SELECTION OF HORIZON FOR FORECASTING INNOVATIVE DEVELOPMENT OF INDUSTRIAL ENTERPRISE

The rapid development of new technologies, an increase in the influence of science on the activities of enterprises, an orientation toward social and economic development, increased competition, and an acceleration of the cycle of introducing new goods and services to the market. These and many other factors have a significant impact on the activities of the enterprise. In the changing environment, before the Ukrainian enterprises, there is an urgent need to introduce such areas of development that will bring their activities to a qualitatively new level, best reveal their competitive advantages and eliminate the disadvantages [1]. They will also open a wider horizon of market opportunities, increasing the competitiveness, special attention is paid to the forecasting of innovation activities and promising areas of development.

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Complete examination;

Non-continuous survey on a special program and only innovative enterprises.

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– organizations and production management systems;

– use of modern information technologies related to the areas of office work, accounting, automation of production processes;

– social technologies related to the social organization of economic and production activities.

Therefore, the most relevant today seem to be statistical surveys of enterprise activity in industry, the most important and largest sector of the national economy, determines...
the scientific and technical progress of the country in all spheres of economic activity [2]. At this stage, it is necessary to envisage full coverage of the entire set of industrial enterprises in order to identify those who are interested in predicting their development.

2. The object of research and its technological audit

The object of research is a complex self-regulating socio-economic system of the meso-level: enterprise. In the work, as a complex self-regulating system of management of socioeconomic factors, an industrial enterprise is considered.

The economic growth of enterprises in the dynamics of its main indicators and the possibilities of cyclical fluctuations serve as a gauge and determinant of the trend of economic development. Therefore, in the general definition (in the author’s vision), economic development is a combination of constantly operating, purposeful, and naturally defined processes [3]. They are interrelated and interdependent on quantitative and qualitative reincarnations of economic entities and the economic system as a whole, in terms of time during the total life cycle of the technology. As a result, the system acquires its new qualitative state both in content and in organizational structure, provided that a naturally defined state of the system is considered as a result of more or less long-lasting changes to its previous state.

From this definition of economic development, economic growth will be understood as the processes of internal secondary influence in a given period of development, or in a more or less short period of the full life cycle of the technological cycle of an economic system. Such processes lead more to quantitative changes in the obtained results than to qualitative changes in the content.

Economic growth, as a factor of economic development, is an increase in the scale of aggregate production and consumption in the country, characterized primarily by such macroeconomic indicators as gross national product, gross domestic product and national income. Economic growth is measured by the growth rates of these indicators over a specified period of time.

The factors of economic growth can be divided into groups of growth ability and real growth, and they can also be represented as a combination:
- supply factors (availability of natural and labor resources, fixed capital, level of technology);
- demand factors (price level, consumer spending, investment spending, government spending and net exports);
- distribution factors (rationality and completeness of attracting resources to the economic turnover, efficiency of utilization of the resources involved in the economic turnover) [4].

The cumulative interaction of these factors determines the dynamics of the possibilities of society and the direction of its movement. In this context, it should be noted that there are very often situations where the leading role of supply factors in economic growth can be supplemented with the hypothesis of a reference to demand factors. This is especially true for countries that are undergoing structural transformational shifts.

Special mention should be made of the negative effects of economic growth. Being, on the one hand, the main condition for material abundance and raising the living standards of the population, opportunities are created for carrying out a policy of social justice, raising the level of education and self-realization of the individual. On the other hand, this leads to an increase in anthropogenic and anthropogenic stress, and the manifestation of antihuman shifts (an increase in pressure on the human environment and environmental pollution) does not solve the problem of equitable distribution and the problem of poverty. On the contrary, it generates anxiety and uncertainty in the future with direct producers, leads to the dehumanization of the personality and transforms the direct manufacturer into a «simple application to the machine».

In this regard, the main active means of neutralizing the emergence of negative values of economic growth and, finally, the development of its positive aspects, it is possible to see the role of government regulation, the conceptual foundations of which are reproduced in the theory of mixed economic systems. In addition, for successful state regulation of economic growth, it is necessary to substantiate the main provisions of economic policy based on in-depth studies of existing development models across the whole range of their problems and basic forms of expression.

