

The perspectives for eco-clusters development in Poland

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Abstract: The paper aim is to increase knowledge concerning formation of eco-clusters regarding their origin and transformation process. Since eco-innovation is emerging as an industry, it should attract attention of decision-makers of different levels. Author presents the complexity of eco-clusters development and the consequences for its governance. The paper shows what is the role of different stakeholders in this process. The author aim is to recognize the current links between cluster policy directed to sustainability and eco-innovation. Clustering may have significant implication on development of a city or a whole region. From the perspective of regional or city development, eco clusters can play important role in development strategies. Countries, regions and cities search how to improve competitive conditions and attract firms and other stakeholders to their locations prepared for cluster initiatives. Author analyzes policy and support instruments for eco-clusters used in the European Union and in Poland. The paper reviews main theoretical framework, empirical findings and statistical data on clusters in Europe.

Keywords: clusters, sustainability, sustainable growth, green growth, eco-innovations, industrial ecology
JEL: L140, Q560, O440, O440, Q550, Q570

1. Introduction

The process of globalization of the economy has raised interest in understanding specific conditions and advantages of company interactions within cluster structures. Clusters are recognized as an important feature of modern economies. What is more globalization have affected tight relations between companies in the clusters. In a global economy clusters give network partners the comparative advantages over these businesses that work on their own. Due to better opportunities clustering becomes more and more popular. Clusters are part of market-oriented game but also become an area of interest for policy makers.

The concept of clusters was introduced by economist Alfred Marshall in 1890 who proposed the cooperation of firms in the same area. Marshall has explained externalities of specialized industrial locations in his "Principles of Economics". He put an accent on agglomeration effects that arise from geographical proximity. Marshall highlighted three distinct drivers of agglomeration: input-output linkages, labor market pooling and knowledge spillovers, which are associated with cost or productivity advantages to firms (Marshall 1920). Over time this set of agglomeration drivers has been broadened by an extensive research.

An explanation of cluster structures has been extended by Porter in his "The Competitive Advantages of Nations" (Porter 1990). "Clusters are geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition" (Porter 1998: 78). They are tightened by localization, knowledge, skills, inputs, demand and other linkages (Delgado, Porter, Stern 2014). Conventional clustering put accent on competitiveness, geographical proximity of firms and institutions, innovation and collaborative strategies.

Clustering is considered as a corporate collaborative action that supports its members in improving their competitiveness and in gaining financial benefits of modern industrial economies. Important advantages and arguments for clustering has been presented by Porter and Kramer in "Strategy and Society: The Link Between Competitive Advantage and Corporate Social Responsibility" (Porter, Kramer 2006: 78-92) and further expanded in the a follow-up piece entitled "Creating Shared Value: Redefining Capitalism and the Role of the Corporation in Society" (Porter, Kramer 2011: 62-77). The authors presented a business concept of 'Creating Shared Value' (CSV). The central premise behind creating shared value is that the competitiveness of a company and the health of the communities around it are mutually dependent.

A cluster concept includes different partners: producers, suppliers, government, universities, think tanks, R&D organizations, professional associations and many other organizations. Networking is a key aspect of most cluster initiatives. In a cluster structure the partners become mutually supporting. Nevertheless networking should not be identified with clustering. Whereas in networking partners cooperate on the basis of an agreement, in cluster organization besides cooperation there is also competition.

Cluster initiatives involve multiple objectives. Some clusters realize a narrow set of objectives. Whereas others can cover all of them. Among the most common are as follows (Sölvell et al. 2003 27): Networking, Research and innovation, Policy action, Commercial cooperation, Education and training, Cluster expansion.

A nation's (region's, city's) competitiveness and prosperity depends on the capacity of its economy to innovate and add new values. Cluster initiatives are perceived to generate a positive impact on local, regional or even national economy. It is well established fact that firms in strong clusters perform better. This applies to all kinds of clusters. Clusters offer a fertile ground for innovation and upgrading of competitive advantages (Sölvell et al. 2003: 19). Companies achieve competitive advantages through an act of innovation. Innovations include both – new technologies and new ways of doing things (Porter 1990). “Cluster firms are characterized by a high degree of specialization and complementarity. This generates dynamic processes of knowledge creation (learning and innovation) and knowledge transfer (diffusion and synergies). In clusters, there are collective learning processes that generate innovation and competitiveness. An innovative and competitive cluster can produce positive externalities to its entire region” (Propis, Driffield 2006: 280).

Countries, regions and cities search how to improve competitive conditions and attract firms and other stakeholders to their locations prepared for cluster initiatives. From the other point of view since eco-innovation is emerging as an industry, it should attract attention of decision-makers of different levels. Clustering may have significant implication on development of a city or a whole region. From the perspective of regional or city development, eco clusters can play important role in development strategies.

