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Theoretical approaches to the management of industries

The article is devoted to the actual problem of building economic systems of new quality in society, namely in the food sector. The authors reveal the tasks, forms and types of economic systems of new quality in the food sector. The authors focus on the use of such approaches as: revolutionary, evolutionary, systemic, factorial, target, and factor-targeted. They give a comparative description of each approach, taking into account its features. Using a systematic integrated approach, an author's vision of the functioning of the food sector, which is shown in the form of a diagram, is given. As a result of the analysis of the economic literature, the authors synthesize its results, highlighting the main stages and characteristics of the use of revolutionary approaches in the transformation of economic systems. Particular attention is drawn to the holistic view of the studied theoretical approaches to the management of the food sector. The study of the factor approach allowed us to identify its main components and determine their properties. The model of factor analysis is considered in detail, its distinctive characteristics and influence on the activity of the food sector. It should be noted that the authors conducted a rather detailed assessment of the program-target approach as the most common in practice of managing sectors of the economy. Following the results of a comprehensive study of theoretical approaches to the management of economic sectors, the authors came to the conclusion that the factor-target approach is the most effective in the context of modernizing the food sector.

Keywords: modernization, economic system, food sector, revolutionary approach, evolutionary approach, system approach, factor approach, target approach, factor-target approach, input, output, processor, transformation, correlation matrix, factor analysis model.

One of the priorities related to the transition of Kazakhstan to a new stage of development is the third modernization of all spheres of the national economy. The head of state, in his Message «The Third Modernization of Kazakhstan: Global Competitiveness notes that two successful modernization projects have provided us with invaluable experience. Now we must boldly step forward and begin the Third Modernization. This modernization is a reliable bridge to the future, towards the goals of the «Strategy 2050» [1].

The current stage of the socio-economic development of Kazakhstan is carried out in the conditions of modernization, when profound technological and institutional transformations are taking place in highly developed countries. These transformations imply qualitative changes in the management system of enterprises in connection with their adaptation to market conditions for more efficient use of resources and the production of competitive products. The implementation of these tasks is carried out on the basis of continuous improvement of the technical level, management methods, taking into account the specifics of the industries and complexity of the operating conditions of enterprises.

In the process of increasing globalization, a special role belongs to the knowledge-intensive industries that are part of the system of high-tech complex. In economics, the concept of «modernization» reflects the processes of change and renewal in the technological and social development of society, both globally and at the level of each country, industry and individual enterprise. It reflects the ongoing complex structural and technological changes in production, investment and innovation, the institutional structure of a state, changes the content of its economic policy in relation to the new modern requirements.

The modern concept of modernization expands the boundaries of the current situation, when this concept was associated only with the improvement of technical and technological parameters of production. Current understanding of modernization states the process of transformation of the economic, social and political systems. Taking into account the area that we are exploring, it should be noted that the problems of improving the management of the food sector can be solved by applying methodological approaches to modernization, allowing us to consistently make the necessary adjustments to the development of economic systems.

Building economic systems of new quality is associated with the use of such approaches as: revolutionary, evolutionary, systemic, factorial, target, and factor-targeted. Each of these approaches has its own characteristics, strengths and weaknesses. So, the main feature of the revolutionary approach is that the process of transition to a new quality is carried out simultaneously and does not stretch over time. In it, the achieve-

ment of a new quality is ensured by a radical breaking, the destruction of the existing one and the construction of a new one.

In general, the stages and characteristics of the use of a revolutionary approach in the transformation of systems can be presented by analogy with how it is done in Table.

Table

The main stages and characteristics of the use of revolutionary approaches in the transformation of economic systems

First stage	Second stage	Third stage	Fourth stage
explosion, breaking, destruction, chaos	decay	stabilization, simple reproduction	development, expanded reproduction

Note. Compiled by the authors.

Transformation of economic systems using revolutionary approaches, apparently, is not limited to the selected stages. It is obvious that the first stage should be preceded by a stage of preliminary accumulation of contradictory and mutually exclusive conditions that make the very existence of the system, which needs updating, impossible. In addition, before you convert something, you should decide, at least in general terms, with the model of the future construction, with the scenario of how it should be created, by what parameters, taking into account what features and with what purpose.