To solve the totality of these problems and conduct research, a sufficient sense of scientific thinking is necessary, based on the use of relevant knowledge, standards, scientific achievements and legal systems of the environment in which these problems are considered. After all, the socio-economic activity of man in society is determined by the general standards of the environment and the definitions of society, which are considered to be acting regulators. Their use in substantiation procedures involves an analysis of the legality and appropriateness in a given situation, the comparison of possible options and the selection of the most effective ones.

So, awareness of the need and feasibility of forming a particular development strategy of a state, its economic system and fields of activity is objectively preceded by knowing a possible set of strategic alternatives based on the initial conditions that have been influenced by various factors of life.

The formation of a system of statistical observation of the development of an enterprise should be based on a combination of its various forms and include a whole complex of interrelated types of statistical monitoring. They should differ in time and periodicity of the survey depending on the studied parameters, connecting reduced annual (accounting for emissions and abnormal indicators) and full periodic surveys [5, 6]:

1. Complete examination.
2. A non-continuous survey on a special program and only innovatively active enterprises.

In the future, this should include statistical reporting on innovations in the enterprise:
- organizations and production management systems;
- use of modern information technologies related to the areas of office work, accounting, automation of production processes;
- social technologies related to the social organization of economic and production activities.

Therefore, the most promising today are the statistical surveys of the enterprise’s activities in industry, the most important and largest sector of the national economy,
which determines the country's scientific and technological progress in all spheres of economic activity. At this stage, it is necessary to envisage full coverage of the entire set of industrial enterprises in order to identify those who are interested in predicting their development.

3. The aim and objectives of research

The aim of research is investigation of the above questions and understanding their importance and practical significance for increasing the effectiveness of the innovation activities of enterprises.

To achieve this aim it is necessary to perform the following objectives:
1. To explore the main approaches to the development of enterprises in the context of social and economic issues.
2. To justify the situational nature of the processes of innovativeness of enterprises on the basis of adaptive management.
3. To substantiate the basic principles, parameters and criteria of the horizons of innovative development.

4. Research of existing solutions of the problem

The question of forecasting innovation is an important issue and is solved as appropriate as necessary. According to the classification in [7], let's highlight some of the concepts of «innovation»:
- embodiment of a new for this industry of an almost unknown method (method) of production;
- receiving a new source of raw materials or semi-finished products, regardless of whether this source was before, or was considered unavailable, or is still worth creating;
- conducting an appropriate reorganization, for example, ensuring a monopoly position (by creating trusts) or undermining the monopoly position of another enterprise.

A great contribution to the development of the scientific foundations of social infrastructure, labor potential management and enterprises in general was made by the authors of works [8, 9]. However, most of the works are devoted to approaches based on the principles of analyzing the retrospective development of processes and phenomena and building models of their future development on this basis [10].

Today, for industrial enterprises of Ukraine, the most tangible impact of those phenomena in the external environment and the factors affecting them, which are only formed and form promising trends in the medium and long term [11]. They will determine the main directions of development both for a particular enterprise and for industry as a whole.

In this connection, the models of economic growth proposed by the author of [12], which, along with production factors, consider a special non-competitive production factor – knowledge, are of particular importance. According to the author of the work [12], the economic rates of new technologies, while prices remain unchanged, depend only on the amount of human capital concentrated in the area of obtaining new knowledge. Hence, it is the research (entrepreneurial) sector that acquires the significance of the main factor of economic progress.

In the context of dynamic changes in technology and the economy of production, competition, information technology and management methods, it is necessary to understand the mechanisms for developing and mastering knowledge, as well as the factors that counteract them. According to the author of the work [13], it is precisely the knowledge and competence of the staff that today underlies the development of the organization.

Considered in the process of the study, the trends and specific features of economic growth occur during the period of institutional changes in the economy, largely contribute to the development and humanization of modern forms and methods of managing an organization. The methodological approaches proposed by the author of [14] remain the least highlighted in this regard. According to the developed concept of enterprise development, it is described by the passage of certain cycles caused by the emergence, development in business practice and the spread of radical innovations.

