ECONOMIC AND SOCIAL EFFECTIVENESS OF CLUSTERS

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Abstract : The article examines the process of regional development through clustering and emphasizes how the future development of clusters contributes to the formation of modern economic and social infrastructures in the regions. An econometric model of the production activities of the " Sultan Tex Groop " cotton-textile cluster has been developed and analyzed. In addition, the study highlights the main factors determining the economic and social efficiency of modernclusters.

Keywords: cluster, clustering, econometric modeling, digital technologies, green economy, green technologies, economic potential, economic efficiency.

In the current era of globalization, clusters have become the main link in the effective growth of the economies of the world's countries, and as a new productive force, they cover about half of economic activity. In particular, in the USA, about 400 clusters operate, accounting for 60-65% of the country's GDP, in Italy, the share of more than 200 clusters in production is about 40% of the country's exports, in China, more than 60 clusters uniting many enterprises produce large volumes of products.

Advanced development through clustering includes economic potential, new technologies, environmental factors and financial opportunities. The process of strategic analysis of clustering helps to determine in which direction clusters should develop, what innovations should be introduced and how effectively interregional cooperation can be established. This, in turn, serves to increase the economic growth and competitiveness of clusters.

Analysis of the literature on the topic: The concept of "cluster" was introduced into the scientific process as an economic concept by Michael Porter in the 1980s. According to Porter, a cluster is a geographically interconnected network of companies and institutions operating in certain industries.[1] is calculated. This definition was given in 1990 by Michael Porter in his work "The Competitive Advantage of Nations". Thus, a cluster is a way of uniting related enterprises, which allows to increase the competitiveness of the regional economy. In terms of organization, a cluster is a vertically integrated structure.

In 2005, economists A. Rasulev, R. Alimov, D. Kurbanova published a paper entitled "Important directions of cluster economic policy in the development of the cotton complex in Uzbekistan"[2] The article covers the basics of cluster development in the country.

The authors Rahimov Odil Berdievich, Mukhitdinov Khudayar Suyunovich, published in the Journal of Management ("Value & Ethics" Gwalior Management Academy. India ISSN-2249-9512, 2022 November Special Issue Page: 222-236 (08.00.00; №6)) study the issue of econometric modeling of clustering of subjects in regions in their article "Kashkadarya province

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[1] Porter M. Clusters and the New Economics of Competition. Harvard Business Review, 1998 // http://hbr.org/product/clusters-and-the-new-economics-of-competition/an/98609-PDF-ENG.

activity of economic subjects econometric modeling of inter-territorial clustering", and the author OB Rahimov's article "Econometric model of interterritorial clustering of economic subjects" published in the scientific journal "Economy and Entrepreneurship" (scientific journal, 2024 №1 (162), ISSN 1999-2300, Journal included in the List of VAKa of the Russian Federation, pp.673-676.) studies econometric models of clustering of economic subjects.

Research methods: Statistical observation, correlation-regression analysis.

It is necessary to find opportunities for the economic development of regions, to foresee unachieved levels of production, to study unused reserves. In terms of optimization, the organization of clusters and their production begins with excellent planning. The planning stage, which represents the initial part of production activity, is of great importance in increasing production efficiency. In planning, the main requirements are set, the economic potential of the developer is analyzed. Planning should be carried out on the basis of a number of programs and the most optimal among them should be identified. These processes are carried out on the basis of economic analysis.

Clusters help to introduce innovations more quickly and apply them on a large scale, which has a positive effect on overall technological progress. The rapid development of digital technologies in the modern economy requires a more in-depth analysis of economic processes. Econometric modeling allows you to analyze and evaluate economic indicators in a digital economic environment. Econometric modeling of clustering serves to strengthen cooperation between production entities, ensure economic stability, introduce innovations and increase competitiveness. It is also one of the main tools for making economic decisions, and is of great importance for the sustainable development of the economy.

Statistical data on the development of the "SULTON TEX GROUP" cluster, one of the agro-industrial clusters in the Kashkadarya region, were analyzed and factors related to its production were considered, where Y is the sales volume of products manufactured by this cluster (billion soums), x1 is yarn production (tons), x2 is jobs in the cluster (in units).