However, the disadvantage of this approach is that the process of transformation of economic systems and the emergence of new ones can be accompanied by sometimes unpredictable consequences. Therefore, it may be preferable to use a different approach in the system transformation. In modern economic research, an evolutionary approach has emerged as a holistic scientific presentation from Darwinian natural selection. According to the economics professor Witte U., the economy «is beyond any doubt connected with evolution», since the transition process from the individual to the world economy «is characterized by constant changes, which in sequence can be defined as evolution» [2].

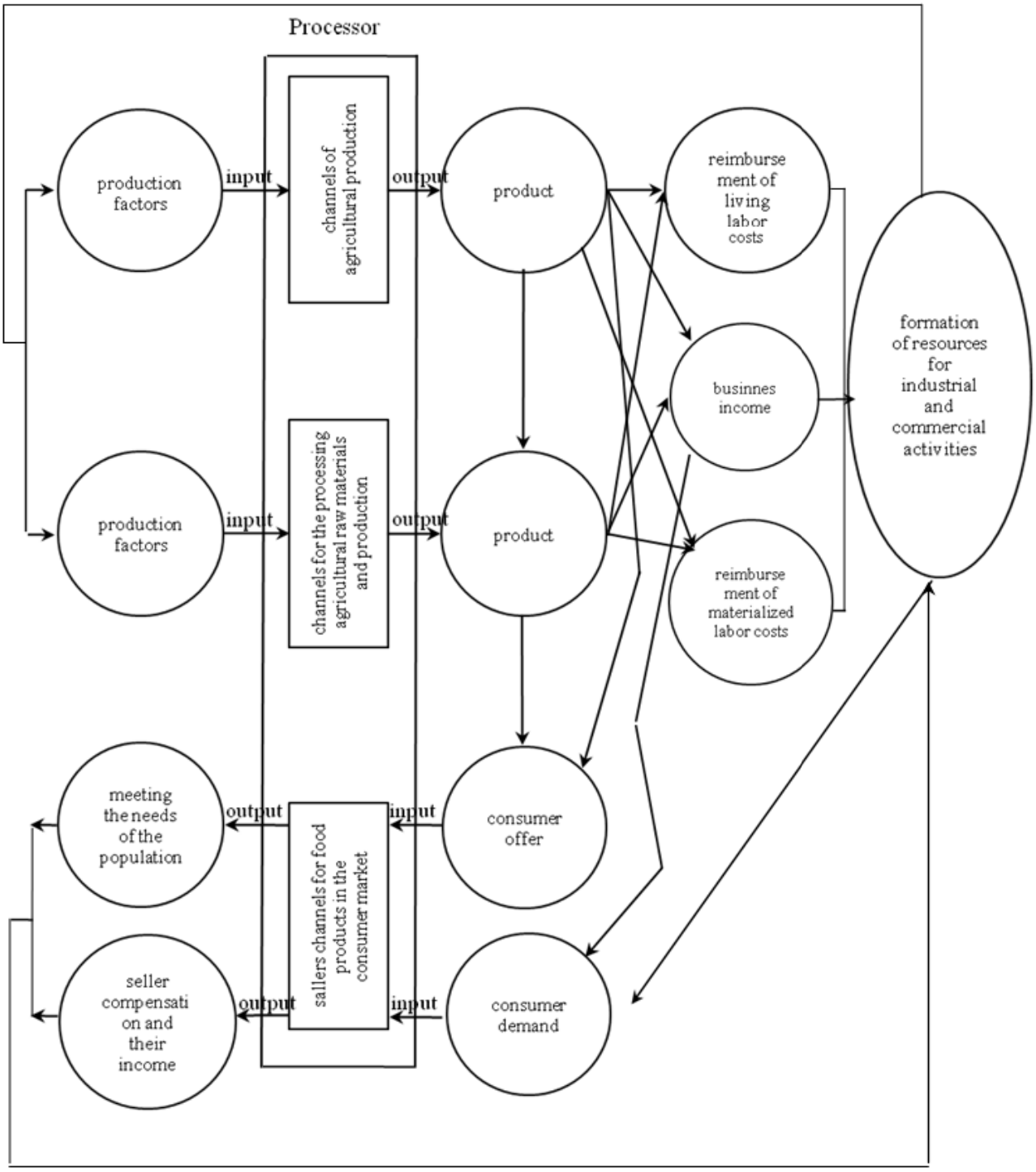
The evolutionary approach to economic research began to be used when trying to move away from the dominant theory of general equilibrium in economic theory. Emerged as an alternative to the latter, this approach allowed us to lay the foundations of the institutional-evolutionary theory, according to which in business activities the rules are largely identical to natural selection. Among those who not only shared, but also developed the views of the institutional-evolutionary theory, such authors as T. Veblen, A. Marshall, F. Hayek, N.D. Kondratiev, I. Schumpeter and others [3–7].