During the rapid development of new production technologies and management, competition, the possibility of achieving the goals of the company significantly affects the innovative potential of the company. The works [15, 16] set forth 14 famous principles for use by the management of companies that convey the essence of a well-known program for managing a corporation in a highly competitive environment, when the success of some generates complex problems for others.

The scientific areas that allow to predict socio-economic processes and phenomena that shape future trends are the foresight, trendwatching, trend-hunting and trendsetting. However, almost all of them consider the activity of the state or, on the contrary, a separate product or brand as an object of forecasting. Thus, today, the question of the theoretical, methodological and scientific foundations of forecasting innovative development at the level of an industrial enterprise, which is based on an approach to the implementation of information on modern trends in the future, remains almost unresolved.

Representatives of different economic schools answered these questions differently. And although there are a lot of answers, all of them were in one way or another «supported» by the basic prerequisites of the two main areas of economic thought of mankind, which in the modern world are called neo-classical and neo-Keynesianism [17].

Noting the presence of the initial basic differences of these economic currents, one can make an assumption about a consistent shift of accents from their consideration as two incompatible currents to the manifestation of tendencies of their convergence in the conditions of the modern social environment.

A retrospective analysis of economic thought shows a permanent process of alternating diametrically opposed views on economic development. From the point of view of modernity, such a vision on the basis of the dialectic of social life and economic thought is completely objective. Within each historical epoch, under the influence of internal contradictions, there was an accumulation of certain quantitative changes, and, as a result, the economic system acquired a new qualitative nuance. The consequence of this was the replacement of the dominant economic theory of another, usually unfriendly with respect to the previous one. And finally, under the action of the law of objections, the economic system moves into a new stage of
development, where the accumulated over time phenomena of unity and struggle of opposites form the accumulation of new changes and the process repeats again and again.

In this case, the authors of this work took responsibility, which is based on the results of research, and put forward a hypothesis about the trend of simultaneous reductions in the time between changes in various economic doctrines (paradigms) and also the alignment of acute angles between them, as a factor of the conical spiral of economic development.

The formation of the presented hypothesis was preceded by a deep analysis of the general historical tendencies of social economic development and associated with one or another stage of development of economic theories.

5. Methods of research

The paper uses the methods of mathematical and applied statistics: in forecasting, processing data obtained by both heuristic methods and using the actual economic and mathematical methods. Thanks to these methods, the results are presented in the next section.

Each of these forecasting methods has its advantages and disadvantages. They complement each other, so are used together.

However, taking into account the practice of the enterprise, the forecasting methods are divided into three conditional groups, which are borrowed from the literature [18]:

1) extrapolation methods;
2) methods of expert assessments;
3) economic modeling methods.

Extrapolation methods are based on the hypothesis of the preservation of existing relationships and their distribution for the forecast period.

Methods of expert assessments suggest a likely development of the system and are based on the use of knowledge and intuition of specialists or experts involved in the study and prediction of an economic phenomenon [19]. The main distinctive feature of this method is that the assessment of the likely values of the indicators is presented in the form of judgments and expert opinions.

Complex economic models are used to clarify the full picture of the dynamics of the activities of enterprises.

Forecasting serves as a link between the market and production, between predicting future economic conditions and finding ways to achieve the intended strategic goal.

Therefore, to ensure a quality strategic forecasting process, the following have been highlighted:

1) clearly understand the purpose of the enterprise;
2) take into account changes in the macro- and micro-environment and try to assess their impact on the activities of the enterprise during a certain period;
3) financial, managerial, personnel policy;
4) form a real, adaptive, business strategic plan, which is adopted at all levels of management.

Forecasting is explicitly or implicitly based on information that is obtained on the basis of primary or secondary information in the context of specific industrial enterprises.

Primary data are obtained from studies specifically conducted to solve a specific problem. Their collection is carried out by observations, measurements, surveys, experimental studies, which are applied only to a part of the general, that is, the general, totality of the investigated objects. This part is known as sampling.

Secondary data are used in conducting the so-called desk research – this is data collected previously from internal and external sources for purposes other than the objectives of the study that is being conducted.

