Mariusz CITKOWSKI, PhD
Institute of Management, University of Bialystok
e-mail: m.citkowski@uwb.edu.pl
ORCID: 0000-0002-7608-7259

CLUSTER AND CLUSTER POLICY
AS TOOLS FOR REGIONAL DEVELOPMENT MANAGEMENT[1]

Summary

Purpose – The purpose of the paper is to indicate the role of a cluster and a cluster-based policy in the process of regional development management as the tools serving the achievement of positive development effects in the region.

Research method – The analysis was based on the review of domestic and foreign literature sources devoted to clusters, as well as the documents and the assumptions of the cluster policy at the EC level and the national and regional level, the participant observation as a member of research and implementation and advisory project teams in the field of cluster management and cluster policy in Poland and in the region.

Results – A cluster can be used at any stage of the strategic management of regional development as an element of strategic analysis, as one of the key consultants in the process of regional development strategy projection, and ultimately as a tool for implementing the assumptions of regional development strategy.

Originality / value – The proposed dual model of cluster policy in the Podlaskie Voivodeship using detailed assumptions, including developed clusters as a tool for managing regional development as a part of the cluster-based policy.

Keywords: cluster, cluster management, cluster policy, cluster-based policy, regional development management, Industry 4.0

JEL Classification: L14, L22, L52, L53, O25, O29, O38, R58

1. Introduction

Economic development in the first two decades of the 21st century has been characterised by considerable dynamic changes. In order to meet the challenges ensuing from the necessity to adjust to the changeable environmental conditions and global competition, enterprises initiate cooperation in various network organisations, including clusters. Additionally, there is increasing competitive pressure placed upon certain regions and economies in the regional system. The generation of

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a higher tax base as the main source of income of regional self-governments and places of employment requires an emphasis on the development of beneficial conditions for the functioning of business. It may take place, by means of appropriate shaping of hard infrastructure (among others, the development of road and railway transport networks) as well as by the development of the so-called soft infrastructure (among others, the shaping of conditions for the adequate process of education and training of staff for the needs of regional economy and the development of institutional surroundings). It occurs most frequently solely through the organisational and financial efforts of local territorial units. However, it should be accompanied by the process of including the private sector. These activities ought to include those areas where the present systemic solutions and the activity of public authorities for economy (in the face of the challenges of Industry 4.0) are becoming less efficient and effective.

Among the objective market structures that can be successfully included in the process of providing public services there exist well-developed and efficiently managed clusters which can compete on a national and international scale.

From the perspective of those managing a certain cluster's rooting region, the most important element is that they offer a range of benefits not only for members (among others, a relative pension), but also from the region where they are located as well as for the country (increased innovation, competitiveness and internationalisation).

Given the above, certain countries in the world initiate activities at the national and regional level aimed at supporting the processes of forming clusters, their development and assistance in the processes of making their management professional. These activities are most justified because in the situation of the occurrence of strong cluster structures in a certain location they constitute tools for the development of economic systems – regional or national ones and for improving the level of their specialisation.

The purpose of this paper is to indicate the role of cluster and cluster-based cluster development policy in the process of regional development management as the tools that serve the achievement of development effects in the region, including their role in the situation of the challenges connected with Industry 4.0. The background for the theoretical considerations is the current state of development of clusters in the Podlaskie voivodeship as well as the range of development tools being utilised and the type of the cluster policy realised in Poland and in the Podlaskie voivodeship. In order to achieve the target there were two basic research questions specified on whether and (if so) why is it necessary to support clusters from the perspective of process of managing the region's development, and the issue of which model should the cluster policy serving more dynamic region's development processes represent.

The analysis will be based on the review of domestic and foreign literature sources devoted to clusters, as well as documents and the assumptions of cluster policy at the EC level and also at the national and regional level, participant obser-

vation as a member of research and the implementation and advisory project teams in the field of cluster management and cluster policy in Poland and in the region.

2. The essence of cluster as the ecosystem forming the development potential for the region's needs

In accordance with Porter's definition [2001, p. 246] a cluster is a geographic concentration of interconnected businesses, suppliers and associated institutions (for example, universities, standards-setting agencies and trade associations) in particular fields that both compete and cooperate with one another.

