**Research-based spin-off creation:**

**VIADUCT REGIONAL STUDY REPORT**

**2023**

**CENTRAL AND WESTERN REGION (Lithuania)**

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# Introduction to VIADUCT project

“Valorising public research to drive technology transfer and commercialisation through the creation of spin-off companies (VIADUCT)" is an international project financed by the Interreg Europe programme, with the contribution of the member states.

The VIADUCT project aims to promote knowledge transfer and commercialisation of public research by addressing key barriers related to the creation and establishment of spin-off companies through the improvement of regional policy instruments. This ambitious goal will be achieved through targeted actions for improving research infrastructure, promoting exchange of experiences, innovative approaches, and capacity building to identify, disseminate, and transfer good practices among regional policy actors.

Spin-off companies are a significant source of innovation, facilitating increased knowledge transfer between quadruple helix actors (universities, research centres, public and private sectors). Furthermore, spin-off companies can provide high-quality jobs and high-value-added products and services, forming a crucial part of mobilising science, technology, and innovation, thus driving regional cohesion and development. Nonetheless, their creation faces significant challenges related to research commercialisation, including:

* Low entrepreneurship culture among researchers, where career orientation favours research and academic careers.
* Difficulty in identifying research results that can be turned into business ideas.
* Lack of business skills among researchers and research managers.
* Regulations that do not support knowledge transfer through spin-off companies.
* Limited access to funding due to a lack of tangible evidence for securing financing.
* High business risk and market uncertainty due to the disruptive nature of products or services.

The project consortium consists of seven project partners: University of Zaragoza (ES), West Regional Development Agency (RO), SATT Conectus Alsace (FR), Kaunas Science and Technology Park, Public Institution (LT), Western Development Commission (IE), Municipality of Pieve di Soligo (IT), Council of Tampere Region (FI), and ASTP (NL). The total budget for the project is almost 1.8 million euros, and the project will be carried out from March 2023 to May 2027.

# Objectives and methodological approach

## 2.1 Introduction to the territorial analysis

One of the first steps of the learning process carried on in VIADUCT is to analyse how is each region dealing with the commercialisation of public research through spin-off creation. The objective of this analysis is to assess if the current methodologies and support measures are working well, and to identify in which areas each region could improve by learning from others.

This analysis consists of three activities: a joint thematic survey, a regional study report, and an interregional analysis report. Both the survey and the regional report will be conducted by 7 partners in their regions. The interregional report will compile the regional results at project level in a comparative way, in order to find synergies among regions that may have emerged from the survey and regional reports.

## 2.2 Introduction to the VIADUCT Joint Thematic Survey

The joint thematic survey on Research-based Spin-off Creation, conducted as a part of the VIADUCT project, aimed to gather valuable information to facilitate the improvement of the support and promotion measures addressed to spin-off companies in different European regions, thus contributing to their growth and success.

The survey was jointly designed by project partners and intended for the following target groups:

* + **Spin-off Companies:** The survey was aimed at companies originally established to bring innovations from public research laboratories or centres to the market. This includes both already established spin-off companies and those in the planning or development phase.
	+ **Researchers and Business Founders:** The survey was also intended for researchers and business founders who have potential or are interested in establishing spin-off companies or already had experience in this process.
	+ **Stakeholders and Supporters:** The survey was open to other stakeholders, such as regional development agencies, research institutions, universities, funders, and others who support and promote the creation and growth of spin-off companies.

With this diverse range of participants, the survey aimed to provide a comprehensive perspective on research-based spin-off creation and related development issues, which can further support to foster collaboration and the sharing of good practices in these areas among seven European regions.

The survey consisted of six separate sections, each of which assessed one of the main barriers of the spin-off creation process: lack of entrepreneurial culture, difficulties to find potentially transferable research results, lack of business management skills of researchers, difficulties to access to funding, legal procedures not conductive to create a spin-off company, and difficulties to consolidate already existing spin-offs businesses. Besides, an extra question intended to assess if there is any relation in the success of a spin-off company with the smart specialisation strategy of the region.

## 2.3 Objective of the regional study report.

The objective of the regional study report is to compile the answers to the survey at a regional level, in order to draw some conclusions on how effective current measures/methodologies on each region are.

