Clusters and smart cities as innovative partnerships for economic growth and new jobs in Romania

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Abstract:

Clusters play an important role in driving competitiveness, innovation and jobs creation in the EU. All clusters are unique, differing in scope, number of SMEs, composition, size, trajectories of development and adjustment to external circumstances. The cluster policy in Romania was launched in 2009 as component of the industrial policy. Clusters have emerged naturally and "bottom-up" from the regional level being mainly industry driven ones. Today, in Romania there are 92 regional clusters and poles of competitiveness out of which 70 were benchmarked by CLUSTERO-Romanian Clusters Association founded in July 2011. Romania has 10 clusters with silver label and 32 clusters with bronze label based on a benchmarking exercise lead by the European Secretariat for Cluster Analysis. Cooperation, innovation and internationalization are the main challenges for the Romanian clusters. Clustering and smart cities are team activities and need a common approach in the regional innovation system. Clusters and smart cities are well aligned with the modern approach of "Open innovation" which depends on the strong interaction between RDI entities, the dynamic entrepreneurship, public administration and the civil society. The paper is focused on clusters as innovative partnerships for the smart cities of the Romanian regions.

Keywords: *triple helix; open innovation; entrepreneurship*.

1. Introduction

European countries and regions have launched a wide range of cluster initiatives, Europe being now among the most active regions in the world economy. The European Cluster Observatory identified around 2500 clusters with up to 40% of the European workforce employed by companies in such clusters. Employees in strong clusters earn on average 11% higher wages than their colleagues in the same industries but located outside of clusters. This reflects the higher productivity that

companies can achieve in clusters (1). Clusters should be open, flexible and attractive to the best talent and expertise available worldwide. According to Michael E. Porter "clusters are geographic concentrations of interconnected companies, often SMEs and research institutions in a particular field" in view to increase the growth and competitiveness within a region, involving also public administration, banks and catalyst institutions. Successful cluster initiatives develop roadmaps to help understand where they are, where they want to be and how they plan to get there.

Clusters are important components of the European Open Innovation System, where all stakeholders need to be involved and create seamless interaction and mash-up for ideas in innovation eco-systems. Open Innovation 2.0 (OI2) is a new paradigm based on a Quadruple Helix Model where industry, R&D entities, public administration and civil participants work together to co-create the future and drive structural changes far beyond the scope of what any one organization or person could do alone. There is much that needs to be done to properly establish OI2 in Europe. There are 5 key elements in the new Open Innovation process: networking; collaboration; dynamic entrepreneurship; research & development; proactive intellectual property management.

A "Smart City" is a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership" (2). Clusters are drivers for innovation in smart cities and offer solutions to main topics such as: governance, society, mobility, safety, sustainability, circular economy, economy & Data & technology.

As Romanian cluster policy initiator I present in this paper the history of the clustering process in Romania and the main challenges for the Romanian clusters within open innovation eco-system. I will present also the strong links between clusters and smart cities as sources of competitiveness and new jobs locally, regionally and nationally. I hope that this paper will contribute to the knowledge of how cluster and smart city concepts have evolved in recent years in Romania.

Innovation actors in the Romanian clusters and cities

Innovation means "the implementation of a new or significantly improved product-good or service-or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations" (3). Innovation is the driver of clusters and cities. In the cluster model, the roles of the three actors can overlap (i.e. *universities* can become more entrepreneurial through creation of spin-offs, *companies, mainly SMEs* can become more involved in research and evolve closer to academia, and *the local administration* can intervene in knowledge creation (through research programs and knowledge absorption). *Entrepreneurship* is key to the success of urban economy and a source of local improvement. It is not only about job creation, but also about enhancing upward mobility and increasing citizens' self-confidence so that they become active agents of development. The city leaders can boost entrepreneurship and create innovation ecosystems providing a framework for sustainable growth.

The effectiveness of the innovation process is influenced by the main four factors: framework conditions, science and technology institutions, transfer mechanisms and SME-specific innovative drives. General framework conditions such as the macro and micro-economic environment, the fiscal system and access to finance shape the activities of SMEs and their ability to conduct innovative activities. The efficiency of science and technology institutions drives the accumulation of knowledge. Transfer mechanisms enhance flows of information and skills between the various stakeholders in the innovation system and are crucial to ensuring that innovation ideas are actually brought to the market and contribute to economic growth. Finally, SMEs themselves need to seek, identify and exploit the potential for innovations to reinforce the innovation process. These four factors correspond to specific areas of policy interventions. Governments need to design measures to address potential barriers in each of these four domains and to decide on the priorities that need to be set.

