

Rural areas' development and competitiveness through innovation ecosystems

Yovka Bankova^{1*}, and Tsvetelina Tsvetanova¹

¹ Faculty of Management and Administration; Marketing and Strategic Planning Department, University of National and World Economy, Sofia, Bulgaria

Abstract. The development of rural areas over the years has been raised as a problematic issue for many countries around the world. Different approaches are applied to solve that issue. One of them, currently, refers to the establishment of regional innovation ecosystems (RIEs). RIEs are complex systems involving multiple actors and resources to drive innovation and play crucial role in promoting sustainable economic development. Understanding the different types, traits, functions, and impact of RIEs can help policymakers and practitioners design targeted interventions and strategies for rural areas. The objective of the study is to explore the advantages of RIEs and their impact on the acceleration of development and improvement of competitiveness of rural regions. The study is conducted by the method of desk research. It aims to examine different types and functions of RIEs as a means to mobilise rural areas' growth, potential and their role as a catalyst of competitiveness. As a result, a classification of Innovation ecosystems and of Regional Innovation ecosystems were developed. It was found that RIEs are capable of enhancing the competitiveness of rural regions by promoting economic diversification, driving innovation and productivity, facilitating access to markets and networks, attracting and retaining talent, providing business support and resources, contributing to branding and marketing efforts, and fostering collaboration and collective impact.

1 Introduction

Thus far, we have observed a lack of clear and common definitions of the concepts rural areas, rural areas' development and rural areas' competitiveness. The lack of agreement on the meaning of these concepts presupposes and explains the existing variety of definitions. In the Regional Outlook for 2016 presented by OECD [1] the authors state that: "There is no internationally recognised definition of a "rural area" and there are ongoing debates about how best to define the concept. While a low population density is a common starting point, it is generally recognised that "rurality" is a multi-dimensional concept, which can embody different meanings for different purposes." The most common definition for rural regions is the one of OECD. According to it rural regions are those with a population density lower than 150 inhabitants per square kilometre [2].

* Corresponding author: yovka_bankova@unwe.bg

For the purposes of the current paper, next, it is necessary to clarify the concept “competitiveness of rural areas”. A broadly accepted definition of competitiveness is given by Michael Porter. He states that “A nation or region is competitive to the extent that firms operating there are able to compete successfully in the global economy while supporting high and rising wages and living standards for the average citizen.” [3]. Regarding the regional level, Porter et al [4] make the following important conclusions about rural regions (RR) and their competitiveness: 1) RR “are governed by the same basic competitiveness drivers as other regions”; 2) “unique characteristics of each region will determine the priorities for improving competitiveness”; 3) “we treat rural regions as imbedded in their surrounding economic geography, with potentially significant interactions between adjacent areas.” Doitchinova and Stanimirova further specify that “A region is perceived as competitive if besides the production of competitive local products, it can provide social, cultural and nature sustainability based on interregional cooperation. In this sense, the territorial competition has a complex nature.” [5] The official position of OECD is that a “competitive region is one that can attract and maintain successful firms and maintain or increase standards of living for the region’s inhabitants” [6]. Cellini and Soci, also, discuss the notion of regional competitiveness and state it “is much more than the potential ability to export or the surplus in trade balance. The wide range of factors under consideration gives support to a conception of the competitive process only partly based on the production of goods.” [7] This last perception, as well, supports the idea that competitiveness of regions depends on many factors. Therefore, the current study adopts the view that the competitiveness of rural regions is the ability to foster, attract and support economic activity so that its citizens enjoy high standard of living.

Innovations, represented by the innovation ecosystems in the study, are identified as an important factor of competitiveness of regions, in particular rural regions [4, 8]. Porter et al. have concluded that “Over time, the sustainable level of prosperity, productivity, and wages in advanced economies is determined by a region’s ability to create and commercialize innovations.” [4]. Numerous policies, regulations and strategies are already in place, specifically addressing the importance of innovation. Hereupon, the New European Innovation Agenda [9] reveals new mechanisms and instruments for generating innovation and economic growth. One of its major flagships addresses the urge to accelerate and strengthen innovation in European innovation ecosystems across the EU. A new concept of creating regional innovation valleys is introduced in the Agenda [10]. This new approach aims to enable regions to work together, considering their smart specialisation strategies and meeting specific local challenges and needs. Through the call for expression of interest, the EU is inviting regions to indicate in which innovation domain (food security, renewable energy, circular economy, digital transition, healthcare system, etc.) they would like to strengthen their research and innovation investments and policies and to engage in interregional cooperation. Potentially, these regions could collaborate to prepare joint innovation plans to constitute connected regional innovation valleys, which correspond to the idea of regional innovation ecosystems. The action proposed by the European Commission could also greatly benefit, rural areas, as their development is considered increasingly important in the context of fostering innovation.

