




## Article

# Within the Entrepreneurship Ecosystem: Is Innovation Clusters' Strategic Approach Boosting Businesses' Sustainable Development?

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**Abstract:** The article focuses on the creation and the development of the entrepreneurial ecosystem around the innovation clusters. Clusters are believed to have a well-defined strategic approach aimed at boosting businesses' sustainable development, especially if clusters are centred around small and middle-sized enterprises. Having undertaken a piece of phenomenological qualitative research, we found that large companies were more open to cooperation and sustainability than the small and middle-sized ones, thus initiating and developing innovation clusters around them (particularly in high-technologized industries such as the automotive and Information Technology). Additionally, we highlight that a sustainable entrepreneurial ecosystem is based on strong pillars, of which small companies' capabilities, including the entrepreneurial ones, are innovation-driven, and place them in the centre of the innovation cluster. This piece of research also provides relevant insights for private and public organisations and policymakers in order to co-create a local innovation and entrepreneurship strategy. Our findings have implications for both cluster literature and the field of entrepreneurship.

**Keywords:** sustainable development; entrepreneurship ecosystem; innovation; cluster; business strategy; SMEs; qualitative research



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## 1. Introduction

Business management is today facing important challenges regarding how to build an environment mutually sustainable for all stakeholders involved [1–4]. The paradigm changes observed by behavioural economists [5,6] forced businesses to embrace cooperation as an efficient strategy [7–9] resulting in the creation of clusters and in the development of sustainable entrepreneurial ecosystems. However, clusters are not static [10–12] and under the conditions provided by the external and internal environmental factors within their operational ecosystem, their behaviours shall be observed, especially the created know-how networking which evolves in time and helps cluster members adapt better to their competition and customers. Hence the importance of our research, which aims at in-depth analysing innovation clusters and their entrepreneurial activity.

Previously in the speciality literature, the correlation between entrepreneurship and sustainable development has been the subject of many studies [13,14] which emphasized the dimension of innovation. Some of the preceding theoretical background has been deeply focused on the contribution of the large companies to developing local entrepreneurship, and of the universities to encouraging the entrepreneurial activity [15], whereas others have analysed the objectives and the practices of higher education institutions in the evolution of start-ups [16] in terms of numbers and economic results. However, the exploration of the influence of innovation clusters on the entrepreneurial ecosystem in environments

such as those of the developing countries is underrepresented. For such reason, this paper aims at filling the identified gaps and at contributing to the analysis of the creation and development of the entrepreneurial ecosystem around innovation clusters, especially in contexts of transition economies.

Under such circumstances, innovation clusters shall develop not only a set of industry-oriented competencies on which their strategic capabilities shall develop, but also numerous cross-disciplinary ones, such as entrepreneurial skills. In our view, innovation shall be supported by well-shaped pillars, such as technology and digitalisation. However, pillars shall be more, so this paper aims at identifying and analysing them in detail. Therefore, our topic needs more focus on the previously published literature and an empirical piece of research to provide key information starting with the research questions presented as follows:

1. Which key pillars support the development of the entrepreneurial ecosystem?
2. Which constraints accelerate the development of the entrepreneurial ecosystem?
3. Which fields of activity are better represented by innovative clusters with active activity?
4. How do cluster members stimulate entrepreneurship within the innovative clusters?
5. Which strategies do cluster members create and implement together so as to develop the entrepreneurial ecosystem?

In this respect, we conducted a piece of phenomenological qualitative research based on an in-depth analysis instrument. Data were collected in the Central Development Region (CDR) of Romania. Results suggest that the entrepreneurial mind-set shall be more developed at regional level, starting with the students' mind-set (hence the importance of the entrepreneurial education to be given to universities) and ending with cluster members' mind-set, irrespective of the innovation degree of the cluster they belong to. Moreover, there is a need for a strategic approach to match not only the regional economic characteristics, but also the micro-environment created by the clusters, which we assumed to be centred around small and middle size companies (SMEs).

These results, corroborated to the previous research, support the positive influence of the innovation clusters within entrepreneurial contexts on sustainable development. However, by contrasting with previous contributions, they permit us to generalize this impact even within emerging entrepreneurial ecosystems, as those of the developing countries. Our findings offer significant insights to public and private organisations, as well as to policymakers, for establishing a clear innovation and entrepreneurship strategy.

Hence, the article begins with an outline of the speciality literature in the field, highlighting the role and importance of innovation clusters in the development of the entrepreneurial ecosystem. Moreover, it also emphasizes the strategies these entities use, so as to present a clear image of the developmental stage of the entrepreneurial ecosystem and the need of public policies and financing. The next section contains the empirical construct we used to generate data and answers to our research questions. Results are presented in the fourth section, which also discusses the main findings and how the analysis of the primary data obtained are representative for the whole population studied. This article ends with the conclusions and suggestions for the future development of policies and regional funding targeting the support of the development of the entrepreneurial ecosystem.

## 2. Literature Review

### 2.1. Innovation, the Result of Collaboration within Clusters

An innovation generally features the attributes of 'new/improved' and 'available', and refers either to a product and/or service, or to a managerial and/or operational process (or any combination of them) which considerably differ from previous products/services/processes. Moreover, the innovation shall have been made available to its stakeholders (namely to its potential users) in the form of a product/service, or used by the company for activities within, in the form of a technological process. Innovative activities include all the types of research and development activities (for instance, the acquisition of software) and all the works of engineering and development, design, training, and market-

ing when they are especially undertaken for the development and/or implementation of product or process innovations [17]. According to OSLO 2018 Manual [18], innovative activities refer to research and development activities, financial and commercial, undertaken when referring to clusters by any of its members and leading to any innovation. Hence, innovative clusters are clusters with research and development activity which innovate products/services and/or business processes, irrespective whether the innovation is still in progress.

Industrial clusters make innovation their survival factor due to the increased competition imposed on the economic environment by the advancement of the globalization process. This puts the grounds of new areas to expand the concept of the industrial district and, therefore, of the cluster. These areas are mentioned in the literature as innovative environments [19]. These highly innovation-intensive spaces can be generated either spontaneously, as a result of market logic and the actions of local promoters or can be induced as a result of public initiatives [20,21].

Under the conditions of a smart specialization, if a cluster cannot manage its activity only with its own resources, it will have to seek to maximize the synergistic effects by collaborating with the economic actors upstream or downstream. Cooperation allows two or more organisations, without losing their functional autonomy, to establish mechanisms for sharing resources and/or knowledge, in order to implement a common strategy that generates competitive advantages for all participants within a sustainable developing environment [22]. However, because of the problems caused by a lack of trust and a standard organizational culture that is not prone to generating alliances, cooperation is not always carried out directly, but mediated by certain intermediary institutions promoting joint projects. As Pyke [23] points out, cooperation between small companies requires an external catalyst or mediator, able to open spaces for negotiation, agreement, and mutual trust. The main role of this mediator can be acquired by various institutions, public or private, such as an association of business people, a union, a university, a central administration body, a technological institute, a local development agency. For such reasons, it is beneficial and important for small enterprises to be part of larger entities such as clusters due to the higher innovativeness and upgrading they facilitate [24]. When analysing the constitutive parts of a cluster, businesses, which actually have a vital role in the economy [22,25,26], are the most vulnerable, especially the small and middle-sized ones (SMEs).

