expenditure on education in the EU [17] – «Economists' perspectives on the investment in human capital: how efficient is public spending on education in EU member states?». A very limited number of EU countries ensure the efficiency of education expenditures simultaneously on three measures. It was about evaluation: by the number of applicants for higher education (I), by the quality of education according to the PISA (Program for International Student Assessment) in the field of science (II), by

inclusiveness, or inversion of youth in the educational process (III). Some countries had high scores on only some indicators and low scores on others. About a third of countries showed low and declining quality of education, according to the PISA criterion. Information on the evaluation of countries by this criterion is given in Fig. 3.

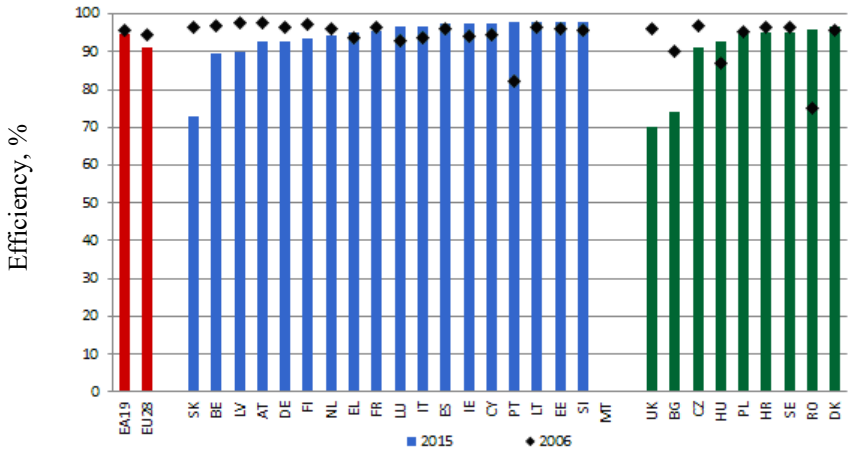

Fig.3. The evaluation of education costs efficiency, according to the PISA criterion

Source: [18]

As Fig. 3 illustrates, at least ten EU countries in the analyzed period showed deterioration in the quality of education. It is significant that this is happening in a community of countries with high welfare rates, sufficient education funding opportunities and investment in human capital.

For our study of the impact of education on economic uncertainty, the following generalizations made in the result of the analysis of the education expenditures efficiency in EU countries are important:

– *there is no ideal* educational policy, in particular, due to the continuity of educational traditions and, consequently, the conservatism of national education systems; this prevents rapid adaptation to the changing environment;

– human capital improvement in Europe occurs not so much due to the increase of public expenditures on education, but through the creation of better national models of financial resources management;

– people with higher level of education have a greater ability to respond to the threat of unemployment in times of economic uncertainty, while unemployment among people with low levels of education in times of uncertainty and crisis increases significantly;

– sufficient funding for education becomes not only a factor of economic stability, influencing economic growth, higher productivity and innovation, but also a factor of social stability, influencing the reduction of income differentiation and overcoming poverty.

Returning to the initial link of our proposed logical chain (Fig. 1), through which we tried to explain the impact of education on economic uncertainty, we can make the following generalizations.

• Education, to become a tool for guaranteeing stability, must facilitate the most important components of sustainable development – smart growth and inclusive growth. Smart growth implies that the education system provides *continuous learning, skills updating,* the ability to create new products and services, and uses new sources of information and technologies. Inclusive growth is based on the fact that the education system contributes to *the formation of communication and interaction skills, the creation of new communities, participation in change management*, etc.

The formation of the mentioned abilities and skills – constant updating of knowledge and interaction, participation, etc. – is discussed, in particular, in the scientific report on the necessary determinants of modern growth of the Ukrainian economy [19].

• Education is designed to form the value priorities of society, without which no success in the economic sphere will guarantee social unity and stability.

With regard to the indisputable fact of the crucial role of education in shaping the values of society, the idea of the Ukrainian researcher about the so-called «chain of educational effectiveness» in the following links deserves special attention: literacy – erudition – professional competence – culture – mentality [20].

• The limitation of economic uncertainty is achieved through a higher level of ***education professionalization***. Professionalization, as a process, involves a person's ability to meet the ever-changing requirements of the profession. Therefore, professionalism is based on at least three principles, namely: 1) the acquisition of fundamental knowledge and skills of the profession, 2) permanent training and self-improvement in the chosen sphere, 3) the implementation of universal and national values in performing professional functions.

Professionalization has a broader meaning than that covered by the «vocational education» concept. Under modern Ukrainian conditions, the latter correlates with the concept of the so-called «vocational training» (i.e. occupational training acquired before higher education) [21]. Attention to vocational training was generated primarily by the lack of qualified representatives of the so-called «working professions» in the Ukrainian labor market. A peculiar reaction to the unsatisfied demand in this segment of the labor market was the development of the Concept of the implementation of state policy in the field of professional (vocational) education «Modern professional (vocational) education» for the period up to 2027 [22]. Despite the focused attention of the Ukrainian authorities on professional and vocational education, the issue of professionalization of education, having a broader meaning, has become relevant for all other segments of the labor market.

Efficient measures to ensure the general professionalization of education include the following:

– formation of the content of education (educational programs) on a competency basis – taking into account what a professional must be able to do, know, anticipate,

taking into account the changing circumstances of the profession and the needs of consumers;

– involvement of successful professionals, professional associations and employers in the educational process;

– creation of a system of professional qualifications with a clear delineation of the range of competencies of specialists in a particular profession;

– a combination of different and most acceptable for the recipient of education forms of professional education and forms of retraining.

The following are some promising strategies for professionalization of education that show evidence of innovation and have been tested in different countries' educational systems:

– organization of the educational process in the form of educational clusters which combine educational, scientific institutions and enterprises, and organizations;

– creation of services to support the process of continuing professional education, such as, for example, adaptation, diagnostic, didactic, and psychological centers, etc.;

– harmonization of international (for example, European) and national qualifications frameworks;

– combination of «educational units» – ECTS (European Credit Transfer and Accumulation System) – and «professional units» – ECVET (European Credit System for Vocational Education and Training) – in educational programs of higher educational institutions;

– creation of new educational institutions – national centers dedicated to ensuring a higher degree of professionalism and employment for young people For example, the Italian center Porto Futuro («Open Doors to the Future»), the French organization Citedes Métries, and the Spanish institution Porta 22 («Open Doors to the Future»).;

– establishment of organizational structures at all levels, from secondary to higher education, that combine educational levels with production and direct training in the pursuit of specialized qualifications and professions. For instance, in France, campuses of professions and credentials (Campus des métiers et des qualifications) and professional centers of competence in Latvia are the examples of such organizational structures.

Our generalizations concerning the relationship between education and economic certainty are important, with regard to the possibility of their use in the Ukrainian economy. It is noticed that different components of the Ukrainian economy demonstrate different levels of economic certainty and stability. For example, the real estate market throughout recent Ukrainian economic history, since the 1990s, has played the role of a kind of «shock absorber of the economy». This is real estate – apartments, buildings, office premises, etc. – which has always been the most attractive asset and investment object for Ukrainians. Such advantages of real estate as an asset are explained by the constant lack of alternative forms of financial assets with a similar level of profitability, usefulness, and risk (reliability) of investments.

In particular, a stable share of GDP testifies to the relatively higher, than in other segments of the Ukrainian economy, stability of the real estate market. «Real estate transactions» account for 8-10% of GDP [23]. Approximately 200,000 Ukrainians find jobs in this market.

Despite the relatively high «potential of economic certainty» inherent in the real estate market, it is characterized by significant volatility. After all, it is usually one of the first to react to changes in the economic situation. In particular, this happened in 2020 during the Covid-19 pandemic. The real estate market and the market for tourist services were the first to react with sales reductions to negative external influences and negative expectations of citizens.

Real estate market research on the reactions of actual and potential consumers of its services showed a fairly high level of *distrust*. It was found that mistrust was formed, among other things, due to the massive lack of understanding of what they do and what specialists in this market should be able to do.

The lack of more or less clear ideas about the profession, the professional functions of operators in the real estate market are inherent not only in consumers of services. A similar misunderstanding is often demonstrated by the national regulators of this market. After all, in Ukraine there has been a debate for decades about who and how should train real estate market specialists, how their qualifications should be certified, and how certification should be carried out. That is, the education of real estate professionals is the «sphere of uncertainty» which permanently creates uncertainty in the market itself. That is why it is important to study the experience of organizing the education of real estate professionals in other countries. Equally important is the awareness of the possibilities of applying such experience to the organization of double education in Ukraine.

The standard «Services of real estate agents – Requirements for the provision of services of real estate agents», approved by the European Committee for Standardization, Qualifications and Competences of Real Estate Agents, can serve as a defining guideline for the organization of education of real estate market specialists. [24].

The list of professional competences of real estate agents is fundamentally important for understanding what should be the education of professionals in this market. Actually, the list covers 12 positions, namely:

1) understanding of the most important financial and economic terms related to real estate transactions;
2) awareness of monetary, credit and banking systems related to the real estate sector;
3) awareness of the economic and political situation related to the real estate sector;
4) awareness of supply and demand factors in the real estate sector;
5) support for real estate investments;

6) real estate marketing, possession of marketing methods and their application to different types of real estate;

7) estimating the costs associated with the use of real estate, such as operating, caused by the need for insurance, etc.;

8) knowledge of the principles and processes of guaranteeing real estate transactions, namely: legislation and practice of mortgages, bank loans and other financial instruments;

9) possession of tools for assessing the real estate market value;

10) the ability to inspect and measure the area of different types of real estate, taking into account the purpose of measurement,

11) awareness of the basics of national and European legislation, norms and standards relating to entrepreneurship in real estate, taxation, labor protection, ecology, etc .;

12) the ability to enter into contracts related to real estate, or to facilitate their conclusion, examination of existing contracts as a result of certain changes to the parties to the contract.

The analysis of the given list of competences of experts of the real estate market, on their content, gives the bases for allocation of at least four necessary components of education of such experts:

– *economic* component (economic terminology for the real estate market, the impact of the macroeconomic environment on the market, supply and demand factors in the market, investment in real estate, assessment of the real estate market value);

– *legal* component (legal basis for guaranteeing real estate transactions, application of legal norms in business activities in the real estate market, conclusion and examination of real estate contracts);

– *financial* component (possession of financial terminology in relation to the real estate market, awareness of the banking (credit) system for the real estate market);

– *marketing* component (marketing tools for research in the real estate market).

With regard to the significant amount of economic knowledge required by a real estate market specialist, we are inclined to conclude that it is appropriate to train such specialists on the basis of basic economic education. It is clear that economic knowledge must be organically combined with the other three elements of the educational process. These are legal, financial, and marketing components related to the real estate market.

The following are ten examples of the experience of implementing educational programs related to the training of specialists for the real estate market in developed countries with established and institutionalized markets (analytical Table 2).

Table 2. Educational institutions and training programs for the real estate market specialists

Educational institutions	Partners involved in the education of professionals and/ or professional communities engaged in educational activities	The content of the educational program
Florida International University (Miami, the USA)	Hollo School of Real Estate and Alvah H. Chapman Graduate School of Business	Training program in international real estate management
Bauhaus Universität Weimar (Weimar, Germany)		Bachelor's and Master's degree programs in real estate management and master classes by practicing market professionals
Antwerp Management School (Antwerp, Belgium)		The only master's program in real estate in the country, which gives the opportunity to obtain a master's degree in real estate (MRE) with relevant training
Kogod School of Business (Washington, the USA)	Professional real estate associations in the USA	Master's program in real estate with specialization: commercial development and investment banking, mortgage financing
Massachusetts Institute of Technology (the USA)	Real Estate Center (founded in 1983), created by the famous American developer, a graduate of the Massachusetts Institute of Technology Charles Spaulding	Master's program in real estate development, covering courses «Finance and Real Estate Development», «Real Estate Economics», «Strategic Real Estate Development», «Complex Urban Projects», «Real Estate Risks», «Leadership in Real Estate», etc.
Neapolis Universitz Pafos (Cyprus)	Royal Institution of Chartered Surveyors in the Eastern Mediterranean	The first special real estate program for Cyprus and Greece
University of Groningen (Groningen, The Netherlands)	Royal Institute of Chartered Surveyors	Interdisciplinary master's program in real estate, built in cooperation with the faculties of spatial sciences, economics, and law
Lucerne University of Applied Sciences and Arts (Lucerne, Switzerland)		Curriculum with specialization: real estate markets and real estate investments with trainings from market specialists
Cambridge (United Kingdom)		The program «Assessment of real estate markets» as independent and as a training course with the same name in other programs with training from professionals
IE School of Architecture and Design (Spain)		Master's program in training real estate development specialists with specialization in the field of investment in urban infrastructure with relevant trainings

Source: authors' own based on information available on websites of corresponding educational institutions.

Summarizing the experience of education of real estate professionals, based on the above examples, we can record the following:

1. There are different models of education for real estate professionals, namely:

a) at the master's (predominant model) and at the bachelor's levels;

b) within other, broader areas of training (managerial, economic analysis, financial, etc. levels) and actually within a special area – real estate market specialists with a master's degree in real estate.

2. Higher education institutions can provide training by building their relationships with real estate market experts in different ways:

a) coordinating their activities with professional public associations,

b) involving some successful professionals and market analysts in the educational process.

3. Despite the differences in models and methods of training for the real estate market, it is conducted in higher education institutions (universities) in different countries. Thus, it is assumed that this specialty is based on wide (universal) knowledge and a certain worldview, rather than on narrow functions and simple mechanical reproduction of certain actions.

4. The education of real estate professionals has many specializations, including those related to new processes in urban planning, environmental issues, and so on. Therefore, educational programs provide different – changing to the current needs of society – accents in the training of real estate professionals.

The Ukrainian real estate market cannot be considered either developed or finalized due to unregulated procedures and processes. These are, first of all, the processes of providing professional education, certification of specialists, etc.

Despite the final immaturity of the real estate market, it has already identified at least four professions which have gained recognition in Ukrainian society: property valuation specialists, real estate agents (realtors), real estate managers (including apartment building managers), and developers.

A certain system of training has been formed for the mentioned professions. The analysis of these systems makes it possible to outline the main problems of education of specialists in the Ukrainian real estate market. Information on the actual state of education of real estate professionals is given in the analytical Tables 3-6.

According to the information presented in the analytical Table 3, the training of real estate market specialists in the segment of property evaluation specialists is carried out by the state authority – the State Property Fund – and in accordance with the current Law of Ukraine. This gives such training a fairly high level of legitimacy. The content of the programs we refer to, in our opinion, narrows the role of property assessors. After all, the programs focus most on «valuation for tax purposes». Instead, property valuation has a much wider range of economic, financial, and social consequences than simply helping to increase tax revenues.

The analysis of the information presented in the analytical Table 4, gives grounds for such generalizations concerning the current system of professional training of real estate agents (realtors):

– the two current proposed programs, providing a wide range of competences, are similar to the programs of universities in other countries. This gives them undeniable advantages. But these programs provide short-term training. Therefore, it is likely that they can be fully mastered only by individuals who already have economic, marketing, financial, legal, psychological, etc. knowledge and practical skills. Such knowledge and skills are provided by university education;

– the content of the analyzed programs does not testify to a clear idea of the qualification (so-called «qualification framework») of a real estate agent (realtor). This conclusion follows, in our opinion, at least from the fact that the program «leads» this profession into the field of construction business.

Table 3. Ukrainian professional education in valuation activities

Profession (specialty)	Training entities	Names of programs	Contents of programs
Valuation activities	The State Property Fund of Ukraine (SPFU) in accordance with the Law of Ukraine №2658-III «On property valuation, property rights and professional valuation activities»	***Basic training program for valuation specialist*** from the SPFU [25]	***Covers the following modules***: *Module 1*: «General valuation questions». *Modules 2-8*: features of the valuation of various objects, namely: land and property rights to them, machinery and equipment, wheeled vehicles, aircraft, vessels, things of cultural value and other things. *Module 9* «Valuation for the purposes of taxation and accrual and payment of other mandatory payments made in accordance with the law».
	Pan-Ukrainian Association of Valuation Specialists – PUAVS	***Curriculum for the valuation*** of property complexes, shares, securities, property rights and intangible assets (SPFU)	***Covers the following modules***: *Module 1* «General property valuation issues», *Modules 2-3*: features of valuation of various objects, namely: integral property complexes, shares, securities, property rights and intangible assets, rights to intellectual property. *Module 4* «Valuation for the purposes of taxation and accrual and payment of other mandatory payments made in accordance with the law».

Source: authors' own

Table 4. Ukrainian professional education in the activities of real estate agents (realtors)

Profession (specialty)	Training entities	Names of programs	Contents of programs
Real estate agent (realtor) with the elements of real estate manager training	Non-Governmental Organization «Association of Real Estate Professionals (Realtors) of Ukraine» – AREPRU in cooperation with the Institute of Real Estate Management (Chicago, USA) – IREM	***CPM Training Course*** (Certified Property Manager Degree – Certified real estate manager) ***«Real Estate Management»*** [26] from AREPRU and IREM	***Covers the following topics:*** «Property Maintenance and Risk Management», «Fundamentals of Human Resource Management for Real Estate Managers», «Marketing and Renting: Real Estate for Retail», «Marketing and Renting: Apartment Building Real Estate», «Marketing and renting: Office buildings», «Real estate investment management: financial instruments», «Financing and valuation of commercial real estate», «Cash flow analysis: practical application», «Ethics of real estate manager», «Real estate management plans: IREM model».
Real estate agent (realtor) with elements of training in construction business and property valuation	Association of Real Estate Professionals (Realtors) of Ukraine	***Residential and Non-Residential Real Estate Program – AREPRU***	***Covers the following topics:*** «Real estate activities in Ukraine», «The main directions of real estate activities. Methods of real estate market analysis», «Organization of real estate companies in the real estate market. Features of real estate management», «Real Estate Marketing», «Theoretical foundations of development. Features of suburban real estate development», «Mortgage and mortgaged property», «Fundamentals of construction business, architecture and urban planning», «Valuation of the technical condition of buildings. Types of demolition of houses», «Fundamentals of real estate valuation. Valuation methods», «Land legislation in Ukraine», «Legal support of real estate transactions», «Violations in real estate transactions, possible ways to prevent them», «Transactions with non-residential and residential real estate. Structure and segmentation of the commercial real estate market», «Real estate as an object of taxation», «Fundamentals of psychology. Psychological aspects of real estate transactions», «Rules of financial monitoring».

Source: authors' own

The information filed in Table 5 indicates that the Ukrainian higher educational institution KNUTE does not offer a system of education of real estate market specialists, but a system of their retraining. Therefore, it is assumed that the relevant education and practical experience have already been obtained. Therefore, the existence of such a program does not solve the issue of the actual education system of «real estate market managers».

Table 5. Ukrainian professional education in real estate management

Profession (specialty)	Training entities	Names of programs	Content of programs
Manager of the real estate market	Kyiv National University of Trade and Economics – KNUTE	***Professional training program*** for real estate market managers KNUTE	***Covers the following topics****:* «Analysis of the structure of the real estate market», «Introduction to development, architecture and urban planning», «Legal aspects of real estate, types of contracts», «Fundamentals of financial and investment management in real estate», «Fundamentals of valuation and management of profitable real estate», «Practice in the real estate services market and the code of ethics of real estate professionals», «Promotion of services in the real estate market, the basics of building databases and information support of real estate firms», «Formation of psychological readiness of realtors for successful professional activity and psychology of conflict».

Source: authors' own

Actually, the fact of the existence of the educational program presented in Table 6, and the fact of certification of managers of apartment buildings is an adequate reaction of the professional community represented by EIAU (Expert Intersectoral Association of Ukraine). This is a response to the formation of a new segment of the real estate market and to new, previously unmet, consumer needs. In connection with the analyzed program, as well as in connection with other programs, some reasonable doubts arise. It concerns whether training can be completed in a short time if program participants do not have the necessary knowledge in the fields of law, economics, management, etc.

Table 6. Ukrainian professional education in real estate management in terms of apartment buildings

Profession (specialty)	Entities which provide training	Names of programs	Contents of programs
Managers of apartment buildings	«Expert Intersectoral Association of Ukraine» Public Union – EIAU	***Training program for managers of an apartment building (group of buildings)*** and / or management of a housing and communal services (HCS) from EIAU	***Covers the following modules:*** «Organizational, legal and economic aspects of housing complex management and maintenance», «Technical and technological aspects of housing complex safe operation and maintenance», «Modern management standards and software for housing complex management and maintenance».

Source: authors' own

In our opinion, the general conclusions from the analysis of the Ukrainian education of real estate market specialists can be as follows:

– the current fragmentary education of specialists is not a system legitimized on the basis of relevant legislation and coordination with professional communities of qualification requirements;

– gaps in the existing system of education of market specialists are actively compensated by the activities of public organizations – PUAVS, ARESRU, EIAU – which are interested in the professionalism of all market operators and members of these associations;

– education offered at the initiative of professional associations has a number of limitations related to deadlines, teaching staff, sources of additional costs, etc., so it cannot be entirely entrusted to these associations;

– education of market specialists should be conducted in combination with the efforts of universities which provide basic education and professional associations, which, cooperating with universities in providing basic education, will organize professional certification, recognition of qualifications and retraining;

– public authorities (commissions, committees, foundations, etc.) can be participants of the education system of market professionals in the role of the so-called «third parties», without claiming the role of «first persons» in the educational process.

One of the possible models of education of potential specialists in the real estate market is implemented at «KROK» University at the Department of Theoretical and Applied Economics (DTAE). This model is based on the following principles:

– implementation in bachelor's degree programs of two specialties – 051 «Economics» and 076 «Entrepreneurship, trade and exchange activities» – disciplines *of students' choice* related to real estate economics, real estate valuation and entrepreneurship in the real estate market;

– coordination of the list and content of the disciplines offered by the department at the choice of students with professional associations of real estate market specialists, namely: with ARESRU and EIAU;

– involvement in the educational process of teachers who have experience as professional valuation specialists, realtors, real estate managers, owners of real estate, valuation etc. agencies;

– creation of the Laboratory of Capital and Property Management at the Department of TAE (Theoretical and Applied Economics), the functions of which include the organization of mini-trainings and seminars by leading experts in the real estate market.

Conclusions: The study of the relationship between education and economic certainty provides a basis for such generalizations:

– education contributes to the achievement of a higher level of economic certainty when its content and forms provide the accumulation of human capital in accordance with the requirements of sustainable development. The latter involves responding to technical innovations and adaptability and involvement (inclusion) of citizens in the life of society;

– the impact of education on the formation of human capital is usually mediated by educational policy. Within its framework, instruments and rules are chosen, including those related to education public funding. The educational policy successfulness and education state spending efficiency criteria should include not only the growth of the number of people covered by education, but also the achievement of the education quality indicators according to socially acknowledged standards;

– higher level of economic certainty is associated with the professionalization of education – a process that means the formation of the ability to meet changing requirements for the profession. This compliance is achieved by combining continuing education and professional activities with participation in professional communities, etc.;

– one of the segments of the Ukrainian economy, the achievement of stability of which significantly depends on the formation of the educational system and certification of specialists, is the real estate market. Professionalization of education of specialists in this market involves national qualifications framework ordering, selecting the relevant model of education, and the model of recognition of qualifications and its official recognition. A promising model of professionalization of education for the real estate market is the combination of university economic education with other elements. It is a combination with the financial, legal, marketing education which can respond to the needs of the real estate market. Public professional associations of real estate market specialists should become even more influential participants, customers of the content of education and assessors of its quality.

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DATA SCIENCE ANALYSIS FOR MANAGEMENT DECISIONS WITH MACRO- AND MICROECONOMIC UNCERTAINTY

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The relevance of the studied issue is explained by the fact that the phenomenon of the national economic uncertainty involves the use of special tools of analysis. These tools need to be more complex and sophisticated than those suitable for use in equilibrium economies with sustainable economic growth. The Ukrainian economy, by the nature of changes and the current mechanisms of reproduction, is an economics of uncertainty. Therefore, management decisions at the national level and at the level of individual economic entities provide an adequate response to uncertainties, identified using special tools.

One of the main *assumptions* of the study is the idea that Data Science tools are relatively more appropriate (relevant) for the analysis of the economics of uncertainty. This assumption is verified in this study and on the basis of verification certain management generalizations and conclusions have been made.

The purpose of the study is to identify specific examples of analysis and specification of Data Science capabilities in assessing economic uncertainty. This is uncertainty at the microeconomic and macroeconomic levels. This goal is achieved through the use of Data Science tools in the analysis of large arrays of economic information using available software.

The definition of Data Science as the science of working with large arrays (bases) of data with the aim to extract non-obvious (hidden behind a large number of events) information about existing relations and dependencies is quite common and undeniable. It is clear that the found non-obvious information should become the basis for making more substantiated, and therefore more effective, management decisions.

To understand the possibilities of Data Science in the analysis of uncertainty, it is advisable to detail the content of this science with its structural elements (components) extraction (Fig. 1).

According to Fig. 1, Data Science is an *integrated* analytical science. It is formed by the direct use of the achievements of at least four areas of research based on certain ideas and tools, namely:

– Cognitive Science, which is the science of general patterns of thinking and algorithms of knowledge of the world, which are implemented in various fields of knowledge, for example, in law, finance, medicine, art, economics, etc.;

– Machine Learning, which is the science of efficient ways of learning and of self-learning systems using computer programs which use algorithms for learning about

the world, including the construction of artificial neural networks (Artificial Neural Network) [6];

– Big Data, which is the science of generating technologies and rules for organizing large databases, their visualization and representation;

– Data Mining, which is the science of extraction of connections (dependencies) and *regularities* from large databases according to the rules of software (machine) learning, not obvious, but objectively existing, therefore, useful for conscious decision-making.

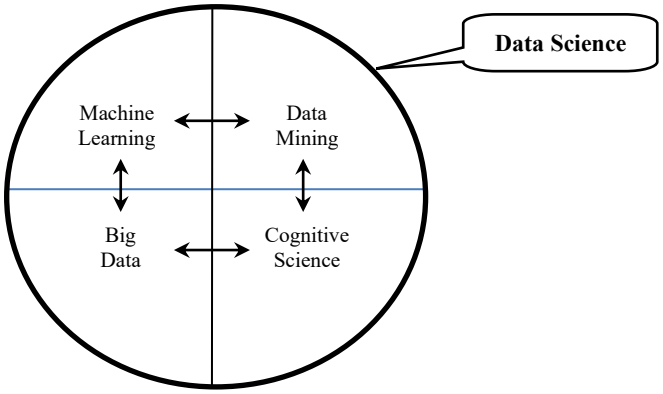

Fig. 1. The content of Data Science by structural elements

Source: authors' own based on [1-5]

The ability of Data Science to provide an appropriate (relevant) analysis of the economy in a state of uncertainty is primarily related to the identification of *non-obvious* relationships (dependencies).

In our opinion, non-obvious relationships (dependencies) have such typical criteria:

– they are not «on the surface» of phenomena, so they are not detected empirically or «in practice», as, for example, a fairly obvious relationship between demand and prices in a particular market, between production costs and output, etc. is identified;

– they do not follow from mass-conscious theoretical constructions, which are usually based on the logical (deductive) derivation of one phenomenon from another, such as the derivation of inflation from unsubstantiated (unexpected) growth of individual elements of aggregate demand or the impact of national currency devaluation on exporters;

– they are caused by discretely random factors («black swans»), which due to the limited intellectual capabilities of communities and ordinary economic entities, as well as due to the limited technical capabilities of the analysis, cannot be predicted with the necessary accuracy;

– they are not expected, in the sense that economic agents will not be able to respond adaptively, rationally, pseudo-rationally, or otherwise.;

– they cannot be detected by traditional methods of information processing and require more sophisticated tools, which are either not yet created or created, but are not used due to the lack of awareness of their benefits and capabilities.

There are grounds to believe that these signs of non-obviousness of relationships (dependencies) between processes and phenomena form the core of *the economics of uncertainty*. In the Ukrainian economy, the uncertainty of relationships caused by incompleteness of objectively necessary transformations (reforms), chaos in actions of government institutions, lack of heredity, therefore, discontinuity (discreteness) of positive traditions of public management of the economy, etc., are added to the fixed by us criterial signs of non-obviousness.

Data Science-analysis is based on the scientific foundation of various schools and areas of economic and mathematical research, within which the issue of detecting and assessing uncertainty is solved.

The retrospective analysis provides grounds for identifying certain stages in the evolution of research on the phenomenon of uncertainty:

– game theory, the ideas of which were formulated in the 1940s by J. von Neumann and O. Morgenstern, and the task was to analyze economic behavior and decision-making under the conditions of uncertainty and conflict situations;

– economic and mathematical modeling of the 1950s – 1980s with its new for that period tools, which cover at least six areas:

1) dynamic and stochastic models which take into account the factor of randomness and uncertainty (R. Frisch, J. Tinbergen, S. Kuznets, K. Arrow, L. Klein, etc.);

2) iterative methods for solving large-scale issues (N.N. Boholiubov, N.M. Krylov, M.F. Kravchuk, A. Yu. Luchka);

3) network planning methods (CPM critical path, PERT programs evaluation and analysis), which allow to minimize the duration of projects taking into account various factors of influence;

4) models of simultaneous equations, which provide for the coverage of a system of separate equations with different levels of identification and different dependent variables which are interrelated (T. Koopmans, T. Haavelmo, G. Gale, etc.);

5) improved models of economic distribution and resources evaluation, in particular evaluation of capital investments from the perspective of the theory of duality (G. Lemke, A.U. Tucker, and others);

6) optimization models of perspective planning, which are used in the development of more substantiated perspective plans for economic development based on knowledge of the most important economic proportions and ratios, production growth rates and consumption levels, rational industry structure (L.V. Kantorovych, V.S. Nemchynov, V.L. Makarov, A.B. Horstko);

– models of behavior of socio-economic systems and assessment of their manageability, which have been actively developed since the end of the twentieth

century and involve the use of mathematical tools in at least two of these special forms:

1) detection of impacts of delay in systems responsiveness to stimuli using linear and nonlinear differential equations (V. Volterra, A.D. Mishkis, N.N. Boholiubov, D. Ya. Khusainov, V.I. Fodchuk);

2) expert-evaluated fuzzy logic with formalization in the form of fuzzy sets (L. Zadeh).

It is significant that a certain potential for estimating uncertainty is formed by fairly simple tools of econometric analysis. This applies in particular to multiple regression, a method of multidimensional analysis in which a dependent variable is associated with a set of independent variables (regressors). The study of the tools gives grounds to assert that the actual evolution of regression analysis took place in the direction of finding ways to estimate uncertainty. It is a question of the transition from simple linear regression to nonlinear, and also to autoregression with lag values of variables for estimation of the duration of impulse «responses» and to the use in regression equations, so-called «fictitious variables».

Each of the mentioned tools of econometric analysis, providing certain advantages, has its limitations. Such a typical limitation is that with excessive amounts of information there is a need to limit and simplify it. This causes a distorted model reflection of reality and, consequently, imperfection of solutions based on model constructions. This limitation is partially overcome, for example, with the use of artificial neural networks (Neural Networks). Econometric models and artificial neural networks are tools of Machine Learning, and, therefore, a component of Data Science (Fig. 1).

The input signals are added and, after going through the transmitting (transmission) function, the output is generated, according to the logic of artificial neural network models. The input signals define particular layers (or «nodes») of the interaction, resulting in a multilevel system.

Artificial neural networks are capable of solving a wide range of tasks and have more analytical capabilities than traditional technologies. The most important, in terms of the goal of our research, is the ability to use them for analysis with partial data when assigning a risk level to each operation [7]. Additional alternatives for uncertainty analysis are developed in this approach.

The use of Data Science tools in economic research, in general, and macroeconomic research, in particular, has a long and illustrious history. The following objects were frequently the subject of data science research:

– exchange rate volatility in bilateral relations between countries [8];

– profitability of the financial market, the dynamics of stock indices [9];

– GDP dynamics, economic shocks and «turning points» in the process of economic fluctuations [10; 11];

– factors of price fluctuations and inflation dynamics [12; 13];

– efficiency of certain types of economic policy, in particular with the use of constructions focused on agents and policy makers *(agent-based modeling in economics and policy-making)* [14; 15].

The application of Data Science **at the macroeconomic level** will be illustrated by the example of building neural networks in the study of two macroeconomic phenomena – *economic growth and income differentiation*. Like all other processes and phenomena of the Ukrainian economy, the variables we selected for the study have a high level of uncertainty. In particular, the trend of economic growth in 2016 – 2018 is unexpectedly interrupted by the slowdown in 2019 and a significant decline in 2020. The latter is not explained solely by Covid-19 factors and the global crisis, but has other special significant internal causes in the Ukrainian economy and society.

The study of the phenomena of economic growth and the level of income differentiation used data on the 31 indicators of the Ukrainian economy for the period 1992 – 2018. To ensure the homogeneity of statistical information, the data on Ukraine available in the IMF databases [16] has been used to the maximum. In order to continue the series of data for the 1990s which the IMF information didn't contain, two other sources have been used for six years [17; 18].

All available indicators are divided into endogenous, i.e. those explained in the models, and five groups of exogenous indicators, i.e. those used to explain. Economic growth rate and Gini coefficient relate to such endogenous indicators. The selection of these indicators is consistent with our goal to explain economic growth and income differentiation in the Ukrainian economy using Data Science tools. Exogenous variables are divided into five groups:

1) the achieved level of development of the national economy;
2) social;
3) financial;
4) monetary;
5) resource potential of the economy.

The division of exogenous model variables into five groups is quite conditional and does not have a significant technical load when building models and explaining the results.

The conditionality of the division of indicators from the database of the studied data is manifested, in particular, in the fact that some of them can be attributed to one or another group. For example, we assume that two indicators of education funding – G_{educ}/G та $Exp_{G/st}/Y_N$ – are indicators of the achieved development level. The reason for this is the idea that the level and quality of education funding, in particular higher (university) education, most reflects the level of development of both the economy and society. Instead, another approach is possible, according to which the indicators of education financing will be presented as belonging exclusively to the group of financial ones. The state budget distribution proportions reflection through them is the basis for such their affiliation. Thus, the division of indicators into groups can be

based on various *theoretical assumptions*, so any existing division is «conditionally correct».

However, the division of exogenous indicators into certain groups, despite its conditionality, is necessary for the so-called premodel analysis. Within its limits, at the level of well-known and conscious theoretical constructions, the question of what «in principle» the studied variable may depend on is solved. In particular, according to the new classical theory, economic growth primarily depends on the resource potential of the economy, the achieved level of productivity, savings and investment in technological progress and so on. Thus, these are the indicators covered by our classification, of groups 1 and 5. Instead, in Keynesian theory, economic growth is explained in terms of financial, credit and income indicators, which affect the total costs. Thus, we are talking about the indicators of our selected 2nd, 3rd, 4th groups.

The list of indicators on the basis of which two neural networks were built is given in Table 1.

Table 1. A complete list of indicators used to build two artificial neural networks

Designation of the indicator in Latin letters	The content of the indicator	Sequence number of the indicator in the model
Endogenous (explained) variable models		
g_Y	Economic growth rate (%)	6
k_{Gin}	Gini income differentiation coefficient	2
Indicators of the achieved level of economic development		
Y/N	GDP per capita (USD)	1
Im/Y	Share of imports in GDP (%)	16
Ex/Y	Share of exports in GDP (%)	17
$S_{N/Y}$	The share of national savings in GDP (%)	15
G_{educ}/G	Expenditures on education in government expenditures (%)	26
$Exp_{G/st}/Y_N$	The share of public spending per student (higher education) in GDP per capita (%)	27
Social indicators		
Sh_{lov20}	The share of the poorest quintile group in income	3
Sh_{hig20}	The share of the richest quintile group in income	4
k_{dif}	Quintile income differentiation coefficient	5
Sh_{Pov}	The share of the population below the poverty line (share of those consuming less than 1,9 USD)	31
Financial indicators		
$D_{Ext/GNI}$	The share of external debt in gross national income (%)	7
D_{Ext}	External debt (USD)	8
T/Y	The share of income taxes in GDP (%)	11
G/Y	The share of expenditures in GDP (%)	12
D_G/Y	The share of public debt in GDP (%)	18
Cr_{IMF}	IMF loans used (in USD)	20
Monetary indicators		
π_{CPI}	Inflation rate according to the consumer price index (%)	10
q_{USD}	Exchange rate (UAH per USD)	13
π_{defl}	Inflation rate in terms of GDP deflator (%)	14
Res_{CB}	National Bank reserves (in US dollars)	19
i^r	Real interest rate (%)	21
i_{dep}	Interest rate on deposits (%)	22
g_{BM}	The growth of broad money (%)	23

Designation of the indicator in Latin letters	The content of the indicator	Sequence number of the indicator in the model
Indicators of resource potential		
L	Labor force (people)	24
u_{ILO}	Unemployment rate, according to international evaluation methods (%)	25
$u^{/}$	Unemployment rate according to national statistics bodies (%)	9
N	Population of the country (people)	28
n	Population growth rate (%)	29
$migr_N$	Net migration (people)	30

Source: author's own

The relationships verification between the variables of the selected database using regression analysis methods revealed that the following list of variables appeared to be the best to explain *economic growth* g_Y (6): π_{CPI} (10), q_{USD} (13), S_N/Y (15), Im/Y (16), Res_{CB} (19), Cr_{IMF} (20), i^r (21). The Table 2 below discloses the quality characteristics of the regression model.

Table 2. Technical characteristics of model quality

Регрессионная статистика								
Множествен	0,91							
R-квадрат	0,84							
Нормирован	0,78							
Стандартная	4,10							
Наблюдения	28,00							
Дисперсионный анализ								
	df	*SS*	*MS*	*F*	*Значимость F*			
Регрессия	7,00	1714,49	244,93	14,60	0,00			
Остаток	20,00	335,48	16,77					
Итого	27,00	2049,98						
	Коэффициенты	*дартная ош*	*-статистик*	*P-Значение*	*Нижние 95%*	*Верхние 95%*	*Нижние 95,0%*	*Верхние 95,0%*
Y-пересечен	-71,20	12,39	-5,75	0,00	-97,04	-45,36	-97,04	-45,36
10 πCPI Inflat	0,01	0,00	4,86	0,00	0,00	0,01	0,00	0,01
13 qUSD Offic	0,32	0,16	1,92	0,07	-0,03	0,66	-0,03	0,66
15 SN/Y Gross	0,61	0,17	3,51	0,00	0,25	0,97	0,25	0,97
16 Im/Y Impo	1,08	0,25	4,32	0,00	0,56	1,61	0,56	1,61
19 ResCB Tota	0,00	0,00	4,55	0,00	0,00	0,00	0,00	0,00
20 CrIMF Use	0,00	0,00	-2,77	0,01	0,00	0,00	0,00	0,00
21 ir Real inte	0,29	0,05	6,42	0,00	0,20	0,39	0,20	0,39

Source: authors' own

The given technical characteristics of the model testify to the following:

– it is possible to observe a high quality of the model, as the variables presented in it explain the economic growth of 84% ($R^2 = 0,84$);

– the probability that the model variables are selected incorrectly is zero (F-criterion = 0), i.e. the variables are selected correctly;

– the impact of all model variables on economic growth, represented by the coefficients at the variables, is significant (P-values <0.1 for all variables).

Despite the high technical characteristics of the model, the signs at the coefficients («+» or «-») testify to the contradictory influences and such which are difficult to explain from the macroeconomic perspective. The following are examples of contradicting effects of variables, particularly in terms of the signs at the coefficients:

– a strong positive impact of inflation on economic growth has been revealed (coefficient at $\pi_{CPI} = +0,01$), despite the traditional approach to excessive inflation as a factor with an inhibitory effect on growth;

– a strong positive impact of increasing the share of imports in GDP on economic growth has been identified (coefficient at Im/Y = +1,08), despite the traditional approach to imports as a phenomenon of «withdrawal» from the economic cycle, and therefore as a factor that should inhibit growth;

– a strong positive effect of the real interest rate on economic growth has been revealed (coefficient at i^r = +0,29), despite the notion of the deterrent effect of raising interest rates on investment and, consequently, on economic growth.

The clarified contradictions between the character (direction) of the influence of indicators, according to the qualitative regression model, on the one hand, and according to the logic of theoretical explanatory models on these influences, on the other, give grounds at least for such assumptions:

– the effects of econometrically selected indicators are more complex than it is predicted in macroeconomic theory;

– it is probable that these effects are nonlinear, cross, and based on multilevel dependencies.

If our assumptions are correct, then in this case to model and explain economic growth it is appropriate to use Data Science tools with the construction of an artificial neural network.

The artificial neural network model has been created in the Deductor environment. The results of network construction are presented in Fig. 2.

The graph of the neural network shows the nonlinear influence of the seven variables on economic growth, their cross-interaction, and the formation of certain «nodes» of such interaction. The strongest, when forming one of the «nodes», was the impact of the real interest rate and used IMF loans, and the weakest – the impact of the share of imports in GDP. When forming another «node», the influence of all variables was approximately the same.

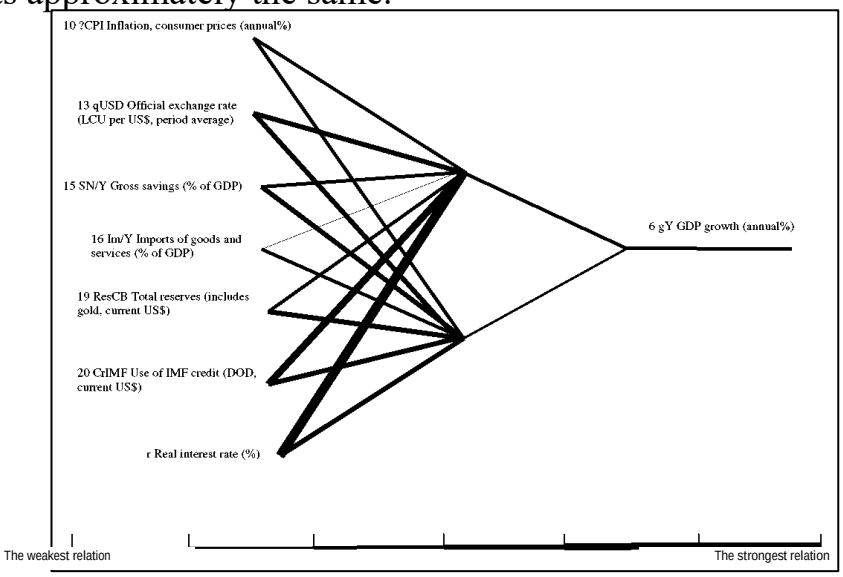

Fig. 2. A neural network graph illustrating the relationship between selected variables and economic growth

Source: authors' own

The verification of the neural network in the test sample is given in Fig. 3.

Fig. 3. The verification of the neural network quality

Source: authors' own

Fig. 3 illustrates the degree of approximation between economic growth actual values and values simulated using a neural network. In the test sample (2017 – 2018), the forecast error averaged less than 1%. This indicates the high quality of the neural network and the possibility of its use for prediction and analysis.

The verification of the relationships between the variables to build a neural network which simulates the level of income differentiation, according to the Gini coefficient, regression analysis methods revealed the best variables to explain. Such variables have become as follows: $u^{/}$ (9), π_{CPI} (10), q_{USD} (13), S_N/Y (15), i^r (21), i_{dep} (22), n (29).

The quality characteristics of the regression model of the relationship between the Gini coefficient and other variables are given below in Table 3.

