



*Asesorías y Tutorías para la Investigación Científica en la Educación Puig-Salabarría S.C.
José María Pino Suárez 400-2 esq a Lerdo de Tejada. Toluca, Estado de México. 7223898476*

RFC: ATI120618V12

Revista Dilemas Contemporáneos: Educación, Política y Valores.

<http://www.dilemascontemporaneoseducacionpoliticaivalores.com/>

Año: VII Número: 1 Artículo no.: 143 Período: 1 de septiembre al 31 de diciembre, 2019.

TÍTULO: Diseño de la cadena de valor para la creación del valor del producto en las ramas de la industria alimentaria a nivel regional.

AUTORES:

1. Ph. D. Tatyana V. Andreeva.
2. Ph. D. Raisa S. Vidishcheva.
3. Ph. D. Anna V. Kurlykova.

RESUMEN: Este artículo está dirigido a la fundamentación teórica y al desarrollo de métodos de diseño de la cadena de valor para crear el valor del producto en las ramas de la industria alimentaria a nivel regional. El método principal para estudiar este problema es la investigación de la cadena de valor para crear el valor del producto en las ramas de la industria alimentaria. Los resultados mostraron que la especificidad de los métodos ofrecidos consiste en la detección de procesos comerciales de creación del valor del producto de la rama de la industria alimentaria sobre la base del establecimiento de los tipos de actividades económicas de acuerdo con la clasificación rusa.

PALABRAS CLAVES: diseño, cadena de valor, valor del producto, industria alimentaria, distritos económicos.

TITLE: Designing of the value chain of creating the product value in the food industry branches at the regional level.

AUTHORS:

1. Ph. D. Tatyana V. Andreeva.
2. Ph. D. Raisa S. Vidishcheva.
3. Ph. D. Anna V. Kurlykova.

ABSTRACT: This article is aimed at the theoretical substantiation and development of methods of the designing of the value chain of creating the product value in the food industry branches at the regional level. The major method of studying this problem is the research of the value chain of creating the product value in the food industry branches. Results showed that the offered methods specificity consists in the detection of business processes of creating the product value of the food industry branch on the basis of establishing the economic activities types in accordance with the Russian classification.

KEY WORDS: designing, value chain, product value, food industry, economic districts.

INTRODUCTION.

The research is important today because in the modern economic conditions, whose integral element is economic sanctions, the issue of food safety of the country on the whole and separate regions in particular took on particular significance. Taking this circumstance into account, it is necessary to understand that in order to assure the high competitiveness of the industrial manufacturing of the food in the region, it is necessary to create efficient methodological management tools making it possible to manufacture the food with the high added value.

In order to assure the high competitiveness of the industrial manufacturing product in the region, there is a need for efficient tools making it possible to create an added value, which will not be redistributed in favor of other participants in the value chain. Under the influence of the scientific and technical progress, new technological processes appear, which must be built into the existing value chains.

The research is aimed at theoretical substantiation and development of methods of the designing of the value chain of creating the product value in the food industry branches at the regional level. In the furtherance of this goal, a number of tasks are expected to be solved: to offer methods of the designing of the value chain of creating the product value in the food industry branches at the regional level; to test the offered methods as exemplified by the Orenburg region; to detect the key business process of creating the food industry product value; to determine the participants composition and the contribution made by each link of the value chain of creating the food industry product on the basis of the added value; to formulate the conclusions about efficiency of the designing of the value chain of creating the product value in the food industry branches at the regional level.

The designing of the chain of creating the product value is covered in the papers by domestic scientists T.V. Ponomarenko, F.D. Larichkin, K.V. Schetinina, who propose introducing the managing subject (corporate center) setting the proportions of distributing the added value among the chain participants [1]. The Russian scientists sorted out the following principal stages of the designing and the analysis of the chain of the added value of the natural resources sector product [1]:

- Establishment of the interrelation between the technological processes.
- Analysis of the chain business processes structure.
- Assessment of the business processes by a potential of creating the value with account taken of the forecasted influence of the external environment.
- Choice of methods and directions of the value growth.

A major contribution to development of the methodic framework of building the schemes of chains of the value creation was made by V.V. Repin, who said that in developing the chain schemes, it is important to show only the main, cornerstone processes, and a degree of detailed elaboration must be that the scheme represented the real business adequately and could be used to adopt the managerial decisions to reorganize it [2].

The methodic aspects of simulation of the integration entities in the agro-industrial complex, forecasting and calculation of the bread technological chain parameters are opened in the scientific paper by O.A. Makarevich [3].

Refurbishment of the Russian enterprises of the pipe and furniture industry in the chains of creating the added value are studied in detail in the joint research carried out by S.B. Avdasheva, I.A. Budanov, V.V. Golikova, A.A. Yakovlev [4]. The Russian economical scientists sorted out links of the chains of creating the value of the furniture and pipe manufacturing products by a functional indication, and they distributed the added value on the basis of interviewing the business participants in these branches.

S.E. Soldatova and D.B. Efimov cover the use of the simulation modeling in optimizing and refurbishing the global chains of the value creation in their paper [5]. S.E. Soldatova and K.Yu.Voloshenko, in their joint paper, presented a six-blocked model of determining the optimal parameters of cooperation of the participants in the chain of creating the value of the agro-industrial complex products, whose target function is the added value maximization [6]. The authorial model is oriented to a wide range of users including the business entities as well as the regional government authorities.

The scientists of Saint Petersburg State University of Economics and Finances O.U. Yuldasheva, G.L. Bagaev, V.E. Prokoptsov, O.I. Yudin, in their papers, opened the methodical principles of the business designing on the basis of simulation of the value creation chain, which include: the preliminary study of dynamics and structure of the consumption value; the variable nature of the chain simulation, which is oriented to the consumption value maximization and the expenses minimization [7]; sorted out the key elements of the strategic network model (firm-organizer, network subjects, intra-network and global branch market), which make it possible to optimize the value creation chain and to design new break-even business models [8].

The designing of the value creation chains in the food industry is covered by the papers by T.V. Andreeva. The author considers the following principal stages of the designing of the value creation chain: assessment of the existing chain effectiveness; formation of the inter-branch chain of the final product; analysis of profitability of each type of the chain activities; detection of the potential possibilities of expansion; analysis of the transfer prices; establishment of the chain options and assessment of their efficiency and choice of a preferable option of the enterprise product chain. This approach laid the groundwork for this research, but there is a need for additional theoretical and methodical recommendations taking into account the specificity of the food industry branches [9, 10]. Let's examine the foreign experience on researching the chains of the product value creation.