On the other hand, an innovative environment should never behave similar to a closed system, but on the contrary, as access to information and technical knowledge from abroad leads to accelerated innovation. At the same time, it should not be neglected that a local system can dismantle due to pressures from abroad, especially in networks or systems created around a large company and for its needs, which may reduce future prospects for cooperation in the local environment as it would depend too much of the parent company's decisions themselves and therefore would be out of local control [20].

In conclusion, integrated territorial organizations, consisting of a group of entities, in which shared resources are generated and where collective strategies are intended to be implemented, will facilitate the creation of spaces that foster collective innovation to increase the competitiveness of regions. Being geographically concentrated, cluster members, such as enterprises (both supplying and demanding), education institutions, trade chambers, public authorities, government/regional/local agencies and bodies, and communities, do create, with their mutual organisational effort, the required synergy to innovate from single products and/or own processes to even new business units and entire markets.

## *2.2. Development of the Entrepreneurial Ecosystem around the Innovation SMEs-Centred Clusters*

In order to better present the context of entrepreneurship creation and development around clusters, the ecosystem approach shall be firstly analysed. It is formed of a number of actors and factors which are interdependent (including both cooperative and com-

petitive relationships) and facilitate/limit entrepreneurship in a particular territory [27]. These actors shall foster actions and show a specific behaviour favourable to providing systemic interaction [28], two features that cluster members generally demonstrate. The entrepreneurial ecosystem is known to have emerged together with regional innovation or industrial structures (which are largely exemplified by clusters and other national and regional innovation systems) and to have been focused on entrepreneurial actors more, and on firms less [29]. However, research shows that entrepreneurial ecosystems must be stimulated more in terms of their societal outcomes and welfare [30] as the consideration from the economic point of view and the existing industrial cluster policies are not properly responding to marketing needs.

Within the entrepreneurial ecosystem, innovation is an objective that many organisations envisage, but they fail to be innovative by their own capabilities, and thus they search for cooperation opportunities, as for example innovation clusters. Fortunately for the dynamics of the economic ecosystem, cluster initiatives play an important part in all the European Union's member states, and their national innovation strategies focus on the creation and development of innovation clusters [31].

Clusters seem to have formed and re-shaped in time: some scientific research uses the concepts of 'cluster' and 'network' interchangeably [32–34]. Industrial clusters are systems of inter-organisational relationships among different entities favoured by geographical proximity, animated by a strong feeling of belonging, and featuring mutual values as trust and reciprocity [35]. Within clusters, a central role belongs to small and middle-sized enterprises, the very promoters of both sustainability and innovation (start-up creation included), hence they will receive a special focus within this paper. The individual economic impact of SMEs is quite small, but given that they account for about 95% of all the companies worldwide [36], it is important to emphasize their general role within clusters and within the economy as well [15]. For such reasons, they are the central pole within the entrepreneurial ecosystem, and their activity has a major impact for its development, irrespective of the characteristics and objectives of the other members of the cluster.

Moreover, the concept of SMEs covers many types of companies, including start-ups, which have become debatable in terms of their definition. Start-ups are viewed from different perspectives by the specialty literature and by the institutional environment. Whereas the institutions and the legislation from both Romania and the European Union (EU) name as 'start-up' any newly registered company, researchers [37] and the business environment use it only for those organizations designed to search for an iterative and scalable business model. Once the business model (consisting of its strategic, marketing, etc. approaches) is known, it will be put into practice and be successfully repeated, whether it is a new venture, business unit, or division belonging to an existing organisation.

Following the researchers and the practitioners' train of thought, our conceptual framework herein presented considers as start-ups all those businesses which scale-up or show viability in terms of strategic growth, and we highlight that such organisations are the seed of the entrepreneurial ecosystem. Hence, in our view, not only is the sustainable entrepreneurial ecosystem about creating new companies which shall possibly develop, explore opportunities, and meet market challenges in order to create jobs and improve products and technologies, but it is also about analysing the impact (economic, social, and environmental) that corporate performance has at the regional level served by clusters [38].

In addition, scholars [19] recognize that start-ups, having innovative capabilities, are able to introduce more technical, social, and environmental solutions, thus contributing to the development of a sustainable economy. The theory, entitled 'triple bottom-line' (the 'triple helix' model) [15,38], showed the importance of the three major actors (government, universities, and industry) and stated that the sustainability of the companies was highlighted by their main activities, as well as by their economic impact, their met objectives, and their clear presentation of results—activities oriented to satisfy humans' vital needs by 'creative destruction' [39], a predecessor of a more sustainable entrepreneurial ecosystem [40]. Moreover, this theory brought a new perspective to sustainable entrepreneurship,

and a fourth constitutive part was added: the citizens; thus, the ‘quadruple helix’ emerged as a concept that forms an ecosystem within which the constitutive parts cooperate so as to generate structural changes aimed at helping them meet objectives that none of them would meet on their own. The quadruple helix explains how the ties between industry, government, university, and the civil society correlate to create a dynamic environment aimed at self-reinforcing innovation, knowledge, and economic development [41]. The quadruple helix theory underlines the multiple simultaneous roles that players, individually or as cluster, have in an ecosystem where SMEs are centrally placed [38].

Some scientific communities have also further developed the quadruple helix concept, managing to define the so-called ‘living labs’ which not only are open, but are also user-centred innovation ecosystems. They are based on a methodical approach to partnerships among public and private organisations and people. One of their main aims is to assimilate research and innovation, which real-life communities and settings benefit from [42], for example smart city services developed in various areas. There have even appeared priority or dominant fields which do this as state-of-the-art patterns of theoretical backgrounds and good practice: governance, housing, mobility, and environment.

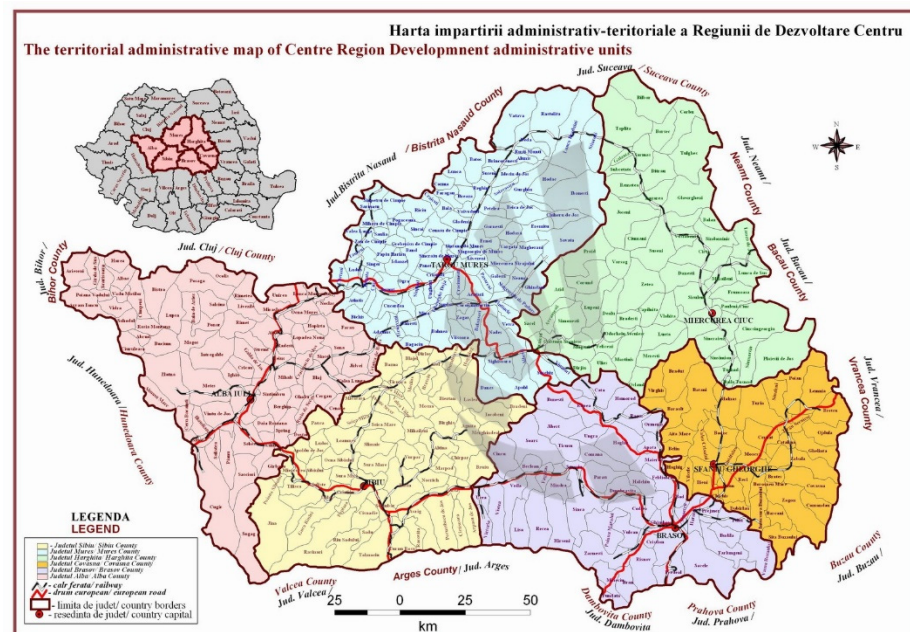
Under such circumstances, entrepreneurship and innovation are considered pillars of long-term sustainable growth and strategic priorities, and gaps must be bridged so as to improve the entrepreneurial ecosystem [38]. Irrespective of cluster members’ capabilities, the competitive pressures in their markets, or their external environments, the outputs of the innovation clusters shall be focused on efficiency and on the complexity of production and/or service delivery. A conceptual framework [43] proposes a few indicators of key outcomes and structural pillars. These pillars, considered essential to stimulate entrepreneurship in a region, include supply factors (infrastructure and human and knowledge capital), demand factors (access to markets, and firm and entrepreneurial capabilities), and barriers to the flow of resources (access to finance, regulation, and social capital and culture).