We convert the values of cluster sales volume (Y) and yarn production (x1) and the number of jobs (x2) that positively affect it in Table 1 to natural logarithm values, the purpose of this work is to more accurately assess the relative changes between variables, which helps to simplify the complex relationships between economic and financial indicators. Data through natural logarithm

Table 1

"SULTON TEX GROUP" cotton-textile cluster product production indicators [2]

Years	Sales volume of manufactured products (billion soums) Y	Yarn production (tons) x_1	Jobs (in units) x_2
2018	150,532	6 316.00	253
2019	226,079	6 222.00	633
2020	250,775	5 711,00	618
2021	276,258	5 709,00	727
2022	445,345	10810.00	750
2023	440,019	12773.00	768

Shifts are reduced, as a result, it is possible to linearize the influence of variables and track trends more accurately. This method is especially used in the analysis of relative changes between variables, reducing the differences between small values and large values, increasing the consistency and reliability of the analysis results. Correlation-regression analysis helps to clearly identify the factors that have a high impact on the development of the "SULTON TEX GROUP" cluster and to form a more effective development strategy in the future.

Table 2

The main parameters of the factors that have a high impact on the sales volume of products manufactured by the "SULTON TEX GROUP" cluster[3]

Outcome variable : Y				
Method : Least squares method				
Range : 2018-2023				
Input variables (observations): 6				
Variable	Model coefficients	Standard errors	t- Student test	p-value
x_1	0.657692	0.137704	4.776144	0.0174
x_2	0.605420	0.115575	5.238345	0.0135
C	2.806943	1.163136	2.413253	0.0 4 47
R- coefficient of determination	0.964671	The mean value of the dependent variable		12.53552
Smoothed R-coefficient of determination	0.941119	Standard deviation of the dependent variable		0.415362
Standard error of regression	0.100789	Akaike's information criterion		-1.444717
Sum of squares of the residuals	0.030475	Schwarz criterion		-1.548837
Maximum similarity fuchsia value	7.334150	Hannan- Quinn writer		-1.861519
F- Fisher's test	40.95856	DW- Darwin - Watson criterion		2.288011
Probability (F- Fisher test)	0.006640			

Results and discussions: Based on the results of the research, we have created the following multi-factorial empirical model representing the growth dynamics of sales of products manufactured by the "SULTON TEX GROUP" cotton-textile cluster :

$$Y = 16,61 * x_1^{0,66} * x_2^{0,61}$$

This model form is a hierarchical model, and the model provides convenience in analyzing relative changes in indicators. This hierarchical model represents the positive impact of variables x_1 and x_2 on Y, using the model, depending on the change in the factors of yarn production (x_1) and the number of jobs (x_2), the sales volume of the cluster's products (Y) increases , this constructed empirical model is a monotonically increasing function.

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[3]Author's development based on the program

this multifactorial empirical model shows that 0.66+0.61=1.27>1, which means that the sales volume efficiency of cluster production products is high.
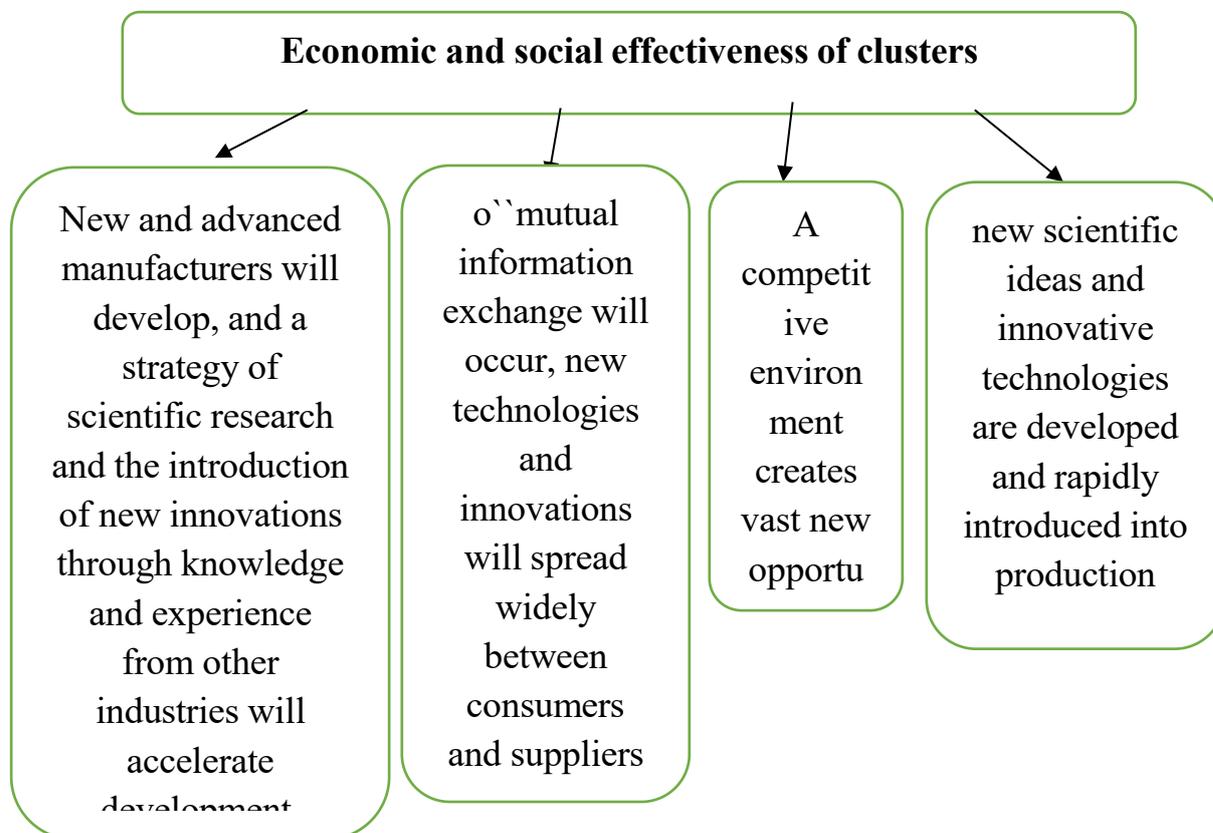
If the analysis is carried out in a deeper and more comprehensive manner, the introduction of innovative technologies, the efficient and effective use of raw materials, and maintaining a stable number of workers will have a positive impact on the production efficiency of this cluster.