Table 3. Technical characteristics of the model

Регрессионная статистика								
Множественны	0,98							
R-квадрат	0,97							
Нормированны	0,95							
Стандартная ош	0,86							
Наблюдения	19,00							
Дисперсионный анализ								
	df	*SS*	*MS*	*F*	*Значимость F*			
Регрессия	7,00	267,20	38,17	51,13	0,00			
Остаток	11,00	8,21	0,75					
Итого	18,00	275,42						
	Коэффициенты	*Стандартная ошиб*	*t-статистика*	*P-Значение*	*Нижние 95%*	*Верхние 95%*	*Нижние 95,0%*	*рхние 95,0*
Y-пересечение	23,62	1,84	12,87	0,00	19,58	27,66	19,58	27,66
9 u Unemploym	-0,92	0,27	-3,41	0,01	-1,52	-0,33	-1,52	-0,33
10 πCPI Inflatio	-0,01	0,00	-7,66	0,00	-0,01	0,00	-0,01	0,00
13 qUSD Official	0,11	0,05	2,09	0,06	-0,01	0,22	-0,01	0,22
15 SN/Y Gross sa	0,16	0,06	2,65	0,02	0,03	0,30	0,03	0,30
21 ir Real interes	0,06	0,03	1,95	0,08	-0,01	0,13	-0,01	0,13
22 idep Deposit	0,24	0,03	7,17	0,00	0,17	0,32	0,17	0,32
29 n Population	-6,89	1,44	-4,78	0,00	-10,06	-3,72	-10,06	-3,72

The considered technical characteristics of the model in this case indicate the following:

– it is possible to observe a very high quality of the model, because the variables presented in it explain the income differentiation, estimated by the Gini coefficient by 97% ($R^2 = 0,97$);

– in fact, there is no probability that the model variables are selected incorrectly (F-criterion = 0), i.e. the variables are selected correctly;

– the influence of all model variables on income differentiation, represented by the coefficients at these variables, is significant (P-value < 0.1 for all variables).

In terms of coefficients signs for variables («+» or «-»), i.e. the character of the dependencies, the impact on income differentiation of selected variables looks even more controversial than in the previous model of economic growth. The nature of the influence of only one variable (out of 7) can be explained at least «from the standpoint of common sense». This is the inverse relationship between population growth rate and income differentiation (coefficient at n = -6.89). This inverse relationship can be explained at least by the fact that a decrease in population growth, other things being equal, increases the share of older people, whose incomes are usually lower. The inverse relationship between income differentiation and two variables – unemployment (coefficient at $u^{/}$ = -0,92) and inflation (coefficient at π_{CPI} = -0,01) – contradicts the theory. After all, the assertion regarding inflation as a factor which contributes to the stratification of citizens in society and unemployment, which causes the growth of poverty, is well-established. The positive effect of devaluation on the increase of income differentiation (coefficient at q_{USD} = +0,11) can be explained by the peculiarities of mass storage of savings by Ukrainian citizens in the currency of other countries. The relationships of income differentiation with three more variables – real interest rate (coefficient at i^r = +0,24), interest rate on deposits (coefficient at i_{dep} = -0,01) and the share of savings in GDP (coefficient at S_N/Y = +0,16) – are the most secretive and little understood. In our opinion, they show uncertainty to the greatest extent in the sense of what cannot be explained, realized and expected.

All these features of the income differentiation model give grounds to assume nonlinearity and multilevel character of dependencies, hence, the expediency of using artificial neural networks in modeling tools.

An illustration of a model of an artificial neural network built in the Deductor environment is presented in Fig. 4.

The neural network graph in Fig. 4 testifies to the nonlinear, cross influence of seven variables on income differentiation and the fact of interaction «nodes» formation. The impact of the share of national savings in GDP in the formation of the second «node» appeared to be the strongest of all impacts. When forming the first «node» of interaction, the influence of the exchange rate of the national currency was the strongest. Instead, population growth rate had the weakest impact on income differentiation in both nodes.

The neural network quality verification in the test sample is given in fig. 5. Figure 5 illustrates the high degree of approximation of actual and simulated with the use of neural network values of income differentiation, which is estimated by the Gini coefficient. In the test sample (2017 – 2018), the forecast error was, on average, less than 1%. This indicates a very high quality of neural network and that it can be used for forecasting, analysis and management decisions taking.

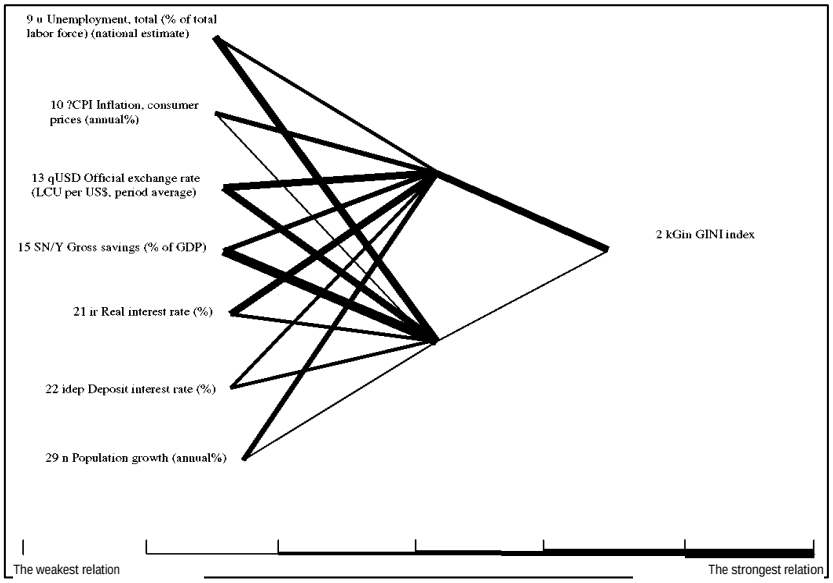

Fig. 4. The graph of the neural network of the relationship between the selected variables and income differentiation, by the Gini coefficient

Source: authors' own

Fig. 5. The neural network quality verification

Source: authors' own

Summarizing the results of using Data Science tools in the analysis at the macroeconomic level, we draw the following intermediate conclusions:

– in the process of econometric analysis of macroeconomic phenomena – economic growth and income differentiation – significant, but «unexplained» and unforeseen relations (dependencies) are revealed. According to our assumption, this reveals economic ambiguity, the so-called «hidden meanings», hence, economic uncertainty;

– the use of Data Science tools makes it possible to draw conclusions about the actual existing dependencies and qualitatively predict the future course of events, even in the presence of vaguely identified effects. Despite the vague identification,

the automatic formation of «nodes» of interaction between variables indicates the existence of complex dependencies.

The purpose of this study is to find an answer to the question of how the use of Data Science tools can contribute to taking more substantiated management decisions. At the macroeconomic level, it is evident that we are discussing decisions made by public authorities and so-called national regulators. The example we have considered can be used in the context of at least the following recommendations regarding management decisions:

– forecasting the dynamics of variables that may be the target of the influence of national regulators (economic growth and income differentiation are just such targets), cannot be based only on obvious factors of influence. Nonlinear multilevel relations between variables should be considered in forecasting;

– to substantiate the specific results (responses) of impulses going into the economy from public authorities, it is advisable to form a more complete and perfect idea of the impulses transmission. The latter covers both obvious and non-obvious elements of the transmission, i.e. the relations between variables.

Both recommendations as concerns management decisions improvement at the macroeconomic level can be achieved using Data Science tools.

The relevance of using Data Science at the **microeconomic level** – the level of individual economic entities – in the modern Ukrainian economy is determined by at least the following circumstances. First, there is a low efficiency of investment in general and investment in the banking sector in particular. Therefore, there is a need to analyze and use such research tools which would help identify not only obvious, but also deep, hidden (non-obvious) causes of low efficiency. Second, in management decisions, at present, a tiny fraction of all information related to the activities of individual economic entities is actually used. According to expert estimates, this share is only 0,5%. Therefore, expanding the database of research data may contribute to a more substantiated answer to the question «Why efficiency is low and how to increase the return on investment» for each case.

We will illustrate the practical use of Data Science technologies at the microeconomic level with a specific example, which makes it possible to identify the benefits of this toolkit.

The object of the study was a specific bank*, which was one of the top 10 banks in Ukraine in 2018. The task (purpose) of the analysis was to find and substantiate ways to increase investment efficiency. It was about media investments in advertising banking services. The purpose of optimizing investment costs for advertising was to increase sales of banking services and increase the profitability of the bank, i.e. increase ROMI (Return of Marketing Investments).

The logic of the model construction in this case was as shown in fig. 6 and reflects the so-called «sales funnel» of the bank through one of the sales channels – the call center.

* Due to the obligation not to disclose information, the name of the bank is not made public

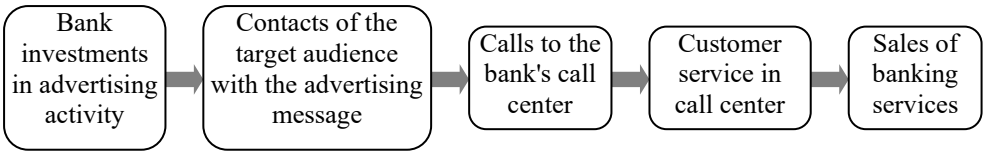

Fig. 6. Model construction logic when substantiating decisions for a commercial bank using Data Science tools

Source: authors' own

The information base of the study covered data on more than 30 indicators in different time intervals, which, according to the source (origin) of the data, were divided into three groups, namely:

- indicators of the bank's activity in relation to the «sales funnel»;
- indicators of advertising activity of the bank and its competitors;
- data on the macroeconomic and social environment of entrepreneurial activity.

The use of the first two groups of data sources in this study is a priori understandable. After all, this is a project as regards the use of advertising activity to increase banking products sales. The third group of sources needs a more detailed explanation.

The banking sector in general, and this bank in particular, incurred enormous losses as a result of changes in the macroeconomic environment during the economic downturn caused by the political crisis and the start of the Russian-Ukrainian war in 2014 – 2015. During this period, the national currency devalued 3-4 times (from 8 to 26-32 UAH per US dollar), the index of confidence in banks decreased significantly [19], deposits in currencies of other countries decreased by 57%, deposits in hryvnia – by 8%, loans – by 38% [20]. Therefore, it is evident, that the recommendations for the bank in 2018 had to be based on the assumption regarding the existence of certain trends in expectations and reactions of consumers of banking services, formed in 2014 – 2015. It was necessary to take into account new macroeconomic trends in economic growth in 2016 – 2018.

The decision to invest in advertising was influenced by the fact that during the national economic crisis, banks in the country reduced their advertising activity. Only a few significant banks were mentioned in the media as attempting to maintain Ukrainians' trust [21; 22]. In 2016, the surveyed bank only ran one advertising campaign, with a low response rate. As a result, the campaign was scaled back and no media advertising was used for the next two years.

Investing in media advertising and designing a media plan to get the best response in the form of calls to the bank's call center emerged as a general business task during the investigated bank's advertising campaign. The investment project's specific goal was to create the «best media mix» of diverse advertising techniques with the optimum distribution of the advertising budget. The achievement of a good return on investment (ROI) is the condition for optimization. As a result, the Data Science project's goal was to research, model, and estimate the call center's load in

relation to the bank's media advertising operations. The Data Mining technique was applied, as well as machine learning technology.

The project was carried out using the CRISP-DM intersectoral data sharing standard [23], which is the most often used analytical model in similar investigations [24]. Information on the indicators of past bank advertising campaigns from 2013 to 2016, as well as statistics on socioeconomic development, were collected in order to generate the necessary database. The classical practice of media planning was considered (taking into account the share of voice in the media channel, the frequency of contacts with consumers and the level of coverage of the target audience). However, the main focus was on business indicators (calls to the bank's call center, sales of bank services and conversion levels). In this way, a new integrated approach to decision making based on Data Science, machine learning technologies and maximum use of data was developed.

With the help of Excel and R-Studio software, an econometric model has been developed with the key metric «Incoming calls to the call center». To implement the approach, mathematical methods of analysis and forecasting based on a database with historical data of the bank, media agency and the external environment (social and macroeconomic indicators) have been used. Parameters which affected the conversion (transmission mechanism) from media activity to calls, as well as from calls to orders and sales had been added to the model. The parameters have been optimized to get the best conversion coefficient.

The general econometric model was divided into submodels for monitoring business tasks at each stage, namely:

1) a model of short-term weekly planning, which allowed to record and assess the impact of advertising on the achievement of the bank's performance (both positive and negative) at any time;

2) a model of tactical planning which allows you to plan the hourly traffic intensity of the bank's call center in response to changes in media activity. In particular, the relationship between incoming calls of potential customers of the bank to the call center and the amount of advertising on television during the day was revealed. This made it possible to determine the efficiency of television activity at every hour of the day and throughout the week. The model created the basis for operational optimization of the bank's call center work.

The multiple regression model with more than 30 factors with daily and hourly characteristics looks like this:

$$Calls\_by\_hours = hours\_coefficient \times day\_coefficient \times (Constant + a_1 \times$$
$$\times Adstock(TV_1) + a_2 \times Adstock(TV_2) + \ldots + a_n \times Adstock(TV_n) + b \times$$
$$\times Radio\_activity + c_i \times billboards\_i + d_i \times Integrated\_economic\_indicator\_i),$$

where Calls_by_hours – number of calls to the call center with hourly information; hours_coefficient – the efficiency of television activity for a certain hour; day_coefficient – the efficiency of television activity for a particular day of the week;

Constant – basic (organic) call level for a certain hour; a_i – efficiency of television activity of the i-th type, i = 1…n; Adstock – accordingly, the immediate, long-lasting and lagging effect of television advertising on the behavior of banking customers over certain time; $Adstock(TV)_t = TV_t + a \times Adstock(TV)_{t-1}$; b – efficiency of activity on the radio; Radio_activity – activity on the radio; c_i – the efficiency of activity in outdoor advertising of the i-th type, i = 1…n; billboards_i – activity in outdoor advertising of the i-th type, i = 1…n; Integrated_economic_indicator – an integrated indicator that simultaneously reflects the level of GDP, income and dynamics of banking products.

The model is quite complex, from a technical point of view, because it embodies a combination of submodels taking into account the course of events during each day and each week. Data from the data source*. Became the basis for calculations. The same data was used to construct the figures below.

Technical characteristics of one of the submodels of the general model are offered in Table 4.

Table 4. Technical characteristics of the submodel

Indicator	Coefficient	Stand. Error	t-statistics	P-value
Constant	19,78	5,97	3,31	0,0017
Economic indicator	-3,82	0,08	-50,44	0,0000
Billboard	32,98	0,42	77,77	0,0000
Radio	65,24	4,45	14,67	0,0000
TV1	158,53	0,75	211,77	0,0000
TV2	140,34	1,08	130,09	0,0000
TV3	178,96	1,45	123,61	0,0000
TV4	110,27	7,70	14,32	0,0000
Multiple R-squared	0,97		Adjusted R-squared	0,97
F-statistics	11894,423		p-value	0,0000

Source: authors' own

The main criteria of technical optimization of the model were: increase of R2, avoidance of autocorrelation, of heteroskedasticity, and of multicollinearity. The achieved modeling results are as follows: the model estimates the influence of factors with a probability of 97% (R2 = 97%), there is homoskedasticity (i.e. no heteroskedasticity), no autocorrelation.

The developed econometric model allowed to determine the influence of each significant factor and to develop recommendations for the most efficient use of media resources. Here are the top five recommendations.

First, the advisability of adhering to certain duration of the media campaign to minimize the «wear-out effect» based on the data that after reaching the so-called weight of the flight in X TRPs (the main measure of television activity), within Y weeks the efficiency of television activity decreases due to the wear-out effect (Fig.

* Internal database of the Ukrainian bank (confidential information).

7). It was recommended to maintain the flight duration at the required level of TRPs for maximum advertising efficiency.

Second, the importance of rotating (replacing) the advertising videoclips during the flight to further increase the number of calls to the call center of the bank and partially reduce the wear-out effect. The conclusion is based on the assessment that the replacement of the advertisement allows to increase the number of calls by 19%, but it does not compensate for the wear effect. Because there are a lot of short flights, it's a good idea to use a variety of advertising materials.

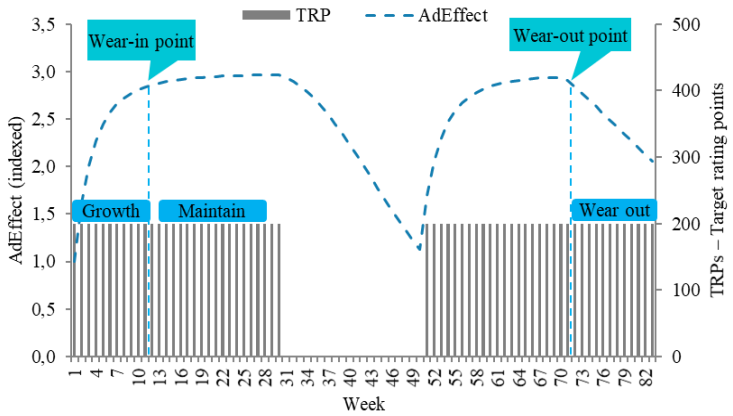

Fig. 7. «Wear-out» effect («wear effect» of the advertising message)

Source: authors' own

Third, the expediency of placing only specific media resources, for example, only the video X" (Fig. 8), avoiding the use of others. It was found that, given the price, advertising, for example, with an X" video, is the most efficient. Therefore, to implement KPIs, it is recommended to use 100% only a certain version of video advertising.

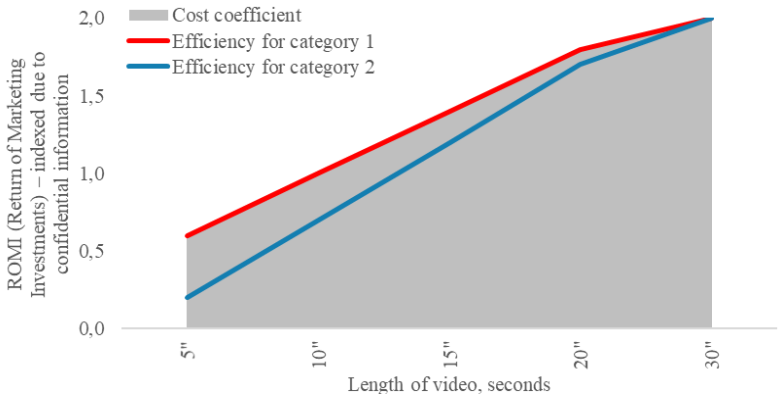

Fig. 8. The efficiency of different durations of videos

Source: authors' own

Fourth, the substantiation of additional activity in other (except already used) communication channels in the last weeks of the TV campaign for potential customers additional coverage and increase of the number of calls to the bank's call center (Fig. 9). It has been proven that another media channel helps to generate additional calls, and the simultaneous use of several communication channels gives

an increase in calls for each day of activity of + 20% compared to calls provided by only one TV commercial.

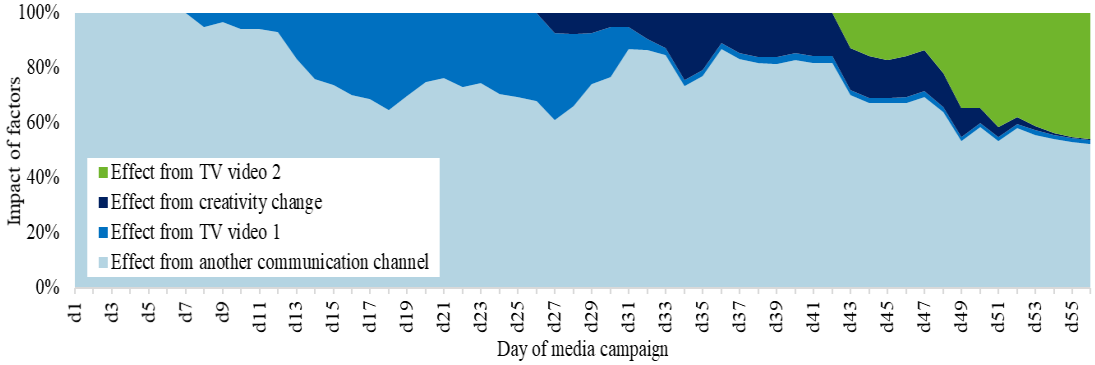

Fig. 9. Decomposition of the model using different communication channels

Source: authors' own

Fifth, the feasibility of implementing tactical organizational changes, namely:

a) restriction of advertising on weekends and holidays on television, as evidenced by the schedule (Fig. 10);

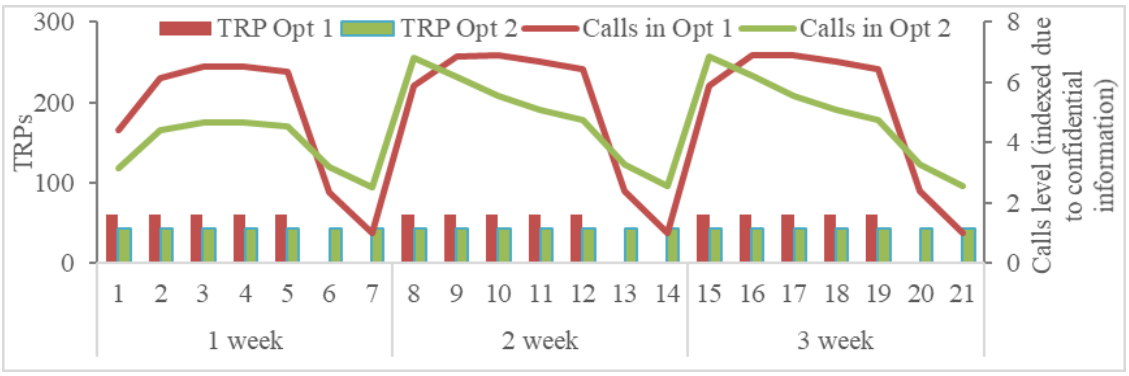

Fig. 10. Calls to the bank's call center according to different scenarios of television activity distribution during the week

Source: authors' own

b) even distribution of activity throughout the day, with the share of evening placements kept to a minimum. It has been established that the efficiency of evening placement is lower than that of daytime and morning placement, and that the effect of evening prime time advertising is similar to that of daytime advertising (Fig. 11).

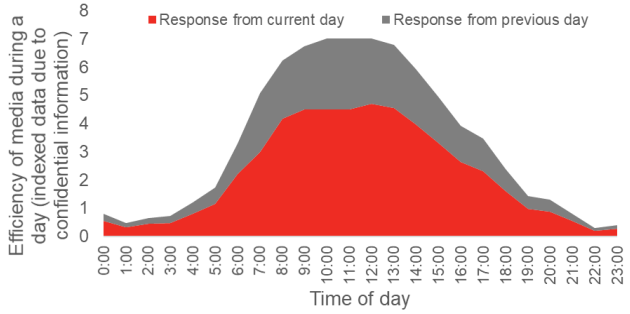

Fig. 11. The number of calls with even distribution of ratings on television during the day (hourly efficiency of television activity)

Source: authors' own

Since the results are a collection of various aspects and conditions that change over time, such suggestions cannot be made simultaneously for all enterprises in the market. This necessitates a unique approach in each scenario.

The main obtained findings of the Data Science project using machine learning technologies are recommendations for improving advertising investment in relation to bank business performance. As previously stated, these recommendations addressed the creation of the most efficient combination (mix) of media, the optimal period (time of day or week) for using mass media to advertise the bank, the duration of specific advertising instruments, and so on. The following specific economic results have been achieved:

– the cost of the advertising campaign is reduced by 14%;

– 58% higher conversion rate (ROMI) – i.e. the link between investing in media activity (advertising campaigns) and the performance indicators of the advertising bank – compared to the standard market level of conversion;

– the activity of the bank's call center is optimized and the probability of «loss» of customer calls due to the impossibility of efficient contact is minimized;

– the possibilities of forecasting the results of the bank's advertising campaign were expanded: on average, the deviation from the forecast was not more than 11% for daily forecasting of results and not more than 8% – for weekly.

It is notable, that the use of Data Science helped to identify the essential impact of factors which could not have been predicted at the beginning of the study and assessed using other research tools. As a result, we conclude: Data Science is an efficient tool for detecting and assessing economic uncertainty at the microeconomic level.

Conclusions: The following generalizations can be drawn based on the study's findings:

1. Data Science is an integrated analytical science which guarantees the best results when using large databases and solving the problem of identifying and evaluating economic uncertainty.

2. The use of Data Science tools in the analysis at the macroeconomic level has helped to identify the following manifestations of uncertainty:

– the significant influence of previously unidentified, i.e. hidden, «non-surface» factors of influence (variables);

– the existence of unnatural, i.e. those that are not explained by either deductive or empirical relationships;

– the formation of random «nodes» of interaction between variables which can mutually strengthen or weaken.

3. The use of Data Science tools in the analysis at the microeconomic level helped to identify the following manifestations of uncertainty:

– the influence on the processes and phenomena of factors from other related areas which change moods, expectations, reactions;

– the nonlinear conversion (transmission) of impulses, which probably has its optimums, or periods of best values;

– the unpredictable distribution of the same events in time when it comes to time peaks and declines of activity;

– the unexpected combinations (mixes) of events and instruments which either strengthen or weaken impulses;

– management decisions improvement based on the applied Data Science tools can relate to more reliable forecasting, selection of management methods, more substantiated tactical planning, organizational changes in the interaction of individual units of economic entities, etc.

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CORPORATE MANAGEMENT EVALUATION TOOLS IN JOINT STOCK COMPANIES UNDER ECONOMIC UNCERTAINTY CONDITIONS

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The growth of entrepreneurial activity in an environment of economic uncertainty, which is linked, among other things, to Ukraine's integration into the global economic space, leads to a greater emphasis on the adoption of corporate management principles and standards by Ukrainian enterprises. The following evidence supports the growing importance of corporate management for Ukrainian companies. First, one of the most important prerequisites for the formation of a public company in developing countries is the introduction of corporate management, which entails the recognition of general principles of business management, as well as the clear and transparent distribution of full powers and responsibility for the company's value increase among key stakeholders. Second, corporate management quality is rapidly becoming one of the most essential components in reducing the uncertainty of a company's operating and development environment by delivering information transparency to all stakeholders. Third, the execution of transformational projects in the organization serves as a catalyst for qualitative and large-scale management system improvements. And without expert consultation support, this is nearly impossible.

In Ukraine, the privatization of domestic companies is resulting in the gradual establishment of a corporate management institution. With the growth of major Ukrainian businesses, the acceleration of corporatization processes, and the proliferation of holding corporations, the demand for corporate management standards to be developed and implemented has grown significantly.

Despite the growing necessity for joint stock companies to implement corporate management principles, the majority of them in Ukraine lack de facto corporate management or have poor quality corporate management.

The study's appropriate information space is formed by the study's thematic diversity and theoretical eclecticism of corporate management efficiency issues. In the monograph «Modern corporation and private property» [1], the creators of the theory of corporate management, A. Berle and G. Means, defined two areas of research: aspects of management in corporations with varying levels of ownership and management responsibility to stakeholders. The emergence and development of agency theory has been linked to a major increase in corporate management studies. The works of notable scientists M. Jensen, H. Demsetz, B. Klein, and E. Fami had a considerable impact on the establishment of the principles of division of

responsibilities and powers, as well as the formation of a corporation's motivating management system [2].

The role of the corporation, as the most complex and promising organizational form of entrepreneurship, is growing in the era of post-industrial, information society, because it is the most competitive element of a highly concentrated and integrated world economy.

The problem of comprehending the nature, functioning, and specific qualities that establish the corporation's place in the economy and its relationship with economic agents, on the other hand, remains unsolved.

Due to legal factors (distribution of property rights; ignoring the rights and interests of individual owners), economic factors (predominance of managerial qualifications and skills, the effect of negative synergism, complexity of corporate control mechanisms; information asymmetry), and social factors (disagreement of economic interests of different groups of economic agents; determinism of individual behavior of the owner depending on the statutory contribution) and institutional factors (change of the role of the corporation as an institution of the global economy; change of the place and role of the owner-shareholder; contradictions between private and collective bases of the corporation), a number of problems related to the specifics of corporate management have arisen [2].

Solving these issues necessitates the development of effective mechanisms for the interaction of the corporation's varied interests and those of its owners, as well as the harmonization of property relations and the resolution of conflicts between them.

According to the «Modern Dictionary of Foreign Languages», a corporation (from the Latin corporatio) is an association, a union created on the basis of professional or class interests. A. Berle and H. Means [1] highlighted the two most essential characteristics of the corporation as a new form of capitalist enterprise: massive capital concentration and a crucial role for hired management.

In most foreign countries, corporations are organizational entities that have combined the required resources to create products and offer public services. This type of organization has grown in popularity across the globe, since:

– it reduces the financial risk to shareholders by excluding their liability to creditors of the corporation outside of the capital invested in shares under existing legislation;

– it allows for the issuance of additional shares as well as the issuance of other securities to raise capital;

– continues to operate even after the change of shareholders;

– encourages investors to invest on advantageous terms;

– enables corporate owners to successfully implement strategic plans on the basis of collective interests.

One of the main factors influencing the successful operation of a corporation is the possibility of its access to investment capital [1].

The definition of a corporation as a joint stock company is generally accepted and a priority in the economic literature. The rigorous separation of owners and managers, as well as the limitation of liability, are the fundamental dividing lines between the corporate and non-corporate sectors, despite the disparities in legal grounds between industrialized countries [3].

Unfortunately, the phrasing of the notion of «corporation» in present Ukrainian legislation differs greatly from international practice. «A corporate enterprise is created by two or more founders by mutual decision, operates on the basis of combining property and/or business or employment of the founders (participants), general management, on the basis of corporate rights, including through the bodies created by them, the participation of the founders (participants) in the distribution», according to the Commercial Code of Ukraine [4].

The recently adopted Law on Joint Stock Companies [5] does not consider a joint stock company as a corporation, but introduces such a concept as «corporate management».

The concept «corporate management» is commonly used in Western economic literature and is quickly gaining traction in Ukraine. This is owing to the widespread use of corporate management and ownership in Ukraine, as well as the need to control it and the rapid growth of such ownership. Corporate ownership is not simple, and corporate management as a category is a complicated system of economic connections that involves numerous internal and external elements [2].

Understanding the main content of corporate management is one of the most important components of determining the principles and mechanisms for increasing its efficiency. Based on a review of approaches to interpreting the essence of corporate management, we can say that there are at least seven different ways to understand such a definition (Table 1).

Table 1. Basic approaches to the definition of «Corporate management»

Approach	«Corporate management» definition
Regulatory and legal	A system of legislation, regulations and management practices in the private sector that allows a company to conduct business and continue to operate, accumulating long-term economic value by increasing the value of shares
Organizational and legal	Management of a company's organizational and legal registration, optimization of organizational structures, and establishment of internal and interfirm relationships in accordance with established goals
Relational	The system of relationships between investors-owners, managers, and stakeholders that ensures the company's efficient operation and the balance of interests of all parties involved in corporate relations
Managerial	Corporate culture management, or a set of basic traditions and attitudes, as well as the principles of a company's behavior in regard to its primary subsystems and elements, as well as in relation to society
Organizational and managerial	The system of bodies, offices, methods, and functions that have regulatory authority over a company's operations
Financial	A system of entities and mechanisms of management influence that guarantees the company's cash flows flow optimally at all times
Financial and property	The chosen method of self-government, which provides a fair and equal distribution of outcomes of activities between all shareholders, as well as «financially interested persons, primarily debtors and investors»

Source: author's own based on [1-3, 6-9]

Since there are so many different approaches to understanding the essence of corporate management, a multidimensional assessment of its efficiency is possible. It's worth noting that the efficiency of corporate management should be evaluated in three ways:

1) legal protection of the company's owners' rights, interests, and powers in the formation and management of property;

2) economic, legal, and mental components of the formation of the corporate management mechanism;

3) ensuring the effectiveness and efficiency of the developed corporate management system.

Thus, corporate management is a modern type of management activity of a joint stock company, which is characterized by the presence of corporate strategy, corporate style of work of managers at all levels, corporate culture, financial and information openness, protection of shareholders and owners of other securities of the issuer.

Corporate management main responsibilities include:

– establishing and maintaining an efficient mechanism for analysis, current and strategic management, acceptance of management decisions, and control over the company's activity;

– ensuring an equal and fair treatment of all shareholders;

– balancing the interests of shareholders, managers, employees, customers, partners, and suppliers, i.e. stakeholders, of the company. [10].

The use, implementation and legislative consolidation of the principles of corporate management allows to take into account the interests of different groups of shareholders. The Principles of Corporate Management is a document that defines the rules by which relations are built in financial markets around the world and compliance with which is one of the necessary conditions for attracting investment. The Organization for Economic Co-operation and Development (OECD) has developed a list of general principles of corporate management that can be used in legislation by countries with economies in transition. These principles, which are not binding even on OECD member countries, are an attempt by the international community to establish a generally accepted framework for corporate management. The OECD sets out in detail the five principles of modern corporate governance (Annex A).

The corporate management system is an organizational model that a company uses to represent and safeguard its investors' interests. The type of implementation of the model depends on the structure of the company, which exists within a market economy, and reflects the very fact of separation of management functions and ownership of the organization [11].

Different corporate management models exist in the developed world. The corporate management model is a representation of the most significant qualities, attributes and patterns of corporate management as an object of socio-economic reality, established by the researcher to gain new knowledge about the corporate management system in accordance with the purpose of the study [12]. Experts

distinguish three models of corporate management: Anglo-American, Japanese and German.

The Anglo-American model (used in corporations in the UK, US, Australia, New Zealand, Canada and some other countries) is characterized by the presence of individual and institutional investors and the number of independent (growing) shareholders not related to corporations (called «external» or «outsiders»), as well as a well-developed legal framework that defines the rights and responsibilities of three key players – the board of directors, managers and shareholders [11].

Close linkages with a vital bank, financial, and industrial network underpin the Japanese model (keiretsu). The Bank offers loans and services for the issuing of securities, current accounts, and consulting to its corporate clients. This bank is frequently the company's largest internal shareholder. Since independent shareholders have little power over the company's policy, their number is tiny [11].

The German model is built on the banking system (banks serve as creditors, voting agents, and depositories), as well as shareholders and employees [12]. The German model has three distinguishing characteristics that set it apart from other models: bicameral board with executive and supervisory boards; legal constraints on shareholders' voting rights, such as the company's charter limiting the number of votes a shareholder can cast at a meeting, which may or may not correspond to the number of shares he owns [12].

For Ukraine, which is transitioning to a market economy, improving company management is a top concern. Corporations' competitiveness might be harmed by a lack of attention to corporate management issues. The establishment of corporate property and the method for managing economic security as crucial conditions for successful and efficient corporate activity require specific attention.

Today, Ukraine's corporate management system is in the early stages of development and formation, sharing characteristics with Anglo-American (institutional investors and shareholders play a major role), German (the company's management system consists of executive and supervisory boards), and Japanese corporate management systems (some markets show signs of a key bank and financial-industrial network, insider shareholders are more interested in long-term control of the company than in making a quick profit).

Institutional and integrative trends of market transformation, active attraction of foreign investment, and battling the risks of hostile takeovers are among the most important factors leading to the establishment of the institution of corporate management in Ukraine.

Large trade, logistics, industrial enterprises, industrial and financial groups, holding and international companies make up the corporate sector of the domestic economy today, and they play an important part in assuring the country's economic progress. They are becoming more active participants in the financial markets, and they are looking for external sources of finance through the initial public offering (IPO) method.

The global financial crisis may act as a catalyst for the adoption of corporate management standards in Ukrainian businesses. Difficult economic situations, in general, not only impede the successful development of businesses, but also create the environment for improving or dramatically changing public management concepts and real-world management methods. Analysts point to one of the causes of the global economic downturn: investors' irrational financial actions, which resulted in huge public and private capital losses. The introduction of a new management logic, which is based on ways to prioritizing the welfare of company owners, according to most experts, should become an effective mechanism for protecting the interests of owners and investors.

Corporate management is an important element of an efficient market economy. Shareholders and other stakeholders should have access to relevant information and the ability to exercise control and influence over management to ensure that the company's assets are used for the benefit of all those individuals. Control is exercised through both internal management procedures and external legal regulatory mechanisms. The ability to exercise such control is important both in economically developed countries and in developing economies.

There should be clear and acceptable manner in which shareholders exercise their ability to control management's operations and participate in crucial decisions for investors and creditors.

The following companies' effective corporate management practice ensures that they consider the interests of a diverse variety of stakeholders and that their management is accountable to their shareholders. This, in turn, helps to maintain the confidence of investors, both foreign and domestic, and to attract long-term loans [13].

Using the appropriate methodology of corporate management assessment, it is necessary to analyze the system of interaction between the company's management, its supervisory board, shareholders and other stakeholders, as well as conduct a comprehensive assessment of management standards on four separate components, namely [14]:

- ownership structure and influence of the owners;
- relations with interested persons;
- financial transparency and disclosure of information;
- structure and methods of work of management bodies.

Compilation of corporate management rating is regulated by the Guidelines for the establishment and operation of independent information and rating agencies specializing in providing information services in the stock market of Ukraine, which, in turn, are developed on the basis of the Concept of rating system of regions, sectors of the economy, economic entities [15].

In a competitive market environment, the corporate management rating and analysis performed for this reason enable such a corporation to position itself in comparison to rival issuers of securities. The corporate management rating provides an analysis of the efficiency of the interaction between management, the supervisory

board and shareholders of the company and other persons with a financial interest in it. The internal structure and methods of corporate management [16-23] are the primary focus of the investigation. The focus is on whether the country's corporate management meets the basic standards of local legislation and regulatory principles, which may include an examination of the country's corporate management (analysis of the legal, regulatory and information infrastructure).

The company's corporate management rating is a current conclusion about the level of compliance of the company's corporate management practices with codes and principles and best practices in this area [13].

In addition, each of the four separate components can be rated on a scale from highest to lowest. These are the following components and subcomponents:

1. Corporate capital structure:

– transparency of the structure;

– concentration of capital and influence from the owners.

2. Relations with stakeholders:

– regularity of shareholders' meetings, the possibility of participation in them and obtaining information about their holding;

– procedures for voting and conducting shareholders' meetings;

– property rights (registration and transfer, equality of property rights).

3. Financial transparency and disclosure:

– disclosure standards;

– timeliness and availability of disclosed information;

– independence of the auditor.

4. The structure and methods of the company's management bodies:

– structure and composition of the supervisory board;

– the role and efficiency of the board of directors;

– independence of external directors;

– policy in the field of remuneration, evaluation of the results of the work of the managing bodies of the company.

Existing approaches appear to be flawed in the face of economic uncertainty since they do not take into consideration both qualitative and quantitative indications, reducing the overall impact of such an assessment. As a result, the proposed Methodology for producing corporate management ratings [13] is based not only on the evaluation of qualitative indicators of company management, but also on the quantitative indicators of its operations (Fig. 1).

The rating is compiled only on the basis of public data disclosed by the joint-stock company on the websites of news agencies authorized by the State Commission on Securities and Stock Market and on the website of the company itself. On the basis of the questionnaire developed by the author (Appendix B), the systematization of information is carried out to determine and evaluate quality indicators. The procedure for convening and holding a general meeting of shareholders is assessed on the following grounds (Table 2).

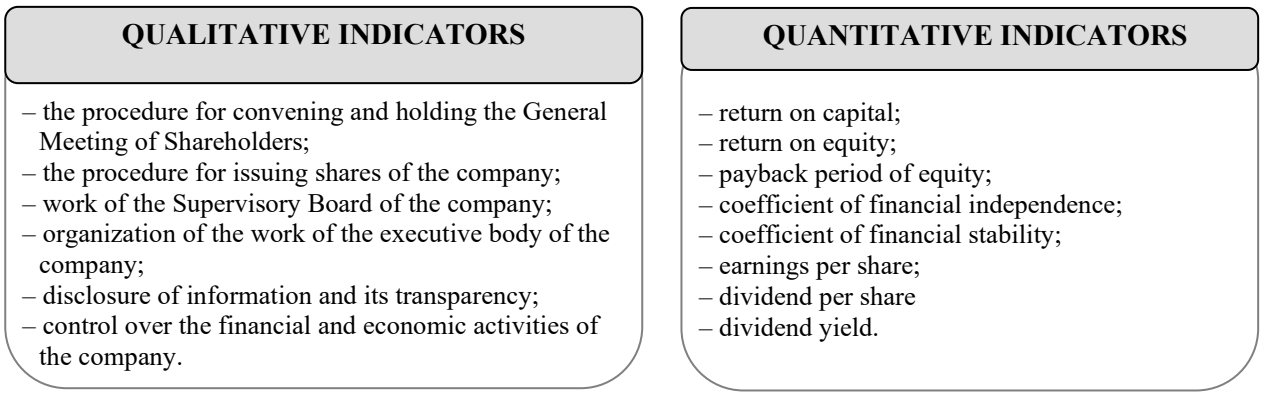

Fig. 1. Qualitative and quantitative indicators for assessing the state of corporate management of joint stock companies

Source: author's own

Table 2. The procedure for convening and holding a general meeting of shareholders

Indicator	Points
The General Meeting of Shareholders is held annually, shareholders have access to documents related to the agenda, have the right to make proposals on the agenda, participate in discussions and voting, as well as receive complete and accurate information about the financial and economic condition of the Company and its results of its operations.	5 points
The general meeting of shareholders is held annually, shareholders have access to documents related to the agenda and have the right to make proposals on the agenda, participate in discussions and voting on the agenda, using bulletins of the approved form.	4 points
The Annual General Meeting of Shareholders is held once a year, and shareholders have the ability to view materials relating to the agenda and submit suggestions to supplement the agenda with specific topics no later than 30 days before the meeting.	3 points
The Annual General Meeting of Shareholders is held once a year, and the Company provides shareholders with the opportunity to become acquainted with the documents linked to the agenda at any time between the time of notification of the General Meeting's convening and the day of their holding.	2 points
The general meeting of shareholders is held annually no later than 4 months after the end of the financial year, shareholders are notified no later than 45 days before.	1 point

Source: author's own

The procedure for issuing shares of the company is assessed on the following grounds (Table 3).

Table 3. The procedure for issuing shares of the company

Indicator	Points
The company issued registered and bearer shares, ordinary and preferred in undocumented form, the register is kept in the depository.	5 points
The Company carried out additional issues of ordinary registered shares in undocumented form, the register is kept in the depository.	4 points
The company carried out additional issues of ordinary registered shares in documentary form, the register is maintained by an independent registrar.	3 points
The company issued ordinary registered shares in documentary form only upon creation, the register is maintained by an independent registrar.	2 points
The company issued ordinary registered shares in documentary form only upon creation, the register is maintained at the enterprise.	1 point

Source: author's own

The work of the company's supervisory board is assessed on the following grounds (Table 4).

Table 4. The work of the supervisory board of the company

Indicator	Points
The Supervisory Board oversees the executive body's activities, protects all shareholders' rights, reports to the General Meeting of Shareholders, has independent members, determines the Company's main objectives, develops a strategy to achieve them, and evaluates its activities annually, including using a rating system. It has a corporate secretary role in its organizational structure.	5 points
The Supervisory Board oversees the executive body's operations, protects all shareholders' rights, reports to the General Meeting of Shareholders, has independent members, sets the Company's key objectives, and invents a strategy to achieve them.	4 points
The Supervisory Board monitors the activities of the executive body, protects the rights of all shareholders, reports to the General Meeting of Shareholders, its members have the necessary knowledge and experience. It consists of independent members.	3 points
The Supervisory Board monitors the activities of the executive body, protects the rights of all shareholders, reports to the General Meeting of Shareholders, its members have the knowledge, qualifications and experience necessary to perform their duties.	2 points
The Supervisory Board monitors the activities of the executive body on a voluntary basis, its members do not have sufficient qualifications and experience in this field.	1 point

Source: author's own

The organization of work of the executive body of the company is assessed on the following grounds (Table 5).