Linkages between the innovation actors are very important for the innovation system. The modern cluster policies aim to put in place a favorable business ecosystem for innovation and entrepreneurship in which new winners can emerge and thus support the development of new industrial value chains and "emerging industries". Modern cluster policies follow a systemic approach that combines different policies, programs and instruments.

The traditional innovation policy was primarily oriented towards research and development, that is the supply side of innovation. A current mainstream is the second generation of innovation policy which is oriented towards systems and clusters. The emerging third generation of innovation policy assumes that there is a potential for innovation which embedded in other sectors or policy domains. The potential can be realized by ensuring cross-sectorial optimization of the components of various sectors' innovation policy through coordination and integration. Clusters are an important part of innovation eco-systems. Innovation eco-systems are similar to clusters, but do not have the same focus on specific sets of related industries. They tend to encompass all activities in a given location (a city or a region) that are connected to innovation.

Romania lags significantly behind other EU Member States, in terms of the level of resources it invests in research and development (R&D). The R&D expenditure in the business sector was 15.9% of the EU average, and non R&D innovation expenditures of companies were 21.3% of the EU 2010 average. The private co-funding of public R&D expenditures dropped by over 36 pp from 2010 to 2016 to reach 61% relative to the EU 2010 average (4).

Romania ranks as poorest innovator in 2017 EU Scoreboard (5). Romania is the worst performing EU country in terms of the proportion of SMEs introducing product or process innovations (almost 65% less than the EU average). The government has introduced a number of policy measures to increase the economy's capacity for research and innovation. Some of these are, however, not yet in place or rarely used. Further action is therefore needed in this area. Possible measures for developing firms' research and innovation capacity include providing SMEs with tailored high-quality services to facilitate innovation, supporting knowledge-based start-ups,

funding the development and launch of new products, and developing incentives for collaboration between large firms, innovative SMEs and universities.

The Ministry of Research, Innovation and Science is in charge of issues such as science, technology, research, development, innovation and financing of innovative clusters while the Ministry of Economy and the Ministry of Small and Medium Enterprises, Commerce and Business Environment are responsible for the areas of SME development, industrial and cluster policies and foreign direct investments.

There are also numerous bodies responsible for implementation of innovation policy in the broader sense of the word: universities, R&D institutes, cities, Science and Technology Parks, incubators etc. In Romania there are 94 public and private universities, out of which 24 universities are members of clusters. Universities are encouraged to adapt management and education structures to sustain links with the business sector, but also to take an active role in developing their communities and local business. R&D Institutes, centers for technology transfer and formation centers are also members of clusters (i.e. Institute for Economic Forecasting that is part of the Romanian Academy is member in 3 clusters). The Romanian State Office for Inventions and Trademarks (OSIM) is the body in charge of acquiring and protecting intellectual property rights.

Romania has 265 cities but the Romanian clusters that are working on a smart city sector are few and located around the larger cities such Cluj Napoca, Bucharest, Brasov, Iasi, Timisoara, Craiova, Constanta and Galati (i.e. Cluj IT Cluster develops the strategy for Oradea-the first smart city in Romania and Cluster for Innovation and Technology Brasov develops smart mobility in the city) (5).

Small and medium-sized enterprises (SMEs) are the weakest part of the national innovation system as demonstrated by a very small share of innovative SME's. In 2016, 34, 26% of the Romanian SMEs have allocated no resources for innovation activities, while 0, 63%% of the enterprises have directed more than 76% of the total investments towards innovation (6). Romania is ranked 62 out of 138 countries for business sophistication in the Global Competitiveness Report 2016 (7). Romania has introduced a number of measures to improve its export performance. In May 2014, it adopted a national export strategy for 2014-2020. Effective implementation of the strategy will require an action plan with clear priorities and an implementation timeline. The SMEs export development program was introduced to facilitate access to international markets. It provides services for trade missions, part-finances participation in international trade fairs, operates a trade portal and commissions market studies. There continue to be significant difficulties, however, in the implementation of these measures, and no evaluations have been carried out to assess their effectiveness. There is a low level of collaboration between SMEs and research entities demonstrated by only 1298 SMEs that are members in clusters. In today's economy it is necessary for all SMEs to connect knowledge to the market successfully in order to remain competitive and clusters could be an opportunity for the Romanian SMEs.