Øystein D. Fjeldstada and Charles C. Snowb, in their article, cover five elements of the business model: clients, value offers, products/services offer, the value creation mechanisms and the value assigning mechanisms. The authors said that each element of the business model is influenced by the firm value configuration depending on the fact whether the firm is a value creation chain, a value shop or a value creation network [11].

M. K. Paras, R. Pal and D. Ekwall research a concept of the value creation chain with a closed cycle. The authors believe that such a chain maximizes the product usefulness before its operational life end as well as after that. On the basis of the data analysis for the period from 1994 to 2015, the key factors were detected, which influence the designing of the value creation chain, for example, product restructuring possibilities, product price, information, the state laws and the consumers' attitude to the economic success of the value creation chain on the basis of the repeated use [12].

The methodological approaches to the designing (or to the redesigning) of the supply chain (SC), including the comprehensive approaches, are presented in the article by G. Calleja, A. Corominas, C. Martínez-Valuea and Rocío de la Torre. The comprehensive approaches are based on typologies of the products, markets and SC and they offer a succession of stages, which must be performed during

the designing. The authors come to a conclusion that the typologies use is not fit for the SC designing, during the designing, it is possible to use only the methods that are fully adapted and developed to the practical application at each stage [13].

Nauhria Y., Kulkarni M.S. and Pandey S. developed a structure of the value creation chain for the Indian automobile industry. As the main research tools, a concept of the balanced parameters system and the strategic maps were used. A structure of the strategic chain of the value creation was designed with the use of decomposition based on the axiomatic designing principles [14].

The simulation and reconfiguration of the value creation chain is considered in the paper by Marche B., Boly V., Morel L., Mayer F. and Ortt, R. from the perspective of the flexibility concept. The article assesses influence of the decisions concerning the product and manufacturing specifications, and strategies of the reconfiguration of the value creation chain after the innovations introduction [15].

L. Alfaro, P. Antràs, D. Chor, and P. Conconi researched the manufacturing firms in more than 100 countries in order to develop the measures to make the integrated and non-integrated resources more efficient. The authors believe that the key decision, which the firms face, is a degree of control over various stages of their manufacturing processes. And solution of an issue of integration of suppliers of the extractive or processing industry depends on the demand elasticity, relative reduction of stages along the value creation chain, and on the firm productivity [16].

Zh. Pang, Q. Chen, W. Han, L. Zheng, in their research, proposed redesigning the supply chain in real time to increase the added value and to gain an additional income of the company. This business technology is oriented to joint designing to receive additional value for the consumer. The authors said that, in order to be successful in practice, the decisions must create the income-oriented values apart from traditional tracking-oriented values [17].

The paper by Th. Reardon was of particular interest. It analyzes the value creation chains in the agriculture in the developing countries. The author believes that the so-called “middle segment” including the processing, the logistics and the wholesale trade accounts for 30-40% of the added value and expenses in the value creation chains of the food. The middle segments’ growth and transformation are connected with development of the small and medium-scale enterprises and with appearance of new organizational mechanisms of interaction of the purchases and the marketing with the farmers and the retail traders. The economic policy of the market and direct foreign investments liberalization, and the laws on food safety favored the expansion of the important intermediate segment of the food value creation chains [18].

Thus, it is necessary to say that the scientists are highly interested in the designing of the product value creation chain, which is of particular importance to the food industry development at the level of the regional and national economy to assure the food safety, to increase the quality of the food and the solvency of the enterprises-participants in the product value creation chain. However, the researchers do not fully touch upon the issues of development of the efficient methods of the designing of the value chain of the product value creation in the food industry branches at the regional level and the approach to determining the contribution made by each link of the chain of the food industry product creation on the basis of the added value.

DEVELOPMENT.

Materials and methods.

The conducted research is based on an analysis of the theoretical foundation covering the issues of forming the value chain of the product value creation, and the assessment of parameters of activities of the economic entities functioning at all the stages of creation and realizing the finished product of the food industry in the Orenburg region.

As the main methodological method, a process approach is applied to the research. This approach will make it possible to clearly and efficiently manage the value chain of the product value creation at the regional level in accordance with such key processes as: the process of assessing the consumer market of the branch product, the processes of managing the raw-material and manufacturing links, the process of managing the distribution links.

The offered methods are mainly aimed at forming the maximum added value in the whole chain of the product value creation in the food industry at the regional level. According to the set value, the methods of designing the product value creation chain were tested in the Orenburg region. The major method of studying this problem was the research of the value chain of the product value creation in the food industry branches at the regional level and economical and statistical analysis of the results obtained.

As a result of the research, there were assessed activities of 532 organizations-participants in the value chain of creating the food industry product value in the Orenburg region (with no account taken of the individual entrepreneurs), including the raw-materials suppliers and the wholesale and retail trade enterprises. According to the results of the research conducted, there are formulated conclusions about efficiency of the designing of the value chain of the product value creation in the food industry branches at the regional level.

The methods of the designing of the value chain of the product value creation in the food industry branches at the regional level include the following stages: assessment of value of the branch's final product; determination of the business processes of creating the branch product value and a composition of the value chain participants; assessment of contribution made by each link (participant) of the chain to creation of the final product value; simulation of the efficient chain of the product value creation.

The value of the branch's final product is assessed on the basis of data of the statistical yearbooks of a specific region (republic) about prices and tariffs, the Central statistical data base of the Federal State Statistic Service (the sections "Average consumer prices (tariffs) for goods and services", "Average prices established by manufacturers of the agricultural products sold by the agricultural organizations") [19, 20, 21].

It is offered to detect the business processes of the product value creation of the food industry branch on the basis of establishment of the economic activities types according to the Russian Classification of Economic Activities [22] (hereinafter referred to as OKVED, which is approved by the Order of the Federal Agency for Technical Regulation and Metrology dated 31.01.2014 No. 14-st, revised on 20.02.2019) with identification of the raw-materials, manufacturing links, and the links of distribution, input and output logistics.