Table 5. Organization of work of the executive body of the company

Indicator	Points
The Executive Body is in charge of the Company's current and future management, and it reports to the Supervisory Board on the implementation of operational and long-term strategies, as well as the company's financial and economic position.	5 points
The Executive Body is responsible for the Company's current and future management and submits a report on the Company's operational plans to the Supervisory Board at least once every three months.	4 points
The executive body is responsible for the Company's current and future management in conformity with the law.	3 points
The Executive Body develops and coordinates with the Supervisory Board the draft annual budget and strategies of the Company.	2 points
The executive body manages the current activities of the Company.	1 point

Source: author's own

Disclosure of information and its transparency are assessed on the following grounds (Table 6).

Table 6. Disclosure of information and its transparency

Indicator	Points
The company publishes annual and quarterly reports in official publications and on the website, and sends the annual report together with the auditor's report to shareholders, clients, partners, and investors on a regular basis. The Company communicates all changes in financial and economic activity that may impact the value of securities or income earned on them within two days of the occurrence. The corporation submits applications to rating agencies on a regular basis.	5 points
The company regularly discloses not only annual but also quarterly reports in official publications and on the website, as well as distributes the annual report together with the auditor's report to shareholders, clients, partners and investors.	4 points
The company regularly discloses not only annual but also quarterly reports in official publications and on the website.	3 points
The Company regularly submits an annual report, the form of which is provided by the NSSMC (National Security and Stock Market Commission) and publishes it in one of the official publications, as well as places an electronic version of the report on the website.	2 points
The Company regularly submits an annual report, the form of which is provided by the NSSMC (National Security and Stock Market Commission) and publishes it in one of the official publications.	1 point

Source: author's own

Control over the financial and economic activities of the company is assessed on the following grounds (Table 7).

Table 7. Control over the financial and economic activities of the company

Indicator	Points
The Company engages an independent audit company, which does not change, to protect the rights and interests of shareholders. The audit commission and the Supervisory Board of the Company are both very efficient. The Company has formed an Internal Control (Audit) Department.	5 points
The Company engages an independent audit company, which does not change, to protect the rights and interests of shareholders. The audit commission and the Supervisory Board of the Company are both very efficient.	4 points
The Company retains an independent audit company to protect the rights and interests of shareholders, which has not altered in the recent 3-5 years. The audit commission of the company is quite efficient.	3 points
The Company uses independent audit firms that have not changed in the last three years to protect the rights and interests of shareholders.	2 points
The Company engages independent audit companies, which are continually changing, to protect the rights and interests of shareholders.	1 point

Source: author's own

The return on capital metric measures how many hryvnias of net profit are generated for every UAH invested in assets. Positive developments in the company's activities are reflected in the increase in this indicator. The following criteria should be used to evaluate return on capital (Table 8).

Table 8. Return on capital

Indicator	Points
exceeds 0,1	5 points
in the range from 0,05 to 0,1	4 points
In the range from 0,0 to 0,05	3 points
In the range from -0,1 to 0,0	2 points
less than -0,1	1 point

Source: author's own

The return on equity measures how many hryvnias of net profit are generated for every UAH invested in the company's equity. Return on equity should be assessed as follows (Table 9):

Table 9. Return on equity

Indicator	Points
exceeds 0,1	5 points
in the range from 0,05 to 0,1	4 points
in the range from 0,0 to 0,05	3 points
in the range from -0,1 to 0,0	2 points
less than -0,1	1 point

Source: author's own

The equity payback period indicates how much and for how long the equity will be offset by the company's net profit. This figure should be as low as possible. The payback period of equity should be estimated as follows (Table 10).

Table 10. Payback period of equity

Indicator	Points
less than the operating cycle (less than 1 year)	5 points
in the range from 1,0 to 1,5 року	4 points
in the range from 1,5 to 2,0 років	3 points
in the range from 2,0 to 2,5 років	2 points
Exceeds 3 years	1 point

Source: author's own

Characterizes the ability of the company to meet its external obligations from its own sources and shows the independence of the company from borrowed funds. The critical value is 0,5. When the value of the coefficient decreases, the company loses its independence. The coefficient of financial stability (independence) should be estimated as follows (Table 11).

Table 11. The assessment of the coefficient of financial stability (independence)

Indicator	Points
exceeds 1,0	5 points
in the range from 0,75 to 1,0	4 points
in the range from 0,5 to 0,75	3 points
in the range from 0,2 to 0,5	2 points
less than 0,2	1 point

Source: author's own

The coefficient of financial stability shows the security of debt with equity. The critical value is 0.5. When the coefficient decreases, the company loses its financial stability. The coefficient of financial stability should be estimated as follows (Table 12).

Table 12. Coefficient of financial stability

Indicator	Points
exceeds 1,0	5 points
in the range from 0,75 to 1,0 року	4 points
in the range from 0,5 to 0,75 of the year	3 points
in the range from 0,25 to 0,5 of the year	2 points
less than 0,25	1 point

Source: author's own

Earnings per share is the amount of net profit per ordinary share of the company in hryvnias. The increase in this statistic suggests that the company's corporate management is improving. The following is a formula for calculating earnings per share (Table 13).

Table 13. Earnings per share

Indicator	Points
higher than the nominal value of the share more than 2 times	5 points
higher than the nominal value of the share less than 2 times	4 points
equal to the par value of the shares	3 points
lower than the nominal value of the share less than 2 times	2 points
lower than the nominal value of the share more than 2 times	1 point

Source: author's own

Dividend per share indicates how many hryvnias of net profit are distributed per ordinary share of the company after dividends on preferred shares are paid. Dividend per share should be estimated as follows (Table 14).

Table 14. Dividend per share

Indicator	Points
higher than the nominal value of the share more than 2 times	5 балів
higher than the nominal value of the share less than 2 times	4 бали
equal to the par value of the shares	3 бали
lower than the nominal value of the share less than 2 times	2 бали
lower than the nominal value of the share more than 2 times	1 бал

Source: author's own

Dividend yield is the percentage of a company's net earnings that is paid out in dividends on ordinary shares. It is dependent on the company's dividend policy. Dividend yield should be estimated as follows (Table 15).

Table 15. Dividend yield

Indicator	Points
exceeds 1,0	5 points
in the range from 0,75 to 1,0	4 points
in the range from 0,5 to 0,75	3 points
in the range from 0,2 to 0,5	2 points
less than 0,2	1 point

Source: author's own

The previously computed indicators are given appropriate weighting coefficients based on the performed expert surveys (Appendix B) (Table 16).

These weights were derived based on a poll of specialists now employed in a variety of businesses, as well as banking institutions, investment firms, government agencies, and other organizations. The overall score for evaluating a joint-stock company's level of corporate management is calculated by multiplying the amount of points acquired for each factor by a weighting factor and then summing the results:

$$R_{crop} = F(X_i) = \sum_{i=1}^{n}[B_i \times K_i] \quad (9),$$

where R_{crop} – total score for assessing the level of corporate management of the Company; B_i – the number of points for the i-th factor (i = 1,...,n); K_i – weighting coefficient of the i-th factor (i = 1,...,n).

Table 16. List of weights

Indicator	Weighting coefficient
the procedure for convening and holding the General Meeting of Shareholders	0,10
the procedure for issuing shares of the company	0,08
work of the Supervisory Board of the company	0,10
organization of work of the executive body of the company	0,10
disclosure of information and its transparency	0,12
control over the financial and economic activities of the company	0,10
return on capital	0,02
return on equity	0,05
payback period of equity	0,05
coefficient of financial independence	0,10
financial stability coefficient	0,05
earnings per share	0,05
dividend per share	0,05
dividend yield	0,03

Source: author's own

Based on the total score of the corporate management level, joint-stock companies are ranked according to classes A, B, C, D and E. The corresponding calculations of the Company's corporate management rating are performed using Excel 2000.

Table 17 is used to rank joint-stock companies according to their classes.

Table 17. Criteria for assessing the state of corporate management of a joint stock company

Class	Characteristics of the class	Total score
A	The joint-stock company manages its business efficiently, with open information about its major activities, interactions with shareholders, the Supervisory Board, and the Audit Committee. The examination of the coefficients used to evaluate the Company's profitability and market activity reveals that its operations are trending in the right direction. The company maintains a consistent dividend policy that is available to all shareholders.	From 4,2 to 5,0
B	The joint-stock company has efficient corporate management, which is characterized by open information on the company's main activities, relationships with shareholders, the Supervisory Board, and the Audit Committee, but there is no information about the company's ability to maintain this level for an extended period of time. Companies in this category require additional attention due to probable flaws that jeopardize efficient corporate management. An examination of the Company's profitability and market activity coefficients may reveal negative tendencies in its operations.	From 3,4 to 4,2
C	In the key areas of operation, interactions with shareholders, the Supervisory Board, and the Audit Committee, the joint-stock company conducts corporate management, which is characterized by an insufficient level of information openness. For issued shares that do not have a significant market value and do not come into free circulation on the stock market, the Company holds an open subscription. The Company's Supervisory Board merely oversees the executive body's actions and reports to the General Meeting of Shareholders. The examination of the factors used to evaluate the Company's profitability and market activity reveals unfavorable tendencies in its operations.	From 2,6 to 3,4
D	In the major activities and contacts with shareholders, the joint-stock corporation undertakes corporate management, which is defined by an insufficient level of information openness. The stock of the company has a low market value and is not in high demand. The Company's Supervisory Board has only visual oversight over the executive body's operations, which it reports to the General Meeting of Shareholders, and external audit companies are invited to conduct a full inspection. The Company's activity analysis reveals non-profitability and minimal market activity.	From 1,8 to 2,6
E	The joint-stock company is in charge of corporate management, which is marked by a lack of professionalism and information transparency. The stock of the corporation has a low market value and is not in high demand. The Supervisory Board is a volunteer organization that monitors the actions of the executive body; nevertheless, its members lack the necessary skills and experience in this field. The Company's activity analysis reveals non-profitability and minimal market activity. The chances of the Company meeting its obligations to its stockholders are limited.	Less 1,8

Source: author's own

Conclusions: Thus, the proposed tools will aid in assessing the state of corporate management in times of economic uncertainty, identifying factors that affect joint stock company activities, and improving corporate development plan.

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COMPARATIVE ANALYSIS OF METHODS FOR COUNTERACTING THE LEGALIZATION (LAUNDERING) OF INCOME OBTAINED BY CRIMINAL MEANS

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Relevance of research. The formation and functioning of the National Financial Monitoring System in different countries of the world is determined by the dynamic history of the development of the processes of profit-laundering and terrorist financing. As the experience of most countries shows, along with state bodies that collect taxes and payments, a number of specialized financial departments deal with financial security issues, because the issue of legalization (laundering) of proceeds from crime becomes global, because various schemes of «money laundering» are transnational in nature and have a connection with organized crime (financial scammers, drug trafficking, terrorist financing, etc.). This problem is a significant threat to the financial and economic security and stability of the state, and also affects the level of socio-economic development of the country. Therefore, the study of methods of countering the legalization (laundering) of income from crime on the example of foreign countries is most actual.

The aim of research there is a detailed comparative analysis of methods of countering the legalization (laundering) of proceeds from crime on the example of foreign countries.

Presentment of the main material. Today in the world, in the context of the process of globalization, transnational crime is taking on new forms. At the same time, there is an improvement in the methods of committing crimes and methods of concealing their negative consequences. The development of the latest technologies, in particular, has led to the emergence of such offenses related to the use of modern communications for criminal purposes, which are actively used in their activities by both individual criminals or their groups, and transnational criminal corporations. Among such criminal acts, the methods and methods of committing which have been significantly influenced by scientific progress, is the legalization of illegally obtained income (dirty money laundering).

At the same time, to prevent tax evasion and other financial crimes, financial intelligence units are created that perform analytical functions of collecting and processing information. Differences between financial intelligence units are determined by certain factors due to the specifics of their activities and functional capabilities, but all of them are aimed at ensuring coordination of activities between law enforcement agencies.

In some countries, financial intelligence units are administrative bodies, while in others they act as police and legal bodies. The experience of countries with developed financial intelligence shows that the effectiveness of their work is determined only by

the availability of a certain legal framework and efficiency of the system for collecting, processing, transmitting and providing financial information, identifying initiators of financial transactions [1].

Laundering of «dirty» money are complex economic and legal phenomenon that has no borders. The term «laundering of money» appeared in scientific circulation relatively recently. However, the international community has already demonstrated the seriousness of its intentions in the fight against this evil.

Ways of transmitting information in different countries significantly affect the effectiveness of financial monitoring in general. Only direct channels of information transmission from financial intelligence units to financial institutions and regulators contribute to the effectiveness of financial reporting monitoring. In the case of information transfer from financial intermediaries to state regulators in the field of Finance, and then to financial intelligence units, the effectiveness of the National Financial Monitoring System is significantly reduced.

Globalization and integration processes, the rapid development of information technologies have led to the fact that the problem of money laundering has reached the international level.

Today, income legalization is characterized by a constant complication of schemes, acceleration of illegal operations, as well as the need to use transit bank accounts, which leads to both serious losses of economic resources and the reputation of banks. The overall scale of this threat to the banking sector can be described by the number of sanctions imposed on them, which indicate their involvement in the legalization of illegally obtained income and non-compliance with the requirements of legislation in this area [2].

Mechanisms for countering the legalization of income of illegal origin in financial organizations should be continuously improved, which will allow high-quality analysis of incoming information, timely identifying information about operations related to the legalization of criminal proceeds, ensure the financial security of the bank, promote the rational use of its resources and achieve strategic goals.

Large – scale «laundering» of illegal income is a global problem that requires a solution from all states of the world. But first, each state must independently recognize this act as criminal and make appropriate changes and additions to its domestic legislation, because this will determine the success of the fight against this serious and dangerous type of crime around the world.

Effective international cooperation in the fight against terrorism, taking into account these negative processes, is impossible without the coordinated work of the international community, since the nature of modern terrorism requires a global response to its challenges based on the principles of international cooperation and cooperation [3].

The analysis of the formation of legal regulation of cooperation between the member states of the European Union on countering the legalization of proceeds from

crime is extremely relevant, since it makes it possible to trace the evolution of such cooperation and ways to improve the forms and mechanisms of collective activity of states in this area, which can simultaneously become an example of best practices aimed at improving the effectiveness of both national measures to combat the laundering of «dirty» money, and those that can be applied in other regional entities.

Usually, International Cooperation in the field of combating terrorism is carried out by:

– establishment at the international level of common approaches to bringing to criminal responsibility for terrorism and its manifestations;

– development and conclusion of international treaties in the field of combating terrorism, adoption of other international documents as a legal basis for regulating the activities of states and international organizations in this area [4].

In practice, this activity can have the character of cooperation in the development of a unified state policy on the Prevention of terrorism, prompt exchange of information between criminal justice authorities, criminal prosecution of terrorists and bringing them to justice.

International cooperation in the fight against modern terrorism is based on the following principles:

– the principle of condemnation of terrorism, regardless of the goals of terrorists, is enshrined in almost all international conventions against terrorism;

– refusal of any form (Financial, military-technical, etc.) of assistance to terrorists;

– global cooperation in combating the financial and technological capabilities of modern terrorism;

– protection of world cultures and religions from the extremist influence of terrorism;

– compliance with international law [5].

«Laundering» of illegally obtained income always occurs not in the country where its source of origin is located, but abroad. It is this fact that determines the development of international cooperation in the fight against money laundering, based on the following principles:

– adoption of relevant international and national normative legal acts;

– conclusion of agreements on legal assistance in struggling money laundering;

– development of international anti-money laundering programs;

– adoption of relevant documents by international economic, financial, political and law enforcement organizations, economic unions;

– creation of special international and national legal and law enforcement agencies;

– introduction of certain rules for the exchange of foreign currency;

– increased supervision of offshore sectors of the economy;

– improving the electronic archive of international money transfers;

– creation of training programs for banking specialists;

– establishing international accounting standards and mechanisms for monitoring their compliance;

– publication of «black» lists of countries;

– blocking bank assets when suspicious transactions are detected;

– publication of special international publications on money laundering [6].

There is a whole system of countering money legalization, the aspects of which are shown in Figure 1.

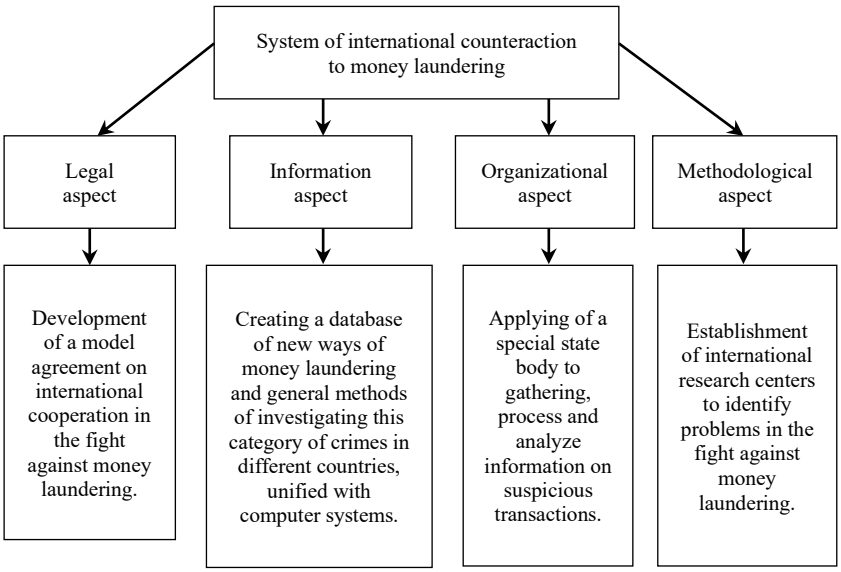

Fig. 1. Aspects of the system of international counteraction to the legalization («laundering») of proceeds from crime

Source: formed by the author based on [7-12]

It is advisable to consider foreign experience in more detail.

The United States of America, as the world's leading economy, was one of the first countries to take measures to legalize criminal income. The country's governing bodies have begun active activities related to the creation of a system to counteract various schemes aimed at legalizing the income of crime means. An important element of this system was the creation of a legislative framework that would regulate the activities of financial institutions.

Most experts date the beginning of the fight against income legalization in the United States to 1970, with the adoption of the law «On bank secrecy», which defined the obligations of financial institutions to keep accounting documents on transactions. Thus, the prerequisites for the development of the Financial Monitoring System in the United States were laid. And already in 1986, actions aimed at «money laundering» were legally classified as a crime under the adopted law «on money laundering control».

The basic law that regulates the specifics of financial monitoring in the United States is the PATRIOT Act 2001. The main purpose of which is to restrict access to the US financial system by introducing more stringent requirements against foreign

financial institutions that open correspondent accounts with US banks. In this regard all American financial institutions should develop and improve programs to detect money laundering operations [13].

In case of violation of legislation in the field of countering the legalization of proceeds from crime and the financing of terrorism, administrative and/or criminal liability in the United States is borne not only by criminals, but also by financial monitoring entities. In particular, an American bank serving a non-resident's account must terminate all relations with a foreign counterparty no later than 10 business days after receiving a written notification from the Minister of finance or the attorney general that the foreign bank refused to respond to the request, and begin legal proceedings in the US court to establish the validity of this request. Refusal to terminate correspondent relations under the above conditions threatens sanctions against the American financial institution in the form of fines of up to 10 thousand dollars for each day, until these relations are terminated.

In the US banking sector, the following regulatory authorities are engaged in countering the legalization of criminal proceeds:

– Office of the money circulation auditor;
– Federal Deposit Insurance Corporation;
– Federal Reserve Board;
– Department for monitoring compliance with the rule of law;
– National Credit Union Administration [14].

These agencies have developed special methods for recognizing possible violations and criminal activities in the banking sector. When conducting an audit of banking structures, the above-mentioned control bodies can focus on the facts of potential fraud, internal abuse and other criminal actions, including those related to money laundering. To verify compliance with the law «on bank secrecy» or investigate possible violations of any other regulatory legal acts, these agencies may conduct bank audits. For example, the Federal Deposit Insurance Corporation has created its own department for economic crimes, which includes specially trained inspectors to study possible criminal activities.

Thus, today the United States has created one of the most effective systems for countering money laundering and terrorist financing. This is primarily due to the fact that the United States, having one of the leading economies in the world, has a wide network of both international credit institutions and credit institutions that are more popular in the US domestic market.

In France, the specifics of the organization of financial monitoring are regulated by two main regulatory legal acts: the law «on the participation of financial institutions in the fight against money laundering from drug trafficking» and the monetary and Financial Code.

The Special Financial Intelligence Unit in France is TRACFIN, which reports to the Ministry of Finance, and its activities are classified [15].

The peculiarity of the Financial Monitoring System in France is that it does not have legally established requirements for providing information about financial

transactions depending on their amount, and the criteria for studying operations for doubtfulness are motivated suspicion of financial transactions that have signs of money laundering, in particular, funds that may be related to illegal drug trafficking, organized crime, by committing fraudulent actions, corruption. Financial transactions that exceed the amount of 150,000 euros and are characterized by complexity or lack of economic meaning require special attention from the subjects of primary financial monitoring.

Both financial institutions are required to provide information to TRACFIN about Atypical financial transactions: banks and credit institutions, payment organizations, insurers, investment companies, pawnshops; and individuals and legal entities that are professionally engaged in financial and related activities: real estate intermediaries, casino owners, clubs and companies that organize gambling, lotteries, sports games, entities that trade in jewelry, antiques, works of art, accountants, auditors, notaries, bailiffs, managers and legal representatives, companies that sell property on the market public auctions and others [16].

Financial monitoring in Germany is carried out by the Financial Intelligence Unit (Zentralstelle für Verdachtsanzeigen), which is part of the police.

Financial and credit institutions in Germany are required to identify the client both if the amount of the financial transaction exceeds EUR 15,000 (or if a long-term relationship is established), and if the financial transaction raises a reasoned suspicion of money laundering. In addition to the initiator of the financial transaction, German financial institutions are required to identify the beneficiary of the suspicious transaction.

An interesting fact is that the central bank in Germany (Bundesbank) does not have regulatory and supervisory powers in the field of countering the legalization of proceeds from crime and the financing of terrorism, since it itself refers to financial institutions that carry out commercial financial transactions. Thus, the Bundesbank, like other financial and credit institutions in Germany, is required to report suspicious financial transactions [17].

Supervision of the activities of financial institutions in Germany is carried out by the Federal Office for supervision of the activities of financial institutions (BaFin). A separate group of Supervisors over the implementation of measures by financial institutions to prevent the legalization of criminal proceeds within BaFin includes 4 sectors: political decisions and international cooperation; inspections of banking institutions; inspections of insurers and institutions that carry out criminal proceeds.

Canada pays special attention to countering money laundering and terrorist financing in order to ensure financial security. According to the Canadian Financial Intelligence Division Financial Transaction and Report Analysis Center (FINTRAC), the annual volume of criminal proceeds in the world ranges from 590 billion rubles. – 1,5 trillion rubles. US dollars. Therefore, FINTRAC's powers to counteract the legalization of illegal income apply to all types of financial crimes, including drug trafficking, financial fraud, tax evasion, corruption, and others [18].

FINTRAC, which is subordinate to the Ministry of Finance of Canada, was established in 2000 under the Canadian act «On countering money laundering and terrorist financing». In 2002, FINTRAC became a member of the Egmont group of financial intelligence units. Today, FINTRAC cooperates with more than 100 financial intelligence units from different countries to exchange information and experience in countering the legalization of proceeds from crime and the financing of terrorism.

FINTRAC aims to promote Canada's public safety and protect the integrity of the country's financial system by identifying and preventing money laundering and terrorist financing.

As the researcher Ivanitskaya O. M. notes, a specific feature of financial monitoring activities in Canada is the multi-source nature of obtaining information. The main sources of information used in the financial monitoring process by FINTRAC are: voluntarily provided information (59%), reports of suspicious transactions (13%), profile reports (5%), information from open sources (3%) and requests from financial intelligence units (20%) [19].

That is, of the total amount of information received on money laundering, only 13% is information that financial institutions and other subjects of primary financial monitoring are required to submit, which indicates a high level of Organization of financial monitoring and the financial system as a whole and a high level of consciousness of subjects who initiate or carry out financial transactions.

In case of violation of legislation in the field of countering the legalization of criminal proceeds and the financing of terrorism in Canada, up to 2 million rubles are applied as penalties. and liability in the form of imprisonment for up to 5 years.

The Financial Monitoring System in Canada is constantly in a dynamic stage of development. The latest directions of its improvement are aimed at developing a unified national system for assessing the risks of money laundering with the introduction of a regulatory process for assessing risks for certain sectors of the financial system and certain products of the financial services sector.

In Poland, the Basic Law» on countering money laundering and terrorist financing» in the field of countering the legalization of criminal proceeds was adopted in 2000. According to the current Polish legislation, financial transactions in the equivalent amount of 15,000 euros or more are subject to mandatory financial monitoring.

The central element of the State Financial Monitoring System in Poland is the inspector general of financial information (Generalny Inspektor Informacji Finansowej – GIIF), subordinate to the Ministry of Finance. The purpose of GIIF is to obtain, collect, process and analyze information to prevent the legalization of assets of illegal or undetermined origin, and to prevent the financing of terrorism. Committing a crime to legalize any assets obtained illegally in Poland is punishable by imprisonment from 6 months to 10 years, with possible confiscation of property [20].

In Belarus, there is no unified strategy at the legislative and political levels to combat the legalization of proceeds from crime, and financial monitoring is

considered as part of other state programs. There is no single coordinating body – the Financial Intelligence Unit. Some of its duties are performed by the Financial Monitoring Department of the State Control Committee of the Republic of Belarus. The majority (98%) of reports of suspicious financial transactions are transmitted electronically from banking institutions, while the rest are transmitted in paper form, which are then manually entered into the system. As defined in the report of the State Control Committee of the Republic of Belarus, the Financial Intelligence Department, other law enforcement agencies and the prosecutor's office do not regularly provide state financial monitoring with feedback on the use of the transmitted materials [21].

In Italy, Financial Monitoring is entrusted to the Ufficio Italiano Combi UIC (SAR), which is subordinate to the National Bank of Italy. The first and second parts of the regulation on financial transactions and reporting of the National Bank of Italy define the rules for conducting financial monitoring by financial institutions throughout Italy. The current legislation of the country provides for banks and other financial intermediaries to maintain detailed documentation on all currency transactions of resident clients. In 2014, the UIC (SAR) received 49,000 reports of suspicious financial transactions.

In the UK, financial monitoring is handled by the Financial Intelligence Unit of the Internal Revenue Service NCIS / ECU, which reports to the UK Ministry of Finance and interacts with the National Criminal Intelligence Service, Customs and excise service, Anti-Fraud Bureau, and National Investigation Service. NCIS / ECU of the UK deals with issues related to countering money laundering, terrorist financing, gambling crimes, and fraud. However, English law prohibits the transfer of information about tax violations to other states. Since 2005, there have been trends in the UK's National Financial Monitoring System to strengthen coordination of the activities of all participants in countering money laundering [22].

Due to the fact that the process of legalization (laundering) of proceeds from crime is carried out mainly using international criminal ties, special international organizations have been created that coordinate work in the field of preventing and countering the legalization of criminal incomes. Such organizations today are:

1. The group for the development of financial measures to combat money laundering (FATF) is an interstate organization that was established in July 1989 at a meeting of the leaders of the group of seven countries in Paris «to assess the current results of cooperation in the field of preventing the use of the banking system and financial institutions for laundering proceeds from crime, and to consider the possibility of taking additional preventive measures in this area».

2. The Egmont Group (Egmont group of financial intelligence units) is an informal association of national agencies performing financial intelligence functions, which was established in Brussels in June 1995 by representatives of 24 countries and a number of international bodies, including the FATF, Interpol, the European

Commission, the World Customs Organization, etc. EG membership is one of the requirements of the FATF recommendations.

3. MONEYVAL is a special committee of COE experts on mutual assessment of anti-money laundering and terrorist financing measures, which was established in September 1997 by a decision of the COE Committee of Ministers to carry out a general and independent analysis of the fight against money laundering in COE member countries (and non-FATF candidate countries).

4. The Eurasian Group for countering the legalization of criminal proceeds and the financing of terrorism (EAG) is an association that was established in October 2004 by signing a declaration by official representatives of the governments of the republics of Belarus, Kazakhstan, Kyrgyzstan, Tajikistan, China, and the Russian Federation under the FATF type.

5. The Basel Committee (Committee for regulation and supervision of banking activities) is a special body that was established in 1974 under the auspices of the bank for International Settlements on the basis of an agreement concluded by 10 developed countries (the so – called Basel concordat).

6. Wolfsberg Group is an Interbank Association that was established in 2000 by the 11 largest banks in the world.

7. The UN is an international organization that unites 192 countries around the world. The UN Charter was signed on June 26, 1945 at a conference in San Francisco (USA) and entered into force on October 24, 1945.

8. The International Monetary Fund is a universal international financial organization that was established in accordance with the agreements adopted at the International Monetary and financial conference of the United Nations in July 1944 in the United States and entered into force in December 1945.

9. The World Bank is one of the world's largest development assistance organizations, founded in 1944.

10. The European bank for reconstruction and development, the bank with the largest volumes of attracted foreign direct investment, and therefore the largest investor in the region, was established in 1991.

11. The International Criminal Police organization (Interpol) is a special body centered in Vienna that is directly involved in the fight against crime [23].

Taking into account the above, it is necessary to emphasize that various schemes for legalizing (laundering) criminal funds are being implemented in the modern world. There is no single classification of such schemes among both scientists and law enforcement agencies. However, based on common characteristics, they can be grouped according to the following criteria:

a) by appointment:

– for the purpose of tax evasion;

– for the purpose of concealing criminal operations (legalizing funds received from crimes);

b) by type of settlement systems:

– cash;

– non-cash (via payment orders, plastic cards, clearing payments, etc.);

c) for the organization of management:

– with centralized management («conversion centers») [24].

This scheme is characterized by a large number of criminal operations. The scheme successfully operates in the presence of a centralized link that organizes operations related to the receipt and transfer of funds, monitors the work of dependent firms, keeps records, and so on. The Central Link also performs the function of protection from law enforcement agencies. If the activities of the central level are eliminated or restricted (for example, the arrest of managers, the bankruptcy of the main multi-branch Company, etc.), the scheme stops working.

Methods with centralized management are characterized by careful provision of interaction functions between participants and, as a rule, the fact that most of the financial resources are concentrated in the Central Link. When financial resources are evenly distributed across different firms, centralized management is inefficient, since it does not provide the necessary reliability of the money laundering process and, as a result, the risk of conflicts due to non-fulfillment of its obligations increases.

– with decentralized or distributed management.

Such a scheme is characterized by the distribution of management functions between individual firms, which are combined only by one-time operations or by the bank through which payment transactions are made. In the decentralized scheme of money laundering, compared to the centralized one, there are problems of protection from law enforcement agencies.

d) according to the method of organizing the transmission of information:

– with information routing.

The interaction of participants in the scheme provides determination of ways to transfer criminal funds in various forms to the addresses of their destination. This process is usually performed by all participants in the system.

– with information selection.

Interaction of participants in the scheme is carried out through the selection (selection) of various forms of criminal means addressed to them.

e) technical support for financial settlements (access methods for electronic transactions):

– with unified access methods focused on electronic payments (client-bank system, plastic cards, etc.);

– using various media of funds (cash, plastic cards, securities, etc.) [25].

The type of carrier determines the properties of a financial transaction that is carried out through the organization of the exchange of certain obligations. The simplest technical tool is a telephone line, the use of which reduces the cost of a financial transaction, firstly, due to the low cost of the carrier itself, and, secondly, due to the presence of backup telephone lines at many facilities that can be used if necessary. The disadvantages of telephone channels for carrying out a criminal

financial transaction for money laundering include insufficient protection from technical interference, the possibility of unauthorized connection (both law enforcement agencies and competing criminal organizations), limiting the range and speed of data transmission by sets of certain components of electronic support of the telephone line.

In addition, the analysis of the features of operational activities related to money laundering allows us to identify typical schemes for legalizing (laundering) proceeds from crime, which are used in the modern world. Below we will analyze each of them in more detail:

– legalization (laundering) of funds by illegal conversion of funds using fictitious enterprises.

– legalization (laundering) of funds by performing speculative operations with securities.

– legalization (laundering) of funds by performing fraudulent transactions with land and real estate objects.

– legalization (laundering) of funds as a result of illegal VAT refund from the budget and in the process of privatization of state property.

– legalization (laundering) of funds with the participation of banking institutions.

– legalization (laundering) of funds with the participation of non-bank financial institutions.

– legalization (laundering) of funds using SAGP.

– legalization (laundering) of funds using virtual currencies.

– money laundering using an online-casino [26].

The analyzed schemes and methods of money laundering indicate that money laundering is a global crime. This is due to the fact that the subjects of money laundering, bringing their activities to the international level, pursue the following goals:

– avoid countries/territories with a clear regulatory framework and a strong law enforcement system;

– exploiting the shortcomings of the regulatory framework and the work of law enforcement agencies that are characteristic of a number of jurisdictions;

– exploiting gaps that exist when there is an insufficient level of cooperation between law enforcement agencies of different countries;

– creating additional layers of transactions in order to make it more difficult to track the movement of criminal proceeds [27].

In the latter case, countries that have laws on the secrecy of financial transactions are often used. Such jurisdictions are called «financial havens» or «offshore zones». They represent all or part of the territory of the country, where a preferential regime for the operation of companies with offshore status that operate outside the territory of registration and conduct operations with the property or funds of non-residents is established and used. Small countries encourage the creation of

offshore companies on their territory in order to develop offshore businesses that bring additional profits to these countries.

The schemes and methods analyzed above make up a far incomplete list of typical schemes for legalizing (laundering) proceeds from crime. Every year they become more complex and branched. Therefore, it is necessary to introduce a procedure for disclosing information about disclosed money laundering schemes, as well as to develop methodological recommendations on measures that will be aimed, on the one hand, at preventing such schemes, and on the other – at their timely detection. It is also advisable to create a single electronic database on the subjects of such schemes, as well as to determine the typical parameters of suspicion of individuals and operations for the legalization (laundering) of proceeds from crime.

In Ukraine, the Financial Monitoring System is currently being formed and developed. The continuous improvement of the legislative framework indicates the adoption of international experience in the field of countering the legalization of criminal proceeds. In particular, on April 28, 2020 The Verkhovna Rada has amended the law of Ukraine «on preventing and countering the legalization (laundering) of proceeds from crime, the financing of terrorism and the financing of the proliferation of weapons of mass destruction» №361-IX, which has significant improvements in comparison with the previous law, which has become invalid [28].

Significant improvements to the newly adopted law include a more detailed definition of actions that can be qualified as legalization (laundering) of proceeds from crime, as well as improved national legislation in the field of financial monitoring, the law also expanded the list of subjects of primary financial monitoring, to which are added insurance (reinsurance) brokers, distributors of state lotteries, law offices and associations, business entities that provide accounting services.

The organization of an effective system for preventing and countering the legalization of proceeds from crime, both on a national and international scale, can significantly reduce the motivation to obtain such proceeds, identify and destroy their sources of origin, and, accordingly, reduce the number of illegal actions performed. In this regard, preventing and countering the legalization of proceeds from crime has become one of the most important tasks of both each individual country and the entire international community.

At the same time, there are certain shortcomings in the organization of financial monitoring, which are due to the very specifics of the financial system of Ukraine, in particular, they can be reflected in Fig. 2.

Fig. 2. Shortcomings in the organization of financial monitoring

Source: formed by the author based on [29-32]

On the territory of Ukraine, EU standards in combating money laundering and terrorist financing are being actively implemented, aimed at further implementation of relevant legislation in accordance with EU standards; continuing interaction of financial intelligence units of Ukraine in accordance with Egmont Group standards; increasing the ability of state institutions to determine the procedure and implement effective supervision of financial intermediaries and representatives of non – financial professions; continuing the exchange of information between financial intelligence units of EU member states and Ukraine about suspicious financial transactions that may be relevant to money laundering; continuing to provide support in training judges, prosecutor's offices, customs officers, law enforcement officers and other financial monitoring specialists; continuing cooperation within the framework of the Moneyval committee of the Council of Europe to ensure the maintenance of high standards in the process of joint assessment of all its members and in typological work [33].

Based on the study of the specifics of financial monitoring in the world, it is possible to determine the most promising areas for using certain features of world experience in the National Financial Monitoring System in Ukraine (Table 1).

Table 1. Directions of using international experience in the process of reforming the National Financial Monitoring System in Ukraine

Country	A feature that can be used in Ukraine
Canada	Transfer of unused planned budget funds to the next budget period.
USA	Broad coordination of interaction between bodies that counteract the legalization of proceeds from crime and the financing of terrorism.
Italy	Subordination of financial monitoring to the central bank, automated risk-based information processing system.
Australia	A combination for the implementation of financial monitoring of the directions of not only countering the legalization of proceeds from crime and the financing of terrorism, but also tax evasion.
China	Differentiation between individual structural divisions of the functions of managing and implementing financial monitoring within the framework of a single authorized body.
Finland	Responsibility of the authorized body for the preliminary investigation process.
Belgium	Assigning at the legislative level to the authorized body in the field of countering the legalization of proceeds from crime and the financing of terrorism the functions of coordinating the activities of financial monitoring bodies.
United Kingdom	Prohibition of transmitting information about tax violations to other states.

Source: formed by the author based on [34-36]

***Conclusions**:* Thus, having studied foreign practice, namely the American experience of organizing systems to counteract the legalization of proceeds of illegal origin and the financing of terrorism, we can conclude that a fairly effective mechanism for combating such a threat has been developed and implemented in this country. It is worth noting that the organization of the Financial Monitoring System in Ukraine does not lag behind international standards and recommendations of international organizations in the field of combating the legalization of criminal proceeds.

However, there are a number of advantages of financial monitoring systems in individual countries that should be applied in Ukraine. In particular, taking into account

the experience of the United States and Canada, it is advisable to include operations with predicate crimes in Ukraine: computer fraud, illegal credit operations, forgery of payment cards and other payment documents, corruption and abuse of official position, tax evasion. In addition, following the example of the United States and Canada, Ukraine should strengthen interdepartmental coordination of supervisory authorities in the field of countering the legalization of criminal proceeds and create a closed unified information system for the exchange of information on the legalization of income between them.

Follow the example of Canada, France, and the United States to ensure effective mechanisms for keeping the information received secret. Such mechanisms can be developed by strengthening the administrative responsibility of employees authorized to work with classified information of both state financial monitoring bodies and subjects of primary financial monitoring (penalties, a ban on holding senior positions, etc.).

It is also advisable, following the example of Canada, to expand the sources of state financial monitoring information on suspicious transactions, using voluntarily provided information, profile reports, open sources of information, and to check the facts of violations obtained from various information sources.

Also, it is necessary to strengthen the responsibility of subjects of primary financial monitoring for violations of legislation in the field of countering the legalization of criminal proceeds. In particular, in the United States, commercial banks only for not terminating relations with a foreign counterparty in case of its refusal to provide information on request pay доларів 10,000 for each day of continuation of such relations, but in Ukraine, the maximum fine for subjects of primary financial monitoring – legal entities is about 2500 (for repeated violations).

It is also necessary to strengthen the personal responsibility of officials of primary financial monitoring entities, which currently provides only for temporary removal from office until the violation is eliminated. Thus, the analysis of foreign experience in organizing financial monitoring systems will allow us to adopt the most effective mechanisms for countering the legalization of criminal proceeds and the financing of terrorism and determine the main directions for improving the domestic financial monitoring system.

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THE PECULIARITIES OF THE RESEARCH TOOLS IN THE ANALYSIS OF ENTERPRISE ECONOMICS IN A STATE OF UNCERTAINTY

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The issue of researching the risks in the activities of an enterprise caused by economic uncertainty is in the center of attention of researchers from different countries. The most cited in this area are the works of F. Knight [1], J. Kallman [2], M. Crouhy, D. Galai, R. Mark [3], T. Flynn, M. McCarthy [4]. The authors of these works focus on the following topics while investigating the uncertainty in enterprise activities: risk interpretation and measurement, risk management, project loss control, risk classification, and risk prediction method.

Many Ukrainian researchers considered the issue of risk identification and assessment in the Ukrainian economy. A special place in these studies belongs to the Ukrainian scientist and practitioner of the Ukrainian diaspora M. Paslavskyi [5]. The mentioned researcher looked at the risks of the Ukrainian business from the standpoint of deep knowledge of the Ukrainian reality, combined with an understanding of the general laws of doing business in developed countries.

Despite the fact that there is currently a substantial quantity of scientific research in the field of analysis of uncertainty (risks) in company economic activity, the question of proper (relevant) analysis remains important.

Classifying the tools of uncertainty analysis, we distinguish, according to different classification features, the following groups of tools (Fig. 1). Such classification features may be: 1) the frequency (prevalence) of the tools used, which is usually related to the complexity of their application and results interpretation: traditional and new; 2) the purpose of application of uncertainty analysis tools: to assess internal and external factors of influence; 3) the orientation of the analysis, which can focus on assessing either future events or the past: Ex post та Ex ante.

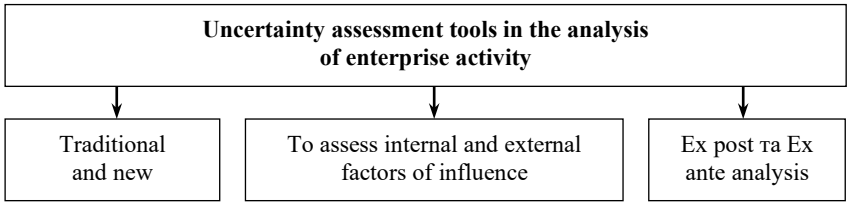

Fig. 1. The classification of tools for estimating uncertainty in the enterprise

Source: authors' own

The revelation of the peculiarities of traditional and new tools, in our opinion, deserves the most attention when analyzing the uncertainty in an enterprise's activities. After all, traditional tools can only answer a limited number of questions about what the effect of uncertainty was or is. Instead, newer tools provide a deeper analysis of uncertainty, but require larger databases and more sophisticated tools. Therefore, we assume that traditional and modern tools should be used simultaneously.

In our opinion, the traditional tools for estimating uncertainty include its estimation due to changes in the indicators of enterprise efficiency, labor productivity, etc. The onset of rapid and unpredictable changes in these indicators can be interpreted as a manifestation of uncertainty.

The category of «efficiency» is multifaceted and has a long history of use in scientific circulation. Almost every scientific school, since the eighteenth century, has tried to define it. It is believed that the first who tried to reveal its essence were W. Petty and F. Quesnay. But they regarded efficiency as effectiveness and used it to evaluate individual governmental or private activities [6]. This category gained relative independence in the works of D. Ricardo, who considered it as «the ratio of the received result to a certain type of expenditures». He made an attempt to assess the capital efficiency [7]. According to K. Marx, production is efficient if with a minimum of advanced capital to create the maximum amount of product with possible lower expenditures of labor and resources [8]. Representatives of the neoclassical school of economics of the twentieth century defined efficiency as the ratio of results and costs.

