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INNOVATION IN THE LUBUSZ REGION. IMPLEMENTATION OF AN INNOVATION MANAGEMENT SYSTEM

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A b s t r a c t

The article reveals the potential of innovation management in regions on the example of the Lubusz Voivodeship. The aim of the article is to analyse the latest activities and initiatives supporting innovation in the Lubusz Voivodeship. To this end, it was important to identify the natur of the implementation process of innovative solutions, which may be recognized as politicial, i.e.: characterized by top-down initiatives and bottom-up implementation. The method of document analysis was used in the study, including primary and secondary sources. As a results, conclusions and recommendatitons for regional policy to support innovation were drawn. They indicate the need to use the scientific potential of University of Zielona Góra and other scientific and research institutions. They also reveal the need to strengthen the cooperation of the local self-government with the University for the development of innovation and creation of partnership networks in the region.

Keywords: innovations, innovation management, education, development of enterprises, learning regions

1. INTRODUCTION

Enterprises are confronted with new, unknown challenges in the face of the ongoing economic and social development. In the wake of globalisation, the conditions in which companies currently operate are particularly exposed to constant and intense changes. This is well reflected in Alan Moore's 'culture of steam' metaphor [10], the essence of which does not concern steam engines, but our civilisation, culture, institutions and symbols, which are like steam, i.e., dynamic, changeable, elusive and hot. It makes it clear that "permanent patterns, established institutions, authorities and hierarchies no longer work. Nowadays, ideas, revolutions or values appear, explode and ... disappear like a hallucination. It is a time of risk and uncertainty, but also of freedom and opportunity" [10]. In the era

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of such intense changes, anticipation of actions and their high flexibility become an indispensable condition for adequate functioning.

The processes of introducing rapid transformations (changes) and adapting to new needs are inevitable in the development of enterprises, because these processes assume an unprecedented pace. Innovative capacity constitutes an important dimension in the processes of adapting to new needs, as it provides enterprises with long-term (continuous) openness to overcoming difficulties in an unknown and uncertain environment [23].

J. Fagerberg draws attention to the role played by innovation in long-term economic and social changes, such as: introducing novelties into the economic sphere, which accelerates structural changes in production, as well as institutional changes, reflected in differences between the performance of companies, regions and countries [2,3].

It is worth noting here that the theoretical foundations of the currently discussed relationships between innovation and the development of enterprises, resulting in the economic growth of countries or regions, are related to the phenomenon of implementing and spreading innovations (the process of diffusion) [13]. Both in theory and practice, there is a turn towards old concepts developed on the basis of J.A. Schumpeter's theory, which reveals the role of innovation in economic development [17, 18].

The concepts that draw attention to the spatial aspect of innovation in the diffusion process are of particular importance in the article. Relevant inspirations within this area go back to the concept by N. D. Kondratiev [8], who developed the cyclicality of economic development approach in his concept of long waves. Today, many researchers (N. Rosenberg, C. Frischtak (1984), Ch. Freeman and C. Perez (1988), R. Hayter (1997), P. Dicken (1988), T. Stryjakiewicz (1999), P. Haggett (2001) draw inspiration from this concept and revitalise it not only in the economic aspect, but also in the spatial aspect, as they point to locations where breakthrough innovations appear [11].

The theory of G. Mensch [1979] [12] and the "metamorphic" model of structural change cycles constitute another approach related to the cyclical nature of economic development. It depicts the development of the economy as a series of intermittent innovation impulses following each other, as well as isolates swarm, collective occurrences of basic innovations. It is important because adaptation of breakthrough innovations is related to the socio-economic conditions within a given region [11]. This way, regions can strengthen or weaken the innovativeness of their enterprises.

Another important theoretical approach developed on the basis of Schumpeter's theory is M.E. Porter's cluster theory, which defines clusters as "geographically adjacent groups of enterprises and related institutions in a specific field, connected by mutually complementary similarities" [15].