The results of the survey are shown in a visual format (section 3) in order to ease their interpretation. Besides, they are divided in sections, as the survey was designed, to facilitate their comprehension.

## 2.4 Methodological approach

In Lithuania the survey was carried out between 01.08.2023 and 27.10.2023. Altogether 20 fully filled questionnaires were gathered. In the following figures, the responses are presented by type of organisation and by position of the respondent.

 Figure 1. Responses by type of organisation.

Figure 1 shows that the majority of respondents (6) are representatives of public institutions. Universities and R&D Public Centres and Regional Governments or agencies also account for a large proportion of respondents (3 responses from both areas). It is important to take this into consideration, as it may present a limitation when comparing differences among types of organization.

Figure 2. Responses by position of the respondent.

Figure 2 shows that the majority of respondents are project managers/coordinators (50 %), as well as directors/managers (25 %). It is worth noting that when comparing responses based on the positions of the respondents, accuracy may be compromised. This is because respondents may hold more than one position, such as researchers who have also founded a spin-off (holding positions as both researchers and entrepreneurs), or directors/managers in different organizations who may also have roles as researchers, consultants, entrepreneurs, etc. For this reason, the analysis will primarily focus on differences among types of organizations. Nevertheless, if important differences are identified regarding the respondent profiles, these will be highlighted.

# Analysis of Central and Western Lithuania region

## 3.1 Survey Results

This chapter analyses the results of the study in deeper. The results are analysed in relation to the questionnaire sections of the survey: Promotion of entrepreneurial culture; Search and valorisation of research results; Business management skills of researchers; Regulatory and legal framework; Funding and financing mechanisms; Business creation and consolidation; Smart Specialisation Strategy (S3).

### 3.1.1 Promotion of entrepreneurial culture

This chapter presents an analysis and evaluation of the results related to the promotion of entrepreneurial culture.

* **How do you evaluate the entrepreneurial culture among public researchers in your region?**

Figure 3. Entrepreneurial culture among public researchers (by type of organisation).

In this question, respondents were asked to rate the entrepreneurial culture among public researchers on a scale of 1 (very unsatisfactory) to 4 (very satisfactory). It is interesting to see how differently this question is approached by practitioners working in different types of organisations.

Figure 3 shows that spin-off companies, public institutions, and bank/investors have the highest perception of entrepreneurial culture among public researchers: 3.5, 3 and 3 respectively. On average, in the region of Central and Western Lithuania, the entrepreneurial culture of public researchers is rated 2.75 by stakeholders (more satisfactory than unsatisfactory).

Universities and R&D public centres, business incubators or accelerators, regional governments and agencies, entrepreneurship associations, entrepreneurship mentors and consultants rated it lower than the overall average. The reason for this difference could be that bank and investors are in contact with successful projects, as they work with spin-offs that have overcome the initial and risker stages of business creation and development. In contrast, business incubators and entrepreneurship associations work with early-stage companies, being in contact with both successful and non-successful ventures.

* **How do you find the support measures to promote entrepreneurial culture among public researchers in your region?**

Figure 4. Support measures to promote entrepreneurial culture among public researchers (by type of organisation).

This question follows a similar structure to the one mentioned earlier, utilizing a ranking system from 1 (very unsatisfactory) to 4 (very satisfactory). On average, in the region of Central and Western Lithuania, the support measures to promote entrepreneurial culture among public researchers are rated 2.75 by stakeholders (more satisfactory than unsatisfactory). Thus, there is a convergence in the assessment of both the entrepreneurial culture itself and the measures to promote it among public researchers.

Interestingly, universities and R&D public centres, business incubators/accelerators, regional governments and agencies are more favourable to the measures to promote entrepreneurial culture among public researchers. This may be because these organisations are leading such measures, or because the measures being evaluated may allow this type of organisation to write and submit applications.

* **What public tools/initiatives could be implemented to promote the entrepreneurial culture amongst public researchers?**

Figure 5. Public tools/initiatives to promote the entrepreneurial culture amongst public researchers.