The world-renowned textbook on economics of C. McConnell and S. Brue provides the following explanation of economical efficiency: «More products from a given cost mean more efficiency». [9].

The American economist H. Leibenstein introduced the concept of X-efficiency in economics into scientific circulation. An enterprise is considered X-efficient if it produces (sells) the maximum possible volume of production with the available resources and the best of the available technologies [10].

Very often efficiency is regarded as effectiveness. In Western dictionaries there is a semantic difference between the concepts of efficiency and effectiveness. In particular, «efficiency» in its translation from English means productivity, useful work [11]. Instead, «effectiveness», translated from English, means the degree of success that gives the desired result [12]. Peter Drucker also emphasized this difference in concepts, namely «effectiveness» means «doing the right things» and «efficiency» means «doing things right». He notes that «to be successful in the long run, to survive and achieve its goals, an organization must be both efficient and effective» [13].

The distinction between the concepts (phenomena) of «efficiency» and «effectiveness» is approved in DSTU (the State Standard of Ukraine) ISO 9000: 2007 «Quality management systems: basic provisions and glossary». According to this standard, efficiency is the ratio between the achieved result and the resources used,

and effectiveness is the degree of the planned activity implementation and the planned results achievement [14].

In our opinion, the efficiency of the enterprise is its ability to achieve the goal, provided that it is close to the optimal ratio between the results obtained and the resources spent on their achievement.

Economic uncertainty can be described as a phenomenon that can exhibit itself in the following ways, according to our definition of «enterprise efficiency»:

– failure to achieve a certain goal or significant deviations from it;

– reducing the amount of material and financial results of an enterprise;

– growth of material and financial costs to achieve the same, other things being equal, i.e. comparable, results.

When assessing the efficiency of the enterprise it is necessary to consider different approaches to determining the expenditures that can be used to calculate efficiency:

1) resource: the result is compared with resources;

2) expendable: the result is compared with current expenditures;

3) resource-expendable: a combination of the two previous approaches.

It is expedient to carry out the analysis of enterprise activity efficiency according to three groups of indicators: productivity, efficiency of additional investments in the capital, and profitability.

Productivity indicators represent the number of hryvnias of gross output per unit (one hryvnia of value) of enterprise resources and characterize their productivity. The ratio of output to the value of individual resources is used to compute it.

In developed countries, *productivity* is the subject of statistical research. In foreign practice, the most common indicator of productivity is the indicator of labor productivity. The only difference is that in Eastern Europe this indicator is calculated by output, and in Western European countries, the United States and Australia added value is used to calculate labor productivity. Capital productivity indicators refer to the national statistics indicators of the United States and Australia. National statistics of foreign countries calculates and publishes indicators of both single-factor and multi-factor productivity. Multifactor labor and capital productivity (by output and added value) is widely calculated in most market economies. And only in Canada and the USA productivity indicators of the whole set of resources (labor, fixed and working capital) are defined. [15].

The second group of indicators – **the efficiency of additional capital investments** – is used to determine the economic feasibility of additional capital growth. Relevant indicators are calculated by the formula [16]:

$$Kef = \frac{\text{Prod}_1 - \text{Prod}_0}{C_1 - C_0}, \quad (1)$$

where Prod_1 і Prod_0 – the value of marketable products of the enterprise in the reporting and base periods, respectively; C_1 і C_0 – the average annual cost of capital, respectively, in the reporting and base periods.

When calculating the efficiency of additional involvement of sources of capital formation and additional investments in fixed and working capital, the denominator of the formula changes taking into account these capital components.

It should be noted that the economic nature of this indicator is complex. When calculating this indicator, four variants of results can be obtained:

$$1.\ Kef = \frac{\text{Prod}_1 - \text{Prod}_0}{C_1 - C_0} = \frac{\Delta\text{Prod}}{\Delta C}, \qquad (2)$$

$$2.\ Kef = \frac{\text{Prod}_1 - \text{Prod}_0}{C_1 - C_0} = \frac{-\Delta\text{Prod}}{\Delta C}, \qquad (3)$$

$$3.\ Kef = \frac{\text{Prod}_1 - \text{Prod}_0}{C_1 - C_0} = \frac{\Delta\text{Prod}}{-\Delta C}, \qquad (4)$$

$$4.\ Kef = \frac{\text{Prod}_1 - \text{Prod}_0}{C_1 - C_0} = \frac{-\Delta\text{Prod}}{-\Delta C}. \qquad (5)$$

The first variant shows that as the enterprise's capital develops, so does commodity output. In such circumstances, it is critical that this indicator has a value larger than one, indicating that additional capital investments are very efficient. The result in the second alternative will be negative since capital expansion is accompanied by a decline in marketable products, which characterizes inefficient extra capital investment. It's critical to keep the negative repercussions to a minimum, hence this indicator's value should be close to zero. The third variation depicts a situation in which an increase in production is achieved by lowering capital. The outcome will also include a minus sign. The increase in the value of this indicator usually suggests a gain in capital usage efficiency. Keep in mind, however, that this option is not suitable for underfunded businesses. Finally, the fourth alternative is obtained if the drop in capital size results in a reduction in marketable products. The least adverse position is when the outcome is less than one, because in such circumstances, marketable products are not lowered as much as the enterprise's capital.

Profitability indicators are important for the analysis of the enterprise. They reflect the level of profitability of the enterprise, as well as the possibility of forming funds for the enterprise current activities. Fig. 2. presents the main indicators of the enterprise economics analysis for each of the three groups.

A multifactor model created by DuPont in the 1920s is used for a detailed investigation of capital efficiency. It entails breaking down the return on capital into individual indicators that are all tied together in a single system. Each of the criteria is a valuable financial indicator. This analysis allows you to establish the specific influence of each component on management performance, as well as identify and eradicate their negative impacts in a timely manner. In addition, untapped internal reserves for increasing enterprise efficiency are estimated using appropriate formulas.

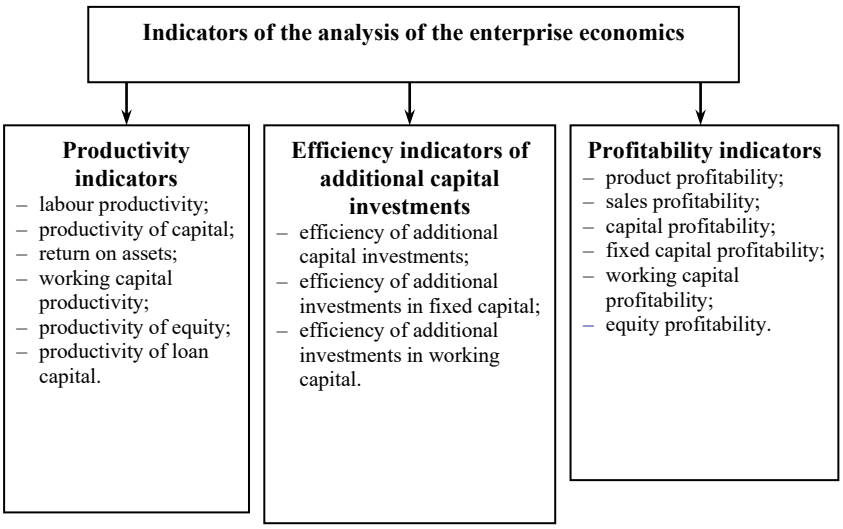

Fig. 2 The main indicators of the enterprise economics analysis

Source: authors' own

Return on capital (ROC) according to this model is calculated by the following formula [17]:

$$ROC = ROS \times Koc, \qquad (6)$$

$$\frac{P}{C} = \frac{P}{SAL} \times \frac{SAL}{C}, \qquad (7)$$

where *ROS* – profitability of sales; *Koc* – capital turnover coefficient; *P* – operating profit of the enterprise; *SAL* – revenue from sales.

This model shows the impact of sales profitability and capital turnover coefficient on return on capital. Analyzing the indicators, it is possible to determine the reserves for further improvement of capital efficiency. The reasons for the decrease in return on capital can be both a decrease in return on sales and a slowdown in capital turnover. If the decrease in profitability is more influenced by the first factor, it is necessary to pay more attention to marketing, pricing, and assortment policy. This indicator's growth can be influenced by both internal and external factors that the organization has no influence on. As a result, it is vital to consider the influence of all possible factors when analyzing the indicator. Capital turnover can be accelerated by lowering fixed or working capital. The focus should then be on selling or writing off fixed assets that aren't being used or are being used inefficiently; reducing raw material stocks, work in progress, and finished products; and reducing receivables.

This model is simplified, but it can be transformed into a multifactor model which will fully determine the impact of individual factors on the efficiency of capital use of enterprises. In our opinion, the multifactor model of capital efficiency can be represented as follows [18]:

$$ROC = ROS \times CP \times Kr \times Kd \times Kfl \times Ke, \quad (8)$$

$$\frac{P}{C} = \frac{P}{SAL} \times \frac{SAL}{FC} \times \frac{FC}{WC} \times \frac{WC}{D} \times \frac{D}{E} \times \frac{E}{C}, \quad (9)$$

where *ROC* – return on capital; *P* – operating profit of an enterprise, thousand UAH; *C* – cost of total capital, thousand UAH; *SAL* – revenue from sales of products, thousand UAH; *FC* – cost of fixed capital, thousand UAH; *WC* – cost of working capital, thousand UAH; *D* – loan capital, thousand UAH; *E* – equity, thousand UAH.

According to the proposed model, the return on capital is influenced by the following factors: return on sales (*ROS*), productivity of fixed capital (*PC*), the coefficient of fixed to working capital (*Kr*), the coefficient of working capital to loan capital (*Kd*), financial leverage (*Kfl*), coefficient of autonomy (*Ke*).

To determine the impact of individual factors on return on capital, we propose such a calculation algorithm based on the use of index (*Ir*) research method:

$$\begin{aligned} Ir = \frac{ROS_1 \times PC_1 \times Kr_1 \times Kd_1 \times Kfl_1 \times Ke_1}{ROS_0 \times PC_0 \times Kr_0 \times Kd_0 \times Kfl_0 \times Ke_0} = \frac{ROS_1 \times PC_0 \times Kr_0 \times Kd_0 \times Kfl_0 \times Ke_0}{ROS_0 \times PC_0 \times Kr_0 \times Kd_0 \times Kfl_0 \times Ke_0} \times \\ \times \frac{ROS_1 \times PC_1 \times Kr_0 \times Kd_0 \times Kfl_0 \times Ke_0}{ROS_1 \times PC_0 \times Kr_0 \times Kd_0 \times Kfl_0 \times Ke_0} \times \frac{ROS_1 \times PC_1 \times Kr_1 \times Kd_0 \times Kfl_0 \times Ke_0}{ROS_1 \times PC_1 \times Kr_0 \times Kd_0 \times Kfl_0 \times Ke_0} \times \\ \times \frac{ROS_1 \times PC_1 \times Kr_1 \times Kd_1 \times Kfl_0 \times Ke_0}{ROS_1 \times PC_1 \times Kr_1 \times Kd_0 \times Kfl_0 \times Ke_0} \times \frac{ROS_1 \times PC_1 \times Kr_1 \times Kd_1 \times Kfl_1 \times Ke_0}{ROS_1 \times PC_1 \times Kr_1 \times Kd_1 \times Kfl_0 \times Ke_0} \times \\ \times \frac{ROS_1 \times PC_1 \times Kr_1 \times Kd_1 \times Kfl_1 \times Ke_1}{ROS_1 \times PC_1 \times Kr_1 \times Kd_1 \times Kfl_1 \times Ke_0}. \end{aligned} \quad (10$$

The first partial index reflects the impact of return on sales on return on capital, the second – the productivity of fixed capital, the third – the coefficient of fixed and working capital ratio, the fourth – the coefficient of working capital to loan capital, the fifth – the coefficient of financial leverage, the sixth – the coefficient of autonomy.

The DuPont model can also determine the impact of individual factors on return on equity [19]:

$$ROE = ROS \times Koc \times Kd; \quad (11)$$

$$\frac{NP}{E} = \frac{NP}{SAL} \times \frac{SAL}{C} \times \frac{C}{E}; \quad (12)$$

where *ROE* – return on equity; *Kd* – debt burden coefficient; *Np* – net profit of the enterprise.

Return on equity, according to this model, is influenced by three factors: return on sales (*ROS*); capital turnover coefficient (*Koc*); debt burden coefficient (*Kd*). The specifics of the impact of the first two factors are considered in the analysis of the return on total capital of the enterprise. The debt burden coefficient reflects the financial structure of the capital chosen by the enterprise. Its growth, on the one hand, can increase the return on equity and on the other – increase the risk of bankruptcy.

Rising uncertainty is usually associated with deteriorating conditions in leading sectors of national economies. The Ukrainian economy was and still is industrial-agrarian. Therefore, the dynamics of industrial production in it is a crucial marker of change. For each individual Ukrainian enterprise, the dynamics of industrial

production can be considered as an external factor of certainty or, conversely, uncertainty of the state. The current state of Ukrainian industry does not meet the requirements dictated by the conditions of global changes. Industrial production has ceased to be a major factor in the growth of the national economy.

The decline in industrial production in general, and especially the production of investment products, causes negative consequences of lagging behind and weakening the national economy, the loss of Ukraine's competitive position in world markets. The military aggression of Ukraine's eastern neighbor, the occupation and annexation of the industrial-intensive regions of Donbass and Crimea, the looting of enterprise property, and the curtailment of production in territories beyond its control, have caused irreparable losses to Ukraine and its industrial potential. The trade war against Ukrainian exports resulted in the destruction of industrial capacity, the severing of historic internal and external economic links, and a precipitous drop in output.

Expanding ties with European partners has a significant positive impact on the development of the country's industrial potential. This is facilitated by the Association Agreement between Ukraine and the EU, especially the existence of a free trade area. Ukrainian exporters partially compensated for the loss of markets of the former partner due to the intensification of trade relations with the EU, which has become Ukraine's main trading partner and key foreign investor [20].

Table 1 shows indicators from the analysis of enterprise economics for each of the three groupings we proposed, based on data from Ukrainian industrial enterprises.

Table 1. The main indicators of productivity of industrial enterprises of Ukraine for 2013 – 2018

Productivity indicators	2013	2014	2015	2016	2017	2018	The relative deviation of 2018 to 2013, %
Labor productivity, thousand UAH / person	418,64	532,19	694,05	851,74	1097,38	1255,76	299,96
Capital productivity	0,70	0,69	0,73	0,75	0,84	0,91	129,87
Return on assets	0,75	0,72	0,56	0,56	0,89	0,98	129,57
Working capital productivity	1,56	1,51	1,51	1,44	1,51	1,67	107,53
Equity productivity	1,80	2,05	3,04	3,82	4,57	4,17	231,36
Loan capital productivity	1,14	1,04	0,96	0,93	1,02	1,16	101,64

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine

Based on the data in Table 1, it can be concluded that the labor productivity indicator at industrial enterprises in Ukraine has been steadily increasing from 2013 to 2018. The average annual increase of this indicator is 167,4 thousand UAH per employee. In 2018, this indicator increased almost 3 times compared to 2013. However, it should be noted that Ukraine lags behind Western European countries in terms of labor productivity in industry.

The main reasons for low productivity are:

– worn-out and obsolete fixed assets;

– outdated technologies;

– insufficiently efficient organization of operating systems and production processes;

– inefficient organization of labor;

– low-efficient management;

– practical lack of incentives to build innovative production, associated with a high level of monopolization;

– weak investment infrastructure;

– insufficient informatization and automation of production.

The capital productivity indicator measures the efficiency with which capital is used, and it has been trending upwards from 2013 to 2018, which is a positive trend. The data in Table 1 show, however, that capital productivity is low. Thus, in 2013, only 70 kopecks of manufactured goods were obtained for every hryvnia spent in manufacturing, 84 kopecks in 2017, and 91 kopecks in 2018.

The increase in the indicator of return on assets in the dynamics is positive for Ukrainian industrial enterprises. As shown in Table 1, the indicator of return on assets declined by 22,22 percent in 2015 compared to 2014. The level of return on assets is influenced by various factors, such as changes in output, efficiency of fixed assets use. The growth of this indicator is observed in 2017 and is 0,89. In 2018, it increased compared to 2013 by 29,57%.

Working capital productivity coefficient characterizes the efficiency of the enterprise working capital use. The continuity of the process of production and sale of products, and as a consequence – its solvency and profitability, depends on the quality of working capital management. Working capital efficiency refers to achieving the greatest possible gain in output for each unit of working capital. There is a trend of insignificant change in this indicator over the analyzed time. Thus, the productivity of working capital in 2018 increased by only 7,53% compared to 2013.

The equity productivity indicator has been trending upwards during the research period, which is good news for industrial businesses. In comparison to 2013, equity productivity increased by 2.31 times in 2018. Such achievements were attained at the expense of an increase in the amount of manufactured goods.

Attracting loan capital to the company's turnover is a common occurrence. The enterprise's financial state improves as a result of this attractiveness, but only if debts are paid on time. The indicator of loan capital productivity reflects the loan capital's efficiency of usage. The data in the table show a decrease in this indicator during 2014 – 2016, and only in 2017 it increased compared to 2016 by 9,68%. It is possible to conclude about the loan capital inefficient use.

In general, all the analyzed indicators are growing, which is quite positive for the industry. For a more detailed analysis, we turn to the indicators of efficiency of additional investments in the capital (Table 2).

The indicator of efficiency of additional capital investments demonstrates that as the size of capital in industrial companies increased in 2017 – 2018, so did the volume of output. However, the study of the data in Table 2 shows that further capital investments were inefficient in 2014 and 2016, as production growth was lower than capital value growth rate.

Table 2. Indicators of efficiency of additional investments in the capital of industrial enterprises of Ukraine for 2014 – 2018

Indicators of efficiency of additional investments in the capital	2014	2015	2016	2017	2018
The efficiency of additional investments in the capital	0,547	1,047	0,841	1,445	2,463
The efficiency of additional investments in the fixed capital	0,419	0,260	0,553	-0,781	3,375
The efficiency of additional investments in the working capital	0,964	1,501	1,160	1,870	7,432
The efficiency of additional investments in the equity	-1,384	-2,250	-11,999	15,397	2,539
The efficiency of additional investments in the loan capital	0,392	0,714	0,786	1,594	82,279

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine

The indicator of efficiency of extra fixed capital investments has a negative trend. As a result, the value of this indicator is less than one, indicating a significant inefficiency of further fixed capital investments. And it wasn't until 2018 when such extra investments looked to be cost-effective.

In 2014 – 2016, the efficiency coefficient of extra equity investments was negative, indicating inefficient additional equity investments. This indicator depicts a circumstance in which an increase in output was achieved while lowering equity. This indicator's results are increasing gradually, and its absolute value has been increasing since 2017. However, it is critical to keep in mind the importance of providing funds to the enterprise.

When looking at the indicator of the efficiency of extra loan capital investments, there is a trend for the indicator to rise. This means that both the loan capital and output have increased. In 2018, the efficiency of extra loan capital borrowings was very high.

Table 3 discloses the third group of indicators for assessing the efficiency of industrial enterprises.

The indicator of production profitability reflects the profit received by the enterprise from each hryvnia invested in production. As a consequence of the analysis of these indicators and their dynamics, it is required to conclude that the level of production profitability for the investigated period is low enough to be described by high prime cost. Between 2015 and 2018, this indication hardly changed.

The efficiency of an industrial enterprise's finished product sale processes is measured by the return on sales. These tables illustrate the sales of industrial products that were not profitable from 2014 to 2016. The return on sales of industrial items has been defined by a positive value of the indicator since 2017. In 2018, the indicator of return on sales increased significantly compared to 2014 and makes 3,31%.

Table 3. The assessment of profitability indicators of industrial enterprises of Ukraine for 2013 – 2018

Profitability indicators	2014	2015	2016	2017	2018
Production profitability, %	-87,39	24,09	24,52	25,91	24,27
Sales profitability at net profit, %	-114,01	-9,82	-1,06	1,96	3,31
Return on capital on net income, %	-9,23	-8,57	-0,96	1,91	3,55
Return on equity, %	-27,49	-35,58	-4,92	10,43	16,31
Return on loan capital, %	-13,91	-11,30	-1,20	2,33	4,54

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine

The amount of net income per hryvnia of capital is shown by the return on equity in terms of net income. These indicators were calculated using net profit and are negative from 2014 to 2016, owing to the fact that the consequence of economic entities' activity in industry is a loss. Since 2017, the net profit indicator has been in growth mode. Thus, in 2017, one hryvnia of capital accounted for only UAH 0.019 of net profit and in 2018 – UAH 0,035.

The return on equity indicator stands out among profitability indicators because it demonstrates the efficiency with which an enterprise's own resources are used. The value of this indicator represents the attractiveness of the company as a place to invest. The amount of return on equity for the analyzed period is relatively low; in 2018, one hryvnia of equity accounted for roughly 0,16 UAH of net profit, and this is the highest level of the indicator. Through the efforts of management personnel, the amount of return on equity in industry can be enhanced.

A similar trend is observed in the analysis of the return on loan capital. The positive value of the indicator is observed in 2017 and one hryvnia of loan capital accounts for only UAH 0.02 profit and in 2018 – UAH 0,04.

Thus, according to the analysis, the situation at Ukrainian industrial enterprises in 2014 was particularly difficult due to Russia's military aggression.

Our detailed analysis of traditional and more up-to-date performance indicators of the enterprise in its various manifestations is important for assessing uncertainty, because it provides an opportunity to find out the following. Having a sufficient database for various performance indicators, we can compose a measure of deviation estimation, for example, by variance or by so-called gaps. Then the minimization of deviations can be interpreted as a decrease in uncertainty, instead, an increase in deviations over a period of time – as an increase in uncertainty. When assessing uncertainty in terms of profitability, for example, the rationale of calculating uncertainty using this traditional indicator from the arsenal of analysis tools would look something like this:

$$\sum_{i=1}^{n} gaps\left(\mathrm{Prof}_i^* - \mathrm{Prof}_{trend}^*\right) \to 0, \qquad (13)$$

where $(\mathrm{Prof}_i^* - \mathrm{Prof}_{trend}^*)$ – deviation of the actual value of return in a particular year from the values of the trend.

To assess the efficiency of enterprises under the conditions of uncertainty, taking into account the impacts of competitive national and global environment, it is advisable to use the indicator *EVA* (Economic Value Added) – economic added value and a balanced system of other indicators.

The Economic Value Added (*EVA*) model was developed by B. Stewart and D. Stern and registered by Stern Stewart & Co. in the early 1990s. This model is used by such well-known companies as: «Coca-Cola», «Siemens», «IBM». Unlike traditional efficiency indicators, *EVA* reflects the close relationship to stock value and takes into account the risk factor. This indicator allows to assess the efficiency of the enterprise from the standpoint of converting profits into its market value [21].

The indicator of economic value added in terms of content is an economic profit which takes into account not only accounting costs but also the alternative costs of invested capital. That is, when calculating the *EVA* from the amount of profit not only the cost of loan capital is deducted, but also the cost of equity.

The *EVA* indicator can be used to assess the efficiency of both the enterprise as a whole and its individual units. It is also used to evaluate the performance of managers and their remuneration.

To calculate the «Economic value added» indicator the following basic formula is used [22]:

$$EVA = NOPAT - (WACC \times IC), \qquad (14)$$

where *NOPAT* – net operating profit after tax; *WACC* – weighted average cost of capital; *IC* – invested capital.

The weighted average cost of capital is calculated by the formula:

$$WACC = \frac{E}{C} \times r_e + \frac{D}{C} \times r_d \times (1-t), \qquad (15)$$

where E – equity of the enterprise; C – the total amount of capital of the enterprise; D – loan capital of the enterprise; r_e and r_d – respectively, the cost of equity and loan capital, $; t – income tax rate.

To calculate *EVA*, the developers have made about 160 amendments to the balance sheet items and the statement of financial performance, but in each case only individual amendments are used. In particular, the amendments concern the definition of invested capital. Advertising, personnel training, research and development, and corporate restructuring should all be included in the latter. In addition, the difficulties in computing this indicator stem from the requirement to determine extra data not included in the financial statements when calculating the weighted average cost of capital.

The results of the calculation of economic value added can be interpreted as follows:

– $EVA = 0$. The market value of the enterprise is equal to the book value of net assets. In this case, the owners have no significant interest in investing capital in the enterprise. The profitability of investing in the enterprise is equated to the profitability of investments in bank deposits.

– $EVA > 0$. The enterprise's market value exceeds its net asset book value. High efficiency of investment in the company also encourages the owner to invest more in the business.

– $EVA < 0$. The market value of the enterprise is less than the book value of net assets. Owners are beginning to lose the capital invested in the enterprise. Further investment in the company is inefficient [23].

In general, the use of economic value added indicators in enterprise economics analysis appears to be quite promising. In comparison to net income, it allows for a more objective assessment of the company's results. However, its application in domestic companies necessitates particular organizational, informational, and personnel modifications. In particular, this concerns the establishment of high-quality management accounting at the enterprise, and training of personnel for the implementation of the appropriate management model.

It's important to remember that the indicator of economic value added measures a company's efficiency in terms of its owners. However, other stakeholders, like as employees, managers, purchasers, creditors, and the government, have an impact on the company's operations. When only the EVA indicator is used, their interests may be overlooked, resulting in a decrease in the enterprise's worth. In these circumstances, combining the usage of the economic value added model with a balanced scorecard is a good idea. The EVA indicator, in particular, should be used as one of the basic evaluation indicators in the «Finance» perspective.

The Balanced Scorecard is a new approach to efficiency management and business analysis. It was developed by R. Kaplan, a professor of leadership development at Harvard Business School, and D. Norton, founder and president of Balansed Scorecard Collaborative Inc. The Balansed Scorecard method is used in enterprises to increase management efficiency through an optimal set of performance indicators. The use of the balanced scores system is unique in that it consists of four perspectives from which the enterprise's efficiency is assessed:

– The Learning and Growth perspective;

– The Business Process Perspective (intra-firm processes, internal business processes);

– The Customer Perspective (consumer orientation, consumer aspect);

– The Financial Perspective.

A balanced scorecard has the advantage of including not just financial but also non-financial factors.

Fig. 3 presents the algorithm for constructing a balanced scorecard.

In practice, enterprises choose the indicators which best meet their strategic goal. Enterprises can also add a fifth vector to the four listed above or replace it with one that best reflects the strategy of a particular enterprise.

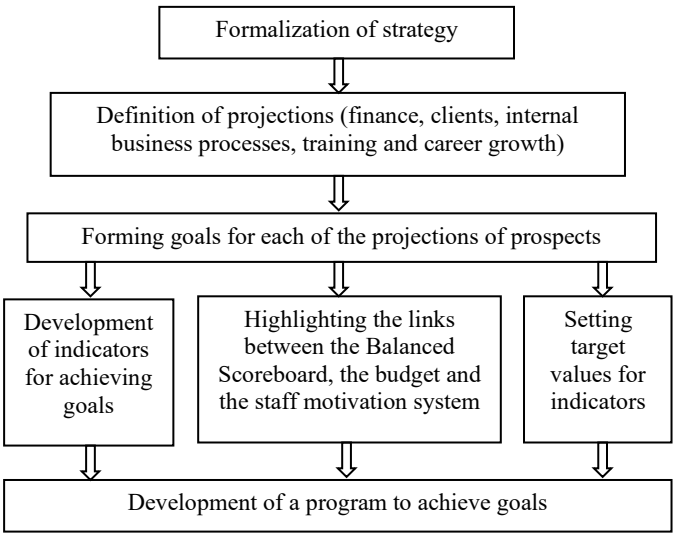

Fig. 3. Algorithm for developing a balanced scorecard

Source: developed by the authors based on [24]

As we can see, the specificity of a balanced scorecard is that there is no single universal list of indicators which could be used to analyze the activities of a particular enterprise. They are formed individually for each enterprise, based on its goals. Therefore, in Fig. 4 we have proposed a list of indicators for each of the four perspectives that can be used by industrial enterprises in building a balanced scorecard.

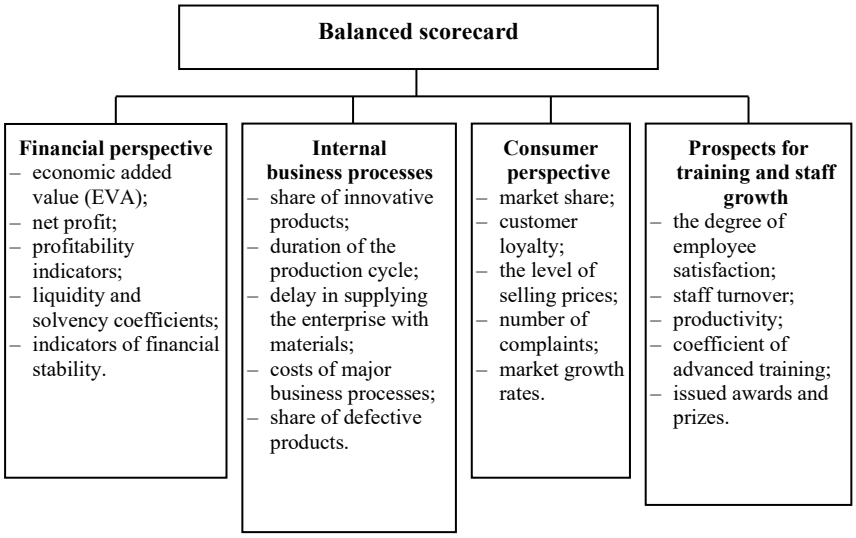

Fig. 4. Indicators that can be used in Balanced scorecard construction for industrial enterprises

Source: authors' own

The practical value of a balanced scorecard lies in solving the problem of achieving strategic goals, which is important for any enterprise, regardless of the field of operation. The optimal set of indicators which each enterprise can choose independently in accordance with its strategic goal will increase the value of forecast

information for management. It will allow to swiftly alter management decisions; it will allow to measure the efficiency and competitiveness of business using non-financial indicators; and it will make the actions of Ukrainian companies more transparent to potential investors.

Important tools for assessing the uncertainty of the enterprise should include methods of risk identification. Modern methods of risk assessment should be divided into two groups: qualitative and quantitative.

Qualitative methods are used at the initial stage of analysis. Their main task is to identify the main risks which arise in the process of financial and economic activities of the enterprise. Most scientists note the difficulty of using qualitative methods. The point is that for their application, specialists must have a thorough knowledge of economics, finance, and significant practical experience in the relevant field.

Quantitative risk analysis must be a continuation of the qualitative analysis. Its results provide information on the quantitative value of individual risks, rather than the total risk of the enterprise [25].

Further on we consider the most common methods of assessing the risks of the enterprise.

The expert method is considered more subjective, as it is based on the opinions of experts. It is advisable to use it with insufficient information, which is its significant advantage over other methods of assessing the risks of the enterprise. The expert assessment is most often carried out using the Delphi method. It is based on a series of successive surveys of experts without personal debate between them. Experts might review their judgements and study the information offered by other experts by repeating the survey method. This results in more accurate data. Additionally, while using this strategy, differentiated estimates are used, where individual expert judgment is given more weight. When using the «Delphi» method, however, it is vital to approach the construction of the questionnaire questions with attention so that they are clearly worded and reveal the problem to the fullest extent possible. In general, the expert method deserves consideration, but only in the early phases of assessing the enterprise's risks. [26].

Based on the use of the method of expert assessments, the method of the Swiss Banking Corporation is used [27]. This method consists of four stages: determining the direction of analysis; collection, grouping of source data; determining the degree of risk; determination of the total degree of risk. We can draw conclusions regarding the economy's financial soundness, and thus the degree of business activity of economic entities, using this method. It also has the advantage of allowing the optimum enterprise activity development variation to be chosen.

To determine the degree of risk a method developed by BERI firm (Germany) is used [28]. According to this method, a special index is calculated (based on a survey of 100 independent experts), which allows to assess the degree of risk.

Method of analogies. Its essence is based on risk assessment by analyzing information on similar risk level projects. The tricky part of using this strategy is

deciding on an analog. Finding such a project that will still be implemented under identical environmental conditions is difficult. This strategy should be used when the company has recently completed a similar project and has all of the required information.

Cost-effectiveness analysis. This method is based on different levels of cost risk for each activity. To do this, each cost element is analyzed. Depending on the actual state of each of them conclusions are drawn regarding the possible cost area. As a result, the cost-effectiveness method allows for the identification of «bottlenecks» in the enterprise's activities from the aspect of riskiness. [29].

The statistical method allows you to assess the risk of the enterprise on the basis of statistical data for the past period. If there is enough information about the main risks of the enterprise in the past, you can assess the likelihood of their occurrence in the future.

The main indicators that are calculated in the statistical method are: mathematical expectation, variance, standard deviation, and coefficient of variation [30].

The mathematical expectation $M(x)$ allows determining the most probable result which can be obtained in the future:

$$M(x) = \sum_{i=1}^{n} x_i \times p_i, \qquad (16)$$

where x_i – values of a random variable depending on specific conditions; p_i – the probability of possible values of a random variable.

Variance $D(x)$:

$$D(x) = \sum_{i=1}^{n} p_i \times (x_i - M(x))^2. \qquad (17)$$

Standard deviation σ:

$$\sigma = \sqrt{D(x)}. \qquad (18)$$

A higher value of the standard deviation indicates a higher risk of the enterprise.

Coefficient of variation V:

$$V = \frac{\sigma}{M(x)}. \qquad (19)$$

The coefficient of variation might range between 0 and 100%. The higher its value, the higher the risk of entrepreneurial activity.

The statistical method is quite simple in calculations. It is used to determine the possibility of losses and the level of risk, but it requires a significant amount of initial information. This can cause difficulties of its use. And due to the fact that in the future it may be possible to observe the influence of factors which were absent in the past, the statistical method does not allow to reliably estimate the level of costs in the future. In addition, it is not advisable to use the statistical method if a new enterprise is being investigated.

The Monte Carlo method is a simulation modeling method which provides modeling of random variables. This method assumes that a set of random values which are different from each other is first generated for the target random variable. Next, this set of random values is processed using the methods of mathematical statistics.

The Monte Carlo method involves a clear sequence of actions in assessing risks. The evaluation algorithm involves the following steps:

1. Formation of a forecast model.
2. Identification of key risk factors.
3. Establishing the conditions for correlation between the performance indicator and variables.
4. Choosing the nature of the probability distribution.
5. Simulation modeling of random implementation scenarios.
6. Analysis of the results with statistical evaluation [31].

The Monte Carlo method is considered to be quite accurate in risk assessment, as scenario modeling is performed automatically, which eliminates subjective assessments. But this method requires significant time and information resources. The advantages of this method in estimating economic uncertainty are obvious and undeniable.

According to the results of the study, the following ***conclusions*** can be drawn:

– traditional uncertainty assessment tools are simple enough to implement, but provide a «superficial» result, giving a rather limited answer to the question of what was or is the impact of uncertainty on the activities of the enterprise;

– the «deeper», in the sense of more accurate, result is provided by the use of the latest analysis tools, including EVA, as well as by using a balanced scorecard, the method of expert assessments, the method of analogies, cost-benefit analysis, etc.;

– in the analysis it is not advisable to be limited to only one method, as higher accuracy and objectivity of risk assessment results is achieved by using several methods.

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COMPETITIVE CAPACITY OF ENTERPRISES FOR ECONOMIC STABILITY AND PREDICTABILITY

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Rapid and unexpected changes in the national and world markets, permanent changes in technologies, especially in the field of communications, often do not work in favor of business entities. Enterprises operating under the conditions of high uncertainty and unexpected impacts are most at risk. Rapid response to change is needed to counter threats. It is about what today is called «change management» and what correlates with the formation of the competitiveness of an enterprise.

Modern strategies for ensuring the competitiveness of enterprises are designed to resolve objectively existing contradictions. This is a contradiction between achieving maximum stability and resource use efficiency in the current period, on the one hand, and the formation of preconditions for changes in the future, on the other. In our opinion, this should first of all reveal the competitiveness of enterprises under conditions of uncertainty.

Unfortunately, the approach to competitiveness on the basis of resolving the contradiction between the «task for today» and the «task for the future» is not reflected in the Ukrainian legislation. According to Ukraine's «On Protection of Economic Competitiveness» Law, the latter is only considered as a competitive advantage over others. The Law states: «Economic competitiveness (competitiveness) is a competition between economic entities with the aim to gain advantages over other economic entities due to their own achievements, as a result of which consumers and economic entities have the opportunity to choose between several sellers, buyers, and a separate economic entity cannot determine the conditions of turnover of goods in the market» [1]. According to the cited article of the Law, economic competitiveness is considered only as a struggle, competition, rivalry with others for market advantages.

Other current laws – the Law of Ukraine «On Protection against Unfair Competition», the Law of Ukraine «On the Application of Special Measures to Import into Ukraine» – focus on the ways to regulate economic activity. These normative documents do not create a basis for the formation of tools for resolving the contradiction between stability and variability [2; 3].

There are various definitions of competitiveness in scientific circulation, filled with somewhat different meanings. In our study, the meaning of «competitiveness» is particularly important. After all, the meaning of the concept of «competitive ability» depends on the meaning embedded in this concept.

Special studies on the evolution of the concept of «competitiveness» provide grounds for some important generalizations. Such studies are carried out, in particular,

by domestic scientists [4]. From the whole array of definitions of competitiveness, in our opinion, it is necessary to distinguish two groups, namely:

– definitions, which reveal the necessary *conditions for the functioning of the market as a competitor* and relate to the number of producers and consumers operating in the market, as well as the freedom to enter and exit the market;

– definitions, which focus on *the tools (methods of implementation) of victory* in competitiveness.

A more detailed analysis of the meaning of the concept of «competitiveness» helps to find out that except for traditional manifestations, which are detected in competitive rivalry, the following its manifestations are considered:

– dynamism of the economy, constant introduction of new technologies in production, management and communication with consumers and partners, formation of new organizational structures;

– profit maximization on the basis of additional costs associated with market research and the creation of innovative forms of promotion of own goods;

– the desire to protect against the negative consequences of market competitive rivalry with appropriate actions aimed at collusion between former competitors and market monopolization, which actualizes the coercive antitrust actions of governments to protect the competitive environment.

As it is known, competition is constantly changing, acquiring new forms. The classic of competition theory M. Porter identifies five driving forces of competition, under the influence of which its changes take place. It is significant that among these drivers, the potential threats to be pushed out of the market by more successful manufacturers are emphasized. The factor of creation of substitute goods with better or new consumer properties by other producers is also singled out [5]. It is clear that these driving forces of competition form the economic uncertainty of an enterprise. After all, it is quite difficult and, for the most part, impossible to predict the actions of other «market players».

We consider it fundamentally important that competition is a relationship with signs of constant changes in the forms and methods of doing business, with the risks of uncertainty. Therefore, **competitiveness** is the ability to operate in such a changing, risky environment, which involves additional costs associated not only with competitive rivalry, but also with adaptation to a changing environment. In this sense, the competitiveness of an enterprise appears not so much as a competition with other «players» of the market, but as a «competition with itself». It is a question of contradiction between an enterprise in its old (traditional) condition and in a new condition. At the same time, the new state must meet the new conditions of doing business, new technologies and needs. This is a special dialectical denial of an old state of an enterprise by the new state, which is a development.

Our proposed definition of competitiveness corresponds to the task of this chapter – to investigate the enterprise competitiveness in terms of economic uncertainty. However, there are other definitions of competitiveness which have

emerged in other contexts. It is these other contexts that have required other emphases in the definition of competitiveness.

In many studies, the enterprise competitiveness is associated with the competitiveness of goods, the competitiveness of industries (sectors) of the economy and the competitiveness of the entire national economy. This connection can be represented as follows (Fig. 1).

Fig. 1 illustrates the idea of interdependence of four levels (manifestations) of competitiveness, namely: the entire national economy, its industries (sectors), enterprises, and individual goods.

The competitiveness of an individual enterprise, which is the object of our study, is formed under the influence of the competitiveness of the industry. At the same time, the competitiveness of each enterprise shapes the competitiveness of the industry in which they operate. The latter, of course, increases with the number of competitive enterprises.

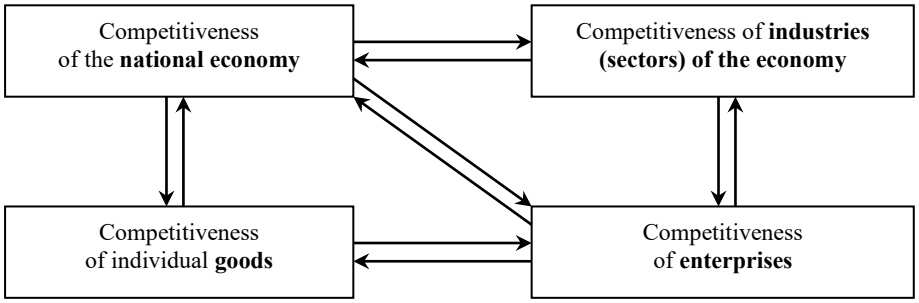

Fig. 1. The relationship between the levels of competitiveness

Source: authors' own

The enterprise competitiveness is implemented through the competitiveness of the goods created by it. Conversely, the competitiveness of goods forms the competitiveness of an enterprise.

Another link between the competitiveness of an enterprise is its dependence on the competitiveness of the national economy. The latter, in our view, plays the role of a kind of «external environment» to promote competitiveness at all levels.

The following conclusion can be drawn from the analysis of Ukrainian studies in the field of enterprise competitiveness issues. Quite often it is determined and evaluated through the competitiveness of the created goods [6; 7]. Less often, the competitiveness of an enterprise is associated in the definitions and assessments with the competitiveness of the industry and the entire national economy [8].

Agreeing with the idea of connection of concepts (phenomena) of competitiveness of economy, industry, enterprise and separate goods, we consider it expedient to distinguish them as distinctly as possible. It is a question of finding out not only the common, but also the special (different) in the content of these concepts. Only in this way the basis for the development of specific methods for assessing different levels of competitiveness can be created.

With regard to the need to clarify the content of the competitiveness of an enterprise, industry and individual product, we make some generalizations.

The competitiveness of the **industry** is mainly associated with the presence of conditions for the creation of innovative products and the introduction of products of the research and development (R&D) sector [9; 10]. Econometric assessment of the level of competitiveness of the industry is often carried out using the ideas of the Porter's diamond mode [11].

It is clear that the competitiveness of a particular industry can be determined and evaluated in comparison with:

a) similar industries in other national economies;

b) other sectors of their own national economy.

With regard to the possibility of assessing the competitiveness of the industry against similar industries in other economies, for most countries not the fact of victory, but the ability to participate in competitive rivalry is relevant. Thus, it is about the ability to occupy a worthy place in the world hierarchy of such industries. This ability of the industry, in our opinion, can be assessed at least by such indicators as:

– the ratio of domestic and foreign prices for products of the industry ($P_d/P_f = k_P$);

– investment attractiveness of the industry for external investors, assessed by the ratio of levels of return on investment, i.e. interest on invested capital abroad and within the country ($i_d/i_f = k_i$);

– the share of the industry in the formation of supply in the international market of products of this industry ($S_d/S = d_S$).

Using the proposed indicators, the index of **external competitiveness of the industry** could be calculated ($I^{Ext}_{Comp/i}$).In this case, the *rationing* of the actual values of the three indicators determined by us (k_P , k_i, d_S) against the background of similar values of indicators of the group of countries selected for comparison could be carried out according to the formula [1]:

$$y_i = (x_{краще} - x_{факт})/(x_{краще} - x_{гірше}),$$

where, y_i – normalized value of the actual indicator, $x_{факт}$, $x_{краще}$, $x_{гірше}$ – accordingly, the actual value of the indicator of the studied country, the better value of the indicator in the group of countries selected for comparison, the worse value of the indicator in the group of countries selected for comparison.

