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**V. M. Babayev, M. K. Sukhonos, O. V. Dymchenko,
Iu. O. Tararuiev, V. O. Yesina, O. O. Rudachenko,
O. Yu. Palant, Ye. N. Vodovozov, Zh. P. Beztsinna**

**POTENTIAL OF BUSINESS ENTITIES: ESSENCE,
ASSESSMENT AND ROLE IN NATIONAL
DEVELOPMENT**

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INTRODUCTION

The behavior of macroeconomic indicators (reflecting the development of both the national economy as a whole and that of individual economic sectors) testifies to the low current efficiency of the functioning of economic entities in the context of economic activities. This in turn necessitates scientific substantiation of developing and introducing theoretical and methodological recommendations to ensure innovative development of the country. One of the most effective ways to practically implement this task is to substantiate methods for quantitative assessment of potential in the context of economic activities.

In view of the above, within the framework of the first stage of the research work, it is necessary:

- to analyze the main problems of building potential of business entities under modern economic conditions;
- to carry out a comparative analysis to determine the essence and composition of potential at different levels of the economy;
- to describe the main methods used for assessing components of potential;
- to analyze the methods used for the integrated assessment of business entity potential;
- to substantiate the main methods to be used in the course of the research to achieve the aim set.

The practical value of applying these methods is that the results of the integrated assessment of potential can be used as a criterion for the priority development of certain economic sectors or economic activities.

1. Problems of building and realizing business entity potential

Under modern economic conditions, the urgency of problems associated with assessment of potential of economic entities at various levels of the economy is increasing. This is due to the fact that in a broad sense, potential is a complex of capabilities of the economic system. The most important feature of potential is that these capabilities are likely to be realized in the future.

Thus, for economic activities which involve strategic planning of development processes, forecasting of economic indicators, etc., the measurement of potential (with regard to various options for its realization) is extremely important.

Since the concept of potential is used to denote capabilities of enterprises, economic sectors, regions or the economy as a whole, these capabilities, as a rule, are quantified (which is why potential is often associated with the most efficient use of system resources in a strategic perspective). This feature of potential leads to the grounding in the scientific literature of a significant number of options which include determining not only potential, based on a system of quantitative indicators, but also its composition and subordination of its components, depending on type of economic system.

Thus, on the one hand, the problems of measuring potential of business entities at different levels of the economy are very urgent, and on the other hand, scientists have not yet developed a single agreed approach to essence of potential, its composition and methods for its assessment.

The relevance of problems associated with building, assessing and increasing potential of economic systems of various levels is confirmed in the publications of domestic scientists. In this case, the type of potential is conditioned by the topic and specificity of scientific works.

For example, V. V. Melnychenko investigates the definition and use of the bioenergy potential of agricultural enterprises (which is very relevant, given the European trends in the production and use of renewable energy sources) [1]. V. O. Kozlovskiy and I. V. Prychepa, analyzing enterprise potential, identify it with economic potential (Fig. 1), presenting a model of enterprise potential which illustrates the interaction of various groups of factors which influence its

building [2, p. 30].

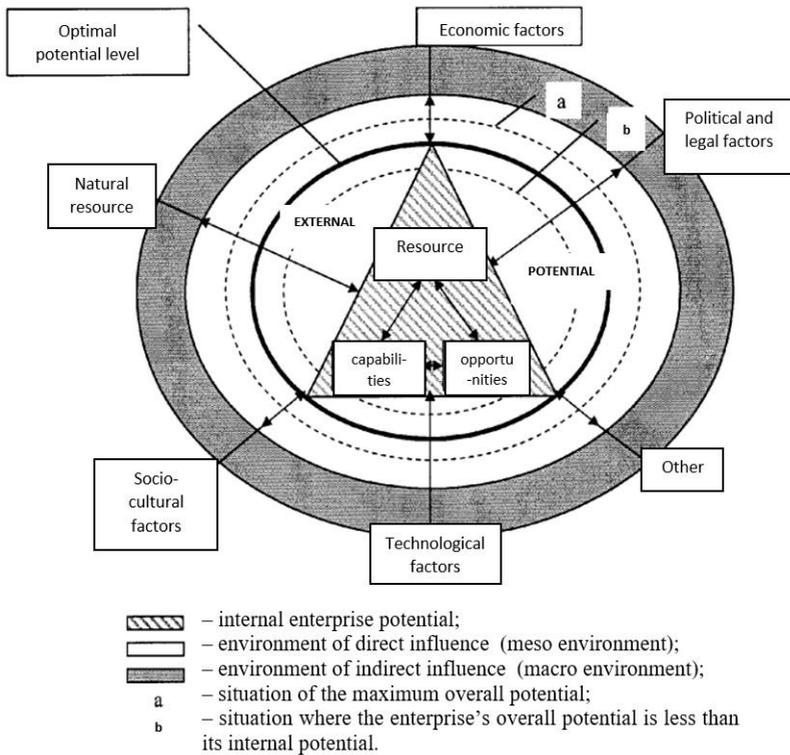


Figure 1. – Model of enterprise potential¹

In view of the above model, a significant problem of building potential of the enterprise, according to the authors, is its optimization. At the same time, internal potential in its essence can be considered as resource potential, and external one – as market potential because the enterprise operates in market environment. Thus, the optimization of potential is achieved through the rational use of internal potential for the most effective use of favorable

¹ See Kozlovsky, V.O., Prychepa, I.V., 2007. *Teoretyko-metodolohichni pidkhody do vyznachennia potentsialu pidpriumstva [Theoretical and methodological approaches to determining the potential of the enterprise]. Visnyk Vinnytskoho politekhnichnoho instytutu, issue 3, pp. 28–33.*

external factors. A fairly similar approach exists in strategic management, when enterprise development strategies are elaborated with consideration for existing opportunities and future competitive advantages. The division of factors into groups is quite traditional and they are not specified. At the same time, the authors demonstrate the perception of strengthening potential as a systemic phenomenon characteristic of any enterprise.

An example of a collective scientific work highlighting problems of building and using potential can be considered a monograph edited by L. L. Kalinichenko. It contains works which deal with problems of building and improving human resource, economic, innovation and investment and other types of potential. The authors pay special attention to the problems associated with increasing competitiveness of enterprises [3].

M. K. Orlaty and co-authors consider issues of building resource potential at the regional level, including in regional potential such components as the economic, natural and climatic, labor, socio-infrastructure and information potential of the region. It should be noted that a feature of the considered work is also taking into account the so-called “potential of the settlement network” of the region. This potential is defined by the authors as the territory of the region which is an element of the settlement network and combines the entire set of settlements: cities, towns, villages, isolated farmsteads, single-family residential dwellings (farmer ones, etc.), etc., which is under the jurisdiction of urban (settlement, village) councils. It has certain historical traditions, rituals, habits, etc. depending on the nature of employment of the population [4]. M. V. Makarenko, analyzing problems of management potential of the region, identifies such specific components as ecological potential, potential for quality of life and clustering potential. The last of them covers the kind of prospects for the creation and functioning of industrial and scientific clusters at the regional level [5, p. 219].

An example of analyzing problems of building and using individual components of potential of the economy of the country as a whole can be considered the work of V. A. Fiodorova and T. V. Karpenko, dealing with human resource potential of the national economy. The author provides the definition and composition of human resource potential as well as systematizes

factors affecting it. In the logical framework model, researchers separate the processes of building and using human resources [6, p. 27].

Since scientists distinguish several types of potential, it is also proposed to single out problems of its building. Below we list those of them which, in our opinion, are common and characteristic of potential of any type.

1. Problems of identifying components of potential and determining its composition.

As noted earlier, researchers do not have a single point of view regarding the composition and essence of potential, which leads to contradictions (e.g., sometimes economic potential is identified with the overall potential of the enterprise, and sometimes with its resource potential). In addition, disagreements arise as to what exactly is considered potential – the current or future capabilities of enterprises and other economic systems.

2. Problems of substantiating methods for assessing potential.

Various scientists substantiate a wide range of methods for assessing potential as a whole or its individual components (the most common is using integrated assessment of potential, which is due to the fact that any economic system is quite complex and has a wide range of different capabilities. The approach to determining essence and composition of potential largely influences choosing methods for its assessment. Thus, the choice of the method for assessing potential is conditioned not only by the selected object of assessment (potential of the enterprise, region, economic sector, etc.) but also by the views of specific researchers as to the essence of potential and the set of indicators necessary for its assessment.

3. Problems of quantitative measurement of potential.

Such problems are primarily associated with the fact that potential is a set of unrealized capabilities which can be used at any time after the moment of assessment (the capabilities used as of the moment of assessment, by definition, are the object of economic diagnostics research). Thus, potential is a dynamic quantity that depends not only on current capabilities of the enterprise, which are constantly changing, but also on the time they will be used. The need to take into account the time factor significantly complicates determining potential of economic systems, therefore, there are several

fundamentally different views on assessing potential:

a) determining potential of the enterprise or another system at a certain point in time without consideration for conditions of its realization – this approach is the simplest since it allows measuring current potential upon the condition of its realization in the near future (future economic benefits are given as of the moment of assessing potential, some of the enterprise's capabilities are evaluated using expert methods);

b) measuring potential with regard to the time of its realization in the future – this task is more complicated and requires combining methods of quantitative forecasting, business planning, strategic management and others (the main problem is to forecast the performance and main indicators of the system, as well as the conditions for realizing potential).

Also, the problems of building and realizing potential depend on the level of the system under consideration. Here are some of them:

Enterprise potential. Problems with evaluating potential of the enterprise arise even if components of the potential are identified in advance. First, activities of the enterprise, even under the most favorable conditions, are limited by competitors and state institutions, and it can be quite difficult to foresee changes resulting from their influence. Secondly, it is necessary to decide how to distinguish between resource and financial potential of the enterprise because it uses financial resources in its activities. Thirdly, the problem of measuring human resource potential of the enterprise remains urgent because it is necessary not only to assess capabilities of employees but also to substantiate indicators characterizing these capabilities. Fourthly, in order to assess management potential, it is necessary to answer an extremely important question: how does management decisions affect (or will affect in the future) performance of the enterprise? One of the options for obtaining an informed answer is to use the scenario approach in combination with the methods of probability theory.

Potential of the region or economic sector. A region or sectors of the economy are different economic systems, but at the same time they can be used as criteria for classification of enterprises (belonging to a certain sector of the economy and at the same time located on the territory of a particular region). The specific of

assessing potential of the economic sector as a component of the national economy suggests determining its production and export potential. At the same time, production potential is forecasted taking into account the probable demand for products in the domestic market, and export potential with consideration for the demand in the foreign one. Thus, not only production but also market capabilities of the economic sector (which in this case is considered as the set of enterprises) should be considered. Since activities of enterprises in the economic sector are related to production and sale of a wide range of goods and services, researchers face a problem of choosing: a) typical enterprises in the economic sector; b) a typical set of goods and services produced by these enterprises. Further, relative indicators characterizing export and production potential of selected enterprises is determined, and the results obtained are extrapolated to the sector as a whole. Without solving the problem described above, the process of determining potential of the economic sector is not limited in time and is associated with the processing of information, which will gradually lose its relevance due to the emergence of new enterprises, goods and services.

Determining potential of the region requires considering the location of productive forces, availability of transport and other infrastructure in the region, assessing the mineral and other available resources. At the same time, potential for using renewable energy sources is of particular importance. The realization of such potential requires considering geographical and climatic conditions, as well as possibilities for using biomass for energy production. Thus, to assess potential of the economic sector or region, it is necessary to initiate a comprehensive study employing a wide range of methods and ensuring proper justification of results.