Taking into consideration the subject of this paper (the issue regarding public support in the processes of cluster development or the spending of public funds while using a cluster as the tool for the development of regional and/or national economy) a cluster ought to possess a subjective character. Therefore, a cluster will be understood in the further part of the paper as an initiative or a cluster organisation within which there were formalised cooperation principles for the units from various spheres (business, science, administration) and various branches having common development goals [Solvell et al., 2003; *Cluster Management Guide…*, 2006, p. 8; Citkowski, 2008, p. 558].

The characteristic features of clusters include, among others: geographical and utilitarian proximity [Ketels, 2003, 4-6; Klimas, 2014, pp. 4-10], the network character of relation processes [Brasili, Fanfani, 2002, pp. 3-4]; the openness and trust (among others, organisational trust) [Chrupała-Pniak, Sulimkowska-Formowicz, 2016, pp. 119-121]; the diversity and richness of competences; knowledge diffusion [Baran, 2013], the capacity to create the ecosystem of open innovations [Huang, Rice, 2013, pp. 85-120], the possibility to obtain a relative pension [Romaniuk, 2016, pp. 508-518]. Clusters are the natural manifestation of specialist knowledge, abilities and infrastructure that supports entities in increasing the efficiency in certain sectors and constitute the determinant of the maintenance of the high living standard of a certain place [Ketels, Memedovic, 2008]. In clusters one may observe the concentration of the richness of competences located in its particular entities as well as in the entire network. In accordance with the resource method, access to resources and competences constitutes the incentive to establish the cooperation between organisations within a cluster and thus to increase their own relation competences [Sulimkowska-Formowicz, 2018, p. 31]. Clusters are considered as "the repositories of competences" in the region development as they guarantee those mechanisms that facilitate the development of knowledge as well as its popularisation and accumulation by means of cooperation platforms [Götz, Jankowska, 2017].

The concept of clusters, which is frequently related to the notion of Marshall districts, is deeply rooted in the theory of location [Marshall, 1961, pp. 222-231]. In terms of the rooting of the concept of clusters and factors having impact on the shaping of cluster relations, it appears to be justified to indicate, among others, Weber's location factors, the central place theory of Christaller, the growth poles of

Perroux and Isard's approach to the non-economic coefficients of location (apart from the economic ones) [Kraska, 2018, pp. 17-41].

The accumulation of a series of competences in network organisations, entire sectors and in regions in spatial terms is particularly important from the perspective of the transformation towards Industry 4.0. In accordance with the opinions of various EU institutions, industrial clusters have become one of the key catalysts that support industrial specialisation [*Skills for Smart...*, 2018, p. 6] and are treated as both the present and future tool for the implementation and development of Industry 4.0 [*Factories...*, 2013, p. 13; *Cyfryzacja...*, 2016, p. 10]. Therefore, the coordinator's challenge is to shape such relations in a cluster that the flow of desired resources and competences is most efficient. In the face of making economic processes more dynamic, increasing constantly the pressure of global competition and the challenges of Industry 4.0, the role of the cluster coordinator as a certain center of the transfer of competences and a competence broker is becoming a strategic challenge [Citkowski, 2019a, pp. 127-139]. It is because cluster development leads, among others, to the development of special and relatively cheap production factors, including suitably qualified employees, knowledge and support services in a certain area. Spatial closeness and the interactions between various entities within a cluster stimulate the flow of knowledge, the processes of learning, absorption and generation of innovations – which, as the consequence, results in the creation of competitive advantage of the region [Stawicki, 2008, p. 14]. The effect of the penetration of knowledge is one of the three main external effects, apart from the specialisation that attracts certain suppliers to a certain branch and the benefits resulting from the access to specialised workforce which have impact on the development of clusters in a certain region and can also be generated by spread clusters [Krugman, 1995]. In the meso economic perspective it is also demonstrated that clusters possess positive influence on the region's productivity and competitiveness, among others, by means of [Kladź, Kowalski, 2010, p. 281]: the creation of the local culture of innovation and entrepreneurship and also economic activation of the region; the acceleration of the transfer of knowledge and specialised know-how to the region's economy; the concentration and development of resources, especially knowledge and high quality of human capital; the improvement of the region's image; the increase of export of local enterprises. They may be the source of technological convergence in the region [Runiewicz-Wardyn, 2011]. Additionally, clusters may have impact on the living standards of inhabitants as well as on the social, economic and ecological development [Skawińska, Zalewski, 2009, p. 30].