The theoretical approaches used in the article imply the importance of innovation in the theory of location, which can be considered in terms of spatial self-organisation. In it, it is possible to switch complex systems from one order to another. The conditions are open, non-linear and far from being in equilibrium [1]. In practice, a territorial unit implements an innovation, integrating the region and leading to transformation (improvement) of the existing formation into an improved structure. As a consequence, "learning regions" come to life, which are capable of creating network relations and spatial proximity in the development of knowledge and innovation resources, as well as of creating and using region-specific resources in the processes of implementation, absorption and diffusion of innovations. Along with their specific cultural and social contexts, territorial settings constitute important binders. In them, local self-governments carry out tasks resulting from regional developmental strategy, thus, stimulating economic activity, competitiveness and innovation within the region by implementing developmental policies that support science and the economy, as well as promote innovations and technological changes [21].

The need to increase innovativeness in regions and create "learning regions" affects the attractiveness of given locations [11]. Here, the main role is attributed to innovative capital, the

development of which can be stimulated through public investment. "Investments create an increase in outlays and productivity in the private sector, especially by supporting education, human resources development, research and technological development, as well as small and medium-sized enterprises" [11]. The processes taking place in learning regions, and especially social interactions, are a condition for the diffusion of innovations, as well as for the potential for spreading new solutions focused on increasing productivity. In this perspective, innovative co-workers appear to be central resources if they are intensively and creatively included in the early stages of transformation processes in an enterprise.

For changes to be experienced in our reality, support for regional innovation management is required. Therefore, regional leadership is of key importance. Regional innovation policy is a relatively new area in Polish regions, which means that it is important to realise that "regional authorities must be independent in creating innovation policies, they should have appropriate instruments and financial resources" [16].

Leadership of local self-governments implementing the idea of "learning regions" is based on strengthening the processes of interaction and knowledge flow between key entities in the region, such as: companies, research organisations (universities and other research units) and public agencies. In this way, network systems are created at the local level, in which universities, business entities, organisational units of local government, business institutions as well as non-governmental organisations have a major impact on shaping and conducting coordinated activities in the creation of knowledge-based economies [6,11]. This direction is well reflected in the activities carried out in the Lubusz Voivodeship (Poland), which successively implements projects focused on the development of innovation. These activities are aimed at increasing innovation in the Lubusz Voivodeship, the result of which is not only to raise its position in the rankings of innovators, but also to increase the quality of emerging innovative projects. The main initiatives and directions affecting the development of innovation in the Lubusz Voivodeship are presented in Table 1.

Table 1. Main initiatives focused on the development of innovation in the Lubusz Voivodeship. Source: own study based on [24]

Implementation period	**Description of the main innovation initiatives/projects in the region**
2016 – 2018	• *Innovation Development Programme* (2016), with subsequent amendment (2018)
2020	• *Expert opinion Analysis, assessment and recommendations in the area of innovation in the Lubusz* Voivodeship, by Dr. Jerzy Tutaj, Wrocław University of Technology. • Elżbieta Anna Polak's, Marshal of the Lubusz Voivodeship appointment of a Lubusz Innovation Team, composed of Joanna Malon, Dr. Jerzy Tutaj, Krzysztof Bortnowski • Creation of the Department of Innovation and Entrepreneurship in the Marshal's Office of the Lubusz Voivodeship • Preparation of *Innovation Development Programme* by dr Jerzy Tutaj from the Wrocław University of Technology
2021	• Establishment of the Lubusz Forum of Innovation - as an advisory body of the Marshal of the Lubusz Voivodeship composed of innovation experts, scientists, entrepreneurs and representatives of businesses. • Organisation of specialist conferences on cluster policy, smart specialisations of the region under the European Funds, transfer of knowledge to business.
2021 – 2022	• Preparation to the contest for the selection of key areas within the Lubusz Smart Specialisations project. Organisation of nine networking workshops with the participation of entrepreneurs, scientists and innovation experts in preparation for a regional partnerships selection contest. • Organisation of the regional partnerships selection contest for key research and development areas in the Lubusz Voivodeship as part of the Lubusz Smart Specialisations project. Selection of partnerships.

New initiatives in the Lubusz Voivodeship aimed at supporting the region's innovativeness may open various entities to develop new processes conducive to the implementation of innovations, which may in turn increase the productivity and efficiency of various organisations. By building and developing networks, they also lead to the creation of various types of partnerships supporting (accelerating) the process of learning in cooperation (learning from each other). Considering the above, it can be seen that there is a lack of research related to the identification of activities oriented onto

support and development of innovation in the region. A similar situation occurs in other regions [5,7,16,22].