Potential of the national economy. The national economy can be considered as a set of economic sectors, but the Ukrainian industry classification system envisages a rather significant break down of economic sectors. Therefore, the most logical is to measure potential of enterprises by economic activity. The advantages of this approach are the availability of statistical information, which is presented in the context of economic activities. The assessment of potential of the national economy is also associated with production, export, and innovation and investment components. However, taking into

account the production capabilities of domestic enterprises, the educational and scientific potential of the national economy should also be measured. Singling it out as a separate component of potential is advisable only at the national level because the development of education and science are issues of national importance (while problems of attracting investments and introducing innovations are being successfully solved at the sectoral, regional or enterprise level).

Having considered the issues of building and increasing potential at different levels of the economy, it is necessary to move on to analyzing the essence of this economic category.

2. Essence and classification of potential

In the context of continuous changes in the internal and external factors, which determine activities of economic entities at various levels of the economy, it is extremely important to have an idea of the current or future capabilities of a particular economic system. This should be done with consideration for the available resources and upon the condition of their rational use (which most often means maximizing economic benefits measured by indicators of income, profit, net cash flow, etc.).

To characterize capabilities of economic entities, with regard to the level of their economic development, in most cases, the concept “potential” is used.

It is worth noting that today there is no single approach to the definition of this term because:

1. The scientific literature often highlights potential of enterprises, companies or their structural units, as the smallest elements of the economic system (which in turn are also systems). But it is also appropriate to assess potential of the economic sector, region or the national economy as a whole, which are more complex economic entities. Thus, assessment of potential and features of its realization depend on the level of the system under consideration.

2. In addition to general potential of the system, it is worth paying attention to its functional components – economic, human resource (including management) potential, capacity for innovation, etc. Various researchers and practitioners single out different components

of potential, which also significantly increases the number of approaches to defining this category (so in some cases the definition of potential is replaced by a list of its components).

3. Even when it comes to the potential of economic systems of one level, scientists offer different definitions (which can be better demonstrated using the example of the concept of enterprise potential).

Thus, the set of definitions of enterprise potential depending on the characteristics described above can be represented using coordinate space (Fig. 2).

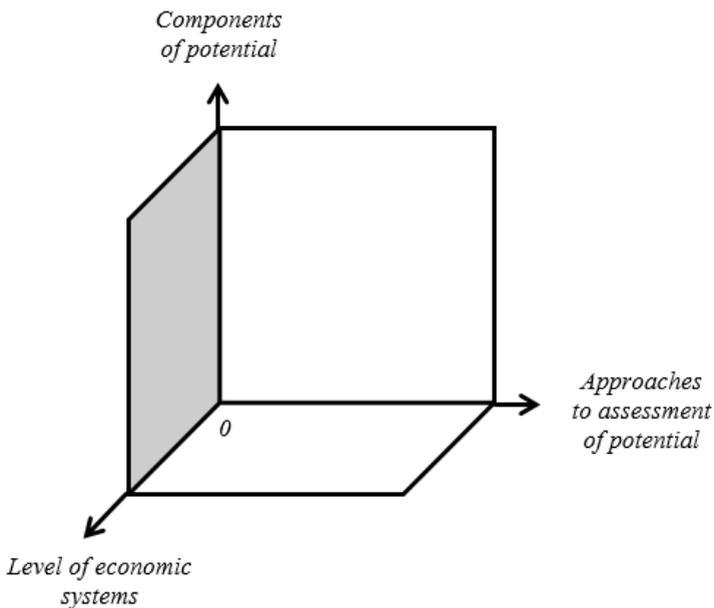


Figure 2. – Set of definitions of potential with consideration for its main features

Features of potential could also include the development stage of the economic system, but this factor is usually not taken into account when formulating definitions of this concept.

In view of the above, it is logical to move to the definition of potential based on the level of economic systems. And it is worth starting with enterprise potential and its types, as it is enterprises that

are given the most attention when it comes to their potential. It is also worth focusing on features of potential, which are described in definitions provided by various scientists.

Further, it is advisable to analyze approaches to measuring potential depending on the level of the economic system, starting with *enterprise potential*. The definitions of this term proposed by domestic researchers are presented below (Table 1).

Table 1 – Definitions of the term “enterprise potential”

No.	Author	Definition
1	B. Ryan	The real or probable ability of the enterprise to perform purposeful work [7, p. 61]
2	O. S. Fedonin I. M. Riepina O. I. Oleksiuk	Comprehensive reflection (integrated assessment) of the current and future capabilities of the economic system to transform input resources, with the help of inherent to its personnel entrepreneurial abilities, into economic benefits, thus maximally satisfying corporate public interests [8]
3	R. S. Kvasnytska M. V. Tarasiuk	A complex, holistic system that includes available resources, abilities and resources which are constantly interconnected and can be used to implement strategic, tactical and current goals of the enterprise [9, p. 75]
4	Yu. M. Safonov N. S. Zaviziena	Available capabilities, resources, reserves of which can be used to achieve a specific goal (objectives) and support competitiveness in the market space [10, p. 13]

One of the most common definitions of potential is given by B. Ryan. He emphasizes that it is the ability of the company to carry out work (activities) which are planned in advance, because the planning process involves the definition of goals.

Some authors, systematizing approaches to determining enterprise

potential, refrain from formulating their own approach, considering only factors which influence its building or its components. For example, O. V. Arefieva, S. H. Miziuk and N. D. Rashchepkin, among the components of enterprise potential name economic security, image and competitiveness [11, p. 6]. On the other hand, N. I. Verkhoglyadova and Ye. V. Kovalenko [12] presents a thorough analysis of the main approaches to measuring enterprise potential, dividing the authors covering the topic into groups depending on their positions. However, they neither conduct a morphological analysis of the definitions under consideration nor give their own definition of this term.

K. I. Chumakov considers enterprise potential in the context of a systems approach, with due regard to business processes. At the same time, potential of the enterprise is also determined by competencies and resource capabilities of the enterprise. Factors affecting it are conditioned by the external environment of the enterprise, the subjects of which are traditionally customers, suppliers, etc. In the work, the author identifies and characterizes in detail features of enterprise potential, the main approaches and factors of its building, but does not give his own definition of this category, limiting himself to general recommendations [13].

L. V. Potrashkova presents the concept of overall potential of the enterprise and proposes to choose a corresponding indicator. We agree with the author's assertion that "...the indicator of the overall potential of the enterprise should characterize the enterprise's potential (future) performance results, which simultaneously act as its future resources" [14, p. 159]. In this case, the most important thing is being aware that potential is a set of unrealized future capabilities (which makes it impossible to use economic diagnostics methods to assess it). As for the thesis that results of the enterprise are its resources, it is most clearly manifested in gaining, distributing and using the enterprise's net profit as positive financial results. In other cases, resources act as tools for obtaining enterprise results, so this statement is somewhat controversial. The author proposes to choose economic capital as the indicator for measuring overall potential of the enterprise.

V. V. Rovenska considers enterprise potential as "the maximum number of production factors which have certain characteristics

including quality aspects and ensure a gradual growth of production, introduction of new technologies not only in production itself but also in enterprise management processes” [15, p. 216]. This statement is also somewhat controversial since in the case of factors which affect unlocking potential, it is not the number of factors that matters but the intensity and nature of their influence.

O. Ye. Kuzmin and O. H. Melnyk suggest including competitiveness and investment attractiveness of the enterprise in the structure of its potential. Moreover, they state that potential of the enterprise is realized in the process of its development [16].

Further, we will analyze approaches to determining economic potential of the enterprise.

I. A. Azhman analyzes the essence of the concept “economic potential of the enterprise”, but it is advisable to consider it one of the most important types of potential, which will be discussed below [17].

In the work dealing with the identification and description of the structural components of enterprise potential, R. S. Kvasnytska and M. V. Tarasiuk recommend to single out financial, investment, production and labor potential of the enterprise, considering other components to be secondary [18, p. 75]. P. V. Krush and M. O. Derhaliuk are also engaged in justifying components of economic potential of the enterprise, but, unlike the authors mentioned above, they propose that the structure of potential comprise the most common resources of the enterprise (material, human, innovation, technical, financial and information). This approach is quite reasonable because irrational use of resources makes it difficult to realize potential of the enterprise. At the same time, the authors’ approach does not consider the fact that economic potential depends not only on availability of resources but also on possibilities for their most effective use in economic activity [19]. V. Z. Buhai, A. V. Horbunova and Yu. V. Kliueva adheres to similar views. But they call the potential which comprises resources of the enterprise resource potential and include in its composition financial, information, material, human, intangible as well as technical and technological resources [20]. With regard to the fact that economic potential is not limited by availability of resources, it is proposed to consider resource potential as a component of economic potential.

L. V. Koval, based on the results of the analysis of various approaches to measuring economic potential of the enterprise, proposes her own approach, according to which economic potential is a set of available resources and possibilities to transform them in order to achieve economic benefits, which is partially consistent with the definitions given above. In this work, it is proposed to consider production, financial, labor, innovation and information potential to be components of economic potential of the enterprise [21, p. 63].

According to A. I. Orekhova, economic potential is the most efficient use of the aggregate capabilities, resources and reserves of the enterprise in order to reach the maximum achievable performance of the economic system. Along with the types of potential mentioned earlier, the article proposes to take into account organizational and managerial as well as market potential of the enterprise as components of its economic potential [22].

N. Ya. Shkromyda, describing the mechanism for assessing economic potential, formulates general recommendations on the research topic under study and presents components of economic potential as well. According to the author, components of economic potential include production, resource, financial, investment, innovation, market, organizational and technological potential, which somewhat expands the list proposed by other researches [23].

According to N. V. Kasianova and co-authors, economic potential of the enterprise is understood as the ability of the enterprise to ensure its own long-term functioning and achieve strategic goals using the available resources [24]. At the same time, the most important components of potential are production, scientific and technological potential, managerial setup, management and market potential. The authors' position on the composition of potential and the subordination of its components is reflected in graphic form (Fig. 3).

The authors' idea of enterprise potential is quite logical, but, unlike many others, economic or resource potential are not at all distinguished as components of the overall potential of the enterprise since availability of resources itself is a key condition for unlocking potential. Thus, if potential is reduced to using resources, any type of enterprise potential can be considered economic. Thus, in this case, economic potential is determined, but not included in overall potential of the enterprise.

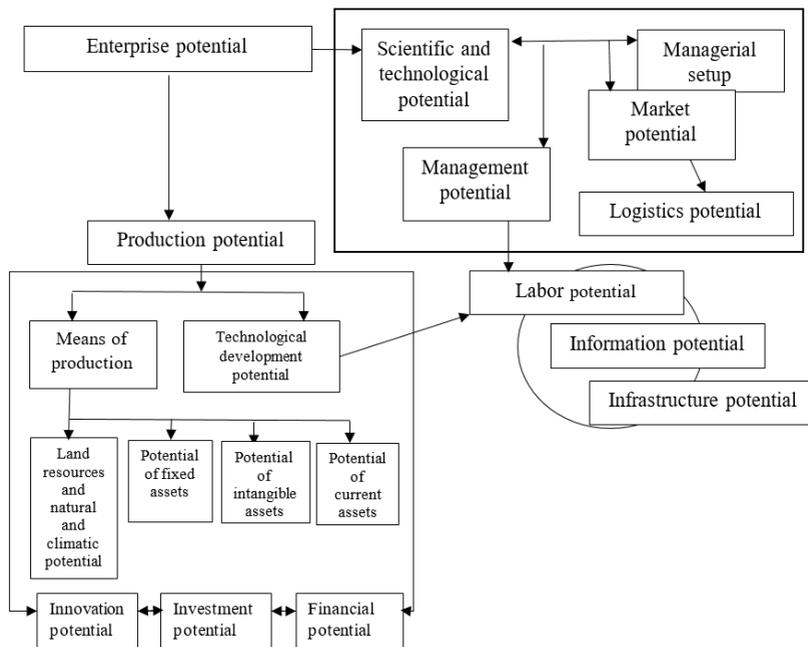


Figure 3. – Structure of enterprise potential²

In [24], the main features of economic potential are given. They include integrity, complexity, interchangeability and alternativeness, interrelations and interaction of its components, etc. From this it follows that economic potential is considered by the authors in the context of a systems approach.

