MANAGING THE DEVELOPMENT OF MICROECONOMIC SYSTEMS IN THE FACE OF GLOBAL CHALLENGES

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Abstract: The study is aimed at improving methodological approaches and methodological tools for studying the functioning and development of microeconomic systems in historical retrospect and in today's post-industrial economy. A system of factors is highlighted, providing conditions are substantiated, and mechanisms for managing microeconomic systems in the face of global changes in the external environment are proposed, based on compliance with paradigm changes, global challenges, global trends in technological development, promising and critical technologies at the national level, priorities and development goals.

Keywords: Actors, Economic system, Microeconomics, Paradigm, Technology.

1 Introduction

The question of the transformation of economic systems has deep foundations in the problems of general economic theory. The problems of formation, development, change of economic systems are directly related to it, and they have been studied in the works of many scientists for a long period of time. A particularly keen interest in the problem of transformation of economic systems has arisen recently. It is caused to a large extent by the strengthening of the interconnection of national economies, the acceleration of their integration into the world economy, an increase in the number of factors influencing the process of the functioning of the economic system and its changes.

It is known that microeconomics studies the observed patterns of interaction of economic agents, the exchange of goods and services. Management of microeconomic systems is possible only at the macro level, by changing certain conditions common to all elementary economic agents.

The spread of digital technologies for a long period determines the trajectories of economic and social development and has more than once led to dramatic changes in people's lives. The formation of the digital economy is one of the priority areas for most countries – economic leaders, including the USA, Great Britain, Germany, Japan, etc. As a rule, they are characterized by a long period of implementation of the "digital development agenda" and the succession of priorities – from building a basic information and communication infrastructure to the formation of a coordinated policy in this area and programs to support the widespread adoption of digital technologies [38].

In recent years, another wave of transformation of business and social models of activity has been unfolding, caused by the emergence of new generation of digital technologies, which, due to the scale and depth of their influence, have received the name "end-to-end" – artificial intelligence, robotics, the Internet of things, wireless communication technologies, and a number of others. Their implementation, according to estimates, can increase labor productivity in companies by 40% [22]. In the near future, namely the effective use of new digital technologies will determine the international competitiveness of both individual companies and entire countries that form the infrastructure and legal environment for digitalization [30].

Today, at a new stage in the development of digital technologies, one of the main challenges is the exponential growth of the quantity, quality, and variety of relationships between organizations, citizens and socio-economic systems, accompanied by a leaping dynamics in the number of transactions and the volume of data circulating and leading to more complex and synchronized integration "all with all", the consequences of which are not yet fully understood. Such transformations will require new skills and competencies from people, a willingness to use new technologies in everyday life. Of particular importance is the formation of educational programs that meet global trends, and personalized learning paths that can provide "digital literacy" [62].

The economic system can be viewed as a formal socio-economic structure organizing the production of goods (services) in demand in the external environment, in accordance with a long-term strategy and using internal and external resources - labor, capital, technology. This definition allows one to study all economic systems (macro-, meso- and micro-) in different historical periods, including today in the context of global challenges, on the basis of a unified systematic approach.

2 Materials and Methods

Microeconomics belongs to the category of empirical sciences, which, according to a number of researchers, puts it on a par with such natural science disciplines as physics. This characteristic is intended to highlight the fact that the task of microeconomic theory is to explain the phenomena and processes observed in the real economy [53]. The solution to this problem is associated with the development of a set of models that allow describing the functioning of both individual parts of the economic system and the system as a whole. Each of the models begins with the formulation of certain hypotheses (axioms), the reality of which cannot be established on the basis of simple comparison with facts [1,2]. Based on these hypotheses, the researcher gets the opportunity, using the deductive method, to logically (mathematically) obtain conclusions regarding the dependencies that exist between individual parameters that appear on the surface of economic life and, therefore, lend themselves to experimental verification. As long as the conclusions from the accepted hypotheses do not contradict the observed facts, these hypotheses themselves are recognized as reliable. At the same time, this approach does not exclude the possibility that sooner or later information about the real economy may be obtained that contradicts the initial assumptions. It is no coincidence that this research method is called the "method of refutable hypotheses" [9].

