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## ВПЛИВ МІЖНАРОДНОЇ МОБІЛЬНОСТІ ТРУДОВИХ РЕСУРСІВ НА ЕКОНОМІКУ

**Резюме.** У статті досліджено вплив міжнародної мобільності робочої сили на національні економіки. Розуміння цього впливу стає особливо важливим у контексті глобалізації, оскільки трудова міграція набуває нових масштабів і форм. Автор вивчає вплив міжнародної мобільності робочої сили на ключові макроекономічні показники в Азербайджані, включаючи ВВП, продуктивність праці та зайнятість. У статті проаналізовано часові ряди даних за 1995–2023 роки. Сучасні економетричні підходи було застосовано для аналізу зв'язку між показниками мобільності робочої сили та рівнем економічного розвитку. Результати показують значний причинно-наслідковий зв'язок між міграцією населення працездатного віку та як реальним ВВП, так і продуктивністю праці. Надано рекомендації щодо оптимізації процесів трудової міграції для підвищення ефективності національної економіки.

**Ключові слова:** міграція робочої сили, населення працездатного віку, ВВП, продуктивність праці.

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## THE ROLE, EVOLUTION AND DEVELOPMENT OF CLUSTERS IN MODERN ECONOMIES

**Abstract.** Clusters are formed by firms in related industrial sectors concentrated in a certain geographical area, gaining competitive advantage through proximity, having specialized supplier and buyer (marketing) advantages due to their location, and supported by physical facilities, education and research opportunities. With the transition from mass production systems to flexible production systems, clusters have become the most important research area in regional development theories. Clusters mostly; includes end product or service companies, specialized input, intermediate machinery suppliers, and service and financial institutions and firms in related industries. However, it also includes units that provide specialized education, conduct knowledge and research, provide technical support (such as universities, think tanks, vocational training providers) and set standards. In the modern world where global competition is intensifying, clusters are emerging as an attractive element of competition. This article attempts to clarify the characteristics of successful cluster examples, taking into account the historical development of clustering. It also seeks to answer the question of whether clusters can be evaluated as an economic and regional development strategy in the long term.

The main purpose of the article is to provide detailed information about the role and benefits of clusters in the economy and industry, to explain the development stages and economic impacts of clusters. There are various theoretical approaches to studying clusters, and some of these approaches are analyzed and reviewed in this article. The creation and development of clusters supports the growth of the economy and industry. In general, the development of clusters has a positive impact not only on direct economic outcomes, but also on areas such as education, innovation and social well-being. This makes the future economy more competitive, innovative and sustainable, while at the same time creating a more stable social and economic environment.

**Keywords:** cluster, economy, innovation, industry, infrastructure.

## INTRODUCTION

Clustering is defined as a group of companies and related institutions connected to each other through spatially close personal relationships and regional elements that complement these relationships. The spatial scope of a cluster can extend from a city or state, to a country or even to a network of neighboring countries. Government units that influence a cluster, trade associations that support the cluster's members, and other collective private sectors can also be seen as part of the cluster.

However, it is known that clusters are not unique to today, but that their origins date back to before the industrial revolution. Clusters vary according to scale, width and development status. Some clusters are primarily composed of SMEs (for example, the Italian shoe and North Carolina furniture clusters), while others include both small and large firms (such as the Hollywood or German chemical clusters). Again, some of these clusters do not have significant connections with universities, while others are located on research universities. These differences in the nature of clusters also reflect differences in the structure of industry components in clusters. An important characteristic of advanced clusters is that they have a deeper and more specialized supplier base, a range of related industries, and more widespread supporting institutions.

In this context, technological and market developments are creating new industries, designing new connections and changing the markets served. With the work done in the field of science and technology, knowledge-based production economy and innovation have become the main determining force of economic growth in the world, as a result of which professional education and skill development, creativity, being able to produce products with high added value based on R&D and their commercialization have become important. Regulatory changes in communication and communication contribute to the displacement of clustering boundaries. The boundaries of the cluster are constantly changing due to the formation of new firms and industries in the cluster, the shrinking or reduction of established industries, and the development or change of local institutions. This intense competitive environment in the global economy has led countries to innovative directions for the future in international fields, as a result of which a new generation of clusters has emerged. In order to survive both regionally and to keep up with global competition in this intense and tough competitive environment brought by globalization, the new generation clusters have to follow the innovative technological development

of our time, create future-proof strategies, and constantly renew and advance themselves. Today, this dynamic view of clusters makes it necessary to examine clusters from a broader perspective rather than considering them within a specific field and industry.

In this article, the dynamics that make up clusters will be discussed in the historical process, and by analyzing the studies of various sections reflecting the perspectives of the effects of clusters in global competition in recent years, the common features of successful clusters will be highlighted. From this point of view, in the article, the theoretical literature will be comprehensively conducted, and a comparative analysis will be used to determine the characteristics of the new generation clusters operating internationally on a global scale. Today, it is necessary to urgently reveal the elements that ensure the success of clusters in global competition, and in this way, clusters should be treated as a strategy in economic development and regional development.