The view of the authors on the components of economic potential can be presented in the form of a table (Table 2).

Also, research works of some authors deal with studying problems of identifying other types of enterprise activities. Specifically, A. V. Artemova and I. V. Artemov, giving recommendations for assessing resource potential of the enterprise, not only generalize the methods of such assessment but also propose indicators for measuring efficiency of resource potential.

² See 24. Kasianova, N.V., Solokha, D.V., Morieva, V.V., Beliakova, O.V. and Balakai, O.B., 2013. *Potential pidpriemstva: formuvannia ta vykorystannia [Enterprise's potential: formation and use]*. Kyiv.

Table 2 – Views of some researchers on the composition of economic potential of the enterprise

Components of economic potential of the enterprise	Author		
	R. S. Kvasnytska M. V. Tarasiuk	L. V. Koval	A. I. Orekhova
Production	+	+	+
Labor	+	+	+
Investment	+		+
Finance		+	+
Innovation		+	
Infrastructure		+	
Management			+
Market			+

The researchers single out human resource, financial and property, information and communication potential, and organizational and entrepreneurial potential as components of resource potential. To determine the level of resource potential, it is proposed to calculate the corresponding composite indicator. Thus, if the need arises for an integrated assessment of enterprise potential, it is necessary to coordinate the methodology for assessing resource potential, presented by the authors, with similar results of other researchers. In addition, there remains a lack of a clear distinction between economic and resource potential [25].

O. I. Maslak and L. A. Kvyatkovska focus on assessing strategic potential of the enterprise. As in the previous case, the authors propose to calculate the composite indicator of strategic potential using the weighted average. As an example of applying the proposed methodology, the authors give coefficients of a particular enterprise. It should be noted that assessment of strategic as well as other types of potential implies getting an idea of future capabilities of the enterprise. Thus, it is not measured by the current level of using resources, capabilities or competitive advantages but by the maximum possible level in the future. Whereas the example with the calculation of the composite indicator, presented in the article under consideration, in its essence is an illustration of methods of economic diagnostics [26].

O. M. Denysiuk and I. V. Gryshchenko in work [27] give a classification of investment and innovation potential of the enterprise with its decomposition into investment and innovation components. A feature of the authors' approach is that the structure of innovation potential includes the types of potential mentioned in other works (resource, human resource, intellectual, management, production, information and communication potential), while investment potential is calculated using indicators of own and budgetary funds, credit resources, and foreign investment). This discrepancy complicates the practical application of the recommendations given in the work. Moreover, resource potential of the enterprise in most cases is not used to incorporate innovations (which are confirmed by the share of enterprises which carried out innovative activities in a certain period).

Based on the results of the analysis of scientific works dealing with the identification and classification of enterprise potential, it is worth stating our views on this matter with regard to the following:

1. The identification of economic potential with general potential is quite logical since, in the overwhelming majority of cases, building and using enterprise potential is accompanied by economic processes. For the same reasons, the category "resource potential" loses its meaning because money, people skills and abilities, information, etc. can be considered resources. Thus, the concept "potential" is complex and is used instead of the concepts "economic potential" and "resource potential".

2. Also, the types of potential should be associated with the main activities of the enterprise, therefore, it is worth singling out investment potential, logistics potential; production, market, innovation and human resource potential. Management (or organizational) potential, in our opinion, is part of the human resource potential, since managers are a category of employees.

3. The separation of investment and innovation potential is due to the fact that investment potential is the ability of the enterprise to attract investment from various sources, and innovation is a technological process and one of possible results of investment. Thus, attracting investments and incorporating innovations are the processes which are different in content and therefore are characterized by different types of potential.

4. It is advisable to correlate some types of potential with the stages of the enterprise's operating cycle, which will illustrate the logical connection between them and the sequence of their using.

Considering the above, components of enterprise potential can be presented as follows (Fig. 4).

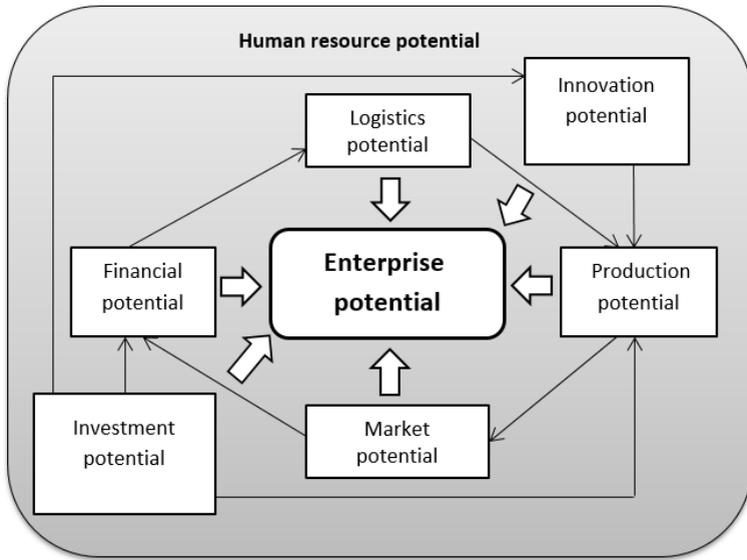


Figure 4. – Interrelation of components of enterprise potential

Unlike the resource approach, it is proposed to conditionally divide components of enterprise potential into those associated with specific stages of enterprise operating cycle and are realized sequentially (financial, logistics, production and market potential) and those that affect the enterprise as a whole (investment and innovation potential). In our opinion, innovation potential is realized mainly in the production activity of the enterprise since results of incorporating innovations are realized in the form of inventions, industrial designs, fundamentally new technological solutions, etc., which as a result leads to the emergence of innovative products.

At the same time, growth in the volume of investments (both internal and external) indicates increase in the financial capabilities of the enterprise, since investments are mainly made in a form of monetary resources. In addition, investment funds are sometimes

used to increase innovation potential of the enterprise (they are considered investments according to their sources, but, in view of the expected results, they are considered innovations).

Human resource potential is of particular importance for any enterprise, since abilities, knowledge and skills of people are realized in all areas of its activity. It is important to note that speaking about human resource potential, we do not single out intellectual, management potential, etc. in its composition, since, under modern conditions, any professional activity requires employees using their intellect (especially in economically developed countries, where production processes are largely automated). Human resource potential covers all areas of activities of the enterprise and ensures the interaction of other components of its potential, which is described above. We should also note that, in our opinion, it is unreasonable to single out information potential since today information capabilities of the enterprise are quite significant, and the use of information largely depends on qualifications of personnel (which determine human resource potential of the enterprise).

Based on the results of the analysis of approaches to measuring enterprise potential, it is advisable to formulate our own definition of this concept.

Potential of the enterprise is a set of unrealized capabilities of the enterprise in such areas as attracting investments, financing activities, logistics, innovation, production and sale of goods or services, as well as staff development.

In this case, we do not indicate the goals of realizing potential since they, as a rule, are determined by the enterprise's management team and are unique for each enterprise.

Having considered enterprise potential, it is necessary to move to more complex economic systems since some researchers consider potential of *the economic sector or region* in their works.

Analysis of papers which deal with defining the essence of potential of the region as a socio-economic system indicates that the overwhelming majority of scientists analyze not potential of the region as a whole but that of its individual components (Table 3).

As in the previous case, researchers pay attention precisely to characteristics of economic potential of the region, which is a complex socio-economic system (the definition of social potential is

also presented below). Describing the above approaches to identifying individual components of regional potential, it is advisable to consider the following definitions (Table 3).

Table 3 – Definitions of components of regional potential

Author	Type of potential	Definition
M. A. Hvesyk and others	resource potential	a set of means, capabilities of the region which are used or can be used for its independent development [28]
V. O. Shutenko, T. I. Horodyskyi	innovation potential	the ability of the region, using available resources and infrastructure, to create an innovative product and introduce it into the market [29]
V. M. Prokhorova	social potential	a systemic set of opportunities and motivations, abilities and qualities of individuals, social groups, society, ensuring their life, social activity and reproduction [30]
R. V. Mann, K. D. Plyhach	economic potential	the totality of available or attracted resources that can be rationally used in case of appropriate opportunities to achieve the set goals [31]
V. Yu. Shkola		the overall capabilities of the region, its enterprises and individual economic entities to reveal, define and most effectively provide for and satisfy social needs (current and future) in the process of interaction with the environment and rational use of resources, in order to ensure economic growth, public welfare, and increase environmental and economic security of the region and country as a whole [32]
O. V. Basiuk		a comprehensive characteristic of the level of economic power of the nation, available resources and capabilities to provide for expanded reproduction, social needs and socio-economic progress of society [33]

Firstly, the comparison of definitions of components comprising potential allows to present its composition or supplement it with new elements (in some cases, it is advisable to determine ecological potential of the region).

Secondly, since the region is a rather complex system, definitions of its potential are of general nature and based on the well-known meaning of the concept “potential”.

An example of this approach is the definition of innovation potential as the ability of the region to create an innovative product. However, as noted earlier, in this case, potential of the region is actually considered as the sum of capabilities of enterprises located on its territory. Likewise, social potential of the region is defined as social activity of individuals or social groups within its territory.

Thirdly, as O. V. Basiuk and V. Yu. Shkola rightly note, at the regional level, the importance of not only economic but primarily of social needs increases (which turns the realization of economic potential into an instrument for achieving social goals). This is explained by the fact that the characteristic of potential of the region envisages considering its capabilities in the field of improving the well-being of the population (the same applies to the country).

In addition, in the process of characterizing activities of the region, it is advisable to take into account geographic, climatic, ecological and other factors, as well as the interaction of social groups within the region. Thus, the economic potential is actually turning into socio-economic and environmental potential.

Fourthly, it is rather difficult to establish the connection between components of regional potential since each type of potential involves analyzing the strategic and tactical possibilities for addressing corresponding problems – socio-economic, environmental ones, etc., which differ in their origin and methods of solution.

Some authors study the composition of regional potential. For example, O. V. Basiuk singles out potential of natural resources, potential of human resources, potential of production sectors and infrastructure [33]. Thus, according to the author, sectoral potential is part of regional potential. We cannot completely agree with this point of view because “economic sector” and “region”, in our opinion, act as classification criteria for enterprises (respectively, based on sectoral or regional features). O. V. Shchelkunova and

I. I. Sokol propose considering the following components of regional potential: tax, financial, innovation, labor, scientific and technological, market and information potential. This approach can be considered controversial since the collection and use of taxes are financial procedures, therefore, tax potential is an element of financial potential. As for information potential, the arguments about the inexpediency of its singling out are the same as in the case of enterprise. Moreover, under modern conditions, it is impossible to unequivocally state that different regions have different possibilities for providing access to information. Summarizing the above, we can define potential of the region.

Potential of the region is a set of identified but unrealized capabilities of the region related to socio-economic development, based on the principles of: a) ensuring economic growth and environmental protection; b) respecting interests of citizens and territorial communities, with regard to the interaction of various social groups; c) considering the geographical, climatic and other natural factors which determine the specifics of the region as a territorial entity.

Turning to the consideration of works which highlight the essence of potential of individual sectors of the economy, it is worth noting that in this case we are talking more about *economic activities which involve several sectors*. Compared to potential of the enterprise or region, the study of potential at the level of economic activity has not been paid enough attention. In addition, sometimes potential is considered simultaneously in the sectoral and regional dimensions. Thus, within a specific activity (or an economic sector), the types of potential singled out for the enterprise and region are not analyzed. Thus, M. V. Vovk in [34] analyzes investment potential of agriculture, formulating general recommendations for increasing investment attractiveness of enterprises in the sector; L. V. Yarema and O. I. Zamora limit their study to economic potential of agriculture in the Ternopil region, using SWOT analysis to fulfill the research objectives [35]; while N. V. Trusova introduces the concept of financial potential of agriculture and proposes a methodology for integrated assessment of such potential, with a preliminary determination of the priority of factors employing the Fishburn method [36]. These works do not contain the authors' definitions of

potential or the description of its composition. The general nature of the works mentioned is explained by a significant number of agricultural sectors, the potential of which is too specific an object of study (moreover, the functioning of agriculture can be considered at the level of the region, economic sector or individual agricultural enterprise).