Important objective of this study is to explore the advantages of RIEs and their impact on the acceleration of development and improvement of competitiveness of rural regions. The paper is organized in three parts. The first one represents a critical study on definitions and typology of innovation ecosystems with a special focus on regional innovation ecosystems. The second - introduces the EU policy, institutions and funds related to innovation ecosystems and the special role of rural areas in the EU Agenda for development. The third part draws conclusions about the positive impacts of the introduction of the innovation

ecosystem concept on the level of rural areas. The study is conducted by a desk research approach.

2 Innovation Ecosystem - concepts and typology

2.1 Innovation Ecosystem (IE)

The term “innovation ecosystem” has gained popularity over the past nearly 20 years and is interpreted in many different ways, focusing on particular set of characteristics. In more general terms, an innovation ecosystem refers to the interactions of various actors, stakeholders and community members essential to innovation [11]. Particularly, innovation ecosystem is a complex network of organizations, individuals, and resources that contribute to the creation, development, and diffusion of new ideas, products, and services [12]. When considering the term innovation ecosystem, it is inevitable not to refer to the ecosystems in nature and the interactions and interrelations, therein. In nature, each organism relates to or interacts with another organism and with the environment. Similarly, in business or innovation ecosystems, all stakeholders interact with each other and relate, either to each other and/or to the environment. Innovation ecosystem actors usually share the resources, as well as the benefits from the utilization of those resources, as in the natural world. Differences can be observed only in the source of resources where in innovation ecosystems resources are primarily shared and provided by the stakeholders involved and not just the environment.

Scholars, economists and researches have studied and attempted to describe and explain innovation ecosystems throughout the years. Back in 2016 a number of researchers examined critically the concept of innovation ecosystem as set in the academic and trade literature. They tried to answer the following question: “What is gained from adding ‘eco-’ to our treatment of national and regional innovation systems?” The conclusion they came to was: “Very little, and the risks outweigh the benefits.” [13]. The concept and interpretation have significantly changed over the years, whilst the number of definitions of the notion have increased and broadened. Granstrand and Holgersson reviewed and discussed the conceptual meaning of the term “innovation ecosystem”, while comparing over 20 definitions and concepts which they had researched and received [14]. The processes they had gone through were of diverse character, considering “the complexity of the source and the apparent competitive nature of the term” [14, p. 2]. They have agreed on the following definition: “An innovation ecosystem is the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors” [14].

For the purposes of the paper, the following definition of “innovation ecosystem” has been also examined²: “...a network of interdependent actors that combine specialized, but also complementary, resources and/or capabilities in an effort to co-create and deliver comprehensive value proposition (product, service, innovation) for end users and to acquire the benefits (profits) obtained in the process” [15]. The latter definition refers more to the purpose and benefits of organising innovation ecosystems where common resources and efforts are used to serve for profit for the actors involved, therein. The word “network”, additionally, suggests of a system where all elements interact with each other and are interdependent. The most recent definition, proposed by Granstrand and Holgersson, differs from the idea of compulsory interdependence, but, rather, offers the nuance of gradually developing (enlarging) set of elements. Therefore, in the current study a combination of both definitions will be used when referring to innovation ecosystem, leaning more to the

² Ove Grandstrand and M. Holgersson have also considered this definition for their study

definition presented by Walrave et al. [15] while not necessarily accepting the need for the actors to be interdependent, but, rather, interconnected.

Different organisations, institutions and researchers identify different types of innovation ecosystems. Some are characterised based on their geographical location, others, on the stakeholders they involve in the process or the main objective of the system itself. Upon exploring the different types of innovation ecosystems and the way researchers categorize them, they could be grouped and presented in the following way (Figure 1)³.