The aim of the paper is to contribute to knowledge concerning formation of eco-clusters regarding their origin and transformation process. It shows the current links between cluster policy directed to sustainability and eco-innovation. The author presents the complexity of eco-clusters development and the consequences for its governance. The paper shows what is the role of different stakeholders in this process. It analyzes also policy and support instruments for eco-clusters used in the European Union and in Poland. The analysis is based on the main theoretical framework, empirical findings and statistical data on clusters in Europe.

2. Public and private sector in cluster initiatives

Successful cluster initiatives need to identify roles for the private and public sectors. Their share and interactions should apply to the realities of modern competition. In the past model of economic development government¹ was responsible for the industrial policy and regulations of business activities. The companies need to compete within this given business and legal environment. In the new model of economic development this division is no longer appropriate. Both, public and private sector need to work together. None of them has instruments to implement all necessary actions separately. The public sector lacks the direct knowledge to understand the specificity of cluster initiatives. The private sector however, needs various support implemented by the governments. Government should be an active participant in cluster organization. Its role is essential in developing and transition economies. Nevertheless public sector activity can't be directed to over-responsibility and over-control. It can be perceived as an essential supporter introducing policies to contribute to the competitive advantages of the cluster organization. Government important role is as a catalyst, not as a controller.

The origins of cluster initiatives are very different. Cluster initiative comes from industry, local or regional governments or in rare cases academia. Cluster can evolve from a business project. It happens that cluster begins with initiative of a group or even one person – a 'clusterpreneur' (Sölvell et al. 2003: 29). In a case of cluster as a private initiative a 'social glue' as Porter call it facilitates access to important resources and information (Porter 1998: 88). It means that personal relationships, face to face contacts and a direct engagement of the initiators is of highest importance. Sometimes government-driven program evolves into cluster. In many European clusters industry is supported and co-financed by public sector.

Clusters are also governed in different ways. The more government-driven or more business-driven way of management is mostly imposed by the origin of the cluster initiative. Clustering policies demand many adjustments of culture and relationships between partners. The complexity of clusters development determines consequences for its governance. Cluster policies has developed from integration of many different policies. The most important are: industrial policy, regional policy, SME's policy, innovation policy.

¹ The term 'government' is used in relation to all: national, regional and local level of public administration.

Partnership is the key for the competitive advantages. It generates benefits that are common for the businesses that are part of clustering structures, for the cities and regions where they are located as well as for the other stakeholders. In the past, private sector has been mainly seeking governments subsidies and other profit favors. In cluster organizations this private-public relations are based on much more collective and multidimensional work.

Tendencies towards cluster formation around cities have been observed in traditional and handicraft industries. Historically, natural factors and transportation routes have played an important role in location of industries and clusters. Nowadays countries, regions and cities search how to improve competitive conditions and attract firms and other stakeholders to their locations prepared for cluster initiatives.

Clustering may have significant implication on development of a city or a whole region. From the perspective of regional or local development clusters can play important role in development strategies. Development of the clusters is strictly interconnected with a health of a local economy and the whole local environment. This interconnections determine private-public strategies based on collective work. As Porter stated: “Investing in public goods is normally seen as a function of government, yet cluster thinking clearly demonstrates how companies benefit from local assets and institutions” (Porter 1998: 88).

3. Market conditions for eco-clusters

The area of green economy is defined as encompassing all economic activities that lead to reducing environmental pressures of human activity. The latter is expected to result from the more efficient use of natural resources and from reducing harmful emissions across the lifecycle. Green economy includes a range of products, services, technologies and processes serving many different economic sectors. This area is characterized by a high interdisciplinarity and high growth potential.

On the one hand, elements of green economy can be understood and approached as traditional vertical economic sectors (e.g. renewable energy production). On the other hand, the area includes dimension of services, technologies or process that can serve - or create value for – any industrial sector (e.g. material and energy efficiency services can be applied in any

manufacturing sector). The latter means that green economy by definition will include cross-sectoral collaboration. Along with pro-environmental trend a concept of business cluster is lately transferred in the field of corporate environmental management and industrial ecology. Esty and Porter (1998) have stated that industrial ecology thinking would assist firms to make productivity improvements in using raw materials and therefore to improve their competitiveness.

Eco-clusters are part of eco-business or green economy in general. Being a part of the growing pro-sustainability trend they cut through all sectors of the economy. Through the eco-innovations and eco-efficiency strategies they create new environmentally friendly products and services.

Eco-clustering is inspired by the cyclic processes in ecosystems. It focuses on environmental aspect of sustainability - closed loop production processes and principles equivalent to ecosystems. It provides new ways of collaborative actions for organizations facing environmental challenges. A terminology is very diverse and the names that are used are as follows: eco-clusters, eco-parks, corporate environmental networks, industrial ecology parks and others. Their common core is care about the environment. They focus on solving environmental problems. Nevertheless they provide multiple conditions for creating innovation and improving competitive advantages.