## THE NATURE OF CLUSTERS

The concept of clusters has been extensively discussed in the works of American scholars such as S. Rosenfeld, M. Lorenzen, M. Storper, M. Porter, A. Marshall, M. Enright, and P. Maskell; Swedish economists L. Lindmark and K. Fredriksson; as well as Russian researchers L. Smirnyagin and A. Gorkin, among others [9]. Economists of the American school have characterized clusters not only as groupings of geographically proximate enterprises but also as mechanisms that strengthen knowledge exchange and innovation, enhance competition and collaboration, and facilitate inter-firm relationships.

The initial concept of clusters can be traced back to Adam Smith's *"The Wealth of Nations"*, which discusses the impact of labor division and specialization on productivity. Later, Alfred Marshall introduced the term "industrial districts", emphasizing clusters as a collaborative and interactive framework of enterprises located within a specific geographic region. Marshall described clusters as the aggregation of small firms with similar characteristics within the same geographic area, highlighting their importance in shaping an outward-oriented economy [11]. According to Marshall, the concentration of enterprises in a particular geographic area facilitates benefits such as technology exchange, the formation of supply chains, and access to skilled labor.

"In Principles of Economics", Marshall outlined the fundamental aspects of clusters as follows [13]:

- 1) Development of interrelated industries,

- 2) Specialization of production processes,
- 3) Concentration of labor resources.

Following Marshall, Michael Porter incorporated the concept of clusters into economic analysis. Porter described clusters as the concentration of enterprises operating in the same sector, collaborating with each other, and located within the same geographic area. His approach represents one of the closest interpretations of the classical definition of clusters [18]. In his work *The Competitive Advantage of Nations*, Porter highlighted that national competitive advantage arises from the geographic concentration of enterprises, their interrelations, and their integration within related industries [18].

Porter's classical cluster model remains a foundational theoretical framework for researchers and holds significant relevance in the formulation of regional development programs, cluster initiatives, and the development of innovation ecosystems.

Subsequent economists have also provided various definitions of clusters. While these definitions emphasize different aspects, the core understanding of clusters as geographically concentrated networks of related enterprises remains consistent:

- *Swann and Prevezer* defined clusters through the lens of supply chain formation, inter-firm relationships, and increased opportunities for skilled labor and knowledge exchange [16];
- *Roelandt and den Hertog* viewed clusters as networks of interrelated enterprises and specialized suppliers operating within production chains, creating added value and complementing one another. Their definition emphasizes not only geographic proximity but also mutual support among enterprises [8];
- *Anderson* characterized clusters as systems based on collaboration and competitiveness, where stronger inter-firm relationships foster competitive advantages [2];
- *Kleiner, Kachalov, and Nagrudnaya* described clusters as groups of geographically proximate enterprises cooperating in production, sales, and consumption activities within value chains [12].

Despite the diversity of perspectives, most definitions share a common essence: clusters are aggregations of geographically proximate enterprises, research centers, institutions, and other organizations that are interconnected, complement one another, and create competitive advantages [1].

#### **The importance of clustering in the modern age**

In recent years, the rapid economic growth and development efforts realized with globalization have become closely related to the ability of

states and companies to compete in the local and global market. Realized rapid developments force to change the purpose and scope of industrialization policies. Previously, industrial policies required only "industrialization", but now increasing "competitiveness" has become the main goal of the policies to be implemented [7]. In the intense competitive environment brought by globalization, many countries, especially developing countries, give a significant place to clustering projects in their development policies.

The new generation clustering approach aims to bring to the fore the sectors and areas of specialization in which the regions have a competitive advantage and to strengthen their competitiveness in these areas. New generation cluster initiatives focus on joint activities aimed at increasing efficiency, innovation and entrepreneurship capabilities of companies, development of cooperation between actors, and attach importance to joint structures and cooperation in areas such as education, information and communication technology, research and development. In the new generation clustering model, the development of cooperation opportunities and innovative activities between companies, especially SMEs, the attraction of foreign capital to the region, the creation of economies of scale, the introduction of policies for the creation of infrastructure that will contribute to the increase of competitiveness at the regional, national and international levels, the public sector, cooperation of private sector, universities, research centers, financial institutions and civil society organizations is targeted. In this context, it is important to ensure cooperation on a global scale as well as regional development in new generation clusters. Today, with the development of technology, the international integration of cultures, ideas and products and their rapid spread throughout the world have led to the development and growth of new generations of groups.