Comparing the two approaches, it should be noted that the evolutionary approach is characterized by a gradual, sequential process of transformation, allowing to take into account all the shortcomings and opportunities in the emerging structures. This approach is accompanied by less destructiveness and greater certainty, since its main feature is the gradual transition of economic systems to a new quality.

In contrast to the evolutionary, the system approach gives a holistic view of the processes under study. The fundamental general scientific category of the considered approach is the system, its representation in the form of an ordered set of elements interconnected among themselves, which are synthesized and form a kind of integral unity. As you know, all systems have input, output and processor. Thus, in relation to the food sector, production factors, a set of laws and various acts regulating economic activity, etc. should be singled out as its inputs. As an output, it would be correct to consider the achievement of goals, the results of its functioning. Input elements are converted to output using a processor that performs the function of promoting the input factors in the results appearing at the output. For example, if we are talking about the production process in the food sector, then in a processor, production factors are converted into its results.

Often the use of the system approach is carried out in conjunction with the systems, integrated approach or the named approaches are considered as identical. Obviously, if the first can be acceptable, then with respect to the second, one should point out the inconsistency with the identification of these different approaches. A systems approach, first of all, implies orderliness, focus and organization, and an integrated approach means a wide coverage of the problem. Consequently, the combination of «system integrated approach» can achieve a combination of conditions of vertical and horizontal integration, that is, in this case, a higher order approach is used to investigate systems that have vertical and horizontal connections that are usually inherent in large economic systems (LES).

Using the features of a systematic integrated approach, we consider the scheme of functioning of the food sector. According to Figure, as a processor of this system, three of its blocks are allocated, which are differentiated by channels. Firstly, the production of agricultural products, and secondly, the processing of agricultural raw materials and food production. Thirdly, the implementation of relevant products in the consumer market. At the same time, the input parts of this system, which determine the connections along the production channels of agricultural and industrial products, are represented by production factors. The corresponding outputs are focused on the creation of a product that forms the processor inputs through the sales channels of food products in the consumer market.



Note. Compiled by the authors.

Fugure. Scheme of the functioning of the food system

These inputs are made up of consumer demand and supply, the implementation of which is carried out in the process of buying and selling consumer goods and food products in particular. Outputs from the processor through the sales channels of food products in the consumer market provide an opportunity to meet the needs of the population and compensate the costs of sellers and manufacturers, as well as generate income from commercial activities.

The results of production and commercial activities, which allow reimbursement of the costs of living and materialized labor and generate income, form production resources, which in the subsequent reproduction process act as production factors. Such a sequence of movement of systemic impulses indicates the legitimacy of using a systemic, integrated methodology in relation to the reproduction of industrial and commercial activities related to the functioning of the food sector.

The complete appearance of the scheme of functioning of the food system through the channels of agricultural production, its processing and production of food products, as well as its implementation in the consumer market, is given by the presence of feedback. Firstly, it is appropriate to consider the movement from the outputs of the production of agricultural and industrial products associated with the formation of production resources to their factors as feedback. Secondly, the nature of the feedback demonstrates the movement from the outputs of the channels for the sale of food products in the consumer market, which are meeting the needs of the population, compensating the costs of sellers and earning income, towards which inputs are presented, as already mentioned, consumer supply and demand, mediated by the formation of resources of industrial and commercial activities.