Weights for three indicators – k_P , k_i , d_S – for the calculation of the integrated index could be determined using common techniques: either by expert evaluation, or by statistical method of the main components.

The competitiveness of the industry against the background of other sectors of its own national economy, i.e. the internal competitiveness of the industry, can be assessed, for example, by the following indicators:

– the share of the industry in creating value added (GDP) of the national economy ($Y_i/Y = d_{Yi}$);

– the share of innovative products in the industry production structure (Y_{In} /Y_i = $d_{Yi/In}$);

– labor productivity in the industry ($Y_i/L_i = k_{Y/L}$);

– the average profitability of enterprises in the industry (R^*).

If the industry's internal competitiveness index needs to be calculated, the same approach could be used as when determining external competitiveness. The logic of rationing indicators should be the same with one difference. Here we should not compare the indicators of similar sectors of different countries, but the indicators of different sectors of the national economy. Depending on the principles underlying the evaluation, for comparison, either all sectors of the economy or industries that are technologically closest to the study could be taken. The weights for the four mentioned indicators in the calculation of the integrated index could also be estimated using common methods of statistical analysis.

The competitiveness of a **product** is mostly defined as its capacity to meet consumer demand, demonstrating competitive advantages over other products through:

– consumer properties, technical characteristics, image features;

– relative (versus imported goods and domestic alternative goods) price level;

– the length of time the product has been on the market, and so forth.

With regard to the relationship between the competitiveness of an enterprise with the competitiveness of the industry and the products created, the following clarification is appropriate. The competitiveness of an enterprise is its ability to compete for market share, to resolve the contradiction between exhisting and required future potential, which is formed by the competitiveness of the industry and the goods it creates.

The question of the relationship between the enterprise competitiveness and the competitiveness of the national economy is of fundamental importance. In our opinion (and this is reflected in Fig. 1), the competitiveness of the national economy both indirectly and directly is related to the competitiveness of an enterprise.

The structure of the global competitiveness index (I_{GCI}) reveals areas where the competitiveness of the national economy has a direct impact on the competitiveness of an enterprise.

The Global Competitiveness Index, as it is known, is calculated annually for all countries by an international organization called the World Economic Forum (WEF). This allows for the creation of a country ranking. Each country's position in the list reflects its level of national economic competitiveness. The Index (I_{GCI}) has a high level of credibility because it is based on a transparent methodology that uses publicly available data and the findings of a global survey. The latter is an annual WEF study conducted in collaboration with a network of partner organizations, including some of the world's most prestigious academic institutions.

Twelve evaluation directions are used to generate the Global Competitiveness Index. The list and content of these areas of evaluation are critically crucial for our

research. The index (I_{GCI}) evaluates the following structural elements using a set of indicators:

- *macroeconomic stability;*
- consumer market;
- labor market;
- *financial system;*
- the size of the domestic market;
- *quality of institutes;*
- *the state of infrastructure;*
- the level of IT and modern communications penetration;
- public health;
- education and skills;
- dynamics of business development;
- *ability to innovate*.

Most of the above 12 directions for assessing national economy competitiveness, in our opinion, can be regarded as areas of influence on the competitiveness of a single enterprise. These are primarily those that contribute to the stability and higher level of certainty of the enterprise performance. These include: macroeconomic stability, financial system, quality of institutions, state of infrastructure, ability to innovate.

Ukraine ranks worse than the global average in the ranking, according to the global competitiveness index. The fluctuations of our country's position in the world rankings are depicted in Fig. 2.

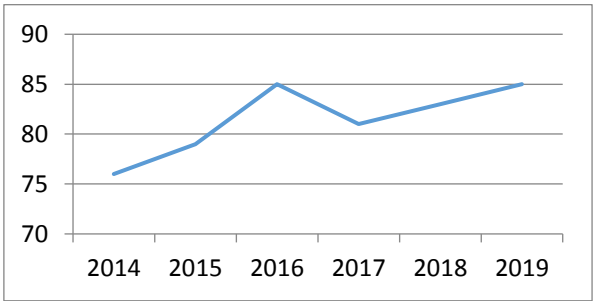

Fig. 2. Ukraine in the international competitiveness ranking

Source: authors' own based on [12]

According to the data in Fig. 2, Ukraine's best ranking in terms of economic competitiveness was 77th from 2014 to 2019. Consequently, eight ranking positions were lost.

The comparison to other countries – a comparative analysis of the ranking's «near environment» – is critical for determining overall economic competitiveness. The general information in Fig. 3 can be used to do this analysis.

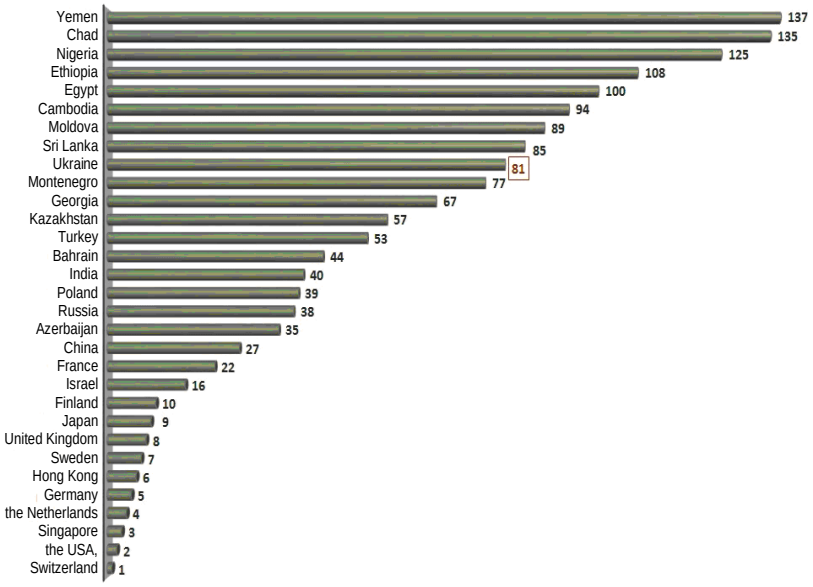

Fig. 3. Ukraine's position in the world ranking, according to the global economic competitiveness index (I_{GCI})

Source: [13]

According to the information from Fig. 3, being in the lower half of the ranking, the Ukrainian economy lags behind the vast majority of post-socialist countries, showing worse performance.

The identification of the reasons for the deterioration of the country's place in the world rankings is fundamentally important for the analysis of competitiveness. For example, in 2018, taking the overall 81st place in the I_{GCI} rankings, Ukraine had the best places in the following specific areas:

– 46th – by the level of education;

– 58th – by the level of innovation opportunities;

– 66th – according to the state of the labor market;

– 77th place – by the level of modern technologies penetration.

Instead, the indicators in the following areas were worse than the general significance of Ukraine's place in the ranking:

– 94th – according to the state of health care;

– 110th – according to the level of development of state institutions;

– 131st – according to the level of macroeconomic stability.

Since there is little doubt that the overall competitiveness of the national economy and the competitiveness of an enterprise are linked, predictions regarding an enterprise's capacity should take into account at least the following factors:

– dynamics of national competitiveness;

– changes of the impacts of certain areas, respectively, of indicators of improvement or, conversely, deterioration of the country's place in world competitiveness rankings.

To quantify the competitiveness of enterprises, using certain methods, it is advisable to explore the emphases in the definitions of this phenomenon. With regard to

the emphases, we can distinguish the following approaches to the content of the enterprise competitiveness:

– from the standpoint of dependence on the competitiveness of the created goods;

– from the standpoint of dependence on the competitiveness of the industry and the entire national economy;

– from the standpoint of the level of resource efficiency;

– from the standpoint of human capital formation;

– from the standpoint of competition with other market operators;

– from the standpoint of the ability to adapt to specific conditions.

The methods used in practice to assess the competitiveness of enterprises are mostly based on these approaches or on their individual fragments.

From a large set of methods for assessing the enterprise competitiveness it is possible, according to certain criteria, to distinguish their groups (Fig. 4).

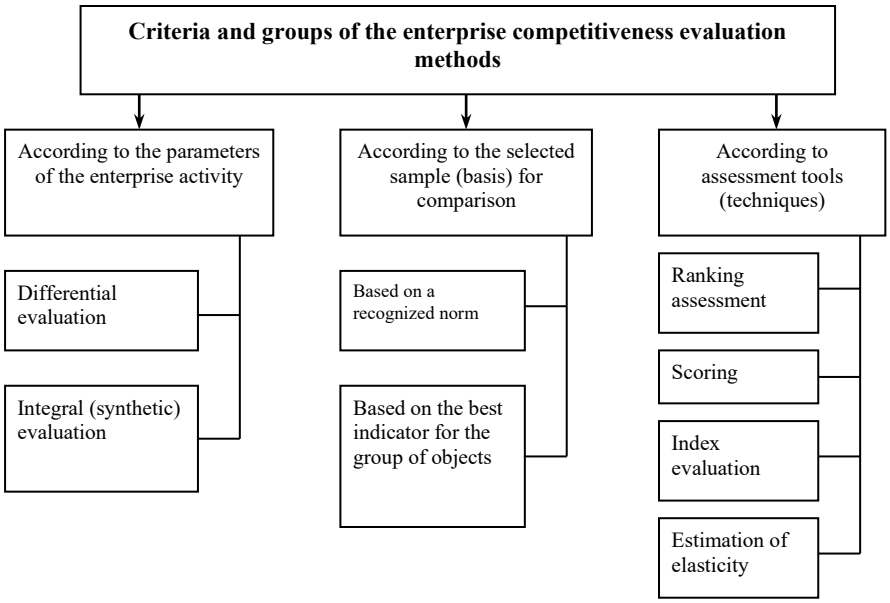

Fig. 4. Criteria and groups of methods for assessing the enterprise competitiveness

Source: authors' own

Figure 4 illustrates the division of methods for assessing the competitiveness of enterprises by three criteria. According to the *first criterion* – considered parameters of the enterprise activity – differential and integral methods have been identified. According to the *second criterion* – the selected sample – methods using a recognized norm and using the best indicator for a group of objects have been presented. According to the *third criterion* – the applied evaluation technique – the methods of ranking, scoring, index evaluation and elasticity evaluation have been distinguished. It is important that each specific method of assessing the enterprise competitiveness can simultaneously belong to several groups, meeting several criteria. This is

confirmed by the analysis of specific methods used in the analysis of the enterprise competitiveness.

Despite the differences in methods for assessing enterprise competitiveness, they are all founded on the concept of benchmarking – *comparison*-based assessment (level determination). Different components of an enterprise can be evaluated through comparison. To begin, it is necessary to compare product quality, productivity, sales, market share, and return on investment, among other factors. The comparison may also relate to such characteristics as quality of management, business reputation, and image of an enterprise. Benchmarking of the enterprise competitiveness, as a very variable phenomenon, must take place permanently. This requires relevant and constantly updated information on various aspects of an enterprise.

The main difficulty of benchmarking, as an approach to evaluation through the comparison of competitiveness, is related to the choice of the basis for comparison. It is a question of a choice of analogues (samples) – objects with parameters of activity which are accepted as a reference. If the compared enterprises differ significantly in the range of products, technologies, organization of production and management, stage of the life cycle, etc., the comparison loses its validity. To avoid incorrectness, the «reference object» – a hypothetical company endowed with certain properties – must be determined taking into account the requirement of similarity.

The idea of a «reference object» has certain advantages, as it creates a certain positive image for the company as a goal to be achieved. At the same time, specialists in strategic management pay attention to the negative results of this approach. After all, the desire of enterprises to «copy the model» can lead to a distortion of economic rivalry and the competitive nature of business. This can result in a loss of benefits from true (objective) competition between enterprises for consumers and for the economy as a whole.

Expert evaluation is a common approach of comparison-based evaluation. This technique can produce positive results if the experts are professional and the survey findings are statistically processed correctly. The task of experts can be to assess the level of a parameter (mostly that has no quantitative indicators) in scores, ranking of the studied objects, the significance of the impact (weights in integrated assessment), etc.

Consideration of individual methods for assessing the competitiveness of enterprises provides grounds for confirming the effectiveness of our proposed classification of assessment methods (Fig. 4).

A differential method is used to determine the enterprise competitiveness in relation to the competitiveness of its products. Individual parameters of a product and the product chosen as a sample (base) for comparison are compared in this way. Such an assessment is appropriate for any stage of the product life cycle and the life cycle of an enterprise.

This uses the simplest formula for relative assessment:

$$q_i = \frac{P_i}{P_{i0}} \times 100\%, (i = 1,2,3,\dots,n), \qquad (1)$$

where q_i – a separate indicator of the enterprise competitiveness for the i-th product, evaluated by certain parameters, such as energy savings in consumption, design quality, reliability in use, etc.; P_i – the actual quantitative value of the parameter by which the product is valued; P_{i0} – quantitative value of the parameter of the product selected (recognized) as a sample; n – the number of parameters by which the product is evaluated, through which the level of enterprise competitiveness is revealed.

The formula 1 can also be used to analyze the enterprise competitiveness using particular economic criteria. Productivity, market share, profitability, economic growth, and other factors can be studied as parameters. Variable models will have the following values: P_i – the actual value of the parameter by which the economic condition of an enterprise is estimated; P_{i0} – the quantitative value of the economic parameter of an enterprise, selected (recognized) as a sample.

The considered method of assessing competitiveness, according to the classification presented in Fig. 4, belongs to the group of differential evaluation (according to the first criterion), to the group of evaluation according to the selected sample (according to the second criterion), and to the group of index methods (according to the third criterion).

Conclusions about the level of enterprise competitiveness, according to the results of differential (by individual indicators) evaluation are quite simple. For example, such an assessment makes it possible to record by how many percentage points the parameter of the product by which the company is valued, deviates from the sample. But such simple conclusions are limited because they ignore many other important aspects of the enterprise competitiveness.

Taking into account the fact of the versatility of the enterprise competitiveness phenomenon, the methods of integrated (comlex) evaluation are used.

Such integrity can be implemented even when assessing the enterprise competitiveness through one product. Complexity is achieved if the product is evaluated not by one but by several parameters. It is about the use of the so-called parametric index of consumer properties of goods (J_n) [14], calculated by the formula:

$$J_n = \sum a_j \times i_j, \qquad (2)$$

where n – the number of parameters being analyzed; a_j – the weight of the j-th parametric index, which is usually determined by experts; i_j – parametric index of the j-th parameter.

With a mixed differential-integrated approach, i.e. when assessing the enterprise competitiveness through a particular product, which is evaluated not by one but by several parameters, the following formula can be applied:

$$q_i = \frac{J_i}{J_{i0}} \times 100\%, \qquad (3)$$

where J_n – parametric integrated valuation index of a particular product; J_{n0} – parametric integrated index of evaluation of the product selected as a sample.

Another option for a comprehensive assessment of competitiveness is to use a customized index calculated without normalizing individual parameter indices, as described in the formula:

$$I_{np} = q_{i1} \times q_{i2} \times q_{i3} \dots q_{in,} \qquad (4)$$

where I_{np} – group indicator of competitiveness according to normative parameters; q_i – separate index indicators of competitiveness taking into account standards; n – the number of parameters being evaluated.

The peculiarity of the evaluation methodology based on the group index (according to formula 4) is that it assumes equal importance of all selected parameters for the enterprise competitiveness. After all, non-competitiveness in at least one indicator, i.e. the absence of a certain parameter (for example, $q_{i2} = 0$), causes a zero value of the entire integral index.

According to the classification shown in Fig. 4, the assessment of competitiveness using formulas (2) and (4) is integral, based on a recognized standard and using integrated indices.

The enterprise competitiveness in all the methods we have considered so far was assessed by the *internal* characteristics of an enterprise. It was about the quality of the manufactured goods as well as many economic activity parameters. The enterprise *external* aspect was present indirectly, specifically in the selection of the sample for comparison. External *parameters*, on the other hand, can be used to assess competitiveness. In particular, these include the parameters of the response of consumers of the industry to changes in certain aspects of an enterprise. Such indicators (at the same time – methods of evaluation), in our opinion, may include:

– coefficients (E_P^D) of the elasticity of consumer demand (D) by the prices of those goods with which first of all an enterprise is presented in the industry market (P):

$$E_P^D = \frac{\Delta D}{\Delta P}. \qquad (5)$$

Stable and relatively low values of this indicator of elasticity, in our opinion, can be interpreted as evidence of a stable competitive position of an enterprise in the market;

– indicators of consumer response to advertising (image) activities of an enterprise, for example, in the form of a coefficient (k_{Adv}^{Rev}) of change in sales (Rev) for each additional unit of advertising (image) expenses (Adv):

$$k_{Adv}^{Rev} = \frac{\Delta Rev}{\Delta Adv}. \qquad (6)$$

The relatively high and rising values of this coefficient can be regarded as a strengthening of a company's competitive position as a result of increased trust in its activities and the information it provides;

– coefficients (k_{Inv}^{Pl}) of an enterprise position change in the ranking of enterprises of the industry (Pl) for each additional unit of usual investment or innovation expenses (Inv):

$$k_{Inv}^{Pl} = \frac{\Delta Pl}{\Delta Inv}. \qquad (7)$$

Positive values of this ratio may testify to the victory of an enterprise in competition with other enterprises in the industry through more efficient investment. The latter is a direct manifestation of greater competitiveness of an enterprise.

These methods of assessing the competitiveness of an enterprise through external response to changes in its activities – in fact, the assessment of elasticity –are differential only in form. In their content, they are integral. The reason for this statement is that the external environment of the industry market responds to an enterprise as integrity. In this integrity, not just one parameter, but many parameters of enterprise activity are intertwining.

Conclusions: Theoretical approaches to interpreting the content of enterprise competitiveness that have been researched create the foundation for views about the relationship between competitiveness and the stability and certainty of an enterprise particular economy. But the contradiction between the stability of the current state of an enterprise and the need for change for the sake of the future, on which we focused, is not yet «embedded» in the general theory of competitiveness. Therefore, the scientific and applied issue of explaining the relationship between competitiveness and economic stability and certainty at the enterprise level can hardly be considered solved.

The methods we examined for assessing an enterprise competitiveness, in our opinion, lack suitable application tools for evaluation that take economic uncertainty into consideration. Although the approaches used in the analysis allow for the inclusion of an uncertainty parameter in the evaluation processes.

In our opinion, future research in the field of enterprise competitiveness should focus on two issues: 1) on clarifying ideas about the relationship between the ability to participate in economic competition and the need to adapt to conditions of uncertainty; 2) on the creation of methods for assessing competitiveness, taking into account the parameter of uncertainty.

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RELEVANT REAL ESTATE APPRAISAL IN MINIMIZING ECONOMIC UNCERTAINTY IN ENTREPRENEURIAL ACTIVITY

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Independent real estate appraisal of property and property rights, based on National Valuation Standards, International and European Valuation Standards and property rights, is a systemic factor in building market relations in Ukraine. Economics introduces real estate into the system of its scientific interest, revealing its specific properties for minimizing the economic uncertainty of entrepreneurial activity. From the economists' point of view, real estate is capital fused with land. This means that the value of real estate is due to its direct dependence on land [1; 2].

The Law of Ukraine «On Valuation of Property, Property Rights and Professional Valuation Activity» requires a certain proof of the valuation results from the subjects of valuation activity. Valuation of property and property rights is the process of determining their value on the estimate date according to the procedure established by regulations on property valuation and is the result of practical activities of the subject of valuation [3].

In our opinion, relevant real estate appraisal is a process of determining the conformity of the real estate value to its actual market value.

Each type of real estate has its own peculiarities of operation, which requires a specific legal regime of regulation. Different types of income provide a special algorithm of taxation – it can be a part of the value of real estate or withdrawal of profits arising from its operation.

Depending on the possibility of income (functional purpose and implementation of the function of capital) real estate is divided into consumer, industrial, commercial, investment, income [4].

Consumer real estate is intended for permanent (or long-term) residence of their own things subjects and placement. This property allows users to receive hidden (alternative) rent. With regard to consumer real estate, there is a special institutionally organized subject of ownership – the association of apartment building owners, which falls into its specific legal space.

Industrial real estate is designed to accommodate various activities in industry, agriculture, transport, communications, etc. Income from this type of real estate is directly included in income from operating activities. In addition, certain types of industrial real estate (like consumer) have a hidden rent, which makes it possible to convert them into commercial real estate.

Commercial real estate is designed to accommodate those types of economic activities that are directly related to the provision of services to consumers (retail

space, offices, cafes, etc.). The main purpose of commercial real estate placement is to get rent from the location (where the required level of purchasing power is concentrated).

Investment real estate is all those objects (regardless of the purpose), the investment of financial resources, which is carried out in order to obtain business income, that includes profit, rent and interest. There is a multidimensional economic and legal environment around the real estate investment, where there are mechanisms for financing and mortgage lending. This environment includes securities transactions, when financing is carried out by issuing certificates of the Real Estate Fund.

The operation of profitable real estate involves the possibility of obtaining income from the transfer of objects in various forms of use (Fig.1). Depending on the real estate, there are many more different forms of use compared to other goods.

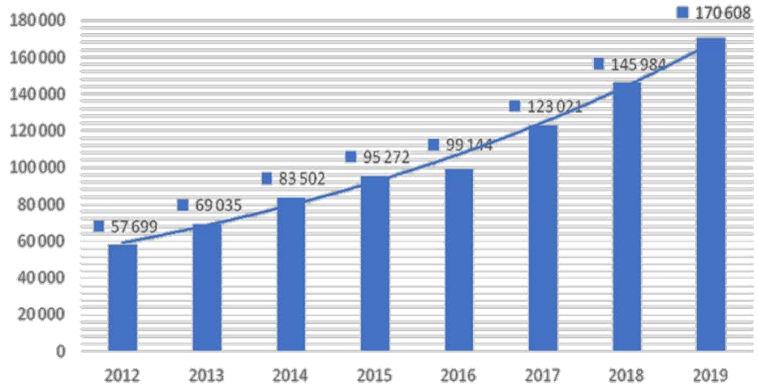

Fig. 1. Real estate transactions at actual prices, UAH mil. and their share in GDP, %

Source: author's own development based on [5]

Only real estate has the following uses:

– freehold (use of the building by the owner together with the land for an indefinite period of time with full responsibility for the real estate maintenance);

– leasehold (long-term lease with division of responsibilities);

– emphyteusis (long-term, inherited lease of agricultural land);

– superficies (the right to build land for an unlimited time);

– easement (the right to use real estate by third parties);

– vertical distribution of property rights (special opportunities to benefit from the underground part or airspace).

Nowadays, the right to purchase limited rights to residential apartments, suites, hotel rooms for a specified period of time (property or non-property timer) is activated. Today, Ukrainian law does not actually regulate these relations, which remain in the sphere of illegal association, that leads to various methods of fraud.

A formalized approach to estimating the market value of real estate requires correct implementation to obtain more proven results than those obtained on the basis of an informal approach (subject-intuitive). Known methodological approaches to real estate valuation are focused on practical application in a stable market economy.

It should be noted that modern market conditions of economic uncertainty pose fundamentally new problems for enterprises, the solution of which will allow to achieve and maintain a competitive position in the market. There is a growing awareness that the development and, consequently, the increase in the value of business is possible by minimizing the economic uncertainty of entrepreneurial activity.

The specifics of the domestic real estate market, which is constantly in conditions of economic turbulence, does not allow to fully adapt the known international approaches to the valuation of real estate in the realities of the national economy. The reasons are also the limitations and shortcomings inherent in each of the classical approaches to property valuation.

Approaches to property valuation differ in their focus and generally take into account cost factors and practical aspects of financial activities, which are formed on the key source information basis (Table 1).

Table 1. Advantages and disadvantages of real estate appraisal methods

Approaches to real estate appraisal		Advantages of the method	Disadvantages of the method
Revenue approach: involves estimating the value based on the ability of the object to generate income	The method of direct (linear) capitalization	It is used for forecasting attacks of constant in magnitude and equal in periods of forecasting net operating income, the receipt of which is not limited in time.	Risk assessment is quite subjective in Ukraine. The method is based on forecasting, not just actual information about performance.
	Indirect capitalization method (cash flow discounting)	Allows you to estimate the future profitability of the object of evaluation and consider the importance of the object in the market of production and sale of services	In an unstable economy, accurate forecasting requires highly qualified appraisers
Cost (property) approach involves estimating the value of the object, based on the cost of its reproduction (replacement) in the prices on the valuation date with subsequent adjustment to the amount of depreciation	Direct reproduction method	Provides the ability to conduct a fairly accurate estimate of the costs associated with the creation of the object and element-by-element assessment of the components of the whole object	Limited use of market information on real estate appraisal
	Substitution method	Has a normative and methodological regulation of determining the cost of replacement with subsequent deduction of the amount of depreciation (depreciation).	The complexity of evaluating objects with a longer service life due to the difficulty of determining wear
Comparative (sales analogues approach): based on estimates of the value of the object, based on the values of similar objects	Method of industry coefficients	Determines the price of the object based on the actual purchase price of similar objects, considering the adjustments for their comparison.	Ignoring the prospects of future development of the object. Laborious collection of complete and reliable information. Complex adjustments in the process of leveling the differences of the object of appraisal.
	Method of analogues	Possibility to involve apparatus of mathematical statistics and computer modeling.	It is impossible to use if there is no information on purchase and sale agreements of analogous firms or the market of purchase and sale of the enterprises is not developed

Source: author's own development based on [6-8]

Therefore, there is a question of reconciling the results obtained in different approaches to minimize the economic uncertainty of business.

The situation on the real estate market makes appraisers increasingly think about developing a comprehensive method of relevant real estate valuation, which could consider various value factors in the calculation process and would combine the advantages of each of the classical approaches [6].

Given that the effectiveness of the assessment to minimize the economic uncertainty of entrepreneurial activity depends entirely on the tools of its implementation, the search for optimal ways to improve the valuation of real estate is of paramount importance.

The theoretical foundation of the property valuation methodology is a systematic approach to determining its main elements.

The real estate appraisal process takes place in accordance with a defined procedure and using generally accepted valuation methods. There are several methods, and their choice is determined primarily by the type of object of assessment and the purpose for which such assessment is conducted.

The following basic methodological approaches are used to conduct real estate appraisal in Ukraine: income, expenditure, comparative. Thus, the income approach focuses on profitability, cost – on assets and liabilities, comparative – on the valuation of the object by comparing transactions on similar objects [7].

The assessment of the property market value and property rights using the income approach is based on determining the projected income from the use of this property.

Based on the income approach, the appraiser determines the ratio of future income from the object of evaluation and its current value. The advantages of this approach, first of all, should include its systematic approach.

The process of returning the funds invested in the object can be both simultaneous (for example, at the time of resale) and distributed over time, when the principal amount invested in the object is returned in the form of periodic receipts over a specific period of time.

The fundamental principle for a profitable approach is the principle of expectation. After all, it is in accordance with the principle of expectation that the value of property is determined by the real (current, present) value of all its future income. It now seems logical to say that the higher the income potential of the assessed property, the greater its value. It should be borne in mind that the analysis of income should be carried out throughout the subsequent economic life of the object of assessment, provided that it is used during this period of time in the most efficient way.

In accordance with the principle of substitution, the maximum value of the assessed property should not exceed the lowest price at which other similar property with equivalent profitability can be purchased. This principle is essentially analogous to the economic principle of investment alternatives. It can be argued that if the appraiser can predict with sufficient accuracy the future income of the owner of the property being appraised over a specific period of time, the use of a revenue appraisal

approach is quite appropriate, and in most cases absolutely irreplaceable. The main methods of this approach are:

– the method of capitalization of net income. On its basis, the flow of income is determined with its conversion into current value, based on capitalization rates [9]:

$$V = \frac{I}{R}, \qquad (1)$$

where V is the value of the business; I – net income; R – rate of return.

However, this method can give an objective assessment only in a stable economy, for which the object of assessment, such as an enterprise, for a long time received a stable income;

– the method of discounting cash flow (the method of indirect capitalization) allows you to calculate the current value of future income. The method of obtaining income does not matter, it can be obtained both from ownership of the property and from the sale of property. Ideology of the discounted cash method flows is that a prudent investor evaluates his property in terms of income as follows: as possible income derived from the operation of the property (for the period); as a reversal – the income from the object of evaluation, associated with its sale in the post-forecast period. This means that the current value of the property can be calculated using the formula [9]:

$$PV = \frac{I_1 + R_1}{1+i}, \qquad (2)$$

where I_1 – income received from the operation of property at the end of the first period; R_1 – reversion (property value) at the end of the first period; PV – current value of the property; i – the discount rate (rate of return on capital).

Ukrainian scientist-practitioner Maksymov S.Y. rightly notes that the use of income approach allows you to most fully consider the target settings of banks, consistent with the parameters of economic and social development of the country [9, p. 35] while researching methods of determining the value of the bank.

Some foreign scientists believe that the method of indirect capitalization is the most universal and reliable method of estimating the value of the enterprise. However, scientists note that this method best reflects the market value of the enterprise, because the value of the enterprise can be reliably estimated only when the income will be calculated, which will be generated by the enterprise in future periods. [10].

We agree with Copeland's assertion that this method cannot take into account a number of objective factors for most assets: inflation, exchange rate fluctuations, and other force majeure circumstances. In addition, the source base for this method are financial and accounting statements, marketing research data, development strategy, long-term plans, etc., which also cannot guarantee objectivity in the assessments, because it is difficult in economic uncertainty to predict the future value of finished products, equipment, raw materials, etc. [11].

The method of discounting cash flow will be effective for application to enterprises, property complexes that develop efficiently, are characterized by stable

income, have a long history of operation. It requires a significant number of adjustments to bring the projected financing structure to the real enterprise value.

According to L.A. Leifer, the practical application of methods of discounting free cash flows for the company, for share capital and assets should give the same generalized value of the company [12]. These methods give the same results after taking into account the following conditions:

– their market value is accepted as the value of share capital and debts;

– the ratio between the components of the company's capital must be constant throughout the valuation period;

– income growth rate is zero.

This statement can be adapted to other areas of economic activity. However, the scientist does not remove the main problem – the exact calculation of future income.

On the basis of the cost (property) approach, the vast majority is the assessment of real estate, the circulation of which is limited (educational institutions, culture, architectural monuments, etc.).

For the real estate appraisal, the cost approach is used if it is necessary to replace such property or determine their economic feasibility.

The use of expenditure income is appropriate if [13]:

– assessment of state facilities;

– establishing the value of special purpose property (schools, hospitals, architectural and cultural buildings, railway stations, post offices, etc.);

– accounting;

– establishment of the object of taxation;

– putting the property up for auction or other open bidding is necessary.

The peculiarity of this approach is the valuation of property solely on the basis of analysis of available assets. On the one hand, this is an advantage of this method, because its results are largely built on an objective basis, but on the other hand, this approach does not consider the prospects of business development based on analysis of key financial and economic indicators, which makes this method more static. The method allows you to determine the lower level of value of the enterprise, property complex as a whole or part of it.

The cost approach is based on the assumption that a typical buyer will not offer more for a property than the amount of money to spend on the purchase of land and the construction of a property similar to the consumer characteristics of the property being valued.

The calculation of the value of buildings and structures in most cases is performed using the method of valuation at the cost of a single indicator, which is most widely used in domestic valuation practice. However, it should be considered that it gives a discrepancy of 15-20%. This method is based on comparing the unit cost of real estate properties (1 m2 of living space, 1 m3 of construction volume, etc.) of the assessed object with the value of a similar unit of measurement of a similar typical structure.

The purpose of the assessment is to calculate the residual value, which is the replacement cost less depreciation. In this case, the replacement cost is determined on the basis of the value of a single indicator of the analogous object, and wear – based on the physical wear of each element of the assessed building.

The calculation is carried out in the following sequence:

1. The choice of construction analogue.

2. Estimation of the value of the object in the prices given in the «Aggregated indicators of replacement cost» (UPVV).

3. Determination of replacement cost.

4. Calculation of residual replacement cost.

The choice of analogue is made with the help of «Aggregate indicators of replacement cost». They are grouped in collections by sectors of the economy or by types of buildings and structures that contain the replacement cost of 1 m3 of building volume, 1 km of pipeline or highway, 1 ton of storage capacity, 1 m3 of foundation, etc. depending on the purpose, construction, capital, landscaping, size and location in a certain territorial zone (for Ukraine 2 zone) considering the climatic region.

When determining the replacement value of a building, the appraised value of a unit of aggregated meter, adopted according to the relevant collection of aggregated indicators of replacement value of buildings and structures for the 2nd territorial zone, is increased by the total number of units of measurement. The object of evaluation value (V_{repl}) when using the method of calculation of the single indicator value (V_{un}), is determined by the formula [6]:

$$V_{repl} = V_{un} \times S(V), \qquad (3)$$

where V_{repl} – replacement cost of the object of assessment, UAH; V_{un} – base value of a single indicator according to UPVV collections, UAH; $S(V)$ – total area (construction volume) of the object of assessment, m^2, m^3.

The replacement cost at the valuation date does not take into account the degree of physical wear and tear and is determined as follows [6]:

$$V_{repl.date} = V_{repl} \times K_n, \quad (4)$$

where $V_{repl.date}$ – replacement cost at the valuation date, UAH; V_{repl} – replacement cost of the object of assessment, UAH; K_n – is the integrated index of construction cost increase from 1969 to the valuation date.

$$K_n = K_{inc} \times K_{app} \times K_{inf} \quad (5)$$

where K_{inc} – coefficient that considers the increase in construction costs; K_{app} – market coefficient of price increase of construction and installation works on the territory of Ukraine; K_{inf} – inflation rate.

The coefficient of increase (K_{inc}) considers the increase in construction costs and is calculated by multiplying the industry index by territorial coefficient.

The market rate of appreciation (K_{app}) characterizes the change in the cost of construction and installation work. The ratio is calculated considering the data of the

State Statistics Committee of Ukraine and published in the collection of official documents and explanations of the State Committee for Construction and Housing Policy of Ukraine «Pricing in Construction».

The inflation rate (K_{inf}) is used if the valuation date differs from the date on which the market rate of increase in the cost of construction and installation work in Ukraine is published. It is calculated by the State Statistics Committee of Ukraine and published in the periodical press on a monthly basis.

Having determined the replacement value of the object, we find its residual replacement value, which is reduced by the amount of wear and is calculated by the formula [6]:

$$V_{res} = V_{repl.date} \times K_{wear}, \qquad (6)$$

where V_{res} – residual value of the object, UAH; $V_{repl.date}$ – replacement cost on the valuation date, UAH; K_{wear} – coefficient of physical wear.

The amount of physical wear is characterized by the coefficient of physical wear of the object, which is determined as follows [6]:

$$K_{wear} = 1 - \frac{W}{100}, \qquad (7)$$

where K_{wear} – coefficient of physical wear, units; W – physical wear of the building, %.

$$W = \sum_{i=1}^{I} F_i, \qquad (8)$$

where F_i is the weighted average wear of the building element (foundation, walls, floors, etc.);

$$F_i = f_i \times l_i, \qquad (9)$$

where f_i – the percentage of wear of the element of the house depending on the technical condition; l_i – the share of the value of the element in the value of the whole object.

Determination of physical wear and tear of the object of appraisal is made on the basis of a review of its structural elements in accordance with the Rules for assessment of physical wear and tear of residential buildings, approved by the State Committee for Housing and Communal Services p 52 from 02.07.93.

Also, when calculating the cost by the method of costs, a necessary condition is to take into account the value of the land component, which means taking into account the right to use the land.

This approach gives the most reliable results when evaluating the objects of unfinished construction, specialized real estate, as well as in the assessment of infrastructure. Less reliable results – when applying this approach to the assessment of built-in premises.

A comparative approach in the process of property valuation allows you to compare the value of the object of evaluation with the cost of acquiring a similar or similar object. However, the disadvantage of this method is obvious – the search for a similar object. This applies to the assessment of the property of large industrial complexes, unique buildings, their location, and so on.

Within the comparative approach (sales analogues), it is a valid assumption that the data on existing transactions are the result of judgments of sellers and buyers regarding the value of objects and include information that allows to decide on the market value of the object. The approach is based on the principle of substitution, according to which a typical buyer will not pay for the object exhibited on the real estate market a price greater than the cost of purchasing another object with the same utility.

In general, the method of market comparison (method of sales analogues) is formalized as follows [6]:

$$V_{ob} = V_{an} \times K_{diff}, \qquad (10)$$

where V_{ob} – the value of the object of evaluation, UAH; V_{an} – the cost of the analogue, UAH; K_{diff} – a coefficient that considers difference between the object of appraisal and the object-analogue.

After selecting the unit of comparison, the main indicators or elements of comparison are determined, using which you can model the value of the object of evaluation by making the necessary adjustments to the selling prices of similar objects.

Based on this, the basic rule of adjustment is formulated in the implementation of the method of comparison of sales: the selling price of the analogue object is adjusted to model the value of the object of evaluation [14].

There are the following main elements of comparison:

• Ownership rights to the object of assessment transferred (K_{own}). The presence of certain restrictions on the right of ownership objectively reduces the value of the object of appraisal, and hence the sale price;

• Terms of sale (free sale, forced sale) (K_{terms}). This element of comparison allows to exclude objects of comparison from a number of analogues or to carry out on them adjustment of the prices of sales at detection of deviations from market conditions of sale caused by atypical motivation of acquisition of property;

• Terms of financial settlements when purchasing an asset (K_{calc}) – purchase and sale agreements in terms of financial settlements can have a variety of options, of which we can distinguish two typical:

a) settlement of the buyer with the seller at their own expense and on the date of sale;

b) financing of the purchase and sale of real estate by the seller, which means providing them with a commercial loan to the buyer (deferred payment);

• dynamics of transactions in the market (K_{dyn}). This element of comparison allows us to identify the influence of time in a broad context on the dynamics of transactions in the real estate market and, accordingly, on the level of sales prices. A component of the time factor is inflation or deflation, changes in property rights legislation, taxation, change in supply and demand for real estate, etc.;

• location (K_{loc}). Territorial coordinates of the location of a real estate object in determining its value are transformed into the rental component of the value. For

example, the value of real estate depends on many characteristics related to its location, namely: differences in the location of land in different climatic zones, in settlements of different categories and within settlements in different functional and economic-planning zones; physical characteristics ($K_{ph.ch}$) determine the usefulness (and hence the cost) of the object of evaluation. The list of physical characteristics is diverse – age and condition, type of building materials used, size and shape of land (for real estate), architecture of buildings or structures and design of other types of assets and more. Thus, the coefficient characterizing the difference between the object of appraisal from the object-analogue can be calculated using the following formula [15]:

$$K_{diff} = K_{own} \times K_{calc} \times K_{terms} \times K_{dyn} \times K_{loc} \times K_{ph.ch}. \quad (11)$$

This approach is used when there is information about the sale of objects with similar characteristics to the object of evaluation. Given that both the primary and secondary real estate market is already formed and there is enough information about the prices of analogues, this method of determining the value is the most reliable.

The comparative approach is implemented on the basis of the following methods:

– method of branch coefficients. The application of this method will be effective in the case of a systematic approach to its use. It is necessary to study the statistical data, as well as analytical generalizations on the main production and financial indicators of the enterprise;

– the method of the analogous company is based on the basic principles of benchmarking and allows on the basis of studying the experience of a similar company or a company that has achieved significant success to determine the adjusted price of the enterprise. The effectiveness of this method depends on a number of factors – the analogue should belong to the same industry; approximately correspond to the form of management; location geography; type of activity; legal and organizational structure; operating time; production volume; number of employees, etc.

Note that in international practice there are a number of methodological approaches to the valuation of real estate, which in an adapted form can be implemented in domestic practice – Edwards-Bell-Olson models, (EBO) [16]:

$$V = B_0 + \sum_{t=1}^{T} \frac{E[\Delta X_t]}{(1+r)^t}, \quad (12)$$

where B_0 – equity (net assets) of the company at the time; E – a symbol of mathematical expectation; r – the discount rate that corresponds to the expected cost of serviced capital; ΔX_t – deviation of net profit at time t from the «norm» (excess profit).

The model belongs to the so-called models of «residual» income (Redial Income Model) or RIM. We believe that Olson's model, as one of the promising developments in the theory of property valuation, synthesizes some advantages of income and cost approaches, while even minimizing the disadvantages of each of them, because property appraisal is based on the integrated application of the following indicators:

– book value in statistical terms for a certain period on the basis of market data;

– discount rates;

– the number of dividends paid;

– empirical parameters, the values of which are set according to the data of the whole market.

However, the application of this model in Ukrainian realities will be caused by a number of problems, as the accounting data of domestic companies largely do not correspond to the market value. In addition, we can assume that this model is based on consistency of volatility, which also complicates its application of these methods in the economic uncertainty of business in Ukraine.

Thus, we can assume that currently there is no appropriate method of property appraisal, tested by foreign experience, which would ensure the objectivity of real estate appraisal in the national economic realities. Those methods, approaches, models that are effective in the conditions of international economic systems, are not adapted to the economic conditions in Ukraine.

We believe that there is a need to supplement national methodological approaches with requirements to increase the amount of objective information in real estate appraisal. Our proposal is based on the author's own observations on the absence at all stages of both real estate and integral property complexes appraisal, the results of intellectual property and other objects of evaluation, objective, reliable, timely, valuable, complete information about the object of appraisal.

In this context, we fully support the opinion of Ukrainian scientist-practitioner Maksymov S.Y., that in an innovative economy and rapid renewal of business processes there is a need to disclose in the financial statements' information on the company's development strategy, which aims to increase business value and strengthen its competitive benefits. Providing stakeholders with a wide range of information will have a positive impact on the market capitalization of companies.

Undoubtedly, the practical implementation of the concept of informatization of relevant real estate valuation requires significant efforts, first of all – is the formation of open access information arrays about the object of valuation.

However, subject to the successful implementation and practical application of this approach, we will be able to minimize the corruption component in the process of relevant real estate appraisal and allow the application of tried and tested international property valuation methods.

Our proposal is also based on the main problems identified by us, which Ukrainian appraisers face in practice in order to minimize the uncertainty of business activity. In particular, it is the classification of information about the prospects of development of settlements to the category of limited access, usually official information, secondly, the lack of systematic data on transactions (we mean sales agreements), thirdly, the lack of analog databases on market value of property and a number of other problems.

The information approach in the appraisal of property involves a set of organized data on the results of economic activity, various aspects that characterize the functioning of the production facility.

The source base of the information approach is formed of planning, normative,

accounting, reporting data and analytical information. The structure of the information array provides information on the actual results of economic activity and indicators as a basis for comparison.

On the basis of the SWOT – analysis information approach matrices that will allow to simplify procedure of construction of an estimation and to provide clarity of the carried-out operations can be developed. In addition, geographic information systems (GIS) can be an important source of information in the context of the information approach in property appraisal. To date, there are few companies that would not need GIS technology. After all, only with the help of this system it is possible to process a significant amount of information in the shortest possible time.

Interesting, in the context of our study, is the experience of Slovenia, where within the framework of a loan from the International Bank for Reconstruction and Development, a «Geoinformation plan to support real estate management» was developed and implemented. The global goal of this project is to provide operational support to the management and economics of real estate in the context of international relations, the use of information databases (land registers, etc.) and tools related to modern information technology. The methodology itself in everything related to data collection is designed at two levels: data are collected both at the state level and at the local level.

