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**FORECASTING AND ASSESSMENT OF UNCERTAINTY IN THE  
ECONOMIC ACTIVITY OF ENTERPRISES**

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**Abstract**

In public life and practical activities of people, uncertainty is an objective, very important and complex scientific category. This article is one of the first attempts to reveal the essence of the category of economic uncertainty itself and to identify its impact on the final results of industrial, economic and socio-economic activities of enterprises in the region. The scientific and practical significance of uncertainty in the field of economic activity of enterprises is to fully take into account its impact on real processes, as well as to justify in the best way such types, volumes, timing, and other indicators of production and sale of goods and services. Taking into account the market conditions, this can bring the greatest end result with the skillful use of available resources for the enterprise. The study reveals the essence of the category of "uncertainty" in the field of economic activity from a scientific standpoint. A mechanism for reducing the uncertainty in the work of industrial enterprises is proposed. Recommendations for assessing the level of uncertainty and improving the final economic results are given.

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## **1. Introduction**

The essence of forecasting, as well as strategic and tactical planning is to determine the desired future state of the enterprise, individual production processes and systems, economic indicators or other end results and those reasonable decisions that need to be made to bring the whole object or some process out of the existing uncertain situation into a new prospective or planned stable position (Ackoff, 2002). Therein the main principles of economic science lie discovered by the famous English economist of world renown ones – Alfred Marshall (Marshall, 1993).

The mechanism of scientific planning and forecasting is based on the close interaction of the processes of microeconomic research of the current state of the entire enterprise and its interconnected systems and economic and mathematical modeling of the predicted level of development and growth in the upcoming planning period, taking into account the possible impact of a set of all restrictions and market uncertainty in the future (Brazhnikov, 2005). In any planning process, regardless of its type and purpose, usually there are several stages. At the very beginning, there are the development and justification of the general goals of project activities, the definition of strategic and tactical tasks. This is followed by the choice of the most economical ways of their implementation and operational management of the course of production processes. If necessary, adjustments to the timing and scope of work due to organizational and managerial obstacles in achieving the planned indicators are made (Bukhalkov, 2010).

## **2. Problem Statement**

The complexity of modern forecasting and planning lies in the fact that some macroeconomic processes like crises and strikes defy any planning at all (Glukhov et al., 2000). A number of individual microeconomic indicators, to some extent characterizing the current state of the domestic and foreign markets, the activities of competitors, the volumes of supply and demand, do not yet have a high degree of accuracy and reliability. This implies our conclusion that any forecasting and planning in conditions of market uncertainty can only rely on the use of incomplete initial data. This presupposes the need to create a new market system of standards for the expenditure of material, labor and all other rare resources.

## **3. Research Questions**

This study presupposes theoretical substantiation, methodological support and practical application at industrial enterprises of a complex system of scientifically grounded criteria, organizational and managerial mechanisms. It includes planning and economic standards and indicators of reducing the influence of uncertainty and increasing, on this basis, the efficiency of using production resources, primarily labor and capital.

## **4. Purpose of the Study**

The main goal of this study is to scientifically substantiate the system of interaction of the prospective forecasting and the current planning of production processes as a mechanism for reducing the

degree of existing uncertainty in the daily economic activities of industrial enterprises and organizations in the region.

## **5. Research Methods**

The methodology, methods, and technology of long-range forecasting and current planning at the various enterprises in the most general form determine the content, object, subject, and results of all planned activities, taking into account the existing market uncertainty (Kleyner, 2008).

We used two interrelated research methods in studying the economic behavior of producers and consumers: inductive and deductive. The inductive method involves the collection of statistical information or factual data at the enterprises, their subsequent thorough analysis, and the formation of scientific conclusions and recommendations. The deductive method, on the contrary, means the possibility of obtaining new knowledge based on the construction of the theoretical hypotheses, the need for their practical verification and confirmation of the conclusions made. In our work, the inductive and deductive methods have become the basis for the study of real processes at the operating machine-building enterprises in the Volga Federal District and in the Samara Region. They were not opposing, but complementary methods of studying the complex problem of economic uncertainty.

Consequently, modern economic theory and methods of scientific research, primarily analysis and synthesis, induction and deduction, should serve as the foundation for strategic and tactical planning and forecasting, including taking into account the uncertainty of the future development and rise of Russian industrial enterprises. They make it possible to take into account the need for a corresponding change in the planned output of products in a timely manner, for example, depending on the continuous rise in prices for material resources or a fall in demand for goods, works, and services.

## **6. Findings**

### **6.1. Research Results**

In accordance with the goals set in the work, domestic production enterprises operating in the Samara Region, the Volga Federal District, and the Russian Federation was selected as the object of the study. The socio-economic relations existing at various levels of management, forecasting methods, systems of planning, organization, and management of production, mechanisms of interaction of industrial, technical and planning and management functions at the enterprise, final indicators and results of economic activity in the conditions of existing market uncertainty were taken as the main subject of the study.