An eco-industrial park is defined by USA EPA (Environmental Protection Agency) as: “A community of manufacturing and service businesses seeking enhanced environmental and economic performance by collaborating in the management of environmental and reuse issues. By working together the community of businesses seeks a collective benefit that is greater than the sum of the individual benefits each company would realize if it optimized its individual performance only.”

Eco-clustering is a networking of various green service sector firms that are located in the same area and cooperate. Such collaboration is constituted by firms that produce green products or help to eliminate environmental problems. Other networks introduce environmental concerns into their strategic management. Their collaboration is focused inter alia on facing environmental issues regardless of the sector. It means a cooperation among firms from different sectors in environmental management practices.

Eco-clustering can be perceived in two channels: first in its narrow environmental friendly form and the second one that in wider perspective is directed to sustainable development.

The emphasis of the environmental issues (mostly connected with environmental sector) are: energy conservation, water management waste management and environmentally friendly design. The sustainability accent of clustering besides those listed above and all the aspects of pro-environmental reduction, reuse, and recycling issues includes impacts on local market, social and workers conditions, corporate social responsibility.

Eco-clusters are perceived to be an important players of emerging and globally competitive industries. Emerging industries can be understood as “the establishment of an entirely new industrial value chain, or the radical reconfiguration of an existing one, driven by a disruptive idea (or convergence of ideas), leading to turning these ideas/opportunities into new products/services with higher added value” (European Forum 2013: 5). The emerging industries aren't always ‘new’ industrial sectors. They are modifications of well-known activities that are evolving into emerging industries in response to new technologies, market demands, and value chain configurations.

In terms of clustering governments and public administration have a new and important role to play. Government in a cluster policy can introduce legal regulations that stimulate awareness of issues such as: environment impact, product safety, energy and resource efficiency etc. Governments can strive to create a strategy including the benefits for cluster initiatives with simultaneous advantages for the whole local development: the inhabitants, environment and local economy. Thereby, a cluster policy can contribute to a policy of sustainable development. Regional policies and strategies that link, support and promote eco-innovation need understanding of the environmental goods and service sector. A monitoring system and definition of a set of indicators to evaluate the efficiency of policies and instruments is also essential.

Cluster based policy is a part of SMEs policy. It means that clusters are considered mainly for small and medium enterprises (SMEs) in order to overcome the scale barriers. The position of (SMEs) is relatively weak on the market. Simultaneously they provide multiple benefits in terms of diversification of services and product. Their services are tailored to the most specific needs. They support local labor market and local development in general. One of the main barriers that eco-innovative companies face are the transaction costs that they are facing when entering markets, the lack of networks and the presence of information asymmetries across supply chains (Barsoumian et. al. 2013: 21).

4. European eco-cluster policy

Cluster-based policy is gaining in importance in the European Union and in the member states. A Lisbon Strategy has introduced to European policy a stronger orientation on clusters. The EU adopted in 2006 a broad-based innovation strategy and identified strengthening clusters in Europe as one of the nine strategic priorities for successfully promoting innovation (Communication 2006). A political agenda in relation to clustering was also described in 2007 in a document “The European cluster memorandum, promoting European innovation through clusters”.

One of the key EU documents entitled “Towards world-class clusters in the European Union. Implementing the broad-based innovation strategy” was issued in 2008. As it is stated: “Cluster policies are designed and implemented at local, regional and national level, depending on their scope and ambition. It is the role of the Community to facilitate and add to such efforts, notably by improving the framework conditions, promoting research and education excellence and entrepreneurship, fostering better linkages between industry (especially SMEs) and research, and encouraging mutual policy learning and cluster cooperation across the EU” (Communication 2008: 2). In 2008 was also established the European Cluster Policy Group to describe and develop a more strategic vision of cluster policy.

Environmental policy and eco-innovation is declared to be a priority for the European Union. The EU policy presented in the “Europe 2020” strategy focus on overcoming recession and transforming the EU economy into more sustainable, ‘green’ and innovative one. This Agenda declares a shift towards ‘green economy’ creating ‘new green’ jobs - based on knowledge, low emissions and promoting eco-friendly technologies (Communication 2010).

Eco-innovation is emerging as a priority in the EU. In recent years, the eco-industry in Europe has been growing by 8% annually making it one of Europe’s most dynamic industrial sectors. Greater importance of environmental issues, pressure on innovation and R&D makes good perspectives for eco-clustering.

