

The Clusters Phenomenon and Sustainable Regional Development

Katarina Rentkova¹

¹ Comenius University in Bratislava, Faculty of Management, Odbojarov 10, P. O. Box 95, 82005 Bratislava, Slovakia

katarina.rentkova@fm.uniba.sk

Abstract. Regional development is closely related to a region and its competitive advantages that affect the competitiveness of the region. Regional policy, structural policy or cohesion policy have a single subject of research. Disparities are this subject of researches and analysis. The concept of regional disparity means that there are differences in the economic, social and environmental levels of the regions. Disparities cause uneven development of state territory, regions, but also cities. Disparities represent undesirable differences between states, regions, but also cities. Disparities cause, by their existence, the slowdown in development and economic growth. They represent the weak side of the region or the cities. At present, there are a large number of policies whose actions are geared to sustainable development. Policies are directed from the local level, across the regional level to the national level. The European Union's cohesion policy is aimed at addressing all types of disparities, economic, social, and territorial. Activities that create synergy effects are supported in this respect. Sustainable regional development is closely linked to sustainable urban development. Therefore, it is essential to focus on observation sustainable urban development, which can be used to ensure sustainable regional development. The cluster phenomenon is growing in popularity, becoming prevalent in strategies for economic development of countries. It is perceived as an important development tool by many organizations, such as the Organization for Economic Co-operation and Development (OECD) or European Union (EU). The goal of research is to analyse cluster policy and the relation between cluster policy, and sustainable regional development. The analysis is oriented on the Slovak Republic. The research is processed by using a wide scale of the scientific methods and procedures. The first part is based on preparation and explanation of key terms, such as the cluster, the cluster policy and European cohesion policy. Results part consists of the main findings and is prepared by using a comparative and causal analysis.

1. Introduction

Sustainable regional development is closely linked to sustainable urban development. Therefore, it is essential to focus on observation of sustainable urban development, which can be used to ensure sustainable regional development. The cluster phenomenon is growing in popularity, becoming prevalent in strategies for economic development of countries. It is perceived as an important development tool by many organizations, such as the Organization for Economic Co-operation and Development (OECD) or European Union (EU). The goal of research is to analyse cluster policy and the relation between cluster policy, and sustainable regional development.



2. Literature review

The issue of balanced development is not a new phenomenon for economics, finance, or urban planning. The development was originally associated mainly with economic growth, but gradually became a complex theme that also deals with human development. Greig, Hulme and Turner [1] dealt with the theoretical and practical understanding of development. The authors concluded that there are six different visions (metaphors) of development:

1. Development as growth and sufficiency - the basic and oldest assumption of developmental definitions. Economic growth is often linked to economic development.
2. Development as sustainability - is the strongest challenge for development than growth. Against the backdrop of this vision, there is the idea that the goal of developing and overcoming global inequalities cannot be to reach the standard for developed countries in all developing countries, but continuous improvement is needed.
3. Development as security - a minimum social standard is an important aspect of the personal safety of every person. The development of the neighbouring countries is a prerequisite for national security (and developed countries, too).
4. Development as an illusion - it is based on analyses of the impact of spending, implemented projects in relation to the achievement of development and especially in the fight against poverty. The illusion is seen as still insufficient tackling world poverty.
5. Development as a star - the goal of each country's development is to advance and be a picture of more developed countries, as long as the benchmark is a comparison.
6. Development as Freedom - Economic Development represents a path to political freedom and is linked to politics, the social environment, and the economy. Development is the goal of every society. [1]

Initial theories were based on the fact that development is associated mainly with the economic development of the country. Therefore, the concept and implementation of strategies aimed at economic development. Over time, it is considered that it is necessary to develop not only plan, in terms of achieving actual development, but also the need to ensure sustainable development. Brundtland [2] defines sustainable development as such development that “will ensure the needs of current generations without jeopardizing meet the needs of future generations and without it happening at the expense of other nations.” The European Parliament (article 2) [3] defined sustainable development. “Sustainable development means the improvement of the standard of living and welfare of the relevant populations within the limits of the capacity of the ecosystems by maintaining natural assets and their biological diversity for the benefit of present and future generations.” European strategy for sustainable development covered economic, social, environmental and financial aspects, as well as coherence of European policies and governance at all levels:

- harnessing globalisation: trade for sustainable development;
- fighting poverty and promoting social development: to reduce extreme poverty in the world by 2015 (people who live on €1 a day or less);
- sustainable management of natural and environmental resources: to reverse the trend of the loss of environmental resources by 2015 as well as to develop intermediate objectives in the sectors of water, land and soil, energy and biodiversity;
- improving the coherence of EU policies;
- better governance at all levels: which means strengthening the participation of civil society, and the legitimacy, coherence and effectiveness of global economic, social and environmental governance;
- financing sustainable development. [4]

On 25 September 2015, the United Nations General Assembly formally adopted the universal, integrated and transformative 2030 Agenda for Sustainable Development, along with a set of 17 SDGs and 169 associated targets. The Heads of State, Government, and High Representatives met at the United

Nations Headquarters in New York from 25-27 September 2015 as the Organization celebrates its seventieth anniversary, have decided on new global Sustainable Development Goals. They have resolved, between now and 2030, to end poverty and hunger everywhere; to combat inequalities within and among countries; to build peaceful, just and inclusive societies; to protect human rights and promote gender equality and the empowerment of women and girls; and to ensure the lasting protection of the planet and its natural resources. They have resolved also to create conditions for sustainable, inclusive and sustained economic growth, shared prosperity and decent work for all, taking into account different levels of national development and capacities. They have announced 17 Sustainable Development Goals with 169 associated targets that were integrated and indivisible. Never before, world have had leaders pledged common action and endeavour across such a broad and universal policy agenda. They were set out together on the path towards sustainable development, devoting ourselves collectively to the pursuit of global development and of "win-win" cooperation that can bring huge gains to all countries and all parts of the world. [5] Sustainable Development Goals were:

“Goal 1. End poverty in all its forms everywhere

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Goal 3. Ensure healthy lives and promote well-being for all at all ages

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 5. Achieve gender equality and empower all women and girls

Goal 6. Ensure availability and sustainable management of water and sanitation for all

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10. Reduce inequality within and among countries

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12. Ensure sustainable consumption and production patterns

Goal 13. Take urgent action to combat climate change and its impacts*

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development” [5]

The topic of sustainable development resonates in studies, analyses, policies and strategies of many major world or international organizations. The European Union (EU) is engaged in sustainable development issues, too. Many policies of the EU have a focus on promoting development. Cohesion policy is one of these policies. The focus of cohesion policy is geared to economic, social and territorial cohesion and solidarity between Member States. Implementation of the policy is applied through the established financial instruments, called Structural funds. Cohesion policy is programmed for a 7-year period and its objectives are geared to regional development. Building on the definition of sustainable development from Brundtland [1], the EU's cohesion policy follows two basic assumptions, namely the time dimension and the spatial dimension.

Development has many different meanings and its interpretation may be different. The authors agree that the development of theories and developmental definitions has been associated with economic growth, in the beginning. Gradually the definitions and criteria varied. Development is currently defined

very broadly, with a social, ecological, political, cultural and regional dimension. There are no uniform criteria for regional development. “The principles and values of regional development reflect the relationship and balance of power between the state, the market and civil society and are politically determined by regional stakeholders. The definition of development is bounded by the structural, institutional and historical context.” [6] Regional development is associated with many concepts. Actually, many approaches, models and concepts explain regional growth and development. Each concept explains regional development from a different perspective otherwise formulates recommendations and suggests strategies. Our analysis uses the division of concepts by the group of authors around Buček [6]. The authors used the distribution of Capellini and Moll, from which Maier and Todling (1998), Pike and Rodríguez-Pose and Tomaney (2007) are also based. Concepts are divided into:

- exogenous concepts of regional development - support and intervention of external factors, impulses;
- endogenous concepts of regional development - support for endogenous factors, i.e. the factors available to the region.

There is a combination of both approaches in the implementation of regional policy. There are many theories for regional development. We can mention - Neoclassical theory, The concept of export base, The concept of growth poles (Model Centre - Periphery), Theory of endogenous growth, New economic theory, Institutional and evolutionary theory, Small and medium-sized enterprises (SMEs) and network companies, Innovative concepts, Regional competitiveness and industrial clusters. All the above-mentioned concepts are of great importance in terms of supporting regional development. [6] The paper is based on the last three theories.