A similar situation arises with studying sectoral potential since authors of scientific publications choose different economic systems as objects of research. For example, in monograph [37], Yu. V. Kindzerskyi and co-authors analyze problems of building industrial potential at the level of country as a whole; and N. S. Stanasiuk proposes an approach to assessing the “level of development of the processing industry potential” (in this case, industrial activities are grouped according to the development level, and the strategies for increasing capacity depend on the group the industrial activity belongs to); and O. V. Kolomytseva analyzes the composition of production and sectoral potential of the region, highlighting potential of production assets, labor, innovation and natural resource potential [38, 39].

Thus, defining potential of a particular economic sector (or a set of sectors) as an economic concept is difficult due to the fact that the sectoral potential is quite often considered as a component of the economy of a particular region or country as a whole. Moreover, scientific works, the authors of which investigate sectoral potential, are focused on substantiating quantitative, expert or combined methods for assessing such potential (i.e. assessing potential of various sectors requires selecting a different set of indicators). At the same time, methodological recommendations for assessing sectoral potential are general, which is due to a significant number of sectors involved in economic activities.

Further, it is advisable to move on to considering the essence of potential at the level of *the national economy*. Various authors focus on different components of potential of the country as a socio-economic system, but given that some components of potential have already been mentioned earlier, it is necessary to focus on components of potential which manifest themselves at the macro level. Along with the already known components comprising potential of economic systems of different levels, it is worth paying

attention to the country's export potential. For example, E. Ye. Radchenko considers the essence of potential of this type depending on the main approaches to its building (resource, performance, system and market ones) and systematizes the definitions developed by other scientists. In his opinion, "the country's potential is closely related to its competitive advantages in the international market and depends on the country's geographic location; economic, climatic, socio-cultural, infrastructural, scientific, innovation, labor, technological, investment and historical environment in which economic entities conduct their activities; legal, political and economic environment for running international business" [40]. Thus, export potential is considered as the sum of capabilities of the country's economic entities in this area. This approach is logical, but it is the assessment of environment in which export organizations carry out their activities that causes difficulties. T. M. Melnyk adheres to the same opinion, considering that export potential of the sector includes aggregate potential of enterprises engaged in it, and the national economy includes that of individual sectors. Moreover, "export potential is objectively related to competitiveness of products intended for sale on the world market" [41]. The report of the National Academy of Sciences of Ukraine "Socio-economic potential of sustainable development of Ukraine and its regions" pays special attention to ecological and economic potential, which is defined as "the maximum allowable value of anthropogenic load on the entire self-organizing set of natural systems". The same work highlights the strategic potential of Ukraine, and the so-called "potential for sustainable development" [42].

Thus, based on the results of the analysis of potential as an economic category depending on the level of the economic system, we can draw the following conclusions:

1. The set of definitions of potential, in our opinion, is determined by such factors as the level of the economic system, definitions of potential provided by various authors, and the composition of potential (Fig. 2).

2. At the enterprise level, it is proposed to divide the components of potential into those associated with specific stages of the enterprise's operating cycle and are implemented sequentially (financial, logistics, production and market potential) and those

affecting the enterprise as a whole (investment and innovation potential) (Fig. 4).

3. Based on the analysis of approaches of various authors, it is proposed to define potential of the enterprise as a set of unrealized abilities of the enterprise in such areas as attracting investments, financing activities, logistics, innovation, production and sale of goods or services, as well as staff development.

4. Based on the results of the analysis of components making up potential of the region, it is proposed to define it as a set of identified but unrealized capabilities of the region for socio-economic development, based on the principles of: a) ensuring economic growth and environmental protection; b) respecting interests of citizens and territorial communities, with regard to the interaction of various social groups; c) considering the geographical, climatic and other natural factors which determine the specifics of the region as a territorial entity.

5. It is established that it is rather difficult to determine potential of the economic activity (or the economic sector) since research works in this area deal with the assessment of components of potential, and not their identification. Moreover, sectoral potential, as a rule, is related to economic systems with territorial characteristics (region or country). Therefore, potential as an object of research sometimes has regional and sectoral characteristics (i.e., the economic potential of the Khmelnytsky region), which makes it difficult to determine it.

6. The important components of potential of the national economy are export, economic, environmental and strategic potential, but, if necessary, they can be singled out as part of potential of regions of Ukraine.

3. Methods for assessing components of potential

The introduction of a market economy in Ukraine has led to significant changes in the field of state regulation. Creating new market segments requires new policies. We need effective support from the Ukrainian authorities in defending interests of economic entities. At the same time, an accurate knowledge of the economic performance of the country, regions, enterprises is needed so that the

regulatory actions of the state would be productive.

One of the most important estimates, which determine capabilities of the system, its generalized resource of productive forces, is potential of economic entities. Measuring potential of economic entities is an important part of research, traditionally used in state regulation to solve a lot of problems related to forecasting socio-economic development, calculating indicators of economic activity of entities at the macro and micro levels. However, under the modern conditions of reforming the Ukrainian economy, the potential does not meet the current tasks and requires further research.

Potential of economic entities is a complex, multifaceted, multi-level category, and therefore the patterns of its functioning (building, use and development) can be disclosed only on the basis of a comprehensive systemic study. It should be noted that potential of economic entities as considered as that of the enterprise, region and country.

The multifacetedness of the concept “potential” is explained by the variety of objects to which it applies. The main feature of the combination of different types of potential is the synergy of ability, which should be aimed at achieving predetermined goals [43, 49].

Let us consider the basic components of potential (Fig. 5). Economic theory distinguishes objective and subjective components of enterprise potential.

Objective components of potential of the enterprise are associated with the tangible physical and personal form of enterprise potential. They are used and reproduced in one way or another in the process of enterprise functioning. These include innovation potential, production potential, financial potential, economic potential, and potential for reproduction [45].

Subjective components of enterprise potential are associated with the social form of their manifestation. They are not consumed but constitute a prerequisite, a general economic social factor for the rational consumption of objective components. The subjective components include scientific and technological potential, management potential, managerial setup and market potential [45].

Let us consider the most significant components in the structure of enterprise potential in more detail.

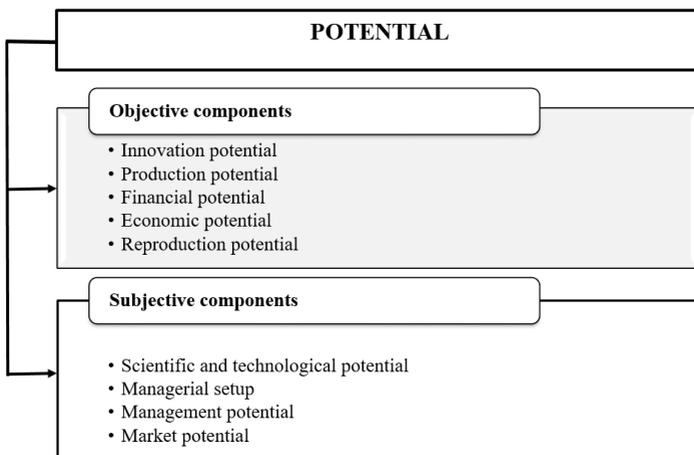


Figure 5. – Basic components of enterprise potential

Innovation potential is the aggregate capabilities of the enterprise to generate, adopt and implement new (radical and modified) ideas for its systemic technical, organizational and managerial renewal [51].

Production potential is the existing and latent capabilities of the enterprise to attract and use production factors to manufacture the maximum possible volume of goods (services). It should also be considered as a set of resources which function and are capable of producing a certain volume of goods (services) [51].

Financial potential is the amount of own, borrowed and attracted financial resources of the enterprise, which it can command to cover current and future costs. The main component of financial potential is investment, i.e., the existing and latent capabilities of the enterprise for implementing simple and extended reproduction [51].

Economic potential is a set of available and suitable for mobilization main sources, means of a particular country, components of potential of the entire economic system, which are being used and can be used to ensure economic growth and socio-economic progress [51].

Reproduction of enterprise potential is a process of continuous renewal of all its components [51].

Particular attention in the structure of enterprise potential should

be paid to labor, infrastructure and information potential. All of them do not fall under the specified classification of components of enterprise potential, they cannot be unambiguously attributed either to the subjective or objective components.

Labor potential is a personified workforce, which is considered in the aggregate of its qualitative characteristics. This concept makes it possible, firstly, to assess the level of using potential capabilities of both an individual employee and the totality of employees, which is necessary to increase human resource efficiency, and, secondly, to ensure a qualitative (structural) balance in the development of personal and tangible factors of production [51].

Infrastructure potential is the ability of shops, units and services, balanced with the requirements of production, to provide conditions necessary for the operation of the main units of the enterprise and meet social needs of its personnel. With hypertrophied infrastructure development, the components of potential of enterprises can perform work or provide certain services to third-party organizations and other market participants [45, 51].

Information potential is the most important component of the technical, technological and management base of modern enterprises. Developed countries have already moved to a new post-industrial (informational) level of social progress. Efficient activity of Ukrainian entrepreneurs, rational use of their potential is impossible without information support adequate to modern requirements.

Thus, according to [53], potential of the enterprise includes economic, production, human resource, innovation, intellectual, scientific and technological potential. This confirms once again that the enterprise is a complex socio-economic system that has many potential capabilities.

Among the above components of enterprise potential, economic potential is gaining great importance. This type of potential is being reproduced through the prism of such components as labor and natural resources, capital and information. Resources are the basic building blocks of potential and allow for the realization of existing capabilities. Economic potential combines human, production, scientific and technological, information and financial resources.

Let us consider the main methods for assessing components of potential. To date, there are a wide range of techniques for assessing

enterprise potential, which are based on various mathematical, graphical and analytical models, matrix, logical and linguistic methods, etc.

Methods for forming the data base include [53]:

1. Criteria methods, which imply taking absolute (natural or cost) values of key indicators as the data base. With proper information support, these methods are the most accurate.

2. Expert methods, which are easy to use, do not require collecting complete information about competitors since they are based on opinion of experienced specialists.

However, the advantage of such methods is at the same time their disadvantage because sometimes the subjectivity of experts can cause the erroneous results.

Methods for presenting final results include [49]:

1. Graphic methods provide a high level of perception of the final assessment results, presented in the form of graphic objects (pictures, graphs, diagrams, etc.).

2. Mathematical methods, which are based on factorial assessment models, which imply calculating one (composite) indicator or values of several indicators, according to which the final assessment is formed. These methods are considered accurate, although sometimes they require complicated mathematical calculations, i.e., special training of employees.

3. Logistic methods, which are algorithmic assessment methods based on logical assumptions.

Methods for developing management decisions include [49]:

1. Cross-sectional research methods, which are essentially static methods because they assess only the actual state of affairs, without providing the possibility of developing measures for the future.

2. Strategic methods, which enable not only assessing competitiveness of the enterprise's potential as of a specific date but also elaborating strategic measures to improve this potential.

Method for assessment includes [49]:

- indicator methods, which imply using a system of indicators, based on which competitiveness of potential of the enterprise and the national economy as a whole is evaluated. "Indicator" is considered to be a set of characteristics which allow for a formalized description of the state of parameters of an investigated object and, on that basis,

to formulate recommendations for improving performance of the object. Each indicator, in turn, is broken down into a series of indicators reflecting the state of individual elements of the object under investigation;

- matrix methods, which are based on the idea of considering interdependence of and trends in competition processes. Using matrix methods, managers can assess the level of competitiveness not only of their enterprise but also of their nearest competitors, which enables developing a strategy of market behavior. Matrix methods are widely used by US consultancy firms, and with adequate information support, such methods can be a reliable tool for assessing potential of domestic enterprises' competitiveness.