The aforementioned characteristic features of clusters as well as the number of benefits they offer for the root regions presuppose the process of taking into consideration clusters as the objective network organisations that are capable of playing an important role in the processes of regional development management. On the basis of global experiences, it is recommended to use clusters as the entities with adequate knowledge for shaping the local development strategy and development strategies of particular branches [Waits, 2000]. Furthermore, clusters constitute the

basic organisational frameworks for understanding regional economies and elaborating economic strategies [Cortright, 2006, p. 46].

In summary, although cluster support may have various justification on the global scale, it is impossible to show that it is one of the key tools of economic development. Business networks and clusters are considered as an essential factor that supports industrial modernisations and innovations, especially for small and medium-sized enterprises [*Cluster programmes…,* 2019, pp. 1, 12].

2. The essence of cluster policy in the subjective and functional perspective

Cluster policy means the entirety of activities undertaken by public authorities at the national and/or regional level and serving the development of cooperation in clusters, increased competitiveness of cluster units and using clusters for the economic growth of a certain area (country/region) [Ketels, 2009, p. 19]. A cluster policy is a policy of horizontal type. It constitutes the element combining industrial and innovation policy with the labor market policy related to education at the occupational, secondary and higher level. Furthermore, a cluster policy is connected with the problem of the sphere of science and territorial development. Therefore, modern cluster policies are based on the systemic approach that combines various policies, programs and tools [*Smart Guide to …,* 2016, p. 11].

As one of the elaborations made by the European Commission representatives implies, during the implementation of a cluster policy it is necessary to lay emphasis on the close synergy between the cluster initiatives and the policy of industrial, innovation and regional type, especially with reference to intelligent specialisation, increasing the scale of SME development and the cooperation between sectors, among others, by means of creating cooperative and competitive capabilities of clusters and making cluster management professional [Engelmann, 2019].

CHART 1

Cluster policy model
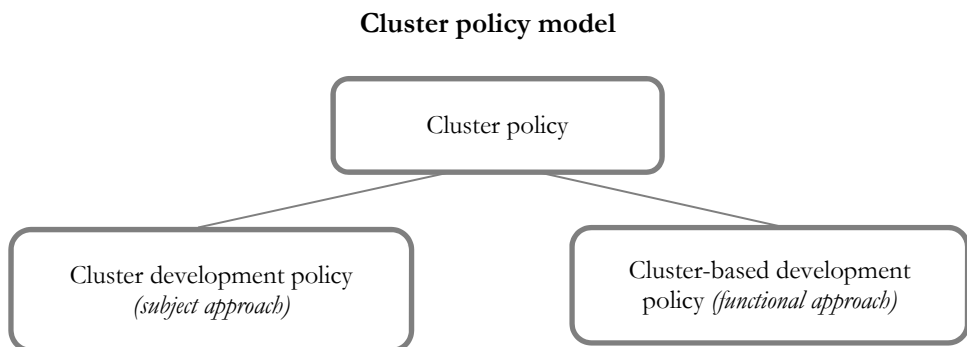
Source: own elaboration.

Cluster policy may be considered in two aspects: as the policy related to the development of clusters (subjective perspective) and the cluster-based policy of development (functional perspective) (chart 1). The policy of cluster development is defined as the entirety of activities undertaken by authorities (both independently and in cooperation with businesses), universities and other entities that are addressed at clusters in order to increase their competitiveness [Ketels, 2009, p. 19]. The functional perspective, i.e. the cluster-based development policy, is connected with having impact on the creation of basic conditions for the formation of clusters and with using the cluster structure as a tool for improving the competitiveness of the entire economic system in which it is located [Ketels, 2009, p. 19] and deepening regional specialisation [Plawgo, Citkowski 2013].

The cluster-based development strategy makes use of clusters as the instrument or tool to perform certain public functions, e.g. within the labor market policy, education policy or the innovation policy. The application of the cluster-based development policy is possible when there are well developed clusters in a certain area of influence (country/region).

In such a situation they may have real impact on the surrounding they function in and thus in the traditional model they may perform a certain range of public functions that are realised by the public sector. Hence, one may expect the so-called "*positive crowding out effect*" or in other words "the crowding in *effect*", where public sector is displaced by the private sector and not otherwise, as it has been in the traditional crowding out effect. As regards the private sector's *"crowding in effect"*, the tasks ascribed to the public sector by means of clusters in the present economic conditions and in the face of the imperfections of the labor market, may concern especially the occupational education level or technical training. It is indicated that presently the occupational education system requires greater involvement of private entities [*Smart Industry…,* 2019, pp. 65-66].

