

**Research-based spin-off creation:
VIADUCT REGIONAL STUDY REPORT
2023**

ARAGÓN (Spain)

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1 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 centers, 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.

2 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 centers 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.

VIADUCT

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 conducive 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 are current measures / methodologies on each region.

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 Aragón the survey was carried out between 05.07.23 and 15.10.23. Altogether 64 answers were gathered. In the following figures, the responses are presented by type or organisation and by position of the respondent.

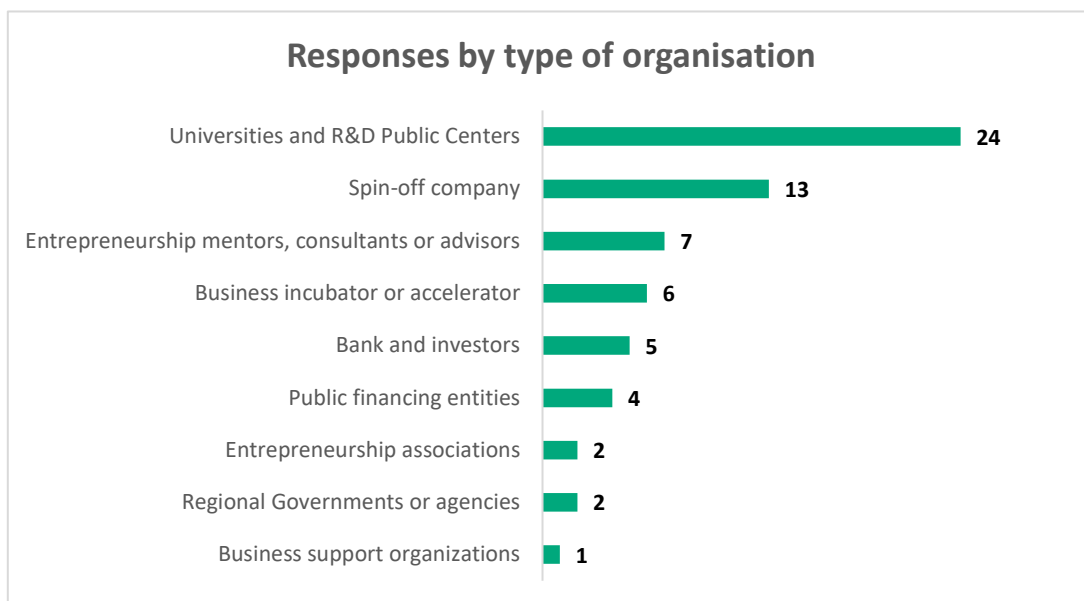


Figure 1. Number of responses by type of organisation.