Let us consider the features of the application of this method using the example of a consumer choice model. The parameters of this model are consumer money income and market prices for consumer goods. The task is to identify functional relationships between the values of these parameters and the demand for individual consumer goods [5, 6, 8]. A rigorous solution to this problem became possible thanks to the Pareto' introduction of the following hypotheses regarding individual preferences: their asymmetry and negative transitivity, continuity, local unsaturation and convexity. In general, the conclusions obtained using the consumer choice model are confirmed by the observed changes in income and prices, on the one hand, and the demand for consumer goods, on the other. Accordingly, the aforementioned axioms regarding the characteristics of human preferences can be considered reliable.

At the same time, the concentration of attention on the analysis of functional dependencies that appear on the surface of economic life, and the related attitude to economic theory as an empirical, descriptive science, create serious methodological problems [10-12, 14]. It turns out that with this approach, the researcher inevitably falls into circles of tautological reasoning, when he has to explain some unknown phenomena through others, also unknown. Indeed, microeconomic theory usually begins with the consumer choice model mentioned above. However, the formulation of this model is based on concepts such as prices and monetary incomes, the origin and nature of which has not been previously said. The same situation repeats itself in the transition to a model that describes the behavior of the firm [19, 20]. The challenge here is to find the scale of output

that will maximize economic profit. Once again, we have to determine costs through non-derived prices, that is, fall into an obvious tautology. The concept of opportunity cost of the capital used, used to solve the problem, in turn, in a “smuggling” way, introduces into the analysis the interest rate, about which nothing is known at this time [3].

Classical microeconomics strictly adheres to the principle that there is no possibility of interpersonal comparison of welfare levels. This is partly due to the fact that money income is not a universal measure of individual utility, because a person's well-being is associated not only with the degree of satisfaction of his own consumer needs. In addition, the tastes of people are highly individual, and, therefore, there is no reason to assert that the same level of income will provide the same “level of happiness” for two different people [4]. This is all the more so relevant for the current era of “karaoke-capitalism”.

The most important principle on which modern microeconomic theory is based is the principle of methodological individualism. It means that the behavior of various groups of people – from the household to the world community – is ultimately determined by the preferences of the members of the respective groups [23-29]. In other words, the so-called holistic approach is rejected, which presupposes that social groups have their own systems of preferences that are not derived from the preferences of their constituent individuals.

The principle of methodological individualism in itself does not exclude the fact that the individual utility functions of group members can include, as independent variables, not only the amount of goods and services they consume, but also the level of well-being of other members of the group. In other words, this principle does not prohibit the existence of an “altruistic component” in the functions of individual welfare [31-34]. At the same time, it should be emphasized that the traditionally favorite character of microeconomics is the “economic man” f Adam Smith. As it is known, the state of the surrounding world (for example, the differentiation of income of members of society, the level of poverty, etc.) does not in any way affect the level of well-being of such an individual; according to Smith, but only the amount of consumer goods and services available to him matters.

Pointing to the derivation of social phenomena from the individual aspirations of members of the respective groups, the mainstream does not imply an unambiguous answer to the question of how exactly the individual preferences of people are transformed into collective decisions [36, 37, 39]. The famous “possibility theorem” by K. Arrow leads to an amazing conclusion. Given a number of assumptions about the characteristics of group decisions – very logical from the general point of view of the mainstream - there cannot be a rule of social choice that is not based on dictate that ensures the transition from individual preferences of group members to preferences of the group as a whole [18]. The rejection of the previously almost obvious thesis that social groups have their own systems of preferences has far-reaching consequences for the whole of economic theory. In microeconomics, it is actually “laying the bomb” under the theory of demand, which is most important to it [35]. The latter is known to be based on the assumption that demand comes from individual consumers with their own preference systems. But in the consumer market, households, which are one of the most important social groups, are much more likely to act as buyers [35].

