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The Romanian Health Clusters Landscape and its Role in the Projects Development and Implementation

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Abstract
Clusters are ecosystems where an organization or person may find resources to develop research and innovation activities. The ecosystem composition is based, beside the geographical concentration, also on the diversity of actors, from providers of specialized products or services to governmental and non-governmental entities such as universities, research institutes, specialized agencies, think tanks, respectively training service providers. The current study was conducted to assess the landscape of Romanian clusters dedicated to the development of the health sector and provides a case study regarding the ROHEALTH - Health and Bioeconomy Cluster by analyzing the benefits of being a part of cluster ecosystem from the perspective of research, development and innovation (RDI) projects development.

Keywords: Cluster; Research; Project; Management; Innovation

Introduction

According to Professor Michael Porter, who is credited with popularizing the term cluster, clusters are geographical concentrations of interconnected companies and institutions in a specific areas. Clusters are made up of interrelated industries and other relevant competitive organizations. A cluster may include suppliers of specialized goods, such as components, machines, and services, or providers of specialized infrastructure. Often, clusters extend downstream to various distribution channels and customers and laterally to producers of complementary products and industries related to common skills, technologies, or developments [1,2]. Clusters may also be defined as groups of firms, related economic actors, and institutions located near each other and have reached a sufficient scale to develop specialized expertise, services, resources, suppliers, and skills [3,4]. Clusters are known to link entities from the same geographic area to help develop new technologies for synergic effect in the projects realization and implementation that simulate knowledge development and dissemination, innovation, economic and social development [5-7].

In 2013, Michael Porter illustrated the cluster concept using the example of the Cairns Tourism Cluster (Australia). The author highlighted how difficult it is to develop new industries, especially private ones. In the case of Cairns, the idea of a tourism cluster has

shown how vulnerable businesses and services are in tourism as the number of tourists decreases. With the advent and development of the Cairn Cluster, tourism flourished in the Great Barrier Reef region [8].

Cluster policies' primary objective is to boost global economies and so enhance enterprises' creative capacity. They also strive to maintain jobs, encourage business reorganization, improve university-industry partnerships, and form interregional alliances. The major advantages of cluster-supportive policies are associated with lower transaction costs and coordination breakdowns. The biggest threats include regional overspecialization, which affects regional economic resilience and leads to knowledge lock-in. Cluster strategies may be developed around a multitude of pillars, depending on where policymakers want to focus their attention: locations (leading regions, less-advanced regions, metropolitan-hub areas), fields (dynamic, exposed, strategic, social significance), or individual players or groups of players (universities, SMEs, multinationals, etc.) [9-11].

In 2006, Michael Porter and Mark Kramer introduced the concept of shared value to further illustrate the importance and implications of clusters. The term "shared value" has since been defined and explained in other articles and writings by both writers that examined the production of shared value. Generating shared value is described as "policies and operational procedures that boost a company's competitiveness while also improving the economic and social conditions of the communities in which it operates." According to Porter and Kramer's Shared Value Initiative, shared value is a management concept in which companies explore financial opportunities in social challenges [12].

Differences in local resources, societal behavior, and activity areas mark clusters creation. In Poland, four categories of factors were identified as a positive influence in the development of creative clusters: geographical (proximity), social (know-how access and experience exchange), institutional (financial instruments), and market (better market position, lower costs and risks) factors [13]. Jucevicius and Grumadaite [14] discussed five patterns of cluster emergence in the post-Soviet countries: (1) large firm as an anchor for small entities (with creation opportunities for attraction of multinational companies [15]), (2) cluster around the needs of a costumer (need legislative support), (3) professional association (industries, business) and clusterization of local (4) business or (5) industrial entrepreneurs. The main possible solution to identified barriers for cluster emergence were multinational companies (as attraction for 1, identification as customer for 2), government coparticipation for 3, attracting translational entrepreneurs for 4 and presentation of research attractiveness to society and companies [14]. Silva and Martinelli [16] interviewed four clusters in Brazil and reported industrial, social, economic and cultural aspects as the top-four dimensions related to local development in the clusters. The analysis conducted by Remotti [17] on IoT (Internet of Things) clusters in Europe (22 out of 989 EU IoT innovation clusters with 1169 out of ~12,000 member companies) reported the technology development (74%) and integration (68%), skills-targeted training and financial services (42% each), grants for collaborative R&D (Research and Development) projects (32%) and start-up mentoring (26%) as top-five cluster services for enterprises. Lendel reported different patterns of changes in the Cleveland-Elyria-Mentor metropolitan statistical area (Cleveland MSA) than U.S. national level regarding the cluster employment, health support products and services, core providers of healthcare, with lower values in Cleveland MSA [18]. Particularities of clusters around the World are oriented towards promoting firms (Canada), research and high tech (Canada, China), knowledge translated to technology (Israel), research translation to economy (Singapore), balanced territorial development (e.g., Mexico, Taiwan, South Korea and Japan) [19]. Country level specific policies for cluster development and support exist in European countries [19].

