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MODELING OF PREREQUISITES FOR COOPERATION BETWEEN LIGHT INDUSTRY AND SCIENTIFIC ORGANIZATIONS IN THE FORMATION OF THE PRODUCTION PROGRAM

МОДЕЛИРОВАНИЕ ПРЕДПОСЫЛОК КООПЕРАЦИИ ЛЕГКОЙ ПРОМЫШЛЕННОСТИ И НАУЧНЫХ ОРГАНИЗАЦИЙ В ФОРМИРОВАНИИ ПРОИЗВОДСТВЕННОЙ ПРОГРАММЫ

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The formation of the production program of light industry enterprises in conditions of end–to-end digitalization of economic processes and transactions, accelerated information diffusion associated with the development of digital platforms, social networks - is associated with the need for accelerated revision and updating of its composition in terms of updating the product range. In this regard, there is a need to attract external creative resources aimed at developing and updating the production program of industrial enterprises through mechanisms of cross-organizational interaction.

The purpose of the study is to develop scientifically based approaches and tools for the formation of a production program at light industry enterprises based on interaction with partners - scientific and educational organizations.

The scientific novelty of the research lies in the development of scientifically-based organizational solutions for the formation of a production program at light industry enterprises using interaction with partners – scientific and educational organizations.

Формирование производственной программы предприятий легкой промышленности в условиях сквозной цифровизации экономических процессов и транзакций, ускоренной информационной диффузии, развития цифровых платформ, социальных сетей связано с необходимостью скорейшего пересмотра и обновления ее состава с точки зрения обновления выпускаемой номенклатуры продукции. В этой связи возникает потребность привлечения внешних креативных ресурсов, направленных на разработку и обновление производственной программы предприятий промышленности через механизмы кросс-организационного взаимодействия.

Научная новизна исследования заключается в разработке научно обоснованных организационных решений по формированию производственной программы на предприятиях легкой промышленности с использованием взаимодействия с партнерами – научно-образовательными организациями.

Keywords: light industry, cooperation, scientific and educational organizations, production program, development prospects.

Ключевые слова: легкая промышленность, кооперация, научно-образовательные организации, производственная программа, перспективы развития.

Introduction. In the era of transformation of all spheres of economic activity, there is an imbalance in the management mechanisms of light industry enterprises, which has both scientific and practical significance in modern conditions when planning assortment policy and developing new types of products at the enterprise. This is difficult to implement without the systematic formation of new levers for launching a production program at domestic enterprises, which determines the efficiency of the entire enterprise in conditions of fierce competition and uncertainty of consumer demand for new goods.

A competent management system of the production program makes it possible to improve the efficiency of the enterprise, and reflects the close relationship between the strategy and decisions of all structural units of the company and the areas of logistics, personnel and financial support.

The increase in the market value of an economic entity, as well as the increase in the efficiency of enterprise management, both contribute to the continuous improvement of the management system of the production program, determined by the structuring of the management activities of the economic entity.

Today, the tasks of rational development and efficiency of the formation, implementation and use of the production program of textile industry entities, affecting the stability of financial and economic activity in conditions of risk and uncertainty, are particularly relevant.

Research methods. The methodological basis of the research is the works and scientific and methodological developments of domestic and foreign researchers in the field of production organization, organization economics and production management, as well as scientific publications and time-based publications.

The main methods used in the study: expert assessment methods, theoretical methods, survey methods and brainstorming methods.

Results and discussion. Today, cooperation between industrial enterprises and scientific and educational organizations is taking on more diverse forms. This is due to the need for constant updating of industrial production in accordance with the requirements of market demand.

Due to the crisis phenomena in the world economy, Kazakhstan assumes the support of domestic producers of products, which is impossible without the transition of the economy to a new course of development.

As part of our research, we have reviewed and analyzed the dynamics of indicators of the textile industry in the Republic of Kazakhstan.

The development of light industry in Kazakhstan is one of the priority directions today, since the industry has social significance, providing high employment of the population [1, 2, 3]. Today, the Government of Kazakhstan is implementing a number of measures to support the domestic light industry: free economic zones, preferential taxation and lending, quotas and grants for training, public investments.