Attention should be paid also to the question of how the issues of dynamics (development) of the economic system are reflected in the microeconomic theory. Generally speaking, the advancement of the analysis of the functional dependences observed on the surface has led to the fact that the method of comparative statics has acquired a special role here [41-49]. Thanks to the latter, it is possible to find out the direction of the instantaneous change in the dependent variable (for example, the amount of the good for which the demand is presented) with an infinitely small increment of one of the arguments (the price of the good or the consumer's income) of the function under study. The results obtained on the basis of the application of this method, of course, have some relation to the characterization of changes in economic indicators, but they do not allow describing the state of the object under study at different points in time.

Microeconomic theory is based on the hypothesis that each economic agent has an objective function, which he seeks to maximize. For example, the function of individual demand is derived from the consumer's desire to ensure the highest level of his own well-being.

However, in the current conditions of exceptional dynamics and instability of the external environment, as well as the transformation of the behavior of actors in accordance with institutional changes, it becomes necessary to revise the methodological approaches to the study and management of microeconomic systems. Now the main thing has become obvious: since the spontaneous market economy has developed the corresponding type of person – “Homo Economicus”, thus the post-industrial society increasingly corresponds to its own form of sociality – free individuality [54].

Despite the urgency of this problem and a fairly wide range of works carried out in this area, to date, an integral theoretical concept has not yet been formed. The systematic analysis of the patterns of transformation processes has not yet been completed, there are discussions regarding the nature, vector, and models of transformation. However, a qualitative breakthrough in understanding the world around us is associated with the development of a new paradigm, a system of ideas and representations that can resolve contradictions that have arisen in science, provide explanations for the accumulated empirical material and open the way to deepening knowledge. At the same time, when developing a new paradigm of economic science, one cannot ignore the deep and qualitatively different contradictions of the new phase of human civilization.

3 Results and Discussion

The basic methodological paradigm underlying modern social development, including economic development, is the theory of post-industrial society. The concept of a post-industrial society was developed in the works of many famous researchers: Brzezinski, Galbraith, Daisard, Castells, Katz, McLuhan, Masuda, Martin, Porat, Stonier, Toffler, Touraine, Bell, and others. In Eastern science, this direction is represented by the works of Dyatlova, Ivanova, Inozemtseva, Moiseeva, Rakitova, Abdeeva, and others. Its origin is associated with the need for the periodization of the development of society, not only on the basis of class or civilizational changes, but also on the basis of the development of technological forces. Since the 18th century, radical social transformations have increasingly become the results not of socio-cultural evolution but of a scientific and technological revolution, and this trend has only intensified since the beginning of the 20th century [17, 55, 59]. The subsequent formation of the concept of a post-industrial society was the result of understanding the need to include technological factors that have a global impact on the political and social structures of society in the fundamental characteristic of social development. As a result, the periodization of social development on the basis of the technological component of production relations, which leads to profound shifts in social systems, becomes the first methodological principle of the theory.

The nature of the development of the system is reflected by the fundamental and market indicators. Fundamental indicators determine the basis, the main characteristics of economic systems and actually indicate at what stage of evolution the economy is [56-58]. For example, stable development is possible if the economic system does not lag behind in such fundamental indicators as the development of technologies, the speed of processing and transmitting information, the state of labor resources, including social aspects, property relations, legal, social and other institutions. Market indicators determine the degree of influence on the external environment and the ability of the system to realize its potential [60, 61]. These indicators

are revealed by comparing the system under consideration with similar systems (benchmarking).

History proves the validity of the hypothesis of the evolution of economic systems and development factors: the agricultural, natural economy based on non-economic coercion is being replaced by an industrial, market economy based on the power of capital, gradually changing as the genesis of late- and post-industrial technologies, the development of mechanisms for conscious market regulation, socialization of capital, etc [63-65]. Moreover, there is a synchronous evolution of macro- and microeconomic systems. Their development is based on general parameters: productive forces, property relations, forced labor. Therefore, for all systems at each stage of development, one can find own key factors of economic development [15]. The determining factors of stable development, applicable for different types of economic systems, are conventionally classified according to the signs of interaction with the external environment into external and internal.

External factors are the economic efficiency of interaction with the external environment, reflecting the ability of the system to create goods and services that are in demand in the external environment with an acceptable ratio of the cost of the product produced, on the one hand, and the cost of attracting resources (increasing the competitiveness of products), on the other [66-67]. At the macro level, price competitiveness is largely determined by the ratio of the real and nominal exchange rates of the national currency. At the enterprise level, the analogy looks even simpler: an increase in the price of a product relative to the prices of competing manufacturers decreases effective demand (all other things being equal).

