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THE ROLE OF CLUSTERS FOR SUSTAINABLE DEVELOPMENT: SOCIALLY RESPONSIBLE PRACTICES, LIMITATIONS AND CHALLENGES. CASE STUDY OF A BULGARIAN INDUSTRIAL CLUSTER

Abstract:

The concept of sustainable development as a global and long-term philosophy of development is directed towards achieving a balance and interconnectedness between economic activities, social aspects and the environment and offers an overall approach to solving the growing and complex global problems.

This paper examines the possibilities that clusters' main characteristics – spatial proximity, strategic collaboration and competition; interaction between stakeholders (businesses, educational institutions, non-governmental organizations) - can provide for the implementation of responsible business practices and joint corporate socially responsible activities which contribute to sustainable development.

Based on publications in academic literature regarding the relationship between clusters and corporate social responsibility (CSR), known as the "cluster" approach to CSR, as well as the results from a practical study of an industrial cluster in Bulgaria, we outline the potential of clusters to bring about not only economic benefits but also social and environmental improvements. The conditions for successful implementation of CSR actions in the cluster are studied, which for some industrial clusters can be prerequisites for improvement of their actual capacity for contribution to sustainable development and for others, they can turn into significant limitations.

The results of the practical study show that in order for industrial clusters to use their potential for contribution to sustainable development, based on the main cluster characteristics (according to cluster theory), in addition to cluster activity, the social-economic and environmental context and the state of development of CSR and clusters in the respective country are also of defining importance.

Keywords:

sustainable development, cluster, corporate social responsibility, mining industry, industrial cluster Srednogorie (Bulgaria)

JEL Classification: M14, Q01, L72

Introduction

In certain industrial sectors, territorial proximity and concentration of enterprises with similar production processes, as well as their interaction with companies in the local supply chain (frequently, concentration of a high number of SMEs as well) on a given territory create significant social and environmental problems. When they are united in cluster organizations, industrial enterprises, related industries, representatives of the state and local authorities, educational institutions, civil society organizations and other stakeholders can collaborate in the implementation of joint socially responsible action, common policies and strategies in order to contribute to sustainable development.

The impact of clusters on sustainable development is direct – through economic development, income and welfare created for the workers, and indirect – through their broader impact on the local economy and environmental protection (Anbumozhi et al., 2013, p. 2). Most studies of cluster advantages in academic literature focus on productivity and innovations for improving competitiveness, and relatively few – on the impact of clusters on society and environmental development. A number of publications in academic literature show that in addition to economic benefits – competitiveness and innovations, - industrial clusters can also provide broader social, economic and environmental benefits (Berry 2004:1, Battaglia, M. et al., Knauseder, J., 2009).

This paper aims to examine the possibilities that clusters provide for the implementation of responsible business practices and CSR actions which contribute to sustainable development.

The objectives which derive from the research goal are the following:

- Clarifying the essence of the concepts clusters, CSR and their interaction;
- Establishing the potential of clusters to provide not only economic benefits, but also social and environmental improvements which contribute to sustainable development;
- Outlining the main limitations for successful application of CSR in clusters (known in academic literature as a “cluster” approach to CSR).

The study is based on the assumption (hypothesis) that the potential of industrial clusters to achieve sustainable development goals through implemented responsible business practices and joint corporate socially responsible actions contributing to sustainable development derives from the specific characteristics of a cluster: spatial proximity, strategic collaboration and competition; interaction between stakeholders (businesses, educational institutions, non-governmental organizations).

This issue provoked the interest of the authors regarding the situation in Bulgaria and directed the study towards using the case study method. The subject of the case study is Srednogorie industrial cluster.

The paper is organized as follows: First, the essence of the concepts sustainable development, clusters, CSR and interaction between them is clarified on the basis of a brief overview of literature. Due to the exceptional variety of opinions and the fact that the terms sustainable development, CSR, clusters are overused without going into in-depth discussion, we present the definitions we have adopted, which are the starting point for the practical study, answering the research questions and confirming the assumed hypothesis.

The second part of the paper focuses on the potential of the Srednogorie industrial cluster to provide sustainable development – the study is carried out as follows: overview of the cluster, analysis of CSR based on the main characteristics of clusters (most frequently described in academic literature), analysis of results and outline of the main possibilities, limitations and challenges in the future development of the cluster. Finally, the main conclusions are presented.

1. The concepts: sustainable development, corporate social responsibility, clusters

The concept of sustainable development as a global and long-term philosophy of development is directed towards achieving a balance and interconnectedness between economic activities, social aspects and the environment, and offers an overall approach to solving the growing and complex global problems. The concept of sustainable development, most often perceived as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, p.43), is subject to much debate (Hall, et al., 2010; Moon, J. 2007; Ivanova D. et al. 2016; Vasileva, E., 2014) and continuous development. It receives a widespread support from a number of international institutions (United Nations, European Union, the World Bank, United Nations Industrial Development Organization (UNIDO), UNDP, etc.), the governments of many countries from all over the world, non-governmental organizations and others, since it creates actual opportunities to mitigate poverty, problems related to the environment and climate change, the adverse effects of industrial development, including changes in existing unsustainable consumption, etc.

The business has a defining role in the process of sustainable development. Corporations are constantly increasing the social, environmental and ethical impacts on human and social life, they are often the agents of the development which absorbs, changes and destroys human and environmental resources on which future development depends. Corporations have or are required to have responsibility for contributing to sustainable development, especially in the programme for sustainable production and consumption, climate change and energy, preservation of natural resources. The growing role of the business in sustainable development is emphasized on a high international level: "…And more and more we are realizing that it is only through mobilizing the corporate sector that

we can make significant progress. The corporate sector has the finances, the technology and the management to make this happen." [Kofi Annan, Secretary General of UN (1997-2006), quoted by Wade M. 2005). The role and responsibilities of the private sector are also ascribed a special place in the Agenda for sustainable development 2015-2030 (UNDP et al., 2016). „The UN sustainable development goals (SDG) cannot be achieved, Jeffrey D. Sachs stresses, without the leadership of private companies, big and small. Multinational corporations bring unique strengths: worldwide scope, state-of-the-art technologies and massive capacity for achieving wide-scale solutions, which are essential for success“ (Sachs, D. 2012, p. 2211). The question is how to mobilize the business to contribute to sustainable development. One of the ways is to encourage and support socially responsible behavior – CSR can be viewed as contribution of the companies to sustainable development (Bansal, P., 2005). Through its internal policies and programmes, as well as with the external investment activity in the community, the business directs and manages its impact on the social problems and the environment. CSR actions in the context of sustainable development can prevent or mitigate the unfavorable impact of the businesses (Carroll, A. B., 2006).