The light industry of Kazakhstan has 1044 enterprises. It employs 12.7 thousand people.

In 2022, the volume of light industry production increased by 18.9% and amounted to 87.5 billion tenge. The growth is observed in the production of textiles by 23,7% and clothing by 7,5%.

In the production of light industry products in 2022, the main share falls on textile production - 53% (46.1 billion tenge), followed by the production of clothing with a share of 37% (32.8 billion tenge) and the production of leather and related products with a share of 10% (8.6 billion tenge) [4].

The trade turnover of Kazakhstan's light industry in 2022 amounted to $1.3 billion, an increase of 14.5% compared to the same period last year.

According to the Ministry of Industry and Infrastructure Development, for 11 months there has been an increase in import flows in all sub-sectors: in the production of clothing by 34%, in textile products by 13% and in the segment of leather, leather products by 35%. At the same time, the main share of imports, as a rule, consists of shoes, men's and women's clothing, T-shirts, sweatshirts, valises, suitcases, handbags, suitcases and hosiery. If men's and women's clothing is mainly supplied from China, Turkey, Russia, Italy, then shoes and outerwear are from China and Russia, valises, suitcases, handbags-suitcases - from China, Russia, Italy and France.

Of course, the reason for the high demand for imported products is the low price. In this aspect, domestic manufacturers cannot compete with foreign products. After all, domestic enterprises have a need for raw materials of a certain quality and for raw materials that are not produced in Kazakhstan. Thus, the final product becomes more expensive [5, 6].

Export of light industry products: 30 enterprises enter the foreign market.

The volume of exports of light industry products in 2022 shows growth. An increase in export supplies is observed in the production of textiles by 21.5% and in the production of clothing by 12%.

The main export items in 2022 were cotton fiber, textile materials impregnated, coated or duplicated with plastics, bed linen. The main volume of exports of cotton fiber - to China, Moldova, Latvia, textile materials were carried out to China and Russia, bed linen - to Russia.

In Kazakhstan, only 30 light industry enterprises enter the foreign market. In general, about 10% of the volume of light industry is exported [7, 8].

According to the Ministry of Trade and Integration, today the main export markets are China (39,4%), Russia (37,4%), Kyrgyzstan (5,2%), Italy (4,8%), Lithuania (4,4%), Uzbekistan (1,5%).

There is an increase in exports of such goods as: bags and packaging bags made of textile materials - by 98%, bed linen, table, toilet and kitchen linen - by 21,8%; nonwovens - an increase of 4,5 times, other shoes with soles and uppers made of rubber or plastic - an increase of 4,9 times; hosierysocks - by 44,5% [4].

The Government annually provides budgetary funds for the provision of service support. So, according to the results of 3 months of this year, such measures were provided to 16 light industry companies (this is reimbursement of costs associated with participation in trade missions, exhibitions, forums). Expenses incurred by enterprises for advertising, rental of premises, warehouses, certification are also reimbursed. At the same time, the Ministry of Trade and Integration provides for reimbursement of up to 50% of transport costs to Kazakhstani companies supplying processed goods for export. This mechanism will allow Kazakh exporters to reduce the cost of production by up to 10%, as well as expand the geography of exports and the range of goods.

Since 2020, MTI RK together with QazTrade has launched an export acceleration program aimed at supporting enterprises from production to the shelves of foreign countries. The target group of the program were food and light industry enterprises. Currently, the training of personnel with higher and postgraduate education for the light industry is carried out by 8 higher educational institutions within the specialties "technology and design of light industry products", "technology and design of textile materials": M. Auezov South Kazakhstan University, M. H. Taraz State University. Dulati, Semipalatinsk State University named after Shakarima, Rudn Industrial Institute, Almaty Technological University, Kazakh University of Technology and Business, Almaty University, Bolashak University.

In the 2021-2022 academic year, the enrollment was 501 people. The amount of the allocated grant for training personnel for this field is 467.

In addition, in the specialty "Technology and design of light industry products", the number of graduates of the 2021-2022 academic year in the bachelor's degree is 386, in the master's degree – 14 (10 of them by state order), in the PhD doctoral program – 1 person.