Desk research is the most affordable and cheap method of obtaining information necessary for forecasting. For organizations, this is the primary method of obtaining information.

Internal sources of information are taken accounting, financial, statistical and other reports of the organization, interviews with employees and managers, information systems in electronic offices, computer centers.

External information is obtained by dividing it into officially published, accessible to all and syndicated information. This is the primary information that is obtained through the information and consulting firm.

The forecasting process is carried out in accordance with such approaches:

1) which market for the enterprise is basic and what is its strategic mission in this market;
2) commodity markets form the basic market and the positioning of the enterprise in each of them;
3) attractiveness of markets and the opportunities and risks to them;
4) competitive advantages of the enterprise;
5) choice of development strategy;
6) ensuring the achievement of the chosen strategy through a set of measures.

6. Research results

An important step in forecasting the innovative development of an enterprise is the analysis of its competitiveness.

In the current business environment for the development of the enterprise’s strategy is important the influence of all parameters on the competitiveness of the enterprise, since competitiveness is an important point in the development and functioning of the market in a competitive environment. Achieving a high level of competitiveness for most business entities in general and for specific products, in particular, is a strategic goal of their development.

To increase the competitiveness of products manufactured today, industry and trade should have a unified methodological base. This allows to quickly assess the competitiveness of homogeneous products and the efficiency of operation in a particular market in order to determine a rational development strategy in the face of changes in the competitive environment [20].

The above reasoning allows to conclude that the assessment of competitiveness is an important process. The objectivity and quality of work in this direction is determined by the degree of access to information, its completeness, reliability, qualifications of specialists conducting this work, the depth of customers’ interest in the obtained results.

The lack of a unified system for assessing competitiveness not only makes it difficult to assess the efficiency of production of goods, but also does not allow for the selection of options for improving their competitiveness.

Therefore, one of the most important problems is determination of a system of indicators for assessing competitiveness and justifying the method of their calculation.

In the economic literature there are many approaches to determining the competitiveness of goods.
Thus, one of the approaches is the use of a system of indicators for development trends and competitiveness classes. The latter include:

- indicators of liquidity and solvency;
- market sustainability;
- profitability indicators of financial and economic activity;
- use of organizational and management capacity;
- evaluation of commercial activity;
- competitiveness of goods: the quality of trade services and the like.

That is, it is about the complexity of assessing the competitiveness of an economic entity and its products. For a summary measure, it is proposed to use the formula:

\[ R_0 = \sqrt{A_1^2 + A_2^2 + \ldots + A_n^2}, \]  

where \( R_0 \) – the competitiveness level of products of the investigated market entity and other competitors; \( A_1, A_2, A_n \) – single indicators for assessing the competitiveness of products of the investigated market entity and other competitors.

Another approach proposes to assess the competitiveness of the quality indicators, namely:

- quality of goods, consumer basket, availability of a certificate of quality;
- indicator of the range of goods, as well as quality of service.

Qualitative performance ranges from unsatisfactory to good evaluation. The generalized method of qualimetry is determined on the basis of complex indicators (weighted average arithmetic formula):

\[ QI_a = \sum_{i=1}^{n} m_i g_i, \]  

where \( QI_a \) – an indicator of product quality; \( g_i \) – a complex coefficient of the \( i \)-th property; \( m_i \) – weighting coefficient of the complex indicator.

An interesting idea is that in order to assess competitiveness, it is necessary to determine the internal structure or parameters of its two main factors: economic (mainly the price of a product) and quality.

The qualitative parameters include material and non-material factors.

Material factors describe the most important functions of a product, namely: ergonomic, environmental parameters, reliability, and the like. These parameters reveal the main characteristics of the product and have a certain value, expressed in those or other units.

The main approach to the assessment of material factors is a quantitative approach to determining the importance of a factor for the consumer and a comparative assessment of the presence of this parameter in the product being examined and that of a competitor.

The calculation is made according to the method of weighting factors for the analysis of the importance of the factor and the method of quantitative comparison on the scale of the presence of this parameter in the product. Determining the weight of a parameter is quite a difficult task. It is advisable to entrust its decision to a group of experts who have reliable market information or conduct qualitative research.