Innovation is a complex process, which results from the interaction of many entities, public and private, over an extended period. It is critical that the public sector provides the leadership and vision to coordinate these efforts and to promote a culture of enthusiasm for innovation. In particular, public initiatives can create

innovation platforms that bring together policy, enterprises, research perspectives and resources to generate innovative solutions to existing challenges.

Cities can act as platforms to drive innovation, sustainability, mobility, inclusivity. Small and medium sized cities can also contribute to implement new models of business mainly in creative and cultural sectors, tourism and eco-tourism, textiles, wood and furniture etc.

Overall, the Romanian government needs to do more to coordinate its policies in the areas of export, industry, innovation, clusters and access to finance, smart cities, human resources development. Integrated policy measures are essential in order to allow SMEs to increase their value creation and competitiveness. There was no public funding to support clusters and smart cities till now, only European Funds were used for cluster management excellence, investments, R&D projects in smart cities etc. Foreign companies and multinationals are investing comparatively more in R&D and innovation than domestic firms. Large firms mainly multinationals (Renault, Ford, Continental etc) within clusters play a catalytic role because they create a critical mass of experienced managers, they provide ideal conditions for high technology firms to develop and they have multiplier effects in terms of a region's local economy for materials and resources.

EU Member States have national/ regional policies and programs in support of clusters. Romania is currently developing a new industrial policy document with a main component of cluster policy and an action plan that will stipulate concrete measures for financing innovation in clusters, attracting foreign direct investments, cluster management excellence, facilitating the access of SMEs in global value chains, promotion of skills development, protection of intellectual property, promotion of technological upgrading etc. Romanian regions are on the way of smart specialization that needs to exploit regional diversity, stimulate cooperation between all stakeholders and open up new opportunities for regional innovation.

2. Cluster development in Romania

Clusters play an important role as drivers of economic growth and innovation locally, regionally and nationally. Clusters are today an important part of Europe's economic reality. Clustering is a team activity, not a solo effort and its successful start requires a core of motivated enthusiasts who would also inspire others to join in.

The first cluster policy document and the Romanian cluster mapping were launched in 2009 to identify potential clusters in the eight development Romanian regions and to focus the re-industrialization process on clusters. In 2010, the Ministry of Economy-Directorate for Industrial Policies launched the Research Program for Industry – INOVCLUSTER projects – to disseminate the cluster concept with all stakeholders (industry, mainly SMEs, R&D entities, public administration and catalyst institutions) and to elaborate a Guide for implementation the innovative cluster concept in Romania.This program had the aim of developing a systematic approach to cluster development in the eight regions of Romania, to promote and strengthen the cluster policy and to gain experience by exchanging best practices with other countries in the region. The specific objectives were to establish a

platform to bring together partners from public research institutions, private sector and public administration in economic sectors as well as to establish concrete partnerships between research, business and public administration around partnership projects. The mobilisation of the stakeholders and ultimately the success of the cluster strongly depend on clear objectives and benefits that are attractive to all participants. Building trust takes time. Clusters in Romania do not always have the necessary critical mass of enterprises and innovation capacity to sustainably face competition and to be world-class. SMEs can and need to work with partners in many locations to access the technologies and supplies they need from the best possible sources.

Romania adapted the triple helix paradigm (industry – R&D – public authorities) to a so called "Four Clover Model", the fourth actor being represented by catalyst institutions such as technology transfer centres, chambers of commerce, consultancy companies etc. Today, there are also clusters that adapted the quadruple model with banks as an important entity. Identifying the relevant stakeholders in a cluster is a challenge in Romania. 60% of Romanian clusters have only fifteen active members out of which ten are productive SMEs but offer increased opportunities to attract external investment, including FDI. Clusters reflect today the cross-sectoral nature of value chains and innovation systems.