But property appraisal requires not only data from the original database provided by the geographic information center – the results of real estate market analysis are also needed. Assessment of property using GIS will provide visual information on the directions of new construction, the density of existing urban development, there will be the possibility of qualitative and quantitative zoning in the real estate market, displaying the area on the city map and the competitive environment near it. It is geographic information technologies that make it possible to combine different types of information, statistical, economic and geographical basis, which is not enough for the analytical activities of table numbers. Only a combination of GIS capabilities and analytical information accumulated by the appraiser makes it possible to have a complete picture of the object of appraisal.

The development of the real estate market creates a new transaction service, which is implemented through the activities of professional surveying firms. The main function of surveying is to provide a comprehensive approach to property management based on the separation of functions of the owner (strategic decision-making, quality control) and manager (development of specific actions of marketing research, consulting, investing and their implementation to achieve effective results for the owner and society).

Conclusions: Real estate valuation, as a procedure with significant stabilizing potential, can be used to limit economic uncertainty. Such an assessment of real estate can be considered relevant for the conditions of national economies with a high level of uncertainty. This is exactly what the Ukrainian economy is like.

Approaches and methods of real estate valuation used in the practice of other countries and in Ukraine contain certain elements that, if implemented, will make the

valuation relevant. It is a question of conformity of an estimation to those concrete conditions in which real estate is used, bought and sold. Despite the importance of general approaches to real estate valuation arising from the economic nature of real estate, special conditions must be taken into account in national valuation methods.

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THE COMPARATIVE ANALYSIS OF ECONOMIC STABILITY AND CERTAINTY TAX PROVISION: UKRAINE VS GERMANY

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The relevance of the topic regarding influencing the stability of the economy through the tax system is undeniable. Ukrainian economic entities are subject to various contradictory influences from financial institutions which do not perform the functions of affordable lending, from the monetary sphere with its changes in the national currency, from the judicial system, which does not protect property rights, etc. But taxes still exert the most significant impact on economic activity. By «tax stability of the economy» we mean not only a set of certain types of taxes and tax rates. These are the means of tax collection, the priorities of the tax authorities, the invariability and transparency of tax collection rules, etc.

For almost 30 years of existence of the newest Ukrainian state the tax system underwent permanent changes. But despite these changes, carried out under «noble political slogans», the tax authorities, for the most part, performed fiscal and punitive functions. Instead, Ukrainian business needed stimulating, advisory, and streamlining functions. The lack of the latter undermined the stability of the economy and continues to hinder its development in the early 2020s. During the most severe economic crisis of 2019 – 2020, the reform of the tax system becomes even more important. The authors consider that in terms of the purpose of this reform, first of all, it is necessary to save Ukrainian small and medium-sized businesses and stimulate aggregate consumer demand. Therefore, the comparison of the Ukrainian practice of taxation with the practice of the most developed country of the European Union – Germany can help justify rational and appropriate decisions in the field of public management.

Analysts from different countries study the impact of taxes on economic stability [1; 2]. The Ukrainian researchers analyze the impact of tax burden on business development [3; 4].

We make assumptions about the existence of such an algorithm for the transition of the momentum from the tax system to economic stability and economic certainty / uncertainty (Fig. 1).

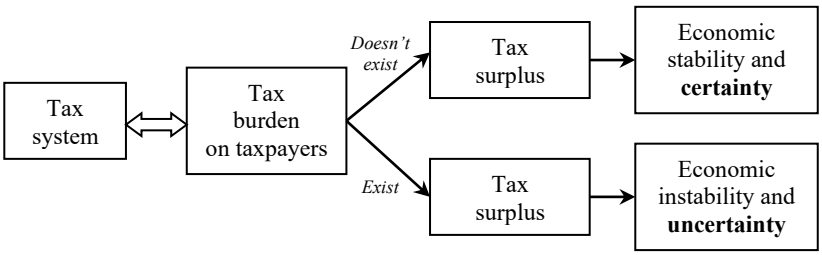

Fig. 1. Algorithm for the transition of the momentum from the tax system to economic uncertainty / uncertainty

Source: authors' own

The figure depicts the idea of the tax system creating economic uncertainty or, alternatively, the participation of such transfer elements as the tax burden and tax surplus in creating uncertainty. The tax surplus, as well as its growth, creates economic uncertainty. Instead, economic certainty is generated in the absence and diminution of the tax surplus.

The concepts of «tax burden» and «tax surplus» are interwoven with the following in the suggested theoretical construction (Fig. 1).

The tax burden is a reflection of the share of total revenues (GDP) redistributed through the budget in the form of taxes (T/Y). Since the relationship between taxes and income (GDP) is not linear, tax revenues reach an optimum only at certain values of income (GDP).

Excessive tax burden becomes a tax surplus. Its (burden) redundancy is manifested at least in the fact that after a certain limit further increase (Δ) of the burden can cause the following consequences:

– slowdown of economic growth due to the loss of entrepreneurial interest in the activity and due to the limitation of the own investment potential of enterprises;

– distrust of the government due to the social justice principles violation and its economic incentives rejection;

– increase in unreasonable expenses due to complicated bureaucratic procedures;

– growth of the shadow economy through the concealment of actual income and business transactions.

According to this logic, tax burden, which does not include a part (Δ) in the form of a tax surplus, forms economic certainty.

The value of the conclusions based on a comparison of the tax systems of the two countries – Ukraine and Germany – may be questioned. After all, countries have significantly different economic potentials. This is, in particular, illustrated by the data in Table 1.

Table 1. Indicators of economic potential of Germany and Ukraine in 2019

Indicator	Unit of measure	Germany	Ukraine
GDP based on purchasing power parity (PPP)	billions of international dollars	4 672,01	560,98
GDP by PPP per capita	international dollar	56 226	13 442
Consumer price index	%	1,3%	7,9%
Unemployment rate	%	3,1%	8,5%
Current account balance, USD USA	bn. USD USA	273,2	-4,2
Current account balance,% of GDP	%	7,1	-2,7
International reserves	bn. USD USA	224	25
Export of goods	bn. USD USA	1 464	46
Export of services	bn. USD USA	347	17
Export of high-tech goods	bn. USD USA	207	1
Exports of high-tech goods in% of exports of goods	%	16,4	5,4
Import of goods and services	bn. USD USA	1 588	76
Import of goods	bn. USD USA	1 217	60
Import of services	bn. USD USA	371	16
Food imports	%	7,8	8,6
Imports of fuel and energy in% of imports of goods	%	8,5	23,5
Export of goods	m. USD USA	1 489 152	50 066
Import of goods	m. USD USA	1 234 454	60 607

Source: authors' own based on [6; 7]

According to the information given in Table 1, the economic potential of the two countries differs significantly in the following parameters:

– by the scale of the generated GDP: in Germany the GDP is 8,3 times higher (in dollar equivalent taking into account PPP);

– in terms of general welfare: GDP per capita in Germany is 4,2 times higher than in Ukraine;

– by the level of macroeconomic stability: the inflation rate is higher in the Ukrainian economy, approximately 4 times, and the unemployment rate was significantly higher than the natural indicator and was 2,7 times higher than in Germany;

– in terms of external economic and financial stability: in Ukraine, in contrast to Germany, there was a negative current account balance, a negative trade balance, high dependence on energy imports, almost 10 times smaller volumes of official foreign exchange reserves;

– by the level of the economy innovativeness: the share of innovative products in Ukrainian exports was 3 times smaller than in Germany [5].

While acknowledging the significant differences in the economic potential of the two countries, however, this cannot be ignored.

First, there is reason to believe that the irrelevance – inconsistency with the objective needs of the economy and society – of the Ukrainian tax system is one of the main reasons for significant differences in potentials.

Second, the Constitution of Ukraine fixes the vector of movement towards the EU – the union in which Germany occupies a leading position. Therefore, the economy and the system of public management in this country should be objectively considered as a certain reference point for Ukraine.

Third, Germany is an important trading partner of Ukraine. For example, in 2019, Germany ranked first among Ukraine's trading partners in Europe with a share of 17,31% of total trade. The volume of this turnover amounted to 9,4 billion dollars USA. It is also important that the growth of Ukrainian exports to Germany this year was greater than the growth of Ukrainian imports from Germany.

Fourth, there is an investment movement between countries. Despite the fact that the volumes of investment flows are not significant, the actual directions of investment are important. Germany's share in foreign direct investment attracted to Ukraine in 2019 was 5,16%. The volume of investments reached 1668,1 million dollars USA. Germany ranks fourth in the list of foreign investors of Ukraine. At the same time, the lion's share (62%) of German investments went to the Ukrainian industry. The second, in terms of the share of German investments, was the direction of wholesale and retail trade and repair of motor vehicles (12,5%), the third – transport, warehousing, postal and courier activities (8%). **Direct investments from Ukraine to Germany in 2019 amounted** to 3,42 million dollars USA, moreover, 72,8% of them are directed to the processing industry [8].

With regard to these facts of economic interaction between the two countries, the comparison of the tax systems of Ukraine and Germany is not devoid of meaning and some scientific value.

The actual comparison of the Ukrainian and German tax systems can be based on the «Doing Business» international ranking from the World Bank. After all, when creating it, the parameters of the tax systems of the countries are taken into account. Table 2 offers data for comparison.

Table 2. The characteristics of the German and Ukrainian tax systems in 2020, according to the «Doing Business» ranking

Indicator	Germany	Ukraine
Tax ranking	46	65
Payments (number per year)	9,0	5,0
Time (hours per year)	218	328
Total rate of taxes and fees (% of income)	48,8	45,2
Index of procedures after reporting and payment of taxes (0-100)	97,7	86,0

Source: developed by authors based on [9]

The information presented in Table 2, indicates the following:

– the Ukrainian tax system is estimated as worse, than German by 19 ranking positions;

– tax burden, as a % of income paid in the form of taxes and fees in the two countries, does not differ significantly, and even in Germany it is slightly higher than in Ukraine (48,8 > 45,2);

– the procedure for paying taxes in Germany is simpler, as it involves less time to record and perform procedures (218 hours < 328 hours), and the overall index of procedures in Germany is better than in Ukraine.

With regard to the differences in the tax systems of countries and other differences in business conditions, the place of Ukraine and Germany in the ranking of attractiveness of doing business during 2006 – 2020 was as follows (Fig. 2).

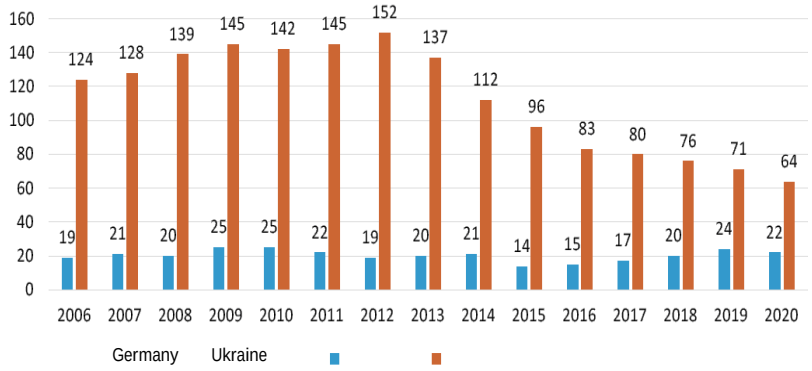

Fig. 2. «Doing Business» Rankings of Germany and Ukraine, according to the index of ease of doing business, 2006 – 2020

Source: developed by authors based on [9]

According to the information offered in Table 2 and in Fig. 2, Germany is not the world leader in terms of the tax system quality, ranking in the fifth dozen of countries. Similarly, the country is not a leader in terms of ease of doing business, often ranking only in the third dozen of countries. But Germany's place in the ranking of ease of doing business for the analyzed period changed insignificantly. Its average value was formed at the level of the 20th position. This can be interpreted as the evidence of relative stability and achieved economic certainty. Instead, Ukraine's ranking changed significantly, reaching the worst position (152nd place) in 2012 and the best (64th place) in 2020. The rapid improvement of the position in the ranking of ease of doing business after 2013 is significant.

The identification of the main «budget-generating» taxes becomes fundamentally important when comparing the tax systems of countries. Information on the shares of tax revenues for certain types of taxes in the budgets of the two countries is presented in Fig. 3 and Fig. 4.

The information presented in Fig. 3, shows that the German tax system is built in such a way that the main «budget-generating» tax in it is the personal income tax (27,48%).

The information from Fig. 4 gives grounds to conclude that the main «budget-generating» tax in terms of the Ukrainian tax system is the value added tax (35,38%). This fact only confirms the pattern recorded in the example of many countries: budgets in countries with lower levels of economic development are mostly formed by indirect taxes. The latter include VAT. Instead, in countries with a higher level of development, direct taxes, in particular personal income taxes, are predominant in budgeting.

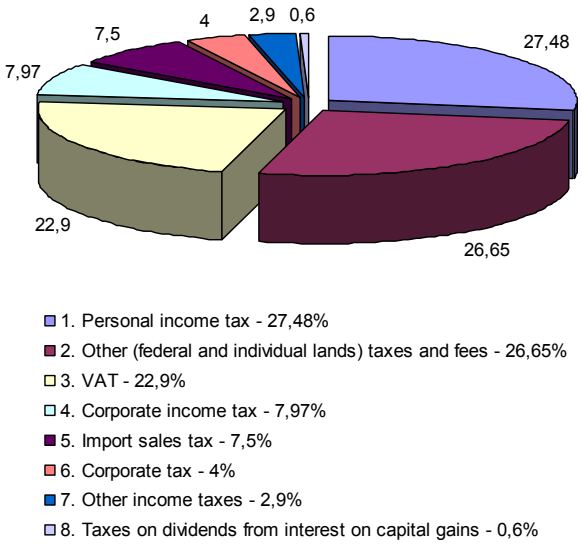

Fig. 3. The structure of tax revenues to the German budget in 2019, %

Source: developed by the authors based on [10]

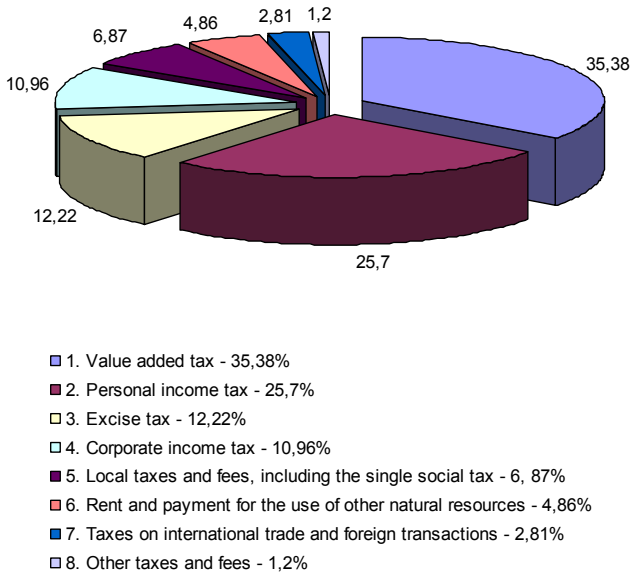

Fig. 4. The structure of tax revenues to the Ukrainian budget in 2019, %

Source: developed by the authors based on [11]

In addition to the difference related to various major «budget-generating» taxes, the comparison makes it possible to identify other differences. We focus only on those that are important for understanding the stabilizing impact of taxes. Such differences, in particular, include the fact that:

– in the Ukrainian tax system there is no corporate tax, which, with regard to the oligarchic model of the Ukrainian economy and the connection of oligarchs with large corporations (monopolies), is unnatural;

– the share of local taxes is significantly different, therefore, the possibilities of local budgets in Ukraine are significantly different.

Germany's tax system is characterized by the collection of taxes at three levels: general (central), federal, and of individual lands. To understand its features and

stabilizing effect, it is important to take into account how taxes are distributed by levels (Table 3).

Table 3. Distribution of taxes by levels in the German tax system

General taxes – Gemeinschaftsteuern	Federal taxes – Bundessteuern	Taxes of individual lands – Landessteuern
– income tax; – corporate income tax; – corporate tax; – sales taxes, including value added tax (VAT); – trade taxes	– energy tax; – tobacco tax; – taxes on alcohol, brandy, wine; – tax on coffee; – intermediate tax on goods; – insurance tax; – tax on motor vehicles; – aviation tax	– wealth tax; – land tax; – inheritance tax; – land purchase tax; – beer tax; – tax on gambling

Source: developed by the authors based on [10]

Based on the information given in Table 3, it can be concluded at least about a more diverse list of taxes collected at the level of federal entities and individual lands in Germany.

The core of the stabilizing effect of the tax system is related to the formation of tax rates on individual taxes and tax benefits. The study of them provides grounds for conclusions about the direction and priorities of both the tax system and all public authorities. Therefore, we consider rates and benefits from the point of view of the priorities to which they can be directed [12-15].

The priority of social stability and *limiting the inequality* of wealth distribution is reflected in the following features of the German tax system:

– progressive taxation of incomes of citizens with differentiation of rates from 14% to 45%, with a tax-free annual minimum income of 8,82 thousand euros and the highest tax rate of 42%, which is applied to income in excess of the annual amount of 53,6 thousand euro;

– non-taxable monthly wage of low-income families in the form of: reduction of the tax base for single-parent families with children (by 1077 euro), as well as for families where one of its members lost the job (by 945 euros), etc.;

– application of a reduced – at the level of 7% – rate of value added tax (VAT) for food (vegetables, fruit, dairy products, flour and cereals), as well as for books and newspapers, as opposed to the general tax rate of 19% for all other goods;

– separation of two groups of personal income taxpayers: 1) self-employed people who create jobs – individual entrepreneurs, freelancers, lawyers, tax consultants, doctors, if they have their own practice (Einkommensteuer), 2) employees and officials (Lohnsteuer);

– reduction of the tax base by the amount of the so-called «income-related expenses» (Werbungskosten), which include the cost of moving to the place of work, as well as those associated with the change of place of work in case of its loss;

– progressive tax on gifts and inheritances with differentiation of rates from 7% to 50% and in setting the limit of 75 thousand euros for the application of the minimum rate;

– higher, than when paying income tax, level of dividend tax (rate 25%) and the higher level of tax on income and capital gains received from the sale of securities (rate 26,375%);

– the actual payment of wealth tax on the purchase of any real estate in the country with a differentiated rate from 3,5% to 5%.

The priority regarding small businesses support, which has such manifestations:

– the standard corporate income tax rate is 15% and increases for corporations by 5,5%, the so-called «solidarity» tax to support the annexed (East German) lands;

– the base rate for non-corporate enterprises is 3,5%, which is adjusted by a coefficient set separately for each municipality;

– by tax rates ranging from 14 to 17,15%, taxes are paid by enterprises profits of which exceed 24,5 thousand euros;

– the income tax rate can be set individually by local tax authorities.

The priority of stimulating export activities, especially outside the EU, is implemented as follows:

– the transactions for the supply of goods and services outside the EU, as well as air and sea transportations, are not subject to sales tax.

The priority of responding to current threats to the economy and society is ensured, in particular, as follows:

– to overcome the economic consequences of Covid-19, the German government reduced the overall VAT rate from 19% to 16%, and the preferential rate for food – from 7% to 5%.

The priority of supporting farming and organic production in the form of «anti-taxes» – subsidies and subventions – is embodied in such actions:

– the use of funds from the EU common funds by the German government (for example, 58 billion euros in 2017) for special support for agricultural producers. In particular, such funds are the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). Germany's share of 6,5 billion euros is 11,2% of the EU funds [16]. It is distributed among farmers by the German government taking into account the following circumstances: 1) the scale of an enterprise (number of hectares of land per farm), 2) the level of development of a region in which the farm operates, 3) natural, climatic and environmental conditions;

– additional support to farms for restructuring, environmental technologies, etc. from the German federal government, in particular through the ELER-Topf, ELER-Hilfen, and ELER-Förderung funds.

Importantly, the provision of benefits to agricultural producers is a completely transparent process. After all, there is an open database from which everyone can find out which German companies, when and to what extent had support. For example, it is known that the number of such recipients has already reached more than 310 thousand enterprises.

An important point in comparing the tax systems of countries is to study what income (wage) remains with a taxpayer after tax. A digital illustration of the answer

to this question using real rates of taxes paid and comparable tax bases is presented in Table 4 and Table 5.

Table 4. Wage formation after taxes paid in Germany

№	Wage and taxes paid	Married person		Person married and with children	
		euro	%	euro	%
1.	Monthly wage (gross) at the level of the average and approximately identical income of a non-resident programmer of the country, according to the «blue card»	5000	100	5000	100
2.	Income tax	1023,50	20,47	636,16	12,72
3.	Deduction of solidarity with the new federal states	56,29	1,12	16,51	0,33
4.	Deductions to the pension fund	465,00	9,30	465	9,30
5.	Deductions for health insurance	389,41	7,79	389,41	7,79
6.	Deductions for insurance in case of need of care	67,48	1,35	56,42	1,13
7.	Unemployment insurance deductions	75,00	1,50	75,00	1,50
8.	The total amount of taxes and deductions paid	2076,68	41,53	1638,50	32,77
9.	Monthly wage (net) after tax paid	2923,32	58,47	3361,50	**67,23**

Source: developed by the authors based on [17]

As evidenced by the information presented in Table 4, the tax burden on wage in Germany differs significantly (by 8,76 percentage points) in the direction of easing for families with children. It is formed in the process of paying six taxes: income tax, deduction of solidarity with the annexed federal states, deductions to the pension fund, deductions to health insurance, deductions to insurance in case of care, unemployment insurance deductions. The list of deductions testifies to comprehensive and detailed by directions social protection of a working payer.

Table 5. Wage formation after taxes paid in Ukraine in 2020

№	Tax	UAH	%
1.	Monthly wage (gross), which corresponds to the average level of wages in major cities of the country in 2020	12000	100
2.	Military tax	180	1,5
3.	Income Tax of Individuals	2160	18
4.	Single social deduction (accrued and paid by an employer)	2640	22
5.	The total amount of taxes and deductions paid	4980	41,5
6.	Monthly wage (net) after tax	9660	**58,5**

Source: developed by the authors using the official sources based on [18; 19]

Table 5 shows that Ukrainians face a tax burden on their wages that is comparable to the preferential burden faced by German households with children. In terms of the existence and non-preferential taxation of wages, Germany has a slightly greater tax burden than Ukraine. The Ukrainian tax burden on wages is formed with the use of three taxes: military tax, personal income tax, and single social deduction. Combining social security payments into a single tax deprives them (payments) of specificity and probably a positive incentive effect.

Conclusions: We derive the following conclusions based on the findings of comparing the tax systems of Ukraine and Germany:

– the Ukrainian taxation system is characterized by the existence of a significant tax surplus, so its stabilizing potential is currently not implemented. The key

evidence for this is that the Ukrainian economy has an order of magnitude worse indicators of welfare, employment, price levels, financial and foreign economic balances, government foreign exchange reserves, and more with roughly the same tax burden on income and wages. The detrimental role of the tax system – how (in what way) taxes are paid in Ukraine – in the current gap in key economic and social indicators is undeniable;

– in the light of Germany's experience, a tax system capable of creating stability and economic certainty should have the following priorities;

– formation, with the use of taxes, of a state of social justice and prevention of unjustified inequality in the distribution of income and wealth;

– support through tax rates and tax benefits for fragile small businesses and farms, exporters of domestic products;

– rapid response to challenges and threats to the economy and society through the use of appropriate mechanisms to reduce the tax burden in crisis situations.

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INNOVATIVE ENTREPRENEURSHIP AND START-UPS FOR THE ECONOMY STABILIZATION: WORLD EXPERIENCE AND APPLICATION IN UKRAINE

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The study of innovative entrepreneurship is relevant for the Ukrainian economy and society, which suffer from underuse of intellectual and natural potential of the country. We assume that traditional forms of business organization have, for the most part, reached their full potential. As a result of the necessity to stabilize the national economy, fundamentally new, inventive kinds of entrepreneurship are emerging. This is the form and content originality that startups have displayed. Despite the existence of hundreds of studies in the field of innovation and startups undertaken by specialists from other countries, there are gaps in the analysis of the prospects and constraints of such activities in Ukraine. The question of whether creative entrepreneurship has the potential to stabilize and strengthen the Ukrainian economy must be addressed.

The purpose of this study is to actualize the problem of Ukrainian innovative entrepreneurship and its organizational form – startups – companies which start a fundamentally new production. It is primarily concerned with finding and assessing opportunities and barriers to such operations in Ukraine. The purpose of the identification and evaluation is to determine the influence of the innovation sphere on entrepreneurship stabilization and economic certainty.

We shall concentrate on a few key concepts without which the study's goal will be impossible to attain. Innovation, innovative entrepreneurship, country models of innovative development, and startups are examples of these concepts. We shall define the main in the content of the above topics without focusing on specifics.

Innovative activity is an ***activity*** which has such defining features:

– it is aimed at creating a new or significantly improved product, technological process, method of providing services;

– it is directly related to the improvement of knowledge, research and development of innovative ideas, embodied in fundamentally new products, services, technologies which are in demand by consumers.

Innovative entrepreneurship is a special type of economic activity focused on innovation, which has the following characteristics:

– provides a permanent search for new opportunities and is focused on the implementation of new projects;

– faces relatively high risks in the initial stages of implementation, so it provides organizational and economic safeguards and higher responsibility of the initiators;

– is motivated by the prospect of receiving innovative (significantly higher than average) profits or other benefits;

– creates significant competitive advantages in the market.

The success of innovation activity is determined by the economic policy of governments, the state of national markets, and the level of macroeconomic stability. In view of this, there are grounds for distinguishing the concept (and the corresponding phenomenon) of **«national models of innovative development»**. Information about the most well-known and clearly defined models is illustrated in Fig. 1.

Fig. 1 illustrates three models of innovative development, adapted to the specific conditions of individual countries.

The multichanneling and variety of funding and incentive sources is a significant benefit of developed countries' rapid innovation development. In the United States, Japan, and Western Europe, funding for research and development (R&D) and innovation is characterized by a mix of different sources. There is a case to be made for differentiating such innovation finance channels from acceptable sources. (Fig. 2).

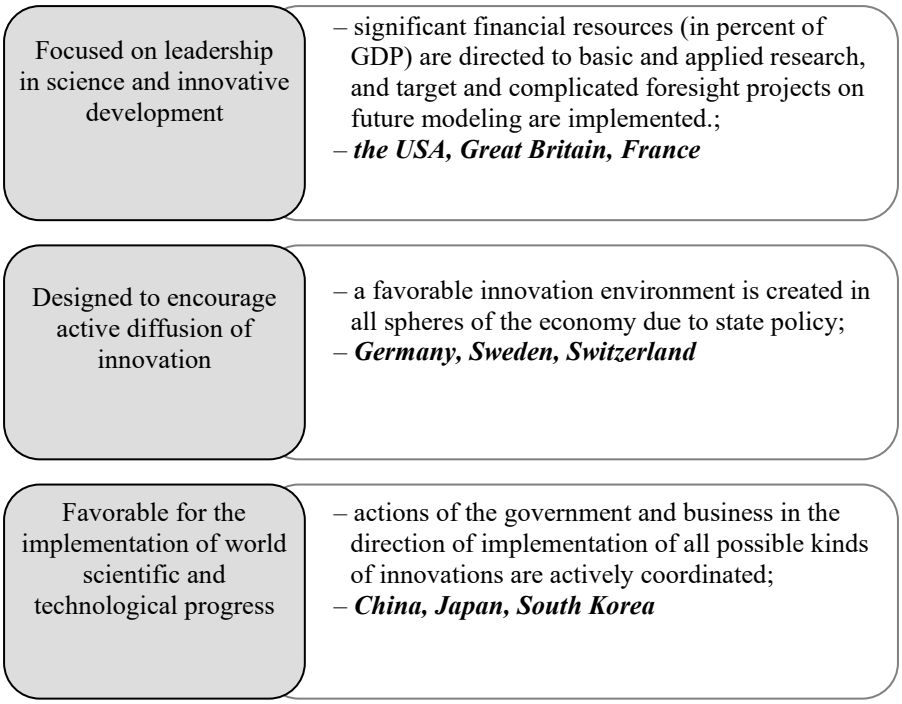

Fig. 1. Models of innovative development of economically developed countries

Source: developed by the authors based on [1]

Fig. 2 illustrates five research funding channels, covering domestic, collectively and privately created, as well as external sources.

The necessity and expediency of promoting innovative entrepreneurship at the price of budget funds is evident from the experience of the United States, Japan, Germany, the United Kingdom, France, and Canada. The state's innovation policy is the most important mechanism for such financing. Governments fund 20 to 50 percent

of national research and development investment in mature market economies. The share of spending on research and innovation in total government spending is small. But it remains stable for 20 years and is 6-7% in the United States, in Germany, France, Britain and Italy – 4-5%, in Japan – 3-5% [1].

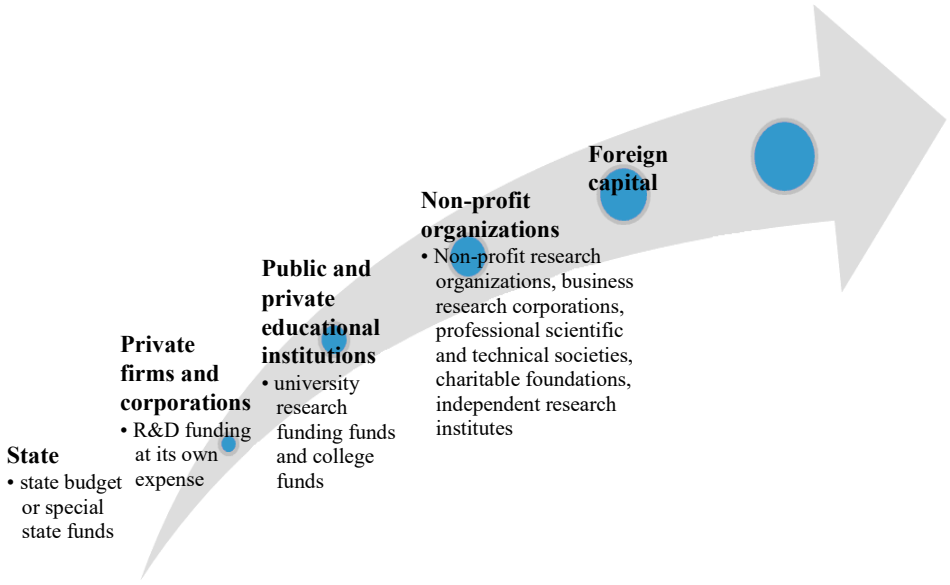

Fig. 2. The main sources of funding innovation activity in developed countries
Source: authors' own

Banks, pension funds and insurance companies can become an important source of financing innovative venture capital in economically developed countries. But in different countries the share and influence of these sources are different.

World experience shows the efficiency of **venture financing**, which involves **direct investment at an early stage** of projects in high-tech areas. As is well known, such financing can be a lifeline for companies that don't have easy access to bank loans. Small and medium-sized business venture capital has aided technological advancement in biotechnology, information technology, semiconductor electronics, and computer technology. Venture financing has become most widespread in the United States, Germany, the United Kingdom, Japan, and the Netherlands. While IT businesses receive the lion's share of venture funding in the United States, venture capital in Western Europe is pretty evenly dispersed across industries and sectors. The analysis of the international experience of the innovative economies formation and the innovative business organization gives the bases for isolation of such important moments of innovative activity, as: factors that aided innovative activity (stimulating factors); factors that slowed down innovation (restraining factors); organizational forms (institutions of support) of innovative activity. The highlighted aspects of innovation activity are presented in the analytical Table 1.

The analytical Table 1 provides information on favorable and unfavorable for innovation factors of influence. They have appeared in the activities not only of the world's innovation leaders, but also of the countries of rapid progress in the field of

innovation. Both can be identified as innovative insiders. The experience of developing organizational structures (stimulating institutions) of innovations is very valuable for countries with innovative outsiders. After all, it is institutions that ensure that stimulus elements have an effect.

In many nations, **«startups»** are a proven and true form of innovative industry. The meaning of this notion can be interpreted in a variety of ways. It's critical for researchers and practitioners in countries that borrow startup experience to consider various aspects of this content. As a result, we concentrate on the uniqueness of content interpretation.

Table 1. Factors and institutions of innovation

Factors that have stimulating effect	Factors that have a destimulating effect	Organizational forms (institutions) of innovation activity support
– consistent and long-term innovation policy of the state with clearly defined goals and tools; – rational use of innovation potential for the formation of a new type of economy – innovation; – systematic interaction of the private, research, and educational sectors; – targeted support of important for the formation of innovation potential activities which can not be developed on the basis of own resources; – implementation of innovation commercialization programs; – expedient in view of national interests attraction of foreign investments of transnational corporations; – legislation on the protection of intellectual property rights and its consistent implementation; – systematic study and adaptation of the best international experience.	– relatively low share of private business in R&D financing (France, Sweden, the Netherlands, India); – detachment of small business from innovation (France, Sweden, the Netherlands, Japan); – «brain drain» – migration of skilled workers (France, Germany); – territorial disparities in innovation development (Germany, India, China, France, Norway); – rapid aging of the population (European Union countries); – underdeveloped venture capital markets (Denmark, Germany); – organizational and legal obstacles to the commercialization of innovations (India, Germany, Brazil); – «over-bureaucratization» of procedures related to business activities (India, Brazil, Asian countries).	– special organizations and bodies responsible for innovation policy definition and implementation (almost all countries); – active interaction with other countries in technology exchange (almost all countries); – creation of innovation clusters (France, Germany); – implementation of major innovations in cooperation with multinational corporations (Sweden, France, the Netherlands, India, Japan); – organizational support of free education aimed at identifying and promoting talented youth (Germany, Norway); – use of «innovation vouchers» (the Netherlands, Great Britain, Germany).

Source: authors' own based on [1]

The term «startup» is commonly connected with the name of a tiny company called «Start Up», which was formed in the United States by two Stanford University students. These are W. Hewlett and D. Packard, the founders of the world-famous Hewlett-Packard Corporation in the field of information technology. As a result, when the term «startup» is used, it refers to a business that makes a significant breakthrough in a specific field, implements a fundamentally innovative concept, and expands swiftly.

A startup, according to Steve Blank, a well-known American entrepreneur who founded eight successful businesses, is an organization «established to develop a repeating and scalable business model». This definition focuses on the start of what others repeat and spread.

Recognized venture capitalist Paul Graham, who became the founder of Y Combinator and Yahoo! Store and wrote the book «Hackers and Artists», noted the

following: it is «a company designed for rapid growth» [3]. This definition emphasizes the fact of dynamic business development.

Eric Ries, the American initiator of the Lean Startup movement and a specialist in the field of high-tech business management, notes that «a startup is a human institution designed to create a new product or service under the conditions of critical uncertainty». This definition is interesting because it focuses on the novelty of the product and the need to act under uncertainty conditions.

The work «The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company» by Steve Blanc and Bob Dorf [5] provides several definitions of startups:

– a startup is a process of entering the market of a newly created company in a short time and, as a rule, with minimal investment;

– a startup is not a scaled-down version of a large company, but an organization that is looking for a profitable business model that can be scaled;

– a startup is a form of business which involves testing not only the financial capabilities of its initiators, but also their endurance, agility and courage;

– a startup is a project to implement a set of untested hypotheses with extremely high risks.

The most appropriate definition for us is that a startup is a newly created company that forms its business on the basis of innovations (innovative technologies), has limited resources, and is focused on the rapid development and conquest of a new market segment. At a first glance, every newly created company can be called a startup. But this interpretation is wrong. What fundamentally distinguishes a startup from a normal newly created enterprise is reflected in Fig. 3.

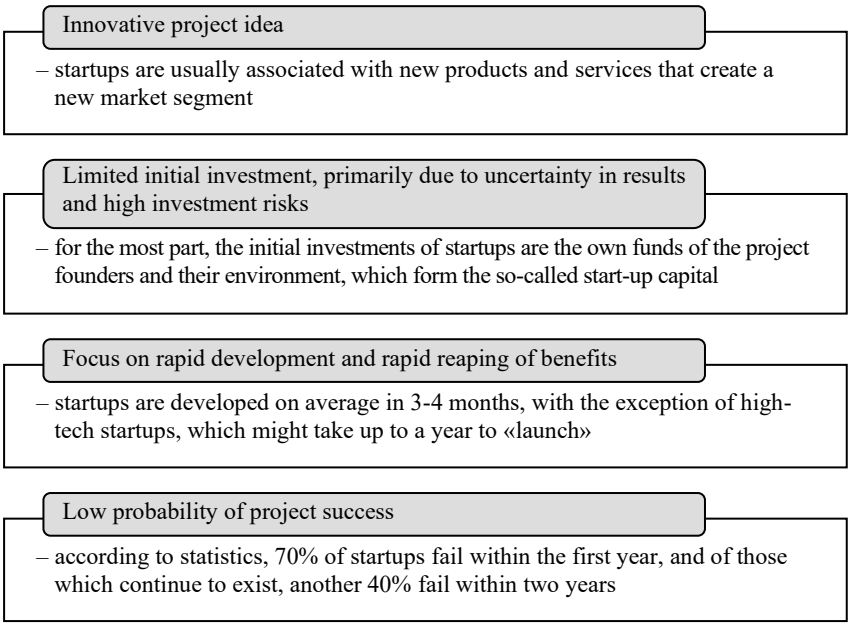

Fig. 3. Key differences between startups and regular companies

Source: authors' own

The essential idea given in Fig. 3 is that a startup differs from a regular newly created company by at least four features, namely: project innovation, lack of investment due to high riskiness of the project, focus on rapid growth and low probability of success.

In addition to these four features of content, a startup, as a form of business, has certain features of the so-called «life cycle». The full «life cycle of a startup», in our opinion, covers the following 5 stages (Fig. 4). The vast majority of startups cease to exist in the first three stages.

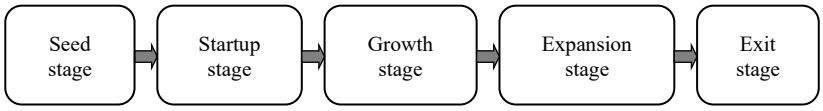

Fig. 4. The «life cycle» of startups

Source: authors' own based on [6]

Illustrated in Fig. 4 stages of the startup «life cycle» have the following features:

– «*seed stage*» involves the formation of start-up capital after the preparation of a paper version of the business project;

– «*start-up stages*» are the beginning of practical activities and market positioning;

– «*growth stage*» is characterized by the achievement of normal (expected) values of key economic indicators: output, sales, profits, etc.;

– «*expansion stage*» means the growth of the scale of the case through additional investment in staff, fixed capital, office space, etc., as well as obtaining high «innovative» profits which compensate for previous risks and correlate with the uniqueness (innovation) of the product;

– «*exit stage*» is associated with the completion of the «life cycle» of a startup, which can be combined with the acquisition of «ordinary» company, with the mass reproduction of previously innovative ideas by other entrepreneurs, as well as exit from the founders and sale of their shares.

Other classifications of stages of the startup «life cycle» are used in the scientific and journalistic literature. Despite the differences in approaches, however, we can state the following:

– startups take on the risks of uncertainty in the initial stages of their existence;

– those of startups that do not cease to exist in the initial stages, in the later stages add certainty to other forms of business and the entire national economy.

Based on the results of the analysis of the world experience of startup development, researchers make generalizations based on indisputable facts.

First, government support for innovation plays a key role in increasing the number of startups and their successful development. The EU management in general and the governments of Germany, France, Finland, Austria, Ireland, Sweden, and Norway, in particular, are implementing support programs for startups. These innovative enterprises are provided with credit and tax benefits, grants for students, promising graduates of educational institutions, for individual entrepreneurs, creating a favorable environment for venture investors. New EU members – Poland, the

Czech Republic, Lithuania, Hungary – have also become active participants in the process of supporting innovative entrepreneurship [7].

Second, government policies of insider countries – leaders and activists in the innovation sphere – share a number of characteristics. This is a clear division of powers between state, regional, and local governments that prevents duplication of functions, implementation in global innovation processes based on international cooperation, including technology transfer, and reforming legislation to meet the needs of innovative enterprises [8].

Third, successful startups are those that are founded to address the most pressing needs, or those that help to develop and support such needs. This is demonstrated, for example, by data from the site «StartupRanking», which ranks startups around the world. The ranking of startups is based on the so-called SR rating, which reflects the importance of the startup on the Internet (SR Web rating) and its social impact (SR Social). Table 2 presents the 10 most famous startups, according to the «StartupRanking» in 2020.

Table 2. Top 10 startups in the world ranking according to «StartupRanking»

Rank	Startup	Founded in	SR rating	Description	Country rank
1	500px	2009	89, 794	The premier photography community for accumulating the best images on the Internet	Canada
2	Canva	2012	89, 645	Graphic design software	Australia
3	Coursera	2012	88,178	Free online courses from the best universities	the USA
4	Duolingo	2011	88,171	Free language education for the whole world	Guatemala
5	Freelancer	2009	88,085	The world's largest freelance and crowdsourcing market	Australia
6	Teespring	2011	87, 665	A platform that allows everyone to create and sell high quality products	the USA
7	Giphy	2013	87, 636	Animated GIF search	the USA
8	Telegram	2013	87,607	Messaging application	Russia
9	IFTTT	2010	87,382	Getting large amounts of information by combining existing online services – Facebook, Twitter, etc.	the USA
10	TransferWise	2010	87,362	Money transfers on the Internet, sending money abroad	Great Britain

Source: grouped by the authors [9]

According to the information given in Table 2, the most successful startups in 2020 operated in such areas as photo and graphic editing, online courses and platforms for education, remote work through remote access, sales of goods through online platforms, GIF-animation, creation of databases for consumers needs, online money transfers.

Fourth, there are typical reasons for the failure of startups, many of which are related to mistakes in managing innovative businesses. The generalizations about these reasons made by CB Insights are given in Fig. 5.

As evidenced by the information presented in Fig. 5, the main reason for the «failure» of startups – 42% of the total – was that they were not aimed at meeting real needs. Hence it is possible to conclude that the idea of a startup can not significantly «outpace» the needs of consumers.

The modern Ukrainian economy is not an innovative economy. The country belongs to the group of innovative outsiders. One of the main reasons for this state of affairs, in our opinion, is the ruling class's desire to maintain the traditional resource-based, non-innovative economic model. Despite this, startups are developing in Ukraine and a growth trend has formed.

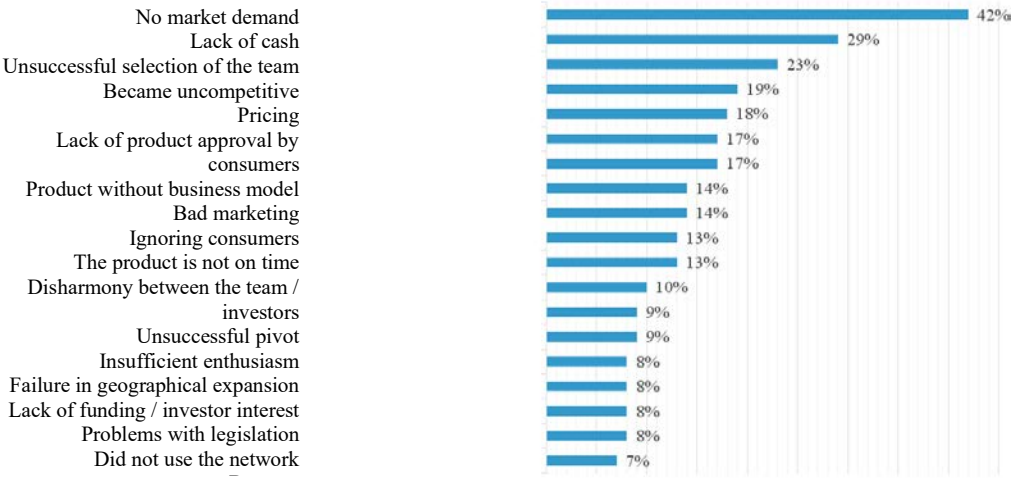

Fig. 5. Identifying the root reasons of startup failures

Source: authors' own based on [10]

There are grounds for such generalizations regarding the development of the innovation segment of the Ukrainian economy and Ukrainian startups.