Joint strategic forecasting and tactical production planning as a purposeful intraeconomic activity make it possible to simultaneously consider a multitude of interrelated political, economic, social, investment, and other problems, taking into account their uncertainty, as a single integral system. In the intraeconomic forecast plan, its individual indicators or groups can be combined into an integrated system of socio-economic development of an enterprise and a region (Tsarev, 2002). The planning of production activities is essentially a synthesis process; the result of the synthesis always becomes a certain predictable system that characterizes the totality of interrelated parts of a single economic complex (Razumov, 1982).

The optimal intraeconomic plan reflects to the fullest extent the basic properties, functions, goals, and objectives of the entire enterprise. Any integral system always possesses properties that are absent in its parts. Therefore, decisions that are not feasible at the planning stage. They can interact with each other in such a way that they will give in the future a really achievable system of planned production and economic indicators of future activities, as famous American scientist Russell Ackoff (1982) claimed in his works.

The common subject of any final activity at the domestic enterprises and organizations of all forms of ownership is the justification and implementation of projects of current and long-range plans and forecasts of their socio-economic development for the short and long term. Let us now consider the main statistical socio-economic indicators of changes in the standard of living of the population in the Samara Region in recent years from the standpoint of their compliance with modern criteria. Table 1 shows the achieved key socio-economic indicators of the growth of the well-being of the region's residents over a five-year period from 2014 to 2018 (Samara Statistical Yearbook, 2019).

**Table 1.** Main indicators of the standard of living of the population in the Samara Region

Name of Indicators	Years				
	2014	2015	2016	2017	2018
1. Average monthly cash income per capita, <i>rubles</i>	26356	27914	26956	27094	28180
2. Growth in real money income, %	102.9	106.1	96.4	100.3	103.6
3. Average monthly nominal salary, <i>rubles</i>	25884	26849	28295	30492	33754
4. Growth in real wages, %	102.4	103.9	105.2	107.6	110.7
5. The average amount of assigned monthly pensions, <i>rubles</i>	10644	11809	12172	13086	13879
6. The average cost of living per person, <i>rubles</i>	7788	8786	9703	9808	9977
7. Population with incomes below the living wage, <i>thousand people</i>	403	428	435	428	418
8. Percentage of the population with incomes below the living wage	12.6	13.3	13.6	13.4	13.1
9. Ratio of pension to wages, %	41.1	44.0	43.0	42.9	41.1
10. Ratio of pension to living wage, %	136.7	134.4	125.4	133.4	139.1

The given indicators of the standard of living of the population of the Samara Region reflect the quantitative and qualitative characteristics of one or the other of the main indicators of the well-being of all residents of the region and the country as a whole: average monthly cash income, growth in real wages, the size of the accrued pension, the size of the living wage, and others. These statistics generally indicate a steady increase with some fluctuations in one direction or the other of all indicators that are approximately at the average Russian level (Tsatsulin et al., 2016). However, a comparative analysis of the main indicators of the Russian and regional living standards of the population with high reliability confirms that all of them, in terms of their absolute values, are at the lower positions than all of Western European countries achieved. In our opinion, this comparison requires a more detailed consideration and analysis with a high degree of certainty of the main social indicators that characterize the standard of living of the population of the region and the country.

Last year, according to the World Bank, Luxembourg occupied the first place in terms of the subsistence level with an indicator of 2344 dollars, which is over 145000 in terms of Russian rubles. Australia, Switzerland, New Zealand, and Monaco take positions from second to fifth. In tenth place there

was Germany with the indicators of, respectively, 1877 dollars, or 116 thousand rubles. The United States in the world ranking in terms of the level of the subsistence level established there took only 17th place – 1257 dollars. However, Russia is in 95th place, as the Russian government recently approved the minimum wage for able-bodied citizens in the amount of 12792 rubles per month according to the new so-called median methodology. Cambodia, Suriname, Belarus and many other countries take positions after Russia.

Consequently, it's necessary now to disseminate at Russian enterprises in all regions on a planned and mandatory basis the certain foreign experience of the steady improvement of production and the growth of its efficiency, the increase in gross domestic product, and the raise to the average European achievements of our low living wage and people's standard of living. This is very important, especially in connection with those uncertain management events due to which the government of the Russian Federation did not implement the Strategy 2020 program. By the end of that period, this program provided for an increase in the worker's wages to \$2700 per month, an increase in the teacher's salary to two average values for the region, a halving of the poverty level, an indexation of the minimum wage of personnel, and an increase in the average pension to three living wages.

Thus, the strategic and tactical plans-projects and targets for the industrial, technical, and organizational and economic development of domestic enterprises and all divisions, developed on the basis of compliance with the principle of certainty, may become in the future the most important direction of their socio-economic activity, both in the short-term and in the long-term period.

## **6.2. The Discussion of the Results**

The main theoretical provisions and practical recommendations of the research were widely discussed at scientific and practical conferences of the international and all-Russian level and approved in the practical activities of machine-building enterprises. The received new materials were reflected in interuniversity collections of scientific works, published in monographs, central journals and textbooks for students of economic specialties of Russian higher education. They were also used in curricula, work programs, and teaching aids during lectures and practical classes at the Faculty of Engineering and Economics at Samara State Technical University.