Therefore, the aim of the article is to analyse the latest activities and initiatives supporting innovation in the Lubusz Voivodeship. To this end, it was important to identify the nature of the implementation process of innovative solutions, which may be recognised as political, i.e.: characterised by top-down initiatives and bottom-up implementation. Another important recognition is to introduce measures that would secure the continuity of the initiatives, as a result of which a constant ability to overcome difficulties encountered by enterprises/organizations (environment variability) would be achieved. The third important aspect is to recognise the essence of building a network of innovative structures which, in the ever-changing environment, would ensure flexibility in the process of the region's saturation with innovation.

2. MATERIALS AND METHODS

2.1. Development of innovation in the region - recognition of the potential for innovation

The activities undertaken by the Lubusz Voivodeship Board since 2016 are in line with the strategy of increasing the region's innovative potential. The latest project *Contest for the selection of key areas within Lubusz Smart Specialisations* adopted a new formula, i.e. to select key areas within the Lubusz Smart Specialisations. At this point, the very notion of smart specialisation of the region requires clarification. In relation to regions, this term appeared in the European strategy in 2010 [19]. It had been developed a year earlier by a group of experts for the European Commission in order to draw attention to the importance of knowledge and innovation in finding alternatives to public investments, which until then had been dedicated mainly to sectors such as ICT, nanotechnology or biotechnology [19].

Under the project, activities were meant to take into account three priorities [19]:

1. Smart growth, understood as development based on knowledge and innovation.
2. Sustainable growth, understood as transformation towards a competitive and low-emission economy that efficiently uses resources.
3. Inclusive growth, understood as support for the economy characterised by a high level of employment and provision of economic, social and territorial cohesion.

The adoption of the priorities by the Commission obliged regions in Member States of the European Union, including Poland, to develop their smart specialisations strategies, which are meant to be key areas in the development of regional policies reinforced with the available support instruments. The selected areas are supposed to provide, as in the case of enterprises, the potential to build a competitive advantage. It was assumed that the purpose of such an initiative would be to better direct resources from the Structural Funds.

The idea of the *Contest for the selection of key areas within Lubusz Smart Specialisations* was adopted in 2021 by the Marshal's Office of the Lubusz Voivodeship, an institution which is responsible for the development of the region and the implementation of regional programmes. In order to ensure constant substantive scientific support, coordination along the line: business - science - local government was assigned to the University of Zielona Góra. Other scientific and research institutions in the region were also included, such as The Jacob of Paradies University in Gorzów.

It is worth noting that the initiative of the competition was preceded by a series of networking workshops in order to identify key areas within smart specialisations at the stage of preparatory work. The workshops were held in three rounds and were coordinated by experts in the fields of innovation and economy. Due to the Covid 19 pandemic, they were held online. They consisted of a panel part and

a workshop part divided into three groups corresponding to the smart specialisations adopted by the region, presented in detail in Table 2 [24].