When asked what public tools/initiatives could be implemented to promote the entrepreneurial culture among public sector researchers, the most frequently mentioned by stakeholders are trainings (9), funding (3) and joint events (3). According to the respondents, there is a need for “training, information about the training, and why the training is needed”, “financial incentive schemes to provide financial support to public sector researchers to set up or develop innovative spin-offs (low-interest loans, subsidised business incubators or venture capital investments)” and “cooperation between public sector researchers and the business community, for example through meetings, forums or events to share ideas and best practices”.

Collaborative projects (3), various joint initiatives (3) and paid internships/traineeships (3) could also be implemented. “Researchers should work with business enterprises to implement activities that are commercial. At the moment, the researcher does the research, and the business does the business.”, - respondents say.

**Conclusions**

In the central and western Lithuania, the culture of entrepreneurship among public researchers is rated more satisfactory than unsatisfactory. The measures used to foster this culture among public researchers are also more satisfactory. However, there is still space for improvement. The main instruments to promote an entrepreneurial culture among public researchers are trainings (to acquire business knowledge and skills); funding (to provide financial support to public sector researchers to set up or develop innovative spin-offs); joint events (to encourage cooperation between public sector researchers and the business community). Collaborative projects, various joint initiatives and paid internships/traineeships could also have an impact on fostering an entrepreneurial culture among public sector researchers.

### 3.1.2 Search and valorisation of research results

This chapter presents an analysis and evaluation of the results related to the search and valorisation of research results.

* **Do you know who to turn to within your organisation and/or region if you identify a research result that could be brought to market?**

Figure 6. Do I know who to turn to within my organisation and/or region if I identify a research result that could be brought to market?

Figure 6 shows that the majority (85 %) of respondents would know where to turn within their organisation and/or region if they identified a research result that could be marketed.

* **How are research results with valorisation potential identified in your public research organisation?**

Figure 7. Identification of research results that can be valorised.

Figure 7 shows that research results with valorisation potential in public research organisations are usually identified using both tools: organisational and researcher analysis (55% of respondents). This could mean that using both areas of analysis achieves the best result.

* **How would you suggest improving the process of valorising research results within your organisation / region?**

Respondents were asked to suggest ways to improve the process of valorising research results. Figure 8 shows that the most common suggestions from respondents were to involve business experts from different fields in the assessment (5), to organise joint seminars/trainings (3), and to use digital technologies in the research (2) or establish a methodology for assessing the results of R&D (or improve) and make it publicly available (2). According to the respondents, “Research analysis is often limited to direct analysis by researchers and/or the organisation itself. In this case, it might be useful to do this on a broader scale, e. g. by involving various networks - business contact databases (e. g. the Europe Enterprise Network) - and querying them on the relevance of the research findings. In this way, not only the potential of the results can be ascertained, but at the same time useful partners can be found for the commercialisation of the results”. It is also proposed to improve the process by presenting success stories, ensuring the transparency of the evaluation system, implementing recognition mechanisms, evaluating the impact, promoting scientific cooperation, informing researchers about funding and other opportunities, promoting their mobility, ensuring access to funding, creating, and strengthening business incubators and accelerators, initiating interdisciplinary projects, raising discussions.

Figure 8. Ways to improve the process of valorising research results.

**Conclusions**

In the central and western Lithuania, the majority of the stakeholders would know where to turn within their organisation and/or region if they identified a research result that could be marketed. Research results with valorisation potential in public research organisations are usually identified using both tools: organisational and researcher analysis. Essential ways to improve the process of valorising research results could be involvement of business experts from various fields in the assessment, organisation of joint seminars/trainings, the use of digital technologies in research and establishment (improvement) of R&D results assessment methodology and public announcement.

### 3.1.3 Business management skills of researchers

This chapter presents an analysis and evaluation of the results related to the business management skills of researchers.

* **Do you think it is easy for public researchers to create a multidisciplinary team to launch a business project?**

Figure 9. Is it easy for public researches to create a multidisciplinary team to launch a business project? (by type of organisation).