According to studies (Battaglia, M. et al.,2010; Knauseder, J., 2009; Santos, M., 2009, Høivik, H, et al. 2010; Lund-Thomsen, P. 2016), the positive impact of socially responsible practices, which in their essence are of “micro” character, can be improved if the efforts of other enterprises (in the same sector or associated industries), the civil society and public sector are added to the socially responsible initiatives of a company, which expands the scope of CSR actions and the effect on global sustainable development goals. In this respect, some authors (Battaglia, M. et al.,2009; Knauseder, J., 2009, Høivik, H, et al. 2010) integrate the concept of Porterian “clusters” to assess the capacity of CSR in the clusters to stimulate competitiveness and sustainable development (Zadek, 2003).

This approach to CSR assumes that due to the local integration and spatial proximity of enterprises located on the same territory and working in the same sector, they face the same challenges (social and environmental problems) and so, they will cooperate with each other and will interact with other stakeholders (businesses, local authorities, educational institutions, civil society organizations) in order to implement socially responsible practices and promote CSR initiatives contributing to sustainable development.

Based on the assumption of collaboration between businesses, civil society organizations, local authorities and other stakeholders working for the establishment of sustainable development, it is possible to clarify the practical significance of clusters for CSR.

This points to clarification of the nature of CSR, the clusters’ concept, and their characteristics, as well as the relation between them, known as the “cluster” approach to CSR (Campi,2008, quoted by Høivik, H, 2010).

Concept of corporate social responsibility

Over the decades, the concept of corporate social responsibility has continued to increase its significance and importance. Corporate socially responsible practices are not to be accepted as innovation but more or less as a regular business activity. Business activities influence the environment, society, economy, and other stakeholders – suppliers, partners, clients, staff, local communities, etc. Over the time, these interrelations have been managed in different way depending on historical, cultural, political, and socio-economic factors.

Although the activity of business organizations is aimed at gaining profit, they conform to the requirements set by society and stakeholders. What Friedman claims in 70s that the only one social responsibility of the business is to increase profits (Friedman, 1970) nowadays gives a way to a much broader consideration about CSR (EC, 2011; Moon, 2007) and also the perception of being a strategic investment (McWilliams et al., 2006) and a source of competitive advantage (Porter, Kramer, 2006).

Numerous available definitions of CSR (Dahlsrud, 2006), often not clear enough (Moon, 2007), make its theoretical development and measurement difficult (McWilliams et al., 2006). Widespread is the understanding to think of CSR as a concept (Moon, 2007) used to describe different beliefs and practices that prove the companies are responsible for their impact on the society and the environment, sometimes beyond the legal requirements; and for the behavior of their business partners, and finally, the companies should manage their relations with society, regardless of whether the reasons are commercial considerations, adding a value for the society, or both (Blowfield, M.; Frynas, J. G., 2005).

The EC modified its definition about CSR to “the responsibility of enterprises for their impact on society” (EC, 2011, p.6). That is only one of CSR interpretations accepted as a starting point in our current research. The broader understanding of EC about CSR relates to a large range of actions that can be undertaken by enterprises to be socially responsible. The essence of the CSR concept explains the different focus of empirical studies in academic literature covering a wide range of questions within the scope of social responsibility.

A particular issue attracting the interest of researchers, as well as of number of international organizations, during the last years, is the application of CSR by clusters.

The clusters concept

The clusters theory is based on the ideas of Alfred Marshal (19th c.), has developed dynamically through the years (Perroux, F., 1950; Boudeville, J.R., 1968) and with the works of M. Porter has gradually turned into the basis of a new approach to economic development since the 90s of the 20th century (Porter, M.,2003; Delgadoa, 2014).

A cluster, according to Porter, is “a geographic concentration of interconnected companies and associated institutions in a particular field, which are community bound and mutually complementing“(Porter M., 2000, p.18). Due to the high geographic concentration of companies connected vertically or horizontally in a given industry (Madsen et al., 2003, p. 5), as well as the wide scope of possible participants in the cluster (the business, educational institutions, local authorities, state institutions, non-governmental organizations), clusters represent a specific form of collaboration (Knauseder, J., 2009), which has been acquiring higher significance in recent years. Clusters are developing in all countries, and the stage of their emergence varies (Oxford Research, 2008)

Clusters, as already stated, have been the subject of many studies which prove the need for their development and outline their role in several directions. Predominant are those which concentrate mainly on the economic advantages of clusters and focus on innovations to improve competitiveness. Clusters are viewed as drivers of competition, innovations and regional development (Garanti, Zvirbule-Berzina, 2014); they provide the companies forming a given cluster with an easy access to important resources, reduction of transportation costs, access to consumers and labour (Marshall, 2009; Porter, 2000; Krugman, 1993). Clusters are defined as a dominant factor nowadays (Dumais et al., 2002), both in reducing transaction costs and providing access to specialized services (Scott, 1988), and development of infrastructure and competitive business environment (Lin et al., 2006), which leads to enhanced efficiency and productivity.

A number of authors focus their attention on the role of clusters in regional development. According to Stimson, R. J.; Stough, R. R.; Roberts, B. H. (Stimson, S. et al., 2006), nowadays regional clusters are stimulants of regional economic development and are used in the making of regional development policies (Pachura, 2010). In their book Clusters and Entrepreneurship (Delgado et al., 2010), M. E. Porter, M. Delgado and S. Stern show that there is a positive correlation between regional clusters and business growth, the establishment of new enterprises and the survival of startup companies.