First. In the second half of 2010s, there was a rapid increase in investment in startups. According to the study conducted by the Ukrainian Venture Capital and Private Equity Association (UVCA), the dynamics of investment was as follows (Fig. 6).

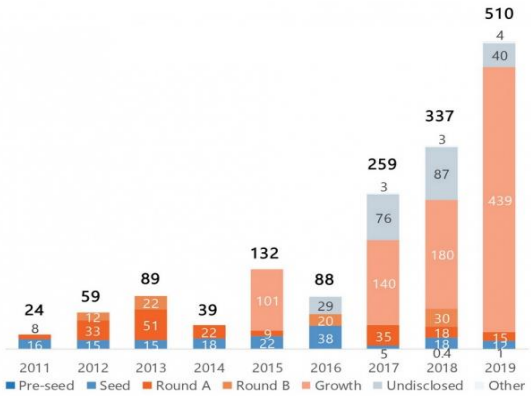

Fig. 6. Investments in Ukrainian startups for the period 2011 – 2019 (million USD)

Source: developed by the authors [11]

According to the data in Fig. 6, investment in Ukrainian startups surged nearly threefold in 2017 (the first year of considerable stabilization of the Ukrainian economy) compared to 2013 (the last year before the Russian-Ukrainian war). In 2019, startup investments grew 1,5 times in a year.

Second. At least seven sources of funding for startups are used in Ukraine, and they are listed in importance in this order [12; 13]:

– *personal money* – own savings of startup initiators;

– *money of friends and relatives* – funds borrowed from a small circle of close people with the aim to organize a family business;

– *crowdfunding* – public funding through specialized platforms, in content similar to charity for a constructive idea;

– *bank loan for the development of entrepreneurial ideas* (formally – the current program called «Affordable loans 5-7-9%»);

– *business angels* – single independent investors at the very beginning of project development, sometimes with the participation in management;

– *state participation in financing* (Ukrainian Startup Fund);

– *venture financing* – the use of fund investor capital for high-risk projects, often under unfavorable launch conditions.

Unfortunately, in Ukraine, public funding, as well as venture capital and bank participation, have not yet proven to be crucial sources of startup finance. This is what sets the Ukrainian economy apart from other innovative economies.

Third. In general, Ukraine has created a legal framework for the organization of innovation activity and the operation of startups. But it lacks concreteness, effectiveness and political will to implement it. The main legislative acts are presented in Table 3.

Table 3. Legislative field for startups in Ukraine

№	Legislative act	Scope of regulation
1.	The Law of Ukraine On Investment Activity enacted on September 18, 1991. №1560-XII [14]	Determines the general legal, economic and social conditions of investment activity in Ukraine
2.	The Law of Ukraine On Entrepreneurship enacted on February 7, 1991 p. №698-XII [15]	Determines the general legal, economic and social principles of entrepreneurial activity (entrepreneurship) of citizens and legal entities on the territory of Ukraine, establishes guarantees for freedom of enterprise and its state support
3.	The Law of Ukraine On the regime of foreign investment enacted on March 19, 1996. №93/96VR [16]	Determines the general features of the foreign investment regime on the territory of Ukraine, based on the goals, principles and provisions of the legislation of Ukraine
4.	The Law of Ukraine On Innovation enacted on July 04, 2002. №40-IV [17]	Determines the legal, economic and organizational principles of state regulation of innovation in Ukraine, establishes forms of state stimulation of innovation processes and aims to support the development of innovation economy of Ukraine
5.	The Law of Ukraine On Science Parks enacted on June 25, 2009 №1563-VI [18]	Regulates legal, economic, organizational relationships related to the creation and operation of science parks, and aims to intensify the processes of development, implementation, production of innovative products and innovative production
6.	The Law of Ukraine On Copyright and Related Rights enacted on December 23, 1993. №3792-XII [19]	Protects personal (non-property) and property rights of authors and their successors related to the creation and use of works of science, literature and art (copyright), and the rights of performers, producers of phonograms and broadcasting organizations (related rights)
7.	The Law of Ukraine On protection of rights to inventions and utility models enacted on December 15, 1993. №3687-XII [20]	Regulates the relationships that arise from the acquisition and exercise of intellectual property rights to inventions and utility models in Ukraine
8.	The Law of Ukraine On protection of rights to marks for goods and services enacted on December 15, 1993. №3689-XII [21]	Regulates the relationships that arise from the acquisition and exercise of trademark ownership for products and services in Ukraine
9.	The Law of Ukraine On Personal Data Protection enacted on June 01, 2010. №2297-VI [22]	Regulates legal relationships dealing with the protection and processing of personal data, with the goal of safeguarding man's and citizen's fundamental rights and freedoms, particularly the right to privacy in relation to the processing of personal data

Source: developed by the authors based on [23; 24]

From the analysis of the Ukrainian legislation it follows that, creating the general conditions of entrepreneurial activity and conditions of investment, it does not regulate special conditions of startup activity. The last of these regulations was adopted 10 years ago. Therefore, the regulatory framework does not reflect modern conditions and special needs of entrepreneurs-innovators.

Fourth. In Ukraine in 2019, the state created a special body that is designed to take care of the activities of startups – the Ukrainian Startup Fund (USF). This can be interpreted as the fact of taking real steps to support innovation.

The goals and priorities of the USF can be inferred from information on the formal features of the fund, areas of funding, and the amount of funds it operates.

Formal characteristics of USF are presented in Table 4.

Table 4. The main characteristics of the Ukrainian Startup Fund

List of characteristics	Contents of characteristics
Ownership	State
Initiator of creation	Cabinet of Ministers of Ukraine
The mission of the fund	support for innovative projects and assistance to the most talented Ukrainian entrepreneurs in creating successful global companies
Terms of financing	– financing only Ukrainian business; – in the form of grants, not through equity participation (from 25 to 50 thousand dollars); – financing companies in the initial stages of development (pre-seed and seed); – financing promising and innovative ideas of technology startups that demonstrate the high potential of global commercial success
Selection process	on a competitive basis: companies are evaluated and selected by a board of independent investment experts
Fund objectives	– support for innovation; – promotion of entrepreneurship; – economic development; – increase in investments; – job creation; – raising awareness
Target sectors	– artificial intelligence (AI); – augmented reality (AR / VR); – big data (BigData); – blockchain; – cybersecurity; – defense; – medicine and health care; – travel; – financial technologies (FinTech); – educational technologies (EdTech); – robotics; – professional services; – software as a service (SaaS); – production; – e-commerce of Internet of Things (IoT)

Source: developed by the authors based on [25].

According to the Table 5, the Ukrainian Startup Fund aims to improve not only the special conditions for the development of startups, but also the general conditions for the development of entrepreneurship. An indisputable positive effect of its activity is a transparent and public competition of projects. The fund finances each

startup that won the competition and is at the early stages of development, in the amount of 25 thousand dollars. A startup operating at later stages can receive $50,000 from the fund. Therefore, one startup that has not stopped operating and is showing growth may have support in the amount of 75 thousand dollars.

In 2019 – 2020, the Fund financed the following Ukrainian startups at the initial stages of their formation (Table 5).

Table 5. Ukrainian startups funded in 2019-2020 by the Ukrainian Startup Fund (up to USD 25,000)

№	The company name	The content of a startup	Direction of funding of the USF
1.	iCorn	The platform brings together farmers, buyers of agricultural products, transport companies, elevators, laboratories, banks and insurance companies related to agribusiness	Artificial intelligence, blockchain, agricultural technologies, Fintech / Legaltech
2.	Caretech Human	Continuous automatic health monitoring and early detection of diseases at home	Healthcare, Artificial Intelligence
3.	Cittart	Marketplace, designed as a mobile application, where any artist can easily place an art object for sale, and the buyer – place an order	Big data, blockchain, retail
4.	Sprybuild	3D printers, polymers, and software for industrial customers, allowing them to mass-produce items cheaply and quickly	Industry
5.	IOON	The first portable device that turns ordinary water into a powerful antimicrobial sanitizer that can be used anywhere and at any time	Healthcare
6.	Dooozen.io	An online service designed to free you from routine work and increase the productivity of everyone who actively works with the LinkedIn network	Media and advertising
7.	BioBin	Mobile application to reduce environmental impact through better consumption and waste management	Energy and ecology
8.	BIOsens	The world's first device that automates sample preparation, analysis, and storage of results on the cloud, allowing for testing outside of the lab with laboratory precision	Agrotechnology
9.	Skyworker	A product that speeds up hiring IT professionals 10 times by building the own online network	Big data
10.	Pytag	Grain trading platform that uses unique algorithms to collect and process all available digital data on the grain trade market	Big data

Source: [25] information data on funded USF startups as of 05.07.2020.

The Ukrainian Startup Fund sponsored the early stages of the establishment of companies whose operations were related to agricultural management, health care, ecology, and the creation of big databases – Data Base, as indicated by the information in Table 5.

At later stages of startup development, the Ukrainian Startup Fund supported (in the amount of USD 50,000) such enterprises (Table 6).

The analysis of startups supported by the Fund at the stages of their later existence shows a fairly wide range of priorities. It covers online services, agribusiness, ecology, medicine, energy, legal advice, and e-government, etc.

Table 6. The Ukrainian startups funded in 2019 – 2020 by the Ukrainian Startup Fund (in the amount of 50 thousand US dollars)

№	Company name	Startup content	The USF funding direction
1.	Norm	Device with built-in power supply and machine learning technology for efficient and healthy operation	Energy and ecology, artificial intelligence
2.	NuWork	CRM system for hiring employees	Big data, artificial intelligence
3.	FlashBeats	Mobile application for creating light shows at music and sports events	Lifestyle
4.	FINMAP	Online service for financial accounting in small and micro businesses	Fintech/Legaltech, educational technologies, retail
5.	Allzap	A platform for creating online stores selling auto parts and a market place	Media and advertising, Retail
6.	GeoDesign	Analytical online service that provides information about the benefits and risks of opening a shop / cafe / hairdresser or other establishments depending on the location	Big data, retail
7.	FRAMIORE	Formation of a women's clothing brand with its own garment production and R&D center for research, development and innovation of textile products and technologies	Energy and ecology, industry, retail
8.	BIOC	Nanopolymerization technology that allows to bind starch at the molecular level and obtain a biocompound (or bioplastic) with excellent physical and mechanical properties	Industry
9.	Cardiolyse	Platform for automatic interpretation of electrical signals of the heart at rest and Holter monitoring of the medical level to identify 19 types of arrhythmias and accurately detect most heart abnormalities	Healthcare
10.	Mate academy	Online University of IT Professions	Educational technologies
11.	ChoiZY	Career guidance online platform that helps teenagers choose a profession and professionals to share experiences with young people	Educational technologies
12.	Legal Nodes	A legal marketplace that helps technology businesses resolve legal issues around the world	Educational technologies
13.	SolarGaps	Blind system with solar cells that generate electricity	Energy and ecology
14.	SMART-MAK LTD	Development, production and sale of products and services for monitoring the consumption of any resources	Big data, Energy and ecology
15.	Agrifinance Online	Through an integrated and transparent online ecosystem, Ukraine's agricultural market players' network formation	Fintech / Legaltech, agrotechnology
16.	HarvesTrack	Hardware and Software (IoT) solutions to control the harvesting process and prevent grain theft during harvest	Agrotechnology
17.	AeroDrone	Unmanned aerial vehicles with high payload and long flight duration	Agrotechnology
18.	FieldBI	Comprehensive analytical and expert system to improve solutions for all market participants	Agrotechnology
19.	Unicorn Nest	Search for the most relevant investors based on the own investor base and the formation of a standard for fundraising	Fintech / Legaltech
20.	Правомен	Automated assistant for domestic legal issues, including the formation of documents and clarification of the capabilities of e-services created by the state	Fintech / Legaltech

Source: [25] information data on funded USF startups as of 05.07.2020.

In total, from the time of its foundation in 2019 to mid-2020, the Ukrainian Startup Fund financed 30 technologically innovative enterprises for a total of 1,25 million USD. Moreover, in terms of the number of funded enterprises and the amount of funding, preference is given to the following areas: agricultural technologies (5

startups and 225 thousand US dollars), energy and ecology (4 and 175, respectively), large databases – Big Data (4 and 150, respectively).

Analyzing the main vectors of funds and the potential of the state fund to support startups, we have grounds for the following generalizations:

– unfortunately, neither the list of goals of the state fund nor the list of actually funded startups includes those that are directly related to the military-industrial complex (MIC). The latter is unnatural for a country at war;

– the direction of cybersecurity, the relevance of which increases with increasing economic uncertainty, the growing number of cyber attacks on various portals and databases, including government, is not discussed;

– the total amount of the funds is small enough and such that it cannot significantly change the situation in the innovation sphere.

Fifth. Despite the fact that Ukraine remains an innovative outsider and does not have the necessary support for the development of startups, the intellectual and human potential of the country creates the preconditions for the development of innovative entrepreneurship. The main Ukrainian startups are emerging in the field of IT technologies. According to StartupRanking, 10 startups were the leading ones in Ukraine in 2019-2020. They specialize in creating and promoting websites, optimization and testing for developers, and online services software. Every year Ukraine strengthens its position in the international IT arena. According to Ukrainian UVCA experts, the country is becoming an R&D hub for foreign companies. In Ukraine, the groundwork for so-called «innovative breakthroughs» is being laid. The latter are the ones who build the image of the future and help to shape it today. According to the ADVICE Audit Consulting Group, Ukraine has produced startups that have the potential to transform the world. Among the change agents are [26]:

– *Carbominer* − startup for the extraction of carbon dioxide from the air with the aim to sell it to industrial greenhouses;

– *Ecotyre* – startup for processing used car rubber tires and metal impurities they contain;

– *Atmosphere* – startup for accurate weather forecasting within limits not exceeding 200 meters from the service consumer;

– *Minect.ai* – startup with the technology of remote demining of the Donbass territories mined by the occupiers, through the interaction of drones and explosive detection equipment – ground radars, metal detectors, thermal imagers, etc.;

– *Greenbin.app* − a startup that provides low waste recycling costs through the use of an attractive incentive system for product consumers;

– *Seadora* − a startup aimed at saving the oceans by minimizing fish waste and directly encouraging fishermen.

There is a list of Ukrainian startups that can lay the foundations today for a model of an attractive and favorable future for people. These include fifteen startups (Table 7).

Table 7. Fifteen Ukrainian eco-startups of world importance

№	The name of the eco-startup	Content of activity
1.	Recycle Map	Interactive map of recycling points of different types of waste
2.	FoodBIOPack	Biodegradable and edible packaging, utensils and cutlery
3.	Ecoisme	Electricity saving system
4.	RE-leaf PAPER	Paper from fallen leaves
5.	Effa	Disposable toothbrush made of recycled paper
6.	Re-beau	Recycled plastic jewelry
7.	Flushwave	Technical water reuse system
8.	Go To-U	International platform with free charging stations for electric cars
9.	SolarGaps	Blinds with solar panels
10.	Stock-factory	Online platform for the sale of problematic goods (damaged packaging, approaching expiration date), which helps to reduce the destruction of goods in retail chains
11.	UGrid	Service for building energy micro-networks that will help reduce the use of fossil energy sources and avoid overpayment for energy supply
12.	TOKA	Network of gas stations
13.	Nuka	Eternal notebook and eternal pencil
14.	Water Cloud UA	Device for water intake from air
15.	Jollylook	Eco-friendly camera made from recycled paper and cardboard for instant photos

Source: systematized by the authors based on [27-29].

The startups listed in Table 7 are concerned with ecology, well-being and formation of attractive prospects, confidence in the future and economic and social certainty. It is not only about Ukrainian citizens, but also about citizens of other countries, because it is about solving global environmental issues.

Sixth. Ukraine is increasing its collaboration with international organizations that promote innovation and help businesses. For example, in 2020, the Ukrainian Startup Fund took part in the creation of AC LAB21, a collaborative online platform aimed at supporting effective solutions to the global crisis with a focus on Eastern Europe. The Memorandum of Cooperation has already been signed with the Solid5 International Venture Fund, the FeelGoodLabs business accelerator, the Center for Entrepreneurship of the Ukrainian Catholic University, and other participants interested in the development of innovation in Ukraine. International cooperation provides new opportunities for Ukrainian startups that have not obtained government support to receive funding from international organizations [25]. Existing barriers to receiving and using foreign money for innovation by Ukrainian entrepreneurs must be removed to reap the benefits of international cooperation.

Seventh. Many barriers to innovation have developed in the Ukrainian economy and society. The SWOT analysis of the conditions for the development of Ukrainian startups, in our opinion, should reveal that restrictions are more important than promotion factors. These limitations are highlighted in all innovation studies. Unfortunately, there are no studies to substantiate the hierarchy of deterrents. It is this «negative ranking» of influencing factors that could create a basis for making sound management decisions. Taking into account the opinion of other researchers, we formulate assumptions about the following hierarchy of the most important factors constraining innovation:

– weakness (limited resources, unstructured nature, etc.) of the Ukrainian investment market [30];

– lack of state support for innovation due to the lack of innovation policy [31] and lack of political will to implement it;

– careless attitude to the resource, first of all qualified personnel potential of the country [32];

– vulnerability of property rights in general and intellectual property rights in particular [33].

With regard to the existence of many factors hindering innovation and the lack of a consistent innovation policy of Ukrainian governments, the studies in the field of substantiation of appropriate tools to stimulate innovation become relevant. In our opinion, the recommendations on the use of such specific incentive tools deserve attention and approval [34]:

– «*mapping*» *of the Ukrainian startup ecosystem*, which will create a state-run open Internet portal providing all the information needed for entrepreneurs, researchers, investors, and everyone interested in innovation;

– *public-private* partnership in providing the necessary level of education and integration of entrepreneurs into international networks and communities for the use of innovative experience;

– combination of *education in the field of IT technologies and entrepreneurship* for the acquisition and use of «digital skills» in practice;

– use *of startup visas – residence permits for foreign initiators of startups;*

– *mentoring (training, educational) programs for entrepreneurs* with the aim to transfer innovative experience on an ongoing basis.

Consclusions: According to the results of the study, the following generalizations can be made:

– the understanding of the impact of innovative entrepreneurship and its form – startups – on the certainty of the national economy is based on the awareness of the relationships of such concepts (phenomena) as: innovation activity – innovative entrepreneurship – startups – innovative national development model. The government's (state) innovation policy, with its inherent aims, priorities, and influence mechanisms, is a reflection of the innovative development model;

– the typical tools for implementing the innovation model of development by innovative insider countries are: a stable share of innovation expenditures in the state budget, active financing of startups by venture funds and commercial banks, and constant participation in international cooperation in innovation sphere and technology transfer. The role of the mentioned tools to promote innovation has not become decisive in the Ukrainian model of innovation;

– a startup, as a form of innovative entrepreneurship, differs from other forms by such properties as: the emergence in connection with the idea of fundamentally new products, services, technologies, low probability of success and significant risks of closure, lack of investment resources, focus on rapid growth and rapid market

acquisition. It is these features that become decisive in assessing the impact of startups on economic uncertainty;

– innovative entrepreneurship (startups) has an impact on economic uncertainty in at least three ways: a) In the widespread replication of creative ideas, startups take on large investment risks and operate as a shock absorber for another (non-innovative) entrepreneurship, b) startups arise and operate in areas related to global issues in the fields of ecology, energy, health, the state of which threatens humanity, and provide their full or partial solution, c) thanks to startups image of the future, in the creation of which they participate directly today, becomes clearer and more comprehensive;

– the restriction of innovation activity, passivity (inaction) of the state in the innovation sphere or ineffective imitation of activity by central and local authorities means increasing the scale of uncertainty of the national economy. Subject to political will, the Ukrainian government should develop and implement a strategy for the formation of the so-called «startup ecosystem of Ukraine» with elements of influence already tested in countries with innovative development models.

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SOCIAL ENTREPRENEURSHIP AS A TOOL OF SOCIAL INCLUSION UNDER THE CONDITIONS OF ECONOMIC UNCERTAINTY

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Ukrainian society continues to seek answers to the challenges posed by the negative effects of deindustrialization, underinvestment, significant import dependence, macrofinancial fragility, unemployment, low incomes, significant social inequality, etc. The situation of uncertainty is complicated by the war and the institutional weakness of the state. The issue of economic uncertainty is exacerbated by pandemics, environmental and man-made disasters.

The most vulnerable members of society – those who belong to a socially restrictive group – are the ones who suffer the most from economic uncertainty. At the same time, they may be the source of increased uncertainty. Therefore, economic uncertainty and social exclusion are interrelated.

In fact, the term ***«social exclusion»*** originated and spread in the mid-1970s as a reaction to the ineffective social policies of the French government. Inefficiency was manifested in the fact that certain groups of people were not covered by the social protection system, joined the ranks of lumpens, and could not participate fully in the life of civil society. Such groups included people with disabilities, people of retirement age, mothers with many children, former prisoners, HIV-positive people, and so on. From now on, *social exclusion* is seen as *a process by which a person / group of people is completely or partially excluded from full participation in society.* This interpretation of the phenomenon of exclusion focuses on unequal access to economic resources and the uneven distribution of benefits in society. It is recognized that the result of this inequality is the stratification of society. Accordingly, the scale of economic uncertainty is growing.

We formulate the assumption that **social inclusion** may be one of the determining conditions for an adequate response to economic uncertainty (*inclusion* meaning «involvement»).

Social inclusion is a new concept with theoretical tools that are continuously being developed. As a result, the terminological apparatus occasionally lacks clarity and unambiguity in terms of meaning interpretation.

During four decades, the concept of social inclusion was developing on the idea of guaranteeing social rights and achieving a higher level of well-being. In the late 1980s, this concept was adopted by the European Union to start forming the social policy [1]. In many areas, it has replaced the concept of poverty reduction, which had

been the focus of European governments for a long time. This concept arose primarily as a result of Europe's welfare state crisis, which saw a failure to effectively address critical social issues.

If social inclusion has already become a reality in developed countries around the world, there is just a general understanding of the concept and debate of general approaches to its actual implementation in Ukraine.

We proceed from the fact that *social inclusion* is not just the opposite (antipode) of social exclusion (rejection, alienation), but the conscious formation of a *certain state* of society. This state is demonstrated by the fact that *citizens have sufficient*, controlled and guaranteed by society conditions in such areas as:

– consumption of goods based on earnings;

– ownership of resources and their use in the process of productive employment;

– management through participation in civil society institutions and direct democracy.

The following fundamental ideas are decisive in the implementation of the concept of social inclusion:

– *appreciation, recognition and respect* for all members of society, despite differences in education, age, social status, etc .;

– *involvement and participation* in various spheres of society, free choice;

– *material well-being*, which includes material and financial support for vulnerable groups;

– *observance of the human right* to a decent standard of living.

Social inclusion is a fundamental element of public life. It is not restricted to addressing the concerns of society's most disadvantaged members. Inclusion «enters» with its substance in the economic and political sectors, going beyond the actual social sphere.

Social inclusion is a prerequisite for resolving a variety of issues, particularly those on the economic-social spectrum. The hiring of vulnerable groups who are not interesting for traditional business is one example of such an issue. After all, such employment involves additional costs to adapt the workplace to the special needs of people with certain disabilities. In this and similar cases, the social problem could remain unresolved due to economic constraints. Therefore, there is a need for non-traditional, more socially oriented forms of business.

A specific type of entrepreneurship emerges as an effective means of merging economic and social goals while also serving as a tool for social inclusion. The term «social entrepreneurship» is used to describe it. A new hierarchy of values is a unique aspect of social entrepreneurship. It is aimed not so much at the profitability of business, but at achieving social welfare.

What social problems related to social inclusion and social development are solved by social enterprises?

To begin with, social enterprises help to alleviate the problem of unemployment. They are designed to help unemployed, low-skilled youth, individuals with impairments, and others integrate into the labor market. At the same time,

employment, as an inclusive process, is not limited to the inclusion of the most vulnerable segments of the population and only in the labor market. It's all about giving people with higher earnings new ways to spend their money. New economic benefits become available, ensuring a decent level of living. Finally, it is possible to become self-fulfilled in the profession.

Employment, thanks to social enterprises, promotes the inclusion of certain categories of the population in various spheres of public life. In the social sphere, employment plays the role of the so-called «social elevator». In the economic sphere, a working person appropriates the income that he or she generates, rather than having it redistributed in his or her favor by the state. Higher education potential is formed in the socio-cultural sphere; a person enters the workforce, develops communication skills, gains new social experience, and so on.

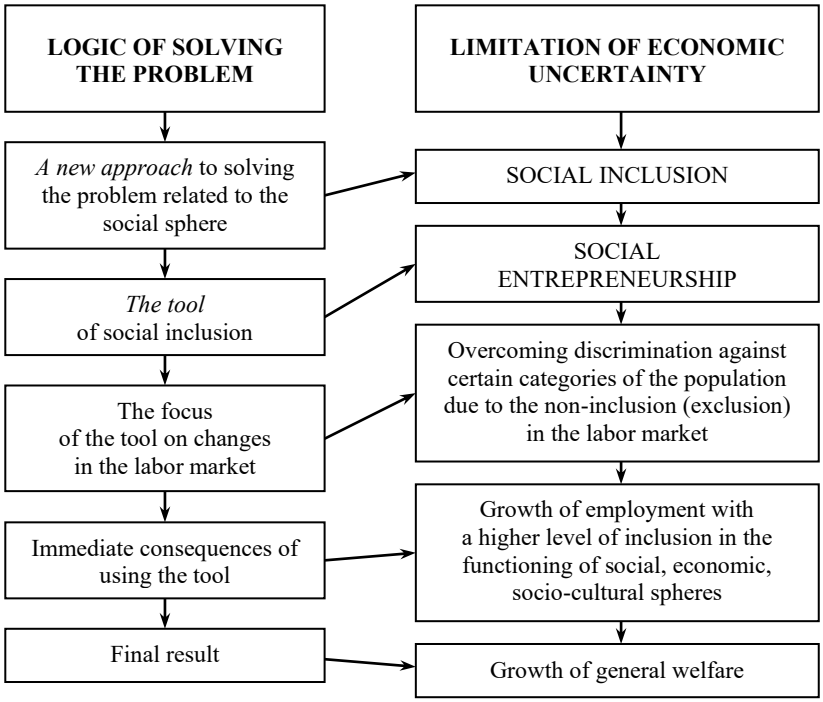

Fig. 1. The relationship between economic uncertainty, social inclusion and social entrepreneurship

Source: authors' own

Fig. 1 depicts the key (conceptual) lines of relationship between social inclusion, social entrepreneurship as a form, and economic uncertainty, on the one hand, and economic uncertainty, on the other.

Fig. 1 illustrates the idea that the exclusion of certain groups from employment causes a higher level of uncertainty. Instead, the use of social inclusion tools, including social entrepreneurship, contributes to greater economic certainty through employment. The latter is embodied in the growth of general welfare.

The concept of ***«social entrepreneurship»*** is included in our general theory of social inclusion. As a result, we believe it is critical to clarify the nature of this phenomenon.

The problem of social inclusion (exclusion) has been the subject of scientific research since the 1970s. Instead, social entrepreneurship has been actively studied since the 1990s.

The theoretical basis of social entrepreneurship is the concept of the so-called «mixed value» by J. Emerson. According to this idea, in any organization (including an enterprise) there is a combination of economic and social spheres, which actively shape each other [2].

There are four approaches to determining the nature (main content) of social entrepreneurship. They are presented in the analytical Table 1.

Table 1. The approaches to determining the content of social entrepreneurship

Identification of the approach	Authors (developers)	The main features of social entrepreneurship	Limitations of the approach
From the standpoint of a broad interpretation of the content	J. Weerawardena, G. Mort, A. Fowler, E. Shaw, related to the activities of the Center for the Improvement of Social Entrepreneurship	Covers the activities of a wide range of organizations, namely: – state social organizations; – traditional business organizations, which always have a social component; – non-governmental non-profit organizations aimed at achieving social goals	No special features of social entrepreneurship are emphasized, it is identified with any activity that has a social effect
Combined (commercial and social) approach	A. Macmillan, J. Robinson, Ya. Rohalin	Covers activities that focus on achieving not only social but also commercial results	Gives an answer to the question of the combination of social activity, but does not reveal the actual content of social entrepreneurship
Innovative approach	J. Wei-Skillern, S. Wurro, J. Meyer, E. Noboa, E. Austin, F. Perrini, H. Stevenson	Is a part of the activities of innovative enterprises, which are usually aimed at solving social problems	The possibility of achieving social goals by non-innovative enterprises is not emphasized
Problem-oriented approach	K. Lidbiter, analysts of the Schwab Foundation	It is an activity the social results of which are aimed at a certain social group – people with disabilities, homeless people, etc. – or at solving general social problems related to the environment, energy, etc.	As a kind of broad approach, does not focus on the peculiarities of social entrepreneurship, only highlighting the results of its activities and consumers of these results

Source: developed based on [3]

From the analysis of the information presented in the analytical Table 1, it follows that mainly «broad» interpretations of social entrepreneurship are used in scientific circulation. This is its interpretation as an activity without emphasizing the peculiarities and differences of such entrepreneurship. A common feature of the four approaches considered is the recognition of a social goal, which, however, is interpreted differently.

In our perspective, something more should be considered when determining social entrepreneurship, in addition to socially recognized outcomes of its actions. It's about the reality that social goals take precedence over the economic aim of profit maximizing and profit direction in resolving socially significant problems in communities or society. The purpose of social entrepreneurship, like

entrepreneurship, is to make a profit. However, it may rank lower in the hierarchy of values than social aims, such as the goal of inclusion. Furthermore, a trait of social entrepreneurship should be the prevalence of democratic values over authoritarian ones. Otherwise, social goals may be «relegated to secondary positions» because of the authoritarian methods of management.

It is significant that the fixation of the fact that the social enterprise, as an economic entity, should be profit-oriented, corresponds to the documents of the EU official bodies. According to these documents [4; 5], social entrepreneurship must meet the following criteria and has to:

– engage in genuine economic activities;

– have a clear social goal that is useful for society;

– make a profit, but have restrictions on its distribution and distribution of assets with the aim to ensure the priority of the social purpose of the activity;

– be independent of the state or other non-profit organizations in designing the own activities;

– ensure inclusive (internal) management and democratic decision-making procedures.

It is critical that the founders of Ukrainian social entrepreneurship create, comprehend, and begin to apply the aforementioned criteria [6].

In the activities of a social enterprise there is a constant contradiction of two aspects of activity – social and economic. With the aim to simplify, we will use the terms economic, business, commercial side of the social enterprise as synonyms. There is a complex system of interaction between social and economic in the activities of social enterprises. It should be the subject of a study to clarify the definition of the notion of social entrepreneurship. In Fig. 2, we provide our thoughts on the peculiarities of the interaction of the two sides of social entrepreneurship, which are based on examining the experiences of social entrepreneurs in other countries as well as the experiences of Ukrainian social enterprises.

Fig. 2 presents those elements of the social and economic components of the activities of social enterprises, the relationship between which explains the objective contradiction of social entrepreneurship. It (contradiction) is manifested in the fact that social orientation, the desire to minimize labor costs with the aim to increase reinvested earnings, etc. can lead to a decrease in economic efficiency. This creates additional economic risks for the company as a social structure. Excessive democratization of the management process can also create certain risks of inefficient activities.

If social entrepreneurship contributes to social inclusion, then the study of the actual channels of influence is fundamentally important to explain this contribution. In our opinion, social entrepreneurship determines social inclusion through the following channels:

– inclusion of citizens in joint activities related to the implementation of social projects;

– the development of individual and group responsibility for a common goal;

– expanding opportunities for additional jobs and additional employment;

– overcoming the social isolation of people with disabilities;

– strengthening communities by intensifying public activity of members of these communities;

– breaking down barriers in citizens' perception of prestigious and non-prestigious activities, respectively, barriers in relations between citizens;

– increasing the potential for solving social problems at the level of local communities while reducing the burden on local budgets;

– formation of new models and ways of providing social services in partnership between business, local communities, and central government.

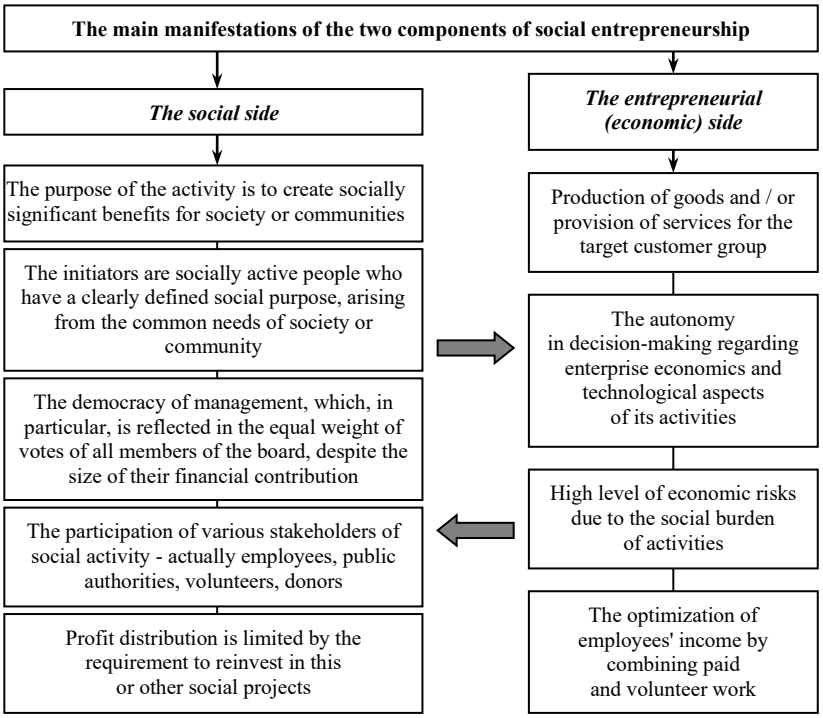

Fig. 2. The components of social entrepreneurship

Source: authors' own

As Ukraine is not a leader in social entrepreneurship, it is fundamentally important for the Ukrainian economy and society to be aware of the experience of social entrepreneurship in other countries. Despite the existence of peculiarities in each national model of social entrepreneurship, there are grounds for distinguishing two basic models. The terms «American model» and «European model» may be used for them. Despite the widespread use of these terms, it is significant that in many countries there is no statutory concept of «social entrepreneurship». And there are no unified approaches to the identification of social enterprises in the EU [7].

Fig. 1 presents information on the peculiarities (differences) of the so-called American and European models of social entrepreneurship.

The fundamental distinction between the two models of social entrepreneurship, according to Fig. 3, is the emphasis on a certain component of their activity. The economic (entrepreneurial, commercial) element of the activity is emphasized in the American model.

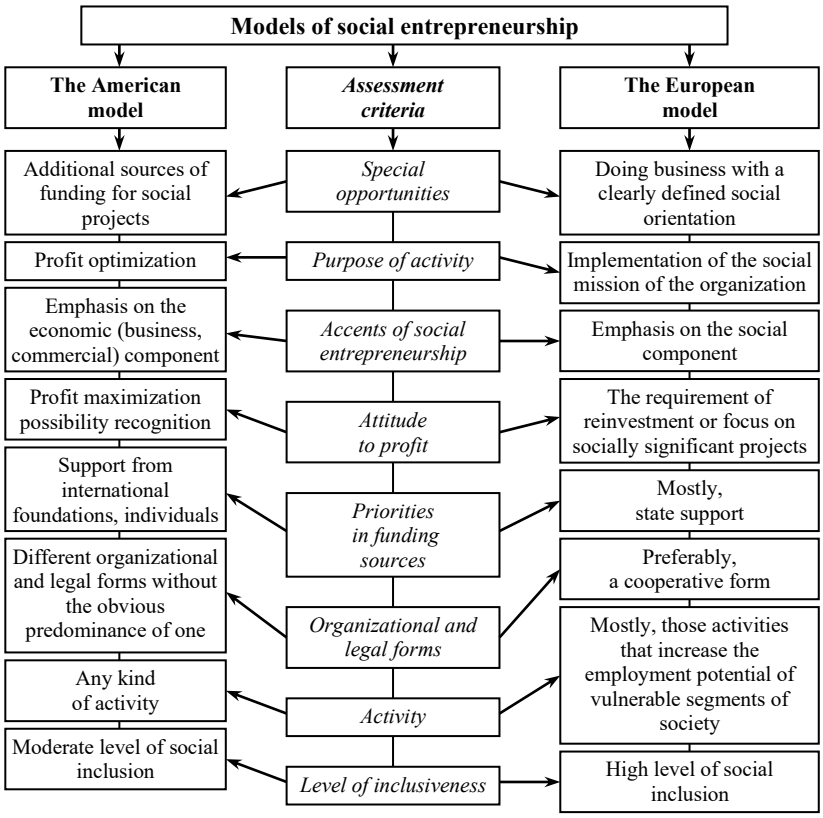

Fig. 3. The features of two basic models of social entrepreneurship

Source: authors' own based on [8]

The European model, on the other hand, emphasizes the social focus of activities. These emphases are also reflected in different attitudes to profit optimization: the value of profit in the American model of social entrepreneurship is greater. Instead, the European model is more «paternalistic»: the role of the state in it is more noticeable. As a result of the reduction in funding for non-profit organizations in the social sphere, the American concept of social entrepreneurship was formed. The more liberal nature of the American model is ultimately manifested in a lower level of inclusion. Instead, the European model makes it possible to ensure a higher level of social inclusion. There is reason to believe that the term «social entrepreneurship» refers to enterprises established according to the logic of the European model. A «business with a social mission» and a clearly emphasized and supported social effect is the European model of social entrepreneurship. Achieving this effect is stimulated by the state through legislation, benefits, and subsidies.

The term «entrepreneurship in the social system», for example, might be applied to the American model. It explores numerous strategies for promoting socially responsible enterprises. These are financial, research, educational support of international and private organizations, state and federal programs of rehabilitation

and employment of people with special needs, taking into account the fact of meeting these needs in providing benefits to entrepreneurs.

Against the background of two basic models of social entrepreneurship, it is advisable to study and emphasize the peculiarities of social entrepreneurship in individual countries. This will help in selecting those forms and tools of influence that can contribute to the formation of the Ukrainian model of social entrepreneurship. We will try to identify those national peculiarities that are manifested in the organizational forms of social entrepreneurship [9-11].

Cooperatives are a typical form of social entrepreneurship in most European countries. In France, for example, they are called «cooperatives of common interest», in Italy – «social cooperatives». In Spain, Portugal, France, Greece, and Croatia, a social enterprise can exist exclusively in the form of social cooperatives.

Social entrepreneurship in the United States is the activity of non-profit non-governmental organizations, the income of which is used for the statutory purposes of the organization, most often to solve social problems of certain target groups of citizens. In the United States, it is enough for a product or service to help solve a certain social problem. And then the enterprise which makes such goods or renders such service can already be called social.

In the UK, a special kind of social entrepreneurship has been introduced – companies that work for the benefit of communities. There are more than 13,000 such companies in the country. The United Kingdom is considered the European leader. There are about 70,000 social enterprises in the country, employing almost a million Britons. Their total contribution to the economy is over 24 billion pounds. In 2017, 68% of social enterprises supported people from vulnerable groups, 44% – employed such people, 28% – worked in the most depressed areas of the country, shaping the economy of these regions.

In Belgium, Denmark, Finland, Luxembourg, and Slovenia, the status of a social enterprise can be granted not only to cooperatives or private companies, but also to public, volunteer, charitable organizations and foundations.

In Latvia, there is a law according to which social enterprises can exist only in the form of a limited liability company (LLC). Their social status must be confirmed annually by the relevant ministry. The state exempts social enterprises from paying income tax.

In Austria, Belgium, Spain, Italy, the Netherlands, Slovenia, Finland, and Sweden, such a form of social enterprise as «Work Integration Social Enterprise» is widespread. Their purpose is to provide assistance in employment and training to vulnerable groups of citizens.

Social entrepreneurship cannot exist without state support. For European countries, this is not only the support of national governments, but also of EU governing bodies. Back in 2011, the European Commission approved a long-term program for the development of social entrepreneurship called «Social Entrepreneurship Initiative» [12]. The purpose of the program is to stimulate the countries of the

European region to develop the social entrepreneurship sector. The program has three major goals: to promote social enterprise activities, to create a legal framework that is conducive to social entrepreneurs, and to make it simpler to receive funds.

The European Commission identifies the following main areas of social entrepreneurship:

– provision of individual social services in the sphere of health care, social protection, and education;

– care for children, the elderly, assistance to the poor;

– employment of people in difficult life circumstances and the unemployed;

– local development of depressed / vulnerable regions;

– garbage recycling, environmental protection, sports, art, culture, science, research and innovation, consumer protection.

The list of the spheres of social entrepreneurship in the documents of the EU governing bodies is important, among other things, because it reflects the European interpretation of the concept of «social». According to the list, this concept covers not only the phenomena associated with inequality of people in society. «Social» is also interpreted in connection with the processes that shape the overall level of well-being in the country. This is not only income and employment, but also the state of the environment, culture, education, and public health.

The reaction to the created conditions and incentives for social entrepreneurship can be analyzed according to the number of social enterprises in some European countries. This information is presented in Fig. 4.

Information from Fig. 4 shows the different potential of social entrepreneurship in different countries. With disparities in the number and structure of the country's population, as well as the level of economic growth, this is entirely reasonable. However, the statistics of social enterprises shows a rather controversial fact of significant (many times) differences between countries with approximately the same economic potential. These include three European leaders – France, Germany, and the United Kingdom. Germany has 2,7 times the number of businesses as France, whereas the United Kingdom has 1,7 times the number of businesses as Germany. This phenomenon must be investigated in order to determine what is driving the differences: anomalies in law, government support, or social enterprise statistics.

With only 150 social enterprises registered in Ukraine, social entrepreneurship is still in its infancy. In the evolution of Ukrainian social entrepreneurship, there are three stages.

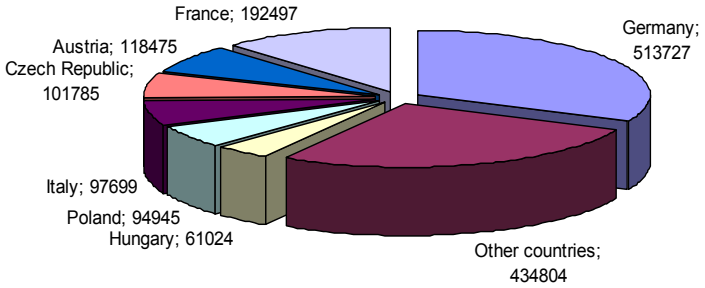

Fig. 4. The number of social enterprises in EU countries and the United Kingdom, 2017

Source: developed based on [13]

The first stage (1991 – 2010) was marked by the initiatives of international donors, primarily USAID, which encouraged the government and society to build a social protection system. First of all, it was about protecting people with certain limitations and special needs. The first legislative act in which the idea of inclusion is present (although there is no actual term) was the special Law of Ukraine №875-12 [14], adopted in 1991. This law is still in force and provides additional preferences for entrepreneurship involving people with disabilities. It also provides for the activities of a special fund for financing business initiatives of citizens of Ukraine, which have certain restrictions. In this way, thanks to the Law, certain conditions for social entrepreneurship have been created. However, the entrepreneurial activity of people with disabilities is not called «social entrepreneurship».