In Romania there are 92 regional clusters and poles of competitiveness (networks of minimum 3 regional clusters or regional clusters with national and international vocation), majority being in embryonic and established stages and few of them are mature. 10 of these mature clusters gained silver label (ROSENC Timisoara, IND AGRO POL Bucharest, Green energy Sf. Gheorghe, Romanian Textile Concept Bucharest, ELINCLUS Bucharest, Agro Transylvania Cluj, iTechSylvania Cluj, Transylvania Furniture Cluj, Cluj IT Cluster and PRO WOOD Sf.Gheorghe) and 32 bronze label based on a benchmarking exercise lead by the European Secretariat for Cluster Analysis.3 regional consortia and 3 national sectoral networks (automotive, ICT and textiles) are also active in cluster development and promotion. Romanian clusters are members of various European networks (South East Europe Network; Cluster House-Balkan and Black Sea Network; European Cluster Collaboration Platform, TCI network, Adriatic Danubian Clustering networks etc).

Clusters have emerged naturally and "bottom-up" from the regional level being mainly *industry driven* ones, out of which the most important examples are those of the automotive sector (Dacia Renault Pole of Competitiveness, AUTOMOTIVEST Timisoara, Ford Automotive Sud Vest Oltenia, ETREC Sacele Brasov; SPRINT ACAROM Cluster; PREL MET Cugir; Transilvanian Mechanical Engineering Cluster), aerospace (Transylvania Aerospace Cluster Brasov, Romanian Aerospace Bucharest), agro-food (IND AGRO Pol Bucharest, Agro-Food Sf.Gheorghe, IND AGRO Vest Arad; Agro Transilvania Cluj-Napoca; Agro-food Tara Barsei Brasov, Agro Pro Oltenia; ALIMENT Transylvania Alba Iulia; Gusturi Transilvane Cluj), energy and eco-constructions (ROSENC Timisoara, Green Energy Sf.Gheorghe, REN ERG Brasov, TREC Cluj, CONSTRUCT Oltenia; Breasla Constructorilor Ieseni; Green Solutions Lower Danube Galati; CERMAND Constanta), creative sectors (ASTRICO Savinesti, TMW Sud Est Focsani, Romanian Textile Concept Bucharest, Transylvania Textile & Fashion Sf. Gheorghe, APP Printing & Packaging Design Timisoara; ICONIC Iasi, Life Style Cluj),

wood and furniture (Pro Wood Sf.Gheorghe; REGIOFA Odorheiul Secuiesc; Transylvanian Furniture Cluster Cluj; Bucharest Furniture Design Cluster), ICT (iTechSylvania Cluj; IT Plus Miercurea Ciuc; EURONEST ITC Cluster Iasi; Different Angle Bucharest; ICT Cluster Craiova, Smart Cluster Alliance Bucharest, Iconic Cluster Iasi; Danube Cyber Security Alliance; ICT Cluster Galati; Banat Software Cluster; START INOVARE Cluster; Control & IT Bucharest), tourism (Transylvania Lands Alba Iulia; Bucovina Tourism Cluster; Balneo-touristic Cluster Transylvania Sf. Gheorghe; Tracialand network of clusters Bucharest; INOMAR Constanta; Transalpina Drumul Regelui Cluster; Dunarea turistica cluster); health and medical sciences (Regional Cluster Health Lower Danube Galati; Health Romania Cluster; BIO TECH Valea Prahovei Cluster; ROVEST Timisoara).

Furthermore, advanced are also *clusters driven by universities and R&D institutes* (Cluj IT Cluster, ELINCLUS Cluster Bucharest, IMAGO MOL Iasi, BioROne Cluster Iasi, ELI-NP Magurele High Tech Cluster Bucharest; MECHATREC Cluster Bucharest; Magurele KET Cluster Klara; MED GREEN Pole Constanta, Cluster for Innovation and Technology Brasov; Romanian River Transport Cluster Galati; Dorothy Urban Logistics Cluster Craiova) (8).

The capacity of the Romanian cities and regions to innovate depends on many factors such as: the business culture, the skills and competences of the workforce, the existence of effective education and training institutions, innovation support services, technology transfer mechanisms, R&D&I and ICT infrastructure, the mobility of researchers, business incubators, new sources of finance and local creative potential etc. Good governance is also crucial. Performance in innovation and clusters varies markedly across Romania (North West, West, Center, Bucharest-Ilfov regions are in the top).

Smart specialization strategies help regions to concentrate resources on a few key priorities (i.e. North West Region-development of Cluj Innovation city and clusters in ICT, agro-food, renewable energies, furniture, creative and cultural sectors). Clusters are used by cities and regions as platforms bringing together and mobilizing local actors to design and successfully implement smart specialization strategies, attracting innovative companies and creating more jobs at local level. Clusters facilitate business opportunities and internationalization for SMEs that activate in cities and regions (9).