Although the importance of clusters for the economic competitiveness of regions is to a large extent indisputable, little is known about their impact on society and the environment. A number of publications in academic literature show that in addition to economic benefits, – competitiveness and innovations – industrial clusters can also provide broader social, economic and environmental benefits (Berry, 2004; Battaglia, M. et al. 2010; Knauseder, J., 2009).

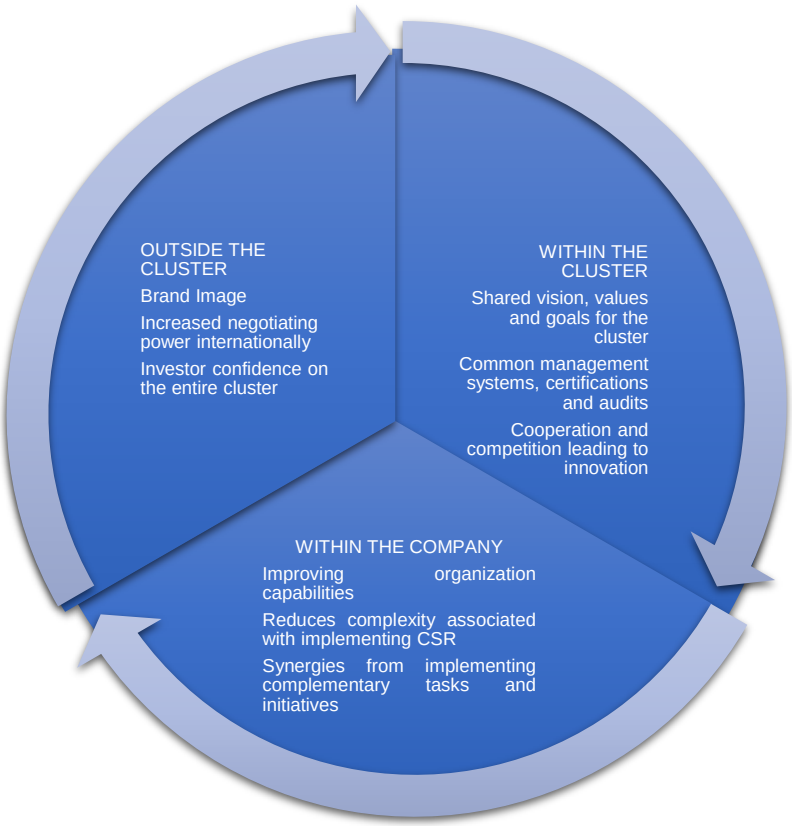
In this paper we adopt the assumption that industrial clusters provide potential for sustainable development – directly, through economic development, income and welfare created for the workers, and indirectly, through their broader impact on the local economy and environmental protection (Anbumozhi et al., 2013, p. 2). And this potential of clusters to contribute to sustainable development derives from their very essence as a concept.

According to Zadek “corporate responsibility clusters” offer the potential for linking and scaling up company-level corporate responsibility practices and outcomes, to create a broader impact on competitiveness and sustainable development. The potential for “corporate responsibility clusters” has been identified as creating competitive advantage within one or few sectors arising through the interactions among the business community, labour organizations and wider civil society, and the public sector focused on the enhancement of corporate responsibility (Zadek et al., 2003, p. 23).

The “cluster” approach to CSR increases the potential benefits by obtaining synergic effects resulting from the interaction between companies and other participants in society (stakeholders). To a large extent these effects depend on the vitality of civil society organizations for raising social awareness and responsiveness. At any time, this can be directed at individual companies or industries. But with time this vitality expands, it is in fact strengthened by the success of these individual initiatives. This also applies to public bodies and service providers that develop capacities that can be widely applied in the course of time, both with the collective and individual effects.

The benefits of implementing the “cluster” approach to CSR occur at different levels - micro perspective (within the company), meso perspective (within the cluster) and macro perspective (outside the cluster and defines the interactions with the society) (Figure 1).

Figure 1. Benefits of the cluster approach to CSR



Source: adpted by Høivik, W.; Shankar, D., 2010

2. Methodology of the research

Based on articles of the academic literature in the field of “cluster” approach to CSR and defined as a mean towards the increase of competitiveness and sustainable development (Zadek, 2003), current research aims to answer the following research questions:

- What is the potential of clusters to provide not only economic benefits, but also social and environmental improvements which contribute to sustainable development?
- What are the main limitations for successful application of CSR in clusters (known in academic literature as a “cluster” approach to CSR)?

The study is based on the assumption (hypothesis) that the potential of industrial clusters to achieve sustainable development goals through implemented responsible business practices and joint corporate socially responsible actions contributing to sustainable development derives from the specific characteristics of a cluster: spatial proximity, strategic collaboration and competition; interaction between stakeholders (businesses, educational institutions, non-governmental organizations).

The main method used is the case-study method that over the time proved to be quite useful in the field of CSR and clusters research (Knauseder, J., 2009; Baumann-Pauly, D., et al.,2013).

The answers of the research questions, as well as the confirmation of the research hypothesis come through the analysis of CSR of Srednogorie industrial cluster as the authors refer the main characteristics of the clusters (frequently pointed out in the academic literature); the outlined potential of the cluster, the limitations and challenges to the future development of the cluster.

The interpretation of the results and the assessment of the potential used by the industrial cluster Srednogorie to contribute to sustainable development is done through the prism of meeting the requirements upon successful implementation of CSR in the cluster.

Secondary sources of information were used, a company data about the industrial enterprises, members of the cluster; data of the local budgets of the municipalities (on whose territory operate the mining and processing of copper and gold-containing ores is carried out); information announced by the cluster; annual bulletins of branch organizations as Bulgarian Chamber of Mining and Geology (Jubilee Annual Newsletter on Mining and Geology in Bulgaria*)* and Bulgarian Association of Metallurgical Industry; published articles and interviews.

The annual Global Innovation Index published by Cornell University, INSEAD, and WIPO, and Global Social Progress published by Social Progress Imperative were the source of information for the analysis of the social, economic, and ecological context that influence the industrial cluster Srednogorie. Correlation coefficients were calculated to investigate the relationship between the state of cluster development and selected indicators – namely, gross national product (GDP) per capita, ecological sustainability, social progress index representing the social, economic, and ecological environment for the cluster.