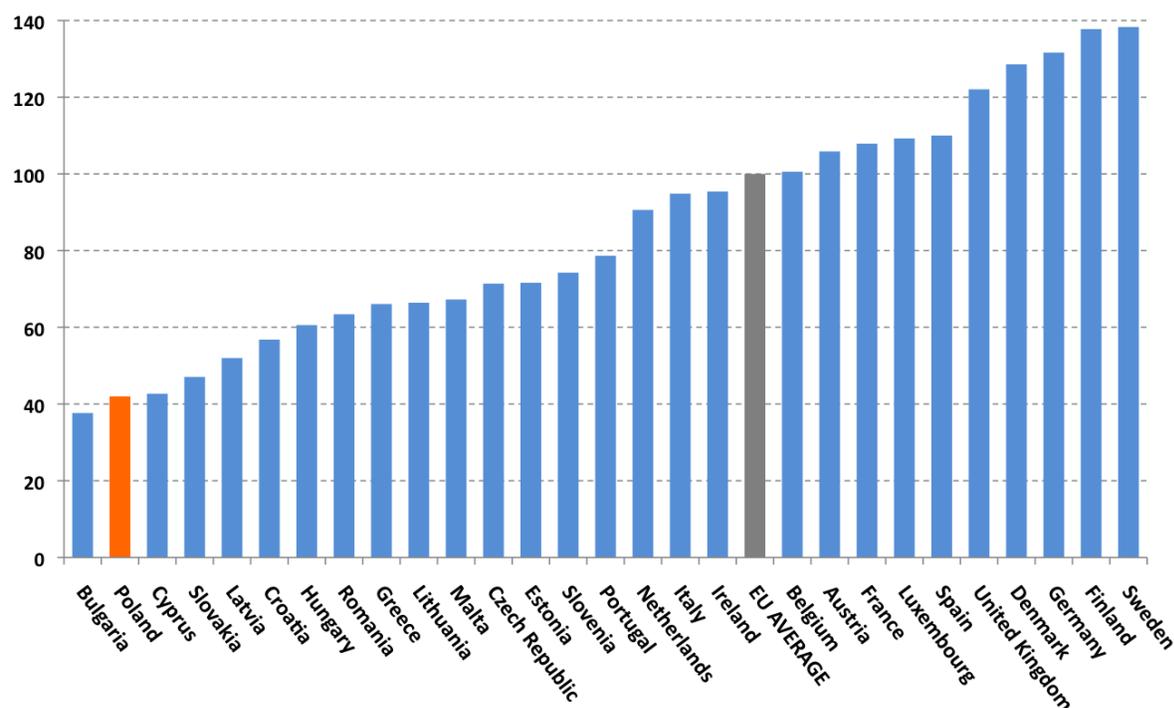
In the UE programme INTERREG IV for the years 2007-2013 the funding for eco-innovation policy was amounted to 86 billion Euro. The aim of INTERREG V for a current funding period 2014-2020 is strictly attached to intelligent, sustainable and integrated growth. An indispensable element of this process is also eco-innovation policy. INTERREG V funding is

mostly directed to support innovation, SMEs, low carbon and resource efficiency. A conglomerate of these priorities makes a good ground for eco-clustering. It is estimated that €2 billion has been allocated to innovation for the period 2007-2013 in the EU-27 and trans-cluster activities (Communication 2008: 7). The next generation of Community cluster initiatives, namely under Europe INNOVA TM is believed to boost cluster cooperation in the EU in a mutually reinforcing way and contribute to the creation of more world-class clusters in Europe. The “European Territorial Cooperation” objective reinforces and replaces the former Community Initiative INTERREG programme.

Important tool for EU eco-clustering policy is the European Cluster Observatory (ECO) which is the Community’s platform for regional competitiveness and clusters. The European Cluster Observatory is a platform of statistical information, analysis and mapping of clusters and cluster policy in Europe. The ECO provides policy makers with comparable information on cluster policies and relative cluster strengths in the EU. The ultimate objective of the ECO is to help member states and European regions in designing smart specialization and cluster industry as part of the Europe 2020 Strategy.

Part of the ECO is the Eco-Innovation Scoreboard which assesses and illustrates eco-innovation performance across the EU member states. The Scoreboard shows how well particular member states perform in different dimensions of eco-innovation compared to the EU average. It currently covers a time series from 2010 to 2013. The Figure 1 presents Eco-Innovation Scoreboard ranking in 2013.

Figure 1: Eco-Innovation Scoreboard ranking in 2013



Source: Eco Innovation Observatory Portal <http://www.eco-innovation.eu/>

In Europe there are about 2000 clusters and about 15-20% of them are eco-clusters. Environmental clusters are very crosscutting, containing parts of many various cluster categories overall. Even if the size of its employment is average among the sectors, it is second in terms of both, turnover and value added, suggesting high capital intensity and productivity. The growth of the sector has seen both periods of increase and decrease and is now about 5% smaller than in 1996, though still ahead of the traded industries in general (Ketels, Protsiv 2014: 48). Clusters as regional agglomerations of co-located industries and services employ 38% of the European workforce (Communication 2008: 3). Table 1 presents the basic facts on environmental industries in Europe.