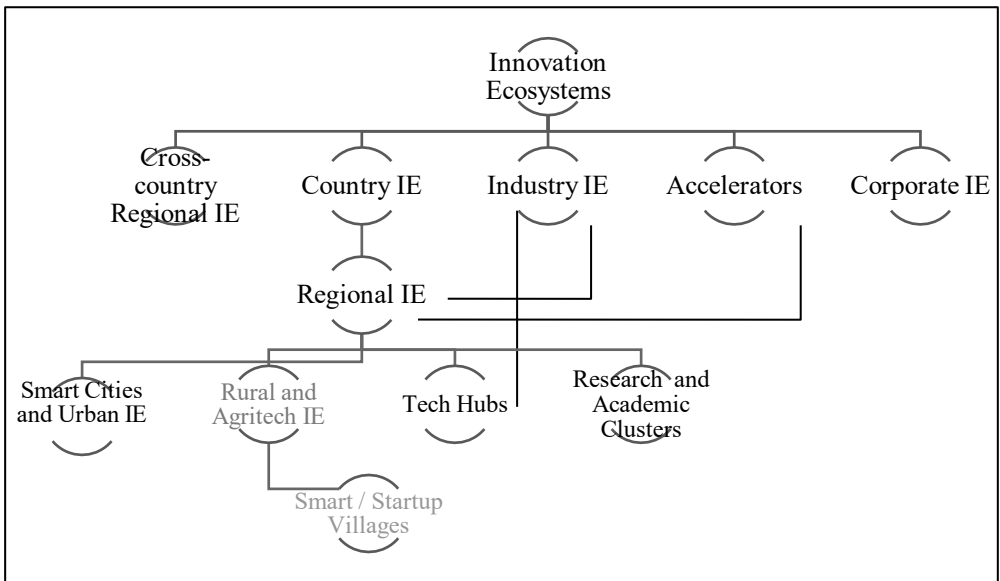


Fig. 1. Main types of innovation ecosystems
Source: Designed by the author

2.2 Regional Innovation Ecosystems

Elizabeth Hoeffcker from the Massachusetts Institute of Technology proposes a new model of innovation ecosystem, which could be easily applied to regional and rural IEs i.e., local innovation ecosystem. While elaborating on the definition of the term, the author analyses the innovation ecosystem model and its elements - actors and their role, resources, and enabling environment. Hoeffcker goes even further and suggests particular opportunities for strengthening the local innovation ecosystem [16].

2.2.1. Main traits of RIE

Regional Innovation Ecosystems (RIEs) and their role in regional, including rural, development is the focus of this paper. RIEs are characterized mostly by their particular geographical location. They can vary in their composition and objectives depending on the specific region they are implemented in and its unique characteristics. As any other type of innovation ecosystem, a RIE is a complex and dynamic system, which is defined by a number of key features. Some of these characteristics include: diversity of actors; collaboration; entrepreneurship, innovation infrastructure, knowledge creation and transfer and supportive

³ Not all types of innovation ecosystems which have been identified are included in the Graph, since some overlapped or corresponded to a different network setting.

policy environment. [17] The stakeholders engaged in RIEs are most commonly: universities, research institutes, startups and startup incubators, accelerators, established firms, investors, non-profits and community organisations, government agencies and local authorities. Each of those actors brings different resources, expertise, and perspectives to the ecosystem, contributing to its overall innovation capacity. Some researchers argue that a key role in the process of developing and fostering RIEs play the academia, in particular – the universities, in that area [17-19]. A study by the European Universities Association [17] acknowledges the key role of universities in regional innovation ecosystems. The report gives very important insights and highlights the strategic role of each actor within the RIEs, based on the case study of 9 European universities within their regional scope. Indeed, universities have played a significant role throughout the years for providing the necessary environment to foster innovation ecosystems. Today, other actors could sometimes play this key role just as successfully as an academic institution. Collaboration, herein, is a key element of the ecosystem. It is crucial that actors work together on all levels. The diversity of actors operating within the same region is a prerequisite for the successful development of the ecosystem. [20] The resources, also, as a key element of the innovation ecosystem, have been studied by scholars and researchers. They have been a focal point to the business when it comes to utilising and sharing those resources for the common (or individual) good. The International Journal of Innovation has recently published an article “Resource orchestration in innovation ecosystems: a comparative study between innovation ecosystems at different stages of development” [21], where the authors, through exploratory qualitative research, have tried to explain the position and main role of the resources, i.e., how they are orchestrated to generate innovation in innovation ecosystems. The study aimed at comparing the resources orchestration in the different stages of development of the innovation ecosystem. The methodological contribution of this study consisted of identifying a direct relationship between resource management and the stage of development of the ecosystem [21]. Resource orchestration is essential when it comes to organising innovation ecosystems of all types, but play crucial role when considering rural areas, where resource sharing is possible also between different types of ecosystems (urban-rural cooperation) [22].