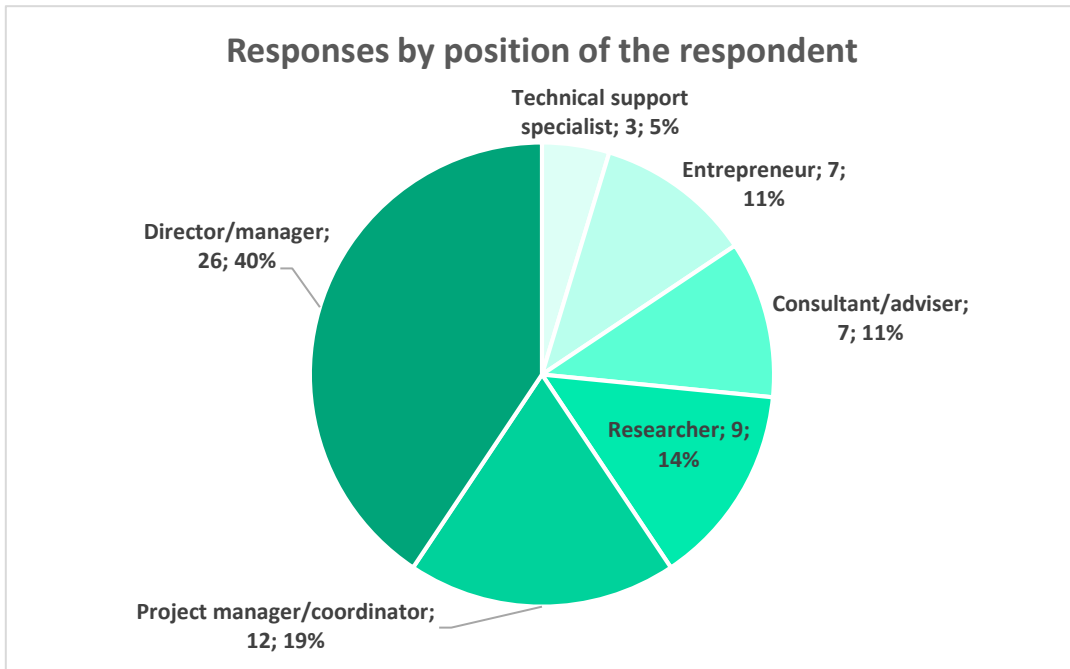


Figure 2. Number of responses by position of the respondent.

As shown in the Figure 1 and 2, most of the responses come from people working at Universities and R&D Public Centers (37.5%) and spin-off companies (20.5%). It is important to take this into consideration, as it may present a limitation when comparing differences among types of organisation. Additionally, 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 organisations who may also have roles as researchers, consultants, entrepreneurs, etc. For this reason, the analysis will primarily focus on differences among types of organisations. Nevertheless, if important differences are identified regarding the respondent profiles, these will be highlighted.

3 Analysis of Aragón region

3.1 Survey Results

3.1.1 Promotion of entrepreneurial culture

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

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). On average, in Aragón, relevant stakeholders found that the entrepreneurial culture among public researchers was not satisfactory, scoring 1.93. However, it is interesting to observe the varying perspectives on this matter among professionals working in different types of organisations. Banks and investors have a rather positive view in this regard, whereas entrepreneurship associations, business incubators/accelerators and even, the researchers themselves hold a more negative perspective. 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 riskier 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. Responses by type of organisation are presented in Figure 3.

There are no significant differences in terms of the profile of individuals responding to the questionnaire. The main finding is that entrepreneurs have the most positive view in this regard, scoring 2,28. One reason for this could be that these entrepreneurs themselves possess an entrepreneurial culture and, as a result, tend to have a more optimistic view of how this culture is spreading among their colleagues.

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

This question follows a similar structure to the one mentioned earlier, utilizing a ranking system from 1 (very unsatisfactory) to 4 (very satisfactory). In this case, the views are somewhat more positive, but they still fall short of being satisfactory, with an average score of 2.27. The fact that there is a more positive perception of the measures taken to promote entrepreneurial culture compared to the evaluation of the entrepreneurial culture itself suggests that relevant stakeholders in Aragón recognize that efforts are being made to promote entrepreneurial culture. However, it appears that

these measures may not be sufficient for their expectations. These types of measures are typically led by the government and public organisations, and it is noteworthy that respondents from these organisations find support measures only slightly satisfactory, scoring 2.5, as can be seen in Figure 3. These results indicate that there is still room for improvement.

