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TRANSFORMATION OF THE INDUSTRY MARKETS STRUCTURE IN CONDITIONS OF THE ECONOMY DIGITALIZATION

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Abstract. The article examines the impact of digitalization on the industry markets structure, which is revealed based on the "structure-actions-result" paradigm. The authors drew attention to such issues as: the main vectors of influence of the digital technologies development on the basic conditions for the formation of industry markets; the transformation of the markets structural parameters as a result of changes in the forms and models of business agents' interactions; the formation of new tools for the behavior of business entities, as well as the regulatory role of the state to achieve the efficiency of industry markets.

Keywords: digitalization, "structure-behavior-result" paradigm, basic conditions for the development of industry markets, behavior of market subjects, government regulation.

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ТРАНСФОРМАЦИЯ СТРУКТУРЫ ОТРАСЛЕВЫХ РЫНКОВ В УСЛОВИЯХ ЦИФРОВИЗАЦИИ ЭКОНОМИКИ

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Аннотация. Рассмотрено влияние цифровизации на структуру отраслевых рынков, которое раскрывается на основе парадигмы «структура-поведение-результат». Указаны основные векторы воздействия цифровых технологий на базовые условия формирования отраслевых рынков, трансформацию их структурных параметров вследствие изменения форм и моделей взаимодействий бизнес-агентов, формирование нового инструментария поведения хозяйствующих субъектов, а также показана регулирующая роль государства в достижении эффективности исследуемых рынков.

Ключевые слова: цифровизация, парадигма «структура-поведение-результат», базовые условия развития отраслевых рынков, поведение рыночных субъектов, государственное регулирование.

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Introduction. Economic activity is carried out simultaneously by various entities pursuing specific, sometimes antagonistic goals. They realize their interests through various means and methods. Different economic activities result in certain economic events. Experience of human research shows that a great number of "chains" of consistently occurring linked economic events, which in science are called "economic instruments," that objectively exist and interrelate with each other. Acting at the same time, conditioning and mutually completing each other, the entire set of economic mechanisms represents a system with all its legitimacy (correctness, hierarchy, communication, etc.) [1, 2]. To determine the mechanisms that influence the vectors of industry development, the nature and interdependence of this influence, it is necessary to justify the choice of conceptual approaches to research that will allow assessing the effectiveness of their impact on changes in the structure of industry markets.

The concept of the industry and its boundaries are very vague. Even if you use official statistics, it is impossible to establish a sufficiently complete identity of the compared objects, called industries. Apparently, we can talk about identifying large formations of firms that have a number of identical parameters. They include a comparable range of products, the same types of product distribution channels, the same degree of vertical integration, an identical type of customers, similar sets of properties of the proposed product, dependence on the use of the same technical means, etc.

Markets combine commodities that are close substitutions from the point of view of their consumers. Conversely, industries combine goods, creating closer substitutes in production, more precisely "from the supplier's point of view" and, accordingly, producers of these commodities. Market, if such a term is appropriate, is "greater" than industry, since it includes not only producers (sellers) of precise substitutes and consumers of related substitutes (according to demand), but also their consumers. Nevertheless, industry usually is "wider than the market". Any sector of the economy supplies several markets with known (often non-overlapping) requirements. To analyze prices and release of a particular product, it is convenient to investigate the market for this commodity, and to realize the possibilities of entry or conditions for entering it, it is convenient to investigate the industry. The potential entrant manufacturer is likely to be in the same industry (albeit serving a different market), which is also likely to be home to firms leaving that market to serve another. Thus, from the point of view presented in this method, it is also important to determine the links between the concepts of market and industry [1].

Materials and methods. "When we use the term "market," wrote E. Mason, we mean Marshallian industry; that is, a qualifying industry that approximately satisfies product and spatial requirements" [1]. As a crucial argument, these are the words of the English economist F. Andrews: "Governments tend to conduct business in terms of industries, businessmen base their considerations on industry conditions and our official statisticians continue to collect data based on the definition of industries, which, although they vary from source to source, remain nevertheless consistent in the main". Thus, the sectorial approach to the analysis of markets had the advantage for American economists because it allowed them (and now allows them) to rely on in applied research based on materials from industrial censuses that have long been and is properly carried out in the United States [1]. In practice, in the works of J. Tirole, F. Edrus, R. Schmalenzi, the concept of market and industry became synonymous. J. Tirole, for example, in the introduction to his book "Markets and Market Power: The Theory of Industrial Organization," discussing the boundaries of markets and their "correct" definition, does not mention the boundaries of industries at all. Sometimes he uses the phrase "market organization" as equivalent to "industrial organization". Such vagueness of industry boundaries determines the use of the conceptual link "market-industry" or "industry-market"

in the research process; the emphasis should be on studying the presence, specificity and nature of intra-industry and inter-industry connections.