The overall beneficial effect is:

\[ U_i = \frac{A_i' \cdot B_i'}{C_i'}, \]  

where \( A_i' \) – weighting coefficient of the parameter \( i \) in product \( j \); \( B_i' \) – comparative coefficient of the presence of the parameter \( i \) in product \( j \).

In the conditions of expanding the market economy, the market is filled with goods with the same material factors, and therefore the importance of non-material factors increases, which make the goods especially attractive.

Aesthetic, innovative, classification and others can be included as intangible. These parameters do not have a physical measure, they are difficult to give a direct quantitative unit, and therefore require the development of a specific methodological base. To build a mathematical model with which it is possible to measure intangible factors, it makes sense to use not their absolute, but their relative assessment.

In this case, the initial basis for the analysis of the competitiveness of goods is determination of a set of factors.

However, the most common and easy to use are the methods for calculating the competitiveness of a sample product (the «ideal product» method); for a group of products; using an expert survey and consumer surveys.

In the first case, the first assessment is given to single indicators of any parameters of the sample and the product of competitors. The determination of the values of these indicators is the basis for calculating the complex, which is the basis of a generalized conclusion on competitiveness.

The latter is determined by the integral indicator. The calculation algorithm is:

- the collective parametric index for various parameters is calculated by the formula:

\[ P = \sum_{i=1}^{n} a_i \cdot q_i, \]  

where \( a_i \) – weighting coefficient; \( q_i \) – relative parameter \((q_i = P_i / P_c, \) where \( P_i, P_c \) – the value of the indicator in accordance with the sample and competitor products\);

- collective parametric index for economic indicators:

\[ q_e = \frac{C_i}{C_c}, \]  

where \( C_i \) and \( C_c \) – costs for sample and competitor products;

- an integral indicator of relative competitiveness is found:

\[ K = \frac{\sum P}{q_e}. \]  

If \( K > 1 \), then the investigated sample is more competitive.

The method for a group of products differs according to the «ideal product» method by the sequence of calculations and the method of presenting intermediate results, and the main difference is the object of comparison.

Understanding the product in this case is the concept of industrial products.
In order to show the research results and the expected result, a SWOT analysis is conducted at state-owned enterprises in Ukraine, among which were:

- PJSC «Dnipro Aggregate Plant»;
- PJSC «Odessa Plant for the Production of Forging and Pressing Machines»;
- PJSC «Dnipro Plant of Metallurgical Equipment»;
- SE «PA Yuzhny Machine-Building Plant named after A. Makarov» (Dnipro), etc.

### 7. SWOT analysis of research results

**Strengths.** The strengths of the investigated enterprises include:

1) all products have a certificate of conformity. This contributes to the creation of a positive image in the eyes of consumers who are accustomed to trust reliable trusted companies;

2) own design department, designs new and modernizes serial models of products. It also contributes to creating a positive image and increasing consumer confidence;

3) expansion of the product sales segment through the best profile companies in the markets. The above companies have a very well-developed dealer network, which allows them to promote products throughout Ukraine. Work is conducted with trusted partners with whom the company has been working for more than one year;

4) active marketing support for the product promotion system. A well-established system of relations with strategic partners allows companies to offer their customers a quality product and a wide range of services;

5) network of warranty service of the manufactured products. It can be solved by the early withdrawal of manufactured products to the world market and the market of Ukraine;

**Weaknesses.** The weaknesses of the investigated enterprises include:

1) significant cost of the technological chain. This problem can be solved by familiarizing and adopting new technologies for collecting and manufacturing products;

2) an insufficient amount of production equipment necessary for the expansion of production. This problem can be solved by concluding cooperation agreements with other state-owned enterprises, or by purchasing equipment for rent;

3) technological difficulties associated with the quick re-equipment;

4) advertising is not well developed. Information about their activities of the enterprise is placed on the Internet, relevant specialized journals and articles of Ukraine. A more effective advertising campaign will be developed in the next section of this paper.