The results in Figure 9 show that respondents do not tend to think that it is easy for public researchers to create a multidisciplinary team to launch a business project (mean score of 2.05, with 1 being very unsatisfactory and 4 being very satisfactory). Entrepreneurship associations, entrepreneurship mentors, consultants or advisors, and banks and investors have a slightly more favourable view of the question (rating 3 - more satisfactory than unsatisfactory). This may be due to the fact that these stakeholders are more likely to encounter professionals with different competences in their own environment or, as mentioned above, that banks and investors are exposed to successful projects because they work with spin-offs that have overcome the initial and more risky phases of start-up and business development.

* **Do you think public researchers have sufficient knowledge to create and manage their own spin-off?**

Figure 10. Do public researchers have sufficient knowledge to create and manage their own spin-off?

Respondents feel that public researchers' knowledge of setting up and managing their own spin-off is insufficient, with an overall mean score of 1.7 where 1 is unsatisfactory and 4 is satisfactory (see Figure 10). Again, the assessment of the bank and investors stands out, which is much more favourable – 3 out of 4.

* **In which business areas do you think there is a need for training? (Please select the four most important ones)**

Respondents were asked to indicate the areas in which training for public researchers is most needed. Figure 11 shows that training is most needed in the following areas: strategy (selected by 14 respondents), finance (selected by 11 respondents), leadership, team management (selected by 9 respondents), legal (selected by 9 respondents), sales and negotiation (selected by 8 respondents), internationalisation (selected by 6 respondents) and marketing (selected by 5 respondents). Communication, human resources, digital competences were also mentioned, but less frequently. It is important to note that two respondents mentioned that training would be needed in all these areas. In addition, it was mentioned that respondents would like to select more than four options. This shows that there is a real need for business management skills for public researchers in the region and on a very broad scale.

Figure 11. Business areas where training is needed.

* **What measures do you think would be useful to improve the entrepreneurial skills of public researchers?**

Figure 12 illustrates the measures respondents suggest for public researchers to acquire business management skills. The most popular measure identified is training (workshops) on relevant topics (selected by 11 respondents). According to respondents there is a need to “organise specialised training <…> to provide researchers with knowledge on business development, business model development, marketing, commercial strategies and financial management”. Trainings should be “<…> complemented by practical training, with real-life exposure to business”. Respondents were also more likely to emphasize financial support to improve entrepreneurial skills (chosen by 3 respondents) and mentoring (chosen by 2 respondents). The following measures have also been identified as contributing to improving the entrepreneurial skills of public researchers: networking platforms or events; incubators or accelerators (support business projects from idea inception to implementation); direct advice; online learning platforms; success stories; sales; clear KPI’s (both result-oriented and motivate (materially) the researcher to achieve higher goals); determining value; management traineeships in successful companies.

Figure 12. Measures that would be useful to improve the entrepreneurial skills of public researchers.

**Conclusions**

The majority of respondents reflected that it is not easy for researchers in Central and Western Lithuania to create a multidisciplinary team to launch a business project. In addition, respondents are not satisfied with the knowledge of public researchers to create and manage their own spin-offs. The survey responses show that public researchers need trainings in strategy, finance, leadership and team management, law, sales and negotiation, internationalisation, marketing, and other areas. Trainings (workshops), financial support and mentorship could be appropriate measures to improve the entrepreneurial skills of public researchers.

### 3.1.4 Regulatory and legal framework

This chapter presents an analysis and evaluation of the results related to regulatory and legal framework.

* **How familiar are you with the legal framework that applies to spin-offs?**

Respondents were asked to indicate how familiar they are with the legal framework that applies to spin-offs, with 1 being completely unfamiliar and 4 being very familiar. The overall mean response rate is 1.95 - more unfamiliar than familiar (see Figure 13).

Figure 13. How familiar am I with the legal framework applicable to spin-off? (by type of organisation).

Analysing the responses from the perspective of the type of organisation, entrepreneurial associations are the most familiar with the legal framework that applies to spin-offs (rating 3 out of 4).

* **Do you think it is easy for public researchers to set up a spin-off from an administrative and legal point of view?**

Figure 14 shows what respondents think about the ease of setting up a spin-off for public researchers from an administrative and legal point of view. Entrepreneurship associations find it easy to do this (overall rating 4 out of 4). Notably, they are the most familiar of the respondents with the legal framework for spin-offs. It can therefore be argued that this type of organisation has one of the most targeted responses. The overall mean score for this question is 2.6 (more easy than difficult). The most sceptical groups were banks and investors, business incubators and accelerators, and spin-off organisations themselves.