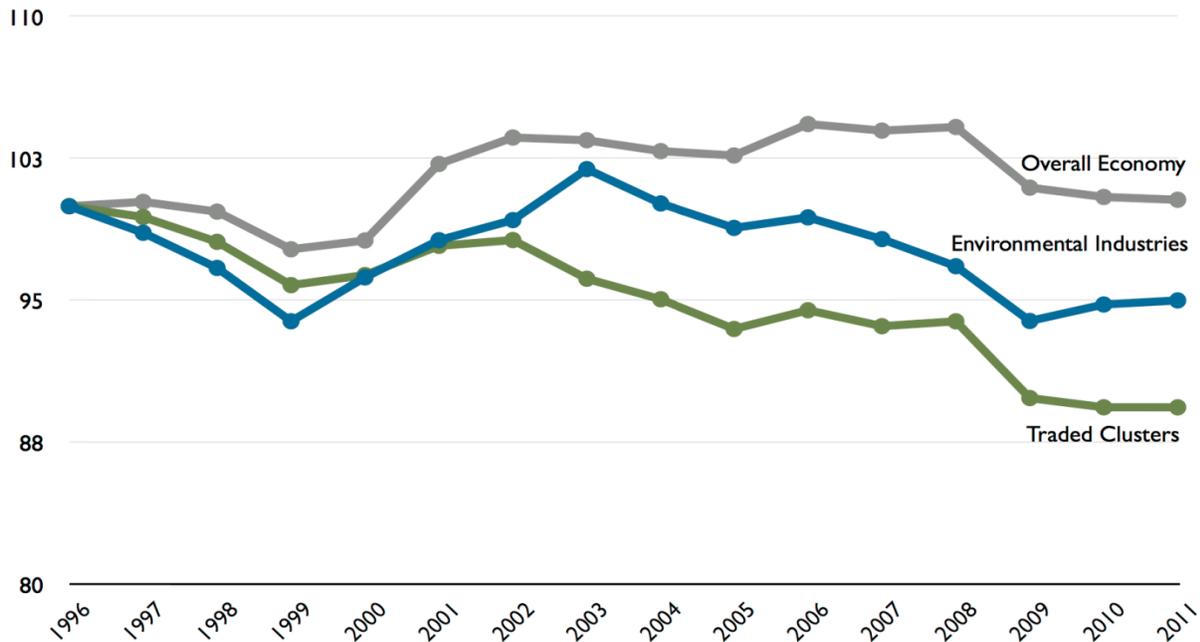
Table 1: Environmental industries in Europe

Basic Facts	Environmental Industries	Share of all traded clusters	Share of overall economy
Number of employees	8 597 431	12.50%	4.97%
Number of enterprises	961 055	9.87%	3.62%
Turnover (million EUR)	2 320 215	13.25%	6.69%
Value added per employee (EUR)	98 777	139.9%	159.6%
Average wage (EUR)	31 803	117.4%	140.3%

Source: (Ketels, Protsiv 2014: 48)

Figure 2 presents evolution of employment in environmental industries in Europe.

Figure 2: Evolution of employment in environmental industries in Europe



(employment in 1996 = 100)