A weighty argument in favor of such a presentation of the scheme of functioning of the food sector is the achievement of the development goal of the system, which we formulated in the process of defining its goal-setting.

So, in the most general form of goal-setting of the food sector, goals and sub-goals can be identified. The purpose of this complex is to provide the country's food needs in accordance with the need to improve the level and quality of life of its population. Sub-goals, in our opinion, should include:

– food production for the population;
– ensuring food security of the country;
– delivery of food to the country;
– ensuring the functioning of the consumer market;
– the formation of real income of population employed in the food sector.

Among the established methodological approaches to systemic transformation, a special place is occupied by factor analysis. This approach is based on the allocation of factors for the development and functioning of the system. The study of factors, the determination of their influence on the final results encounters the problems of evaluating their impact. At present, approaches have been developed that allow figuratively speaking, «the leading to a common denominator» of factors and prerequisites that have different dimensions, incomparable characteristics.

One such approach is an attempt to assess factors in physical or monetary terms. Obviously, the first is applicable if among the factors are those having the same natural meters. For example, if agricultural raw materials are considered as a factor, then it can apparently be measured in tons, hundredweights, etc. and then it is quite appropriate to use natural quantitative indicators.

It’s another matter if the factor being selected is made up of a whole range of conditions and prerequisites that have different evaluation characteristics that prevent even the simplest arithmetic operations from being performed on them.

In this case, a universal evaluation method can be applied, when all conditions and factors are reduced to a single monetary value. Using this approach, it is possible, for example, to easily perform any actions on factors that differ in nature and, for example, to sum up fixed and current assets, reduced to a single monetary calculation, etc.

Even more universal is the use of multidimensional statistics in factor analysis, which makes it possible to attract a large array of different indicators without reducing them to common units of measurement.

Among these methods, quite similar economic and statistical methods of factor and component analysis can be provided. Nowadays, the factor and component analysis have a fairly widespread implementation in economic research methods. The development and widespread use of these methods was preceded by the initial appearance of the single-factor model of the American researcher S. Spearman. Subsequently, factor analysis received a solid mathematical base, which is largely associated with the development of L.L. Turstone.

For the first time, the methods of component analysis were presented in the writings of the English scientist C. Pearson. Further impetus to the application of the method was given by the development of H. Hoteling [3, 4]. The formal definition of factor analysis as a method of multidimensional statistics is based on the spatial dimension of processes, which are characterized by a number of parameters, or so-called aggregated variable factors. The factor is a new characteristic, obtained by successive transformations of variables, which contains information about spatial changes in time and thus provides material for determining the general trends of what is happening. In other words, factor analysis is considered as a method for estimating the variation of characteristics, and more precisely, the covariance of various variables [5].

The model of factor analysis is usually described as follows:

$$x_j = \sum a_{ji} y_i + l_j, \quad (1)$$

where x_i – independent variables; j – index of independent variables, which varies from one to n (j = 1,... n); n – number of attributes (source variables); y_i – generalized factors; i – factor index that varies from one to m (i = 1, m); a_{ji} – load of the generalized factor on the variable x_j; l_j – characteristic factors causing random variation of variables x_j.

Factor analysis allows us to describe the processes in a holistic form using m factors derived from n random signs. Note that with a large set of features, the formation of a correlation matrix, the individual elements of which determine the closeness of the linear stochastic connection between them, complicates the task, sometimes making it insoluble. In view of this, there is a need for information compression, its aggregation, and then a smaller number of parameters make it possible to isolate factors.

Another of the methods mentioned here, which is also based on the use of a significant array of data characterizing various aspects of the process under study, is the method of principal components. This method, being a modification of factor analysis, allows you to move from the space of measured indicators, indicators into the space of the main components, each of which can be considered as a specific state of the process, a phenomenon that has a well-defined interpretation of what is happening. At the same time, the main components are ranked in order from the most pronounced manifestation to the weakening one [6–9].

The main components have the following properties:

– the components are not correlated with each other, they are orthogonal;

– each successive component selects the maximum variance of the initial parameters, being orthogonal with respect to the previous one;

– all components are measured by a single system of primary parameters.