As indicated in the report *Smart Guide to Cluster Policy* [2016, p. 9], cluster policies and the strategies of intelligent specialisation have become crucial for the realisation of the European growth strategy. On the other hand, the conclusions of the European Council concerning the strategy of the EU industrial policy indicate the necessity of further development of the European cluster policy in order to combine and increase the scale of regional clusters in the pan-European world-class clusters based on the principles of intelligent specialisation so as to support the formation of new value chains in Europe [Guichard, 2018]. The recommendations concerning the direction of the development of the European cluster policy may be found in the Announcement of the 4th European Forum of Cluster Policies of 2019 from Bucharest [*Fourth European …*, 2019]. It implies, among others, that clusters constitute the key measure of industry transformation and the internationalisation of European entities on global markets.

Since 2003 there has been observed mainly the realisation of the cluster policy of subjective type. The past Polish experience may be divided into three periods. The first period covers the years 2003-2007, when during the usage of structural funds at the national and regional level (mostly national), the focus was mainly on the pro-

motion of the idea of clustering and the training of the potential animators of clusters. This period may be specified as the policy of popularising the idea of clustering. It was accompanied by the first cases of the incubation of cluster initiatives in the downward process [Citkowski, 2019 b, pp. 28-31]. The years 2007-2012 were the period of strong support for the formation and development of clusters, or rather cluster initiatives. There was observed a rapid "expansion" of clusters and, in particular districts, the number of cluster initiatives exceeded 50. The third stage (2012-2019) witnessed mainly the gradual professionalisation of management in clusters, the emergence of leaders in the group of highly developed clusters, among others, thanks to the assistance within the process of certification and support of key national clusters (KKK) and further development of cooperation, chiefly in the most developed cluster structures in Poland. In the Podlaskie districts there are presently located two KKK: The Metal Processing Cluster and Polish Construction Cluster [Citkowski, 2019 b, pp. 28-31].

The image of cluster policy at the regional level in Poland was specified in the report "Cluster policy implemented in regions in the years 2015-2019". The analysis (the state relevant for the end of December 2018) regarded the strategies of regional development, all the regional operational programs and detailed descriptions of the priority axes of operational programs. Almost in all regions both clusters and cluster initiatives were taken into consideration in strategic and operational purposes of particular strategies. There is no information on the activity of clusters and cluster initiatives at the level of socio-economic diagnosis and the tools dedicated for clusters. Based on the above, the strategic analysis ought to be considered as the starting point for the realisation of proper and efficient cluster policy [Kryjom, 2019, p. 4]. In terms of the regional cluster policy and the number of tools being used, the first positions are occupied chiefly by the Mazowieckie and Wielkopolskie voivodeships. These voivodeships, among others, initiated the activities that aim at determining the key regional clusters. In the Podlaskie district there is, among others, no uniform document that would specify the frameworks of the cluster policy. Poland does not have any system for the evaluation of which tools serving the support for clusters the regions have and for the assessment of the cluster development level in regions. In this context it seems appropriate to create the system of evaluation of cluster policy not only at the national level, but also to create the frameworks for the evaluation of cluster policy for the regional level [Citkowski, 2019b, pp. 32-34].

3. Cluster and cluster-based development policy as the tools
### for regional development management

Cluster policy and, the development policy based on clusters and most developed clusters (in Poland – the clusters included in the KKK group) may constitute key instruments for the management of regional development. Owing to the multi-layer character of clusters, the dynamic course of development and technological advancement (chiefly as regards industrial clusters and clusters in creative sectors) as

the ecosystems of open innovations and strongly correlated with the concept of regional intelligent specialisations [Sahaa at al., 2018] it is possible to treat clusters with complete confidence as the tools which (like a lens) concentrate the specificity of the challenges of Industry 4.0 [Piątek, 2017; Rußmann et al., 2015, p. 3] and are also capable of meeting these challenges. During the conference Clusters 4.0 –*The shaping of intelligent industries* held in December in Brussels it was proved that the development of 4.0 clusters requires the redefinition of national cluster policies. The efficient use of clusters may be beneficial from the perspective of industrial transformation, innovation and the quality of the services offered in a knowledge-based economy [Bembenek, 2017, p. 34]. The European Commission sets the following challenges for industry in the EU: it should be more adaptive and innovative and interconnected by means of various ecosystems of industry/innovation and should have improved connections with potential investors. The same analysis showed that the role of clusters should be essential here. Among them there were mentioned, among others: the key role in designing and implementing the regional strategies of innovations, the natural creation of synergy with regional ecosystems in Europe, the support for industrial modernisation/tools for regions with the aim of accelerating their transformations in industry [Lepore, 2018].