Good practices transfer motivates the participants in clusters as it demonstrates that the concept can give results in similar settings. In Romania, good practices from Hungary, Germany, France, Wallonia, Italy, Austria and Spain were implemented and experience of Norway, Denmark and Poland by seminars organized in Romania was a benefit for Romanian clusters. Once good practice from foreign countries is transferred, the Romanian participants should be ready to generate clusters and participate in European projects like Adriatic Danubian Clustering-ADCwww.adcproject.eu(South East Europe Program 2007–2013) with the aim to enhance the knowledge on the potential for cross-border cooperation and to promote it, granting greater visibility of the SMEs in the region, to facilitate networking in four sectors like agro-food, modern housing, mechatronics and logistics and to promote the Adriatic-Danube area as an integrated productive

system for international investors; ClusteriX-Clusters for European Innovation Cross-Linking-a project co-financed by the European Regional Development Fund and made possible by INTERREG IVC www.clusterix.info and www.ecoplus.at with the aim to enable regional authorities to identify, analyze and explore the potential of strategic future cluster development through the exchange of experience and best practices between nine partners from eight EU different countries; the overall objective of ClusteriX was to help increase the competitiveness of European regions and their innovation potential through the improvement and strategic reorientation of cluster policies by using smart specialization strategies; SEENECO-South East European Network of Excellence of Cluster Organizations-a project co-funded by the Competitiveness and Innovation Framework Program (CIP) under the DG Enterprise and Industry for the European Commission www.cluster-excellence.eu with the aim to promote the cluster management excellence by elaborating a set of "training tools" for trainers, a "benchmarking tool" of clusters performances based on a set of indicators and creation of a collaboration platform for clusters; Cluster PoliSEE-Smarter Cluster Policies for South East Europe-a project funded under the 3rd strategic call of the South East Europe Program www.clusterpolisee.eu. The overall objective of this project was to increase the competitiveness of European regions and their innovation potential through the improvement and strategic re-orientation of cluster policies by using smart specialization strategies. A specific Cluster Policy Learning Platform has been put in place with the aim of creating a competence centre for cluster stakeholders in South-Eastern Europe and a catalogue to promote South East Europe networks of clusters in the global value chain were the main outputs of this project. There are also many other projects focused on clusters and their role in smart cities and regions.

Each Romanian cluster has an agreement/protocol of collaboration and a development strategy focused on research, development, innovation and technology; entrepreneurship; development of new business models; development of new production processes and conservation; education, training and qualification; marketing, branding and internationalization; management and leadership; protection of intellectual property; value chains development; sustainable cooperation in cities and regions etc.

Cluster management organizations are the legal entities of clusters that support the strengthening of collaboration, networking and learning in innovation clusters and act as innovation support providers by supplying or channeling specialized and customized business support services to stimulate innovation activities, especially in SMEs. They are usually the actors that facilitate strategic partnerships across clusters. In Romania majority of clusters have not a legal form but the cluster management organization that could be an NGO (non-profit organization) or a business organization/consultancy company has a legal form.

Efficient, professional cluster management organizations are critical for raising the quality of business support services and driving cluster initiatives towards self-sustainability. EU COSME Program encourages the Excellence of Clusters management through training and exchanges of best practices as well as the benchmarking exercise in view to obtain the basic bronze label. Romanian cluster

management organizations are invited to improve their support services and better integrate innovative SMEs into clusters. Romanian clusters consider access to finance very important for their development. There was no public funding to support clusters and the European programs are very useful but insufficient for the cluster development and internationalization.

CLUSTERO – the Romanian Cluster Association www.clustero.eu is created in July 2011 and brings together 45clusters and individuals with the purpose to coordinate the sustainable development of clusters in the eight Romanian development regions. CLUSTERO exists to create a competent and long-term platform for the development of cluster organizations in Romania and an active interface for their internationalization. The role and activities of CLUSTERO are focused on: information, communication and knowledge transfer and networking; facilitator of the cross-cluster cooperation and internationalization; partner for the national, regional, European and international consortia in various projects; advisory point for new cluster initiatives formation and awareness building, training on cluster management and clusters promotion, helps clusters to develop a visible profile, lobbying etc. CLUSTERO is member in various European platforms (Balkan and Black Sea Cluster House Network; European Cluster Collaboration Platform; South East Europe Network, Danube Network etc).Annually. CLUSTERO is co-organizer of the Romanian Annual Clusters Conference and it is co-organizer of several clusters events in Romania and abroad.