Innovation is seen as the most important common feature of successful clusters. The innovative capacity and economic success of many agglomerations, such as Silicon Valley, Baden Württemberg, and Italian industrial regions, have attracted the attention of researchers interested in the causes of this type of economic dynamism. Therefore, the innovative capacity of clusters has been at the center of most analysis. Many researchers point to the existence of knowledge spillovers from public research centers and universities as a reasonable explanation for the innovative capacity of SMEs [19].

According to Audretsch and Feldman, who pointed out the connection between innovative clusters and the industrial life cycle, the spatial concentration of production leads to the further

spread of innovative activity. Apparently, innovative activity is developed by knowledge overflows available in a specific area, especially in the early stages of the industrial life cycle. Especially in the early stages of the industry, where tacit knowledge plays a very important role, other sources of new knowledge, such as university research, increase the tendency of innovative activity to cluster. However, innovative activity can be spread by additional increases in the concentration of production established in the same region during the maturity and decline stages of industries. Spatial clustering in the activation of innovative activity will only serve as an accumulation effect in the initial and growth stages of the industry, but later it will create a congestion effect. In this case, the trend towards spatial clustering for innovative clusters will undoubtedly be shaped by the stages of the industrial life cycle [3].

However, the most important commonality among the international examples discussed in the study by Bresnahan et al., which explores the origin of some innovative regional clusters, is the connection between the growth and development of the competitiveness of the cluster and the market opportunities that require previously unexplored new technologies [5]. Timothy. In some analyzes, it was revealed that innovative activities that reduce the use of low-skilled labor in clusters create new market and investment opportunities. Strong regional clusters create new jobs and industries in addition to job growth in existing jobs [6].

#### **Economic impacts of clusters**

Since the second half of the 20th Century, the development of clustering has become increasingly significant in the economy, playing a major role in shaping regional policies. Currently, clustering encompasses more than 50 % of the leading global economies and plays a crucial role in integrating national producers into global value chains [4].

Clusters contribute to monitoring the quality of goods and services, providing various after-sales services, fostering a successful business environment, producing goods in line with market demands, developing entrepreneurial activities, and facilitating risk distribution. They also play a vital role in the creation of new sectors and enterprises. Collaboration and competition among cluster participants generate a synergistic effect. As a result, the success achieved by one enterprise positively impacts the performance of others within the cluster [4].

The concentration of firms around a cluster in the same geographic area minimizes transportation costs, enhances collaboration as firms become more familiar with one another, simplifies the delivery of raw materials and products, and increases

access to specialized labor. Consequently, economic performance improves. Research has shown that enterprises within clusters offer more job opportunities and contribute higher tax revenues to the state budget. The activities of clusters have been observed to positively impact the economic development of the region in which they operate, fostering entrepreneurship and improving efficiency metrics [22].

Many countries now prioritize the creation and development of clusters in their economic policies to gain competitive advantages within regions. Clustering has become a tool for stimulating regional and innovative development.

#### **Examples and elements of clustering in developing countries**

Studies on clustering in developing countries take into account the industrial regions formed by small firms conquering international markets in Europe, especially in Italy. However, two basic questions are raised in these studies on developing countries. Are there similarities between clusters in developing countries? What are the conditions that enable, modify or prevent the growth of these clusters? The results of the studies can be summarized as follows:

- Industrial clusters are important in developing countries. Many of the sample materials have shown that clusters are common across many countries and sectors. It is difficult to determine the statistical presence of these clusters in industrial production. Because economic regions that do not comply with administrative boundaries often fail to maintain existing specialization;
- These growing clustering experiences are quite diverse. At one end of the spectrum there are artisan clusters that show little dynamism and do not seem conducive to expansion and innovation. On the other end, there are clusters that have deepened the division of labor between firms, increased their competitiveness and entered international markets. There are many intermediate examples along the spectrum. It is also noteworthy that successful clusters differ from the Italian model in many respects;
- It is seen that there is internal heterogeneity in clusters. In addition to simple clusters, medium and large firms have played an important role in the formation and management of clusters. In this regard, although the experiences of developing countries are very different from the Italian model, they are not different from the Italian reality of the 1990s in terms of the problems they face [20].

Successful clusters cannot be formed from only small firms. Silicon Valley, located in California,

which is the largest value-added economy of the USA, has become the global center of computer technologies, software and smart electronics sectors. Silicon Valley is the world's first next-generation innovation cluster. The name of the region comes from the establishment of many companies specializing in the design and production of silicon-based computer microchips. Silicon-based integrated circuits, microprocessors, microcomputers and many other technologies were invented here. There are more than 4,500 companies in Silicon Valley. Silicon Valley is a cluster that many countries and regions try to emulate or even copy [10].

