Economic Efficiency Analysis of Textile Clusters: In Case of Uzbekistan

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Abstract- **This article proposes a methodical approach to analyzing the efficiency of textile clusters. The influence of textile clusters in Namangan region on the competitiveness of the industry, the potential for implementation of innovative projects, the impact on the economic indicators of the industry, the presence of connections and interactions between the cluster members, the geographical proximity of the cluster members, and the correct selection of the cluster members were evaluated. Based on the evaluation results, a scientific proposal and practical recommendations were developed for the effective organization of market activities of textile clusters.**

Keywords: Cluster, textile, sewing, knitting, industrial clusters, efficiency, synergy

1. INTRODUCTION

The textile industry of Uzbekistan, as a long-developed industry, is distinguished among the countries of the world by its unique favorable resource opportunities and the formation of a market environment. The textile industry plays an important role in meeting the demand for consumer goods of the population, increasing the standard of living and culture, as a supplier of composite products for the development of other industries, as well as providing the country with the main currency income.

The textile industry as a multidisciplinary complex includes spinning, sewing, knitting, and silk industries. Since the first day of Uzbekistan's independence, textiles, which are the main consumer goods of the population, have been developing based on strategies aimed at radical improvement of production, then modernization and diversification, and in recent years, innovative development.

The unique features of the textile industry are the constant demand for the products produced in the world market, the high labor capacity, the environmental purity of the industry, and its high role in the development of other industries. In the textile industry, compared to other sectors, there are opportunities for the wide activities of small businesses and private entrepreneurs.

The textile and knitting industry of Uzbekistan is the only industry that has a high share in the real sector of the economy and fully covers the production chain.

Chain enterprises produce spun yarn, kalava, raw and finished fabrics, and knitting and sewing enterprises - clothes and household goods. The importance of the development of this sector of the economy for Uzbekistan is primarily related to the availability of local raw materials (cotton, silk, wool), as well as the high labor capacity of the textile industry. This is also important in terms of finding solutions to problems such as employment and raising the standard of living of the population. In the conditions of increasing demand for natural, high-quality products in the world market, consistently monitoring the quality indicators of products is important in their export. Taking into account these circumstances, conducting scientific research on the improvement of the methodology of continuous assessment of the activity of textile clusters is an actual direction of research.

2. LITERATURE REVIEW

Along with the ongoing efforts to support clusters at the country level, many questions arise when creating clusters, one of which is the assessment of the effectiveness of the cluster being created.

In the studies on the implementation of the cluster policy, including based on M. Porter's theory, it has been shown that the development of clusters depends on the competitive environment formed in the network. Based on the characteristics of the textile products market, it can be observed that a highly competitive environment has been formed in this industry in Uzbekistan.

Approaches to evaluating the efficiency of network clusters have been widely studied in scientific research and a number of approaches have been formed. And the main researches are the organization of industrial clusters in the region and regional growth. In many studies [1][2][3] the mutual integration of cluster members was evaluated

according to the level of localization, geographical proximity, economic status, concentration, and size[4]. Statistical analysis, integrated assessment, expert assessment, SWOT and PEST analysis methods and questionnaires were widely used in the assessment. In the above methods, quantitative methods for evaluating the efficiency of clusters were relied on, and the motivational factors of enterprises joining the cluster were not taken into account enough.

For example, by E. Fezer, the high share of items in the network was chosen as the main indicator, and when evaluating the efficiency of clusters, he mainly focused on the formation of the added value chain [5]. According to L. Bertinelli, the network was evaluated according to the geographical agglomeration of enterprises[3]. Also, in practice, the methods of basing the possibilities of clustering on the factors that determine the adaptability of enterprises to the competitive environment are widely used. [6][9][10][11]

3. METHODOLOGY

According to M. Porter's expanded concept of competition, the main determinants for the development of clusters are the following [7]:

- Factors of production;
- Demand status;
- Status of use of public services and infrastructure;
- The state of geographic proximity and vertical integration;
- Horizontal integration and cooperation in competition;
- Mutual cooperation relations;[8]
- Methodology

Taking into account the cases mentioned in the scientific literature, it is necessary to evaluate the effectiveness of clusters according to the following characteristics:

1. Impact of clusters on network competitiveness;
2. Implementation of innovative projects;
3. Growth of economic indicators of the network;
4. The presence of connections and interactions between cluster members;
5. Geographic proximity of cluster members, proper selection of cluster members and their number.