The internationalization of the Romanian clusters through networks covers a wide range of activities that influence both South East Europe region and country in which the cluster is located: access to knowledge, access to new markets, access to key infrastructures, access to new products and forms of collaboration. The exchange of best practices between networks of clusters created in various sectors contributes to identify specific issues for the region and specific measures for challenges. Transnational cooperation is more challenging than working on a national basis. Using cluster networks, Romania and the 8 regions prepare a knowledge base for cluster funding and developing a common understanding of the important role of clusters for the development of EU regions.

Cluster development is a market driven phenomenon where an entrepreneurial mindset is a key ingredient. Clusters offer a vibrant environment for SMEs (cooperation, infrastructure, skills). Enterprises, mainly SMEs, participate actively in cluster collaboration and innovative networks because this gives them access to new knowledge, new business partners and other advantages that can strengthen their innovation, sales and export. This is why the Romanian enterprises (especially the small and medium-sized) and their growth and development potentials are the focal point of the Romanian cluster policy.

Many Romanian clusters are already focusing on areas with significant social challenges, for instance within energy, environment, welfare, health, transport, tourism, agro-food and modern housing. Romania is strongly in favor of a broad concept of innovation that includes not only technological innovation but also non-technological, social, institutional, organizational and behavioral innovation. Clusters could promote and support innovation as products and services.

Design is also used as a term to describe particular approaches to innovation. Design is also meant to empower cluster members to invent together solutions to economic and social problems. Innovation within clusters go through four stages, from ideas, prototypes, implementation to a final stage that is to scale up so that the new approach makes a real impact and becomes part of the cluster strategy and work.

The key objectives of the Romanian cluster policy are focused on assisting Romania developing more world-class clusters in strategic economic sectors for the benefit of SME and promoting cluster cooperation at local, regional, national and EU levels to facilitate SME promotion and internationalization and support the development of new world-leading competences.

3. Conclusions

Clusters and cluster policies do not offer an instant solution that will work in all circumstances. Good cluster policy requires strategic, consistent and concentrated efforts that are evidence-based and not constrained by various interests. But when these conditions are met and the cluster policy focuses on promoting cross-sectoral collaboration and value-chain linkages, it can help industrial transformation processes and be an important tool for designing and implementing smart specialization strategies (10).

Cluster programs at different levels (EU, macro-regional, national, regional, and local) are often uncoordinated and pursued in parallel. In Romania, clusters are essential, but to be effective they need the right framework of funding, commitment, and support for smart specialization and creating an open space for cross-fertilization. Building trust is critical for cooperation and involves focusing on strengths, adding value and connecting the right people in certain expertise domains.

Smart specialization needs to be broken down into concrete opportunities, as is reflected in the emphasis on niche and value-chain development. This involves a region identifying its own advantages, and becoming the starting point for internationalization and strategic partnering efforts. Clusters in priority sectors are an important component of the smart specialization strategies in the Romanian regions. Clusters determine the landscape of the territory economic evolution. Local policy makers have to intercept the evolution of the territory to create and consolidate regional branding strategies connected to the clusters' ones. Cluster marketing and branding can be a powerful communication tool if it is in line with the regional innovation strategy for smart specialization (11).

High quality cluster management is a key element of successful world-class clusters. Strong management is crucial for cluster organizations for providing professional services to cluster SMEs, for assisting them to access global markets successfully, and for raising the innovation capacity and competitiveness of cluster firms. More than 50 Romanian cluster managers followed the training courses in Barcelona, Linz, Lyon or Copenhagen.

Exchange of best practices and cooperation between clusters improve their activities, strategy and services, internationalization and communication, marketing and branding, promotion in EU networks and partnerships for EU projects (Horizon 2020, KICs calls 2016, COSME, INTERREG, Creative Europe etc), in particular trans-

national cooperation raises the profile of clusters and makes them internationally more attractive.

In conclusion, this paper demonstrates the importance of clusters and cluster policy for economic growth and creating new jobs in the Romanian cities and regions as well as the need of cooperation within European regional networks.

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