

SOCIAL INNOVATION IN CLUSTERS AND SMART CITIES

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ABSTRACT

Clusters and smart cities are well aligned with the modern approach of “Open innovation” which depends on the strong interaction between RDI entities, dynamic entrepreneurship, public administration, and civil society. Social innovation is a challenge for clusters and smart cities as well as for Romania. Clustering and smart cities are team activities and need a common approach in the regional innovation system. Clusters are drivers for social innovation in smart cities and offer solutions to main topics such as: governance, society, mobility, safety, sustainability, circular economy, economy & data & technology. Social innovation is a complex process, which results from the interaction of many entities, public and private, over an extended period. The paper intends to focus on the linkages that involve social relationships or networks that produce benefits for the members and cities of the cluster and on measures focused on the importance of social innovation that could determine the reduction of the gap between Romania and the other EU Member States. From a methodological point of view, the research paper encompasses 4 components: 1) Clusters and smart cities development in Romania and promotion of social innovation 2) New methods to assess the cluster and smart city impact on innovation, economic growth and social integration, including the testing of methods at the level of the pilot cities Cluj, Timisoara, Alba Iulia, Oradea, Brasov, Iasi, Piatra Neamt 3) Expected results using specific tools for the new methods developed and large scale dissemination activities including: the elaboration of a Guide on social innovation in clusters and smart cities in the near future; the creation of a national platform for collaboration on social innovation and social entrepreneurship in Romania. 4) Conclusions on clusters and smart cities willingness to embrace this concept of social innovation primarily because there is a new sense of urgency in the need to find solutions to many of the societal problems.

Keywords: clusters, smart cities, social innovation

INTRODUCTION

The **social innovation** in clusters and smart cities is a novelty for Romania as well as for many other countries. Social innovation is a worldwide phenomenon driven by globalization with its main goal to create social change. The growth of social innovation, both in Romania and internationally, has been significant over the last few years, during which time there has been considerable evolution in the concept and a widening of its application. The more appropriate definition of social innovation within clusters and smart cities could be that of Stanford University (2008) “A social innovation can be a new product, production process, or technology (much like innovation in general), but it can also be a principle, an idea, a new organization, a social movement, a new method, an intervention, or some combination of them [1].

Clusters could promote and support social innovations as products and services. The European Cluster Observatory identified around 3043 clusters with up to 40% of the European workforce employed by companies in such clusters. Employees in strong clusters earn on average 3% 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 [2]. Clusters and smart cities 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 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 anyone organization or person could do alone. There is much that needs to be done to properly establish Open Innovation 2.0 in Europe. There are 5 key elements in the new Open Innovation process: networking; collaboration; dynamic entrepreneurship; research & development; proactive intellectual property management.

Smart City is defined by different people in different ways. 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” [3]. People make a city smart. The primary goals of the Smart city include offering digital means for supporting social needs in all daily transactions. It is important to understand that the objective of Smart City is to provide basic infrastructure and give a decent quality of life to city residents through a clean and sustainable environment and application of “Smart” solutions.

“When we talk about the smart city, we are definitely talking about social innovation, and so the importance of collaborative networks, partnerships, a community development and citizen participation” [4]. According to Deakin and Al Wear (2011) [5], there are four factors that contribute to the definition of a smart city:

1. “The application of a wide range of electronic and digital technologies to communities and cities;

2. The use of ICT to transform life and working environments within the region;

3. The embedding of such Information and Communications Technologies (ICTs) in government systems;

4. The territorialisation of practices that brings ICTs and people together to enhance the innovation and knowledge that they offer.”

At the beginning of 2015, the European Economic and Social Committee (EESC) adopted a document that sets the basis for a new development and support strategy for Smart City projects, called "Intelligent Cities as the engine of a new industrial policy in Europe"[6].

The study of the World Bank "Magnet cities-Migration and Commuting in Romania” published in 2017 [7] shows that the large, medium and small secondary cities (outside the capital of Bucharest) are like innovation hubs where the local administration's vision emphasized on raising the quality of people's lives, attracting investments and tourists, ICT and mobility oriented as well as on integration the sustainability as the main topic.

The paper intends to focus on the **objectives** related to the innovative capacity of these clusters and smart cities of linkages that involve social relationships or networks that produce benefits for the cluster members and local communities, on important tools and measures to increase social innovation in clusters and cities to become models of good practices for other clusters and cities, on social awareness within clusters and cities to reduce the gap between Romania and other countries as well as on fostering the cross-sectoral cooperation.