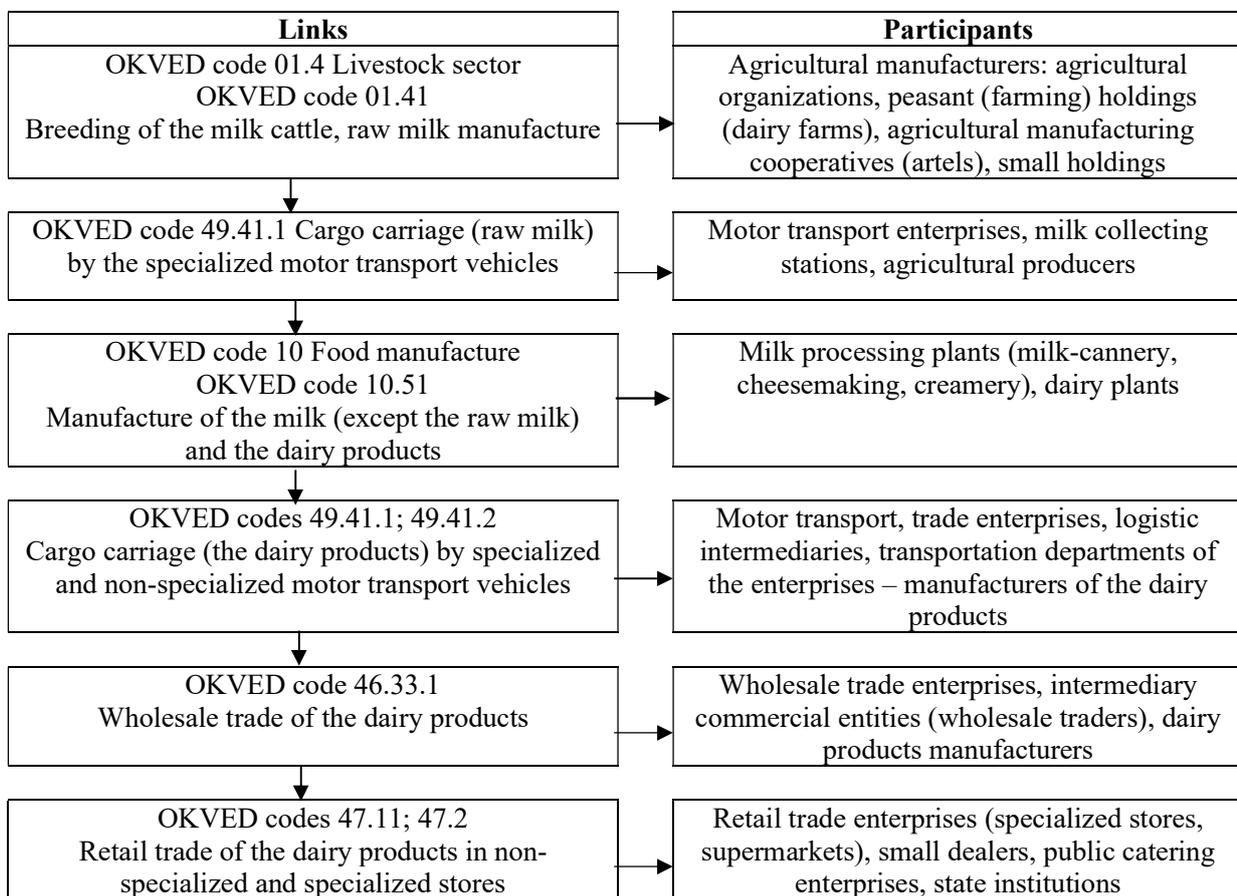
It is recommended to determine the composition of participants (economic entities) of the value chain with the use of the open information resource Rusprofile.ru, which provides the true and complete information on activities of legal entities and individual entrepreneurs registered in the Russian Federation [23]. This service offers the possibility of searching the organizations by a set type of the economic activities in accordance with OKVED and the regional belonging.

The composition of the main links and participants of the value chain of creating the dairy products value on the basis of OKVED, according to the methods offered, is shown in Figure 1.

A fully integrated chain of creating the dairy products value consists of seven links, an intermediate outcome of activities of which is the material flow (raw materials, service, product), and the final outcome is the finished product (dairy products), which is of value to the buyer and which he acquires via the retail trade network.

A raw-material link of the value chain of the dairy products is the economic activities "Breeding of the dairy cattle and manufacture of the raw milk" (OKVED code 01.41), which belongs to the

agriculture's livestock sector. These activities are carried out by such agricultural manufacturers as the agricultural organizations, the peasant (farming) holdings, the agricultural manufacturing cooperatives (artels), the small holdings. The chain's manufacturing link is presented by a type of the activities "Manufacture of the milk (except the raw milk) and the dairy products" (OKVED code 10.51). The distribution links include "Wholesale trade of the dairy products" (OKVED code 46.33.1) and "Retail trade of the dairy products in non-specialized and specialized stores" (OKVED codes 47.11, 47.2). The value chain's logistic links include the economic activities types on cargo carriage by the specialized and non-specialized transport (OKVED codes 49.41.1; 49.41.2).



Source: the drawing is made by the authors on the basis of OKVED [22].

Figure 1. Composition of the main links and participants of the value chain of creating the dairy products value.

Table 1 shows a grouped composition of the main links and participants of the value chain of creating the value of products of the meat, bread-baking, macaroni, fat-and-oil branches of the food industry, which was received by means of generalizing the value chain schemes according to the methods offered.

Table 1 shows that unity of input and output logistic links, and the distribution links, including the wholesale and retail food trade is typical for the value chain of creating the food industry products value.

The offered form of grouping of all the participants in the value chain by the economic activities types offers the possibility for determining the organizational-economical peculiarities of its functioning as well as a composition of the organizations involved in the product value creation in a specific region, a federal district and a country.

So, for the value chain of creating the vegetable oils, bread products and macaroni products value, the general organizational and economical peculiarities are established:

- Availability of the common raw materials base that is a product of the agriculture's crop-growing branch (grain and oil crops).
- A long period of the raw material keeping, which requires availability of the production capacities to carry out the activities to keep and store the grain crops.

In order to assess the contribution made by each link (participant) of the chain to creating the final product value, it is recommended to use the added value parameter. Proportions of distributing the added value between the value chain links are determined by means of a structural analysis of the average retail prices for the branch's final products. The main information sources in performing the structural analysis are the data of management accounting of some organizations (estimates of expenditures, actual and cost budgets), official statistical data about the retail prices structure for some types of the food products in the Russian Federation [24].

Table 1 – Grouped composition of the main links and participants of the value chain of creating the value of products of the meat, bread-baking, macaroni, fat-and-oil branches of the food industry.

Chain participants		Agricultural manufacturers	Motor transport vehicles, elevators, grain storages	Meat processing and packing factories, mills, bread-baking plants, macaroni factories, oil-extracting factories	Motor transport enterprises	Wholesale and retail trade enterprises	
Links of the value chain of the value creation	Meat products	OKVED code 01.4 Livestock sector OKVED code 01.42.11 Breeding of the meat and other cattle for meat OKVED code 01.46 Breeding of pigs OKVED code 01.47 Breeding of the poultry	OKVED code 49.41.1 Cargo carriage by the specialized motor transport vehicles	OKVED code 10.51 Manufacture of the milk (except the raw milk) and the dairy products	OKVED codes 49.41.1; 49.41.2 Cargo carriage by specialized and non-specialized motor transport vehicles	OKVED code 46.3 Wholesale trade of the food products	OKVED codes 47.11; 47.2 Retail trade of the food products in non-specialized and specialized stores
	Bread products, macaroni	OKVED code 01.11 Growing of the grain, leguminous crops and the oil seeds	OKVED code 52.10.3 Keeping and storage of the grain (sunflower seeds)	OKVED code 10.61 Manufacture of the flour and the cereals OKVED code 10.7 Manufacture of the bread products			
	Vegetable oils		OKVED code 49.41.1 Cargo carriage by the specialized motor transport vehicles	OKVED codes 10.41.2; 10.41.5 Manufacture of the unrefined and refined vegetable oils and their fractions			

Source: the table is made by the authors on the basis of OKVED [22].