2.2.2. Common types of RIEs

Most common types of innovation ecosystems are illustrated in Figure 1. A short preview of the different types of RIEs will highlight the main perspective, elements or factors of the ecosystems. Finally, emphasis will be put on rural innovation ecosystems and their development. RIEs can often overlap or combine elements from different types depending on the specific characteristics and goals of a region. The key is to create an environment that encourages collaboration, knowledge sharing, entrepreneurship, access to capital, and supportive infrastructure to drive innovation and economic growth.

Additional (not included in Fig. 1) types of RIEs have been identified, such as creative and cultural districts, which emphasize the development of creative industries, including arts, media, design, fashion, and entertainment, as well as, the social entrepreneurship hubs, which promote innovation and entrepreneurship to address social and environmental challenges. The Social Innovation Park in Singapore is recognized as a successful social entrepreneurship hub [23]. The creative and cultural regional ecosystems have been actively promoted by the EC through the S3 Industrial Modernization Partnership Platform [24]. The two additionally identified types of innovation ecosystems are not necessarily relevant to rural development. Therefore, they are not in the focus of this paper.

Urban innovation ecosystems often refer to the idea of smart cities, but they could also foster technology hubs, social entrepreneurship hubs, research and academic clusters and industrial and manufacturing zones. Smart cities ecosystems [25] focus on leveraging

technology and data-driven solutions to enhance the quality of life in cities. They promote innovation in areas such as urban planning, transportation, energy efficiency, and public services. The other types of regional innovation ecosystems are not necessarily geographically limited to one city or to an urban area, however, they clearly consist of all necessary elements to create and sustain an innovation ecosystem.

Research and academic clusters revolve around universities, research institutions, and academic centres, usually located in or nearby big cities. Back in 2015 researchers identified the changing role of universities (particularly in Europe) as playing an active role in their communities, “anchoring the importance of knowledge in the regional innovation ecosystem” [26]. This type of RIEs promote collaboration between researchers, academics, and industry partners to drive innovation. Universities could also set the direction in which the region develops by collaborating with the other stakeholders on how to organise the educational process, what subjects and majors to be developed further in order to generate needed talent, but, also, to provide an environment that fosters and co-creates innovation. Many startup incubators, accelerators, spin-offs, etc., have emerged out of universities, contributing greatly to the local, regional, state, and, also, global economic and scientific development. A good example of an academic leader is the Swiss Federal University of Science and Technology – ETH Zurich, the results of whose operation are adding value not just to the business, but to the society and to the global scientific world [27] Research centres are being established, also, in rural areas, where innovation and entrepreneurship are fostered. The Centre for Agricultural Excellence concept has emerged in the rural area of Goondiwindi, Queensland, Australia [28] These are, however, just very few examples of successful academic-centred RIEs.

The industry innovation ecosystems focus on supporting traditional and newly emerged industries and manufacturing sectors in a particular region (industrial zones) [29]. They provide infrastructure, resources, and specialized services to facilitate innovation and technological advancements in manufacturing processes. Agencies and cross-country institutions (mainly within the European Commission) have launched a number of programmes in order to promote and support these processes on country and cross-border level. Funding for fostering industry innovation ecosystems and cross-border cooperation is usually available through EU grants and state subsidies, as outlined in section 3 of this paper.