Edward S. Mason and J. Bain (Harvard) proposed basic models of the industrial market structures theory in the 30s of the 20th centuries [1]. They were subsequently used by many scientific schools. It was Mason and Bain who formulated the "structure – actions – result" paradigm, which determined the methodology of the industrial market structures theory for a long time. This structural paradigm assumes a cause-and-effect relationship between market structure, firms' behavior and effectiveness of operation (Fig. 1).

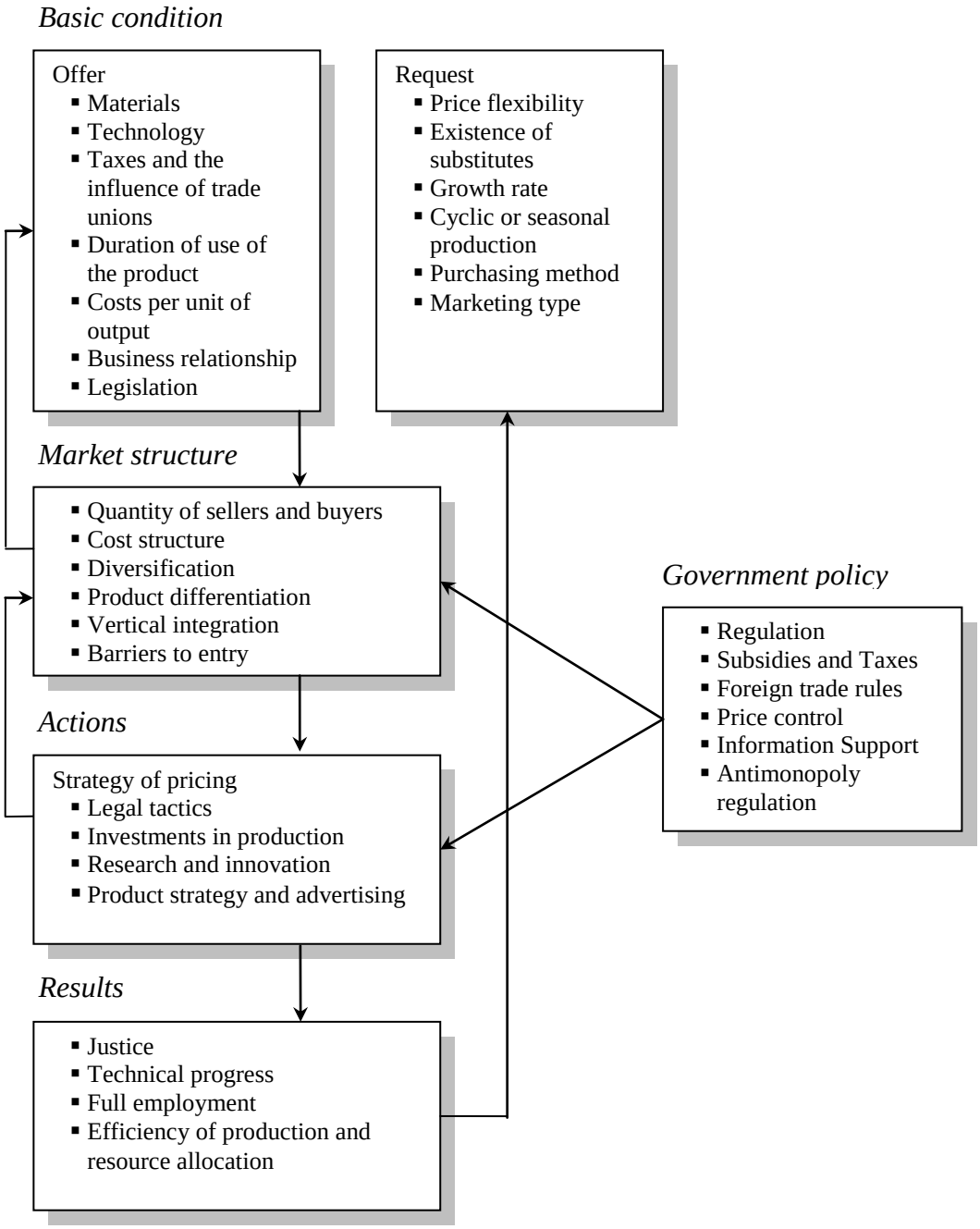

Figure 1. Paradigm "Structure – actions – result" [2]

As any theoretical structure, it is distinguished by a certain conventionality and schematism, and does not completely describe the existing factors of the operation of sectoral systems. Although, it is considered that its use is possible for the analysis of individual markets, industries and different sectors of the economy, because it offers a convenient and logical scheme of analysis that is effectively usable in the context of the digital conversion of the economy and our society in in total.