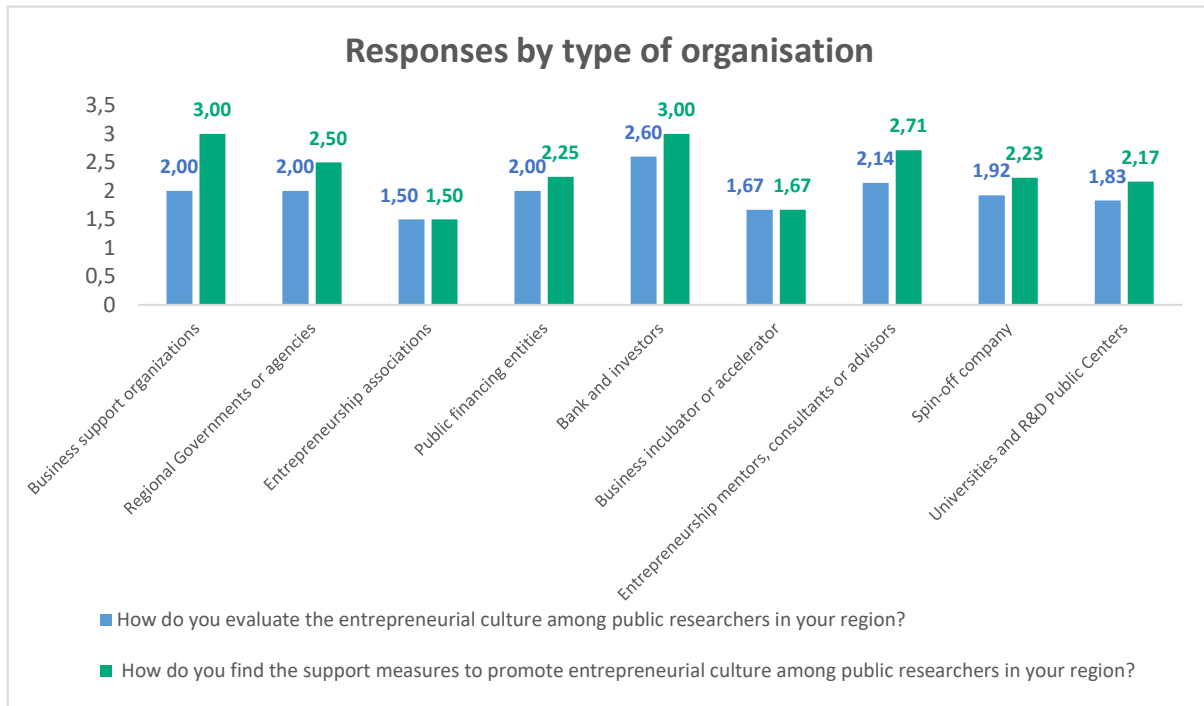


Figure 3. Average score of the responses by type of organization.

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

This was an open-ended question, allowing respondents to suggest as many initiatives as they wished. The suggested mechanisms have been categorized and are presented in Figure 4, with the number of respondents who proposed initiatives in various areas. The most common suggestions are related to **facilitating education and training regarding entrepreneurship**, including aspects like financing, intellectual property, venture creation, or marketing, among others. Some recommendations not only emphasized the implementation of mandatory entrepreneurship education for researchers but also suggested introducing this type of education from elementary school. Another major area of concern is **creating incentives for researchers**. In Spain, researchers undergo evaluations every six years, and the outcomes of these evaluations determine their salary increases and career advancements, among other things. Currently, the emphasis is placed on publishing in high-impact publications, which is prioritized over engaging in tech-transfer activities. Consequently, researchers are more incentivized

to publish rather than to participate in tech-transfer activities. This demand is primarily voiced by researchers, but other respondent profiles have also mentioned it.

Another important aspect is the **restrictive legislation that hinders researchers from working at spin-offs**. This represents one of the main barriers preventing researchers from starting their own business. Additionally, the administrative complexity involved in creating a spin-off, coupled with the considerable time it may require, can discourage potential investors from entering into such ventures.