1. SMEs and Networks. Theory considers entrepreneurship, the growth dynamics of small and medium-sized enterprises and the interrelationships between firms as a basic factor of development. Recommendations for regional policy and regional development are aimed at supporting the creation, development and operation of small and medium-sized enterprises, providing financial assistance, counselling, support for business cooperation.
2. Innovative concepts. The fundamental factor is innovation and innovation strategies. Innovation can occur because of cooperation between regional agents. Regional policy should support the building of systemic links between actors in innovation systems and increase absorption capacity.
3. Regional competitiveness and industrial clusters. The main factors of development are competition, cooperation between geographically concentrated companies from related sectors. Regional policy and its direction should support regional actors and strategically guide their competitiveness.

3. Methodology

The research is processed by using a wide scale of the scientific methods and procedures. The specific range of methods was based on the research needs of the individual parts. The intention is to follow the logical continuity of this paper, the correctness and the adequacy of information and data. One of the research parts is focused on the definition and the determination of the development, sustainable development and regional development. This section is prepared by using the analytical method (the analysis and casual analysis) and the synthesis. We analysed scientific publications and scientific articles, papers and legislation by various authors. ([1-2, 6-10]) The first part is based on preparation and explanation of key terms. [11] Methodology contains of identification of research assumptions, as well as methods and sources used in the paper. Results part consists of the main findings.

The paper is organised as follows. In section 2, we begin by considering the nature of development, and from this discussion, we develop the definition of sustainable development and relation to regional development that we subsequently employ in the rest of the paper. In the same section, we explore the theoretical relationship between development and regional competitiveness (including industrial clusters). Here we focus on different approaches to these issues. On this basis of discussions, we develop the section 4. In section 4, we then explain the cluster phenomenon, in general and the situation in Slovakia. We explain the concepts of clusters by using different literatures. This is important for our overall results.

Article represents the basis of the planned long-term research that expected the use of more scientific methods such as mathematical modelling and statistics that will give results that are more accurate. It is expected also to focus on different regions in Slovakia and to analyse the activities of Slovak clusters according to different areas.

4. Results and discussions

Regions are a complex structure of relationships that exist among entities operating in the region. The regional development actors may be public institutions (higher territorial units, city authorities, ministries, etc.), as well as companies. Many authors, in their studies devoted to the importance of corporate networks. Companies engage in collaborating with other companies and organizations. The aim is to increase the efficiency of the division of labour. Companies know to overcome many limitations by engaging in network. Network companies gain a competitive advantage. Collaboration brings economies of scale but also provides scope for exchange of experience and interdisciplinary learning. Promoting a knowledge-based economy is one of the priorities of the economic policies of the states, but also the policies of the EU. Knowledge has always been an essential force in economic development. Nevertheless, in today's increasingly knowledge-based world, more and more countries are embracing knowledge and innovation-related policies to spur growth and competitiveness. A knowledge economy is one in which knowledge assets are deliberately accorded more importance than capital and labour assets, and where the quantity and sophistication of the knowledge pervading economic and societal activities reaches very high levels. [12] OECD defined knowledge economy like an economy whose growth is based on the ability to produce, disseminate and exploit new knowledge. [6]

Theoretical concepts based on endogenous factors point to the large role of small and medium-sized enterprises. SMEs are largely involved in regional development. SMEs are major employers; fulfil the role of innovators and the user of the latest technologies. "The new, emerging SMEs more effectively use available resources more flexible and introduce new business ideas and new approaches." [6] Due to the action and existence of SMEs, regions gain a competitive advantage. European cohesion policy supports the creation and existence of SMEs. According to Armstrong, the reasons for interest in SME are:

- SMEs have the ability to create a large number of new jobs,
- SMEs have the incentive to stimulate innovation,
- SMEs have the ability to create a diversified and flexible industrial base and create a group of entrepreneurs who are able and willing to take risks in business,
- SMEs have the ability to stimulate intense competition, thereby creating an entrepreneurial culture of entrepreneurship,
- SMEs have the ability to create flexible networks and improve business relationships.