In Switzerland, a small country, the entire country has an innovation cluster organization. In Switzerland, the entrepreneurial ecosystem has developed as a part of the entire country's culture rather than urban life. There are universities and research centers in the country that have hosted important inventors. In Switzerland, the whole country acting as an innovation cluster made it necessary to create a national interface organization. For this purpose, Swisspark National Incubators and Technology Parks Association was established in 2000. This association works for the purpose of network development, university, industry and public cooperation in Switzerland. Switzerland has created a unique exemplary model with the structure of a single innovation park organization across the country.

The London FinTech cluster was born from the intersection of three horizontal mergers established in London for decades. London is the intersection of an entrepreneurial talent pool, a strong technology cluster and the world's most competitive financial center. The presence of global financial institutions and technology companies has developed the cluster as a source of entrepreneurial and technical talent. Existing financial institutions such as banks, asset managers and insurers are potential customers for FinTech services. The London financial technology cluster is strengthened by government support and has a globally competitive position.

As the examples show, although cluster models in developing countries differ according to local needs and resources, the main success factors include innovation, support for the entrepreneurial ecosystem, and public-private sector collaboration. Such structures not only contribute to economic growth, but also increase competitiveness, allowing them to effectively occupy a place in global markets.

## CONCLUSION

With globalization, the competition between countries, regions and firms, or in other words

many economic units, has become more intense and complicated. At this point, the definition of competition has begun to be considered in a broader framework, in such a way as to focus on innovation from cost elements.

With globalization expanding the field of competition and leaving regionalism in the background, the discussion of whether the competitive forces used in the past will still be an effective tool today has come to the agenda. In the analysis of many developed and developing countries, clusters have become the focus of research in terms of their contribution to economic development and performance. In the past, the theories that were evaluated as industrial regions with emphasis on external economies in the context of cost minimization, which prioritized local organization, expanded over time and began to be discussed in the context of clusters. Especially the social elements and innovation have taken the idea of firm gatherings a step further than what was previously considered. Now, in economic development, great importance is attached not only to economic elements, but also to social capital, which expresses social elements. For this reason, difficulties in the transfer of localized knowledge and maturity and its application to other places are seen as the most important factors that give advantages to clusters. Therefore, it can be stated that each cluster has its own and regional advantages.

In general, the cluster, in the context of competitiveness, it can be said that the manner of integration into the global economy is more important than being treated as a strategic one. From this point of view, the preservation of the unique characteristics of the cluster constitutes the most important source of advantage in its integration into the global economy. This advantage based on local knowledge creates a cluster that cannot be replaced in global competition. Looking at successful examples in developed and developing countries, it is noticeable that the measure of success is the preservation of the internalized qualities of clusters. This basic feature is a prerequisite that is effective in the short term. However, the functional improvement activities based on the potential they have in themselves are an important criterion for maintaining competitiveness in the long term.

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## **РОЛЬ, ЕВОЛЮЦІЯ ТА РОЗВИТОК КЛАСТЕРІВ У СУЧАСНИХ ЕКОНОМІКАХ**

**Резюме.** Кластери утворюються компаніями в споріднених галузях промисловості, які зосереджені в певній географічній зоні, отримують конкурентну перевагу через близькість, мають спеціалізованих постачальників і покупців (маркетингові переваги) завдяки своєму розташуванню та підтримуються фізичними, освітніми та дослідницькими можливостями. З переходом від масових виробничих систем до гнучких виробничих систем кластери стали найважливішим напрямом досліджень у теоріях регіонального розвитку. Переважно кластери включають компанії, які надають кінцеві продукти або послуги, спеціалізовані ресурси, постачальників проміжного обладнання, а також сервісні та фінансові установи та фірми в суміжних галузях. Однак вони також включають підрозділи, які надають спеціалізовану освіту, проводять наукові дослідження, надають технічну підтримку (наприклад, університети, аналітичні центри, постачальники професійної освіти) і встановлюють стандарти. У сучасному світі, де глобальна конкуренція загострюється, кластери стають привабливим елементом конкуренції. У цій статті зроблено спробу висвітлити характеристики успішних кластерів, з огляду на історичний розвиток кластеризації. Авторка також намагається відповісти на запитання: чи можна оцінювати кластери як економічну та регіональну стратегії розвитку в довгостроковій перспективі?

Головна мета статті полягає в тому, щоб надати детальну інформацію про роль і переваги кластерів в економіці та промисловості, пояснити етапи розвитку та економічні наслідки кластерів. Існують різні теоретичні підходи до вивчення кластерів, і деякі з них проаналізовано та розглянуто в цій статті. Створення та розвиток кластерів підтримує зростання економіки та промисловості. Загалом розвиток кластерів позитивно впливає не лише на прямі економічні результати, а й на такі сфери, як освіта, інновації та соціальний добробут. Це робить майбутню економіку більш конкурентоздатною, інноваційною та стійкою, водночас створюючи більш стабільне соціальне та економічне середовище.

**Ключові слова:** кластер, економіка, інновації, промисловість, інфраструктура.

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