3. Case study: Srednogorie industrial cluster's possibilities and limitations for sustainable development

3.1. Overview of the cluster

The subject of the case study is the Srednogorie industrial cluster – one of the first successfully functioning clusters in Bulgaria[1], established in 2005 on the basis of the regional industrial principle under the initiative of large enterprises belonging to the industry of mining and processing of copper and gold-containing ores in the central Srednogorie

[1] In Bulgaria, in contrast to other European countries, where clusters began to emerge in the 1990s, clusters appeared at a much later stage – 2003-2004 – as a result of the financial support received under different programmes funded by the EU.

region: Asarel-Medet AD, Aurubis Bulgaria AD, Elatsite-Med AD and Dundee Precious Metals Chelopech. It is the only cluster in Bulgaria awarded the Silver Label of Cluster Management Excellence (the internationally recognized certificate of cluster management is issued by the European Secretariat for Cluster Analysis following an audit on the overall activity of the cluster).

In addition to the companies for mining and processing of copper and gold-containing ores, members of the Srednogorie industrial cluster include companies related to the mining industry – Geotechmin OOD, Optics AD, Opticoelectron AD Eurotest-Control EAD, Air Liquide Bulgaria EOOD, Energeo EOOD, as well as hi-tech companies for manufacture of optical, optical-mechanical and optical-electronic systems and items servicing the industrial production. These are Optics AD (Panagyurishte) and Opticoelectron AD (Panagyurishte).

Active members of the cluster include representatives of the local government of the municipalities: Anton, Zlatitza, Mirkovo, Panagyurishte, Pirdop, Chelopech, Chavdar and Strelcha, on whose territory mining and processing of copper and gold-containing ores is carried out, and representatives of research and educational organizations – Centre for Management and Vocational Training EAD, Panagyurishte, University of Mining and Geology St. Ivan Rilski, Technical University-Sofia, University of Forestry-Sofia, University of Chemical Technology and Metallurgy-Sofia.

Characteristics of Industrial Cluster Srednogorie

The cluster's impact on the sustainable development presently and in the future, depends primarily on its characteristics.

- *Industrial Significance*

Among the members of the cluster are mining companies Asarel-Medet AD, Elatsite Copper AD, Dundee Precious Metals – the primary and only enterprises in Bulgaria that mining and process copper and gold-containing ores, which shows Srednogorie leading role in the development of the mining industry, as well as the development of non-ferrous metallurgy (Auburus JSC – one of the leading companies in the cluster is the only processor of copper in Bulgaria). Indicators for the cluster's defining role in the mining industry is the biggest share of metal mineral mining (with a permanent production) in the total worth of the production of mineral-raw material industry for 2011-2016– about 60%.[1]

- *Export orientation* – integrated and export-oriented base industries.

The analyses, carried out and based on National Statistical Institute data and reports of the branch organizations - the Bulgarian Chamber of Mining and Geology and the Bulgarian

[1] Based on data from The Mineral Raw Material Industry in Bulgaria in 2016, Yearly Bulletin, 2016, pp. 15-16

Association of Metallurgical Industry, show that the cluster is predominantly export-oriented and its development is definitely influenced by the market conditions in international markets (mainly the London Metal Exchange).

- *Ecological extensiveness* – inherited problems for restoring the environment;
- *Energy intensity* – big industrial consumers of fuel and energy;
- *Economic significance* – a key share of the GDP, major employers, investors, tax payers. The members of the cluster generate approximately 8% of the state's GDP and are among the major corporate employers in the country, providing employment for over 8000 people.
- *Urban division* – sparsely populated and remote settlements.

The cluster's member municipalities are small municipalities (three towns and five villages) with limited potential for development, poor economic activity, bad demographic characterization (decreasing and aging population). For the majority of municipalities on whose territory copper and gold-containing ores are being mined, members of the cluster have a defining role in their economic development as well as the region's development. (see: *the website of the cluster* http://www.srednogorie.eu)

3.2. Why Srednogorie industrial cluster needs to implement CSR?

The need for implementing CSR in industrial clusters in many EU countries (the so-called "cluster approach" to CSR) explained by Massimo Battaglia et al. (2010) with two main reasons, refer also to Srednogorie industrial cluster. These are the significant social and environmental problems which arise in certain industrial areas as a result of the concentration of enterprises with similar production processes, as well as their interaction with the companies in the local supply chain (frequently, high concentration of SMEs) on a given territory on the one hand, and on the other hand, capacity to meet the needs and requirements of stakeholders related to CSR through joint actions, common policies and strategies, depending on similarity in the relations with the same local stakeholders. Both aspects are very important for the mining industry.

Due to the nature of the production activity and the way of management of enterprises from the mining industry, they can contribute to sustainable management goals, but they can also cause many of the problems which the United Nations sustainable development goals are trying to solve – degradation of the environment, carbon emissions, displacement of population, worsening of economic and social inequality, increase of conflicts, higher risk of numerous health problems, both for those working in the mining enterprises, and the population living on the territories where the mining companies operate.

If managed properly, enterprises from the mining industry can assist economic development by creating jobs – directly and indirectly, business development, increasing

fiscal revenues and infrastructure links. They can also stimulate innovations and provide investments on a scale which changes during long time horizons (UNDP et al., 2016).

Acceptance by the local community of the significance of implemented environmental and social activities of the business is linked to receiving an “operating license” (Porter, 2006), which makes this aspect of fundamental significance. The local dimension of stakeholders is typical of the companies in the cluster. The relations of enterprises with stakeholders (mainly the local authorities and population in the municipalities where they operate) are intensive and direct. Many of the residents often work in the industrial enterprises in the region – enterprises for mining and processing of copper and gold-containing ores, members of the cluster (in all municipalities, they are the largest enterprises, and in some – the only ones) provide most of the employment for the local population and form the population’s income (71% of those employed in the municipalities from Sofia region live and work in the same municipality[1]). For example, Asarel-Medet AD provides over 30% of jobs in the industrial sector of Panayurishte municipality, plus about 6400 jobs servicing the company in the municipality and the country.