Europe faces the burden of transforming itself into equitable successful society based on a modern, competitive, and resource-efficient economy. Inciting industrial players forward towards a clean and circular economy through in-depth collaboration along value chains and the use of new technology, sustainable solutions, and disruptive innovation is important for fulfilling the European Green Deal's fundamental goal [20]. Moreover, in the context of the current COVID-19 (Coronavirus Disease) pandemic, clusters have shown their full effectiveness in mobilizing industrial actors, research, development and innovation (RDI) organizations and public authorities to find quick solutions to the challenges of the medical sector and the economy in general, both in Europe [21] and globally [22,23]. Although the profound economic effects of the crisis associated with COVID-19 pandemic are still difficult to estimate, in the medium and long term it is already clear that we will witness a recalibration of value chains at European and global level, a process in which European clusters will play a crucial role [24,25].

The current study was conducted to assess the landscape of Romanian clusters dedicated to the development of the health sector and presents a case study regarding the ROHEALTH - Health and Bioeconomy Cluster by analyzing the benefits of being a part of cluster ecosystems from the perspective of research, development, and innovation projects development.

The Romanian Health Clusters Landscape and its Role in the Projects Development

The cluster policy in Romania was elaborated in 2009, as part of the industrial policy because the industry needs strong tools to promote innovation at the level of partner companies and SMEs (**S**mall and **M**edium-sized **E**nterprise**s**) included in clusters, increase their competitiveness, internationalize, and complete the missing links in value chains [26,27]. In Romanian law, the cluster represents a group of legal entities and natural persons constituted on the basis of an association contract, including accredited science and innovation organizations and/or accredited higher education institutions, other non-commercial organizations, on the one hand, and economic agents, local public administration authorities, employers' associations or professional associations, individuals, financial institutions, international organizations, domestic or foreign investors, on the other hand, for the purpose of carrying out the activity of scientific research, education and technology transfer of scientific results and innovations, their capitalization through economic activities [28,29].

Romania's new Industrial Policy Document prepared by the Ministry of Economy in 2018, highlights the role of clusters in 3 horizontal objectives [30]:

1) Innovative cluster, as an instrument of a smart economic policy;
2) High share of Romanian links in global value chains
3) Smart and sustainable economic growth through innovation in industry .

According to the records of the Ministry of Economy, the Directorate of Industrial Policies and Competitiveness, which coordinates the cluster policy as a component of the industrial policy of Romania, 76 cluster initiatives registered in the ministry's database existed in 2020.

The European Union developed in 2009 a cluster benchmarking methodology, the "Excel in Cluster Excellence" Initiative (ECEI), to improve cluster organizations' management processes and the quality of services for their members. This resulted in the European cluster excellence labels (as gold, silver, and bronze).

Most of the cluster support organizations, structures that ensure the management of clusters set up in Romania, have been subjected by ESCA (European Secretariat for Cluster

Analysis) to an extremely rigorous certification process. Following a rigorous process conducted at national level in 2020, three clusters were classified as gold, 17 as silver, and 58 as bronze labels [31].

At the European Union level, in December 2021, more than 1226 cluster organizations from 47 countries have been benchmarked and awarded a BRONZE label, 158 from 24 countries a SILVER label, and 125 organizations from 18 countries got a GOLD label. Today, cluster managers and policy-makers alike recognize this "cluster management quality" system. Only nine ECEI GOLD Label clusters active in the Healthcare and Medical Science field, coming from four countries: Denmark, Germany, Norway, and Romania. From the six ECEI GOLD Label clusters from Romania, ROHEALTH is the only cluster in the field of Healthcare and Medical Science.

Clusters provide new sorts of knowledge transfer that significantly impact the country's economic growth trajectory. Cluster strategies may serve as a foundation for developing the areas of health and bioeconomy in Romania. For example, health clusters may contribute to improving the health of the Romanian population by attracting new resources to the state and local budgets, which in turn will create new jobs and set the basis for the optimization of the medical system. Additionally, the possibility to operationalize the provisions of Directive 2011/24/EU on the application of patients' rights in cross-border healthcare, may raise the interest of other European citizens to come to Romania to benefit from the provisions of the Directives transposed into Romanian legislation [26,30,31].