The coefficient for the variable yarn production (x_1) is 0.66, which means that yarn production (x_1) has a positive average effect on sales (Y). In other words, a 1% change in yarn production (x_1) leads to a 0.66% change in sales (Y). The coefficient for the factor number of jobs (x_2) is 0.61, which also indicates a positive effect, i.e. a 1% change in the number of jobs (x_2) leads to a 0.61% positive change in sales (Y). In this cluster, this reasoning can be interpreted as follows: if yarn production in the cluster is increased by 1%, then the sales volume of the cluster's products will increase by 0.66%, and if jobs in the cluster are increased by 1%, then the sales volume of the cluster's products will increase by 0.61%.

This model is used to make decisions in real-world situations. to do and cluster development future dynamic changes in forecasting is applied.

Conclusions and recommendations: The development of clusters leads to the formation of modern economic and social infrastructures of regions, which demonstrates their economic and social efficiency .

The economic and social effectiveness of clusters is determined by:

Economic and social effectiveness of clusters

| New and advanced manufacturers will develop, and a strategy of scientific research and the introduction of new innovations through knowledge and experience from other industries will accelerate development | o``mutual information exchange will occur, new technologies and innovations will spread widely between consumers and suppliers | A competitive environment creates vast new opportu | new scientific ideas and innovative technologies are developed and rapidly introduced into production |

New opportunities and scientific ideas in the process of clustering and their implementation in production significantly contributes to economic growth at the regional and national levels . Clusters for digital technologies with integration to do – to work release and from resources effective

use optimizes. Through digitization, enterprises can quickly provide each other with information, which results in increased efficiency. With the help of artificial intelligence and new technologies, it is possible to monitor production processes in clusters, produce products that meet requirements, and even achieve progress in the areas of technical maintenance . Green technologies and renewable energy sources are of great importance in making production processes within clusters environmentally safe and efficient. By reducing and saving raw materials, and increasing energy efficiency, the possibilities of creating ecological cluster systems expand. Clusters create new broad opportunities through the exchange of experience and ideas . At the same time, it is necessary to expand the scope of implementing scientific and technological ideas through open innovation platforms .

By implementing the above ideas and technologies in clusters, modern technologies will be introduced into regional production processes, competitiveness will be increased, and sustainable economic growth will be achieved.

Clustering in strategic areas strengthens cooperation between entities, increases competitiveness, and stimulates their economic growth.

Clustering promotes knowledge exchange and cooperation on experience between entities. It creates opportunities for faster implementation of innovations and use of technological innovations, which greatly stimulates the technological development of these entities.

Through clustering, entities are able to pool their resources, reduce costs and use resources more efficiently. This helps to increase the efficiency of production processes, which in turn increases competitiveness by reducing prices.

Cluster entities integration logistics networks to improve take comes. Product and of services faster and cheaper delivery provided, as well as transport and infrastructure system efficiency increases.

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