The confirmation by the advanced practice at Russian and foreign enterprises of the proposition that the functions of long-term and current planning in a market economy as the basis for economic forecasting of an increase in production efficiency put forward by us have to be expanded being the most important result of this study. The top management of all industrial enterprises operating in conditions of uncertain market relations should have long-range and current plans for future production activities and know what types and volumes of work should be performed and what economic results will be achieved, taking into account internal and external constraints (Top-priority tasks of top managers, 2002). In other words, any plan as an economic forecast must be comprehensively substantiated with scientific and practical requirements (Thompson & Strickland, 2000). The experience of domestic enterprises proves the need for scientific methods of market planning and forecasting at present now (Bukhalkov, 2010), and foreign long-term practice as a criterion of truth proves such a possibility of making economic forecasts in real-life conditions (Vorst & Reventlow, 1994).

The article reveals the scientific essence of the category of “uncertainty” from a broad planning and economic position as the degree of probable deviation of expected, predicted, or planned indicators from a given criterion of economic development, as well as from the established main goal of production activities for the corresponding short or long term. Its significant negative impact on the achievement of high final results of industrial and economic activities at the enterprises was revealed. The practical necessity and theoretical possibility of observing the principles of certainty, progressiveness, and optimality in the process of developing of strategic and operative plans-forecasts at the industrial enterprises was proved.

As it was established in the study, the principle of certainty in planning and forecasting of the processes includes not only the development of plans and production targets, but also their mandatory implementation, which means the need for appropriate control over the course of their implementation. In the domestic economic literature and economic activity, the problem of assessing the quality of drawing up and implementing plans has been raised repeatedly. However, all attempts to develop criteria for the quality of plans have always rested on the issue of differentiating the indicators of the quality of the development of plans and the final indicators of the activities of the executors of the corresponding plans (Syroezhin, 1986). Our research has confirmed that in market conditions the quality of all plans and forecasts can be assessed with a high degree of certainty by harmonizing and meeting the interests of consumers.

In the conditions of market uncertainty, we proposed a system of relative indicators characterizing the degree of deviation of actual indicators from their planned values. According to the calculated numerical indicators, it is possible with sufficient accuracy for practice to assess the level of reality and intensity of plans, the degree of their validity and progressiveness, as well as certainty and optimality (Bukhalkov, 2010). We propose calculating the corresponding indicators, for example, the coefficient of tension or progressiveness, on the basis of the ratio of the established planned and existing normative (progressive) indicators according to the following formula:

$$K_t = A_{pl} / A_r, \quad (1)$$

where  $K_t$  – coefficient of relative tension (progressiveness) of plans, %;

$A_{pl}$  – planned (actual) indicator, *units*;

$A_r$  – reference (standard) indicator, *units*.

When assessing the quality of drawing up or implementing certain sections of plans, the greatest difficulty lies in the choice of objective (reference) norms or standards, which should become a criterion of equal tension, progressiveness, or an acceptable degree of certainty of plans. The magnitude of the deviation of the actual (planned) indicators from the reference (normative) ones will indicate the level of uncertainty of the plans-forecasts. These are the greater the relative deviation, the lower the degree of accuracy and certainty of the forecasted plans and, accordingly, the higher the level of uncertainty in the results of the final economic activity.

In the article, the complex issues of improving the strategic forecasting and tactical production planning as an important mechanism for reducing the uncertainty and a corresponding relative increase in the level of certainty of the results of economic activity at the industrial enterprises in the region were considered from scientific and practical positions. The theoretical hypothesis put forward by us in the study received the practical confirmation about the predominant importance of the principle of certainty in improving all types of planning and forecasting of economic activity at Russian enterprises.

Some actual problems of market planning and forecasting have not yet been considered in this study. This concerns, first of all, assessing the quality indicators of plans, substantiating the progressive reference standards for future plans-forecasts, establishing the optimal production rates for workers and teaching load standards for teachers. In Soviet higher education, for example, there were different norms of educational work for teachers of political economy and concrete economics. The teachers of political economy as faithful guides of the party line of the life had a preferential load rate of 550 hours per year, while the ordinary teachers-economists had a load rate of 720 hours per year for the same money. Therefore, now further improvement of the regulatory framework for planning in a market economy and the development of methods for the engineering of predicted indicators is required. Such complex practical problems as ensuring reality, progressiveness, equal intensity, and optimality of planning tasks for different categories of workers are also in need of continuation of scientific research and deep theoretical substantiation.

## 7. Conclusion

The developed scientific provisions, economic systems, organizational mechanisms, and methodological recommendations have been practically tested in production and are acknowledged by Russian science and the public. The recognition of the research results by economic science and higher education was expressed in the fact that the main theoretical conclusions and methodological provisions were widely reflected in the materials of scientific and practical conferences at various levels. It was noticed in interuniversity collections of scientific papers, as well as in published peer-reviewed monographs and textbooks for students of economic specialties of higher education.

The obtained scientific and practical results of the research can serve as a basis for further improvement of the theory and practice of strategic planning and operational forecasting of economic activity in conditions of market uncertainty. The application of the developed methodological recommendations in production will contribute to the growth of socio-economic results and an increase in the standard of living and the well-being of all workers.

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