To conclude, innovation has proven to be key to success in a firm, with innovative companies managing to record growth rates twice as fast as those that do not innovate [44]. A trend that has manifested itself visibly in recent years in the entrepreneurial ecosystems is the transition to open innovation based on collaboration between stakeholders in the ecosystem [16]. Interactions formed among stakeholders (suppliers, customers, competitors, and public institutions) have led to the emergence of the innovation clusters [45].

### 3. Materials and Methods

#### 3.1. Research Localization

We undertook this study in the Central part of Romania, presented in Figure 1 below, which is currently known as the Central Development Region (CDR) and which consists of the following counties: Alba, Braşov, Covasna, Harghita, Mureş, and Sibiu. This regionalization led to the creation of one very powerful economic area, but which features internal disparities with regard to its economic activity [46–48]. Stakeholders of this region benefit from the expertise of the Regional Development Agency in charge of this CDR, which coordinates a Regional Innovation Consortium. This consortium acts as the main cooperation platform for the four major regional players (public authorities and institutions, research-development-innovation bodies and universities, start-ups and businesses, and the civil society) and it is aimed at boosting the development of a regional know-how-based economy [49]. It consists of 42 entities, of which 21.43% are clusters, 11.9% businesses, 19.05% universities, 2.38% research institutions, 16.67% non-governmental organisations (NGOs), 21.43% local public authorities, 2.38% public service bodies, and 4.76% are technology information centres [49]. As we may observe, clusters are well-represented at regional level, emphasizing their role and importance at macro-economic level.



**Figure 1.** The map of the CDR of Romania (source: <http://www.adrcentru.ro>) (accessed on 9 September 2021).

The CDR is continuously increasing its innovative development, mainly as a result of the capital, firm, and entrepreneurial capabilities of innovative SMEs, which play central roles within innovation clusters. The descriptive statistics presented in Tables 1 and 2 below clearly show that the turnover and the number of employees of the innovative Romanian companies have increased, particularly the turnover of innovation SMEs (by 76.7% from 2016 to 2018) and the average number of employees of large innovation companies (by 62.0% from 2016 to 2018), which underlines their rapid advance and their importance within innovation clusters. As we observe in Table 1, total turnover of the innovation companies represented in 2016, 23.15% of the total turnover registered by all the Romanian companies and in 2018, it increased to 29.39% showing that Romania is innovating.

Moreover, the number of people employed by the Romanian innovation companies increased by 54.3% from 2016 to 2018. Unlike reported turnover, which we have just presented, large innovation companies were the economic entities which employed the most employees. In 2016, the number of people employed by the large innovation companies represented 67.1% of the number of employees recorded by all the Romanian innovation companies, and the figure slightly increased by 3.3% in 2018. With regard to the innovation SMEs, as descriptive data in Table 2 below present, 5.34% of the total people employed in Romania in 2016 delivered their work in innovation SMEs, and this figure slowly increased to 7.37% in 2018.

**Table 1.** Turnover of Romanian innovation companies, thousands, LEI.

Descriptive Indicator	2016	2018	Deviation
Small innovation companies	14,140,590	25,024,068	+76.9%
Middle-sized innovation companies	28,590,287	50,482,889	+76.5%
Large innovation companies	157,450,500	208,722,534	+32.5%
Total innovation companies	200,181,377	284,229,491	+41.9%
of which, service companies	97,367,634	107,921,997	+10.8%
Total Romanian companies	864,765,522	967,479,082	+11.8%

(Source: [www.insse.ro](http://www.insse.ro) last accessed on 1 September 2021).

**Table 2.** Average number of people employed by Romanian innovation companies.

Descriptive Indicator	2016	2018	Deviation
Small innovation companies	42,539	61,743	+45.1%
Middle-sized innovation companies	68,887	92,863	+34.8%
Large innovation companies	226,666	367,322	+62.0%
Total innovation companies	338,092	521,928	+54.3%
of which, service companies	126,216	225,837	+78.9%
Total Romanian companies	2,087,094	2,107,413	+0.9%

(Source: [www.insse.ro](http://www.insse.ro) last accessed on 1 September 2021).

Table 3 below presents the total number of innovation companies registered in Romania and in the region we analysed: in 2018, there were 4198 innovation companies in Romania, and 10.22% of them were located in the CDR. The figures at regional level followed the increasing tendency of those at national level: during the observed period, the number of innovative companies in the CDR increased by 53.2% and in Romania, by 43.5%. Out of the 429 innovation companies, the highest number are SMEs, more precisely 88.58%. Furthermore, we also present the number of successful innovators out of the total innovation companies: in Romania, in 2016, 95.56% of the innovation companies succeeded in innovation products, processes, or organisation and management, and this figure increased to 98.28% in 2018, thus highlighting the dynamics and importance of innovation for the Romanian business ecosystem.

**Table 3.** Total number of innovation companies in Romania and in the CDR.

Descriptive Indicator	2016		2018	
	Romania	CDR	Romania	CDR
Small innovation companies	2059	172	3022	265
Middle-sized innovation companies	643	77	825	115
Large innovation companies	223	31	351	49
Total innovation companies	2925	280	4198	429
of which, service companies	1432	92	1900	141
Successful innovators	2795	-	4124	-
Total Romanian companies	28,809	3946	28,776	3878

(Source: [www.insse.ro](http://www.insse.ro) last accessed on 1 September 2021).

### 3.2. Research Methodology

We have previously presented the concept of the entrepreneurial ecosystem which consists of various entities, of which clusters represent our object of herein analysis. Whether innovative or not, clusters do form on the pillars of the entrepreneurial ecosystem and create discrepancies within, especially in terms of their different economic activities and their strategic approaches to the business environment. Hence, some clusters take leadership roles and become models with their business strategies for the other entities of the ecosystem, as well as supporting the entrepreneurial activities more or less encouraged by the driving forces internal or external to the entrepreneurial ecosystem. In this respect, the general objective of this paper is to undertake a deep analysis on how innovative SMEs-centred clusters create and develop the entrepreneurial ecosystem, whereas its specific objectives are:

- (1) evaluating stakeholders' attitudes about the creation and consolidation of the entrepreneurial ecosystem;
- (2) underlining stakeholders' opinions on the limitations restraining the entrepreneurial development of the business ecosystem;
- (3) analysing stakeholders' views and visions about the business sectors in which innovative clusters have developed;

- (4) identifying stakeholders' opinions about the strategic roles that the main clusters' actors play in stimulating entrepreneurship and in developing the entrepreneurial ecosystem.