Authors such as Buček, Tvrdoň, Reháč (2010), but also Moulart and Sekia (2003) investigated the cooperation of companies, the existence of networks and impacts on regional development. Concepts that deal with the territorial dimension of innovation activities are - Innovative milieus, Industrial districts, Localized production systems, New industrial areas, Innovation clusters, Regional innovation systems, Learning regions. All concepts are based on the cooperation and division of labour. Innovation and knowledge are a common indicator of all concepts.

Clusters are an essential trigger in innovation policy to make European SME more competitive. New market opportunities that result from major societal challenges request products and services, which can only be delivered in a multi-disciplinary approach making use of the key enabling technology in Europe. The transnational consortium of the strategic project CluStrat has identified the major issues of new cluster concepts to support the necessary innovation processes in SME. In order to stay competitive, Europe must take action to boost the innovation performance of its regional economies. Three main factors have been identified:

1. a systemic coordination of actors and competencies in order to achieve the quality and scope of collaboration that is needed – across all relevant technologies and branches;
2. a demand driven approach, including end-users in all stages of the innovation process;
3. integrating knowledge on the possibilities of key-enabling technologies (KET) as identified by the European Commission (including micro-/nanoelectronics, nanotechnology, photonics, advanced materials, industrial biotechnology and advanced manufacturing technologies).

Clusters are – usually regional – hubs of competences along a value chain in a given industry or technology branch, representing a critical mass of actors from R&D, industry and other institutional contexts. Clusters have thus become an accepted part of today's innovation framework, and innovation policy support for advancing the positive impact of professionalized cluster management organizations (cluster initiatives) on the regional competitiveness is available in many European regions, as well as at the EU level. Cluster initiatives cannot only play an important part in creating an awareness of the new market opportunities in the emerging industries among their member companies. They can also act as promoters of cross-fertilization with other industries and technologies, through cross-cluster collaborations within and beyond regions. [13]

Clusters are one of the driving forces of regional development. Many organizations address the importance and climbing position of clusters in ensuring the region's competitive advantage and long-term development. Porter defined clusters as “geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, many clusters include governmental and other institutions—such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations—that provide specialized training, education, information, research, and technical support.” [14] European Commission describes clusters like groups of specialized enterprises – often SMEs – and other related supporting actors that cooperate in a particular location. In working together SMEs can be more innovative, create more jobs and register more international trademarks and patents than they would alone. Clusters operate together in regional markets. 38 % of European jobs are based in such regional strongholds and SME participation in clusters leads to more innovation and growth. There are about 2000 statistical clusters in Europe, of which 150 are considered excellent in terms of employment, size, focus and specialization. [15] Using the analysis of OECD: “In a knowledge-based economy, these clusters of innovative firms form around sources of knowledge. They are based on a sophisticated infrastructure in which knowledge is developed, shared and exchanged, and are characterized by highly concentrated and effective links between entrepreneurs, investors and researchers. Clusters can take a variety of forms, depending on their main technological and commercial areas of specialization. In most cases, they operate within localized geographical areas and interact within larger innovation systems at the regional, national and international level. With globalization, dynamic clusters are becoming key factors in a country's capacity to attract the international investment that generates new technological expertise, to interest investors in innovation (venture capital, etc.) and to benefit from the international mobility of skilled personnel.” [16]

Clusters based on competences are characterized by a concentration of companies that created the commercial use of specific knowledge emerging in the region. Such clusters are the result of specific regional research and high skilled workforce. Companies do not need to be connected business relationship. Companies often operate in a variety of industries, such as information technology companies, providing systems management. Clusters based on the value chain create firms that are linked by mutual business relationships. Gereffi, G. et al. [6] have depicted a value chain as a sequence of activities that are needed to market a particular product. However, this chain is not the same as the supply chain. A supply chain is a sequence of activities that will trigger the demand of a leading firm.

According to Porter [17], clusters vary in size, breadth and state of development. Some consist primarily of small and medium-sized enterprises, others involve both large and small firms, and some are centered on research universities, while others have no important university connection. The differences in their nature reflect the differences in the structures of their industries. In The Cluster Policies Whitebook [18], the authors describe seven elements as typical cluster characteristics:

- Geographical concentration,
- The specialization or common denominator of a cluster,
- The cluster actors,
- Cluster dynamics and linkages: competition and co-operation,
- Critical mass,
- The cluster life cycle,
- Innovation.