3.3. CSR in the Srednogorie industrial sector

In accordance with the research questions and the hypothesis, the analysis of socially responsible activities in the Srednogorie industrial cluster was carried out on the basis of the main characteristics of the cluster under existing cluster theory. Among the variety of definitions of clusters, the most common main characteristics are the following: Strong regional relations and spatial proximity, Related and supporting industries, Impact of institutions, NGOs and governments, Simultaneous competition and cooperation, Integration into global production networks (Knauseder, J., 2009)

Strong regional relations and spatial proximity

Spatial and, in particular, social proximity can be important steps towards a sustainable economy, and their main advantage in the context of sustainable development is the formation of regional identity of the companies which are more inclined to take into account environmental and social requirements.

The positioning of the leading companies in the Srednogorie region, determined by the geographic characteristics of the region and, more specifically, the presence of rich copper and gold-containing ore deposits, long experience, history[2] and traditions in the mining and

[1] Regional Development Strategy for Sofia-region 2014-2020, p.45

[2] Ore mining in this region in Bulgaria began after the second World War. Development of the porphyry copper deposits Medet, Elatsite and Asarel began in the early 50s of the 20th century.

processing of copper and gold-containing ores form the regional identity of the Srednogorie industrial cluster. The endogenous regional potential around which the cluster has been built, as well as its industrial specificity, not only enhance its regional identity but also activate the involvement of different stakeholder groups in the process of sustainable development.

Cluster theory emphasizes the uniqueness of local conditions which predetermine the significant differences in the goals and structure of cluster development efforts. Bringing together the main competences of industrial enterprises and their collaboration with other stakeholders, members of the cluster (the business, local authorities, research and educational institutions) is directed towards achieving the mission and strategic goals of the cluster.

The Srednogorie industrial cluster, in accordance with its mission and strategic goals entirely oriented towards sustainable development, implements CSR initiatives in four main areas: environment, healthy working conditions, human resources development, enhancement of the economic and social development of the region. The priority themes derive from the main characteristics of the cluster, its geographic position and industrial specificity.

Collaboration between cluster partners and good regional relations provide access to information, knowledge exchange, construction of common infrastructure, availability of materials, access to information and capital (cf. Giuliani et al. 2005: 556; Sternberg 2005:128). The exchange of information and sharing of experience is carried out through joint forums, scientific conferences, seminars and round tables carried out by the Srednogorie cluster association, which are dedicated to sustainable development; the cluster's website; the "Shared Values" magazine issued by it – a magazine about industry, clusters and competitiveness, as well as through the annual bulletin of the Bulgarian Chamber of Mining and Geology (all mining companies are members of the Chamber); in local media editions whose companies are some of the new cluster members.

There is a close collaboration between the industrial enterprises for mining and processing of copper and gold-containing ores and the local structures, mainly the municipalities. The long and well-established practice of public private partnership in the construction of technical and social infrastructure in the region contributes to its economic and social development.

Related and supporting industries

"Related industries are those in which firms can coordinate or separate activities of the value chain when competing, or those, involving complementary products (say computers

and software). The separation of operations can be carried out in the development of technologies, production, distribution, marketing or services“ (Porter, 2004, p.144).

A large part of the activities related to the mining industry in the field of design, surveys (geological, engineering-geological and hydro-geological surveys and drilling), mine consulting and engineering, construction works, scientific research, maintenance service of major machinery and facilities, etc., are carried out by companies, members of the cluster (Geotechmin OOD, Optics AD, Opticoelectron AD, Eurotest-Control EAD, Air Liquide Bulgaria EOOD, Energeo EOOD).

The links between the value chains of the companies and their suppliers are important for the competitive advantage and sustainable development. Big companies can encourage implementation of CSR through requirements to the suppliers they work with. Academic literature and practice show that this is a suitable way to attract small and medium-sized enterprises to the cluster and encourage their social responsibility. A typical example in this respect are the requirements for acquiring international certificates (ISO 14001).

Impact of institutions, NGOs and governments

Practice shows that efforts for cluster development are much more successful when the business community has a high level of trust in the government and when influential local governments take decisions to participate in the initiative. As already stated above, active members of the cluster with which long-term public private partnership is in place are representatives of the local authorities of the following municipalities: Anton, Zlatitsa, Mirkovo, Panagyurishte, Pirdop, Chelopech, Chavdar and Strelcha.

The state plays a key role in the development of the mining industry since it is the exclusive owner of the underground resources and it creates the regulatory framework. The cluster, due to its industrial significance, together with the Bulgarian Chamber of Mining and Geology (all mining companies are members) takes part in formation of policies, development of the National Strategy for the Mining (mineral and raw materials) Industry, adopted by the Bulgarian government in 2015. The amendments of the Law on Underground Resources adopted in 2010 have direct relevance to the subject of the study. They introduced a change in the allocation of the concession remuneration between the national and the local budget – 50:50 (formerly 70% for the state budget and 30% - for the municipalities). This has a favorable impact on the development of the municipalities, members of the cluster.

State institutions do not provide sufficient assistance for the development of sustainable mining industry in Bulgaria – there is no national strategy and policy in the mining sector, there are no policies in the field of planning underground resources consumption (National Strategy for the Mining (mineral and raw materials) Industry, 2015).

Educational institutions, non-governmental organizations and civil society have a significant impact on the activities of the clusters and are able to promote responsible business practices. The state educational and research institutions that have partnership relations with the cluster contribute to the development of human resources by preparing experts and applied research. Our study showed that the collaboration with scientific institutions consists in support for their development, participation in joint scientific forums, but there are no joint projects for scientific research and technological development. A Partnership Agreement for assistance in future joint activities and projects has been signed between the University of Mining and Geology “St. Ivan Rilski” and Dundee Precious Metals Chelopech.

Clusters also provide good opportunities for involvement of NGOs which aim to support sustainable development (see: UNDP et al., 2016). According to members of the cluster, although the cluster strives for partnership and implementing joint activities with non-governmental organizations, relations with some non-governmental environmental organizations are very difficult – overcoming their resistance to the development of new mineral deposits, including copper ores, lack of communication and lack of will for dialogue on controversial issues.