In Romania, several health clusters exist, both regionally and nationally, and a meta-cluster that includes the regional and national ones (Figure 1). Economic theory and international practice confirm the role of clusters as catalysts for competitiveness based on innovation and internationalization [32]. Therefore, cooperation with EU member states, regions, cities, and groups in strategic partnerships remains a preferred approach for Romanian Clusters to exchange best practices and facilitate networking for future projects [31].

Cluster may bring a valuable contribution in all steps of project development and implementation, from initiating the project towards completion. One of the greatest advantages of collaboration between cluster partners is higher cost efficiency when similar needs and problems are solved together. A cluster is more visible and stronger as compared to a single entity, thus transfer of new knowledge in the field is faster. Furthermore, a cluster may contribute to raising awareness on the importance of a specific topic, thus facilitating access to the public sector and other economic sectors of the cluster members.

Usually, in the initiation stage, the development directions of the entities must be identified, as well as its existing resources for further development. Further on, the innovative value of the project ideas must be validated in the cluster. The identification of funding sources, weather they are non-refundable, bank/non-bank loans or private investors is also an essential aspect in the project initiation. In the planning phase, project scope and objectives are established and strategies to meet those objectives are defined. Cluster partners can support the project implementation by providing business plan consultancy services, protection of intellectual property consultancy services, and specialized human resources. In this stage, apart from identifying the socio-economic impact of the project, courses that can cover the skills needed for the beneficiary's existing staff, as well as suppliers of goods/services, equipment and works (design of medical or technical facilities, construction of facilities) are also identified. In the execution stage of the project, the cluster may intermediate the meetings between suppliers and beneficiaries and assist in the negotiation process upon request. Additionally, letters of support from potential users for the developed products/ services and legal analysis of the project and the regulations that affect it may be provided. In the monitoring phase, the project's progress is tracked, reviewed, and regulated.

The legislative and/or administrative changes that affect the implementation of the project are assessed and, at the request of the beneficiary, the analysis of the project status and an opinion on the existing risks may be provided. In the completion stage, the project and its results are promoted on all available channels such as media, conferences, webinars, and scientific publications.

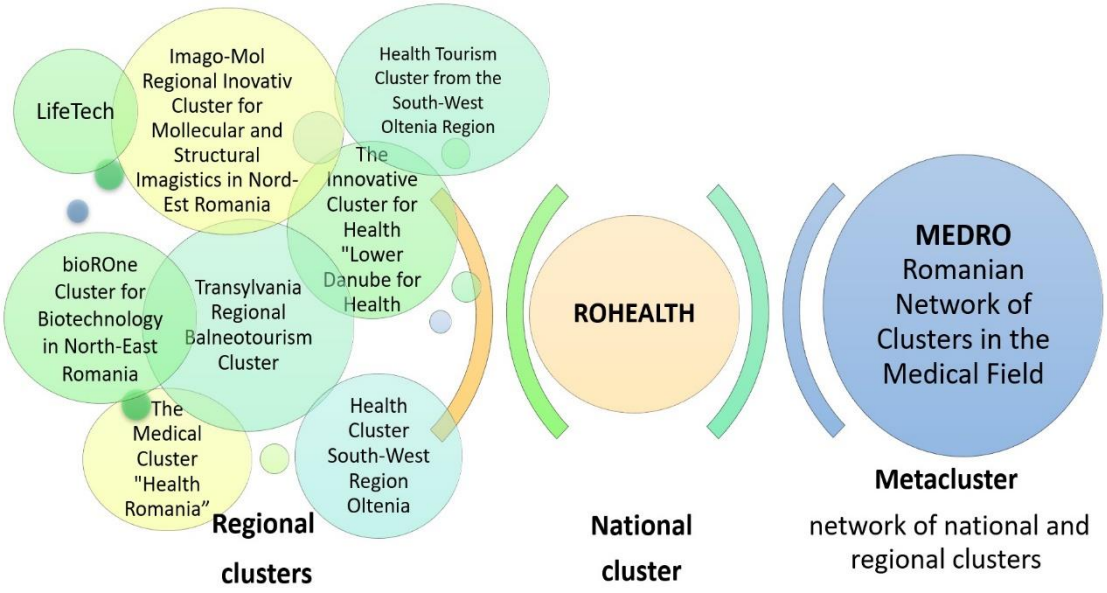

Figure 1. Health-orientated clusters in Romania at regional and national level

ROHEALTH Health and Bioeconomy Cluster – Case Study

The ROHEALTH was founded in 2015 to generate and implement initiatives and activities related to health and bio-economy. The activities carried out within the cluster promote entrepreneurship and cooperation between private companies, universities, research organizations, and public entities/authorities through sustainable national and international partnerships to increase their competitiveness through research, development, and innovation.