Thus, the offered approach makes it possible to scientifically classify the business processes of creating the food industry product value, to determine the key links and the main participants in the value chain on the basis of establishment of the economic activities types according to the Russian Classification of Economic Activities (OKVED) with identification of the raw materials, manufacturing links, and the links of distribution, input and output logistics.

To carry out the research, the morphological analysis is used, which provides for the segmentation of the participants in the product creation chain by geographical and branch criteria. To determine the geographical segments, it is offered to district a region into the main zones. Traditionally, there are sorted out three economic districts of the area researched: Western, Central and Eastern districts. As segmentation of the participants in the value creation chain by the branches, it is recommended, according to the process approach, to sort out the raw materials, manufacturing links and the distribution links.

Results.

At the initial stage of the designing of the value chain of the product value creation, the food industry branches are assessing a value of the branch's final product as the main research subject. At this stage, there is performed a trend comparative analysis of the average consumer (retail) prices for the raw materials and the products from the perspective of separate branches of the food industry.

As the consumer prices comparison base, a price for the main raw materials (semi-finished product) is taken to manufacture the branch product in a specific region. A degree of dependence on the raw materials base is established by means of correlation of the final product and raw materials price. A growth of the price relation coefficient indicates the relative reduction of a level of dependence of the manufacturing links of the value chain on the raw materials base and on the contrary.

In this research, there assessed a value of the food industry dairy branch products as exemplified by the Orenburg region (Table 2).

Table 2 – Average consumer prices for the main raw materials and the food industry dairy branch products in the Orenburg region for 2015-2018, rubles for a tonne [19, 20, 21].

Sequential number	Products	2015	2016	2017	2018	Price relation coefficient to a level of the prices for the raw milk		
						2015	2017	2018
1	Raw milk	17344	18132	19715	17453	1.00	1.00	1.00
	Rate of growth, %	-	104.5	108.7	88.53	-	-	-
2	Drinking unskimmed pasteurized milk 2.5-3.2 % of fat content	38120	40770	43440	48110	2.20	2.20	2.49
	Rate of growth, %	-	107.0	106.5	110.75	-	-	-
3	Cultured milk foods	54100	58070	60910	64150	3.12	3.09	3.49
	Rate of growth, %	-	107.3	104.9	105.32	-	-	-
4	Sour cream	164400	173930	184290	188560	9.48	9.35	10.56
	Rate of growth, %	-	105.8	106.0	102.32	-	-	-
5	Fat cottage cheese	244030	260560	271770	282740	14.07	13.78	15.57
	Rate of growth, %	-	106.8	104.3	104.04	-	-	-
6	Butter	344670	404560	441640	494450	19.87	22.40	25.30
	Rate of growth, %	-	117.4	109.2	111.96	-	-	-
7	Rennet hard and soft cheeses	362530	397850	408240	434310	20.90	20.71	23.39
	Rate of growth, %	-	109.7	102.6	106.39	-	-	-

Table 2 shows that the average dairy products prices for 2015-2017 were in direct relationship to the price policy followed by the agricultural manufacturers breeding the milk cattle and manufacturing the raw milk, since in the dairy products prime cost the expenses for the main raw materials are from 65 to 80 %. The 2018 data indicate higher growth rates of prices for the dairy products in comparison with growth rates of prices for the main raw materials. In 2018 rapid reduction of the average raw milk price did not lead to the expected reduction of prices for final products of the milk branch.

For the period from 2015 to 2018, a coefficient of the dairy products prices relation to a level of the prices for the main raw materials – the raw milk increased significantly, in other words, the dependence of the manufacturing links on the raw materials base decreases relatively. The main reason for this situation is gradual development of the raw materials links of the value chain in the Orenburg region, in particular, of the dairy cattle production that has been subsidized by the state in recent years. In prospect, the raw milk production ramp-up, when the European community establishes the severe economic sanctions towards Russia, will favor the reduction of a value of the dairy branch final product and, as a consequence, will assure the food safety to a country that entered upon the path of import substitution.

The next stage of methods of the designing of the value chain of the product creation provides for the determination of the business processes of creating the food industry product value on the basis of OKVED and a composition of the value chain participants at the regional level. During the research, there was performed a quantitative analysis of the main organizations-participants in the value chain of creating the food value in the Orenburg region (with no account taken of individual entrepreneurs) from the perspective of economic districts. The data are shown in Table 3.

As Table 3 shows, out of 532 participants in the value chain of creating the food value in the Orenburg region, 392 organizations belong to the raw materials links, including 238 organizations growing the grain crops and the sunflower seeds, which makes up 44.7 % of the total number of organizations. All the researched organizations are small business entities, with the proceeds value being less than 800 million rubles, out of which more than a half are small peasant (farming) holdings. The activities of 49 organizations of a raw materials link of the value chain are unprofitable, which makes up 15 % out of the total number.

Table 3 – Quantitative composition of the organizations-participants in the value chain of creating the food value, which operate in the Orenburg region from the perspective of economic districts* Source: the table is made by the authors on the basis of OKVED [22] and the service Rusprofile.ru as of 31.12.2018 г. [23]