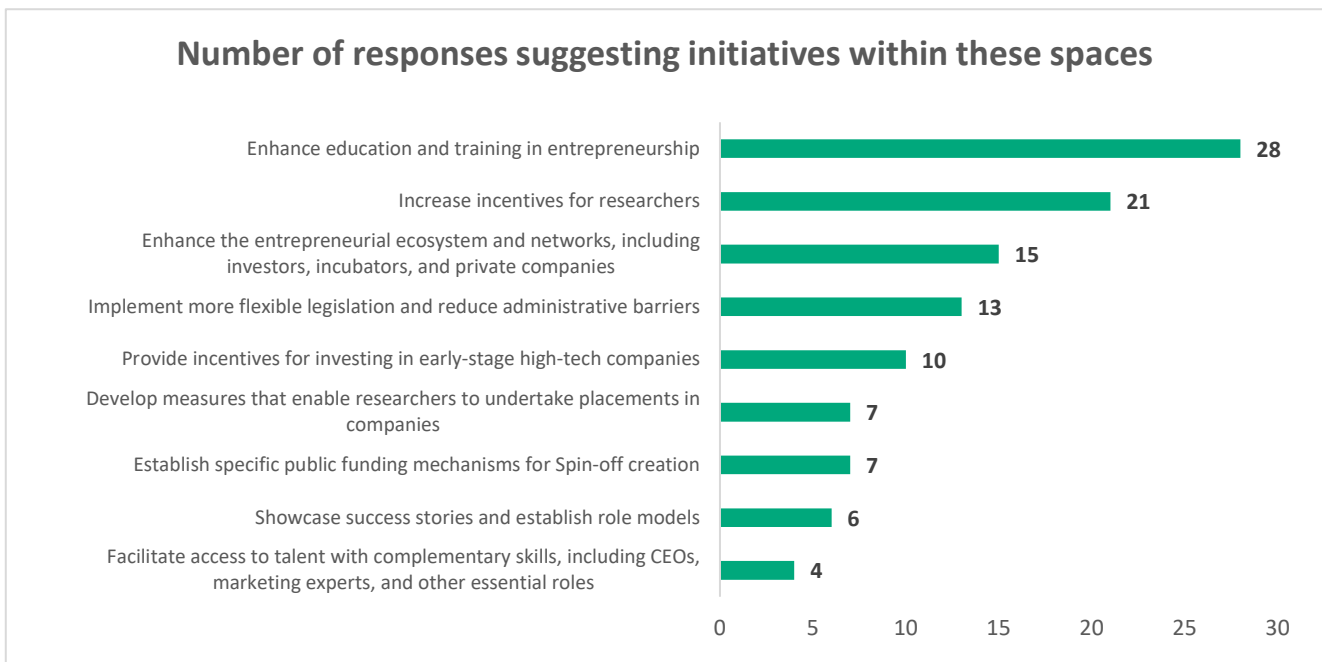


Figure 4. Number of responses by thematic area.

There are other commonly mentioned initiatives, such as **establishing more robust networks** among stakeholders and **incentivizing early-stage investment and public funding**. However, there have also been original suggestions. Some respondents proposed that **researchers should undertake placements at private companies**, which would help them acquire valuable experience and make valuable connections. Additionally, the issue of **limited access to complementary talent for business creation** was raised. While researchers excel in science and technological development, creating a successful business often requires additional expertise, particularly CEOs specialized in early-stage venture creation, as well as expertise in marketing, financing, and other areas.

All these topics are very interesting, and while some of the suggestions may present challenges due to the need for legislative changes, others offer simpler solutions that can be swiftly implemented. It is vital that when new initiatives are put into practice, their impact can be effectively measured. This measurement is valuable not only for assessing their effectiveness but also for guiding potential iterations and improvements in the future.

Conclusions for this section

The analysis of the information gathered in this section reveals that in Aragón, there exists a deficiency in entrepreneurial culture among public researchers. Despite the presence of measures and initiatives aimed at fostering change and boosting entrepreneurial culture, these efforts remain limited, and their results do not seem to be readily apparent.

Apart from education and training, it seems that the main barrier preventing researchers from becoming entrepreneurs is the absence of incentives and the challenging legislative landscape. Researchers encounter significant difficulties when attempting to maintain their research positions while simultaneously working on their own spin-offs. Researchers have limited control over these barriers and must primarily advocate for change through interactions with government agencies. This lack of control can negatively impact their motivation of pursuing entrepreneurship.

There are measures and initiatives suggested by the respondents that are more straightforward to implement, and researchers with a desire to start their own businesses can undertake themselves. There are many entrepreneurial programmes for researchers, mature networks of relevant stakeholders, including investors, accelerators and incubators, big corporates, etc. even specific funding for early-stage companies that researchers can access and make use of. Nevertheless, as long as there is a lack of incentives and concerns regarding the potential impact of launching a spin-off on a researcher's career in research, creating an entrepreneurial culture that encourages researchers to establish new companies remains a challenge.

3.1.2 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?**

Almost all respondents are aware of whom to contact if they identify research results that could be commercialized. As indicated in Figure 5, only two individuals reported not knowing who is responsible for this within their organisation. The remaining respondents either possess this knowledge or hold positions and functions where this is not relevant. This question is especially directed to researchers, who needs this type of support. All researchers replying to the survey have indicated that they are aware of who to contact within their organisation when having relevant research results that can be commercially exploited.