On this basis it should be noted that well-developed clusters may constitute an essential element at each stage of the process of strategic management of regional development (chart 2). As regards to strategic analysis, a cluster may be the source of information that is strategic for the appropriate formation of the region development strategy. It may be considered as economic, social and on an organisational basis for drawing conclusions and finding operational solutions at further stages of designing and implementing strategies.

CHART 2

Cluster as an element of regional development management process
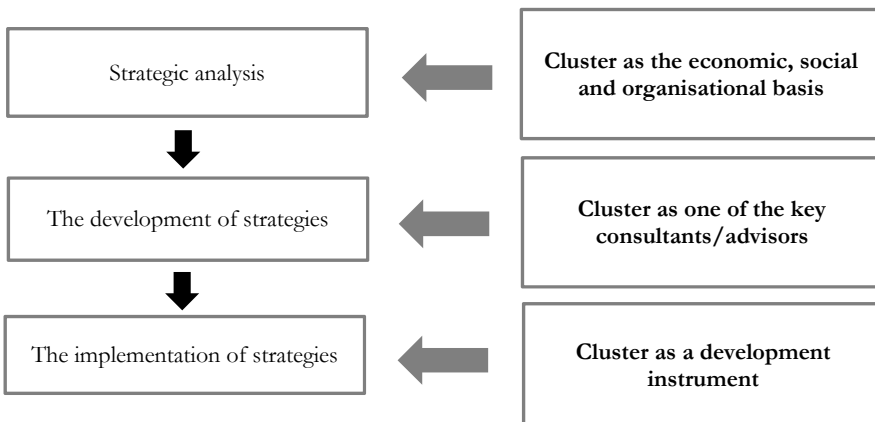
Source: own elaboration.

The stage of forming the development strategy of a certain region (given the current conditions) usually ought to consider the long-term development of regional intelligent specialisations. As it has been pointed out at the European Commission level, clusters and cluster policy are treated as the most effective tools in the development of regional intelligent specialisations. Therefore, clusters in the stage of strategy development should be considered as the key consultants of operational programs and implementation projects. Thanks to the interdisciplinary knowledge concerning a certain branch (absorbed from the domain of business, science and administration) the entities perfectly recognise factors and barriers for the development of a certain sector.

At the same time, in the process of realising the cluster-based development policy a cluster may constitute a very well profiled instrument for the realisation of specific implementation projects for particular branches inscribed in the strategy as the regional strategies of specialisation.

Therefore, it should be assumed that cluster policy ought to have dual character. It means that regional authorities should fully utilise the potential of well-developed clusters as the instrument of regional development within the framework of a scheme (see chart 2). Consequently, it should have a functional character. At the same time the cluster policy ought to support clusters by means of various forms of assistance, depending on the level of their development (including the less developed ones) in order to generate in them the professionalisation of management processes and, as a consequence, bring benefits for cluster members and the surrounding. In the second situation cluster policy will have a subjective character.

4. Potential directions of the evolution of cluster development policy in the Podlaskie voivodeship

The cluster policy model in regions ought to be correlated with the region's specific character, development dynamics of the branches included into the branches strategic for the region presently or are considered as the potentials of the region's development in the future. The empirical results show that the paths to innovation and modernisation in the regions of the European Union countries are diversified among regions, depending on the local specificities [Camagani, Capello, 2013]. Furthermore, according to the analyses, the largest potential in terms of development and contribution to the formation of intelligent specialisations is present in those clusters that function in the branches where it is already possible to identify the density of entities (regional specialisations). The optimal situation from the point of view of the development of intelligent specialisation is the occurrence of the combination of strong branch and strong cluster structure. It is necessary to focus on the support for the existing clusters functioning in those branches that already constitute the regional specialisation [Plawgo, Citkowski, 2013, p. 7]. Furthermore, as literature shows, both strategies of regional development, i.e. cluster initiatives and intelligent specialisation, are political approaches of local dimension that aim at benefit-

ing from the advantages of closeness in order to promote economic growth and efficiency [Sahaa et al., 2018].