Simultaneous competition and cooperation

The strong competitive environment in the cluster obliges companies to continuously improve their activities and to make innovations. This leads to higher efficiency and productivity, which can not only reduce costs, but also reduce adverse effects on the environment and improve the living standard of people in the region.

Internal competition in the cluster and the country is weak and it can hardly be expected to increase in the future. The main actors on the domestic market are the active mining companies, members of the cluster for the term of their concession agreement. Due to the export orientation of the cluster, the market structure of international markets has a definite impact on its development (mainly the London Metal Exchange). According to Eng. L. Tsotsorkov, the CEO of “Assarel Medet” and Chairman of the Bulgarian Chamber of Mining and Geology, the risks for the future development of the leading companies in the cluster are mostly related to market conditions and the EU, as well as the eco standards of the EU. They will largely determine the competitiveness of the companies in the mining sector in the new economic conditions.

As the rivalry between existing companies is relatively low, competition arises in other two areas – to attract the most experience employees or regarding the environmental challenges. Directly related to the activities of the companies (mining and processing of copper and gold-containing ores) are their socially responsible practices and joint CSR initiatives, thus creating benefits for both business and society (Porter et al., 2011). Efforts

of Industrial cluster Srednogorie are concentrated in the following priorities: environment; healthy working conditions; development of human resources, as well as accelerating the economic and social development of the region. The policies on environmental protection and working conditions shall set and meet higher requirements than those provided by legislation or regulations. [1]

Human resources are a key factor for the success of the companies and it's imperative that cluster efforts be aimed towards programs for increasing qualification and adopting a series of educational measures for improving competencies in front of firm employees. The leading companies in the cluster use different mechanisms for the development of human resources. The in-company and external training and internship programmes are aimed at improving the human capital of the companies. The mining companies "Dundee Precious Metals Chelopech EAD" and "Aurubis Bulgaria AD" implement joint practical three-year internship programmes with the Vocational School for Mechanical and Electrical Engineering - Pirdop.

By nature the production process of the mining and processing of copper and gold-containing ores, has a negative impact on the environment. It is for this reason that the protection of the environment is a top priority in the activities of the companies and one of the main objectives of Industrial cluster Srednogorie. A proof of the consistent activities of protecting the environment, carried out by the leading companies in the cluster is the growing investment in new environmental projects, as well as the achieved environmental results (reduced carbon emissions, reduced consumption of natural resources, reduced water pollution, etc.)

The directions in which activities are carried out to reduce the negative impact on the environment are:

- repairing past environmental damages caused up to the time of the privatization of companies (for example technical and biological restoration of post-mining landscapes);

- improving production processes all over the value chain;

- technological innovations;

- improving energy efficiency and making use of renewable energy sources;

- modern management of water resources and the waste from ore mining and dressing;

- environmental monitoring.

Characteristic of all companies in the cluster are the constant improvements in all areas of the health and safety at work. The main actions in this respect are: a) technological

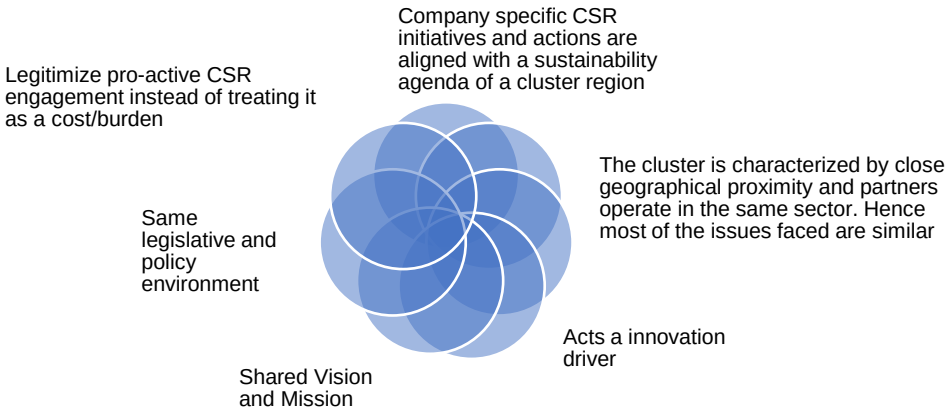
[1] A distinction should be made between complying with legislation and regulations and CSR. The regulations, stipulated by law, are part of the command and control approach of the state and they set out the minimum of requirements, mandatory for all companies. CSR activities are above legislative requirements. See: Slavova, I., 2013.

measures, such as the development and modernization of production, the consistent and successful improvements in production safety; b) internal and external training on occupational health and safety, which are part of the standards for all levels of management; c) monitoring and planning of comprehensive and preventive measures to reduce and eliminate risk to the health and lives of workers and improve working conditions in all workplaces.

The mining and processing of copper and copper-gold ores within the cluster is carried out in accordance with the three major international standards - for quality (ISO 9001), for environmental protection (ISO 14001) and for healthy and safe work environment (OHSAS 18001).

The characteristic of the Industrial cluster Srednogorie that help to embed and implement CSR are presented on Figure 2.

Figure 2. Characteristic of Industrial cluster Srednogorie, that help to embed and act on CSR



Source: own composition

4. Analysis of results

Based on academic literature and research (Battaglia, M. et al., 2010; Knauseder, J., 2009, Santos, M., 2009; Høivik, et al. 2010; Lund-Thomsen, P., 2016; Bembenek, B., 2015) regarding the conditions in which CSR in clusters can be successful for the attainment of sustainable development goals, we will establish the opportunities and limitations characteristic of the Srednogorie industrial cluster.

First, applying the cluster approach to CSR presupposes the existence of *common social and environmental problems* which should be managed at the cluster level. The territorial

concentration of mining enterprises in the Srednogorie region, existing for decades due to rich ore deposits of copper and gold, as well as their interaction with companies in the local supply chain, give rise to significant social and environmental problems. The management of the big industrial companies is directed towards both implementation of their production processes with reduced environmental impact, and implementation of a number of activities for remedy of old environmental damages caused prior to company privatization (mainly investments for technical and biological reclamation of areas disturbed by past activities, the goal being total reclamation of affected terrains).