The criteria selected according to these characteristics are evaluated in a 5-point system. In the evaluation, the score "0" is evaluated according to the positive or negative influence of clusters on the development of the network; A score of "2.5" indicates an insignificant effect; A score of "5" indicates a significant positive effect. Expert groups will be formed for this assessment. Highly qualified personnel are involved in this group.

The group of experts is invited to determine weighting coefficients (K_i) and influencing factors (k_i) for each criterion. Based on the number of established criteria to determine the efficiency of cluster activity (N_j), the weighting coefficients for each feature are determined:

$$N_j = \sum k_i * K_i \tag{1.1}$$

in this

k_i- selected criteria;

K_i- weighting coefficients according to selected criteria;

The network cluster creation efficiency index (N) is defined as the arithmetic mean value of the final scores for all features. Based on the above scale of points, the following criteria are selected for the formation of clusters:

if the final score is from 2.5 to 5 points, creating a cluster is effective;

if the final score is between 1.5 points and 2.5 points, it is possible to create a cluster, but they are unreliable;

if the final score is less than 1.5 points, it is impossible to create a cluster;

It forms an industrial cluster and accordingly determines the efficiency of the network cluster.

The proposed metrics for evaluating cluster performance are presented in Table 1.

Table 1: System for evaluating the efficiency of textile clusters

Factors (k_i)	Weight coefficient. (K_i)	Influencing factors	Evaluation recommendation
1. Impact of clusters on network competitiveness (N_1)			
k_1 — launch of production facilities in clusters	0,3	- the average load factor of production capacities	Total textile production capacity in the region is determined based on the ratio of production capacity of clusters;
k_2 — impact of cluster enterprises on regional industry	0,3	- increase in the volume of manufactured products.	It is determined based on the change of the share of clusters in the production of total industrial products in the region
k_3 — the impact of cluster enterprises on the export potential of the region	0,3	- - export development	It is determined on the basis of changes in the share of clusters in the total export of industrial products in the region
k_4 — image of cluster enterprises	0,1	-image of business activity of cluster enterprises;	It is determined based on expert evaluation
2. Implementation of innovative projects (N_2)			
k_5 is the level of innovative activity of clusters	0,3	- increase in the number of innovations in the network after the establishment of the cluster;	Weight of innovations implemented by clusters in total innovations implemented by industrial enterprises;
k_6 - level of implementation of new projects of clusters	0,3	- level of introduction of new technologies	Share of clusters in the number of new projects implemented in the industry;
k_7 – commercialization of innovative products	0,3	- the share of innovative products in the manufactured product	The share of clusters in the total innovations created in the regional industry
k_8 - use of modern information technologies	0,1	- level of use of CRM and ERP software systems of clusters	Joriy etilgan jami CRM va ERP dasturiy tizimlarida klasterlarning hissasini aniqlash asosida ekspert baholanadi
3. Growth of economic indicators of the network (N_3)			
k_9 – production of total industrial products	0,4	- the share and growth of cluster enterprises in the production of total industrial products	Total industrial products are calculated based on determining the share of clusters in the volume of production
k_10 is the number of people employed in the industry	0,3	- Share of people employed in cluster enterprises in the total industry;	It is determined based on the ratio of the number of people employed in the total industry to the number of people employed in the clusters
k_11 is the volume of investments in fixed capital	0.3	- renewal of the main funds of cluster enterprises;	It is calculated on the basis of changes in the size of the company's own funds directed to the increase of fixed assets;
4. Existence of connections and interactions between cluster members (N_4)			
k_12 — level of cooperation	0,4	- the ability of cluster enterprises to achieve the required level of cooperation;	The cooperation of each participant is evaluated by experts according to various criteria. If the obtained value is higher than the average indicator, it is assumed that the cooperation within the cluster members is developed

Factors (k_i)	Weight coefficient. (K_i)	Influencing factors	Evaluation recommendation
k_13 — creation of infrastructure necessary for cluster development	0.3	- the possibility of creating the necessary infrastructure	Expert assessment
k_14 – introduction of new management methods	0.3	-management competence of cluster leaders	
5. Geographic proximity of cluster members, proper selection of cluster members and their number (N_5)			
k_15 is the geographical proximity of cluster members	0,5	-territorial location of cluster members	Closeness of cluster members is determined based on geographical concentration
k_16 — correct selection of cluster members and their number	0,5	- selection of the minimum number of enterprises with the maximum share in the domestic market	It is determined according to the Poreto principle based on the production volume of each enterprise and the number of employees in the enterprise

Source: compiled by the author

4. ANALYSIS AND RESULTS

Namangan region is one of the main textile, sewing and knitting industry regions of the republic where textile clusters have formed. By the end of 2022, a total of 7 textile clusters were operating in the region. Clusters produced raw cotton on 63,000 hectares of land. During 2018-2022, they exported products in the amount of 227.6 thousand US dollars. By the end of 2022, a total of more than 26,000 people are employed in the clusters and their enterprises.