The correct interpretation of these components, which are a linear combination of random variables, each of which shows the tightness of the relationship between the component and the variable becomes important in using the principal component method.

Therefore, the main components are usually logically justified by a qualitative analysis of the quantitative parameters of these components.

The task using the principal component method is formed as follows: having a system of dependent variables x1, x2 ... xn, obtain a system of independent principal components y1, y2 ... yn by means of the orthogonal transformation of the matrix {aij}.

In general, the model entry is:

$$x_i = \sum a_{ij} y_i, \quad (2)$$

where x_i – i dependent variable; i – index of the dependent variable, varying from one to n; y_i – j component; j – component index ranging from one to n; a_{ij} – the weight of the j-th component in the i-th variable.

In essence, the method is based on obtaining a weights matrix, a separate line of which is considered as a peculiar illustration of the process under study, a phenomenon. The magnitude of the matrix coefficient indicates the relative significance of one or another parameter in this process illustration, and its sign (plus or minus) reflects the direction of the impact, which can be interpreted as direct or opposite. It is essential to use this method that the principal component method can be used with a rather limited array of statistical data, when the usual regression analysis has large errors [10–14].

In general, the correlation matrix in the considered methods serves as the starting material for the subsequent study of the selected values of attributes. On their basis, for example, regression equations can be constructed, linking the factor signs with the resultant ones. With the help of these equations, an economic interpretation of the obtained new characteristics is carried out. The presented methods of multidimensional statistics can be applied in evaluating the system of production, processing and marketing of food products,

especially since these methods were widely used in analyzing the economic activities of various associations and complexes.

Apparently, these methods provide a basis for determining trends in economic development, since using the necessary information, the factors or components obtained by means of appropriate transformations can be interpreted, for example, as directions for the development of economic activity.

Of particular interest in the framework of systemic transformation is the consideration of a targeted approach. This approach is implemented through targeted programs that contain specific actions aimed at achieving the goal.

Of particular interest in the framework of systemic transformation is the consideration of a target approach or, more precisely, a program-target approach, in which the main focus is on achieving the intended results. With this approach, the decisive importance in the functioning of the system is given to obtaining results at the output, to which all its elements, including the input elements and the processor, are subordinate. It is obvious that the absolute dominance of the output elements over other elements of the system, when the means and methods of their achievement are taken into account only from the standpoint of the realization of goals, allow you to fully concentrate and direct efforts in a given direction. In this scenario, the program-target approach can be very effective, but the price of what has been achieved will be exorbitant and the resources invested will not be covered by the results [15]. That is why the program-target approach is often criticized because of the low impact of many programs compared to the resources spent on their implementation.

Target programs can be presented in the form of industry, territorial, intersectoral and interregional. According to their content, they distinguish economic, social, environmental, and also complex programs. They are provided with the order of actions, deadlines, necessary resources and specific performers. It is obvious that the management of the implementation of such programs should be assumed by the government authorities.

As a rule, all successfully implemented programs of the past years, among which, programs related to the military-industrial sector, the exploration of outer space, the creation of high-tech models of aeronautical technology have a solid reserve of innovative advancement, which in its turn allowed those areas, in which they were carried out, to keep good positions. One of the main reasons for this is the lengthening of the product life cycle, the manufacturer of which were the areas, activities mentioned above. The use of a targeted approach to solving problems of the national economy is often criticized because of the low impact of many programs compared to the resources spent on their implementation. Using the selected methodological approaches directly to the system of production, processing and sale of food products, that is, what generally covers the food sector, it is necessary to note the relatively low level of its development in Kazakhstan. The level of functioning of this sphere in the country does not correspond to the degree of importance of the problems of providing the population with food, the level of solving general economic goals in the country, not to mention the development of the most advanced sectors of the economy, which can be attributed today to the financial sector, or the communications and telecommunications sector.

In this regard, among the methodological approaches used in system modernization, the most effective is the factor-target approach, which is based on identifying the factors that ensure the achievement of the intended goals. Using this approach to organize the management of the modernization of the food sector of the country will allow implementing a consistent implementation of the overall strategy to provide the citizens of the country with sufficient food of good quality.