In the specialty "Technology and design of textile materials", the number of graduates of the 2021-2022 academic year in bachelor's degree is 82 (79 of them by state order), master's degree – 10 (10 of them by state order), PhD – 2 people.

The above-mentioned higher educational institutions have identified bases for professional practice and internship of students in the relevant specialties: knitting factory of JSC "Altex", LLP "AZALA Textile", LLP "Cashmere", LLP "Mimioriki", LLP "Semipalatinsk leather and Fur Combine", LLP "Murager" (Semey), sewing factory "Educational and production enterprise of the Kazakh Society of the Deaf" (Kostanay), LLP "Production and innovation Company" ASTANAANA ltd (Astana), LLP "Tarazbylgaryetik", LLP "Fiberglass pipe Plant", hosiery factory "Bota".

Personnel training in the field of light industry is conducted in 89 educational institutions of technical and vocational education in 6 specialties and 11 qualifications.

The contingent of students in the field of light industry in educational institutions of type - 9614 people, including 9189 people by state order. In the context of specialties:

Processing technology of fibrous materials - 90 people, by state order - 90 people;

Technology of production of leather and sheep products - 16 people;

Garment industry and clothing modeling - 9222 people, by state order - 8928 people;

Textile production - 171 people, by state order - 171 people;

Technology of knitted, textile, haberdashery products - 25 people.

An industry council for the development of technical and vocational education and training in light industry has been established.

Taking into account the projects of the state program of industrial and innovative development of the country, professional standards for priority specialties of light industry have been developed. An independent specialized center has been established to assess and assign qualifications to graduates of technical and vocational education in light industry.

The state mandatory standard of technical and vocational education provides for an increase in practice, which will allow educational institutions to independently change the content of 50% of educational programs [9, 10].

Relations with the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken", regional chambers of entrepreneurs, employers' associations, associations of colleges of the Republic of Kazakhstan are developing for the organization of professional practice and industrial training.

Indicators of innovation and investment activity reflect the readiness of industrial enterprises to introduce new technologies, the reorientation of production to the manufacture of new materials, the creation of cooperatives, including in cooperation with research organizations. Tables 1-3 analyze the dynamics of indicators of innovation and investment activity of textile industry enterprises, including the share of innovative developments, cooperation in research, based on data published in the innovation activity indicator for 2017-2022.

Table 1

Indicators		Year					
		2017	2018	2019	2020	2021	2022
The share of technological innovation costs in the total volume of goods shipped, works performed, services, %		9,7	8,1	1,2	0,8	0,6	0,4
The share of costs for technological, marketing, organizational innovations in the total volume of goods shipped, works performed, services, %		0,6	0,2	1,2	0,8	0,1	-
The proportion of employees who carried out research and development in the total number of employees of organizations that carried out technological innovations, by type of economic activity, %		0,5	0,5	1,0	1,2	1,1	1,9
The share of innovative goods, works, services in the total volume of goods shipped, works performed, services by the level of novelty and types of economic activity	newly introduced or subjected to significant technological changes	2,3	2,2	5,6	5,3	3,7	2,8
	subjected to improvement	0,6	0,3	0,8	0,8	0,6	0,5
Index of the physical volume of investments in fixed assets aimed at reconstruction and modernization by type of economic activity in the Republic of Kazakhstan (in shares compared to the previous year)		1,29	2,2	0,61	2,4	0,83	-

Note: compiled by the authors according to the Bureau of National Statistics.

During the period under review, there has been a decrease in the share of expenditures on technological innovations in the total volume of goods shipped in 2018 compared to previous periods. In 2017-2018, there were the lowest indicators of the share relative to the total number of employees of the enterprise, and in 2022, the highest among employees who are engaged in research and development, as well as engaged in the implementation of technological innovations. Data analysis allows us to conclude that enterprises are uncertain and unprepared for independent measures for the development and implementation of innovative developments, which is associated with the emergence of additional risks.