The main **barriers** that exist now are related to the followings:

- An insufficient expertise regarding support for social innovation within clusters and smart cities;
- An insufficient cooperation and networking between stakeholders of clusters and smart cities on the dimensions of social innovation;
- A fragmented knowledge transfer on best practices in this field from abroad to Romania;
- A clear lack of exploitation of innovative solutions to address the social challenges within clusters and smart cities;
- The traditional concepts and models of innovation are not adequate to understand socially driven innovation;
- A lack of financing and competences on social innovation, clusters and smart cities;
- Miss of the appropriate methodology to evaluate the social innovation performances in clusters and smart cities.

CLUSTERS AND SMART CITIES DEVELOPMENT IN ROMANIA AND PROMOTION OF SOCIAL INNOVATION

Innovation is the driver of clusters and cities. *Entrepreneurship* is key to the success of the 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. Innovation ecosystems 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.

In Romania, there are 320 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, Galati (i.e. Cluj IT Cluster develops the strategy for Oradea-the first smart city in Romania and for Sibiu that is part of the pilot project of research and innovation Smart City; Cluster for Innovation and Technology Brasov develops smart mobility in the city of Brasov etc). In this context for developing a Smart City, the focus has to be on people. However, too often the focus on people is neglected. The engagement of people in a city requires to – a) build an enabling environment for the public to voice their views and thoughts; b) develop public awareness through sharing and providing access to information; c) identify talents available within the city to provide and implement solutions; and d) form teams to guide, assist, and monitor implementation.

Awareness about smart solutions plays a crucial role in developing true smart citizens. In this regard, the city authorities cannot ignore to take efforts to raise citizen awareness on the efficient usage of the smart solutions and services in which substantial investments are made. This requires first, education for mindset change of the people, good governance, and enforcement of the law where there is any infringement. To build and implement smart cities successfully, we need to have in-depth insights on the actual needs of citizens of a city and build solutions that are feasible, workable and sustainable in that city. The traditional Smart city model includes separate subject areas or municipal government spheres: transport, healthcare, education, safety, municipal services, environment, the involvement of citizens [8]. The model is oriented on stakeholders – the great number of government agencies, state and business organizations. The city authority's goal is to identify all the stakeholders, determine their roles, responsibilities and possibilities, but many stakeholders remain forgotten.

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 [9]. Romania is ranked 62 out of 138 countries for business sophistication in the Global Competitiveness Report

2016 [10]. There is a low level of collaboration between SMEs and research entities demonstrated by only 1928 SMEs that are members in clusters..

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

Clusters play an important role as drivers of economic growth and innovation locally, regionally and nationally. Clustering and smart cities are team activities, not a solo effort and the success requires a core of motivated enthusiasts who would also inspire others to join in.

Clusters have emerged naturally and “bottom-up” from the regional level being mainly industry-driven ones, out of which the most important are those of the automotive sector, agro-food, energy and eco-constructions, creative and cultural sectors, wood and furniture, ICT, tourism, health and medical sciences. Furthermore, advanced are also clusters driven by universities and R&D institutes or by the local administration. 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.

Smart specialization strategies help regions to concentrate resources on a few key priorities. 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, implement of social innovation and eco-innovation. Clusters facilitate business opportunities and internationalization for SMEs that activate in cities and regions [11].

CLUSTERO - the Romanian Cluster Association www.clustero.eu is created in July 2011 and brings together 45 clusters and individuals with the purpose to coordinate the sustainable development of clusters in the eight Romanian development regions.. 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.

NEW METHODS IN SMART CITIES AND CLUSTERS ASSESSMENT

There are many different ways of assessing the smartness of cities and clusters. The first way of evaluating of city and cluster smartness is the usage of indicators, elaboration of indexes and city/cluster rankings.

Various evaluation methods, models for understanding and conceptualizing smart cities and clusters have been developed to explain the smart city and cluster concepts, which aim to define their scope, objectives and architectures.

A meaningful smart city assessment method should be able to measure individual well-being and satisfaction in the city in a comparable and dynamic way which is a very complex goal. Methodological limits, practical and economical obstacles of data collection at the settlement level are also affecting the elaboration of a better evaluation system. More specifically, focusing on the city's vision, strengths and weaknesses, using bottom-up approach assessment methods are needed.