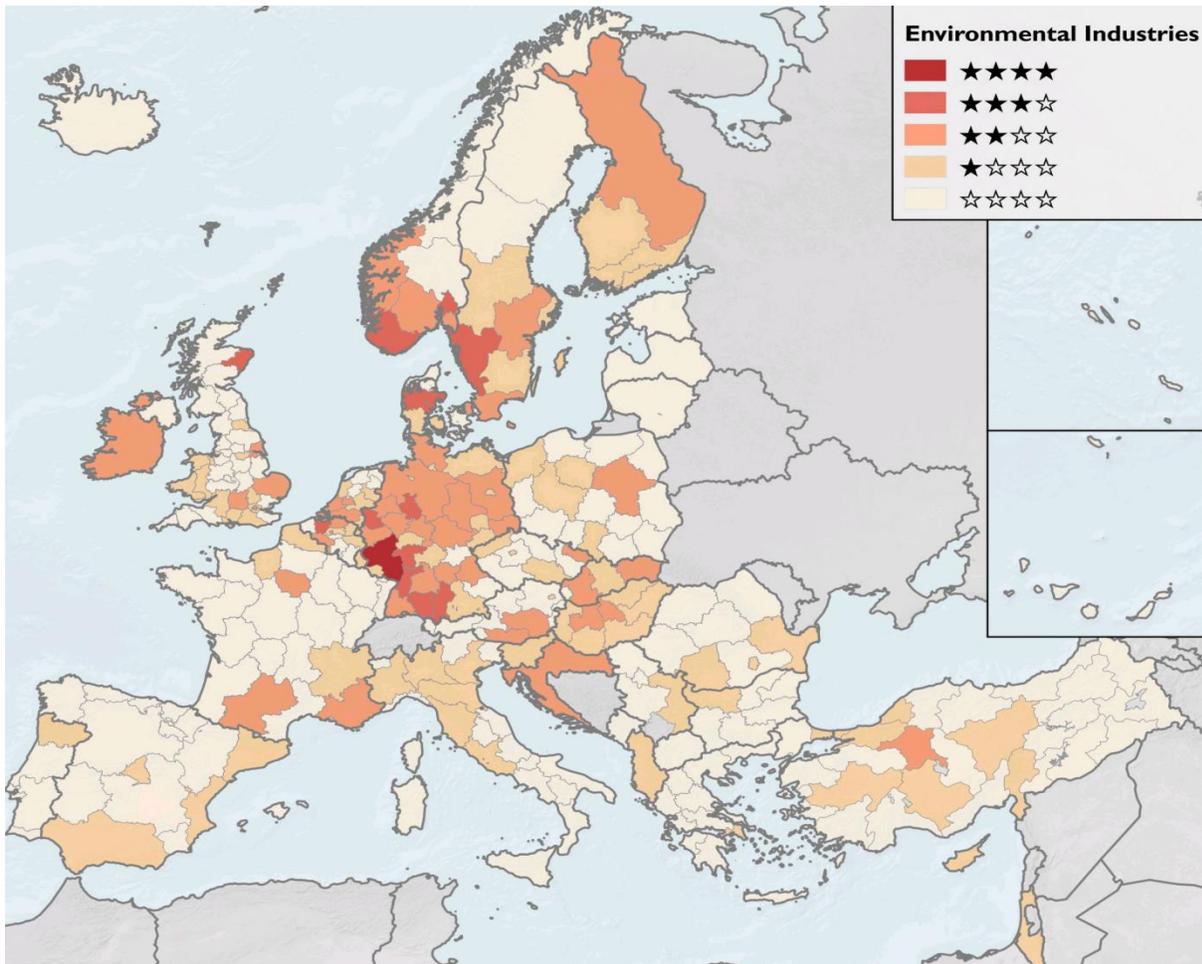
Source: (Ketels, Protsiv 2014: 48)

There is not a single type of cluster policy across EU member states that could be applied uniformly. Nevertheless all the policies aim to promote and support knowledge based networking

which in turn contributes to innovative solutions, cluster development and in general local and regional prosperity. The main aim to support cluster initiatives is based on “common assumption about the value of the agglomeration of firms and the importance of linking people, skills and knowledge at a regional level” (OECD 2007: 11).

Eco-clusters are present across the EU, with some countries leading the way. The profiles of the top regions are quite different and reflect their unique strengths. The German regions are strong in production technology, metal and chemical industries. The Nordic regions specialize more on engineering and transportation. Nevertheless even if these regions perform the best in terms of their environmental impact does not necessarily imply strong sustainability. One thing worth to be mentioned that the frontrunners on eco-innovation tend to specifically support the establishment of eco-clusters rather than integrating eco-innovative aspects into general cluster policy for all sectors (Barsoumian et al. 2013: 20). The map (Figure 3) indicates the geographic concentration of selected eco-clusters across Europe. It shows the leading European regions in environmental industries.

Figure 3: Leading European regions in environmental industries



Source: (Ketels, Protsiv 2014: 50) Stars represent strength of the particular clusters

The main sub-sectors of the eco-clusters in Europe are:

- renewable energy;
- material and energy efficiency;
- waste management;
- reuse, recycling and remanufacturing;
- repair and maintenance;
- sharing economy, including renting and leasing;
- environmental services, including environmental engineering;
- water and environmental protection.

5. The perspectives for eco-clusters development in Poland

Polish political documents states that clusters play an important role in driving competitiveness, innovation and regional policy. Simultaneously a real impact and support for the clusters of the Polish national policy seems to be rather poor. The elements of cluster policy were implemented in 2010 in “The National Strategy of Regional Development” (Krajowa Strategia Rozwoju Regionalnego 2010). “The National Strategy of Development” (Strategia Rozwoju Kraju 2020 2012) has also introduced the references to cluster policy. Nevertheless these references are rather marginal. The national cluster based policy mostly focuses on SMEs and links with regional policy. The interconnections between the two are well emphasized in the Regional Operational Programmes (RPO) of most of the Polish regions.

A new perspective for the EU structural funds in 2014-2020 for Poland amounts to 72,9 billion Euro. The main activities co-financed in this period include R&D activities and their commercialization, key investments for road infrastructure, eco-transportation, entrepreneurship development, digital development, social inclusion and labour activation. Many of them attaches directly or indirectly to clusters.