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Г.Н. Накипова, Ж.З. Арынова

Өнеркәсіпті басқарудың теориялық тәсілдері

Мақала бүгінгі таңда қоғамдағы жаңа сапаның экономикалық жүйелерін, атап айтқанда, азық-түлік секторында құру мәселесін шешуде. Авторлар азық-түлік секторындағы жаңа сападағы экономикалық жүйелердің міндеттерін, нысандарын және түрлерін көрсетті. Революциялық, эволюциялық, жүйелік, факторлық, мақсатты және факторлы-мақсатты көзқарастарды қолдануды қарастырды. Олар өз ерекшеліктерін ескере отырып, әр көзқарастың салыстырмалы сипаттамасын берді. Жүйелі интеграцияланған тәсілді пайдалану арқылы диаграмма түрінде көрсетілген тамақ саласының жұмыс істеуінің авторлық көзқарасы келтірілген. Экономикалық әдебиеттерді талдау нәтижесінде авторлар экономикалық жүйені трансформациялаудағы революциялық тәсілдерді пайдаланудың негізгі кезеңдері мен сипаттамаларын айқындай отырып, оның нәтижелерін синтездейді. Азық-түлік секторын басқарудың зерттелетін теориялық тәсілдерінің тұтас көзқарасына ерекше көңіл бөлінді. Факторлы әдісті зерттеу оның негізгі компоненттерін және олардың қасиеттерін анықтауға мүмкіндік берді. Факторлық талдаудың моделі, оның ерекшеліктері және азық-түлік секторының қызметіне әсер етуі егжей-тегжейлі қаралды. Айта кету керек, авторлар бағдарламалық-мақсаттық тәсілдемені экономиканың секторларын басқарудың ең көп таралған тәжірибесі ретінде егжей-тегжейлі бағалау жүргізді. Экономикалық секторларды басқаруға теориялық көзқарастарды жан-жақты зерделеу қорытындылары бойынша, авторлар факторлы-мақсатты тәсіл азық-түлік секторын жаңғырту тұрғысынан ең тиімді болып табылатындығына көзжеткізді.

Кілт сөздер: жаңғырту, экономикалық жүйе, тамақ өнеркәсібі, революциялық тәсіл, эволюциялық көзқарас, жүйелік тәсіл, факторлық көзқарас, мақсатты көзқарас, факторлы-мақсатты көзқарас, енгізу, шығу, процессор, трансформация, корреляциялық матрица, факторлық талдау моделі.

Г.Н. Накипова, Ж.З. Арынова

Теоретические подходы к управлению отраслями экономики

Статья посвящена актуальной на сегодняшний день проблеме построения экономических систем нового качества в обществе, а именно в продовольственной сфере. Авторы раскрывают задачи, формы и виды экономических систем нового качества в продовольственной сфере. Основное внимание в работе акцентировано на использование таких подходов, как революционный, эволюционный, системный, факторный, целевой и факторно-целевой. Дана сравнительную характеристику каждому подходу с учетом его особенностей. С использованием системного комплексного подхода предложено авторское видение функционирования продовольственной сферы, которое показано в виде схемы. В результате анализа экономической литературы авторы синтезируют его результаты, выделяя при этом основные этапы и характеристики использования революционных подходов в преобразовании экономических систем. Особое внимание обращено на целостное представление об исследуемых теоретических подходах к управлению продовольственной сферы. Исследование факторного подхода позволило выделить его основные компоненты и определить их свойства. Подробно рассмотрена модель факторного анализа, его отличительные характеристики и влияние на деятельность продовольственной сферы. Следует отметить, что авторы подробно провели оценку программного-целевого подхода как наиболее распространенного в практике управления отраслями экономики. По итогам комплексного исследования теоретических подходов к управлению отраслями экономики авторы пришли к выводу о том, что наиболее действенным в условиях модернизации продовольственной сферы является факторно-целевой подход.

Ключевые слова: модернизация, экономическая система, продовольственная сфера, революционный подход, эволюционный подход, системный подход, факторный подход, целевой подход, факторно-целевой подход, вход, выход, процессор, трансформация, корреляционная матрица, модель факторного анализа.

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