In order to meet our research objectives, we conducted a piece of phenomenological qualitative research aimed at collecting primary non-numerical data by individual in-depth interviews. The interviews were based on a semi-structured interview guide which provides flexibility and allows us to clarify information and make field notes [50]. It consisted of two major topics of discussion which were divided into several sub-topics. Even if topics and sub-topics were previously developed to meet the set objectives, they gave every participant the necessary freedom to approach them and express their personal points of view. The topics and sub-topics are presented in Table 4 below.

**Table 4.** The qualitative research instrument.

Topics	Sub-Topics
1. The past, present, and future of the entrepreneurial ecosystem in Central Romania	1.1. Key pillars of the development of the entrepreneurial ecosystem
	1.2. Main constraints in accelerating the development of entrepreneurship
2. Inside out the innovative clusters in the Central Romania	2.1. Economic activities and industries encouraging the creation and consolidation of innovative clusters
	2.2. Main actors within innovative clusters playing a central role in stimulating entrepreneurship
	2.3. Innovative cluster members' business strategies for supporting entrepreneurial activities

(Source: original).

As sampling methods, we used both purposive sampling, by inviting people we already knew had the necessary experience and perspective over the topic of research, and snowball sampling [51], by asking the former to recommend other subjects who could add value to our study. We reached saturation after having interviewed 27 stakeholders operating in the CDR, Romania. First, they were asked for informed consent to participate in the study. Secondly, they were given a short characterization questionnaire made of seven identification questions. Our sample of 27 people consisted of representatives of private businesses (81.48%), public institutions (11.11%), and associations (7.41%). The organisations they represented were small-sized (55.56%), middle-sized (7.41%), and large (37.03%), and they operated in the following fields of activity: automotive, textile, tourism, banking, wood and furniture, advertising, and health. Additionally, 51.85% of our sample were the owners of the organisations they represented, whereas the other 48.15% were employees, of which 76.92% were managers and 23.08% were operational employees. To bring more relevance to this study, we asked them whether the organisation they represented was part of a cluster and 81.48% gave a positive answer. With regard to the innovation degree of the cluster they were members of, we received a sample mean of 2.75 points (out of maximum 4) by using a Likert-scaled question with a rating from 1 (very little) to 4 (very high), which required the respondents to assess the cluster's innovation degree. We also asked whether their organisation was centred within the cluster and out of the 20 subjects, 85% gave a positive answer. Bivariate analysis showed that the centre-positioned cluster members were all private, operated in the industrial fields (94.12% of cluster-centred participants), were businesses, of which 52.94% small-sized and 41.18% large companies, and assessed their cluster with the same score of the whole sample at the innovation score (2.76).

Third, interviewers presented the topics of discussion to every participant, after having explained that the interview consisted of an open discussion on two major topics which they were familiar with, for that reason having been selected. The participants expressed their opinions and views freely, according to the sub-topics which were introduced with some open-ended questions. If necessary, the interviewers asked for more details or for



clarifications. Every interview lasted 30–40 min and took place face-to-face or over phone (according to the availability and localisation of every participant) in May–July 2021.

By using the content analysis [52], we performed the in-depth exploration of the resulted primary data in two phases: one inductive and one iterative [53]. First, we performed the inductive analysis: we organized the participants' answers on the five sub-topics of discussion. Next, in the iterative phase, we compared the answers and searched for similarities. We assigned a code to similar meanings as shown in Table 5: rc to 'real capital', fc to 'financial capital', hc to 'human capital', kc to 'knowledge capital', bc to 'business capabilities', ec to 'entrepreneurial capabilities', C to 'constraints', BS to 'economic activities and industries', and A to cluster's actors. Thus, we obtained nine different categories with answers with similar meanings.

**Table 5.** Qualitative research categories and their coding.

Category	Code	Interviews Content
real capital	rc1	production facilities, offices, headquarters, and warehouses
	rc2	equipment and machinery
	rc3	stocks of raw materials and stocks of (un)finished production
financial capital	fc1	earnings, revenues, and profit
	fc2	funding, loans, and credits
	fc3	uncollected invoices
human capital	hc1	academic education
	hc2	vocational education and qualifications
	hc3	skills
	hc4	attitude to work
knowledge capital	kc1	research
	kc2	product/service development
	kc3	intellectual property
	kc4	leadership and influencing
business capabilities	bc1	innovation
	bc2	management and organisational culture
	bc3	cooperation
	bc4	costs with procurement, service, and maintenance
	bc5	access to markets
entrepreneurial capabilities	ec1	motivation and scope of start-up
	ec2	risk-taking
	ec3	Support from government, public agencies, and institutions, partners
constraints	C1	lack of infrastructure
	C2	restrictive law and regulations
	C3	unskilled workforce
	C4	difficult access to finance
business sectors	BS1...n	economic activities and fields
cluster's actors	A1	educational institutions
	A2	large businesses
	A3	SMEs
	A4	public authorities
	A5	associations
	A6	intermediary organisations (hubs, incubators, accelerators, etc.)

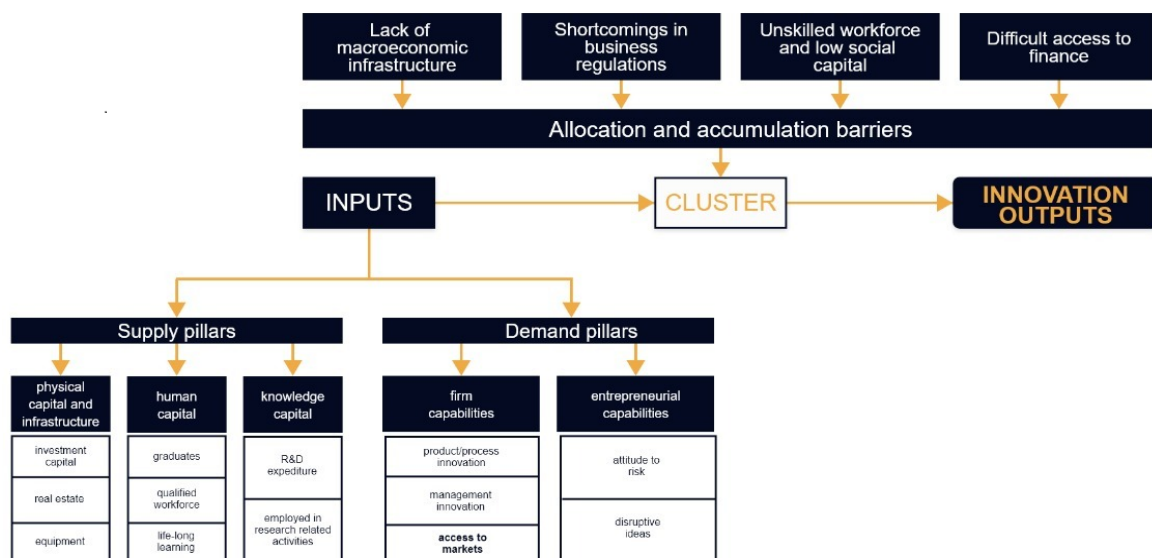
Finally, we grouped results according to our research objectives and generated the comparing and contrasting exploration of data, which led to the generation of the research conclusions. Furthermore, although the data collected within the qualitative research are not considered to be statistically representative, they are relevant for the population we studied. We also tested the reliability of our research results with the method entitled

data triangulation [54,55] and we validated them with other studies presented in the specialty literature.