The technology hubs often shape an ecosystem which fosters innovation and entrepreneurship in technology-intensive industries such as software development, information technology, artificial intelligence, biotechnology, and advanced manufacturing. Sometimes, they are also referred to as digital innovation ecosystems [30]. Tech hubs can be of global scope, on a country level or between countries in a particular region. Europe hosts a number of intercountry regional innovation ecosystems focused on high-tech specialisation [31].

Additionally, the Agri-tech ecosystems are categorized under the technology hubs innovation ecosystems. These ecosystems concentrate on agricultural innovation and rural development. They leverage technology, data analytics, and sustainable practices to drive advancements in farming, food production, and rural industries. In the UK, they are also referred to as Agri-tech centres [32]. Agri-tech ecosystems enhance and positively impact the performance, development and competitiveness of rural areas.

3 EU policy for innovation ecosystems

Innovation performance, cohesion and regional disparities have been and continue to be priority topics on the EU’s agenda for development. Respectively, on that level, there are variety of initiatives to create innovation ecosystems. Diversity of institutions and funds that support the innovation ecosystems could be identified. Some of these institutions established

on EU level are the European Cluster Collaboration Platform (ECCP), the European Institute of Innovation and Technology (EIT) and the European Innovation Ecosystems (EIE) under Horizon Europe's Pillar III "Innovative Europe". The Horizon Europe programme and Cohesion Policy Funds, more specifically Interregional Innovation Investment Instrument of the European Regional Development Fund, are the main institutional tools to support the initiative for innovation ecosystems' creation.

A communication from July 2022 introduces the European Commission's New European Innovation Agenda and affirms the role of innovation to raise European competitiveness, to ensure the well-being of its citizens, to contribute for the achievement of the UN Sustainable Development Goals, including the green and digital transition. The communication raises a significant problem. It states that "regional disparities in research and innovation performance remain deep across the EU and this innovation divide has been increasing." [9, p. 12]. As reasons for that they refer to the unexploited potential in regional innovation ecosystems, lack of incentives to establish such ecosystems, also lack of experience and enough resources [9]. The underlined problems are said to be mostly valid for less developed regions, majority of which are rural areas.

The president of the European Commission, Ursula von der Leyen, declared that "Rural areas are the fabric of our society and the heartbeat of our economy. They are a core part of our identity and our economic potential." [33]. The arguments explaining the importance of rural areas come from the fact that in Europe rural areas cover 83% of the EU territory in 2018, they are home to 137 million people and that their population is 30 % of all the population of the EU [34].

The European Commission has announced a long-term vision for the EU's rural areas up to 2040. The vision refers to the development of the regions towards "stronger, connected, resilient and prosperous rural areas and communities" [33]. The approach and measures to achieve that long-term vision for the rural regions are specified in Rural pact and the EU Rural Action Plan. Ten specific goals were defined and they refer to (1) setting up attractive space and establishing territorial development of harmonious type; (2) switch in the governance approach towards the one of multi-level and place-based (tailor-made) policy; (3) people living in this areas to be providers of food security, economic opportunities, goods and services for wider society, including bio-based materials and energy; (4) well-being of people who also live in dynamic communities to be the focal point ; (5) inclusive, supporting communities living in the rural regions open to newcomers; (6) preserving the nature and sustainable management of natural resources; (7) digital innovation to enter and to be well established in the rural areas; (8) improved entrepreneurial, innovative and other skills of people living and working there; (9) places equipped with all the services and solutions people might need; (10) places that represent diversity in terms of activities and living conditions based on uniqueness of potential of place and local people.

The programming period 2014-2020 was the first one to introduce the concept called "Smart Specialization Strategies" (SSS or S3). That concept was formulated in 2009. Over the time, the S3 concept as an approach for strategic planning, has proved to be appropriate for the region level, including rural areas. In the core of the S3 concept is the idea to prioritize. It is a bottom-up approach that supports the process of drafting the regional innovation strategies and requires a comprehensive understanding of the uniqueness of the region and its socio-economic potential. Based on well understood regional capabilities it was possible to identify a limited number of promising for the future and innovation-oriented activities. . The objective of the application of the S3 is competitive advantages to be established and further to increase competitiveness of the region. Moreover, the Strategic Plan 2020-2024 (a plan developed for the Research and innovation strategy 2020-2024) states "In addition, supporting Smart Specialisation Strategies in key partner countries can mobilise the entrepreneurial discovery process of local opportunities in digital and green transformation".