The cluster unites the efforts of its members (leading companies and local authorities) for mitigation of social problems in the region. At the present stage, for most of the municipalities (members of the cluster), the big companies operating on their territory are the main and only alternative for economic development, employment and revenues for the local budgets (especially for the small municipalities – Chelopech, Mirkovo, Chavdar, Anton).

Second, the *relational environment in the cluster* can facilitate cooperative behavior development. The organizational structure and culture of the cluster are characterized by the existence of a relational environment comprised of systematic business and non-business relations between local participants, while collective identity is shared, based on common values and the way business is done. (Becattini, 1979 and 1999, Piore e Sabel, 1987, Piore, 1991, quoted by Battaglia, M. et al., 2010)

The Srednogorie industrial cluster has its regional identity, shares a common mission and strategic goals. The common values of all leading mining companies in the cluster are related to the environmentally responsible way in which they try to carry out their business activities, which is clearly reflected in their corporate missions and values. Due to the same social and environmental problems, the priority areas in which they implement their CSR are the same: environment, healthy working conditions, human resources development, enhancement of the economic and social development of the region.

The individual CSR activities of the leading companies in the cluster, directly related to their main production activity and an element of their corporate management, stand out with their long-term perspective and complexity (Santos, M., 2009). They, as part of sustainability management on the territorial level and a tool for strengthening its potential, create cumulative social and environmental effects.

The relational environment existing in the cluster facilitates the process of bringing together company competences of mining companies in implementing joint CSR initiatives. A cluster approach to CSR does not imply putting forward a new philosophy of social responsibility (Battaglia, M. et al., 2009) but – in most cases – simply to support the evolution from implicit CSR to explicit CSR (Matten and Moon, 2008*)*

Not all possibilities for cooperation in CSR are used – there are no joint research projects for scientific research and technological development. Involvement of other stakeholders is also weak – companies, suppliers of services, non-governmental organizations, universities and scientific institutes (members of the cluster), etc.

Joint activities, as a scope and forms of CSR in which subsidiaries of multinational companies as cluster members can participate, depend on the policies of corporations regulating the rights of their structural units. As stressed by Lund-Thomsen and Nadvi (2010, p. 205), still little attention has been paid to whether and how local cluster-based actors might negotiate the norms and values codified within the CSR requirements of leading global firms.

Third*, leadership in the cluster*. The big mining companies in the cluster are leaders with regard to CSR not only on the local level but also on a national scale. All socially responsible activities are implemented under their initiative and funding, they and the cluster have often received awards in the field of sustainable development. Asarel-Medet AD is one of the first members of the Bulgarian Network of the UN Global Compact**.**

The expectations for big industrial enterprises as leaders not only in the industry but also in CSR are to encourage responsible behavior of other companies and related industries in the mining industry, and SMEs (most often through the supply chain).

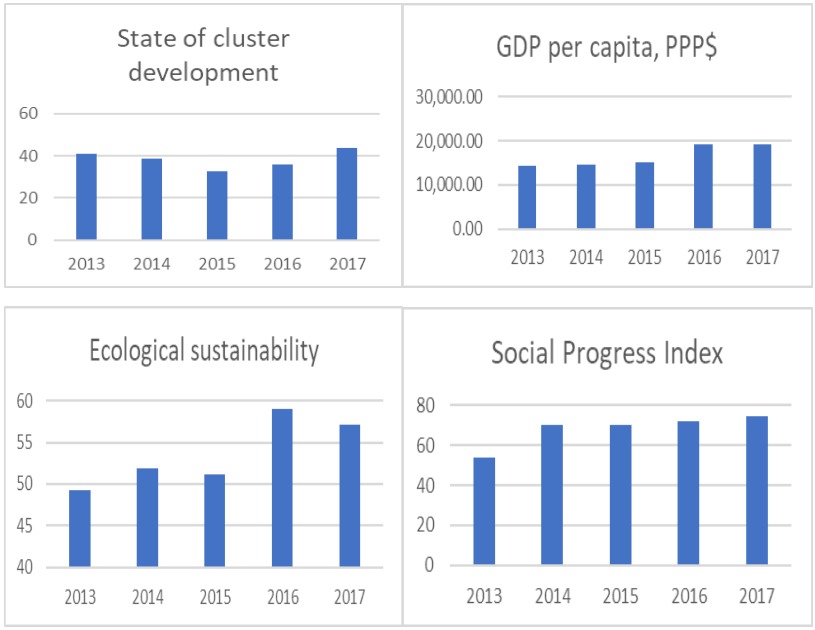
Fourth, sustainability of the “cluster” approach to CSR depends on the attitude of outside parties in a direct relationship with the cluster organization (trade partners, insurance companies, etc.). Sustainable development goals can be achieved when *external participants outside the cluster have socially responsible behavior.* In this respect, the situation in Bulgaria cannot be defined as a favorable or fostering CSR activities of the cluster. The research of the authors in the field of CSR in Bulgaria (university research project “Corporate Social Responsibility in Bulgaria – part of European social practice”, Slavova, I. et al. 2014) proved that the majority of companies operating in Bulgarian market (45% of studied (on the basis of information provided by their websites) companies (in number - 70) and all companies covered by the empirical study, primarily small and medium enterprises (empirical study,200 companies in total) carry out corporate philanthropy primarily as monetary donations scattered among different causes; and corporate social initiatives, often as a single initiative that do not interrelate to the companies’ aims and activities. CSR activities are observed during the recent years (since 2012) with growing number of companies carrying out social initiatives. Applying Zadek's classification, we can conclude that most of companies operating in Bulgarian market (primarily small and medium) are first-generation companies (Slavova, 2015a) regarding the corporate social responsibility – they have a short-term plan to protect their reputation, "a strategy to relieve pain" (Zadek, 2001).

An exception are the large companies (subsidiaries of transnational corporations) which implement a strategic approach and integrate CSR into their structures, processes, and

systems. What distinguishes them are the long-term campaigns supporting the society and environment. To this type of companies belong the mining enterprises, members of the industrial cluster Srednogorie.