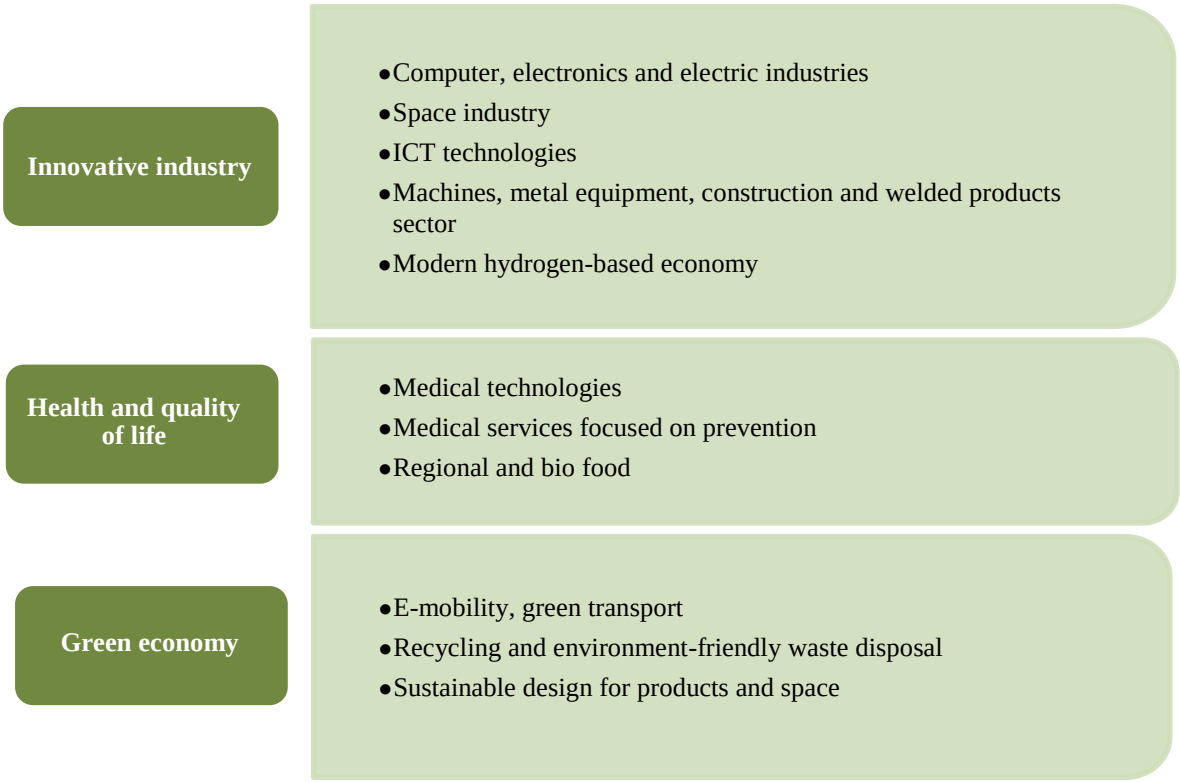

Fig.1. Lubusz smart specialisations (LSS) [source based on [24]

Representatives of business institutions, universities as well as R&D institutions were selected for the participation in the first workshop. Its aim was to familiarise them with the idea of a contest for regional leaders and to win them over to implement the idea. In the second stage, workshops of specific specialisations addressed entrepreneurs from the Lubusz region. In each of the three specialisations: innovative industry, health and quality of life as well as green economy, the workshops lasted three months. Thematic subgroups were also created. Participants were offered constant assistance of experts cooperating with the Marshal's Office as well as employees of the Marshal's Office. A total of 140 people participated.

The evaluation of the workshops revealed numerous key conclusions regarding the need to urgently inventory the companies' potential and indicate the areas in which they may become future beneficiaries of European Funds. The participants pointed out the need to exchange information on individual workshop groups (especially between sectors ICT + health, ICT + energy), which already at the initial stage demonstrated the need for networking. They found it necessary to create innovations in areas with high developmental potential. They also expressed their need to strengthen cooperation with Lubusz universities, in particular with the University of Zielona Góra. Attention was drawn to the prerequisite to find a field of cooperation between small and large economic entities as possible partners in projects co-financed by the European Union.

2.2. Contest for the selection of key areas within Lubusz Smart Specialisations (LSS)

Evaluation of the workshops confirmed the usefulness of their main objectives, i.e. to connect partners from the fields of science, entrepreneurship, business organisations and bridge institutions, as well as to initiate an impulse for new project ventures. In effect, the process resulted in the creation of partnership proposals, whose assumptions and intellectual and material potential were presented to the public. Also, the preparatory process greatly helped to understand the idea of partnership, which also contributed to applicants' successes. Finally, the main objectives of the contest were identified and the necessary indicators to be achieved were defined, all of which are summarised in Table 3.

Table 2. The main objectives of the Contest, source own study based on [24]

Objectives	Indicators to be achieved
• networking of partnerships and selection of consortia	• generating research and development/innovation projects
• verification of smart specialisation areas	• selection of the most promising areas with high R&D potential, the so-called key areas
• updating technology in the face of challenges related to new trends	• digitisation, industry 4.0, automation, circular economy, artificial intelligence, robotisation, etc.
• strengthening active and participatory processes of entrepreneurial discovery	• creation of new innovative projects thanks to the creation of strong networks of connections
• launching multi-level and cross-sectoral cooperation between the most active and innovative entities in the region	• creating specific projects and innovative ventures
• increasing the chances of internationalisation of Lubusz technologies	• gaining new markets for innovative products and services
• strengthening innovative competences	• networking, "mapping" of similar technologies (preventing duplication)
• mobilisation of regional partners and stakeholders to prepare innovative projects and undertakings	• financing new projects under the new 2021-2027 perspective
• involvement of local and regional clusters in regional policy	• the process of shaping regional policy and preparing representatives to act as leaders in the region