#### 4. Results and Discussion

##### 4.1. Pillars Supporting the Creation and Development of Innovation Clusters in the CDR of Romania

Firstly, this topic of discussion approached two aspects, as previously presented in the literature review: the supply factors and the demand factors [43]. We aimed at identifying the interviewees' attitudes regarding the elements related to the demand and supply, presented in Figure 2 [43] below in our view considered to be the key elements in terms of the development of new businesses or creation of new clusters in the Romanian CDR. The interviewed stakeholders underlined the importance of the physical capital and infrastructure, of the human capital, and of knowledge capital on the one hand, and of SMEs' business and entrepreneurial capabilities on the other. We underline that these factors belong to the internal environment of every company, and they correlate in order to create a sustainable and favourable microclimate within the innovation cluster.



**Figure 2.** The cluster-centred entrepreneurial ecosystem (Source: adapted from Audretsch, David B., Cruz, and Torres. 2020. "Entrepreneurship Ecosystems in Developing Countries". Washington, DC, USA: World Bank).

The interviewed stakeholders, both public and private, and irrespective of their size, underlined that start-ups face two major problems in terms of their innovative degree: (a) macroeconomic, as the lack of adequate infrastructure to operate their business (these results do meet the second objective of this paper, so we will present them later) and (b) microeconomic, as lack of state-of-the-art physical capital and innovative results of research and development. Of the respondents, 48.1% (especially managers of public organisations and managers and owners of large businesses) pointed out that there was a consistent presence of foreign capital, especially the German capital in the Braşov and Sibiu counties (the county of Braşov ranked fourth in the country regarding the foreign direct investment). However, foreign investment is mainly concentrated in large companies (the automotive and wood industries were exemplified) and less in small businesses, which in our sample had 100% Romanian capital. On one hand, this makes the procurement of machinery and equipment difficult, especially the most innovative ones which imply not only some costs of procurement (evaluated as unavailable by 70.4% of subjects), but also with set up, personnel training, and maintenance (assessed as high by the two representatives of professional associations and by 78.6% of respondents from small businesses). On the other hand, our subjects underlined the need of own professional headquarters, offices, warehouses, and production facilities, some of them highlighting that their companies

were spending too much money on rents or bank loans. This is also a particularity of small businesses, as 57.1% of their representatives stated they needed more space to meet their current objectives and develop their strategic initiatives, especially those developing and/or implementing innovations.

Apart from the physical capital, the human capital seemed of high interest to our respondents. Interviews with stakeholders revealed that there were three major pillars on which the sustainable entrepreneurial ecosystem was developing in the Romanian CDR. First, this region is an important academic region with many public and private universities. Of the interviewed stakeholders, 11.1% underlined that universities had departments specialized in engineering, IT, economics, law, philology, medicine, humanities, thus offering a relatively rich pool of graduates, and especially of skilled labour in the technical field and services to the labour market. Stakeholders from large companies (29.6% of our sample) mentioned that they were more interested in graduates of technical faculties, reasoning that they needed qualified employees, while those from small businesses, in IT graduates or students being more focused on digitalisation of their businesses. However, 92.6% of our respondents highlighted the lack of operational workers and the lack of vocational competences of the existing workers. They said that the Romanian vocational education in the CDR should be more developed, and the gap between the labour market and education should be dramatically reduced so as to meet the cluster members' needs of qualified workforce. Statistical descriptive data show that, in the CDR in 2020, 59,737 students learnt in universities, whereas 15,916 students were registered in technical high schools (secondary education) and 8274 students were matriculated with post-secondary and foremen schools ([www.insse.ro](http://www.insse.ro) accessed on 13 September 2021). As we observe, the data show there is a critical lack of operational workers on the labour market and confirm our respondents' point of views. Hence, a special focus was given to life-long learning. As some subjects pointed out, 'learning should put theory into practice more' and 'change the workforce's attitudes with regard to its work type and schedule, waging and benefits' as well as 'workers' rights and duties should be better defined'. The new forms of learning, starting from self-teaching to online learning [56], were mentioned as being 'more appealing to employees', especially with the rapid development of online platforms and applications.

Furthermore, 44.4% of the participants in this research stated that, although the knowledge capital was high in their area, the total R&D expenditure as a share of GDP is low in the CDR. R&D expenditure in the private sector is below R&D expenditure from the public sector, and this affects the dynamics of the innovation cluster, as cooperation among high and low innovative players cannot be productive, especially if there are many public authorities, government bodies, and institutions with low rates of people employed in research-related activities or which do not properly transfer know-how to the private sector. In this respect, one of the interviewees located in Braşov county said: 'R&D plays a key role in generating smart and sustainable economic growth, creating new jobs, developing new products and services that increase productivity and industrial competitiveness. However, very few companies have research centres in the CDR that will contribute to consolidating their product portfolio'. The above findings were confirmed by other results mentioned in the literature which emphasize that the R&D expenditure from business enterprises as a share of GDP is only 0.01 percent in Braşov, whereas that of the public sector is 0.08, ranking the fifth among country regions [17]. All three respondents from public institutions (11.1% of our sample) pointed out that Romania ranked the last in the EU, allocating only 0.31% of GDP to research (compared to the European average of 1.42% in 2020). They were also concerned about the negative effects of the fact that the jobs in research and development in the public sector were blocked, making the number of employees in the field to stagnate at 31,000 people, unlike in the other EU member states which registered increases (the number of employees in this sector in the EU increased by 26% last year). These facts suggest the need to increase support for research institutions in the whole region.

In addition to the supply factors, 77.8% of the interviewed stakeholders (including all the representatives of small businesses) believed that, if entrepreneurship is stimulated

so as to guarantee the sustainable development of the region, the existence of some firm capabilities will compulsorily be entailed. Innovation is the major capability to be presented so as to reduce cluster members' weaknesses and properly respond to the environmental constraints. For all the participants, innovation referred to products and services delivered on to their customers and 18.5% of them (all of them managers) thought about innovating the managerial processes (generally speaking, managerial skills were envisaged) or facilitating their organisations' access to markets. As for the implementation of innovation, the interviewed stakeholders emphasized two aspects: SMEs' in-house innovations show limited performance, and there is also poor ability to transform inputs to innovation outputs, as private businesses' performance largely depends on their managers' ability to effectively implement innovation projects. Hence, there is again emphasized the need of specific competences, in this case, of project management. These ideas are consistent with the results reflected in other research in the field [57]. A possible solution to improve the situation could be the mutual collaboration of the regional actors in the field of innovation, which is one of the key features of a developed ecosystem.

In addition, in 29.6% of the respondents' view, the relatively low appetite for entrepreneurial risk, which has manifested itself for a long time, ultimately limited entrepreneurship activities within innovation clusters (representatives of large businesses stated that both intrapreneurship and entrepreneurship are low in their organisations). Assessing the reasons for which new businesses were set up, the stakeholders stated that entrepreneurs were more pushed by their own needs, mainly innovating so as to meet customers' needs/requirements, to express their passions and vocational skills, or to improve something in terms of quality and/or costs (respond to disruptive ideas). The above-mentioned statement matches the findings presented in the literature, which highlight that, over the period 2013–2017, nearly three-in-ten businesses in Romania were created as the entrepreneurs did not have any other individual opportunity in the labour market [57]. In this regard, the participants in the research expressed their belief according to which they anticipated that this situation will change, as emerging entrepreneurs are those who will capitalize on the opportunities that emerged after the COVID-19 crisis, such as: potential for recovery as the time to make an investment is the initial payback period after a stagnation, government support programmes, weakened competition due to the exit of some companies from the market, available labour force, the opportunity of technology, and openness to digitalization.