Figure 14. Is it easy for public researchers to set up a spin-off from an administrative and legal point of view?

* **How could the regulatory and legal framework for the creation of spin-offs be facilitated?**

Respondents identify the following main ways to facilitate the creation of spin-offs within the regulatory and legal framework: the simpler and clearer the establishment process and its dissemination (highlighted by 4 respondents); financial support (highlighted by 3 respondents); more legal freedom (highlighted by 2 respondents); facilitation (highlighted by 2 respondents) and free professional consultations (highlighted by 2 respondents). According to respondents, “knowledge of how to do it, the simplest possible process and the dissemination” would help because “there is a myth that universities do not want to share IP”. What is more, it could be facilitated by “developing dedicated sources of finance for the creation of spin-offs, such as tax incentives for investors or public funding for new technological solutions”.

Figure 15. Ways to facilitate the creation of spin-offs within the regulatory and legal framework.

**Conclusions**

The results show that stakeholders are not fully familiar with the legal framework applying to spin-offs. Nevertheless, from an administrative and legal point of view, it is considered to be more easy than difficult for public researchers to set up a spin-off. Given the need for improvement in the field, it is considered that a simpler and clearer start-up process and the dissemination of information and financial support would encourage the creation of spin-offs in this respect.

### 3.1.5 Funding and financing mechanisms

This chapter presents an analysis and evaluation of the results related to funding and financing mechanisms.

* **Are you aware of the existing funding support mechanisms for spin-offs in your region?**

The majority of respondents are aware of existing funding support mechanisms for spin-offs in the region (overall mean is 2.7, with 1 being completely unaware and 4 being completely aware) (see Figure 16).

Figure 16. How aware am I of the existing funding support mechanisms for spin-offs in my region?

Figure 16 shows that entrepreneurship associations, public institutions and universities and public R&D centres are the most aware of the existing funding support mechanisms for spin-offs in the region (rating 4, 3.16 and 3 respectively). This may be because these types of organisations are active engaged in the region with spin-off companies.

* **In your experience, do you think that public researchers know where to go to obtain this funding?**

Less than half of respondents (45 %) think that public researchers know where to go to obtain this funding (see Figure 17).

Figure 17. Do public researchers know where to go to obtain this funding?

15 % of respondents think that public researchers do not know about it and 40 % of respondents cannot answer this question.

* **How would you improve the existing financial support for the creation of spin-offs (new methods of support, more funding, better conditions, facilitating the process...)?**

The main way to improve the existing financial support for the creation of spin-offs according to respondents is increased and more consistent funding (highlighted by 5 respondents). Respondents also identify the following ways that could be used: use of external consultants (highlighted by 2 respondents), dedicated spin-off funds (highlighted by 2 respondents), additional assessment of risk aspects (highlighted by 2 respondents). To improve the existing financial support for the creation of spin-offs, it is also important to ensure a transparent and efficient funding application and evaluation process; encourage the use of digital technologies and data analytics; encourage partnerships between spin-offs and established businesses; publish programmes; find new ways to support; develop programmes to provide practical assistance to founders of spin-offs; create regional and national networks of spin-offs; tax incentives and more flexible and simpler grant administration rules. According to respondents “Most very early-stage companies have few support tools. Companies must have a financial history. Otherwise, there is very little support. Early-stage investment funds and accelerators should be more active”. Suggested improvements identified presented in Figure 18.

Figure 18. Ways to improve the existing financial support for the creation of spin-offs.

**Conclusions**

Most stakeholders are familiar with the financial support mechanisms for spin-offs in the region. However, less than half of the respondents think that spin-offs know how to access this funding. The main way to improve the existing financial support for the creation of spin-offs according to respondents is increased and more consistent funding.

### 3.1.6 Business creation and consolidation

This chapter presents an analysis and evaluation of the results related to business creation and consolidation.

* **What kind of support do you consider essential for setting up a spin-off business?**

Figure 19. Essential support for setting up a spin-off business.