Fifth, the cluster approach can be successfully applied only in a *specific social and economic context* where the relational structure can facilitate corporate behavior development. The social, economic, and ecological context in Bulgaria that influence the industrial cluster Srednogorie cannot be assessed as beneficial. The conclusion of the authors is backed up by the analysis of indicators presented on the Figure 3, as well as by a deeper and more detailed research conducted by the authors in the frame of a research university project "Development of Cluster Initiatives in Bulgaria: Status, Prerequisites and Challenges"[1].

Figure 3: Main indicators for Bulgaria



Source: Cornell University, INSEAD, and WIPO, 2013, p.150; 2014, p.160; 2015, p.180; 2016, p.192; 2017, p.202; Social Progress Imperative, 2013; 2014; 2015; 2016; 2017

The overall assessment of the macroeconomic environment in Bulgaria during the recent years is about being stable. But the stability does not correspond to satisfying results in number of areas. This is the case of one of the basic economic indicators – gross national product (GDP) per capita. The lowest level in Bulgaria compared to the other member

[1] The project is financed by the fund „Research and development" to the University of National and World Economy, Sofia, the project number: NID NI1-21/2015 (НИД НИ 1-21/2015), 2015-2017

countries of the European Union. Unfortunately, the latest data dating from the last 5 years do not support an expectation of a change in that tendency. What we can conclude, based on the presented data for GDP per capita, is: (1) the last position among the other EU member countries; (2) very slow growth, especially during the last two years 2016 and 2017.

The index "Ecological sustainability", presented in the Global Innovation Index (GII)[1], during the last five years is in a state of improvement. According to the data announced in the last report, Bulgaria is ranked 24th out of 127 countries that confirms the idea of improvement.

Social progress index[2], measuring the extent to which countries provide for the social and environmental needs of their citizens. The indicator for Bulgaria represents a tendency of being stable with a very small positive change during the last four years. The rank of Bulgaria for 2017 is 41 out of 128 investigated countries or this is defined as an upper middle social progress.

The last of the four selected indicators is the "state of cluster development". According to the data announced in the GIIs for the years 2013 up to 2017, the development of clusters in Bulgaria is not satisfying. The rank is 73 out of 127 countries. Nevertheless, the fact that the number of registered clusters in Bulgaria is extremely large, their development is lagging. One of the reasons we find that explains the situation is the fact that the foundation of clusters is narrowly related to the available funds in the frame of the European Operational programs. The lack of clear national policy in cluster development is one of the basic prerequisites for the unsatisfactory results in the area.

Correlation coefficients (CC) are calculated from the point of view of the index state of cluster development (SCD). The relationship between that index and each of the other three indicators is assessed. The CC for the SCD and GDP per capita (PPP$) is 0.21; with Ecological sustainability – CC is 0.09; and with Social Progress Index – CC is -0.18. As it is visible the three correlation coefficients signify for a very low correlation between the development of clusters and economic, ecological, and social aspects in the country. Even in the case of social issues in Bulgaria we find a negative relationship with cluster development. This is not a surprising result as different publications and research projects (Slavova, I., et al., 2016; Bankova, 2011, 2015;) recommend after the clusters start to be functioning to pay more attention to the corporate social responsibility and different aspect it comprises.

[1]Cornell University, INSEAD, and WIPO, The Global Innovation Index, https://www.globalinnovationindex.org/analysis-indicator, retrieved August 10, 2017

[2] Social Progress Imperative Website: www.socialprogressimperative.org, accessed August 10, 2017

Conclusion

The main conclusion of the study carried out in accordance with the assumed hypothesis is the following: the Srednogorie industrial cluster has limited potential to contribute to sustainable development. The capacity of the cluster to contribute to sustainable development is limited both in terms of direct impact – through economic development, income and welfare created for the workforce, and in terms of the broader impact (indirect) on local economy and environmental protection (Anbumozhi et al., 2013).

In the case of the Srednogorie industrial cluster, the hypothesis is partially confirmed. The main arguments for this statement are contained in the answer to the research questions: first, what opportunities does the cluster use to contribute to sustainable development and second, what are the existing limitations?

At this stage, the contribution of the cluster to the economic and social development is indisputable (Slavova, 2015b) – mining companies provide employment and income for the predominant part of the population in the region; they are a major source of revenues from concessions in the local budgets; a major investor in the social and technical infrastructure, etc. In the long term, however, the production of non-renewable and resources limited to the time when the deposits will be depleted, as well as the export of products with little added value, cannot be drivers neither for higher standard of living of the population in the municipalities where the mining and processing of copper and gold-containing ores are carried out, nor for the economic and social development of the Srednogorie region. In this respect, the state has a defining role.

With regard to CSR, the cluster uses a number of possibilities to contribute to sustainable development. The strategic CSR, which stands out with long-term and complexity of individual companies, creates a cumulative social and environmental effect. Based on Porter's competition theory and its application in the CSR practices within the cluster, we can say that when clusters carry out explicit CSR as part of their activities, it is beneficial not only for the development of the cluster, but also leads to innovations through collaboration and competition between companies. The positive effects of feedback contribute to the continuous growth of the cluster (Høivik, H, 2010).

Collaboration between cluster members is mainly directed towards improving the production factors, human resources, exchange of knowledge and experience, capital and infrastructure, which create conditions for enhancing competitiveness (M. Porter, 2004) and sustainable development. Joint CSR actions of the Srednogorie industrial cluster are limited and its future intentions are in this direction.

We should also take into account the fact the participation and forms of CSR of local enterprises/subsidiaries of multinational companies are defined by the policies of corporations regulating the rights of their structural units. The economic, social and

environmental context, the weak development of CSR and clusters in the country have an unfavourable impact on using the cluster's potential for sustainable development.

The future challenges to the Srednogorie industrial cluster are related both to applying existing socially responsible practices and corporate social initiatives, and to finding new ideas and expanding the collaboration between cluster members in implementing joint CSR activities, seeking partnership with other stakeholders in support of the implementation of sustainable development goals.

In order to use the full potential of industrial clusters for sustainable development, which derives from the specific characteristics of the cluster (according to cluster theory), the efforts of the companies, members of the cluster, and establishing relationships with stakeholders are required, but the social-economic and environmental context in which the cluster operates, the state of development of CSR and clusters in the country, the activities of governments in the field of sustainable development, and the participation of NGOs are also of great importance.

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