#### *4.2. Constraints to the Entrepreneurial Development of the Cluster Ecosystem*

Among the areas considered unfavourable to entrepreneurship presented in Figure 2 above, the respondents unanimously mentioned the poor-quality macro-economic infrastructure, referring mainly to the lack of highways (and airport in the county of Braşov) and to the overused railways and airports which limit the out-carrying of various activities. One participant stressed that the spatial pattern of the investment capital in the infrastructure within all the CDR exhibited the strong dominance of other Romanian regions, and the substantially lower level of investment in the central one [58].

Business regulations was rated as the second biggest constraint by 62.9% of the questioned stakeholders, especially in terms of the permanent change of fiscal policies and its lack of predictability. Representatives of small businesses said that Romanian law was not uniformed, whereas all the respondents from the business sector stated that public authorities did not work together so as to meet the needs of their sector or the citizens'. One participant suggested that the presence of public authorities and governance bodies within clusters should be more numerous in terms of entities and more active in terms of proper contribution to the clusters' activities, including the innovative ones.

Another area rated unfavourable by the interviewees is the skilled labour markets. Upon asking them to explain in further detail, there were 55.6% of the stakeholders (especially from companies operating in industry) who said that insufficiently qualified labour in certain areas, such as process automation, IT, the limited managerial capabilities, disinterest

among young people to continue the pattern of activities in the area, and the lack of some technical knowledge, represented obstacles to the development of entrepreneurship. Such points of view did not refer to own employees (herein before mentioned in the model as 'supply pillars'), but to the workforce external to their organisations or to the clusters they are part of, and with which they cooperate and do business. There were 25.9% of the respondents (all from the business sector) who rated the entrepreneurial mind-set as hostile, and who considered that clusters development relies on health culture and high-quality social capital. It is interesting to note that managers of large companies warned about this shortcoming more than SMEs' managers did. The lack of collaboration among actors was rated unfavourable by 33.3% of the stakeholders. According to a manager of a large company, 'intensifying collaboration between corporations and SMEs would stimulate innovation and lead to win-win partnerships. We, as a corporation, would benefit more from the flexibility and creativity of small businesses, while the latter would benefit from our experience, infrastructure and our customers'.

Correspondingly, 48.1% of all the respondents rated the access to finance as a major inconvenience for entrepreneurship. Most start-ups' financial resources come from personal and family funds; a few start-ups reported they had received funds from sources available in well-established financing ecosystems (such as venture capitalists and angel investors or through crowdfunding). Additionally, a limited number of start-ups reported having received funding from government-backed loans or funding activities. The geographical proximity of the capital, which absorbs a large part of the resources, was considered an unfavourable factor for eight respondents.

#### 4.3. Economic Fields and Activities Encouraging the Creation and Development of Innovative Clusters

This objective was aimed to identify the interviewees' views and visions about the key sectors in the Romanian CDR which feature innovation clusters and their characteristics. The interviewed stakeholders emphasized the importance of seven sectors, of which two are high-tech, namely automotive and IT. According to our subjects' scoring, there are two fields (IT and automotive) which received higher scores at 'cluster's innovation degree' than the sample average of 2.75, and three others (service, textile, and wood and furniture) which scored lower, as presented in Table 6 below. This implies that there is a need for creation and development of more innovation clusters in the underrepresented fields, or that there are fields (such as tourism) where clusters exist, but their innovation is very low.

**Table 6.** Scores registered by economic fields and activities.

Economic Field	No. of Answers (n = 20)	Scores (Out of Maximum 5)
Service (public management, education, tourism)	n = 4	1.75
Textile	n = 2	2.0
Wood and furniture	n = 5	2.2
IT	n = 6	3.5
Automotive	n = 3	4.0

The research participants declared that companies in the high-technology manufacturing, especially those in the automotive industry, are predominant, followed by wood and furniture, tourism, and the textile industry. The sectors that registered the strongest development, according to 55.6% of the respondents, are those in the field of health and IT, a phenomenon accentuated in the business environment influenced by the COVID-19 crisis. Although IT has lately registered an exponential growth, in 22.2% of our participants' views (all from the IT field), it remains the sector with the lowest number of companies. A field in which a notable change was observed is banking, which, after the speed-up of the digitalization phenomenon (most transactions taking place online) registered the closure of more and more territorial offices and, consequently, the reduction in jobs. Unfortunately, 14.8% of the subjects stated that the dismissed employees from the banking

sector would very difficultly find a new job unless they had a second qualification. Of these seven relevant sectors mentioned, the largest employers in the area are the companies from automotive, textile, wood and furniture, the former being the ones that generate the highest turnovers. In fact, these sectors were also mentioned by 37.0% of the participants to have the largest number of large firms within their industry (who are cluster initiators and developers as well), but the smallest number of start-ups. Despite the fact that it hires the fewest employees, the IT sector seconds the heavy industry sector in terms of turnover. IT and tourism have the largest number of young companies. At the same time, the textile industry has a very small number of new companies which, in general, are micro-enterprises focused on handcrafts.

In time, researchers have shown that learning within a cluster drives performance. Under such circumstances, a company is more likely to innovate if it is situated in a region where other companies from the same field are located [32,58]. The corroboration of the results obtained for meeting this goal reflects the stakeholders' current perception regarding the innovation in clusters. When participants discussed whether cluster companies offered innovative products or services, only 25.9% of them believed that companies offered something innovative for their business market (irrespective if their market is local, national, or international), indicating the IT and automotive clusters as the most innovative while considering the tourism and textile industries as weakly innovative. Moreover, although the innovation outcomes are visible in the health sector too, the presence of a cluster was not identified, this sector being dominated by the branches of several national players, among which, in our participants' view, there was no collaboration, but strong competition; however, subjects underlined that this field of economic activity represented a market where very few start-ups operated.

To sum up, a consensus has been reached about the elements of innovation: all the stakeholders highlighted that in more than half of the companies which were members of clusters, innovation consisted of the technology used, whereas 29.5% of them provided an innovative product/service or used an innovative business model. Representatives of associations underlined that, although the majority of cluster members provided technological solutions to their customers (most often in terms of Software and Digital platforms), only a few were tech enterprises. In this regard, one of the interviewed managers stated that 'the increase of automation and the goal of autonomous production bring considerable development potential, especially in terms of robotics solutions and service solutions, based on digital technologies. Our start-up aims to occupy a key position in the rapidly growing markets of process monitoring and robotics. We want to offer our customers innovations for the production of the future'.

An important remark was made by all the managers of large companies and 64.3% of small businesses, who stated that within innovation clusters, they found strong relationships between companies (in general, large IT and automotive companies) and universities, most of which were project-based and innovation-focused, and involved students, teaching staff, and researchers' participation. Regarding the research–development–innovation equation, the respondents representing public institutions stated that 'research and development transforms money into knowledge' while the respondents from the private sector considered that 'innovation transforms knowledge into business opportunities'.

#### *4.4. Strategic Roles Played by the Main Clusters' Actors in Stimulating Entrepreneurship and in Developing the Entrepreneurial Ecosystem*

In the interview guide, we split up this topic of discussion into two sub-topics. For the coherence of this paper, we present the results related to this objective according to every sub-topic of discussion. Results showed that, in order to meet their business objectives, large businesses within clusters use cooperation as their main strategic alternative, which is based on their innovation and other actors' entrepreneurial visions and missions, as stated by 48.1% of our sample. Moreover, within the sub-sample formed of small companies, 42.9% are not part of any cluster and 57.1% elaborate their strategies on their own capabilities,

of which innovation is low, and on the entrepreneurship opportunities brought by the business ecosystem.