Evaluation helps a) to explore the current status and position of settlements as smart cities, b) to present the relative position of cities to each other c) to explore the development or "movement" of cities towards becoming smart cities, d) to provide information and model future actions, e) to prepare, establish decisions and to determine development trends.

In comparative analyses, cities are evaluated and ranked according to their different economic, social and geographical parameters, not least in order to determine "leaders" and those, lagging behind, performing better and least settlements. The city rankings and lists were used by the cities as well, to elaborate development priorities and to improve the prestige and image of the settlements. Romanian cities as members of European urban system are facing global challenges as well: urbanization, ageing population, increasing unemployment, inadequate urban housing stock, climate change, environment pollution, unhealthy environment; traffic jams, inadequate public transport services (long travelling time, parking problems, problems of radial transport system); problems of waste management; inadequate support of regional and governmental authorities on sustainable urban development (need for more autonomy) [12].

Smart city uses technology that city services and systems are connected in a more intelligent and effective way and makes investments into human capital to increase quality of life. City administration puts inhabitants not services in to the center (less bureaucracy, more electronic spread of information and data, better capability to share with other institutions, better transparency) and creates an environment friendly and an intelligent transport system. Technology creates huge possibility to monitor the water and waste management and to assure a better public safety. Cost efficient social and health supply system, quality education and an attractive tourism are also important for cities to become smart. In Romania, the usage of opportunities given by ICT is further disappointingly low.

Indicators and indexes are useful tools of preparation of location choices for enterprises or investments. They are also aiming at positioning cities according to their competitiveness, strength and weaknesses. Indicators are helping to elaborate strategic priorities and development possibilities. There are many advantages of using indicators and indexes for the evaluation of city smartness. City rankings attract lot of attention in both scientific and public life. They generate discussion and debate on smartness, competitiveness, quality of life, helping to rethink formerly elaborated strategies and development priorities. They also allow to position cities, can be marketing tools in city promotion and contribute to the success of city leaders [13]. The usage of indicators is relatively simple, clear, easily interpretable, easy to understand, visualize, compare and reproducible in time and space but there are some limits related to data collection, transparency, comparison of different indicators and methods (the lack of some information on social innovation and quality of services) etc.

As indicators and city rankings have their own limitations and problems, other possible methods were developed. One of them is the analysis followed by clustering. Romanian Clusters Association – CLUSTERO developed this method in relation with the “smartness” of a city (i.e. the relationships between Cluj Innovation City and the seven clusters to develop in top areas of agro-food, ICT-2 clusters, renewable energies, creative and cultural industries, wood and furniture, life style). The analysis follows changes in the dynamic of innovation, entrepreneurial culture, use of funds, number of enterprises and jobs created in clusters with influence on the city, progress of ICT (impact of social media, convergence of products and services, trans-sectoral approach of topics of interest, broad band etc), number of tourists, behavior of the consumer (personalization of products and services, immediate availability of products and services, shortening the life cycle of products, reduction of carbon footprint) etc. 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, civil community etc. Identifying the relevant stakeholders in a cluster is a challenge in Romania. In cities like Cluj, Oradea, Timisoara, Alba Iulia, Brasov, Iasi, Piatra Neamt, clusters help to develop the smart strategy of the city and to implement projects of interest for the quality of life of citizens and for their “happiness”. But there is an increasing demand for including subjective factors into the evaluation. For this reason citizens are asked to fill questionnaires where they have to evaluate their medical status, well-being, satisfaction and happiness. A key issue that was identified when considering happiness of the cities, is the potential for inter-disciplinary research aimed at a better understanding of what makes a ‘happy’ city. For this, it is needed to conduct the analysis on a wide range of disciplines including geography, economics, sociology, urban and regional planning and psychology.

The paper shows that the assessment of smart city and cluster performances is complicated because there are many different factors of influence: culture, infrastructure, location, administration, local facilities, capabilities and limits etc.

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More specific, focusing on city's vision, strengths and weaknesses, using bottom-up assessment methods are needed for analysis of social innovation within clusters and smart cities.

THE ORIGINAL CONTRIBUTION AND THE EXPECTED RESULTS

The original contribution of this paper consists in the promotion of first research in Romania of social innovation within clusters and smart cities. The methodology will give the possibility to better analyzing, evaluate and compare the social innovation cluster's performances. Foresight exercises, projects generation seminars, social innovation audits and business review, cross-cutting collaboration, collaboration platforms will be put in practice as tools for social innovation cluster and smart city development and for increasing their performances on the global market. The project proposes a transfer of know-how and innovation to clusters and smart cities from abroad to Romania within of important annual events like "EU-Asia Gateway 2018 - The 4th Transylvanian International Clusters Conference" that will take place in Cluj.