Research papers on building and realizing enterprise potential usually do not adequately address the issue of measurement of its value and efficiency of its unlocking.

A comprehensive system of indicators is needed to assess potential of the enterprise, and the design of such a system should be based on a structural model taking into account not only the actual development patterns but also conceptual framework. The structural model of a system of indicators used to measure enterprise potential should meet the following requirements to its formation [48]:

- general theoretical interpretation, interrelationship and purposefulness of individual indicators, their groups and the system as a whole;
- provision of comparability, uniformity of purpose of group indicators and the entire system;
- availability of indicators acting as basic adjustment parameters, reference categories;
- possibility of adjusting values of indicators depending on the level of using the employed resources and the result efficiency;
- facilitation of predicting the behavior of indicators.

It should be noted that a set of assessment principles, indicators, criteria and methods constitute an assessment methodology. In a general way, the methodology can be presented as a sequence of the following actions: forming categories, developing indicators, establishing a comparison criterion, selecting an assessment method, and obtaining assessment results.

It is appropriate to consider a well-known methodology for

assessing economic potential, which is used to break it down into individual components, calculate the main indicators of the abovementioned components and aggregate them into a composite indicator, which is used to analyze development trends and achieve sustainable development [52]. The methodology provides for breaking down business entity potential into the following components:

- financial potential;
- productive potential;
- innovation and information potential;
- institutional potential, etc.

The assessment of the components of business entity potential is carried out by corresponding indicators, with the use of theoretical ranging and simple averaging. The composite indicator is calculated as a multidimensional weighted average of the indicators used. The result obtained is a ranking of economic potential of business entities, which characterizes their relative capabilities.

The advantage of this methodology is a comparative simplicity of assessing potential of business entities when their ranking is required. The disadvantages include a low accuracy and impossibility of estimating economic potential in physical and monetary terms.

It is worth mentioning a methodology for measuring business entity potential which enables obtaining an amended estimate for indicators, the totality of which is broken down into the following groups [49]:

- economic indicators, including: economic potential of entities and its use; volume and efficiency of production; situation on regional markets; investment activity; energy and food security; financial self-sufficiency of entities; tax burden and availability of an independent tax base for setting local budgets; indicators of territorial structure, concentration of economic activity, diversification level; ownership structure in the region;
- social indicators, namely: unemployment and employment; nominal and real income flow; income and expenditure structure; ratio of average monthly income to minimum subsistence level; consumption of material goods and services; level of infrastructure development, etc.;

– environmental indicators, including: anthropogenic load on the territory; level of pollutant emissions into the atmosphere; condition of surface water bodies and sewage disposal, etc. ; demographic indicators, which reflect information on the number of urban and rural population, its sex and age structure, working population, level of education, population density, net migration, etc.;

– indicators of resource provision and use, which enable analyzing the availability and condition of labor potential, natural resource potential, production potential, and potential of infrastructure.

For a comprehensive diagnosis of development level of business entities, a method of multidimensional comparative analysis is employed. It involves studying any business entity based on a totality (set) of selected indicators presented in the form of a matrix of raw data (a_{ij}): The best values of the indicators are selected from all the values, and as a result a hypothetical reference object is formed with the matrix of optimal (best) parameters ($\max a_{ij}$). The indicators for the other business entities (a_{ij}) are then divided by the corresponding values of these indicators for the reference entity ($\max a_{ij}$), which results in obtaining a matrix of standardized coefficients (x_{ij}) (1):

$$X_{ij} = \frac{a_{ij}}{\max_{ij}}, \quad (1)$$

The resulting coefficients are squared and multiplied by the weighted coefficients K_i determined by expertise. The values for each entity are added up; the root of the sum is found, which results in obtaining the score for business entities (R_i):

$$R_i = \sqrt{K_1 x_{1j}^2 + K_2 x_{2j}^2 + \dots + K_n x_{nj}^2}. \quad (2)$$

The scores are ranked, which allows for determining the place an individual business entity among other entities under study in terms of development level.

The advantages of this methodology for assessing business entity potential are in the balanced system of indicators and formation of a basis for multidimensional comparative analysis. This makes it

possible to obtain amended scores of potential of business entities. Its disadvantages include the impossibility of estimating potential in physical and monetary terms.

According to foreign researchers [52], business entity potential is expressed through a multi-level hierarchy of factors, where the upper level – market share – is directly related to the competitiveness achieved, and quality of management – the lowest, fifth level, describes the economic results achieved.

V. A. Sidun, J. V. Ponomaryova establish the criteria for assessing potential by economic activities: production activities (volume of production and product range, logistics, production potential of the enterprise and the extent of its use, condition of physical infrastructure, cost of production, organization of the production and technological process, and volume of services); financial activities (volume and structure of capital, its price, operating profitability, financial status and solvency of the enterprise, volume and composition of current capital and its consumption, duration of the operating cycle, structure and direction of using financial resources, amount and composition of investments); HR management activities (labor supply, labor productivity and efficiency, level of wages, employee loyalty) commercial activities – product mix policy, price policy, advertising, organization of economic ties, nature of business transactions and their efficiency, brand, etc.; organizational and management activities (planning system, day-to-day management, managerial and professional competence, information management, management technique) [56, 57, 89].

P. S. Zavialov distinguishes the following groups of indicators for assessing potential: market share, innovation activities, production performance, marketing, financial performance [50].

I. P. Chepurnyi believes that the criteria for assessing business entity potential are as follows: indicators characterizing efficiency of production process management; those reflecting efficiency of working capital management; those helping to get an idea of efficiency of sales promotion management; rate of competitiveness [59].

I. Sh. Dzakhmisheva proposes to assess business entity potential in terms of product quality, product mix efficiency, service culture,

service conditions, and accessibility of services [47].

Thus, the analysis of the studies confirms the lack of a uniform approach of domestic economic science to the selection of criteria for assessing business entity potential: each researcher identifies their own set of criteria, which may sometimes be complementary.

To date, the most comprehensive classification of criteria used for the assessment of business entity potential is proposed in the work of V. A. Pavlova [55]. The author divides the criteria into two groups: labor and resource ones. The intensity of information, level of service, level of product differentiation, and level of employees' experience are considered to be the labor criteria. Resource criteria include financial, production, market and organizational dimensions of potential.

All existing methods for assessing business entity potential can be broken down into nine groups [48]:

- methods based on comparative advantage analysis;
- methods based on the theory of equilibrium of the firm and industry;
- methods based on effective competition theory;
- methods based on quality theory;
- matrix methods for assessing competitiveness;
- integrated method;
- method based on the multiplier theory;
- method used to determine a competitive position of the enterprise in view of its strategic potential;
- benchmarking techniques.

The first method is the most common and comes from the postulates of the international labor division, more specifically – D. Ricardo's comparative advantage theory. According to this approach, the prerequisite for gaining a strong competitive position is the existence of a comparative advantage which allows for relatively low production costs compared to those of the competitor. The significant disadvantages of this method are considered to be the static nature of the results obtained as well as the inability to assess efficiency of the enterprise's adaptation to the changing environment.

Studying and assessing potential based on A. Marshall's theory of equilibrium of the firm and industry and factors of production theory

merit some attention. Under this method, equilibrium means a state where business entities have no incentive to change their behavior [54]. The criterion for competitiveness of business entities is when they have such factors of production which can be used in a way that is more productive than that of their competitors. Indicators typically include interest rates on loans, relative value of equipment purchased, relative wage rates, and relative value of material resources. Accordingly, the lower the relative value of production factors of a particular producer compared to its competitors, the better its competitive position and potential are considered to be. The main drawback of this method is that it mainly reflects the external working conditions of a small enterprise, which have objectively developed, and hardly takes into account the influence of internal factors.

A separate group is comprised of techniques for measuring business entity potential, which are based on effective competition theory. The main tool of competitiveness analysis is a comparison of the performance of entities in the sector with that of their competitors and with the sector averages.

With this approach, analysis generally focuses on three main groups of indicators: supply chain efficiency, efficiency of own production, financial sustainability of business entities. When assessing business entity potential, individual and group performance indicators are compared with the corresponding indicators of competitors and sector averages. On the basis of the ratios obtained, conclusions on the comparative competitiveness of capabilities of the studied objects are drawn.

However, this method has disadvantages [54, 88]:

First, the indicators of the first and second groups are quite closely related and the distinction between them is conditional.

Second, it is difficult enough to summarize the results of the analysis even by groups of indicators, and all the more difficult is to justify the resulting combined indicator of potential of business entities.

Third, the method does not make it possible to assess the behavior of the factors influencing competitiveness.

Assessment of potential using the quality theory generally rests upon studying consumer value of the products, with the most

important parameters being compared with those of the competitor producers. The disadvantage of this method is that it does not consider supply-chain performance of business entities and identifies competitiveness with competitiveness of potential of business entities; in addition, the method is applicable only to business entities producing only one type of product.

Scientifically interesting are matrix methods for assessing business entity potential developed in the mid-1960s of the 20th century. Their advantage is that they enable investigating changes in potential over time. The theoretical basis of these methods is considered to be the life-cycle concept. According to this concept, any product or technology from its entry into the market to its abandoning passes through certain stages of the life cycle, including introduction, growth, maturity and decline. At each stage, the producer can sell goods or products of a certain technology in different volume, objectively affecting the market segment occupied by the small enterprise and sales over time. The disadvantage of this method is that it is difficult to construct matrices and interpret the outcome, which makes it impossible to use it effectively in practice.

The integrated assessment method, which implies using two criteria: the first shows extent to which the consumer's needs have been met, and the second reflects production efficiency, proves to be quite effective in assessing business entity potential. The advantage of this method is the simplicity of calculations and possibility for unambiguous interpreting of the results obtained. The disadvantage lies in the fact that the integrated assessment does not allow for in-depth analysis and identification of resources for enhancing potential of business entities.

Methods to estimate business entity potential also include a multiplier theory-based method. Using the provisions of this theory, it is possible to indirectly evaluate competitive advantages of business entities of one cluster over those included in other ones which are related to quality of services provided or products manufactured. The disadvantage of the method is that it is difficult to construct a numerical model of sequential dependence of some indicators on others. Within these approaches, it is possible to use different methods for calculating business entity potential, which are conditionally classified into three groups.

The first group includes methods used to assess the level of other types of potential (import, export potential, etc.), but they can be by analogy applied to determine the overall potential [45, 47]. The second group refers to the methods used to assess individual components (elements) of potential and their integrative effect. The third group includes those based on the determination of potential as a subsystem of a more complex economic potential.

The first group of methods for assessing business entity potential, within the resource approach, includes the estimation method similar to the calculation of export potential as a product of productive potential, product competitiveness factors and supply and demand factors (the production potential is calculated as value of resources) [48]. Within the process approach, it is a method of summing expert estimates of resources and catalysts weighted by their significance coefficients [44]. Within the structural approach, there can be used the DEA analysis method, a variation of which is the super efficiency model [56].

When employing the income approach, it is advisable to apply methodologies similar to those used in the project analysis: individual indicator matrices, which allow for the estimation of each of them [58]; integrated indicators defined as the square root of the sum of the squares of the individual (particular) indicators; weighted average of individual indicators with weighted coefficients; taking the square root of the sum of the products of squares of individual indicators and the expert estimate of the significance of each of them; extracting the square root of the sum of squares of the deviation of individual indicators from the reference ones), etc. [47, 54, 59]. A composite indicator model can also be used. The model is developed based on the principal component analysis, according to which it is possible to eliminate influence of multicollinear relationships [47, 51, 54].