District	OKVED code	Activities	Quantity of organizations, units			
			total	unprofitable	With proceeds value of > 150 million	with growing sales volume
Raw materials links of the value chain						
Western	01.11	Growing of the grain crops and the oil crops seeds	91	3	3	52
	52.10.3	Grain keeping and storage	9	3	0	6
	01.4	Meat cattle production	6	2	0	3
	01.41	Dairy cattle production	14	2	4	6
Central	01.11	Growing of the grain crops and the oil crops seeds	80	17	5	56
	52.10.3	Grain keeping and storage	11	2	3	9
	01.4	Meat cattle production	21	7	4	10
	01.41	Dairy cattle production	9	0	3	5
Eaestern	01.11	Growing of the grain crops and the oil crops seeds	67	8	0	51
	52.10.3	Grain keeping and storage	8	2	0	5
	01.4	Meat cattle production	10	3	4	5
	01.41	Dairy cattle production	3	0	0	3
Total			329	49	26	211
Manufacturing links of the value chain						
Western	10.61	Flour and cereals manufacture	7	1	1	2
	10.7	Bread products manufacture	14	0	0	3
	10.41	Oil and fat manufacture	1	0	1	1
	10.51	Dairy products manufacture	7	3	2	2
	10.1	Meat products manufacture	7	2	2	5
Central	10.61	Flour and cereals manufacture	7	1	4	4
	10.7	Bread products manufacture	21	1	2	10
	10.41	Oil and fat manufacture	2	0	1	1
	10.51	Dairy products manufacture	8	2	5	3
	10.1	Meat products manufacture	16	2	4	10
Eaestern	10.61	Flour and cereals manufacture	6	1	0	1
	10.7	Bread products manufacture	14	3	1	5
	10.51	Dairy products manufacture	3	0	1	2
	10.1	Meat products manufacture	7	1	4	3
Total			120	17	28	52
Links of distribution of the value chain						
Western	47.11 47.2	Retail trade of food in non-specialized and specialized stores	25	4	3	8
Central			33	7	4	12
Eaestern			25	0	0	9
Total			83	11	7	29
Sum total			532	77	61	302

The chain participants implementing the activities “Grain keeping and storage” are equally distributed in the Orenburg region. The activities of the majority of elevators (23 out of 28) are income-generating, with growing sales volume.

The activities of the meat cattle production organizations are focused on breeding the poultry, pigs, meat cattle. In the Orenburg region, according to the service Rusprofile.ru, the meat cattle production is implemented by 37 organizations, 21 out of which are located in the Central district (the largest organization are Selective and Hybrid Center “Vishnevsky” LLC, PJSC Ural Broiler, Orenbiv LLC), 10 organizations in the Western district (Agricultural Production Cooperative Poultry Plant Gaiskaya, MK Valley LLC).

The activities on breeding of the milk cattle and manufacture of the raw milk are implemented by a small number of participants including 14 organizations in the Western district of the Orenburg region, 9 organizations in the Central district, 3 organizations in the Eastern district. All the milk farms are the small business entities, the largest farms are Farm Machinery Depot of the Agricultural Complex “Tashlinsky” LLC in the Western district, Agricultural Production Cooperative Collective farm “Krasnogorsky” in the Central district of the Orenburg region.

The manufacturing links of the value chain of creating the food value in the Orenburg region cover such the food industry branches as the flour and cereals, bread-baking, fat-and-oil, dairy and meat branches. According to the open information resource Rusprofile.ru, 120 economic entities, the majority of which are the small business representatives (about 77 %), are manufacturing the food in the Orenburg region. The activities of 17 organizations of the food industry are unprofitable, with 52 organizations having the increasing rates of proceeds growth.

In the Orenburg region, the oils and fats, in particular the sun flower oil, are manufactured by three organizations located in the vicinity of the raw materials base in the Western and Central districts. The largest oil-and-fat enterprise is Sorochinsk oil extraction plant with the proceeds value being more than

7 billion rubles a year, which belongs to the companies of the vertically integrated holding company Nizhny Novgorod oil-fat plant.

The meat products are manufactured in the Orenburg region by 30 meat-processing factories, the activities of 25 factories are income-generating. The most famous factories in the region as well as in Russia are Orsk meat processing and packing factory, Novotroitsk meat processing and packing factory, meat processing and packing factory ZheLen, A7 Agro Processing.

The distribution links, which carry out the retail food trade in the Orenburg region, are distributed in the region virtually equally. However, the ranges and results of the regional trade enterprises activities are small, which is shown by the data of the official statistical reporting. In the region there are no large regional trade networks, which has a negative impact on the final products prices as well as on the region development on the whole, including through the short payment of a great part of the gross added value created by links of the distribution and the tax payments into the area budget.

According to the results of assessment of the quantitative composition of the participants in the value chain of creating the food value from the perspective of the economic districts, the Orenburg region's Eastern district, in the general structure, is behindhand in terms of all the activities, which characterizes its development level negatively.

At the final designing stage, it is necessary to carry out the simulation of the value chain of the value creation and to offer options of the organizations-participants integration, which are aimed at making the activities of each participant more efficient and at maximizing the added value of the area product.

Discussion.

The most controversial issue during the designing of the value chain of the product value creation in the food industry branches is a choice of parameters for assessing its efficiency on the whole and of each specific link.

The added value application as a resulting parameter of the value chain functioning is explained by a possibility of receiving, on its basis, of a fair assessment of the created value of the branch's final product, unlike the generally accepted accounting statement parameters (proceeds, sales profit or net profit). The value-added parameter, which is calculated as a difference between the proceeds and the input resources (material expenses), is able to comprehensively assess the results of functioning of the whole value chain. While creating the product value in a separate branch, each value chain participant, when implementing its activities, creates not just a value (price) of the intermediary product, but the added value [25]. When considering the added value in the whole chain of the product value creation, it is important to understand that it is formed on an accrual basis, starting with the raw materials links, passing via all the manufacturing links and ending with the distribution links (of the trade networks), which directly sell the final product to the consumer (Figure 2).

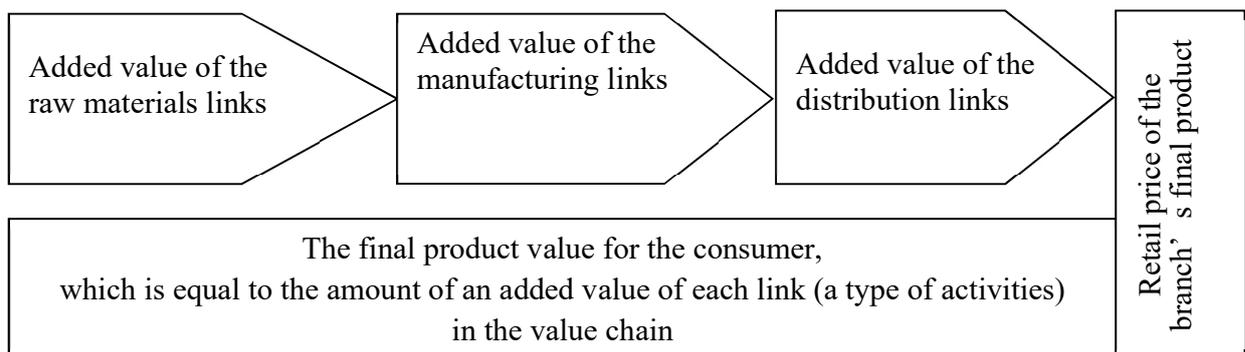


Figure 2 – System of creating the product value [10].