In turn, internal factors are the organization of production within the economic system, determined by the structure, flexibility of interaction between the elements of the system, management efficiency and the use of modern technologies (increasing labor productivity).

The listed development factors are inherent in all economic systems at all times, although their constituent elements have changed significantly over time. Over a long historical period of time, traditional extensive development factors associated with the involvement of additional resources prevailed - the territory of the state and available natural resources, population, later capital was added to them [13].

In the industrial economy, the factors of development of economic systems were based on the concentration of industrial capital, the efficient use of material factors and means of production, such as production assets and technologies (including mass production with minimal costs due to economies of scale, vertical integration, rigid organizational structure and division functional duties, labor exploitation), gaining market share due to price competition and power over the consumer (market segmentation and setting own standards in each segment, striving to maximize the profit and value of companies, advertising of manufacturing companies) [68]. The incentive for development was profit in the narrow sense, i.e., financial result prevailed, and external effects were not taken into account. Namely this period was associated with the accumulation of capital, redistribution of property, and a predatory attitude towards natural resources.

In the modern economy, intensive development factors prevail, associated with the achievements of scientific and technological progress, flexible production, new forms of management, the focus of business on the interests of customers, and respect for employees as carriers of business knowledge and competencies. Welfare becomes the goal of economic systems' activity: at the macro level it is wealth, improving the quality of life, improving the health of the population, and preserving the environment [38]. At the micro level, this is not only financial profit, but also social goals - from public opinion about the company's products to caring for the environment, i.e., in modern economic systems, economic activity is associated with both maximizing the value of the system itself, and with positive externalities that contribute to the development of other larger systems.

An assessment of the development potential of the economic system can be made on the basis of a model built according to two indicators – human capital and innovation and investment activity. Parameter estimation is based on two components - potential and efficiency of its use. The human capital index can be calculated as follows: the share of people with higher education is multiplied by the share of workers working in their specialty, i.e., it is assumed that the potential is education, and the actual employment in the specialty determines the efficiency of the use of intellectual resources. It is important that intellectual resources and human capital are formed within the economic system, and not be attracted from outside. The human capital index is a very conditional indicator (used in the UN), but it is convenient in its relatively simple calculation for economic systems of various levels. The innovation and investment activity index is calculated as follows: the share of R&D and innovation expenditures in total expenditures is multiplied by the share of innovative products in gross output. This indicator is also easy to determine both for companies and for the state.

If the system has a low human capital and low indicators of innovation and investment activity, then it is “doomed” in the sense that for development it is necessary to carry out fundamental reforms. If the system is characterized by high indicators of human potential, but low innovations, then we can talk about a good educational base and the need to change the business climate to increase investment attractiveness.

The opposite situation is also possible. With high innovations and a good investment climate, the educational system turns out to be insufficiently effective, and in this case it is necessary to import human capital, which is what happens in the United States. As to Eastern Europe and Russia, there is also an imbalance in the labor market: many people prefer to receive education in the field of economics, management, law, i.e., in the most paid spheres of activity until recently. The lack of specialists in technical and engineering fields can become a brake on innovative development. We would like to note that the assessment of the potential of modern economic systems is oriented towards the future. That is why two factors of future development are initially distinguished – innovation and human capital.

New factors of development are created by objective changes taking place in all spheres of social life. In the modern world, one can distinguish processes that, due to their universality, have a decisive impact on all economic systems. They form the fundamental factors in the development of economic systems. The main trends that have the greatest impact on economic systems are the following [16, 21, 30]:

- The processes of globalization and toughening of competition, including the wide spread of democracy and market relations;
- Acceleration of changes (acceleration of innovation and reduction of the life cycle of goods and services, the emergence of new technologies);
- Information breakthrough (development of information and communication technologies, simplification of access to information networks);
- The growing importance of intangible production resources (development of human capital, socialization of economic and managerial relations).