The main part in determination of the type of market and the features of an organization's behavior belongs to the basic conditions of the industry and production markets, which are characterized by the parameters of supply and demand. According to F. Scherer and D. Ross, the basic characteristics of the demand are "...price elasticity of demand at different prices, availability of substitute commodities and cross-elasticity for them, growth rates and temporary fluctuations of demand, method of purchasing by customers (for example, according to a given price list, by closed auction or by open tender) and the market characteristics of the product (for example, expensive, prestige commodities, cheap everyday household items or large durable goods)" [2].

The enumeration of such characteristics also includes the rate of population growth, which, given elasticity, provides the potential volume of demand, the place and concentration of consumers, determining the geographical frontiers and density of the market. One should remember that demand parameters are not constant. Buyers' preferences, tastes, habits, and purchasing methods can be changed quite quickly. As a whole, the fundamental conditions of the market of the demand are determined by the inventive attitude of buyers to the offered product. Of course, with the development of digital technologies, the geographical frontiers of markets are blurred on the demand side, while the degree of diffusion of innovations increases significantly.

The system properties that characterize the relation of the industry with the external environment and determine the ability of industry for sustainable development are:

– the degree of independence of the industry;

– the interdependence of the industry and the external environment;

– the compatibility of the industry with other systems of the external environment (macro and microenvironment, infrastructure);

– the openness of the industry [3].

The system properties characterizing the level of industry development determine continuity of industry development, alternative ways of industry development, synergy of the industry as a system, the ability of industry to adapt to changing environmental conditions, innovative nature of industry development, level of standardization of industry functioning processes, the degree of their inertance [3, 4].

The different combination of production environment, production factors, nature of meeting needs with the results of the national economy sectors production does not allow assessing the degree of sustainability of a particular industry development of using a single methodology. The attempt to formulate changes was used in the most general strategic trends in economic development of industries in the context of digital transformation and the transition to sustainable development in the concept of the "Structure – actions – result" paradigm.

Table 1. Comparative characteristics of development and sustainability of industry development

Directions	Development	Sustainability of development
Basic conditions for the industry functioning	Legal and social system dynamic balance. Availability of a sustainable supply of materials and basic technologies	Social partnership. Availability of technologies reducing the consumption of materials per unit of final product
	Increasing production volumes satisfy increasing request through pricing policies and the supply of substitute goods in the cyclical (seasonal) production	Satisfaction of the growing demand on the bases of the principles of social and ethical marketing with a diversity of offered items, services and forms of consumption, applying secondary and renewable resources in a flexible pricing policy
Structure of industry	Availability of a sufficient number of competing sellers and buyers providing products of a sufficient degree of diversity, in conditions of predominantly vertical integration while maintaining barriers and cost structures at going into the industry	Availability of a large number of suppliers and consumers with open access to international resources. Alignment of levels and number of entry barriers, proximity of volumes and structure of industry costs, prevailing horizontal (network) integration
Reactions of industry	Competition of product price taking into account the quality of products and services. Locality of flexibility and innovations. The desire to absorb and/or eliminate competitors. Production integration. Aggressive advertising	Competition in quality and consumer properties with a flexible pricing policy and reduced lead-time. Community participation in the distribution of results. Increasing the pace of cooperation and integration processes
Results of industry functioning	Regulated minimum distribution of results. Sufficient employment to maintain living standards. Production efficiency is sufficient to ensure the reproductive process. Technological update	Qualified employees. A harmonious combination of the individual and society interests when consuming the results. The production result is balanced on the reproductive, technological and life processes with minimal damage to the environment and maximum involvement of renewable resources
Government policy	Numerous taxes, limited price regulation, monopoly restrictions. Support for individual and corporate entrepreneurship, regional autonomy and legal regulation of relations between subjects, egocentric federalism	Harmonized taxes, modern government regulation, unified rules for relations with business, active information and marketing support. Support for integrated structures, cooperation between government and business, networked organizational innovations, including collective stimulation of infrastructural development

Results. From the supply side basic conditions include location and ownership of major materials; nature of the technology; involvement of employees in trade unions and other types of professional industry movements, duration of the product used in its life cycle, time characteristics of production; costs per unit of output, the nature of business relationships and the state of the legal system. General conditions from the suppliers are variable and relatively independent as they are based on factors such as materials and production technology. Although, they can also be more or less sustainable depending on the specifics of the market (industry) and the speed of its technical progress. Technology, location of sellers, costs of transportation, scale and diversity of output for many industries are sustainable over time, but under the influence of the development of end-to-end technologies in definite sectors, they have changed greatly or quite cyclically, in accordance with the Kondratiev's cycles theory [5].