At the stage of assessing the contribution made by each chain link to creation of the final product value, which is based on the added value, there appears an issue of choice of the calculation methods. There are several methodic approaches to determination of an added value of each link of the value chain.

The Russian economists A.A. Yakovlev, S.B. Avdasheva, I.A. Budnov and V.V. Golikova offer an approach making it possible to establish a contribution made by each link of the value creation chain, which is based on holding the formalized and non-formalized interviews with the enterprises managements in the branches being researched [4]. The interviewing is aimed at receiving the expert

assessments of respondents, which makes it possible to determine a composition of the value chain participants, proportions of distributing the added value between them, and reserves of the added value growth.

I. Paleshkina and E. Peplozyan, in their research, consider a way of determining a share of the added value of the value chain participants, which is based on a comparative assessment of the average prices of each participant in the milk market (agricultural manufacturers, processing enterprises and retail trade organizations) [26]. This approach testing is presented through the example of the dairy branch product of the Orenburg region (Table 4).

Table 4 – Structure of the average retail price in the milk market of the Orenburg region in 2018 [22, 23].

Average selling price, ruble for a tonne			A share of the market of each participant in the value chain of creating a pasteurized milk value with 2.5-3.2 % of the fat content, %		
raw milk at the level of the agricultural manufacturers	pasteurized milk with 2,5-3,2 % of the fat content at the level of the milk processing plants	pasteurized milk with 2,5-3,2 % of the fat content at the level of the retail trade organizations	agricultural manufacturers (raw materials links)	milk processing plants (manufacturing links)	retail trade organizations (distribution links)
17453	36131	48110	36.28	42.22	21.50

Table 4 shows that the value chain of creating the pasteurized milk value is managed by the manufacturing links, which account for about 42% of the retail price.

The presented methodical approaches do not make it possible to fully determine exact proportions of distributing the added value between all the links (participants) of the value chain, since they are based either on the expert assessments made by the respondents or on comparison of the value parameters of the raw materials, manufacturing and trade links with no account taken of standards of the main raw materials consumption per a product unit, the manufacturing, logistical expenses, the wholesale and retail trade turnover.

Total added value created by the external chain participants	76.9	69.6	68.9	67.1	55.5	45.7	33.9	31.4	23.4	10.0
Total added value created by integration cooperation participants	23.1	30.4	31.1	32.9	44.5	54.3	66.1	68.6	76.6	90.0
Large holding entities – the integration cooperation participants operating in the Orenburg region as of 01.04.2019						Agricultural holding company A7 Agro: A7 Agro – OMK LLC; Summer meadow LLC		Holding company Investservice: MTS AK “Tashlinskiy” LLC; MPZ “Tashlinskiy” LLC		

Source: the table is made by the authors on the basis of [24].

* Legends:

■ – a share of the added value, which is created by the integration cooperation participants, %;

□ – a share of the added value, which is created by external participants, %.

↕ – directions of integration cooperation of the chain participants (backward integration and/or forward integration).

35.7 – a share of the added value of the anchor (key) link of the chain, a participant concentrating the maximum added value, %

Determination of the anchor (key) link of the value chain of creating the product value is the basis of the choice of integration direction (“forward” and/or “backward”) in creating the efficient integrated entities in the food industry in the forms of holding companies, corporations, joint ventures, public private partnership, financial industrial groups and clusters.

The performed analysis of participants in the value chain of creating the dairy products value in the Orenburg region made it possible to detect the following organizational-economical peculiarities:

– Availability of a great number of separate agricultural manufacturers of the raw milk, whose share in total manufacture volume makes up the following figures: agricultural organizations – 25 %, population holdings – 68.6 %, peasant (farming) holdings and individual entrepreneurs – 6.4 % [27].

- A small number of regional and inter-regional vertically-integrated holding company-type systems;
- Absence of innovation integration forms in the agroindustrial complex – clusters, and prerequisites for their creation in the region.

Table 5 sorts out the region's vertically-integrated holding company-type systems, including:

- Agricultural holding company A7 Agro (Orenburg) that, within the chain of creating the dairy products value, unites such organizations as: A7 Agro – Orenburg dairy plant LLC – the regional leader on the raw milk processing, with the production capacity of up to 300 tonnes per a day; Summer meadow LLC – a network of retail minimarkets of the agricultural holding company, which are equally located in the whole Orenburg region (more than 90 points) [28]. The agricultural holding company also includes the following companies: A7 Agro Processing LLC (Orenburg) – a manufacturer of flour, cereals, bran, mixed fodders, bakery, confectionery, meat products and frozen semi-finished meat products; A7 Agro LLC (the Orenburg region, the village of Ilek) and A7 Agro – RB LLC (the republic of Bashkiria) – the agricultural manufacturers focusing on growing of major kinds of one-year agricultural crops (grains, sunflower seeds, vegetables); the agricultural holding company's managing centers are UK – A7 LLC and A7 Management LLC [29].

The agricultural holding company A7 Arpo, which presents VI option of the integration cooperation of participants in the dairy products value chain, makes it possible to accumulate 54.3 % of the added value. This chain option is functioning without the main raw materials link on the raw milk manufacture, which accounts for 35.7 % of the added value. The backward integration, or the integration towards the main raw materials suppliers level, is implemented by the agricultural holding company by means of implementing the investment project on opening of a dairy farm on the basis of A7 Agro – RB LLC for 128 head of cows to 2022, with the investments volume of 457 million rubles. [30];

- Holding company Investservice (Orenburg), whose managing company is Investservice LLC,

presents VIII option of the integration participants cooperation, which makes it possible to create 68.6 % of the added value. The holding company unites the Orenburg region's largest dairy farm – Farm machinery depot of the agricultural complex “Tashlinskiy” LLC (the village of Trudovoe, Tashla district) and the milk processing plant “Tashlinskiy” (the village of Tashla, Tashla district), which ranks second in the region in terms of the milk processing volume after A7 Agro - OMK LLC [31].

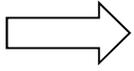
At the stage of stimulation of the value chain of creating the product value in the food industry branches, whose main goal is the synergistic effect achievement through savings on the transaction and transformation expenses, it is necessary to have access to the information resource about the regional participants (organizations) of the value chain and their production capacity. In this connection the authors offered a matrix of simulation of options of the integration cooperation of the participants in the value chain of creating the food industry product value, which is based on the added value calculation and the land zoning (Table 6).