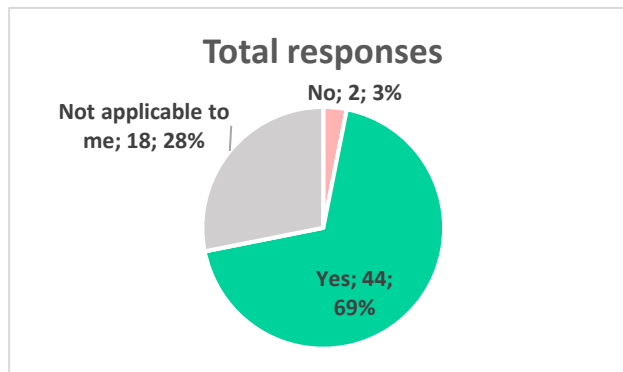


Figure 5. Number of responses by option.

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

This question primarily targets professionals working at universities and research centers, and even at spin-offs, although they are not considered public research organisations. Most of the professionals working at other type of entities have selected the options “I am not aware of it” or “Not applicable to me”, since they do not work at public research institutions. The question is structured as a multiple-choice question where respondents must choose one option. The Figure 6 shows the results from the relevant entities.

Professionals from universities and public research centers are generally well-informed about the process. Researchers are responsible for communicating their findings, but these organisations also have specific individuals actively working to identify and valorise research results with commercial potential. It is interesting to note that out of the nine researchers who responded to the survey, only five indicated that both researchers themselves and their organisations proactively work to exploit their results. This suggests that the role of the Technology Transfer Office (TTO) might not be widely known among them.

Regarding entrepreneurs and workers of spin-offs, it should be highlighted that 61.5% (eight out of thirteen) acknowledge that their organisations have mechanisms for valorising relevant research results. These types of companies are technology and knowledge-based, and therefore research intensive, so it is positive to see that they are aware of the need to identify and transfer their results. What is not clear from this question is whether this work is conducted internally within the spin-off or if they receive support from the TTOs of the institution from which they originated. This is an area that should be clarified in future research.