Figure 19 shows that respondents consider the following to be essential support for setting up a spin-off business: financing instruments (selected by 16 respondents), legal, tax and financial advice (selected by 15 respondents), incubation (selected by 14 respondents), business development consultancy (selected by 12 respondents) and training (selected by 9 respondents). It can be noted that the answers correlate with the results of the previous analysis, and the importance of team building support and networking is also highlighted by respondents.

* **At what stages in the consolidation of a spin-off are there specific support programmes / initiatives in your region?**

Respondents say that most of the specific support programmes/initiatives in the region are provided during the incubation stage (selected by 16 respondents) (see Figure 20). The region is thus focusing more on the initial stages of spin-off consolidation. The figure also shows that specific support programmes/initiatives in the region are also addressing the scale-up, raising venture capital funds, internalisation stages.

Figure 20. Spin-off consolidation stages with specific support programmes/initiatives in the region.

* **What do you miss in your regional policy to consolidate and/or scale spin-off businesses?**

Figure 21. What am I missing in my regional policy to consolidate and/or increase the scale of spin-offs?

Figure 21 shows that financial instruments are most missing (highlighted by 3 respondents) regional policy to consolidate and/or increase the scale of spin-offs. “Many spin-offs enter a stagnation phase after the final prototype has been developed because the financial means to commercialise the product are not available. Pumping out a product is only half the job. Getting the product ready for the market is the second important part. Therefore, financial instruments are needed to fully commercialise the product.”, - say respondents. A regional policy that includes training, an initial package of mentoring and networking support, flexible legal environment, cooperation between all stakeholders, motivation, hands-on projects would also contribute to consolidation and/or increasing the scale of spin-offs.

**Conclusions**

Most respondents indicate that financial instruments, legal, tax and financial advice, incubation as well as business development consultancy and training should be essential support for setting up a spin-off business. According to the respondents, specific support programmes/initiatives are currently more focused on the incubation stage of spin-offs in the region. In general, respondents in regional policy to consolidate and/or increase the scale of spin-offs financial instruments are most missing.

### 3.1.7 Smart Specialisation Strategy (S3)

This chapter presents an analysis and evaluation of the results related to Smart Specialisation Strategy (S3).

* **Do you think that a higher percentage of the spin-offs created in your region are framed within the priority/specialisation areas defined by the region, or on the contrary, do you think that there are no significant differences?**

Figure 22. Does a higher percentage of the spin-off created in the region are framed within the priority/specialisation areas defined by the region?

Most respondents (75%) say that a higher percentage of spin-offs created in the region are framed within the priority/specialisation areas defined by the region. “I believe that the percentage of spin-offs related to the priority and/or specialised areas identified by the region may be higher than in other sectors of the region. This is often reflected in the objectives of the regional strategy and efforts to promote innovation and economic development in these specialised areas. Such strategies may include research and development projects, training programmes and funding instruments that are more focused on these areas.”, - say respondents and add “<…> it should be noted that this depends on the specific region and the effectiveness of the S3 measures it implements. In addition, the business environment, availability of finance and other factors that may affect the creation and growth of spin-offs in a region need to be considered. It is therefore important to analyse these facts carefully and assess whether the development of the priority areas is successful.”

**Conclusions**

According to the respondents, a higher percentage of spin-offs created in the region are framed within the priority/specialisation areas defined by the region.

## SWOT Analysis

The analysis of the surveys allows us to identify the strengths, weaknesses, threats, and opportunities of the Central and Western Lithuania region for the commercialisation of public research through spin-off creation.

Identified strengths

* **Promotion of entrepreneurial culture** – the development of an entrepreneurial culture, including the presence of business incubators, accelerators, and networking opportunities, other support measures, creates an environment conducive to the growth of spin-off companies.
* **Search and valorisation of research results** – the involvement of organizations and researchers in the search and valorisation of ideas enhances the quality, relevance, and impact of research outcomes, fostering a collaborative and synergistic approach to innovation and knowledge transfer.