Cluster policy measures and instruments proposed for financing during the current EU funding period have been presented in the report “Directions and assumptions of the Polish cluster policy until 2020 - Recommendations of the Polish Cluster Policy Group”. These recommendations accent a need of stimulating a process of development of the key national clusters (world class clusters) with the biggest competitive and international potential. Support for clusters should be more direct. It means that it should not be transferd towards the cluster coordinators but directly to cluster actors i.e. enterprises and business support institutions such as universities, R&D organizations, schools, specialized business support institutions etc.

Cluster policy in Poland is mainly identified with funding instruments applied by the national and regional governments which promote the establishment of clusters in all the Polish regions. The instruments aim to establish cooperative networks and basically organizations are invited to apply for funding for the establishment and running of clusters. At the national level cluster-based policy is rather general. There is no special focus on eco-sectors. However at the regional level, some regions have identified cluster policy in a more explicit way. There are numerous eco-clusters that have come into existence.

According to the database from the ECO, Poland is among the least resource-efficient economies in the EU. Poland is among the countries that have scored persistently low in the European Eco-Innovation Scoreboard since 2010. Resource efficiency has not improved substantially since 2000. Poland ranks relatively poorly also in energy and carbon efficiency. One of the key explanatory factors of this performance is the significant dependence on the conventional energy sector based on coal. Polish economy underperforms in all the scoreboard components, being particularly weak in R&D investments as well as in economic outcomes related to eco-innovation. Although the overall picture is rather challenging. The activities undertaken by the particular clusters indicate a considerable economic opportunity in modernising the production processes, notably in energy sectors.

Polish Agency for Enterprise Development presents updated information on the Polish clusters on the Innovation Portal (<http://www.pi.gov.pl>). ‘Cluster Map’ is a cluster database that has been collected directly from cluster coordinators willing to register and publish information about their clusters on this website. By the end of 2014 175 clusters have been registered in the database. A summary of data provided by these clusters is presented below:

- Mazowieckie has the highest cluster population with 33 clusters located in the region;
- the smallest cluster populations with only 2 cluster initiatives have been reported in Kujawsko-Pomorskie and Warminsko-Mazurskie regions;
- the most popular profiles of specialization include: energy and renewable energy source, ICT and telecommunication, ecological construction;
- clusters have more than 7000 members in total including: enterprises, science institutions, business organizations and other entities;
- most clusters operate on a regional or sub-regional scale while about 30 clusters claim to have business operations on a global scale.

6. Concluding remarks

This paper is another voice in a debate on clustering that have already come a long way from its beginnings in the early 1990s. Along with civilization trends and rising environmental awareness eco-clusters reach an important role on the world map of cluster initiatives. Clustering is a general phenomenon across nations. Many countries introduce also eco-cluster policy and

undertake the organized efforts to improve growth and competitiveness of the eco-initiatives. What is more eco-business is expected to continue to be a steadily growing market. Implementation of eco-cluster strategy implies close ties between industry, government and academia.

Clustering opens new public-private avenues of local and regional development. In a clustering debate eco-clusters are receiving increasing attention in the light of sustainability and cities redevelopment discourse. Governments can be perceived as an essential supporter introducing policies to contribute to the competitive advantages of the cluster organization. Their important role should be perceived as a catalyst, not as a controller. It is essential in promotion of eco-innovations and all the eco-friendly initiatives that contribute to sustainable development. These initiatives are perceived to generate a positive impact on local, regional or even national economy. In this sense public policy can stimulate and direct industry to the more sustainable channels of economy. For the best outcomes eco-innovations cluster policy should be tailored at a local or regional level where it can best address the eco-innovative needs of a specific industry.

The European Union has adopted a cluster-based policy. As a result, clusters are today an important part of Europe's economic reality. The number of cluster initiatives has steadily been increasing in the EU over the past decade. They are also a part of green economy. Europe is considered to be a strong eco-innovation player in the world, accounting for approximately 30% of the world turnover in eco-related technologies and services (Barsoumian et al. 2013: 5).

Poland as the EU member state should integrate cluster policy into its national reforms. It means strict links and coordination of the overall industrial, innovation, regional, SMEs, and environmental policies. Poland is currently at an early stage of cluster policy adoption. The same attaches to eco-innovation and in general to green economy. Even though eco-innovation seems to be a point that is politically discussed. National policy should promote and facilitate cluster initiatives by an establishment of closer and more efficient linkages between industry and education and between public and private sector. It is expected that intensification of cluster processes in the Polish economy in the 2020 time horizon is going to contribute to a relevant increase of its competitiveness and innovativeness.

Bibliography

Barsoumian S., Severin A., Spek van der T. (2011), Eco-innovation and national cluster policies in Europe – a qualitative review, Greenovate! Europe EEIG European Cluster Observatory Brussels.

Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Putting knowledge into practice: A broad-based innovation strategy for the EU, COM (2006) 502 Brussels <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52006DC0502> [10.03.2015].

Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, Towards world-class clusters in the European Union. Implementing the broad-based innovation strategy, COM (2008) 652 Brussels <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52008DC0652R%2801%29> [10.03.2015].

Communication from the Commission, EUROPE 2020. A strategy for smart, sustainable and inclusive growth COM (2010) 2020 Brussels http://ec.europa.eu/europe2020/index_en.htm

Delgado M., Porter M. E., Stern S. (2014), Defining clusters of related industries, The National Bureau of Economic Research, working paper No. 20375, <http://www.nber.org/papers/w20375.pdf> [10.03.2015].

Dzierżanowski M. (ed.) (2012), Directions and assumptions of Polish cluster policy until 2020 Recommendations of the Working Group for Cluster Policy, Polish Agency for Enterprise Development Warsaw.

Eco Innovation Observatory Portal <http://www.eco-innovation.eu/> [15.03.2015].

European Forum for Clusters in Emerging Industries (2013), Extension of the European cluster observatory: Promoting better policies to develop world -class clusters in Europe. Policy roadmap. European Cluster Observatory http://www.emergingindustries.eu/Upload/CMS/Docs/Policy_roadmap.pdf [15.03.2015].

Esty D.C., Porter M.E. (1998), Industrial ecology and competitiveness, Yale Law Faculty Scholarship Series, Paper 444, http://digitalcommons.law.yale.edu/fss_papers/444 [17.03.2015].

Innovation Portal (<http://www.pi.gov.pl>) - Polish Agency for Enterprise Development [15.03.2015].

Ketels Ch., Protsiv S. (2014), European cluster Panorama 2014, REPORT European Cluster Observatory, Center for Strategy and Competitiveness, Stockholm, School of Economics, Stockholm.

Krajowa Strategia Rozwoju Regionalnego 2010-2020: Regiony, Miasta, Obszary wiejskie (The National Strategy of Regional Development 2010-2020: Regions, Cities, Rural areas) (2010), Ministerstwo Rozwoju Regionalnego, Warszawa.

Marshall A. (1920), Principles of economics, MacMillan, London (Original work published 1890).

OECD (2007), Competitive regional clusters: National policy approaches, OECD Publications, Paris.

Porter M.E. (1990), The competitive advantage of nations, “Harvard Business Review”, vol. 68 no. 2. pp. 72 - 91.

Porter M.E., (1998), Clusters and the new economy of competition, “Harvard Business Review”, vol. 76 no. 6, pp. 77-91.

Porter, M. E., Kramer, M. R. (2006), Strategy and society: The link between competitive Advantage and Corporate Social Responsibility, “Harvard Business Review”, vol. 84 no. 12, pp. 78–92.

Porter M.E., Kramer M.R. (2011), Creating shared value, “Harvard Business Review”, vol. 89 no. 1/2, pp. 62–77.

Propis De L., Driffield N. (2006), The importance of clusters for spillovers from foreign direct investment and technology sourcing, "Cambridge Journal of Economics", vol. 30 no. 2, pp. 277-291

Sölvell O., Lindqvist G., Ketels Ch., (2003), The cluster initiative Greenbook, AB Stockholm.

Strategia Rozwoju Kraju 2020 (The National Strategy of Development) (2012), Ministerstwo Rozwoju Regionalnego Warszawa.

The European cluster memorandum, promoting European innovation through clusters (2007), The High Level Advisory Group on Clusters.

Perspektywy rozwoju eko-klastrów w Polsce

Streszczenie:

Celem artykułu jest rozwój i upowszechnienie wiedzy z zakresu procesów tworzenia i transformacji eko-klastrów. Wzrost znaczenia eko-innowacyjności widoczny być powinien w polityce przemysłowej na wszystkich szczeblach zarządzania. Autorka prezentuje znaczenie współpracy dla procesów zarządzania w klastrach wskazując na rolę poszczególnych partnerów tego procesu. Celem autorki jest wskazanie powiązań polityki ukierunkowanej na zrównoważony rozwój ze wsparciem dla eko-innowacji. Klastry odgrywać mogą dużą rolę w rozwoju lokalnym i regionalnym. Stanowiąc powinny zatem element strategii rozwoju miasta czy regionu. Państwa, regiony i miasta poszukują strategii kreujących konkurencyjne rozwiązania dla inwestycji w ramach struktur klastrowych. Artykuł odwołuje się do polityk oraz instrumentów wsparcia eko-klastrów w Unii Europejskiej oraz w Polsce. Dokonano w nim przeglądu literatury, badań oraz danych statystycznych w zakresie struktur eko-klastrów w Europie.

Słowa kluczowe: klaster, zrównoważony rozwój, zielona gospodarka, eko-innowacje, ekologia przemysłowa
JEL: L140, Q560, O440, O440, Q550, Q570