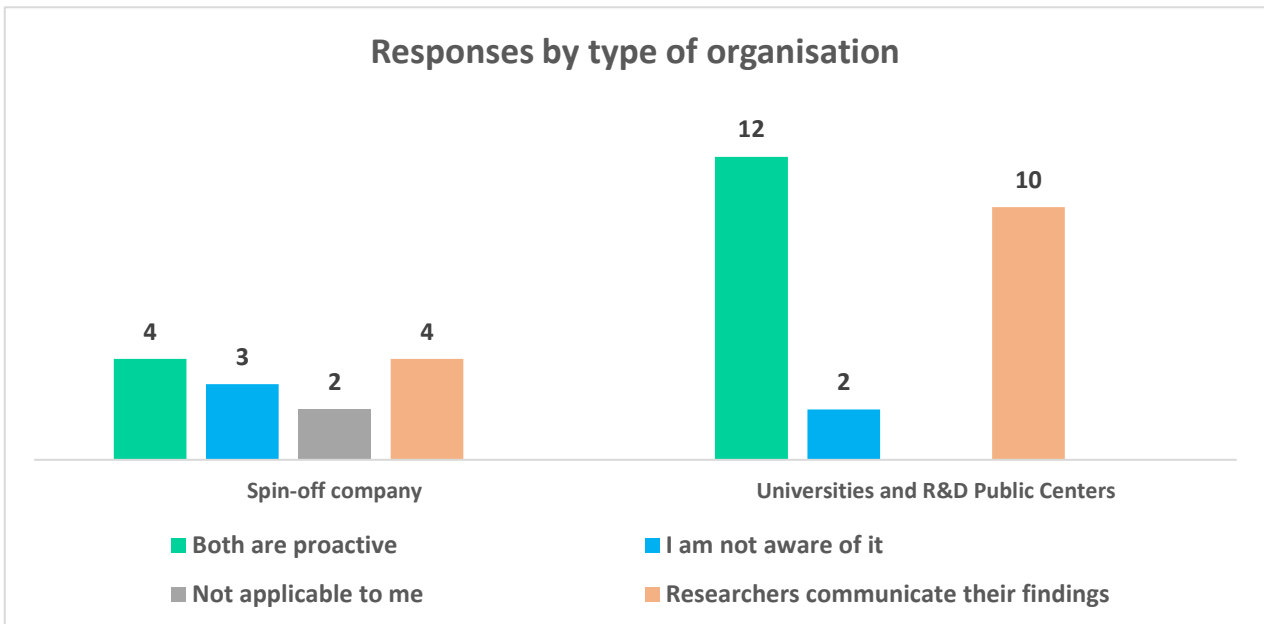


Figure 6. Number of responses by type or organisation - Spin-off company and Universities and R&D Centers.

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

This is an open question to which 41 out of the 64 participants have replied. The lower response rate can be attributed to the fact that this topic is not applicable to all participants. Various specific initiatives have been suggested, which have been categorized and are presented in the following list:

1. Enhance connections between researchers and companies:

The primary focus here is on establishing connections that enable researchers to engage with real-world problems and, as a result, align their research with validated market needs. This approach would create a more efficient model for research valorisation and technology transfer. To achieve this, it is crucial to develop initiatives that promote public-private collaborations. These could include forums, establishing strategic partnerships between organisations and private entities, creating contact points between public institutions and private enterprises, harnessing the potential of clusters to enhance collaborations, and providing financial support for collaborative research projects. Furthermore, it is essential to train researchers in this regard, equipping them with the knowledge and skills needed to identify relevant companies in their specific technical fields, establish connections, and maintain fruitful relationships.

2. Enhance education on research results exploitation and valorisation methodologies:

Similar to the previous section, there is a noticeable gap in knowledge among researchers concerning research valorisation, especially regarding intellectual property. It is essential to introduce educational

programs that equip researchers with the necessary knowledge in this domain, which is highly demanded by the participants of the survey.

3. Employ more specialized tech-transfer personnel.

While there are existing technology transfer structures, such as Technology Transfer Offices (TTOs), responsible for managing tech transfer and valorisation activities, these structures often face limitations in terms of resources and personnel. Many suggestions align with the need to strengthen these structures. For example, in universities, it is proposed to complement TTOs by introducing innovation managers in the different research centers or institutes. These innovation managers would work closely with researchers, enabling the implementation of a valorisation and exploitation perspective right from the start of their research projects. Researchers would benefit from more hands-on and day-to-day support.

4. Considering valorisation initiatives from the beginning.

Adopting this approach can only be accomplished when the other recommended measures are in place. This entails establishing strong connections with companies, enhancing knowledge of tech transfer processes, and receiving hands-on support from organisations. Researchers should cultivate a mindset where they consider valorisation in all their projects right from the start.

In addition to the broader initiatives, several specific measures were suggested, including:

- Improving research results promotion through dedicated websites and/or social media.
- Strengthen collaborations with stakeholders who can provide support and work with researchers for assessing the market potential of research results.
- Providing access to databases and other tools that help researchers assess the potential of their research.
- Implementing incentives and awards for researchers.
- Creating more specific valorisation process and plans.

Conclusions for this section

In general, it appears that most researchers and professionals involved with research results are aware of who holds responsibility for valorisation activities within their organisations. This is particularly important for researchers and professionals working at universities, research centers, and spin-offs, who actively perform research activities.

What is particularly noteworthy in this section are the various suggestions aimed at improving research results valorisation. By analysing all the information, it becomes evident that the most significant gap in fostering research valorisation is the lack of connection between researchers and the market. This gap encompasses not only connections with private companies that can exploit their

results but also real-world problems that research outcomes can address. For research results to be valuable and exploitable, they must offer solutions to actual problems. Often, research is conducted without considering market needs, and only after it is fully developed it is presented to the market, moment in which it becomes evident that there is no demand for it.

Measures need to be taken to cultivate a market-oriented mindset among researchers aiming to valorise and transfer their results. All the measures listed above are essential to achieve this.