Identified WEAKNESSES

* **Insufficient business management skills of researchers** – researchers typically specialize in specific scientific/academic domains and usually lack expertise in business management, entrepreneurship, and commercialization. The primary focus of academic training is often on research skills rather than business acumen. Academic environments may not provide researchers with sufficient exposure to entrepreneurship and the practical aspects of starting and managing a business. Traditional academic career paths may not emphasize the skills needed for entrepreneurial ventures.

Identified threats

* **Unclear regulatory and legal framework** – complex and unclear regulatory processes can discourage researchers and entrepreneurs from setting up spin-offs. Challenges related to intellectual property (IP) management, including unclear ownership, complex licensing processes, and disputes over IP rights, can pose significant threats to spin-off companies.
* **Challenges related to financing and financing mechanisms** – challenges in accessing capital are significant threats to spin-off companies. Limited access or availability of venture capital, angel investors, or government grants can constrain the financial resources needed for business development.
* **Inappropriate support and cooperation instruments for business creation and consolidation** – incentives that do not align with the spin-off companies needs may discourage entrepreneurs. Policies should provide appropriate incentives for risk-taking, innovation, and long-term business sustainability. Inadequate opportunities for collaboration between academia, industry, and government can limit the synergies needed for the successful creation and consolidation of spin-off companies.

Identified OPPORTUNITIES

* **Smart Specialisation Strategy (S3)** – aligning a spin-off with the Smart Specialisation Strategy provides a structured and strategic approach to entrepreneurship, leveraging regional strengths, promoting innovation, and contributing to sustainable economic development. This alignment increases the likelihood of spin-off success and enhances the overall impact on the regional or national economy.

* **Promotion of entrepreneurial culture**
* **Search and valorisation of research results**
* **Insufficient business management skills of researchers**
* **Smart Specialisation Strategy (S3)**
* **Unclear regulatory and legal framework**
* **Challenges related to financing and financing mechanism**
* **Inappropriate support and cooperation instruments for business creation and consolidation**

Figure 23. SWOT Analysis.

# Conclusions and final remarks

In conclusion, the region's promotion of an entrepreneurial culture, coupled with a robust commitment to the search and valorisation of research results, stands as a formidable strength in fostering innovation and economic development. The deliberate cultivation of an entrepreneurial mindset not only encourages risk-taking and innovation but also creates a supportive environment for spin-off to thrive. Simultaneously, the region's emphasis on searching for and maximizing the value of research outcomes underscores a dedication to translating academic knowledge into tangible societal and economic benefits.

While the region demonstrates notable strengths in various aspects of fostering innovation, the identified weakness in business management skills among researchers presents an opportunity for targeted improvement. Strengthening the business acumen of researchers is critical for bridging the gap between groundbreaking research and successful entrepreneurial ventures. By investing in training programs, mentorship initiatives, and resources aimed at enhancing business management skills, the region can empower its researchers to navigate the complexities of startup creation and management.

The region faces significant challenges in its regulatory and legal framework, funding, and financing mechanisms, as well as the overall process of business creation and consolidation. These threats underscore the need for a concerted effort to address structural barriers and create an environment conducive to entrepreneurial growth. The complexities within the regulatory and legal framework demand careful consideration and reforms to streamline processes, reduce bureaucratic hurdles, and provide clearer guidelines for spin-offs. Concurrently, the challenges associated with funding and financing mechanisms necessitate innovative solutions, such as the development of diverse funding sources, public-private partnerships, and targeted financial support to mitigate the risk associated with entrepreneurial ventures. Moreover, the obstacles in business creation and consolidation highlight the importance of comprehensive support structures, including mentorship programs, incubators, and networking opportunities. Fostering a more supportive ecosystem for spin-offs is vital for overcoming these threats and ensuring the sustained growth of entrepreneurial endeavours in the region. Addressing these challenges will require collaboration between policymakers, industry stakeholders, and the entrepreneurial community to design and implement effective strategies.

The Smart Specialisation Strategy (S3) emerges as a strategic opportunity for the region, particularly in the creation of spin-offs. By aligning entrepreneurial initiatives with the identified areas of specialization, the region can capitalize on its unique strengths, knowledge base, and competitive advantages. The S3 provides a structured framework that not only guides the focus of research and development but also facilitates the seamless transition of innovative ideas from academia to the commercial sphere.