Table 6 – Matrix of simulation of options of the integration cooperation of the participants in the value chain of creating the food industry product value on the basis of the added value and the land zoning (case study of the pasteurized milk manufacture in the Orenburg region)*

Average added value per 1 tonne of milk		Chain link (activities type according to OKVED)	Participants in the value chain of creating a value of the food industry product		
			Economic districts of the Orenburg region (other regions)		
%	Thousand rubles		Western	Central	Eastern
35.7	17.18	OKVED code 01.41 Breeding of the milk cattle, the raw milk manufacture	Dimtrov collective farm (Alekseevsky district, the settlement of Yudinka). Production capacity is 3 thousand tonnes. Elan LLC (Alekseevsky district, the village of Martynovka). Production capacity is 3 thousand tonnes		
9.8	4.71	OKVED code 49.41.1 Cargo carriage (raw milk) by specialized motor transport vehicles			
20.6	9.91	OKVED code 10.51 Manufacture of the milk (except the raw milk) and the dairy products	MK “Buguruslanskiy” LLC (the town of Buguruslan). Production capacity is 21 thousand tonnes		
2.5	1.20	OKVED codes 49.41.1; 49.41.2 Cargo carriage (the dairy products) by specialized and non-specialized motor transport vehicles			
8.0	3.85	OKVED code 46.33.1 Wholesale trade of the dairy products			
13.4	6.45	OKVED codes 47.11; 47.2 Retail trade of the dairy products in non-specialized and specialized stores			
90.0	43.30	Integrated added value created by the integration cooperation participants with account taken of the production capacity in absolute and relative terms	445.5 million rubles 76.6 % (IX option)		145.48 million rubles 44.5 % (V option)

Source: the authors' development.

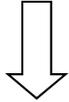
*Legends:



– horizontal integration of the chain participants.



– backward vertical integration, to the level of the chain raw materials links.



– forward vertical integration, to the level of the distribution links

The land zoning makes it possible to focus on the transport expenses minimization between the raw materials, manufacturing distribution links of the value chain. During the value chain simulation, economic districts of specific regions are located in the matrix' horizontal direction, while the value chain links (types of the economic activities), except a link of manufacture of other raw materials and energy resources, are located in vertical direction. As a criterion of efficiency of the integration cooperation of the value chain participants, the added value parameter is chosen, whose growth favors the development of regional economy. A magnitude of the added value of each chain link in monetary terms is determined on the basis of its share proportions and the average retail price for the drinking unskimmed pasteurized milk with 2,5-3,2 % of fat content in the Orenburg region as of 2018 (48110 rubles for a tonne, Table 2).

With the use of a matrix stimulation structure that is based on the added value and the land zoning, possible options of the integration cooperation are built as exemplified by the participants in the value chain of creating the dairy products value in the Orenburg region:

1) option V is unifications of the participants by means of horizontal and vertical forward integration, two milk processing enterprises Irikliniski dairy plant LLC and "Irikla Milk LLC, which are created on the basis of joint shared ownership, by the founders and which have the single legal address, and the retail trade enterprise Irikliniski trading house LLC. This option of integration cooperation of the value chain participants will make it possible to create 44.5 % of the added value by joint efforts, which makes up 145.48 million rubles in absolute terms.

2) option IX is unification of the participants by means of the backward vertical integration, including the large enterprise of the dairy branch – MK "Buguruslanskiy" LLC and two agricultural organizations located in the Western economic district of the Orenburg region (Elan LLC, Dimitrov collective farm). This unification, upon condition of the maximum production capacity operation, is able to accumulate up to 76.6 % of the added value or 445.5 million rubles per a year, but this happens upon conditions of continuous supplies carried out by external raw milk suppliers. This is connected with the fact that the recommended unification of the raw materials chain links can supply only 6

thousand tonnes of the raw milk to the dairy plant while the required volume is 21 thousand tonnes per a year. In the future, for efficient functioning of this integration cooperation option, it is necessary to build up the production capacity of the raw materials links – the raw milk manufacturers in order to reduce dependence on the external raw milk supplies by the small-scale agricultural manufacturers.

CONCLUSIONS.

There are presented methods of the designing of the value chain of creating the product value in the food industry branches at the regional level. The offered methods are tested as exemplified by the Orenburg region. There is established inequality of contribution made by each link of the value chain to the creation of the food industry product value on the basis of the added value. There are detected business processes of creating the branch product value according to the OKVED and they are assessed from the perspective of economic districts. It is shown that in the region the business processes are not integrated virtually, which is connected with the growth of expenses of separate value chain participants, the added value decrease and the increase in a number of the branch's unprofitable enterprises managing the manufacturing chains. The offered matrix of simulation of options of the integration cooperation of the participants in the value chain of creating the food industry product value, which is based on the added value calculation and the land zoning, can be used in the practice of the value chain management at the level of enterprises as well as at the regional and interregional levels in order to design the efficient organizational-economical entities that are able to easily adapt to a change of external management conditions.

To make a more exact assessment of efficiency of the integration cooperation of the value chain participants, it is necessary to enter, into the matrix composition, the data on all the enlarged types of the products manufactured, including the price, the proportions of distributing the added value, the planned manufacture volume. The simulation process can be automated with the use of the software development tools implementing the standard IDEF0, which include BpWIN, Business Studio, Corel iGrafx (IDEFO), IDEFODoctor, IDEFO on WEB [31].

The developed methods of simulation of options of the integration cooperation of the participants in the value chain of the product value creation can be used in the practice of designing the organizational-economical entities in the food industry branches as well as in other branches of the industrial sector.

The article materials can be of use to specialists of the regional and federal government authorities, various government ministries and agencies, whose operation is aimed at the economic development of branches of the agriculture, the food, processing industry and the trade. The research results can be used by the university lecturers in the educational process to train the masters and the bachelors meeting the innovative economy requirements.

BIBLIOGRAPHIC REFERENCES.

1. Ponomarenko T.V. (2017). Methodic approach to the assessment of a value of the deposit development project and the added value chain creation. / T.V. Ponomarenko, F.D. Larichkin, K.V. Schetinina // Economic and social changes: facts, tendencies, forecast.
2. Repin V.V. (2007). Business processes of a company: building, analysis, regulation. – M.: RIA “Standards and quality”. – 2007. – 240 p.
3. Makarevich O.A. (2016). Important methods of managing the corporate integrated entities: monograph / O.A. Makarevich; under the general editorship of T.P. Baranovskaya. – Krasnodar: Kuban State Agricultural University, 2016. – 322 p.
4. Avdasheva S.B. (2007). Refurbishment of the Russian enterprises in the value creation chains (case study of the pipe and furniture industry of Russia). Economic journal of Higher School of Economics. – 2005. – No.3. – P. 361-377.
5. Soldatova S.E., Efimov D.B. (2017). Tools and methods of building the configuration of global chains of the value creation in the agroindustrial complex // Collection of materials of the industrial conference: Economy and management under the conditions of digitalization: state, problems, foresight / edited by A.V. Babkin – 2017. – P. 208-214.