Clusters can be observed at all geographic levels, in large but also small economies, in urban and rural areas as well. Clusters exist in various stages of development. Clusters, as well as businesses pass through different life cycles. The life cycle of clusters consisting of [6]:

- Stage of creation - inventions, innovation and investment form the basis for clustering. The achievements of regional companies in the markets attract innovators and competing firms, the incentive business.
- Age of maturity - processes and services are routine. The price is the decisive factor, there is high competition.
- Stage of Bankruptcy - Original products are replaced by products with lower costs or substitutes.

Clusters play a role in regional policy. Support for the development of sectors or regions is also organized through the cluster initiative. Support system, which aims to increase the competitiveness of regional firms in related sectors, uses a cluster initiative. Cluster initiatives are most often focused on technologically intensive industries (IT, manufacturing technology, biotechnology, automotive technology). The aim is to support the development of human resources, the development of clusters, the development of the cluster itself, the development of cooperation, innovation and technology, the improvement of the business environment. It is important that members of the cluster initiative are mainly regional leaders, foreign investors, but also specialized non-regional firms, institutions or research institutions and universities. All mentioned for the objectives are in line with the concept and focus of regional policy, especially the programming period 2007-2013.

The Slovak republic ranks among those countries with the shortest experience considering cluster concept, development since it was the slowest to adopt the cluster-based policy in comparison with other EU countries - after the year 2005. The first steps towards a cluster-based policy approach appeared only recently within the governmental documents for the time frame of 2007-2013. The Slovak equivalent for the English term cluster has been used in the country. There is no ministry or agency explicitly focused on clusters in the Slovak Republic. However, clusters primarily expect help from the Ministry of Finance, the Ministry of Economy, the Ministry of Education, Science, Research and Sport and the Ministry of Labour, Social Affairs and Family of the Slovak republic. Clusters expect help from specialized agencies such as the National Agency for Development of SME's (NADSME) – currently

transformed to Slovak business agency (SBA), the Slovak Investment and Trade Development Agency (SARIO) and the Slovak Innovation and Energy Agency (SIEA). Listed agencies only deal with clusters as a tool for support of SMEs and improving the business environment in the Slovak Republic. [10] Support for the development of clusters in the Slovak Republic is legislatively partially solved only in the case of tourism through Act no. 91/2010 Coll. on the promotion of tourism. The law entered into force on 1 January 2011. The law does not explicitly mention clusters as actors but defined types of associations.

The Union of Slovak Clusters (UKS) is an association established in 2010 to initiate and support development of clusters and cluster policy in Slovakia and to incorporate Slovak clusters into European competitive partnership including mutual transfer of knowledge and technology. It is the organization representing clusters in Slovakia and it has a national dimension covering the entire territory of Slovakia. The main mission of UKS is to promote networking, partnerships and transfer of knowledge, experience and information between regions and SMEs through clusters. UKS supports the participation of clusters in international events and in international projects focused on education, development, research, innovation and transfer of knowledge. [19] The Slovak republic has short experience considering the cluster concept development. [20] Currently, the technological cluster and clusters in tourism exist. [21] High interest in clustering processes is visible in Trnava region. It is possible to see the interest in clustering processes also in Žilina, Banská Bystrica and Košice region. Three main areas can be distinguished: services-tourism sector, manufacturing industry and IT/ICT industry. Clusters represent dynamically changing systems with often-complex internal relationships and links. A changing external environment may affect clusters positively, but if it changes too often, it can also act negatively. Cluster policy needs to be built very carefully. Clusters can be stimulated through a variety of policies. Policies can be focused directly on clusters, but they can also act indirectly. [22]

5. Conclusions

Supporting regional development and reducing regional disparities are key issues for many countries' economic policies. The EU has set up a cohesion policy whose objectives reflect the current problems of society and states. Policy is moving to support SMEs that are the driving force behind economies. SMEs are the main employers; they are the place to implement innovative ideas, new technologies and practices. Clusters do not have a long history of activity, in general, but clusters play a role in regional policy. The Slovak republic has short experience considering the cluster concept development, too. Support for the development of sectors or regions is organized through the cluster initiative. Support system, which aims to increase the competitiveness of regional firms in related sectors, uses a cluster initiative.

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