In 2022, 222,400 tons of cotton raw materials were harvested by the cotton-textile clusters in Namangan region on a total of 63,406 ha of cotton fields, and 74,300 tons of fiber were produced within the internal capabilities of the clusters. 100% of the fiber is processed by the clusters, and the remaining capacity is directed to the processing of cotton fiber grown by farms. In 2022, the rate of processing of yarn, which is considered the next process after cotton fiber, by textile clusters was 41 percent, and the contribution of non-cluster enterprises was 59 percent. The clusters have spinning capacities capable of fully processing their self-grown fiber (Table 2).

Also 56.0 mln. p.m of gauze, 8,000 p.m of knitted fabric and 34,950 thousand pieces of ready-made sewing and knitted products. Clusters worked at full capacity in 2022 and exported products in the amount of 111,485 thousand US dollars.

Table 2: According to the creation of the added value chain by cotton-textile clusters in Namangan region and export indicators, for 2022

№	Cotton textile cluster name	Cotton field (ga)	Crop grown in 2022 (tn)	Productivity (s/ga)	Fiber production (tn)	Available capacities				Export (Thousands of US Dollars) Effective 2022
						Yarn (tn)	Gauze fabric (thousand square meters)	Knitted fabric (tn)	Finished product (thousands)	
1	Cotton-textile clusters	63406	222434	34	74293	75250	56000	8000	34950	111485
2	Textile Finance Namangan	9436	29752	32	9937	18000		6000	13000	36419

3	Namangan Textile Clus.	9340	34367	36	11479	17200	30000		2000	906
4	Art Soft Tex Cluster	23218	87357	38	29177	16850	17500		5000	24000
5	Namangan Cotton Tex	3955	10377	26	3466	2200		2000	150	4807
6	Tashbulok Tex	5550	20779	37	6940	6000				15894
7	Uchkorgon Textile	5869	17278	29	5771	15000	8500		4000	19378
8	Iftikhar Clothing Industry	6038	22524	37	7523				10800	10082

Source: Prepared based on the information of the Association of Cotton-Textile Clusters of Uzbekistan

"Art Soft Holding" LLC, considered one of the largest cotton textile clusters, has a complete technological cycle of turning cotton raw materials into finished products, including raw and finished wool fabric production.

"Art Soft Holding" LLC has been operating as a textile cluster since October 10, 2018. The enterprise produces fluffy towels, knitwear and many other types of products. The enterprise is one of the enterprises with its prestige and image in the textile industry of Uzbekistan.

Using the evaluation method, the efficiency of the cotton-textile clusters formed in the textile industry of Namangan region is evaluated. Efficiency is calculated based on the economic indicators of textile clusters to analyze the activity in 2021-2022 according to the proposed method for determining the efficiency of cluster activity. The data of Table 3.11 was compiled to calculate cluster efficiency analysis based on formula (1.1).

Based on the data in Table 3, the coefficients reflecting the efficiency of cluster activity are as follows:

$$N_{k2021} = \sum k_i * K_i = 1{,}74$$

$$N_{k2022} = \sum k_i * K_i = 0{,}84$$

According to the evaluation results, the final evaluation of the efficiency indicator (N) of creating a cluster in the textile industry for all characteristics was 1.74 in 2021, while in 2021 this indicator was 0.84. Based on the above scale of points, it is considered impossible to create a cluster if the final score is less than 1.5 points.

Table 3: Results of the assessment of the effectiveness of the activity of textile clusters

Key indicators	Weight coefficient.	2021-yil	2022-yil
1. Impact of clusters on network competitiveness (N1)			
K1 — loading of production capacities in clusters (general average against total capacities)	0,3	0,438	0,439
Impact of K2-cluster enterprises on regional industry	0,3	0,069	0,108
K3 — impact of cluster enterprises on regional export potential	0,3	0,702	0,667
K4- image of cluster enterprises (expert assessment results). It is assessed by experts on a 10-point scale and applied to the maximum score. The total number of experts is 10.	0,1	0,43	0,67
2. Implementation of innovative projects (N2)			
K5 – level of innovative activity of clusters	0,3	0,214	0,281
K6 – level of implementation of new projects of clusters, billion soums	0,3	0,606	0,295
K7 – commercialization of innovative products	0,3	0,044	0,074
K8 – use of modern information technologies	0,1	0,313	0,273
3. Growth of economic indicators of the network (N3)			