The research outcomes are the followings:

- A first research on social innovation within clusters and smart cities in Romania, that creates links between research institutions and researchers from abroad and Romania;
- A new guide for social innovation in the Romanian clusters and smart cities;
- A set of recommendations for developing a support infrastructure for clusters and smart cities such as public, private and European funds (programs), training, networking etc.;
- The new topics on social innovation in clusters and smart cities presented at the national/international scientific events (conferences, innovation forums, workshops, seminars) with different target groups: clusters, public authorities, R&D institutions and researchers, SMEs and sectors ;
- A Romanian platform to share opinions on the research project and connected with the official website of the Romanian Cluster Association – CLUSTERO (www.clustero.eu);
- Specific leaflets, articles in different reviews about the research project.

CONCLUSION

Clusters and smart cities do not offer an instant solution that will work in all circumstances for the well-being of their members and communities. In Romania, clusters and smart cities 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 a niche and value-chain development. This involves a region identifying its own advantages, and becoming the starting point for internationalization and strategic partnering efforts. Local policymakers have to intercept the evolution of the territory to create and consolidate regional branding strategies connected to the clusters and smart cities. Exchange of best practices and cooperation between clusters and smart cities improve their activities, strategy and services, internationalization and communication, marketing and branding, promotion in EU networks and partnerships for EU projects (Horizon 2020, COSME, INTERREG, Creative Europe etc. This paper demonstrates the importance of clusters and smart cities for implementing social innovation as well as the need of cooperation within European regional networks.

ACKNOWLEDGEMENTS

This work has been done within the project „CLUSTERIX 2.0 - New Models of Innovation for Strategic Cluster Partnerships“ within Interreg Europe Programme financed by European Regional Development Found (Contract: PGI00274).

REFERENCES

- [1] James A., Phills Jr., Deiglmeier K., Dale T. M., Rediscovering Social Innovation, Stanford Social Innovation Review, USA, vol.6/Issue 4, pp. 87-102 2008;
- [2] Ketels C., Protsiv S., European Cluster Panorama Report, European Commission, Sweden, pp. 47-55 2016;
- [3] Mosannenzadeh F., Vettorato D., Defining smart city: a conceptual framework based on keyword analysis, TEMA Journal of Land Use Mobility and Environment, Holland, pp. 684-694, 2014;
- [4] Porter E. M., Toward a New Conception of the Environment-Competitiveness Relationship, USA, Vol. 9/Issue 4, pp.76-89, 1995;
- [5] Deakin M., Husam A. W., From intelligent to smart cities, UK, vol.1, pp. 134-139 2011;
- [6] European Economic and Social Committee, Intelligent cities as the engine of a new industrial policy in Europe, pp. 2-11, 2015;
- [7] Cristea M., Mare C., Moldovan C., China A., Farole T., Vințan A., Park J., Garrett K. P., Ionescu-Heroiu M., Magnet Cities: Migration and Commuting in Romania. World Bank, <https://openknowledge.worldbank.org/handle/10986/27874> License: CC BY 3.0 IGO, Romania, pp. 47-62, 2017;
- [8] Narmeen, Z. B., Jawwad, A. S., Smart City Architecture: Vision and Challenges, (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 6 /Issue 11, pp. 246 – 255, 2015;
- [9] Nicolescu. O., White Charter of Romanian SMEs, http://www.aippimm.ro/files/articles_files/57/6521/white-charter-of-romanian-smes-2016.pdf, Romania, pp. 26-52, 2016;

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[10] World Economic Forum, Global Competitiveness Report 2016-2017, Switzerland, pp. 7-12, 2017;

[11] Leucuta C., Cosnita D., Analysis of Romanian clusters, Romania, pp. 10-12, 2017;

[12] Manitiu, D. N., Pedrini G., Smart and sustainable cities in the European Union. An ex ante assessment of environmental, social, and cultural domains, SEEDS Working Paper13, Italy, pp. 74-84, 2015;

[13] Giffinger, R., Smart cities. Ranking of European medium sized cities. ACE: Architecture, City and Environment, pp. 7-25, 2010.