As indicated in the synthesis of the strategic diagnosis of the Podlaskie voivodeship, the region's competitiveness depends on the competitiveness of selected intelligent specialisations and other activities that create the region's specialisation [*Diagnoza strategiczna województwa…*, 2020b, p. 18.]. The root of the regional intelligent specialisations of the Podlaskie voivodeship includes: the agri-food sector and the sectors combined with it by the value chain; metal working and engineering industry, the ship-building industry and the sectors connected with it by the value chain; life sciences and sectors connected with them by the value chain as well as eco innovations, environmental sciences and sectors connected with them by the value chain (including renewable energy sources, resource-efficient construction, effective wood processing) [*Plan rozwoju…*, 2016].

The development strategy for the Podlaskie voivodeship until 2030 in the operational objective 1.1. *Industries of the future* shows that it is necessary to ensure increase in the participation of industry in economic structure on the basis of branches rooted in the region (particularly those included in intelligent specialisations), modernising them using the latest development trends of Industry 4.0, transforming them thus in "industries of the future". In this context the potential to generate the industry of the future includes developed economy branches in various parts of the voivodeship: metal and machine engineering, medical sector, agri-food industry, wood industry, furniture sector, yacht production and construction. The implementation challenges in this regard include, among others: the support for the networking of enterprises, the creation and development of clusters and investments in the development of intelligent specialisations of the Podlaskie voivodeship. Furthermore, in the operational objective 1.2. Podlaski system of open innovations – clusters are supposed to play an important role [*Strategia rozwoju…*, 2020]. Table 1 shows that among 8 clusters observed in the Podlaskie district, currently (30.05.2020) only three operate fully, while two among them (Metal Processing Cluster and Polish Construction Cluster) fit into the intelligent specialisations of the Podlaskie voivodeship.

TABLE 1

Clusters in the Podlaskie voivodeship

Lp.	Nazwa	Status	Adres strony internetowej
1.	Metal Processing Cluster	National Key Cluster – active *ESCA – SILVER LABEL*	www.metalklaster.pl
2.	Polish Construction Cluster	National Key Cluster – active	www.budowlanyklaster.pl
3.	Technology Cluster INFOTECH	Regional cluster – active	www.infotech.org.pl
4.	Podlachia Lingerie Cluster	Regional cluster – in the state of operational hibernation	www.spkb.com.pl

Lp.	Nazwa	Status	Adres strony internetowej
5.	Polish Eastern Medical Cluster	Supra-regional cluster – in the state of operational hibernation	www. klastermedyczny.org
6.	Food Cluster Naturalnie z Podlasia	Regional cluster – in the state of operational hibernation	www.naturalniezpodlasia
7.	Tourism Cluster of Eastern Poland	Regional cluster – in the state of operational hibernation	www.klasterturystyczny.pl
8.	North-Eastern Eco-Energy Cluster	Regional cluster – in the state of operational hibernation	www.pwkee.pl

Source: own elaboration.

It is worth pointing out that the sectors representing the aforementioned clusters are famous for: generating the largest revenues from PIT and CIT, achieving one of the highest location indicators in the years 2010-2016, generate the highest values as regards the value of export and intra-community supplies in the value of global production in the Podlaskie voivodeship [*Diagnoza strategiczna województwa…,* 2020a, pp. 102-112]. The sector represented by third active cluster of the Podlasie voivodeship – INFOTECH – is listed in the district strategy as the inseparable element of the region's development and requires support in terms of the development of infrastructure and IT systems in the entire region, the digitalisation of data and information, the development of digital competences and services delivered electronically (hardware and software). Owing to the characteristic low population density in the Podlaskie voivodeship, one of the important forms of improving access to public services is to supply them in a digital format. The remoteness of many inhabitants from urban centers leads to placing particular emphasis on further development of e-administration or e-health [*Strategia rozwoju…,* 2020].

Therefore, on the basis of the current recommendations of the European Commission, the experiences of cluster policies in Europe and in accordance with the past national and regional experience [Plawgo, Citkowski, 2013; Stryjakiewicz, Dyba, 2014; Zemska, 2018; Borowczak et al., 2019] outlined below are the directions of the evolution of cluster policy in the Podlaskie voivodeship.