6. Soldatova S.E., Voloshenko K.Yu. (2016). Identification and simulation of participation of the enterprises of the regional agroindustrial complex in the value creation chains // Management consulting. – 2016. – No. 10(94). – P. 83-92.
7. Yuldasheva O.U. (2012). Simulation of the chain on creating the consumer value / O.U. Yuldasheva, O.I. Yudin // Problems of the modern economy. – 2012. – No. 1(41). – P. 218-222.
8. O.U. Yuldashevaa, G.L. Bagiev, V.E. Prokoptsov (2013). Bulletin of Saint Petersburg State University of Economics and Finances. – 2013. – No. 2(80). – P. 49-55.
9. Andreeva T.V. Designing of chains of the product value creation in the food industry / T.V. Andreeva // Vestnik of Orenburg State University. – 2011. – No. 13. – P. 6-11.
10. Andreeva T.V. Chain of the product value chain: formation and assessment of efficiency: monograph. – M.: RIOR publishing: Scientific and Publishing Center Infra-M, 2012. – 179 p.
11. Øystein D. Fjeldstada, Charles C. Snowb (2018) Business models and organization design, Long Range Planning, Vol. 51, Issue 1, Pages 32-39 <https://doi.org/10.1016/j.lrp.2017.07.008>
12. Manoj Kumar Paras, Rudrajeet Pal & Daniel Ekwall (2018) Systematic literature review to develop a conceptual framework for a reuse-based clothing value chain, The International Review of Retail, Distribution and Consumer Research, 28:3, 231-258, DOI: 10.1080/09593969.2017.1380066.
13. Gema Calleja, Albert Corominas, Carme Martínez-Valued & Rocío de la Torre (2018) Methodological approaches to supply chain design, International Journal of Production Research, 56:13, pp 4467- 4489, DOI: 10.1080/00207543.2017.1412526
14. Yugal Nauhria, Makarand S. Kulkarni, Sunil Pandey (2018) Development of Strategic Value Chain Framework for Indian Car Manufacturing Industry, Global Journal of Flexible Systems Management, Vol. 19, Supplement 1, pp 21–40 Cite as <https://doi.org/10.1007/s40171-017-0179-z>

15. Marche, B., Boly, V., Morel, L., Mayer, F. & Ortt, R. (2019). Agility and product supply chain design: The case of the Swatch. *Journal of Innovation Economics & Management*, 28(1), 79-109. doi:10.3917/jie.028.0079
16. Laura Alfaro, Pol Antràs, Davin Chor, and Paola Conconi (2019). Internalizing Global Value Chains: A Firm-Level Analysis, *Journal of Political Economy* 127, no. 2: 508-559. <https://doi.org/10.1086/700935>
17. Zhibo Pang, Qiang Chen, Weili Han, Lirong Zheng (2015) Value-centric design of the internet-of-things solution for food supply chain: Value creation, sensor portfolio and information fusion, *Information Systems Frontiers*, Volume 17, Issue 2, pp 289-319. Cite as <https://link.springer.com/article/10.1007/s10796-012-9374-9>
18. Th. Reardon (2015) The hidden middle: the quiet revolution in the midstream of agrifood value chains in developing countries, *Oxford Review of Economic Policy*, Volume 31, Issue 1, SPRING 2015, Pages 45-63, <https://doi.org/10.1093/oxrep/grv011>
19. Statistical yearbook of the Orenburg Region. 2018: statistical abstract / Orenburgstat. – Orenburg, 2018. – 530 p.
20. Central statistical database of Federal State Statistics Service. Average consumer prices (tariffs) for foods and services. – Access mode: <http://www.gks.ru/dbscripts/cbsd/DBInet.cgi?pl=1921001>
21. Central statistical database of Federal State Statistics Service. Average prices of manufacturers of the agricultural products sold by the agricultural organizations since 2017 – Access mode: <http://www.gks.ru/dbscripts/cbsd/DBInet.cgi?pl=9460013>
22. Russian Classification of Economic Activities (approved by the Order of Federal Agency on Technical Regulation and Metrology dated 31.01.2014 No. 14-st) (revised 20.02.2019). – Access mode: http://www.consultant.ru/document/cons_doc_LAW_163320/
23. Rusprofile.ru – a gratuitous service of verification and analysis of the Russian legal entities and businessmen. – Access mode: <https://www.rusprofile.ru/>.

24. Central statistical database of Federal State Statistics Service. Retail price structure. – Access mode: <http://www.gks.ru/dbscripts/cbsd/DBInet.cgi?pl=1923007>
25. Andreeva T.V., Ermakova Zh.A. Added value in a system of analysis of the products manufacture chain // vestnik of Orenburg State University. – 2011. – No. 10 (129). – P. 242-248..
26. Poleshkina I., Peplozyan E. Armenia;s dairy sector: peculiarities of interrelation between the participants of the dairy chain of supplies. – Moscow: Eurasian center on food safety, 2016. – 21 p. – Access mode: http://ecfs.msu.ru/sites/default/files/node/publication/17/03/poleshkina_peplozyan_rus.pdf
27. Agriculture, hunt and forestry of the Orenburg region. 2018: statistical abstract / Territorial authority of Federal State Statistic Service for the Orenburg region. – Orenburg, 2018. – 159 p.
28. Official site of “Summer meadow” LLC – corporate chain of stores pfthe agricultural holding company “A7 Agro”. – Access mode: <http://xn--c1adjehdl3bn.xn--p1ai/about>.
29. Official site of the agricultural holding company “A7 Agro”. – Access mode: <http://a7agro.ru/site/o-kompanii.html>.
30. The DairyNews – everyday news of the dairy market. – Access mode: <https://www.dairynews.ru/company/holding/a7-agro-ooo/>
31. Mohammadi, M. (2017). Combination of Modeling Techniques for Supporting Business Process Architecture Layers. International Journal on Advanced Science, Engineering and Information Technology, 7(3), 1038-1048. Cite as: <https://pdfs.semanticscholar.org/69aa/60491421eba7c71386ab215b7e3424d7603c.pdf>

DATA OF THE AUTHORS.

- 1. Tatyana V. Andreeva.** Candidate of Economic Sciences, Ph. D., Associate Professor.
- 2. Raisa S. Vidishcheva.** Ccandidate of Economic Sciences, PhD., Orsk Humanitarian Technological Institute (Branch), Orenburg State University, Russian Federation.

3. Anna V. Kurlykova. Candidate of Economic Sciences, PhD., Associate Professor Orenburg State University, Russian Federation.

RECIBIDO: 5 de agosto del 2019.

APROBADO: 19 de agosto del 2019