The analysis of the known methodologies for assessing business entity potential and its components pointed to the existing problem of the scientific substantiation of methods for estimating the value of different types of business entity potential. As of today, no relevant calculation methodology has been developed in the market economy, although several attempts to do it have been made.

Enterprise economic potential is a complex, dynamic, integrated,

interconnected and synergistic set of all its available and prospective resources and capabilities, used to achieve tactical and strategic objectives of the enterprise’s development at different stages of its life cycle.

The analysis of the literary sources showed that, depending on the basic assessment criterion, it is possible to single out among the existing concepts the resource concept, comparative concept and initial one, and among the estimation methods one can distinguish the expert method, scoring method, and analogy method, factorial analysis, methods of mathematical programming. Table 4 presents the main methods for assessing economic potential of the enterprise.

Analyzing the works of scientists in assessing components of business entity economic potential, several basic approaches can be identified.

Table 4 – Basic methods for assessing enterprise economic potential

Groups of methods for assessing enterprise economic potential					
Indirect assessment methods			Direct assessment methods		
An indirect assessment of the enterprise’s economic potential is carried out using the actual values of its performance indicators			Direct assessment of the enterprise’s economic potential is an estimation of its future capabilities		
Methods for assessing enterprise economic potential and its components					
expert method	scoring	comparative analysis /ranking	analogy method	factorial analysis	methods of mathematical programming

In the study of Ye. V. Lapin, the method based on “the theory of factors of production” is proposed and justified for the assessment of industrial enterprise economic potential. According to this method, the value added of the enterprise can be defined as the sum of the value added of its production factors, namely, labor, capital, natural resources, and information. This method makes it possible to assess the importance of individual subsystems of the enterprise’s economic potential – human resource, production, innovation, organizational and management potential. Therefore, assessment of the industrial enterprise’s economic potential is based on the economic results that can be obtained in the future [60].

In work [60], the components of enterprise economic potential – human resource, production, innovation, organizational and management potential – are evaluated. To assess economic potential of the enterprise, a decomposition method, combining a method of formal and expert assessment of significance, is used.

The formula for calculating the indicator of economic potential is (3):

$$P = \sum_{j=1}^N P_j \times k_j, \quad (3)$$

where P_j is a quantitative or qualitative measure of using the j^{th} component of the enterprise's economic potential;

k_j is the coefficient of significance of the j^{th} component (determined by experts)

N is the number of components of the enterprise's economic potential.

In paper [61], it is noted that the methodology for assessing the enterprise's economic potential is a combination of the income, comparative and cost approaches. Specifically, the following algorithm is proposed to measure economic potential:

1. Calculating indicators of economic potential of processing enterprises.

2. Calculating composite indicators of processing enterprises' economic potential, constructing graphs to illustrate resource capability of the components of potential and matrix to summarize characteristics of the components of processing enterprises' economic potential.

3. Measuring efficiency of using processing enterprises' economic potential.

4. Calculating combined indicators of efficiency, constructing diamonds (rhombs) to present the efficiency of components of processing enterprises' economic potential.

Indicators used to measure the level of economic potential of processing enterprises include indicators characterizing the level of management, production, financial and labor potential.

To obtain realistic results when assessing regional economic potential, M. V. Makarenko [62] proposes using a model which includes the following indicators and considers specific priorities (4):

$$EP = f(x_1 x_2 x_3 x_4 x_5 x_6 x_7), \quad (4)$$

where EP is economic potential;

x_1 is composite indicator of the region' resource capacity;

x_2 is composite indicator of the region's financial capacity;

x_3 is composite indicator of the region's innovative capacity;

x_4 is composite indicator of quality of life in the region;

x_5 is ecological potential of the region;

x_6 is organizational potential of the region;

x_7 is region's clustering potential.

L. D. Harmider [63] proposes to use the following algorithm, in which the estimation method is based on peer review:

Phase 1: identifying the areas of research of human resource potential.

Phase 2: establishing a system of object to research human resource potential.

Phase 3: carrying out an expert assessment. Expert assessment of the level of development of enterprise human resource potential is carried out using a five-point scale.

Phase 4: calculating the composite indicator characterizing the development level of human resource potential (DHP) of a trading enterprise according to the formula (5):

$$DHP = \alpha EDQC + \beta EDG_{ual}C + \gamma EDCC + \delta EDCE, \quad (5)$$

where DHP is level of development of human resource potential of the enterprise;

EDQC is estimate of the development level of quantitative characteristics of the enterprise's human resource potential;

$EDQ_{ual}C$ is estimate of the development level of qualitative characteristics of the enterprise's human capital;

EDCC is estimate of the development of characteristics of conditions for realization of the enterprise's human resource potential;

EDCE is estimate of the development of characteristics of employment of enterprise's human resource potential;

α , β , γ , δ are weighted coefficients of the corresponding components of development of the enterprise's human resource potential.

In study [64] it is proposed to assess potential of the trading enterprise using the data on the enterprise from its reporting forms and documents, namely: 1. “Balance”; Form №3-trade “Report on sales and stock of goods in the trading network and the restaurant industry network”; subsidiary accounts to Article 92 “Administrative Expenses”; technical documentation specifying the term of machine and equipment operation; analytical research information; Form №5 “Notes on the Annual Accounts”, Form №1-PV “Labor Report”, №2 “Profit and Loss Account”.

The enterprise’s potential is offered to be calculated using formula (6):

$$VRPB = VMP + VSP + VHP + VFP + VIP + VInfP, \quad (6)$$

where VRPB is value of resource potential built

VMP is value of material potential;

VSP is value of space potential;

VHP is value of human resource potential;

VFP is value of financial potential of the trading enterprise;

VIP is value of image potential of the trading enterprise;

VInfP is value of information potential.

In the study mentioned above, the following formulas are used to conduct the evaluation of components of the enterprise’s potential (7-9):

$$Vhp = Dlr \times \overline{Pw} = (\overline{W} \times (Nfe + Npe) + Es + Et + Ed + Esc) \times \overline{Pw}, \quad (7)$$

where Vhp is value of human resource potential;

Dlr is depreciation of labor resources;

Pw is average period of work of 1 employee at the trading enterprise (months, quarters or years);

W is average wage of 1 employee for the reporting period (month, quarter, year);

Nfe is payroll number of all full-time employees of the enterprise as of the date of evaluation;

Npe is number of part-time employees as of the date of evaluation;

Es, Et, Ed, Esc are respectively current expenses on selection, training, development, social security of personnel in the reporting period (month, quarter, year).

$$VFP = VFP_{ec} + VFP_{bc} = CB + FI + CP = CB + FI + (R + B), \quad (8)$$

where VFP is value of financial potential of the trading enterprise;

VFP_{ec} , VFP_{bc} are value of financial potential formed, respectively, at the expense of equity and borrowed capital as of the date of evaluation;

CB is balance of cash and its equivalents as of the date of evaluation;

CP is cash in payments as of the date of evaluation;

FI is financial investments;

R, B are receivables and bills of exchange received, respectively, as of the valuation date.

$$VInfP = VIB + VIT = (E_p + E_{cs}) + (VS_p + VS_d), \quad (9)$$

where VInfP is the value of information potential;

VIB, VIT are the value of the information base created and the information technology of the enterprise as of the evaluation date, respectively;

E_p , E_{cs} are expenses of the enterprise on periodicals and communication services (including the Internet), respectively;

VS_p , VS_d are the value of the software purchased and developed by the enterprise, respectively, as of the evaluation date.

R. O. Tolpezhnikov believes that in determining production potential consideration should be given not only to the realization of potential but also to the influence of factors which traditionally belong to labor potential, and which some authors include in production potential [65].

Production potential is calculated according to formula (10):

$$P_p = (P_a + P_{ca}) \times P_{sp}, \quad (10)$$

where P_p is production potential;

P_a is potential of assets;

P_{ca} is potential of current assets;

P_{sp} is the process staff potential.

In turn, fund potential (Fp) is calculated as the product of the average annual value of capital assets (CAaver) and the standard rate

of capital investment efficiency (SRci). Potential of current assets (Pca) is calculated as the product of annual volume of materials (M) and resource mass extraction factor, which is determined as the ratio of value of material resources used in production to the total value of material resources consumed by an enterprise (Rm). While measuring potential of process staff (Psp), first, the impact of living labor (i.e., labor of an average employee) is estimated by determining its asset equivalent in value terms. It is calculated as the product of the coefficient of realizing the potential of process staff, which grows with an increase in the degree of experience, qualifications of employees (Q), and the ratio of changes in the capital-labor ratio per an employee (Rcl) until the change in the productivity of one employee (Lp) [65].

Thus, assessment of potential is a process that is difficult to formalize. The objectivity and quality of research work in this area are determined by the degree of access to information, its completeness, reliability, capability of the staff involved, and the depth of the clients' interest in the results obtained. Domestic and foreign scientific papers describe various methods used to assess business entity potential. Therefore, one of the most important problems is the justification of methods for calculating competitiveness level since it should be based on identification of a range of indicators which provide for the most detailed analysis of competitive potential of the enterprise.

4. Methods of integrated assessment of business entity potential

To date, it is the integrated method that is most commonly employed for assessing business entity potential. It is based on using both quantitative and qualitative indicators and provides for reducing subjectivity in the selection of weighted coefficients in the process of compiling the indicator components. It is calculated by means of a composite index, which is calculated based on normalized values and weighted coefficients.

Figure 6 shows the algorithm for calculating the composite indicator of business entity potential.

The integrated method for assessing potential is reflected in the following works: [66, 67, 68, 69, 70, 71.72, 73, 74, 75, 76.77, 78].

To determine the innovation potential, the integrated assessment methodology was used by a number of scientists, namely: M. Y. Gliznutsa, P. M. Hryhoru, O. A. Bilovodska, H. Ye. Bazhenov, T. F. Riabovolyk, M. P. Voinarenko. and others. O. Ye. Kuzmin. and O. H. Melnyk, and others were addressing a similar task to determine economic potential. A. V. Lypenko, T. S. Duda, V. M. Hryniova, L. V. Shaulska, and others dealt with problems related to assessment of labor potential.

It is worth noting that the advantage of an integrated method for assessing business entity potential is, first of all, the simplicity of calculations, availability of information and possibility of unambiguous interpretation of results obtained.

Disadvantages of its application include:

- difficulty in determining the level of significance of the indicators included in the composite performance indicator;
- obligatory requirement for taking account of characteristics of the sphere and field of operation of business entities or choosing homogeneous ones;
- static nature of the results obtained and limited period of their validity;
- assessment is made for a certain period of time;
- need to define the benchmark and obtain necessary data.

Let us consider a few illustrative examples of the application of the integrated method for assessing potential in works of leading scientists.

In the work of M. Ye. Rohoza [79], an algorithm for diagnosing enterprise potential, based on the comparison method, is used to calculate the composite indicator of enterprise potential. The above algorithm includes several stages [79].

At the first and second stages of diagnosing enterprise potential, the individual indicators of potential are grouped.