S3 concept differs from the sector and cluster policies mostly by the fact that its goal is not to reinforce regions in their most advanced industrial sectors but to support the diversification of their economies [35, p. 4]. For European regions the application of S3 approach serves the cohesion policy objectives.

4 Rural regions' development through the innovation ecosystem concept

City-centric regional development and innovation policies have often overlooked rural potential [36]. The application of the innovation ecosystem concept could provide opportunities for economic growth and development in rural areas. In particular, regional innovation ecosystems (RIEs) can have a significant influence on the competitiveness of rural regions. By further exploring the structures and elements of RIEs and the possible interactions within the ecosystem, the competitive advantages of rural areas fostering innovation could be followed through. Below, are also addressed some recently emerged types of RIEs referring to rural regions' development.

In the past several years the concept of Smart villages and, most recently, Startup villages, has emerged. The European Commission (EC) and the European Parliament have added to this concept by promoting it on a regional and national level [37]. Smart villages, usually, rely on a participatory approach [38] to develop and implement development strategies to improve their economic, social and environmental conditions, in particular, by mobilising solutions offered by digital technologies. The Startup village concept, on the other hand, focuses on innovation and ambitious entrepreneurship to connect local businesses to local production networks, providing opportunities to benefit from wider markets, resources and knowledge to enhance the competitive performance of rural areas. The Joint Research Centre of the EC published a report designated to the conceptualisation of the Startup Village [39]. Its authors identify several building blocks within the concept of a Startup Village. One of those is the ecosystem which includes: the incorporation of multiple interdependent actors and facilitating factors; a bridge between innovation and entrepreneurship; a tailored approach to rural space and scale; and a multi-scalar design and management. They, also, emphasize that, although, there are different types of ecosystems, what is relevant for the Startup village is the commonalities identified in the literature as: “the coexistence of collaboration and competition, knowledge circulation, spillover effects, and catalysing economic outcomes”. [40]

Other scholars and researchers agree that one of the possible solutions for rural development and competitiveness is the creation of specialized innovation ecosystems in rural areas as the, so-called, Digital Innovation Hubs [41]. The results of the research and analyses of those scholars showed that rural digital innovation hubs have a positive impact on local businesses, especially considering their sustainability. Stakeholders in the Digital Innovation Hubs could join efforts and resources to design and provide tailor-made solutions for local businesses, institutions and authorities based on the needs and goals of the stakeholders involved. Indeed, there could be many challenges facing the development of rural areas, which obstruct or slow down the processes of creating and sustaining innovation ecosystems, therein. However, those could be overcome by leveraging local resources, building strong partnerships, and fostering a culture of innovation [40]. These are, also, the preconditions for nurturing entrepreneurship and thriving innovation. A policy brief from the Policy Learning Platform on Research and Innovation (Interreg) highlights the challenges and necessity of rural innovation. The authors of the paper agree that building innovation capacity and innovative solutions is essential for rural and sparsely populated areas in the process of overcoming their inherent challenges and for remaining attractive business locations. [42]

Certain characteristics of RIEs could support rural development and competitiveness.

The economic diversification, which is a strategy that is often observed in RIEs, fosters innovation and entrepreneurship and creates new economic opportunities. This particular characteristic could be crucial for a rural area which aims at better development and economic performance by shifting the local economy away from its single income source toward multiple sources [43].⁴

By supporting the development of diverse sectors such as technology, agribusiness, renewable energy, and creative industries, RIEs enable rural regions to tap into new markets and revenue streams, making them more resilient to economic fluctuations and more sustainable in their development. RIEs provide rural businesses with improved access to markets, networks, and supply chains within and beyond the ecosystem. Through collaborations and partnerships with urban-based companies, RIEs help rural enterprises reach larger customer bases, expand their distribution channels, and access new markets. Additionally, participation in RIEs allows rural businesses to tap into networks of investors, mentors, and potential collaborators, enhancing their visibility and competitiveness. [44]

Skilled workforce is often scarce in remote regions, however, RIEs can help attract and retain talented individuals, such as skilled workers, entrepreneurs and professionals in rural areas by fostering an environment that supports innovation, entrepreneurship, and quality of life. This influx of talent enriches the local workforce, stimulates economic growth, and brings new perspectives and expertise to rural businesses, enhancing their competitiveness. Chinese researchers studied the development of talents in rural areas under rural relativization, showcasing the YongNing Township of WanYuan City [45]. The collaboration of urban and rural authorities becomes essential in enabling and retaining environment for talent.