#### 4.4.1. The Strategic Roles of the Main Cluster Members

Regarding the identification of the main actors that play a role in stimulating regional entrepreneurship, the stakeholders' answers were not every different. Overall, 59.3% of the respondents declared that county councils and local municipalities were two key institutions that play a central part in the governance of the entrepreneurial ecosystem, both at county and regional levels, but they should be more active within clusters. Associations of municipalities are also relevant at the regional level, and may undertake entrepreneurship-related initiatives, thus underlining the need for cooperation at public level.

Additionally, 18.5% of the participants considered that the existence of local intermediaries, hubs (especially those representing creative industries), incubators and accelerators is essential to support the development of start-ups. Such intermediary organizations must be set up and supported by a mix of public and private entities. The mutual agreement on this subject was that 'Braşov Metropolitan Agency (BMA) has put together a business centre and a technology transfer and business incubator (known as CATTIA) as well as it developed, in partnership with the Municipality of Braşov, a hub for innovation in tourism (known as HIT). In addition, several business consulting firms have created the FIT Digital Innovation Hub. The Braşov Chamber of Commerce and Industry organizes a wider range of training sessions and courses on topics related to entrepreneurship and partnerships with other associations for developing projects that support entrepreneurial activities. These initiatives to set up hubs, incubators, and co-working spaces have been reported in recent years but need to be strengthened in the future by a mix of public and private policies'.

The participants repeatedly brought into discussion the need to create industrial parks in order to offer companies new spaces to operate, and also to give them the opportunity to be in the vicinity of other companies with which to exchange knowledge.

Transfer of knowledge is an important catalyst for progress in research and teaching. In order to make the best use of knowledge for regional development, universities cannot function in isolation, but only connected with other actors, such as companies, public institutions, cluster associations, research centres, etc. [59]. Given these issues, a holistic approach would promote education in entrepreneurship and R&D management, where education institutions, universities mainly, must have clear aims and duties. As one stakeholder said: 'to stimulate the creation of new companies and to boost the entrepreneurial activity in the CDR, the involvement of the universities is vital'. The interviewed representatives of start-ups and public institutions stressed that, located in the CDR, there are some large and diversified universities (in Braşov, Sibiu, Alba-Iulia, Mureş, and Sfântu-Gheorghe) and this should create real opportunities to gather successful entrepreneurs to share their experience to students. In the interviewed managers' opinions, the visibility of the research by disseminating research results in the business environment in parallel with the cultivation of the entrepreneurial spirit and the creation of an entrepreneurial mind-set among the students are goals for the creation of a strong entrepreneurial ecosystem.

#### 4.4.2. Strategic Approach to Develop the Sustainable Entrepreneurial Ecosystem

The respondents asserted that, even if entrepreneurship and innovation are highlighted as strategic areas for regional development (mostly by small businesses), the strategies in this direction are not clear to all the stakeholders. A total of 51.9% of the respondents said local public authorities should elaborate, in collaboration with local decision makers, facilitators, and intermediaries, an entrepreneurship and innovation strategy, and develop some programmes and projects to improve the position of the CDR ecosystem at a national and international level. Subsequently, it is necessary to establish a functional framework for monitoring and evaluating the implementation of the strategy. The representatives of the business sector mentioned that the lack of involvement of the city administrations

must end, emphasizing that the municipalities must be a streamline and initiate venues for events in the entrepreneurship field. The participants in this research are convinced that a core challenge for the business environment in general, and for start-ups in particular, is represented by the business regulations. In their opinion, the most important changes need to be related to the simplification of bureaucratic procedures and the updating of regulations to take account of new business models. According to one respondent, 'taking as a model the examples of others cities, Bucuresti, Cluj, setting-up and pilot a start-up or innovation fund by city hall initiative would contribute to have a well-established funding ecosystem and would attract others investors such as business angels and venture capital funds'. This point of view matches the results stated in other studies, which stressed the key role of public institutions in developing the entrepreneurial ecosystems [57].

Asked if they believe that, in the CDR, intermediaries provide consultancy, allow for knowledge sharing, and foster collaboration among the ecosystem actors, the respondents unanimously approved that very few start-ups received business support or advisory services from hubs, incubators, or accelerators. In their opinion, in the current environment, a well-developed ecosystem must have functioning intermediaries which should allow greater ecosystem collaboration, and which should act as bridges between the main actors. The intermediary organizations have to develop their projects and programs in support of the entrepreneurial initiatives, through which start-ups and innovative SMEs may be endowed with key skills. The stakeholders also referred to the collaboration between start-ups and large companies, saying that through the intervention of the latter, the functioning and the capacity of the start-ups could be improved, while allowing knowledge sharing and the development of firm capabilities. However, there is limited collaboration between them as well. These outcomes are in accordance with the conclusions highlighted in other studies [15,48] showing that the cooperation between large companies and start-ups in the CDR is in an early stage. This is justified by the fact that clusters use only the basic models, without any application of a complex model of collaboration. Representatives of associations (who all stated that their organisations were members in clusters) acknowledged that their institutions played the same central role within clusters as most associations from other developed countries, justifying this by the fact that, in Romania, the culture to encourage collaboration, first in a specific field (i.e., the association) and then at pluri-disciplinary level (i.e., the cluster), has started to develop, and the number of their members and of the projects undertaken together started to increase.

When assessing the industrial parks' capacity to provide infrastructure for start-ups, eight industrial parks in CDR were mentioned. Some of these were born through the transformations of former industrial sites, others were built on an empty site. The problem that has been identified in relation to these parks refers to the fact that they do not specifically encourage entrepreneurial activities among innovative companies and start-ups; mainly they bring together larger companies. In the current context, it is almost imperative to think of the quadruple spiral when referring to the regionalization of innovation. Researchers [41,60] have shown that innovation is increasingly based on a quadruple helix of industry–university–government–citizens interactions. Knowledge is a key factor in this interactive and non-linear model of innovation. The role of universities in creation and dissemination of knowledge, in the development of an entrepreneurial mind-set, and in the incubation of technology-based firms has given innovation a prominent place in institutional functions, particularly as universities are the first to develop the mind-set of the future generations of new entrants of the labour market. As the technological requirements of the companies increase, so does their interaction with university researchers, producing higher levels of collaboration and knowledge exchange.

Starting from the quadruple helix theory, we identified the ways in which education (represented mainly by universities) contributed to the creation of an entrepreneurial mind-set among students and also to the development of the entrepreneurial system. Regarding the training and development of students' entrepreneurial skills and competencies, all respondents highlighted similar ideas. They stated that the activities approached by univer-



sities (such as delivering training; offering mentoring and consulting; organizing contests of business ideas/plans; inviting successful entrepreneurs to deliver speeches and participate in workshops, etc.) are appropriate. However, even if the participants in these activities are numerous, the spin-offs are very few. Respondents also appreciated that universities do not offer financial support, as there were no funding projects implemented for their students to use in order to create start-ups. By collaborating with the business environment, by involving more companies and start-ups in activities as those presented before, and by offering prizes to students with feasible business ideas, the clusters would generate better results consisting of increased student participation within the entrepreneurial ecosystem. Some of the owners interviewed added that they would be willing to invest in start-ups set up by students if they considered that they offered a product or service that met a real need in the market. Another category of respondents suggested that the mentoring activities carried out by universities are not fully effective, as mentors are teachers, who do not have daily contact with the business environment. A proposal from 25.9% of the participating managers was to have mentors employed by companies to deliver work in the universities. Through their practical experience, they would bring their input and complement the theoretical knowledge provided by the teaching staff. At the same time, a few participants considered that there was a need to improve the university curriculum in order to achieve a better synergy between education, practice, and research.