At the third stage, the normalization of individual indicators of the enterprises' potential is carried out in order to bring the indicators to a reference one, determined by formula (11):

$$P_i = \frac{Y_{ir} - \min_j Y_{ij}}{\max_j Y_{ij} - \min_j Y_{ij}}, \quad (11)$$

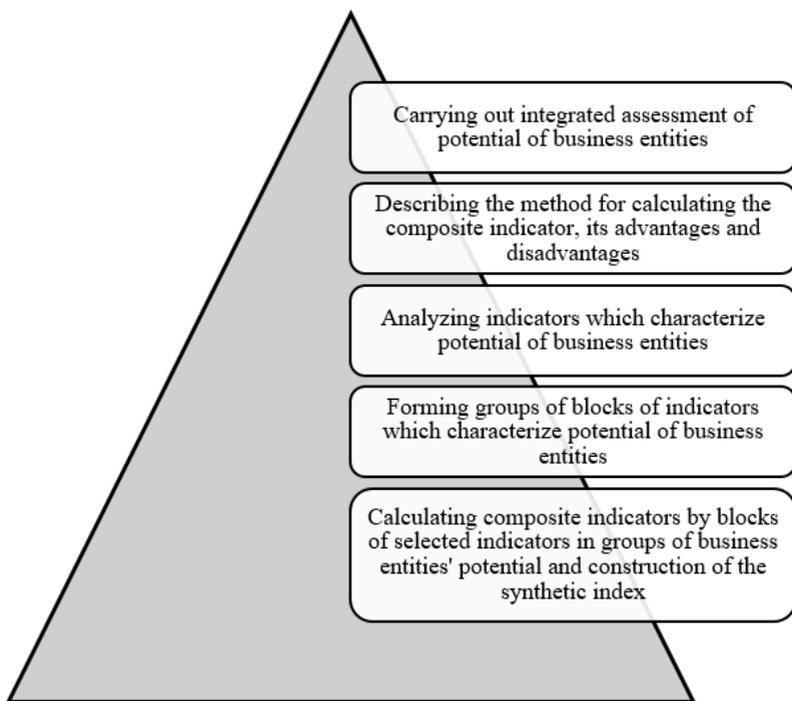


Figure 6. – Algorithm for integrated assessment of business entity potential

where ρ_i are reference indicators;

Y_{ir} is the baseline indicators of the enterprise potential.

At the fourth stage, the weights for the blocks of indicators of the enterprises' potential (K_r) are determined, provided that $\sum k_r = 1$.

The fifth step implies calculating the composite index of the r^{th} block of indicators of enterprises j to determine the preliminary indices for the blocks according to formula (12):

$$I_{ri} = \frac{\rho_1 + \rho_2 + \dots + \rho_n}{n}, \quad (12)$$

where ρ_1, \dots, ρ_n are the indices for r^{th} block;

n is the number of indicators of the r^{th} block.

Thus, the analysis of enterprise performance allows for calculating the synthetic index of their potential.

The advantages of the proposed methodology for assessing enterprise potential are: the calculation of the composite indicator is simple, objective and has a sufficient set of investment attractiveness factors; the methodology makes it possible to draw detailed and comprehensive conclusions on different activities of the enterprise. Deficiencies in the methodology are the subjectivity of expert estimates when determining the weights of individual groups of indicators; the need to perform a lot of calculations.

O. V. Hryvkivska [80], in her studies, uses the scoring of financial potential by financial performance indicators and ranking of enterprises by their financial potential. The author proposed a composite indicator that takes into account not only widely used financial, economic, technological indicators and indicators of labor potential but also innovative aspects of enterprise performance. If the indicator demonstrates a high level, it gets 4 points, average – 3 points, low – 2 points and critical – 1 point, respectively. Enterprises with a score in the range of 10-19 have a critical level of financial potential, 20-29 have a low level of financial potential, 30-39 have an average level of financial potential and 40 or more – a high level of financial potential. To determine the level of financial potential, the resulting financial coefficients of the proposed scale are compared. The proposed system is characterized by the simplicity and clearness of the calculated indicators, by the publicity of the information base used in the analysis, by universality, possibility for comparing and ranking enterprises in terms of the degree of development of their financial potential within the framework of a common methodology. To obtain a qualitative assessment of the level of financial potential of enterprises and to establish the directions of their development, the calculations are carried out, on the one hand, with consideration for changes in the values of indicator over time and on the other hand, in comparison with other entities [80].

V. I. Usyk, in scientific work [81], calculates potential by means of a composite indicator, calculated on the basis of normalized values and weights of three indicators. The method of expert evaluation, namely the weights method, was used to calculate the weighted coefficients. The opinion of the experts was obtained through a questionnaire. This method is the most effective and

widespread survey technique, as it allows for a better combination of provision of expert with information and independent creative activity. The broad possibilities for regulation and control of communication among the experts minimize the risk of conformism. However, the complete independence of the experts during the survey cannot be achieved either. The generalized expert opinion S_i by the i^{th} indicator was calculated by formula (13):

$$S_i = \sum_{i=1}^n a_{in} / m, \quad (13)$$

where a_{in} is the weighted coefficient that was assigned by the n^{th} expert to the i^{th} attribute;

n is the number assigned to the expert;

i is the number assigned to the attribute;

m is the number of experts who evaluate the i^{th} attribute.

The higher the S_i value, the more significant the attribute is.

Other scientists, which carried out an integrated assessment of the investment and innovation potential, were L. M. Gazuda and K. M. Haustova [82]. One of the main tasks of the study is to standardize the indicators and then convert them into points (B_i), based on the G. Harrington's modified desirability function, with the use of a 6-point scale (0-6). Accordingly, 6 points is gained by the indicator, the value of which is the reference for the population of data under study, and 0 points is the lowest indicator in comparison with the reference one. To determine the standardized values of the indicators, the min-max method was used. This technique makes it possible to reduce all the data to one range between 0 and 1 (14):

$$x_i = \frac{x_n - x_{\min}}{x_{\max} - x_{\min}}, \quad (14)$$

where x_i is standardized value of the corresponding i^{th} indicator of the investigated enterprise;

x_n is the value of the statistical indicator for the enterprise (industry);

x_{\min} and x_{\max} are the minimum and maximum values of the indicator, respectively.

Expert evaluation methods are most often used to determine the weights of individual and system indicators which comprise the composite indicator. The use of the proposed methodology is applicable and universal, which makes it possible to assign weights to individual factors depending on the enterprise's strategic goals and interests. For a more detailed study of the individual factors, it is suggested that the individual components of the composite indicator be weighted at each level of aggregation by formula (15):

$$K_i = B_i \times W_i, \quad (15)$$

where B_i is score of the i^{th} indicator;

w_i is weighted coefficient of the i^{th} indicator in the system of indicators of a certain level.

Then the generalization is done in the same way, but for composite indicators, in which the hierarchy of the system is manifested.

Combining the availability of an information base, substantive and structural content of potential and logic of development (which is why innovation potential is being measured) with a large number of mathematical methods, the focus should be on the method of taxonomic analysis of the synthetic development index [82]. This method is increasingly being used in innovative economies. The choice of mathematical methods for the construction of synthetic indices is made on the basis of the list of mathematical and practical problems in the economy. When determining the taxonomic indicator of development level, V. Pliuta [83, 84] developed his own methodology.

It implies the implementation of the following stages:

1. Rationale of indicators for a group of enterprises belonging to the same industry.

2. Standardization of indicators with different units of measurement. For this purpose, the following equation was employed (16):

$$Z_{ij} = \frac{x_{ij} - M_j}{S_j}, \quad (16)$$

where z_{ij} is standardized value of the j^{th} individual indicator for the i^{th} year;

S_j is standard deviation of the j^{th} individual indicator;

M_j is arithmetic mean of the j^{th} individual indicator;

x_{ij} is value of the j^{th} indicator for the i^{th} year.

3. Comparison of the normalized values with the reference ones (17):

$$K_j = \frac{Z_{ij}}{Z_e}, \quad (17)$$

where K_j is partial coefficient of the relevant indicator;

Z_{ij} is actual value of the indicator;

Z_e is reference value of the indicator (the highest or criterion one).

Furthermore, by generalizing the partial coefficients, the degree of conformity of the analyzed enterprises with the hypothetical reference enterprise are established, all the indicators of which are reference ones.

The disadvantage of the above method is that negative results were obtained during the normalization process (16). But method (14) does not have such disadvantage, which makes its application a priority.

On the basis of the data obtained, the conclusion – identification of leading business entities by economic activity in the system of socio-economic development – is made.

5. Stages of and methods for assessing potential by economic activity

As already noted, assessing potential at different levels of the economy are primarily necessitated by resource constraints, which must be managed efficiently to ensure a sustainable economic growth. In this situation, an industry or a group of industries is regarded as an investment object to achieve the realization of their potential in the future. In this study, the analysis and justification of the methods for assessing potential of a particular economic sector is a priority. There are several options for analyzing the information about a sector of the economy: a) using economic sectors as objects of analysis; b) selecting enterprises which in a generalized form represent the industry since they have typical characteristics; c) using economic activities as objects of analysis. In this work we are

inclined to the third option, which is explained by the following reasons:

First, according to the relevant classifier, the national economy consists of a fairly large number of industries, which means the emergence of a significant number of potential investment objects and as a result will lead to dispersion of investment funds.

Second, it is theoretically possible to select individual enterprises as representatives of a certain industry, but in practice this approach involves not only determining the criteria for selecting such enterprises but also calculating their number in proportion to the values of the indicators used as a distribution base. Furthermore, this situation is complicated by the use of the reporting information of a large number of enterprises with the formation of data sampling (in this case the industry is considered as a sampled population).

Third, the advantage of using economic activities is the publicly available statistics describing each of them over a period of time. This allows for both using the absolute values of indicators and determining coefficients.

Having identified the objects to be analyzed, it is necessary to describe the main stages of assessing potential by economic activity, the content of which is close to stages of economic diagnosis combined with the use of techniques for forecasting quantitative indicators (Fig. 7).

Let's consider the stages of assessing potential in more detail, focusing on the way of their implementation starting from the second stage since the selection of objects to be analyzed has already been considered.

Collection and analysis of information from open sources, which allows for getting an idea of the availability and accessibility of information, which in general terms characterize economic activities. The main sources of data used for the calculation of economic indicators are as follows:

- data of the State Statistic Service of Ukraine;
- data contained in official statistical publications (i.e., “Ukraine in Figures”, “Industrial Property in Figures”, etc.);
- statistical reports reflecting the national economy development;
- reports of international organizations, etc.

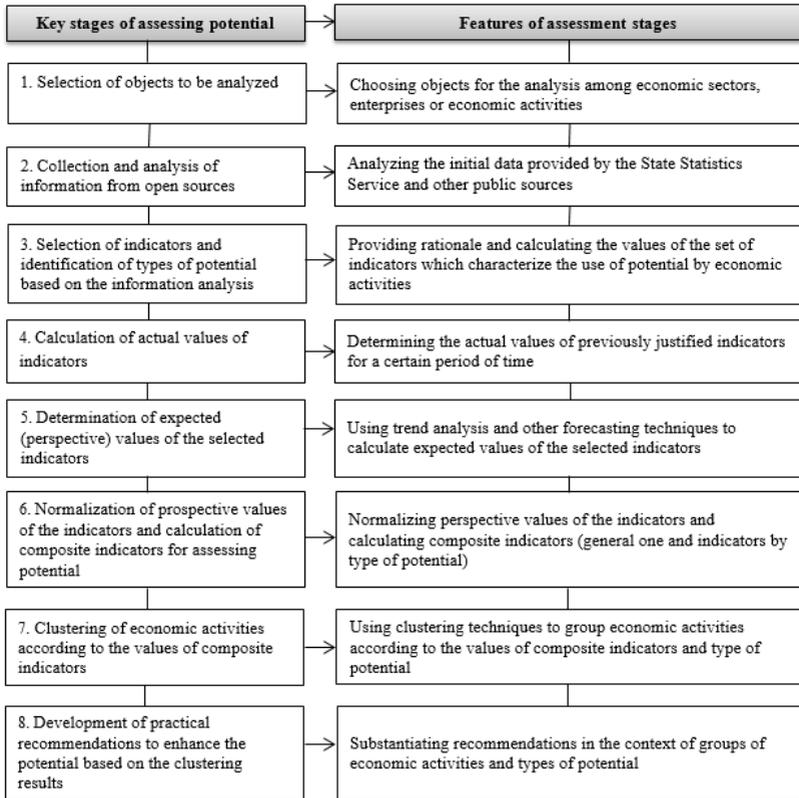


Figure 7. – Key stages of assessing potential

Furthermore, experts may be involved in the further development of the project, but only if there is a need to assess the factors whose impact is difficult to characterize using quantitative methods.