Fundamental conditions determine the structure of the market, the main parameters of which are, firstly, the number and distribution of sellers and buyers, the presence or absence of barriers to go into the market for new enterprises, product differentiation, as well as vertical integration and diversification of production. Together with the market capacity, the size of the enterprise determines the main indicator of the market structure – the number of enterprises on it [6–8]. Modern trends in networking and digitalization of interactions between economic agents are improving in the direction of developing their large platforms and in an effort to form business ecosystems [9].

Market structure, in turn, influences the behavior of buyers and sellers. Altogether, the behavior of any market participant can be described using such factors as amount of production, pricing policy, advertising the range of produced goods, activities, methods and modes of product promotion, and so on.

The structural concept of industrial markets organization assumes a direct relationship between both market structure and enterprise behavior. The activities of enterprises (in the new conditions of competition, lack of products, but the platforms on which these products are sold) in markets striving for excellence are aimed at strengthening existing and conquering new market positions. In the original interpretation of the concept, it leads to a redistribution of market power of individual enterprises and a change in market structures. Digitalization of business processes of market participants and new platform formats for business interactions create new effects that can make market power for players, including through organizational decisions and the creation of an overall value proposition. That is, digital formats of interaction demonstrate the desire of economic agents to implement joint decisions in the field of pricing, sales and product promotion.

Ideally, the rationality of the industry structure and behavior of firms should automatically lead to high market performance. However, due to various reasons, the economic result of the operation of the market turns out to be lower than accepted norms. Then the government can use a policy of intervention in market processes and try to improve the state of the economy by applying administrative measures to influence the structure of the market and the behavior of its subjects [1, 2, 6, 10]. Thus, the paradigm "basic conditions – market structure – actions – results" defines the main provisions of the structural concept of industry markets. In general, we believe that it is possible to use it for analyzing markets of various types. These can be narrow industry markets or entire sectors of the economy, both national and local markets. Depending on the scale of the market, the parameters studied may also change, but the general scheme and logic of the analysis remain unchanged.

Discussion. Analysis of the connection between technological change and economic growth is a real fact based on the idea that technological innovation is a crucial factor in economic growth. As a result, technological innovations led to changes in the industrial structure and economic system of the country as a whole. For enterprises, they have caused

structural changes associated with profit-seeking activities, such as the emergence of new business models, production methods and staff employment (the appearance of remote employment). As for individuals, they have changed consumer behavior and preferences, and recent trends in digital transformation have increased this process.

Digital conversion has been accelerated by most important technologies of the Fourth Industrial Revolution, including artificial intelligence, big data technologies and machine learning [10]. This affected not only economic paradigms, but also social systems, disrupting existing practices and order [10, 11]. The Fourth Industrial Revolution may focus on rapprochement and innovation, which will be accelerated by artificial intelligence, robotics, autonomous vehicles, the Internet of things, and nanotechnology. In addition, the components of the Fourth Industrial Revolution differ qualitatively from the "core" of the Third Industrial Revolution: computer hardware and software, semiconductors and the Internet. These technologies can be described as innovations in which a synergistic effect arises from the interaction of IT development processes and different disciplines, such as physics, chemistry, biology and others. It is facilitated by machine learning and artificial intelligence [11].

Conclusion. Firstly, the structural concept of industrial markets is concentrated on three groups of problems. The first is related to the problems of the firm theory, its scope, scale, behavior and organization. The second is the influence of imperfect competition. Thus, the concept involves the study of the leadership circumstances in the market, the factors of its preservation and loss, the forms of its manifestation, price and non-price competition (pricing decisions, assortment, innovation policy and conditions of relations). The third group of problems is connected to state policy towards business. R. Shmalenzi identifies here one question of a normative and two questions of a positive nature [1, 2]. The normative question is what the optimal business policy should be. While positive questions include the problem "How effective is government intervention in markets in general? Who and what actually determines the policy of intervention and whose interests does it serve?" The structural concept under consideration was developed in relation to the conditions of a developed market during a period when the digital "meta-market" space of the Internet did not exist. However, a logical question is how applicable this approach is to the analysis of digital economy markets, whether there are any restrictions, and whether additional parameters need to be introduced into the analysis structure.

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