The contest for the selection of key areas as part of Lubusz smart specialisations (LSS) was initiated on June 1, 2021, and was completed on August 31, 2022. A two-stage application process was adopted, which is graphically presented in Fig. 1. Stage I concerned the call for initial applications and took place from June 1 until October 31, 2021. In the first stage of the contest, eleven partnerships, representing the areas of Lubusz smart specialisations, i.e. Innovative Industry, Health and Quality of Life and Green Economy applied for their participation. The Contest Committee assessed their strengths and weaknesses. Experts working in the Committee recommended further opportunities to expand partnerships and indicated opportunities for further partnership development.

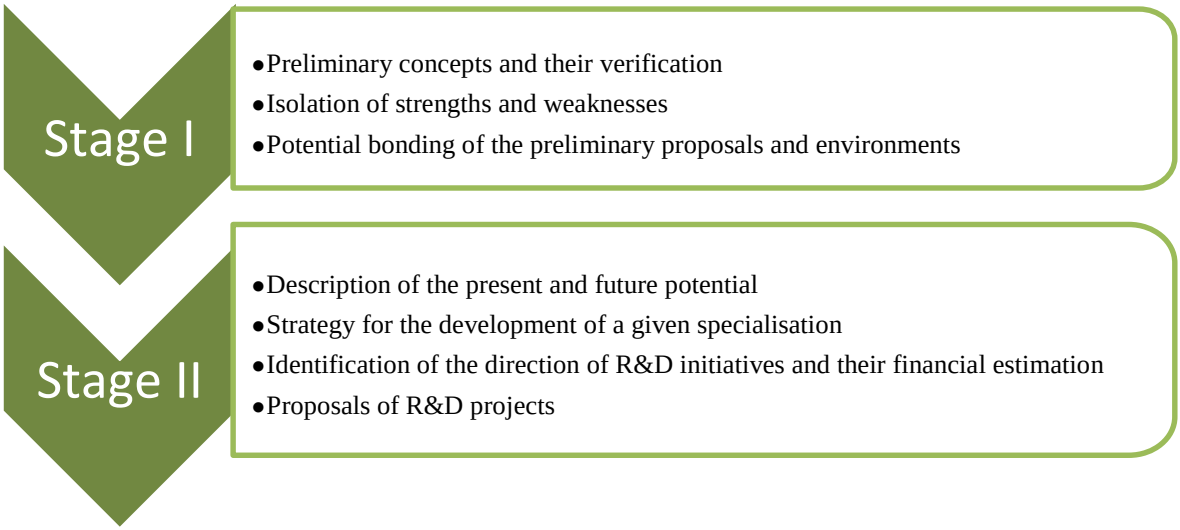

Fig. 2. Stages in the Contest, source: Own study based on: www.innowacjelubuskie.pl

3. RESULTS AND DISCUSSION

After the first stage and the submission of applications, the contest procedure provided for an expert evaluation with recommendations that the representatives of the partnerships were to verify and implement. There were eight partnerships in the second stage. Their evaluation involved a detailed analysis of the potential of a given partnership, i.e. its ability to carry out R&D activities. For this purpose, specific project ideas had to be presented. The Board of the Lubusz Voivodeship engaged not only experts in the field of innovation and economics, but also experts on European Funds to work in the Committee. The main assessment criteria were: (1) challenges, trends, potential market, (2) economic and technological potential (current and future/projected), (3) branchmarking (national and international), (4) strategy and action plan (including R&D programme and key projects), (5) the potential of partnership and previous activities supporting the development of specialisation on a national and international scale [24]. The entities selected in the Contest are included in Table 4.