Indeed, RIEs could foster collaboration and collective impact among stakeholders in rural regions. By bringing together businesses, educational institutions, government agencies, and community organizations, RIEs create a collaborative environment that promotes shared goals and collective problem-solving. The process of collaboration and strategic partnership within an innovation ecosystem, however, should be carefully understood, organised and facilitated. Giovanni Schiuma and Daniela Carlucci [46] propose a research agenda for understanding how to establish and develop strategic partnerships between companies and universities in innovation ecosystems. They focus on university-based innovation ecosystems, however, the principal outputs of their study, also, relate to any innovation ecosystem, including geographically allocated ones. Collaboration strengthens the regional innovation ecosystem, aligns efforts, and maximizes resources, resulting in improved competitiveness for rural areas.

Part of the collaboration between different stakeholders in an ecosystem is sharing and contributing with resources which creates favourable environment for competitiveness (not necessarily within the ecosystem) and economic growth. The available resources and their utilization by the stakeholders within the ecosystem could already provide competitive advantage of particular rural areas if their orchestration is agreed and well managed among stakeholders [21].

In the past, rural areas relied primarily on traditional industries, however, innovation ecosystems offer a range of innovative economic solutions to support the well-being of all stakeholders involved in the process. RIEs provide crucial support and resources to rural businesses. This can include providing access to and making use of business incubators, accelerators, mentoring programmes, and allocated financing. Such support helps rural entrepreneurs and startups overcome challenges, develop their ideas, and scale their

⁴ The UN refers to “economic diversification” as the process of shifting an economy away from a single income source toward multiple sources from a growing range of sectors and markets”.

businesses. By offering tailored services and expertise, RIEs strengthen the business ecosystem in rural regions, improving competitiveness and fostering sustainable growth. Researchers of the Western Balkans Research and Innovation Platform have, also, identified the access to diverse network of organisations, businesses and individuals as a first advantage of participating in a regional innovation ecosystem [44].

Innovation ecosystems could stimulate innovation and drive productivity improvements in rural regions. The Journal of Business Research has recently published an article [47] presenting a study on innovation ecosystem's health. The authors contribute to the literature by outlining a list of indicators to measure innovation ecosystem health and its structural and relational antecedents. The results of the study were associated with a case study; however, they could be applied to any innovation ecosystem and are particularly relevant when organising RIEs in rural areas. By connecting local businesses, entrepreneurs, and researchers with urban centres, universities, and research institutions, RIEs facilitate knowledge exchange and technology transfer. This enables rural businesses to adopt advanced technologies, best practices, and innovative solutions, leading to increased productivity, efficiency, and competitiveness [31].

Visibility of rural areas is a strategic factor in their potential for development. Researchers argue that developing a brand that conveys sustainable and environmental values could create market opportunities in rural areas and enhance their economic performance [48]. RIEs can contribute to branding and marketing efforts for rural regions. By showcasing the innovation, entrepreneurship, and unique strengths of the region, RIEs help build a positive image and reputation for rural areas. This can attract not only talent but also investment, tourism, and partnerships, creating new opportunities and boosting the competitiveness of rural regions.

5 Conclusions

The role of innovation ecosystems in the development of rural areas and their competitive advantages has significantly increased in recent years. Research institutes, government agencies and bodies and regional authorities are providing means and opportunities for fostering regional innovation ecosystems. RIEs are capable of enhancing the competitiveness of rural regions by promoting economic diversification, driving innovation and productivity, facilitating access to markets and networks, attracting and retaining talent, providing business support and resources, contributing to branding and marketing efforts, and fostering collaboration and collective impact. By leveraging these advantages, rural regions can position themselves as competitive and attractive destinations for business, investment, and sustainable growth.

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