Firstly, the cluster policy of the Podlaskie voivodeship ought to take advantage of the Key National Clusters – Metal Processing Cluster and Polish Construction Cluster as the tools serving development processes of the region and increasing the regional specialisation. In the situations of less developed clusters the vast majority of them requires selective support within the so-called Cluster Development Policy – the subjective approach as much as it will be reasonable from the point of view of stimulating the cooperation activity in particular sectors of the regional economy.

Secondly, clusters should be considered as a certain instrument for the development of particular socio-economic space having imperfections that cannot be overcome by offering individual support. Thanks to a certain critical mass, cooperation relations as well as trust and pro-development attitude it is possible to realise

a number of undertakings serving chiefly the achievement of positive effects for the entities functioning in a cluster and also to generate positive external effects.

Furthermore, the support for the development of clusters in the Podlaskie voivodeship ought to have a selective character. They should be preceded by the diagnosis of the cluster development phase, real development barriers and development potential, the external conditionings of cluster development. The selective character of support will increase the efficiency of the tools being used as well as the effectiveness of the spent public funds by means of adjusting the support to the real needs and possibilities of the absorption by clusters. The parallel processes of direct cluster support and coordinator ought to be accompanied by the processes serving the development of industries of the future. Clusters per se (mainly key clusters in Poland) constitute relatively well-developed ecosystems that qualify as the centers of Industry 4.0. They constitute a verified entity – an instrument for the region's development. Therefore, regional support should aim at the creation of regional competence center that (being based on the network cooperation) would generate a wide spectrum of services for the leading branches in the region as well as benefits for the region and country.

Those clusters that are characterised by high development level and thus are also well managed may constitute an essential instrument for the realisation of those public tasks that so far have been dedicated to being realized by public sector units. In particular in those places where in the region/country there can be noticed imperfections in infrastructure (hard and/or soft) that reduce the possibility of the developing enterprises, reinforcing their competitiveness, innovation and internationalisation. Therefore, it is worth using the existing networks of enterprises and business environment institutions to create within clusters the solutions, among others, in terms of the modernisation or complete change of the model of staff training to the needs of business in line with the challenges of Industry 4.0. The functional approach may be used also for the needs of Industry 4.0, among others for: the digital transformation of the regional economy, the development of the education system for the needs of regional economy, the development of regional intelligent specialisations and economic promotion of the region.

5. Conclusions

The formalised cluster cooperation is a frequently observed phenomenon on a global scale. Similarly, universal phenomenon is the support offered by both national and regional public authorities for the cooperation of business, science and administration sectors in various models. From the point of view of increasing competitiveness, innovation and internationalisation of regional economies it is appropriate to use a proper model of cluster policy that is adjusted to the current state of regional economy and the structure of generic population of clusters in the region. The application of the cluster-based development policy and the cluster devel-

opment policy may be an efficient instrument for the management of regional development.

Global experience shows that well developed clusters not only bring a number of benefits for their members (among others: increased innovation, competitiveness, support in the expansion abroad) and also generate a number of positive external effects firstly for the region they are located in and secondly for the country. Furthermore, it is pointed out that clusters constitute an efficient instrument in the development of regional intelligent specialisations. The above enables the formulation of the statement that in order to dynamize the development processes in the region it is necessary to support the development of clusters, among others in terms of professional cluster management.

Taking into consideration the level of development of Poland in the Podlaskie voivodeship there is essential premise for regional authorities to take measures to prepare a dual model of cluster policy in the region. On the one hand, support will be similar to that offered in the subjective model. However, on the other hand, while using the potential of the KKK functioning in the region as the instruments in the regional development in particular dimensions. They include: the transformation of industry towards Industry 4.0, the development of intelligent specialisations, the economic promotion of the region, the improvement of the regional dimension of vocational and higher education for the needs of regional economy. The above is possible owing to the prepared long-term strategy in terms of the support for w clusters and the use of clusters for the needs of the regional economy.

It is worth noting that presently the cluster policy is a universally applied instrument to support enterprises at regional level worldwide and on a comparatively small scale in Poland. The lack of the application of this type of instrument in a certain region (in the situation of changelessness of other conditionings) will be connected with the weakened competitiveness of entities and thus also of the region on a global scale.

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