The cluster currently comprises 84 members on 31 December 2021: small medium enterprises (46), authorities & public institutions (3), hospitals (6), research institutes (7), universities (11), individuals (4) and non-governmental organizations (7) (Figure 2). ROHEALTH is creating shared value at the national and regional level and in the local community through its R&D and business activities in the fields of health and bioeconomy [33].

ROHEALTH – Cluster for Healthcare and Bioeconomy has obtained the ESCA (European Secretariat for Cluster Analysis) certifications for all three labels: bronze in 2017, silver in 2019, and gold in 2021 [34].

The cluster members have extensive experience in research and development, gained through participation in large national and international projects such as those funded by programs FP6, FP7, H2020, INTERREG IVC, structural funds, National Research Plan, and others, and their experience covers a wide range of skills, from consulting and project development to research and development of new advanced materials for the medical field.

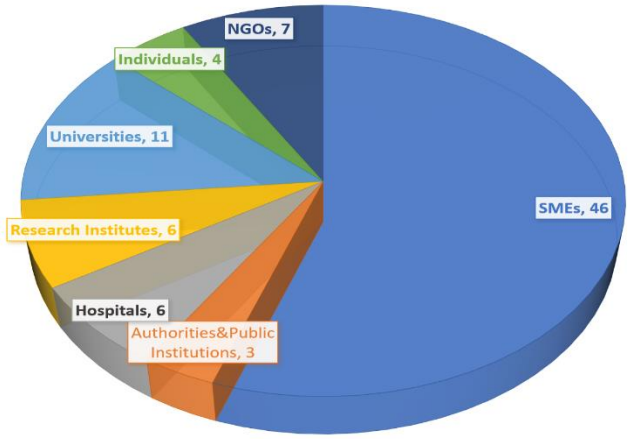

Figure 2. Classification of ROHEALTH Health and Bioeconomy Cluster members

The projects supported by ROHEALTH and won by its members include Competitiveness Operational Program (COP) research infrastructures (2 projects), HORIZON projects (2), Start-ups (2), Spin-off (1), innovative service projects in the field of plant raw materials and crop management (2 projects), development of innovative biotech services (2 projects), development of innovative solutions for the protection of staff (professionally exposed) and the population against contamination with SARS-CoV-2 virus (1 project), development of a prophylactic peptide vaccine for COVID-19 (1 project), SARS-CoV-2 (COVID-19) thematic projects for hospitals, financed by the call Strengthening the Covid-19 Sanitary Crisis Management Capacity, in which ROHEALTH members contributed in the implementation (5 projects), as well as other projects from various sources of funding (POCU, Erasmus, ROP, POSDRU, Cross-Border, etc.) [33]. Because most of these projects were approved primarily on their innovation potential, the staff and stakeholders involved in the implementation have acquired significant technical know-how, which is hard to quantify, yet crucially important for the transfer of knowledge in the areas of health and bioeconomy.

Apart from project development, ROHEALTH showed an active involvement in the consultation related to the Operational Health Program, Smart Specialization Strategies (RIS) in each region of Romania and participated in consultations carried out by authorities regarding the elaboration of the National Recovery and Resilience Plan (NRRP). The cluster also ensured the panel coordination of "Healthy Living" - (health section) in the consultations carried out regarding SMART areas included in the National Strategy for Research, Development, and Innovation (NSRDI). These achievements have been accomplished in the midst of a very inconsistent national cluster support strategy, with ROHEALTH establishing business models and diverse instruments to meet the requirements of members, particularly SMEs. Examples of such tools are the annual organization of a brokerage event in the field of Health and Bioeconomy with national and international participation but also the implementation of business review tools, innovation and internationalization audits, training sessions, consulting in accessing projects publicly funded, for ROHEALTH members.

In conclusion, ROHEALTH Cluster produced quantifiable shared value for the Romanian Health Clusters Landscape through its actions and scope and may serve as a model for other regional clusters.

List of abbreviations

RDI – research, development and innovation
SMEs – Small and medium enterprises
R&D – research and development
ESCA - European Secretariat for Cluster Analysis
NRRP - National Recovery and Resilience Plan
NSRDI - National Strategy for Research, Development and Innovation

Ethical Issues

Not applicable.

Conflict of Interest

The authors declare that they have no conflict of interest.

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