**Opportunities.** The opportunities of the investigated enterprises are as follows:

1) search for new markets (new market segments). This suggests that the above companies are quite authoritative in the global market, and therefore this can be a sufficient argument for entering into new orders and entering into new promising contracts;

2) training of service specialists in centers for the implementation of pre-sale training, warranty and post-warranty service. This will be a good factor for attracting new consumers of enterprises;

3) improving the quality of products. This is very necessary, since today the quality of products is one of the main criteria when purchasing goods;

4) participation and attendance of the largest regional exhibitions (according to the marketing plan). This will contribute to more and more rapid familiarization of the population and, above all, potential consumers with the products manufactured by enterprises.

**Threats.** There are such threats in the investigated enterprises:

1) constant rise in prices for raw materials, components. This problem is caused by the political and economic situation in the country;

2) activation of major competitors and the emergence of new producers on the Ukrainian market. This problem can be solved by the early withdrawal of manufactured products to the world market and the market of Ukraine;

3) significant improvement in the design of components and parts, as well as the quality of competitors’ products. State-owned enterprises should continuously develop and improve, conduct trainings and staff development events to withstand such fierce competition.

### 8. Conclusions

1. The main approaches to the development of enterprises in the context of social and economic issues are investigated. The socio-economic (production) activity of each person in a particular enterprise is determined by the general social standards of the existing social formation, and is considered to be acting regulators in predicting the innovative development of the enterprise. But with the increase in national income, on the basis of profitable activities of industrial enterprises:

   - the standard of living of people rises and their propensity to consume is relatively weaker, while at the same time as saving, it increases;

   - total production increases at a slower pace than total income. This leads to a weakening of the productivity of production and its subsequent reduction. The reduction in production leads to two sad consequences:

   1) economy reaches an equilibrium state in conditions of part-time employment of labor resources and capital;

   2) efficiency of capital investments in production decreases, which is accompanied by a weakening of investment activity. In the structure of labor collectives, their number as a whole corresponds to the Pareto rule (rule 20/80) and is 19.6 % – the leaders, 35.8 % – active performers, 39.2 % – passive performers and 5.4 % – outsiders.

2. To determine the alternative development strategy of the enterprise, the production potential, the attractiveness of products, sales problems, expenses, finances, and personnel potential are identified. In other words, these factors determine the success of the enterprise in the future. These provisions are fundamentally important, since in modern enterprises the development of projects begins with the definition of a strategy under which the corresponding organizational structure and management system is created. On the one hand, the convergence of the positions of the main economic theories is caused by the practice of economic development itself. On the other
hand, it also forms the rules and regulators of this development, which is of a worldwide nature and forms a new era of global development of economic systems. Each of these systems is special in nature, but in the aggregate they act under the influence of a general macro-regulator of adaptive control. This type of management arose as a result of the permanent process of mutual criticism of representatives of the market economic mechanism (the classical direction of economic thought) and the state mechanism (Keynesian direction), as well as their numerous followers. Historically, this process led to an unexpected result: the usefulness of both market and state economic mechanisms was convincingly proved. However, what is missing in one mechanism is sufficiently in the other.

3. The socio-economic component of the enterprise is a subject which production is working for the satisfaction of interests. The economic structure, in turn, combines the interests of the labor community and each employee with the interests of production. At the same time, it translates all values, accomplishments, and expenses into a money equivalent, with which production, collective, social, and even family and personal relationships in the working community are consistent. It also determines the conditions under which the reproduction of capital, fixed and circulating funds, labor. At the same time, topology, structural and schematic organization, functional and technological complex, socio-economic and management education characterizes the enterprise as a structural and functional system. System-wide processes carried out by similar components of an enterprise reflect its socio-economic analogue. Together, the waters demonstrate the dependence and interaction of production with the external environment. One of the reasons for this situation is the excessive «formalization» of methods for solving economic problems, when most often the number of different assumptions and the amount of abstraction contributes to a strong deviation of the forecast from real life.

Thus, in the present horizon of innovative development is the prospects of a new look at forecasting and assessing the risks of industrial enterprises. It is especially necessary as a result of new fundamental changes in the environment, which entail a change in the entire business philosophy. This approach can be used by all enterprises in the region, regardless of their subordination and ownership.

References


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