Consequently, economic systems capable of finding adequate answers to the challenges of modern economic reality can develop steadily. We can say that the factors of sustainable development are management mechanisms that use fundamental challenges to strengthen their own system and achieve high internal efficiency.

Among the factors of the stable development of microeconomic systems that contribute to maximizing opportunities in the context of globalization, toughening competition and

accelerating changes, we can single out the following: a flexible strategy; the optimal combination of specialization and diversification, supported by a set of business competencies; combining companies for a synergistic effect; creation of new products and markets by anticipating needs; search for best management practices (benchmarking); partnerships with suppliers and customers; a departure from vertical integration to horizontal links [40, 50].

One should note the increasing role of intangible resources and information technologies that can stimulate development if the system has a flexible organizational structure, optimized for strategic objectives; innovation is focused on priority areas and continuous product improvement; management is built on the knowledge and development of the human capital system, employees are motivated for the company's success, and economic activity is socialized. In such circumstances, a self-learning organization is formed; information, communication and other modern technologies are widely used; the culture and values of the organization are formed that are receptive to change. If economic systems ignore modern challenges, then they will not be able to develop steadily and, most likely, they will be ruined or absorbed by competitors. These ideas are confirmed by the well-known representatives of the modern concept of management, R. Kaplan and D. Norton, who noted that while in the early 1980s tangible assets accounted for more than 60% of the market value of enterprises, by the end of the 20th century they amounted to less than 30% [7]. Accordingly, in a modern economy, when intangible assets have become the main source of competitive advantage, new management tools are needed. Another founder of management, P. Drucker, notes that within the microeconomic system, there are only two types of key resources – knowledge and skilled people in the areas of management, buying, selling, technology, and money. These resources provide the best business value and are quickly manageable [38].

The spread of systemic research methods and the creation of cybernetics were accompanied by the development of economic and mathematical modeling. In economics, micro and macromodeling is beginning to play the most important role. The preconditions for the emergence of microeconomic research were formed in the second half of the 19th century, when in economic science much attention was paid to the psychological factor. The Austrian school of marginal utility began to consider the autonomous individual, almost completely independent of the surrounding world, as the starting point of economic science. The main task of its activities is to meet the needs in conditions of organic resources. The behavior of an individual was considered in various hypothetical situations in order to choose the optimal option (A. Marshall's theory of choice). This assumes almost complete interchangeability of factors of labor, capital, energy resources, etc. As a result, political economy was replaced by pure economic theory. With this approach, economic science acts as a collection of algorithms for the behavior of an individual or a firm in standard situations.

However, today's new paradigm is a consequence of ontological and epistemological premises and will be built from the elements formed in the course of the development of economic theory. The key role in understanding modern problems is played by the creation of a fundamentally new theory of economic and technological development, its value criteria and indicators. Traditional views based on the resource terms of growth and measuring it by incremental values of production, income, output, etc., have largely exhausted themselves. In the near future, economic growth in this form will become impossible and even unnecessary. A qualitative transformation of the structure and mechanism of social reproduction requires rethinking the system of factors and sources of economic and technological development. The traditional scheme: labor, land and capital – even with the mechanical addition of science and information to it – is no longer able to explain the changes that have taken place, let alone the coming changes.

4 Conclusion

The very globalization of the world economy creates new competitive conditions for the activities of economic entities, objectively affecting all levels and spheres of their interaction with the environment. In this regard, the search for optimal approaches to the management of microeconomic systems, which are becoming increasingly more complicated in the post-industrial digital economy, becomes relevant.

Every entrepreneur and business representative understands that the interests of the city as a whole coincide with his personal interests, that regional interests as a whole create an area for each individual manufacturer and resident of the region to benefit. The motivation for complex development appears, which depends on the favorable conditions created for the efficient functioning of production and the improvement of people's lives. Moreover, the stability of the process of development and functioning of the system is achieved by balancing not all of its elements, but the main, pivotal ones that determine the efficiency of the functioning of the regional economy and improve the quality of life. Therefore, the ideas of coopetition and sustainable development are increasingly being introduced into the field of microeconomic systems, which should be taken into account for the competent management of these systems.

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Primary Paper Section: A

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