Selection of indicators and identification of types of potential, which suggests the construction of a hierarchical structure of indicators for which first-level indicators form groups of indicators, which in turn are used to assess the potential of a certain type. This approach would enable to better specify the results of determining the composite indicator of potential by economic activity, which in turn will increase the validity of practical recommendations.

A preliminary analysis of publicly available data revealed three important types of potential, namely economic, human resource and

innovation potential. This composition of potential is based on a) availability of statistical data; b) results of research papers where these types of potential are investigated quite frequently; c) universality of these types of potential, the growth and implementation of which is a practical task for all entities engaged in a certain economic activity; d) conviction that it is the availability of economic resources, combined with the recruitment of qualified personnel and creation of conditions for innovation, which ensures the development of national economic sectors.

Calculation of the actual values of indicators, which concerns only relative indicators since the normalization procedure makes it possible to turn absolute values into relative ones (in this case, the maximum value of the indicator is equal to 1, and the minimum is 0). The list and content of indicators will depend on the information available (the methodology for measuring them will be presented in the next chapter of this scientific paper). Determination of the actual values of indicators involves using a coefficient analysis (in case of using relative values) as well as the method of comparison (in the process of determining deviations of the indicators).

Determination of the expected (prospective) values of the selected indicators is proposed to be carried out using the forecasting methods, the use of which involves:

1. Determining the duration of the period for measuring the expected values of indicators (as a rule, it is 2.5-3 times less than the actual period).

2. Choosing methods for determining the expected values of indicators, which can be justified using the techniques for verifying the quality of forecasts. These techniques in turn imply comparing the forecast values with the actual ones for the same period (it is believed that the actual value of an individual indicator should be determined using forecasting methods). One of the criteria for assessing the quality of forecasts is the mean relative error (MRE), determined based on the relationship (18):

$$\text{MRE} = \frac{1}{n} \sum_{i=1}^n \frac{|f_v - f|}{f}, \quad (18)$$

where n is number of indicators to be compared with the predicted values;

f_{iv} is forecast value for a certain period;

f is actual value for a certain period.

The above ratio is fairly common because, if applied, the positive and negative deviations are not offset, but accumulated, which increases the validity of the results obtained. Based on the results of the quality check, several methods with low deviations of actual and expected values are applied.

Among the methods to be used to determine the expected values of absolute or relative indicators is exponential smoothing and trend analysis.

According to the first method mentioned, the expected value of an individual indicator is determined on the basis of its latest known value and the average value of all indicators in the series. To determine the significance of these components, the α indicator – constant smoothing, which vary within the range (0, 1), is used. The formula which presents a basis of the exponential smoothing method is as follows (19):

$$Y_{t+1} = \alpha Y_t + (1 - \alpha) Y_{aver}, \quad (19)$$

where Y_{t+1} is expected value of the next period indicator;

α is constant smoothing value ($0 < \alpha < 1$);

Y_t is value for the period t ;

Y_{ser} is hypothetical value of the indicator over the t period, calculated on the basis of averaging other retrospective values of the series.

If it is necessary to calculate the expected values of the indicators for several periods, the latest of the determined values is included in the models as the known value.

The application of the constant value α is the key difference between the exponential smoothing method and other methods used to determine the expected values of economic indicators. In fact, α is a weighted coefficient, which is selected by the researcher at their discretion, depending on the behavior of the data under study. If attention is paid to the latest value of the indicator under study, the value α shall be investigated at the level $\alpha > 0.5$, and in another case – $\alpha < 0.5$.

This approach is useful when more than one indicator is being considered since it enables to take into account the behavior of each of them by selecting different values. But the use of the constant smoothing value increases the subjectivity of the results. Therefore, the selection of this value requires justification.

Trend analysis makes it possible to construct trends for changes in indicators in time.

In the case of a combination with the least squares method, the trends are constructed based on the criterion of minimization of the sum of the squares of deviations of the actual values from those constituting the trend. The following is a mathematical representation of the criteria for determining the trend of change in the indicator according to the method of least squares (20).

$$\sum (Y_T - Y(X_T))^2 \rightarrow \min , \quad (20)$$

In most cases, the trend is a linear function, but the application of software allows the construction of step and logarithmic functions describing the changes in the indicators. This feature allows taking into account the peculiarities of changes in each indicator by applying an eigenfunction. To describe the correspondence of changes in the indicator and the constructed trend, the coefficient of determination (R^2) is also used. The coefficient characterizes the specific weight of the sum of deviations Y , which is defined by the independent variable in the sum of the total deviation. Thus, the coefficient indicates to what extent the changes in the indicator are described by the constructed trend.

It is worth noting that in the case of calculating the values of coefficients, the expected value of each component will be determined separately, thus increasing the accuracy and validity of the calculations made.

Normalization of the prospective values of indicators and calculation of composite indicators for assessing potential. To normalize the expected values of indicators, it is proposed to use the formula by which the normalized values are calculated as the ratio of the difference between the actual and maximum value of the indicator and the range of a series of values (which is determined as the difference between the maximum and minimum values of the

series).). This relationship is often mentioned in works of different researchers (see p. 5, p. 15). As already noted, the advantages of using this ratio are the ability to use absolute values and avoid negative normalization results (as is sometimes happened with the application of its variant with the use of the standard deviation).

There are several options for determining composite indicators by type of potential, namely: a) using mean values (arithmetic, geometric, etc.) without taking into account the weight of the indicators; b) the same method with taking into account the weight of the indicators and justifying criteria for determining weights for each group of potential. The criteria are selected with respect to the specificity of the potential of each type.

In addition to composite indicators of types of potential, it is reasonable to calculate a synthetic composite indicator of potential by economic activity. The “radar method” or its analytical version can be used for this purpose. If the composition of the potential remains the same, the radar method in our case will be reduced to: a) comparing the areas of triangles generated on the radar graph, depending on the actual values of the composite indicators for different periods by types of potential; b) determination of the maximum area of the triangle formed by using the maximum unit values of the composite indicators. The results of the calculations do not exceed 1 (which is considered to be the maximum possible value) and are measured in unit fractions or per cent.

The following is an example of the radar technique for the integrated assessment of potential by economic activity (Fig. 8).

As can be seen, three types of potential are used, which determines the particularities of graphic presentation of the results of calculations.

The assessment of potential in this case is carried out using a composite indicator, calculated as follows (21):

$$I_p = \frac{S_{actual}}{S_{max}}, \quad (21)$$

where I_p is the composite indicator of potential, the percentage of unit;

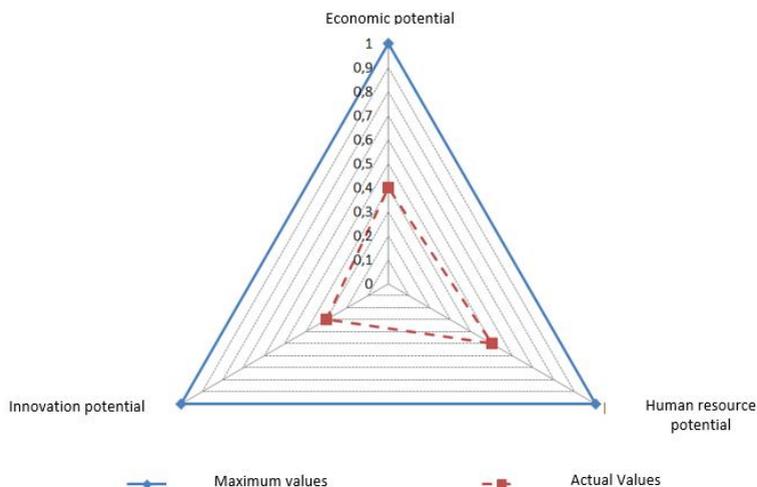


Figure 8. – Example of using the radar chart for integrated assessment of potential by economic activity

S_{actual} is the area of the triangle formed by the actual values of composite indicators by type of potential over a given period, unit of area;

S_{max} is the area of the triangle formed by the maximum (unit) values of the composite indicators calculated for different types of potential over a given period, unit of area.

Also, a composite indicator of potential can be determined as the ratio of volumes of figures formed in a three-dimensional space (since three types of potential are used).

Clustering of economic activities according to the values of composite indicators. Each type of economic activity is characterized by composite indicators reflecting the use of a certain type of potential. This makes it possible to identify the economic activities with the best, worst and medium composite indicators using one of the cluster analysis methods. The most common of these are distinguished by the method used to determine the distance between clusters and the way objects are assigned to a particular cluster. This leads to the fact that the employment of different methods gives slightly different results. Let us describe the principles of application of some clustering methods.

1. The k-nearest neighbor method (distance between two clusters is determined by the distance between the two closest objects).

2. The furthest neighbor method (the distance between clusters is determined by the longest distance between any two objects in different clusters).

3. The unweighted pair group method with arithmetic mean (UPGMA) (the distance between two clusters is considered as the average distance between all pairs of objects in them).

4. The weighted pair group method with arithmetic mean (WPGMA) (similar to the unweighted pair group method with arithmetic mean, the difference being only that the cluster size (the number of objects in it) is used as the weighted coefficient).

5. The k-mean method (minimizing the sum of squares of the distances between each object and the center of its cluster, which is similar to the least squares method). Since, as already mentioned, different methods can produce different results several clustering methods are planned to be used for this purpose.

Development of practical recommendations to enhance the potential based on the clustering results, which implies the justification of activities to enhance a particular type of potential, depending on the group of economic activities the potential was assigned to as a result of the analysis. The recommendations will depend to a large extent on the outcomes of all the stages of potential-building described.

It is also worth noting that the composite indicator of potential is proposed to be used as the basis for the allocation of budgetary resources to ensure the accelerated development of a particular economic activity.

Thus, the main steps of the assessment of potential by economic activity have been described above, with consideration for the methods to be used to achieve this goal.

CONCLUSIONS

The results of the first stage of the research are as follows:

1. In the course of analyzing the key problems affecting the functioning of business entities, it is revealed that the identification of components and the estimation of the value of potential (which is complicated by the discrepancies in this field) are the most relevant. Furthermore, potential is by definition always realized in the future, which requires the identification of expected values of economic indicators for its correct assessment.

2. The investigation of the nature and types of potential with regard to characteristics of economic systems provides for the following recommendations:

a) at the enterprise level, it is proposed to divide the components of potential into those related to specific stages in the enterprise's operational cycle and implemented sequentially (financial, logistics, production and market potential) and those affecting the enterprise as a whole (investment and innovation) (Fig. 4);

b) considering the approaches of various authors, it is suggested that an enterprise's potential be defined as the sum total of the unrealized potential of the enterprise in the areas of attracting investment, financing activities, logistics, implementation of innovations, production and sales of goods or services, as well as staff development;

c) with regard to the analysis of components of regional potential, it is proposed that it be defined as the sum of the region's identified but unrealized potential for socio-economic development, based on the principles of: ensuring economic growth and environmental protection; b) respecting interests of citizens and territorial communities, with regard to the interaction of various social groups; c) considering the geographical, climatic and other natural factors which determine the specifics of the region as a territorial entity.

3. The research also includes a comparative analysis of the methods used to quantify the value of potential as well as its integrated assessment. The analysis shows that the overwhelming majority of researchers are inclined to use quantitative methods for assessing potential, while experts are called only when it is difficult to quantify the impact of external and internal factors on potential.

Most commonly, the average values, normalization methods and taxonomic analysis are employed to assess the potential. Therefore, the methods being used today to assess potential require improvement.

4. Moreover, the study presents the main stages and methods to be applied for further research in the field. Considerable attention is paid to clustering techniques (since the objects under consideration are characterized by different types of potential) and quantitative forecasting (since, as already noted, the realization of potential is associated with the future).

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