Table 3. A ranking list of key areas, Source: own study based on [24]

Key area	**Entity representing partnership**	**Average score** (max. 111 pts.)
Development of Space Systems - ICT Materials and Technologies	Hertz Systems Ltd Sp. z o.o.	120.80
Lubusz Digital Centre of Medical Technology	Perceptus Sp. z o.o.	116.20
Industry 4.0	Regional Centre of Technology and Knowledge INTERIOR Ltd.	101.00
Innovative Industry - Sub-area: Industry 4.0	Lubusz Metal Cluster	99.60
Green Transformation	Renewable Energy Centre, University of Zielona Góra	92.20
Smart City and IoT - Smart Resource Management in the Economy	BIOT Sp. z o.o.	84.80
Transport, Logistics and Autonomous Vehicles	Damian Hajduk	65.00
Accepted conditionally		
InnoFood - High-quality Food	University of Zielona Góra	69.20

Completion of the contest and the experience gained by the Committee members constitutes a basis for formulating conclusions and recommendations for the Lubusz Voivodeship self-government, concerning three groups of partnerships, depending on the level of qualification of their applications.

The first group included two highest scoring partnerships: *Development of Space Systems - ICT Materials and Technologies* and *Lubusz Centre of Digital Medical Technologies*. Adequate practical project preparation translates into great opportunities for its quick implementation and in the opinion of the Committee, this group was considered ready to raise funds for regional, national and international projects. The Committee members recommended further support for these partnerships as part of activities carried out by the Marshal's Office of the Lubusz Voivodeship. The second group included partnerships with lower scores: *Industry 4.0, Innovative Industry - Sub-area: Industry 4.0, Green Transformation, Smart City and IoT - Smart Management of Resources in the Economy*. The preparation of these partnerships to create innovative projects was assessed as good, but requiring further work. A

large group of partners included in the Industry 4.0 partnership, which was established on the initiative of the leader of the Regional Centre for Technology and Knowledge INTERIOR Sp. zoo., was rendered by the Committee as significant. The Committee see a large group of stakeholders as promising in the area of developing project activities in the future. High ability to implement innovative projects was demonstrated by *Innovative Industry - Sub-area: Industry 4.0,* where *Lubusz Metal Cluster* became the leader. Partnerships in this group adopted the concept of creating horizontal and R&D projects and some of them are already beneficiaries and partners in such projects.

The third group consists of the two lowest scoring applications: *Smart City and IoT - Smart Resource Management in the Economy, Transport, Logistics and Autonomous Vehicles*, and the conditionally accepted *InnoFood High-quality Food*. Their low rating resulted from poor justification of their competitive advantages in connection with R&D activities, which would constitute a basis for further development of smart specialisations in the region. Their low score was also due to the fact that specific projects were not shown in the context of their practical implementation, e.g. there was no indication of partners and stakeholders. However, their areas of expertise were rendered of high importance to the development of the region.

4. CONCLUSIONS

Innovation still seems to be a challenge for the Lubusz region. Despite great achievements, such as its opening to flexible forms of (network) innovation management, there is also a strong need for continuation of undertaken activities. In the summary of the latest activities at the regional level, both positive and promising aspects as well as negative aspects that require correction can be identified. The positive aspects are the following:

1. Cooperation in the framework of partnerships is a driving force for innovation for the region and creates opportunities for good use of European Funds.
2. It is important to disseminate knowledge about innovations and their use in the economic development of the region. The activities carried out in recent years are conducive to this.
3. A chance for the development of innovation in the region lies in the scientific and research potential of regional universities and the existing infrastructure of research centres in cooperation between science and economy.
4. Monitoring areas of smart specialisation of the region in order to adapt to the economic potential and production capabilities of the so-called targeting of European Funds is of great importance.
5. The regional government plays a very important role in strengthening the knowledge-based economy, although it does not directly create technological projects. The initiatives of the local government strengthen the power of innovation in the region.

Difficulties to overcome also reveal several aspects. An important recommendation is the need for the Marshal's Office of the Lubusz Voivodeship to carry out further activities supporting the development of partnerships depending on their needs, which will make it possible to increase the value of the initiatives carried out so far. This shows that there is a need to develop workshops or model activities for various bottom-up partnership proposals. It is worth diagnosing such bottom-up potential in a broader perspective and developing various support paths. In this area, the scientific potential of the University of Zielona Góra, as well as of other scientific and research institutions appears to be too poorly used. Therefore, there is a need to strengthen the cooperation between the Marshal's Office and the University for the development of innovation and creation of a network of partnerships in the region.

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