Table 2

Year	The proportion of employees who carried out research and development in the total number of employees of organizations that carried out technological innovations, %	The share of technological innovation costs in the total volume of goods shipped, works performed, services, %
2017	0,5	0,6
2018	0,5	0,1
2019	1	1,2
2020	1,2	0,8
2021	1,1	0,6
2022	1,9	0,4

Note: compiled by the authors according to the Bureau of National Statistics.

The share of employees performing research and development, despite some growth, remains insignificant, while there is no increase in research and development costs, which is a factor limiting the research and innovation potential of enterprises, which forces them to focus mainly on external resources in the development strategy of the production program, where 2 sources are currently viewed: engineering companies (mostly foreign), whose availability is reduced in the conditions of sanctions for Kazakhstani enterprises, or domestic scientific and scientific educational organizations. It should be noted, at the same time, the share of expenditures on technological innovations in the total volume of goods shipped, works performed, services for 2022 did not suffer significant changes compared to 2017.

Table 3

Year	Newly introduced or subjected to significant technological changes, %	Subjected to improvement, %
2017	2,8	0,1
2018	0,8	0,1
2019	5,6	0,3
2020	5,3	0,8
2021	4,3	3,7
2022	2,8	0,5

Note: compiled by the authors according to the Bureau of National Statistics.

These data clearly indicate the existence of the interest of enterprises in the development of new technologies, which is necessary to increase competitiveness, however, creative and research resources are needed for the formation of the assortment and inclusion in the production program, which enterprises do not have.

During the period under review, there has been a slight increase in the interest of textile enterprises in cooperation in the research and development of new projects, but instability is noticeable.

The most innovative and active organizations in the textile market today are enterprises that produce non-woven materials and fabrics for special and technical purposes [8, 10].

In this case, it is proposed to consider the practical activities of modern domestic light industry enterprises in the development of a new product range. Currently, enterprises engaged in innovative activities are creating projects related to interaction with scientific and educational organizations, this trend is increasing. Tables 4 and 5 show the dynamics of indicators by types of cooperative interaction and types of economic activity.

Table 4

Distribution of organizations involved in joint projects by types of cooperative ties, %	Year					
	2017	2018	2019	2020	2021	2022
Constant cooperation	25	66,7	75	50	100	33,3
Cooperation within the framework of the project	75	33,3	25	25	0	66,7
One-time, informal cooperation, not related to a specific project	0	0	0	25	0	0

Note: compiled by the authors according to the Bureau of National Statistics.

Table 5

Distribution of organizations involved in joint projects by type of partners, %	Year					
	2017	2018	2019	2020	2021	2022
Organizations in the group that the organization belongs to	0	33,3	25	0	0	16,7
Consumers of goods, works and services	25	66,7	50	12	12,5	33,3
Suppliers of equipment, materials, components, software	50	66,7	75	82,5	68,7	16,7
Competitors in the industry	0	33,3	50	5,9	6,3	16,7
Consulting and information firms	0	0	25	0	6,3	0
Scientific organizations	0	33,3	25	12	12,5	50
Educational organizations of higher education	50	33,3	25	5,9	12,5	16,7

Note: compiled by the authors according to the Bureau of National Statistics.

The events of recent years indicate an increased interest in the partnership of enterprises with representatives of Scientific and educational organizations, including indirectly through equipment suppliers, but the trend is unstable, which indicates the search for universal solutions to maximize benefits.

Conclusion. Thus, the development of mechanisms of cooperation of light industry enterprises with representatives of scientific and educational organizations is a promising direction. Innovative development of the production program is expensive and requires additional time, so the main prospects fall on cross-organizational interaction and the involvement of external resources of scientific and educational organizations.

Joint interaction of enterprises with scientific and educational organizations allows to form a production program based on mutually beneficial partnership, thereby reducing the time and organizational risks of the life cycle of innovative joint solutions implemented. This form functions by creating a temporary or permanent cross-functional and inter-organizational team between an industrial enterprise and a scientific and educational organization.

Based on the above analysis, the following variants of business models of organizational interaction between an enterprise and a scientific and educational organization can be determined:

- custom development
- collaborative development model (permanent or one-time);
- a model (or models) of initiative development by a scientific and educational organization, including:
- within the framework of regular research and development work,
- within the framework of competitive activities,
- a model for providing access to developments by subscription.

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