One of them stated that he appreciated 'that the labour market's needs are changing very quickly, we are looking more and more for graduates with entrepreneurial skills, focused on customers, able to work in a team, who are able to demonstrate a can-do approach, an opening to the new ideas and the desire to create value from all of these. I have the belief that higher education institutions are not fully able to develop graduates' skills before-mentioned, which would help them to survive and to grow in a dynamic labour environment and in an increasingly global market. For this reason, I believe that it is mandatory a better synergy between education, research and practice and, consequently, an improvement of university curricula'.

A total of 37.0% of the interviewees expressed the idea that, although the universities had developed multidisciplinary research institutes that provided the infrastructure needed to support further engagement with the private sector, the collaboration between the tertiary education and the private sector was still to be further developed, as no functional technology transfer initiatives were identified. Regarding the weak technological transfer from the university to the business environment, one of the respondents mentioned: 'I would not say that the relationship between the university and the business environment is underdeveloped. There are other reasons behind this. First of all, there is a very modest stock of innovations, just a few inventions that do not usually turn into innovations. Secondly, research is partially underfunded due to poor access to international research funding'.

## 5. Conclusions and Proposals

This research presented the key entrepreneurship pillars in terms of supply and demand factors in contrast to the principal limitations in the development of entrepreneurship within innovative clusters. Moreover, it highlighted the sectors in which innovative clusters developed, and the strategies used by cluster members in stimulating entrepreneurship. The results obtained reveal an incipient but expanding entrepreneurial ecosystem in the Romanian CDR that is faced with significant structural constraints.

Results obtained in the CDR show, in terms of supply factors including infrastructure and FDI, that central Romania falls behind other regions of the country. In this sense, the infrastructure is considered one of the biggest shortcomings of the county, while foreign investment, although at a fairly high level, is not oriented towards entrepreneurship. On the other hand, in terms of knowledge capital, the CDR has a relatively rich graduate pool and qualified workforce in the technical field and service, especially in tertiary education.

Finally, in terms of demand factors, the CDR is weak when it comes to the entrepreneurial capabilities. Stakeholders that were surveyed for the purpose of this study mentioned the lack of entrepreneurial capabilities as one of the causes of the relatively low appetite for entrepreneurial risk, justified by the small number of companies embracing disruptive ideas/businesses.

In order to establish the strategies for the future sustainable development, we identified four major obstacles to Romanian entrepreneurship: the poorly developed macro-infrastructure; business regulations/legislative shortcomings; unskilled labour market and low social capital; and the difficult access to finance, with more than half of our participants reporting that they financed their start-ups from their own resources. Very few start-ups benefit from government-backed financial support or from risk investors such as VCs and angel investors. In this regard, there is a need for making a stronger connection between cluster members within the CDR, and specialists from the business environment should be actively involved in initiating entrepreneurial projects with education institutions and public authorities. The results emphasise the lack of collaboration among actors as an obstacle, declaring that receiving support in terms of training or knowledge transfer from incubators or accelerators, government programmes, and/or mentor or consulting firms is a very rare practice.

With regard to the third objective of the research, the results identified seven key innovative industries in the CDR. In addition, the presence of relevant clusters was identified in high-technology sectors (automotive and IT) and the tourism, wood and furniture, and textile industries. The clusters in IT appeared to be the most dynamic. Although this field counts the fewest employees, it concentrates the most numerous young companies, as well as the highest number of small companies compared to the other fields which have innovation clusters centred around the large companies, for example the automotive industry. The analysis of the agglomeration revealed that there were important clusters in the tourism and the textile industries located in the CDR. However, the clusters in these fields showed little innovation, highlighting opportunities for future development.

The results of the research mentioned above confirm that cluster members, especially public authorities and institutions, R&D entities, universities, entrepreneurs, and civil society, must involve more in achieving a sustainable entrepreneurial environment, as mentioned in the quadruple helix theory. Based on the data collected, local authorities should be aware of the strategic importance of the entrepreneurship, and take steps to articulate coherent and impactful policies and programmes for the business environment. Creating a permanent platform for cooperation between the four major regional actors, the public sector, universities, industry, and local intermediaries, to ensure a balanced representation of the parties involved in the entrepreneurial discovery process, is a proposal for the future.

The survey also revealed that private intermediary organizations are emerging, but their number is limited, and they face critical sustainability challenges, as a large majority of start-ups declared having not received any support in terms of knowledge transfer or training from incubators or accelerators, consulting firms, or government programmes.

Beside the lack of support for the adoption or diffusion of knowledge and technology, other limitations mentioned include the lack of collaboration among actors in the ecosystem and the lack of funding. Previous research has shown that SMEs are more creative and can implement new ideas more easily than corporates, as they are more flexible [15]. However, most SMEs have limited innovative performance, the present study showing that the lack of financial resources is an obstacle in the development of innovative products or services. One suggestion would be to intensify collaborations between corporations and SMEs that would bring mutual benefits, the speed for large companies and the resources for SMEs.

In addition, results also confirm that universities are a key player in developing the local entrepreneurial ecosystem. For these reasons, start-ups need to be supported more in their entrepreneurial initiatives and development by stakeholders (such as authorities, universities, and non-profit associations) and the business environment as well. Therefore,

it is mandatory to share the experience with universities, other entrepreneurs and/or enterprises through channels such as business organizations, accelerators, incubators, and public programmes. In this regard, a suggestion would be for the university to set up an Entrepreneurs' Club, in which entrepreneurs from different fields to support students who choose entrepreneurship as a career option.

Complementing the theoretical contribution, these analytical results showed the ability of the entrepreneurial ecosystem and the challenges that entrepreneurs in the CDR face. The results also provide important insights for institutions, policy makers, large companies, and intermediaries in order to design public policies to support innovation and the development of an entrepreneurial ecosystem. Clusters' stakeholders should encourage internal technical and commercial knowledge flows among cluster firms. Key actions to achieve knowledge sharing would be the promotion of joint research and development projects, commercial projects, and the organization of conferences, workshops, and events to put companies in touch with each other. Obtaining a functional entrepreneurial ecosystem developed around start-ups also involves providing support to them from all stakeholders, such as public authorities, associations, and citizens, as stated in the theory of the quadruple helix.

In contrast to past contributions from the geographic economy that have deeply investigated the internal network of the cluster [21,61–63], and previous research that has studied entrepreneurial initiatives and possible areas of entrepreneurial success [40,64–66], this current research proposes a new approach, investigating the relationship between clusters and entrepreneurship. We highlight that this paper presents the strategic approach used by SMEs-centred clusters with a high level of innovation. Within these clusters, collaborative relationships are very intense, and thus they are boosting the entrepreneurial ecosystem in the CDR. Hence, innovation clusters contribute to the growth of a regional knowledge-based economy.

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