Key indicators	Weight coefficient.	2021-yil	2022-yil
K9 – production of total industrial products	0,4	0,371	0,374
K10- employment potential	0,3	0,191	0,203
K11 is the volume of investments in fixed capital	0.3	0,078	0,044
4. Existence of connections and interactions between cluster members (N4)			
K12— level of cooperation	0,4	0,620	0,655
K13 — creation of infrastructure necessary for cluster development	0.3	0,27	0,38
K14- access to a new level of management	0.3	0,74	0,83
5. Geographic proximity of cluster members, proper selection of cluster members and their number (N5)			
K15 - geographical concentration of cluster members (calculated based on the Herfindahl - Hirschman index)	0,5	0,209	0,159
K16 - correct selection of cluster members and their number	0,5	0,368	0,388
N_k		1,17	0,84

Source: Compiled by author

In our opinion, the enterprises selected for activities aimed at creating a value-added chain in Namangan region and covering links from raw materials to finished products do not create sufficient conditions for the creation of textile clusters in the region, and it is not possible to create textile clusters with the selected enterprises. Accordingly, it is necessary to revise the strategy aimed at creating clusters in the region and set strategic goals aimed at achieving synergy effects based on mutual integration of textile enterprises based on market mechanisms.

5. CONCLUSIONS

The textile industry in the Republic of Uzbekistan is one of the most developed regions and analyzes are carried out based on the activity of the textile clusters formed in them. It is appropriate to evaluate the activity of textile clusters and make appropriate decisions based on the proposed methodology for other regions.

Clusters are a key approach to socio-economic development, innovation, knowledge and added value creation for enterprises. Industrial clusters are considered not only as economic agglomeration, innovation drivers in Industry 4.0, but also contribute to the innovative development of the national economy, ensure regional socio-economic development and improve the well-being of the population.

Textile clusters are activities aimed at creating global value chains (GVCs). The global value chain is the international distribution of value created in the processes of enterprises until the products reach the final consumers. The clusters formed in the textile industry of Uzbekistan create a basis for ensuring participation in the global value chain through effective communication and integration with international brands. Also, high flexibility in product and process standards in developing markets facilitates participation in global supply chains.

REFERENCES

[1]. Battalova A. Otsenka potentiala clusterizatsii otrasli. Internet magazine "NAUKOVEDENIE" Vypusk 6, November - December 2013. http://publ.naukovedenie.ru;

[2]. T. Yu. Kovaleva. Algorithm identification and direct clustering in the economic region. Journal of Perm University. 2011 Vyp. 4(11). Issledovanie podderjano grantom RGNF No. 11 — 12-59011a/U.;

[3]. Stejskal J. Comparison of often applied methods for industrial cluster identification. URL: http://www.wseas.us/e-library/conferences/2010/ Tenerife/DEEE/DEEE-46.pdf (data obrascheniya: 13.06.2011)..

[4]. Bertinelli L., Decrop J. Geographical agglomeration: the case of Belgian manufacturing industry // Federal planning bureau. Economic analyzes and forecasts. 2002. November. 45 p.

[5]. Feser E., Renski H., Koo J. 12 Regional cluster analysis with interindustry benchmarks //Targeting regional economic development. - 2009. - S. 213.

[6]. Papadopoulou E. Applying Shift–Share analysis (SSA) on LEADER. Initiative local action groups in Greece. URL: http://www.rudieurope.net/uploads/media/Case study_Greece_2_ 01.pdf. 2011.

[7]. Grant R. M. Porter's ``competitive advantage of nations'': an assessment //Strategic management journal. - 1991. - T. 12. – no. 7. - S. 535-548.

[8]. Ergashkhodjaeva S. J. et al. Evaluation of textile and clothing industry clustering capabilities in Uzbekistan: based on model of M. Porter //Int J Econ Manag Sci. - 2018. - T. 7. – no. 439. - S. 2.

[9]. Khakimov Z. Transformation of clusters to "Industry 4.0" // Economy and education. - 2022. - T. 23. – no. 2. - S. 244-250.

[10]. Djasurovna E. S., Ahmadovich H. Z., Nishonovich S. A. The ways of improving competitiveness of textile industry enterprises based on marketing strategies //European Journal of Molecular and Clinical Medicine. - 2020. - T. 7. – no. 7. - S. 751-762.

[11]. Akhmadovich H. Z. The ways of improving competitiveness of light industry enterprises based on marketing strategies" monograph. - 2018.