For the first time, the term «social entrepreneurship» began to be used in Ukraine only in the 2000s and became widespread thanks to the «Network of Public Action in Ukraine» (UCAN). The network supported the activities of 28 Ukrainian social enterprises that existed at the time.

The second stage (2010 – 2015) is associated with an increase in the number of studies on social entrepreneurship, with the development of relevant programs and organizational support structures. A study by Ukrainian author K. Smahlii, published in 2014 [15], was one of the first investigations to be noticed by the Ukrainian scientific community. The Consortium for the Promotion of Social Entrepreneurship in Ukraine was founded in 2010. It brings together five international organizations with the purpose of providing financial, educational, and advisory support to social entrepreneurs that have just started operations. The positive result of the Consortium's activity was that social enterprises began to operate actively in several large cities of Ukraine. And the responsibility for their support has largely begun to be taken by local communities and local businesses.

At this point, the «Social Initiatives» All-Ukrainian Resource Center for Social Entrepreneurship Development, the socialbusiness.in.ua portal with the first register of social enterprises, and a social investment program for social enterprises with relatively low interest rates have all been established as organizational forms of support for Ukrainian social entrepreneurship.

The third stage (early 2016 and still) is characterized by an increase in the number of social enterprises, the expansion of the range of entities that support social entrepreneurship. In particular, at this stage Ukrainian small and medium business as well as Ukrainian universities actively joined. International organizations continue to play a significant role. At this stage, there were changes in the emphasis on the activities of social enterprises. Modern Ukrainian social entrepreneurship and the volunteer movement are overcoming the consequences of the Russian-Ukrainian war in eastern Ukraine. Refugees, children of frontline territories, soldiers in need of rehabilitation after injuries, families of the dead, etc. become the subject of attention.

Ukrainian entrepreneurship courses began to be taught at Ukrainian universities during the third stage. As a result, experts with the required skills began to be trained.

With regard to the significant financial and advisory support for social entrepreneurship from EU countries, one could expect the replication of the European model in Ukraine. According to the criterion of priority of the social over the economic, the European model in Ukraine, indeed, is partially implemented. But the Ukrainian national model lacks the second part of the European model, namely, consistent economic state support. In this second part, the Ukrainian model of social entrepreneurship is more like the American one with its initiative private funds and citizens.

It seems that the Ukrainian national model of social entrepreneurship with special features is being created. Within its limits, social entrepreneurs are forced to take over those social functions that the state does not perform, although it should perform under the law. The reasons for the state's failure to perform its social functions in the Ukrainian reality are: the weakness of state institutions, lack of political will, the formed oligarchic model of the economy with non-social values, etc.

Conclusions: Based on the analysis of the relationship between social inclusion and social entrepreneurship, on the one hand, and economic uncertainty, on the other, we can make the following generalizations.

Social entrepreneurship as a form of social inclusion undoubtedly expands the scale of economic certainty. After all, social enterprises achieve greater coverage of citizens with employment, receiving earned (factor) rather than redistributed incomes, ensure the development of professional and communication skills, and intensify participation in management and government institutions.

At the same time, social entrepreneurship has some potential for expanding *economic uncertainty*. It is related to the contradiction between the social and economic sides of the activity, which [contradiction] is manifested in the fact that the prerogative of the social can lead to a loss of economic efficiency.

The contradiction between social and economic in the activities of social enterprises is resolved within a specific national model of social entrepreneurship. This model means the existence of special state requirements for organizational forms of social entrepreneurship, as well as special tools of state support and forms of

interaction with civil society institutions, international organizations, local communities, and non-social business.

It is likely that a mixed model of social entrepreneurship is being formed in Ukraine, which is forced to combine certain features of the so-called European and American models. This mixture is largely determined by the gaps (failures) of the modern Ukrainian state in the performance of social functions, respectively, in the provision of social guarantees and standards.

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REAL ESTATE MARKET INFRASTRUCTURE AS A FACTOR OF ECONOMIC CERTAINTY AND MARKET STABILITY

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The relevance of the study of the national real estate market from the standpoint of improving the business infrastructure of this market is beyond doubt. After all, this sector has contributed a reasonably considerable percentage of the country's GDP and hundreds of thousands of jobs at all periods of modern Ukrainian economic history. The percentage of the real estate market in the country's produced GDP is depicted in Figure 1.

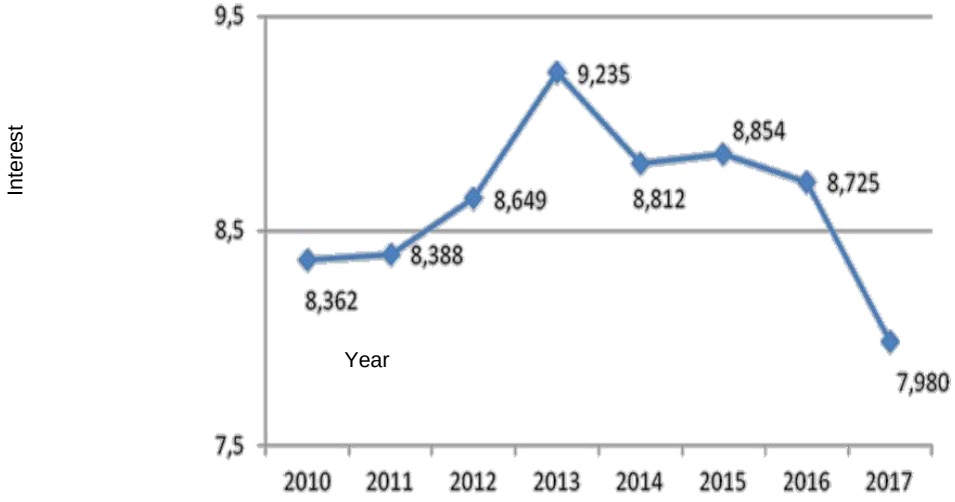

Fig. 1. Dynamics of the share of «Real estate transactions» in Ukraine's GDP

Source: authors' own based on [1]

The information presented in Fig. 1 indicates that the share of activities defined as «Real estate transactions» in the country's GDP is significant. It is comparable, for example, with the shares of such spheres as education, medicine, etc. The real estate market has usually created a significant number of jobs in the Ukrainian economy. The dynamics of the number of jobs provided through the functioning of the real estate market is illustrated in Fig. 2.

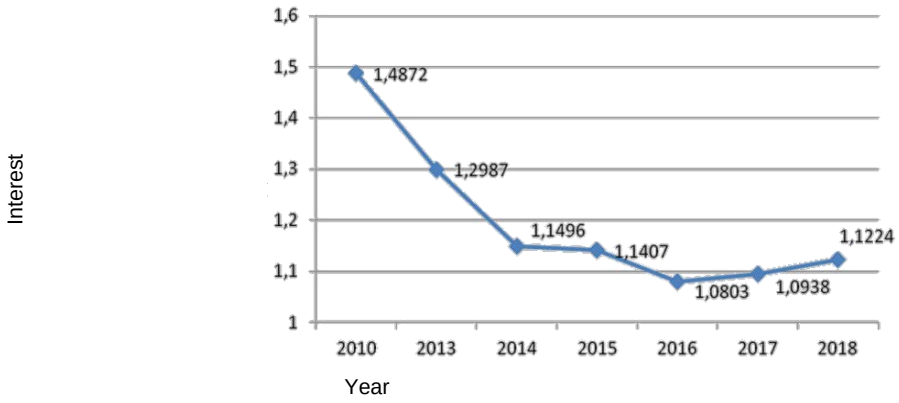

Fig. 2. The dynamics of the share of employed people in the sphere of «Real estate transactions» in Ukraine in 2010 – 2018

Source: authors' own based on [1]

The information on the share of employees in the field of «Real estate transactions» in Fig. 2 indicates that, starting from 2016, the positive dynamics of growth in the number of employed people began. It was close to the level of 2014, when the recession began because of the Russian-Ukrainian war.

Many studies by specialists and experts in the real estate market have been conducted on topics concerning the organization and functioning of the market [2-4]. The majority of contemporary real estate market research is devoted to clarifying price trends and examining the elements that influence price dynamics. However, there is a lot of research on more fundamental issues, such as the relationship between the overall economic crisis and the status of the real estate market, and how to use the real estate market to mitigate the consequences of the crisis.

The real estate market domestic researchers [5-7] focus not only on trends in real estate prices, but also on understanding the role of this market in stabilizing the national economy. In particular, we consider the relationship between the development of the real estate market, on the one hand, and the development of the financial market, on the other, between the dynamics of real incomes of Ukrainians and the scale of acquisition of residential, commercial etc. real estate.

From 2020 onwards, both domestic and foreign researchers are interested in assessing and forecasting the impact of the emergency – the Covid-19 pandemic – on the evolution of the real estate market [8].

The modern real estate market of Ukraine is formed by representatives of several types of business activities and provides for their interaction. The need for such a merger stems from the complexity of real estate economics, the diversification of real estate demand structure, and the expanding needs of consumers. In view of all the above, we make assumptions about the feasibility of using the term **«real estate market infrastructure»** in market analysis and in practice.

The infrastructure of the real estate market, like that of other markets, should cover individual market sectors represented by entrepreneurs with varying levels of expertise. Regardless of their disparities in skills, they are all involved in the

establishment of services that support the purchase, sale, reproduction, and use of real estate. Our idea of the infrastructure of the real estate market is illustrated by the diagram (Fig. 3).

Fig. 3 illustrates the following ideas about the real estate market infrastructure in general and entrepreneurship in the real estate market in particular:

– the infrastructure of the real estate market covers the so-called «core», which consists of entrepreneurs of related activities, namely: realtors, property appraisers, property managers, and developers;

– in addition to the «core», there is an element of infrastructure in the form of the so-called «protective field» consisting of five elements, namely: national regulators (public authorities), banks related to mortgage lending, construction (repair) organizations, real estate insurers, and consulting companies;

– united by the real estate market, the enterprises that form the «core» of the market infrastructure perform, albeit related, but special functions. Therefore, we are talking about four segments of the «core», namely: realtors, appraisers, real estate managers, and developers;

– «protective belt» of the real estate market infrastructure is designed to form its stabilizing – efficient and safe – environment related to legislation (rules of activity), the formation of sources for investment, reproduction of real estate, insurance and intellectual – analysis and substantiation of decisions – provision.

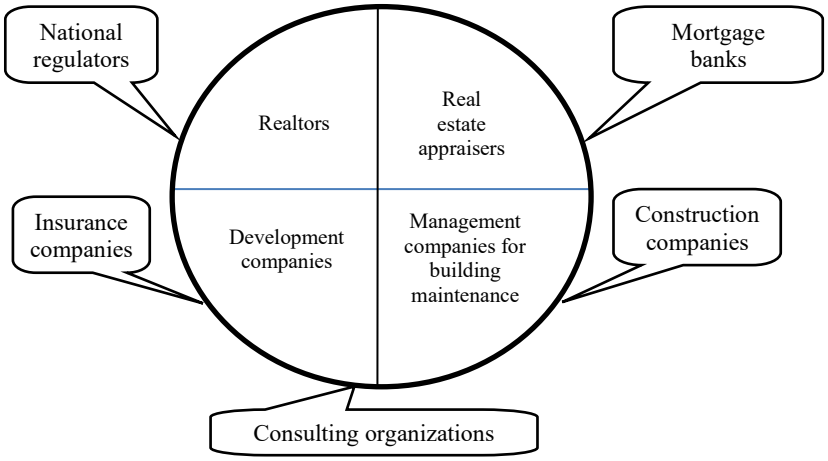

Fig. 3. The real estate market infrastructure and relevant forms of business activity

Source: the authors' own

Each area of the «core» of the real estate market infrastructure – real estate, valuation, building management, and development – has its own organizational, legal, and problem-solving challenges in Ukraine. We will try to describe the most defining peculiarities and current difficulties of each of them.

Real estate forms the core of entrepreneurial activity in the Ukrainian real estate market. It has already stood out as a specific functional area and as an activity.

Real estate entrepreneurs have special relationships with national regulators. These relationships are quite controversial. In particular, there is a discrepancy

between the official interpretation of the meaning of the term «real estate activity» and the essence of this activity from the standpoint of real estate market operators.

The activities of the following economic entities are distinguished according to the Classifier of Economic Activities [9] (Section I): «landlords, agents and/or intermediaries for the sale or purchase, rental of real estate, provision of other real estate-related services, such as real estate appraisal or acting as agents of escrow accounts». These activities «may be carried out in respect of owned or leased real estate, and may be carried out on the basis of fixed payments or on the basis of a contract», according to the document. It also refers to the construction of structures in conjunction with the purchase of ownership or lease of those structures. It is also important that the document highlights the activities of «real estate managers». The subject of the latter are three groups of real estate transactions, covering:

– purchase and sale of owned real estate;

– leasing;

– commissioning of owned or leased real estate.

The analyzed document refers to such a form of entrepreneurship as real estate agencies, which, according to the creators of this document, cover the following activities:

– intermediary services for the purchase, sale or lease of real estate on the basis of fixed payments or on a contractual basis;

– provision of consultancy or real estate appraisal services, which are related to its purchase, sale or lease, for a fee or contract;

– escrow agent services.

It is this interpretation of the activities of realtors that leads to a conflict between related professions – realtors, real estate agents, appraisers, and real estate managers.

Attempts to pass laws [10] without reconciling interests and without the necessary communication with the professional community of realtors create destabilization and uncertainty instead of stabilization and certainty.

Many real estate transactions involve realtors or real estate agents. Thus, according to the Association of Professional Real Estate Managers, there was the following dynamics in the number of transactions involving professional realtors (in% of the total number of transactions in the real estate market):

2001 – 2008 – 75-80%;

2009 – 60-65%;

2010 – about 50%;

2011 – 40%;

2012 – about 37% [11];

2013 – 2018 – 60-65% [12].

The analysis of the dynamics of real estate transactions, with the participation of professional realtors, shows the fluctuating nature of changes. To some extent, there is a tendency to lower this share. This is most common during periods of economic downturn and growing public distrust of government officials. During periods of

increased economic stability and confidence in the government's policies, however, the share of such transactions rises.

Customer perceptions of real estate market experts' skill, as well as consumer expectations for activity outcomes, are significant aspects of the organization of entrepreneurial activity in the real estate market. Consumer surveys showed that out of 100% of potential buyers and sellers of real estate, only 11% flatly refuse to cooperate with realtors, 15% have already decided which realtor they will work with, and 16% want to work with a realtor, but do not know who to contact [12].

The attitude of customers to real estate is quite controversial. After all, 31% of customers are actually ready to work with a realtor, but do not understand the essence of the real estate service and do not know its value. And 23% of customers are ready to work with a realtor, but are wary of low quality real estate services. Only 4% of consumers have doubts about the need to use a real estate service [13]. According to real estate market analysts, there is a severe shortage of such services that demonstrate high quality, openness, and clarity for realtor activity consumers.

According to consumer survey data in the real estate market, there is a lack of confidence in the interaction between market professionals and customers, as well as customer ignorance of the benefits of working with market professionals and a shortage of highly skilled specialists.

Real estate, as a separate type of business, has an objective economic and social basis for future development. De facto, a separate submarket of services has been formed – the market of real estate services. De jure, the legalization of this market is still ongoing. The current legal framework for the functioning of the Ukrainian market of real estate services includes the following codes: the Civil Code of Ukraine, the Commercial Code of Ukraine, and the Tax Code of Ukraine. Its components are separate laws, namely: the Law of Ukraine On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Financing of Terrorism and Financing of Proliferation of Weapons of Mass Destruction, the Law of Ukraine On Consumer Protection, and the Law of Ukraine On Advertising. The important component of the legal framework is the Order of the Ukrainian Research and Training Center State Enterprise, the National Standardization Body №40 enacted on February 27, 2019 On the adoption of the national standard DSTEU (the State Standard) EN 15733: 2019, Services of real estate agents. Requirements for the provision of real estate agents [14].

Unfortunately, there is no special law on the regulation of real estate activities in Ukraine. For many years, there has been a debate between supporters of the adoption of such a law and supporters of the idea of the irrelevance for such special legislation. Both sides of the discussion have arguments to justify their own approach.

The main problem of regulating the real estate market is the lack of certainty in the regulatory mechanisms. There is a choice between two alternatives, namely: between «hard» state regulation and «soft» regulation with the transfer of powers to self-regulatory organizations. At the beginning of streamlining the real estate services market, we believe there should be «mixed regulation» by the state and public (self-

governing) professional groups. The promotion of market certainty and development should be the criterion for such a partnership. The vector toward stronger market self-regulation should be applied in the future.

According to data collected by state statistics bodies, with the participation of public associations of realtors and market experts, the number of participants in the real estate services market ranges from 50 to 65 thousand people [1]. It is impossible to provide a more accurate estimation of the number of market participants to ensure a higher level of certainty of transactions for several reasons:

– there is a significant number of enterprises in the form of the so-called sole proprietors, which have already ceased or are ceasing their activities, but this has not yet happened officially;

– a significant number of entrepreneurs do not legalize their activities;

– there is no single register of market participants in real estate services.

Legislative recognition of real estate services as a separate product of entrepreneurial activity remains incomplete. This forms one of the main causes of economic uncertainty in this market. This is the opinion of the Ukrainian researcher M.A. Minenko. He, in particular, records such specific reasons for market uncertainty as the partial exclusion of the state from addressing the issue of legitimization of real estate as a service, and the absence of the Law of Ukraine On real estate (brokerage) activities which would contribute to the formation of a transparent legal framework [15].

Public associations of market specialists play an important role in the running of the rather «young» Ukrainian real estate market, which is now in a condition of high uncertainty. Associations lobby, organize, take legislative initiatives, try to make activities transparent, and protect the interests of market participants. These are, in particular, the Association of Real Estate Specialists (Realtors) of Ukraine, the Union of Real Estate Specialists of Ukraine, the Realtor Chamber of Ukraine, and the Guild of Realtors of Ukraine. But democratic principles of functioning of public associations sometimes hinder the formation of a common vision of problems, as well as the development of equal approaches to the organization of relations with public authorities etc. This may be the reason for the slow formation of the legal field and the legal recognition of real estate as an officially standardized profession.

Unresolved issues of systemic misuse by authorities surfaced in the early 2020s, posing a barrier to the growth of real estate as a profession and a sort of entrepreneurial activity. These include representatives of the parliamentary corps and individual officials who are trying to «regulate» the market with the aim to create various «fundraising schemes» for all market participants. Legal uncertainty is becoming one of the primary reasons for consumers' lack of trust in real estate brokers. After all, the realtor, as a market player, does not yet have a defined national professional and legal status to the consumer of services, owing in great part to government measures.

The Real estate community of Ukraine is gaining its status and trust of Ukrainian citizens under the conditions of economic uncertainty in various ways. Important achievements of the professional community are the following actions and the following results of these actions:

– permanent participation in international congresses of the National Association of Realtors of the United States, the International Real Estate Federation (FIABCI), and the International Association of Real Estate Management;

– permanent representation of professional associations in the work of educational programs of the European Education Fund;

– introduction of the European norm (EN) of the Standard «Services of real estate agents. Requirements for the services of real estate agents» at the level of the State Standard of Ukraine;

– participation in working groups to develop a draft Law on the regulation of real estate (brokerage) activities;

– participation in the work of the Intersectoral Qualification Council for the development of professional standards in the field of real estate management, landscaping and housing and communal services for the development of «Realtor» and «Real Estate Agent» professional standards;

– involvement in the development of master's programs that include specialization and can be classified as a «real estate market specialist»;

– participation in the formation of the general system of educational and professional training of specialists in the real estate services market according to a single state standard.

In our opinion, the following steps should be the primary ones for the final legitimization of real estate as a separate profession and a type of entrepreneurial activity:

– the establishment of a single national governing body based on self-regulation, with the following functions: representing market participants' interests in relations with state institutions and other stakeholders, establishing a register of official realtors of Ukraine, participating in market professional certification, developing quality standards services provided, and monitoring and reporting of violations by members of the professional community;

– approval of unified standardized approaches to real estate activities as a special type of entrepreneurship;

– further implementation of NSS (National State Standard) in the part «Services of real estate agents. Requirements for the services of real estate agents»;

– creation of the «Realtor» and «Real Estate Agent» Professional Standards, as well as acceptance of educational and professional training programs for bachelors and masters in the appropriate specialization based on these standards;

– introduction of required and agreed-upon information on the specialties «Realtor» and «Real Estate Agent» into the State Classification of Professions and the Handbook of Qualification Characteristics of Professions;

– establishment of a system for confirming the qualifications of «Realtor» and «Real Estate Agent» in accordance with international standards.

Entrepreneurship in the appraisal activity of Ukraine is characterized by a number of organizational peculiarities and unresolved issues.

An appraiser in Ukraine can be a natural person (a citizen of Ukraine, a foreigner or a stateless person) who has a basic or complete higher education. The said person must be trained in an educational institution that has concluded an appropriate agreement on the training of appraisers with the State Property Fund of Ukraine.

Recognizing the need for appraisers to receive specialized higher education is a significant advantage and achievement in this field. A property appraiser must, among other things, complete a one-year internship in the relevant narrow specialization with an appraisal agency, pass a qualifying exam, and obtain an appraiser's qualification certificate in accordance with the requirements of Ukrainian legislation [16].

The availability of requirements and processes for including information about appraisers and objects of appraisal activities in the State Register is another beneficial aspect in the organization of appraisal activities. The law also establishes the legal structure and processes for gathering, storing, processing, and acquiring data related to assessment activities. According to the State Register, 13,125 persons were legally registered in Ukraine as of June 2020.

The public organization «All-Ukrainian Association of Appraisal Specialists», which represents the interests of entrepreneurs-appraisers, has brought together professional appraisers. This organization identifies and discloses difficulties that restrict or obstruct appraisal activities. It is clear that long-term disregard for these difficulties leads to growing uncertainty in the evaluation sphere.

The following are some of the issues with appraisal activity organization that contribute to increased uncertainty in this area:

– lack of current state policy in the sphere of appraisal activities, with clearly defined new standards for appraisers in particular and appraisal operations in general;

– lack of legal basis for the combination of state regulation and self-regulation of appraisal activities, as well as the delegation of certain functions of the state to professional self-regulatory organizations;

– difficulty in understanding, interpreting and applying the current Law of Ukraine On Property Valuation, Property Rights and Professional Valuation in Ukraine. These are primarily the rights and responsibilities of the state, the appraisal community, the public, and end users of appraisal services as well as rights and responsibilities for pricing and regulatory initiatives.

The public organization «All-Ukrainian Association of Appraisal Specialists» recognizes the necessity to design a Concept for appraisal activity growth in the 2020s. It should include prior achievements in property appraisal organization, forecasts for the future of appraisal operations, and unsolved challenges. Currently, a draft of such a Concept is being produced.

The initiated reform of housing and communal services in Ukraine in the 2010s introduced a new profession for our country – building managers, in particular, of apartment buildings. The need for real estate management specialists was formed under the influence of the expansion of the right of co-owners of apartment buildings to dispose of common property. After all, residents of apartment buildings have the right to independently choose one of three forms of management [17]. These are, in particular, the following forms:

– creation of an association of co-owners of an apartment building (condominium association), which encourages residents of their own house to take responsibility;

– involvement in the management of the house of a manager, whom the co-owners elect independently, or in case of failure to decide on the form of management, a manager is appointed by the city authorities on a competitive basis;

– independent management of an apartment building, without creating condominiums and without involving a manager.

The apartment building management services carried out by a manager are provided on the basis of a contract for the provision of management services, which is concluded in accordance with the already mentioned Law [17] and the Law of Ukraine On Housing and Communal Services [18].

In the modern interpretation, the competencies of entrepreneurs involved in the management of apartment buildings include the ability to perform the following functions:

– maintenance of the common property of an apartment building, including interior premises and adjacent territories;

– performance of sanitary and technical works;

– maintenance of internal house systems;

– purchase of electric and thermal energy to ensure the functioning of the common property of an apartment building;

– current repairs of the common property of an apartment building.

It is obvious that the above list of functions covers only a small part, primarily only the technical requirements for business results in this area. Therefore, it is incomplete. In particular, it does not cover the economic and communication functions, respectively, the competencies that a manager should have. The latter, in our opinion, should also include the following functions:

– optimization of expenditures for maintenance, repair, and modernization of the building, taking into account its technological condition;

– monitoring of the quality of services and prices for services of repair, restoration and other works;

– negotiating contracts for the performance of work with construction and repair organizations, as well as maintaining supervision over the execution;

– developing commercial projects and securing external finance to enhance the building’s condition, preserve the environment, improve living comfort, and so on;

– communication with local and central authorities in cases of unforeseen situations, man-made threats etc.;

– participation in concluding insurance contracts for buildings, structures, property etc.

Business activities in the sphere of building management, in our opinion, are marked by extraordinarily high uncertainty when compared to other real estate market activities. This is due, among other things, to the lack of a business tradition in this sector and the lack of experience of Ukrainian entrepreneurs in this field.

In the XXI century, in the real estate market of Ukraine, a new type of entrepreneurship – development – has been launched and is actively developing.

A development company is an organization that produces money by creating and developing real estate to increase its value. In the broadest sense, it is a legal or natural person who promotes and implements a real estate business project.

In 2020, about 400 development companies were registered in Ukraine. According to experts, domestic enterprises provide over 90% of development services. The share of foreign companies is insignificant. This is due to the fact that Ukrainian development companies have certain advantages in the market. Those relating to land use, in particular, with better adaptability to the unique economic realities of Ukraine.

Traditionally, the functions of development companies in the real estate market include:

– registration of construction permits by local authorities (project instructions, investment contract, technical passport, obtaining approvals and permits);

– project development (formation of a group of project developers, management of a draft project development and feasibility study);

– construction supervision (conducting tenders among construction contractors, construction management, commissioning of the facility);

– attracting credit and investment funds from outside the country (development of investment strategy for the project, structure of project financing, agreements for signing between the company and financial institutions);

– real estate promotion (development of marketing concept and strategy, advertising, development of a standard lease or sale agreement and negotiations with potential customers).

A development company can perform both the role of an investor in a development project and the role of an intermediary, as well as an organizer of an investment project in the field of real estate.

Development is a special business related to the maintenance of investment projects in real estate. Taking responsibility for the timing and quality of the project, developers also take on some of the project risks. One of the difficulties of entrepreneurial development in Ukraine is the unjustified transfer of these risks by developers to other economic entities and attempts to avoid liability.

The infrastructure of the real estate market, as illustrated in Fig. 3, includes those enterprises and organizations that do not actually form the real estate market, but create an external environment for its operation. This external environment is

formed with the participation of: national real estate market regulators, financial institutions (in particular, mortgage banks), construction companies, consulting companies, and insurance companies.

National real estate regulators are primarily public authorities, consisting of: the Ministry of Finance of Ukraine (in particular, in terms of financial monitoring), the State Property Fund of Ukraine, and the Ministry of the Development of Communities and Territories of Ukraine. The issue of belonging of all-Ukrainian professional associations to the national regulators needs special research. These include, in particular, the already mentioned public organizations: the Association of Realtors of Ukraine (AFNU); the Union of Real Estate Specialists of Ukraine (SFNU); the Ukrainian Society of Appraisers (UTO), the Confederation of Builders of Ukraine (KBU), and the Construction Chamber of Ukraine.

The functioning of the real estate market is influenced by financial and credit organizations represented by mortgage banks and other commercial banks. After all, they provide financial resources that market participants may be lacking in the short term. Such Ukrainian banks as PJSC «Kredobank», Ukrhazbank, Pravex-Bank, Oschadbank, Privatbank are actively engaged in mortgage lending.

Ukraine is attempting to stimulate mortgage lending by decreasing the interest rate on credit funds. At the same time, the standards for borrowers have altered, particularly in regard to the borrower's proven official income. Banks scrutinize income data more thoroughly. The biggest problem with lending is the distrust of borrowers of mortgage lending. It was caused by the negative experience of borrowers during the «mortgage boom» of 2006 – 2008.

Construction companies create that part of the external environment of the real estate market, which is associated with the emergence of new objects in this market and their reproduction in good condition (repair). The relationship between direct market participants and construction enterprises has some peculiarities. These relationships are, on the whole, constructive. The cooperation between real estate industry experts and developers is thriving. Cooperation takes place primarily in the following ways:

– developers that have a contract with a certain real estate agency pay it a commission for promoting and selling real estate to the customer;

– developers collaborate with all realtors who propose and sell assets made by the developer on the basis of the so-called public offer of collaboration for all realtors.

The issue of cooperation between developers and real estate agents is primarily related to the fact that some developers identify realtors as competitors. It is a question of competition and allegedly «conflict of interests» between the sales departments of a developer and realtors. This interpretation of «conflict of interest» is incorrect, at least because the sales department has the function of advertising the object. Such a function does not exist for a realtor who provides comprehensive support for the transfer of real estate from a developer to a buyer.

Consulting companies, another segment of the real estate market infrastructure, can be involved in the creation of projects for the renovation of buildings and structures, their redevelopment, the use of innovative technologies, and the search for investors both domestically and internationally.

Insurance companies are an important part of the infrastructure of every business, including real estate transactions. Insurance companies' roles should be expanded and adequately regulated under Ukrainian conditions. This is due to the significant depreciation of real estate, man-made threats associated with the unsatisfactory state of utilities, and the lack of the necessary standards in building construction and maintenance.

In the real estate industry, there are several types of insurance. Classic real estate insurance and property insurance, often known as title insurance, are the most prevalent. In Ukraine, the first type of insurance is more common. The pricing algorithm is the primary constraint on the growth of real estate insurance services. The cost of the insurance service is calculated as a percentage of the object's worth, which is paid annually. Second, receiving insurance reimbursement in the event of an insured occurrence is a very cumbersome operation, which increases the scope of economic uncertainty.

Conclusions: From the analysis of the infrastructure of the real estate market in Ukraine and the entrepreneurship related to this market, we make the following generalizations.

The Ukrainian real estate market has significant potential for development and a positive impact on the stabilization of the entire national economy. The market creates hundreds of thousands of jobs and forms a significant part of the value added represented in the country's GDP.

The Ukrainian real estate market's stability potential is not fully achieved. This refers to all market components and types of commercial activity that make up the «core» of the market infrastructure. Real estate, appraisal, real estate management, and development are examples of these types of entrepreneurship.

Each type of entrepreneurship in the real estate market has special difficulties that can increase economic uncertainty. But there are at least two problems common to all market segments. *The first* is related to the incompleteness and imperfection of the legal framework regarding the activities of market professionals and their relations with public authorities. *The second* concerns the professional self-organization of the market carried out by public self-governing professional organizations.

Ukrainian public professional self-government organizations are designed to help solve a number of priority problems in the functioning of the real estate market, namely:

– creating and lobbying for the regulatory framework necessary to stabilize the real estate market;

– identification of professional standards of activity in the market and control over their observance;

– encouraging the development of a vocational education and retraining system for real estate professionals;

– establishing efficient communication between public authorities (national regulators) and entrepreneurs, on the one hand, and between entrepreneurs and consumers of services, on the other.

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APPENDIX A

Table A.1. The essence of the principles of corporate management of the OECD

Definition of the principle	The content of the principle
Protection of shareholders' rights	A) Basic rights of shareholders: reliable methods of property registration; transfer of shares; regular and timely receipt of information about the corporation; participation and voting at the General Meeting of Shareholders; participation in elections of the Council; obtaining a share of the corporation's profits. B) Shareholders have the right to participate in decision-making and to obtain sufficient information on issues related to fundamental changes in the corporation. C) Shareholders must be able to efficiently participate in the General Meeting of Shareholders and vote at the meeting, as well as be informed about the rules, including the voting procedure governing the General Meeting. D) The capital structure and mechanisms that allow individual shareholders to obtain control that is not comparable to their share in the shareholding are subject to disclosure. E) Corporate control markets must be able to operate efficiently and transparently. F) Shareholders, including institutional investors, should consider the costs and benefits of exercising their voting rights.
Equal treatment of all shareholders, including foreign and minority	A) The treatment of all shareholders who own shares of the same type must be the same. B) It is necessary to prohibit any transactions in their own interests and transactions with the use of confidential information. C) Members of the Supervisory Board and the Management Board are obliged to declare their material interest in agreements or issues related to the corporation.
The role of stakeholders in company management	A) The corporate management system must ensure compliance with the legally protected rights of stakeholders. B) If their interests are protected by law, the stakeholders should be able to use efficient methods of protection in the event of their rights violation. C) The corporate management system should allow the participation of stakeholders in activities to improve the efficiency of the company. D) If stakeholders are involved in the corporate management process, they should have access to the necessary information.
Information disclosure and transparency	A) Information to be disclosed should include: results of financial and operational (economic) activities of the company; company tasks; ownership of significant stocks of shares and voting rights; the list of members of the Board and the Management Board, as well as the amount of remuneration that each of them receives; significant, predictable risk factors; important issues related to employees and other stakeholders; structure and policy of company management. B) Information should be prepared, verified and disclosed in accordance with high quality standards for financial and non-financial disclosure and audit. C) Audits should be undertaken annually by an independent auditor who provides an external and objective examination of financial statements to ensure correct preparation and submission. D) Dissemination channels should provide equal, timely and non-costly access to the required information.
Responsibilities of the Board	A) Board members must act on the basis of all necessary information, in good faith, with due diligence and caution, in the best interests of the company and shareholders. B) If the decisions of the Board may affect different groups of shareholders differently, it must treat all shareholders equally. C) The Board must ensure compliance with relevant legislation and take into account the interests of stakeholders. D) The Board must perform certain key functions. E) The Board should be able to make an objective, independent, in particular from the Management Board, judgment on shareholders. E) Board members must have access to information that is accurate, timely and relevant to be able to perform their duties.

APPENDIX B

QUESTIONNAIRE

for determining the weighting coefficients of qualitative and quantitative indicators of corporate management of a joint-stock company

Indicator	5	4	3	2	1
Procedure for convening and holding the General Meeting of Shareholders					
The procedure for issuing shares of the company					
The work of the Supervisory Board of the company					
Organization of the work of the executive body of the company					
Disclosure of information and its transparency					
Control over the financial and economic activities of the company					
Return on capital					
Return on equity					
Payback period of equity					
Coefficient of financial firmness (independence)					
Financial stability coefficient (financing coefficient)					
Earnings per share					
Dividend per share					
Dividend yield					

APPENDIX C

SURVEY
to conduct a qualitative assessment of corporate management when compiling a corporate management rating

1. Name of the legal entity _____

_____

2. Identification code (USREOU)_____

3. Location _____

4. Legal address _____

5. E-mail or an Internet site _____

6. Date and state registration body _____

_____

7. Activities under NACE _____

_____

_____

8. Taxation system (underline) – general, fixed agricultural tax, single tax (3%, 5%).

9. The amount of authorized capital _____

10. Nominal value of shares _____

11. Number of issued shares _____

12. Number of shareholders and their share

– legal entities – _____

– individuals – _____

13. List of shareholders whose share in the authorized capital exceeds 10%

_____

_____

_____

14. Licenses obtained for certain activities:

_____

_____

_____

15. Head (Director, Chairman of the Board) of the enterprise:

Name and Surname _____

Date of birth _____ Code _____

Education _____

Experience in the specialty _____

Work experience in the position _____

16. Chief Accountant:

Name and Surname _____

Date of birth _____ Code _____

Education _____

Experience in the specialty _____

Work experience in the position _____

17. Deputy Head (Director, Chairman of the Board) for Financial Affairs:

Name and Surname _____

Date of birth _____ Code _____

Education _____

Experience in the specialty _____

Work experience in the position _____

18. Chairman of the Supervisory Board:

Name and Surname _____

Date of birth _____ Code _____

Education _____

Experience in the specialty _____

Work experience in the position _____

19. Chairman of the Audit Commission:

Name and Surname _____

Date of birth _____ Code _____

Education _____

Experience in the specialty _____

Work experience in the position _____

20. Presence of a registered trademark (yes, no)_____

21. Number of years of the enterprise activity _____

22. The presence of internal control in the enterprise and its form _____

_____

_____

23. Periodicity of mandatory audits_____

_____

_____

24. Periodicity of thematic audits _____

_____

_____

25. How many years have you been working with an audit firm? If it changes often, then why?

_____

_____

_____

26. The results of inspections of state bodies – administrative, financial, criminal sanctions (the necessary must be emphasized and deciphered).

_____

_____

27. How often is the General Meeting of Shareholders convened in a joint-stock company?

1) annually, once a year;
2) annually, every nine months;
3) annually, every six months.

28. How often is an extraordinary General Meeting of Shareholders convened in a joint-stock company?

1) annually, once a year;
2) annually, every nine months;
3) annually, every six months;
4) has never been convened.

29. Where is the General Meeting of Shareholders held?

1) on the territory of the joint-stock company;
2) outside the joint-stock company, but in the city where it is registered;
3) in another city.

30. Who organizes and conducts the General Meeting of Shareholders?

1) the executive body of the joint-stock company (Management Board);
2) the Supervisory Board of the joint-stock company;
3) independent registrar;

4) representatives of the State Commission on Securities and Stock Market;
5) the mandate commission appointed by the Board;
6) other.

31. Who supervises the registration of shareholders and their representatives participating in the General Meeting?

1) the executive body of the joint-stock company (Management Board);
2) the Supervisory Board of the joint-stock company;
3) independent registrar;
4) representatives of shareholders;
5) representatives of the State Commission on Securities and Stock Market;
6) other persons;
7) control was not carried out.

32. How is voting conducted during the General Meeting of Shareholders?

1) with the help of cards;
2) by raising hands;
3) with the help of mandates;
4) with the help of bulletins approved by the Supervisory Board;
5) with the help of bulletins approved by the General Meeting of Shareholders.

33. Who keeps the minutes of the General Meeting of Shareholders?

1) Secretary of the General Meeting of the joint-stock company;
2) a representative of the Supervisory Board;
3) corporate secretary;
4) an employee of the department of work with shareholders.

34. Who counts the votes during the General Meeting of Shareholders?

1) the counting commission elected by the General Meeting of Shareholders;
2) counting commission approved by the Supervisory Board;
3) counting commission approved by the Board of the joint-stock company.

35. Who is responsible for keeping the minutes of the General Meeting of Shareholders?

1) corporate secretary;
2) Secretary of the General Meeting of the joint-stock company;
3) a representative of the Supervisory Board;
4) a representative of the executive body of the joint-stock company;
5) department of work with shareholders.

36. How many people are members of the Supervisory Board of a joint-stock company?

1) less than 4 people;
2) 4 people;
3) 5 people;
4) more than 5 people.

37. Who is a member of the Supervisory Board?

1) employees of the joint-stock company;
2) shareholders;
3) independent experts.

38. What is the number of meetings of the Supervisory Board per year?

1) less than 3 meetings;
2) 3-4 meetings;
3) 4-6 meetings;
4) more than 6 meetings.

39. How many people are members of the Audit Commission of a joint-stock company?

1) less than 4 people;
2) 4 people;

3) 5 people;
4) more than 5 people.

40. Who is a member of the audit committee?
1) employees of the joint-stock company;
2) shareholders;
3) independent experts.

41. What is the number of meetings of the Audit Commission per year?
1) less than 3 meetings;
2) 3-4 meetings;
3) 4-6 meetings;
4) more than 6 meetings.

42. Who develops the strategy of the joint-stock company?
1) general meeting of shareholders;
2) Supervisory Board;
3) Board.

43. Whose competence includes the election and removal of members of the executive body (Board)?
1) the Supervisory Board;
2) General Meeting of Shareholders.

44. Does the Charter provide for restrictions for representatives of the executive body on concluding agreements on behalf of a joint-stock company, under which the decision to conclude such agreements is made exclusively by the General Meeting of Shareholders?
1) does not provide;
2) provides, depending on the amount of the agreement as a percentage of the authorized capital of the joint-stock company;
3) provides, depending on the amount of the transaction as a percentage of the book value of the assets of the joint-stock company;
4) provides other restrictions.

45. Do the officials of the executive body of the joint-stock company have a personal interest in the company's activities (conflict of interest)?
1) the largest shareholder is the Chairman of the Management Board;
2) the largest shareholder is the Chairman of the Supervisory Board;
3) the largest shareholders are members of the Management Board;
4) the largest shareholders are disinterested persons.

46. How are the relations between the company and the members of the Supervisory Board regulated?
1) by concluding civil law agreements, which provide for payment for their work and other relationships;
2) on a voluntary basis;
3) in another way _____.

47. What documents provide for the basic rights and responsibilities of the Chairman and members of the Board of the company?
1) the Civil Code of Ukraine;
2) the Charter of the joint-stock company;
3) Memorandum of Association of the joint-stock company;
4) Regulations on the work of the Board of the joint-stock company;
5) other documents.

48. What documents provide for the basic rights and responsibilities of the Chairman and members of the Supervisory Board of the company?
1) the Civil Code of Ukraine;
2) the Charter of the joint-stock company;

3) Memorandum of Association of the joint-stock company;
4) Regulations on the work of the Supervisory Board of the joint-stock company;
5) other documents.

49. How is the information about the activities of the company distributed?

1) the Company regularly submits an annual report of the prescribed form to the SSMSC;
2) the Company regularly publishes an annual report of the prescribed form in one of the official publications of the SSMSC;
3) the Company publishes its annual reports on the Internet site;
4) the Company distributes the annual report together with the auditor's report to shareholders, clients, partners and investors;
5) the Company notifies of any changes in financial and economic activities that may affect the value of securities or income from them no later than 2 days from the date of occurrence;
6) the Company regularly applies to rating agencies to assess its financial condition and compile a credit rating.

50. How are shareholders notified of the General Meeting and the agenda?

1) the announcement of the convening of the General Meeting of Shareholders is published in the specialized and local press no later than 45 days before holding;
2) the announcement of the General Meeting of the joint-stock company and the agenda are sent to each of the shareholders;
3) shareholders are given the opportunity to get acquainted with the documents related to the agenda;
4) shareholders have the right to make proposals to supplement the agenda with certain issues no later than 30 days before the convening of the General Meeting;
5) shareholders have the opportunity to obtain complete and reliable information about the financial and economic condition of the Company and the results of its activities.

51. What shares are issued by a joint stock company?

1) the Company issued ordinary registered shares in documentary form;
2) the Company issued ordinary registered shares in undocumented form;
3) the Company issued ordinary bearer shares in documentary form;
4) the Company issued ordinary bearer shares in undocumented form;
5) the Company issued preferred registered shares in documentary form;
6) the Company issued preferred registered shares in undocumented form;
7) the Company issued bearer preferred shares in documentary form;
8) the Company issued bearer preferred shares in undocumented form.

52. Who maintains the register of owners of the Company's shares?

1) the register is kept at the enterprise;
2) the register is maintained by an independent registrar;
3) the register is kept in the depository.

53. How often are the shares issued by the Company?

1) the Company issued shares only at the time of creation;
2) the Company carried out an additional issue of shares once;
3) the Company carries out an additional issue of shares more than once.

54. How does a joint-stock company replenish its current assets?

1) at the expense of profit;
2) at the expense of unpaid dividends;
3) at the expense of bank loans;
4) due to additional issues of shares;
5) due to the issue of bonds;
6) at the expense of investments of other enterprises;
7) in another way.

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Monograph

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