3.1.3 Business management skills of researchers

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

In this question, participants were asked to rate how easy is for public researchers to create a multidisciplinary team to launch a business project, using a scale of 1 (very difficult) to 4 (very easy). On average in Aragón, relevant stakeholders hold a pessimistic view on this matter, finding it challenging for researchers to form multidisciplinary teams for launching spin-offs, with an average score of 1.57. This aligns with the issues highlighted in previous questions, where one of the main concerns and suggested improvements relates to the difficulties in finding complementary talent to establish new research-based businesses.

In Figure 7 the average scores by type of organisation are presented. It is noteworthy that workers at organisation with direct contact with spin-offs and spin-offs themselves are the ones with the most negative view on this topic. They find it very challenging to access the necessary talent they require, what highlights the difficulty of obtaining capable team members and co-founders as a major barrier when initiating new companies.

Conversely, when analysing the responses based on the respondent's profile, researchers are the group with a more positive view on this aspect, with an average score of 1.78, although they still find it challenging. This difference might be attributed to the fact that these researchers have not yet initiated a company and have not directly faced the problem themselves.

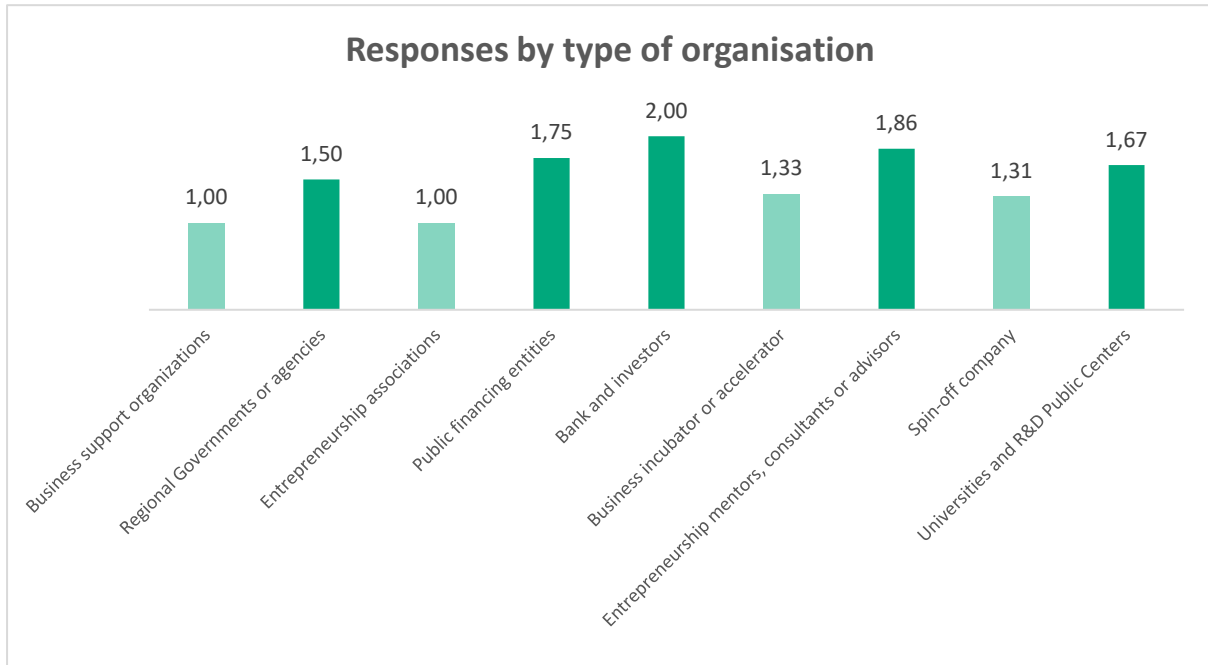


Figure 7. Average score of the responses by type of organization.

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

Similar to the previous question, participants were asked to rate, on a scale from 1 (Definitely not) to 4 (Yes, absolutely), whether they believe public researchers possess sufficient knowledge to create and manage their own spin-off ventures. On average, participants in the survey expressed a lack of confidence in researchers' knowledge, with an average score of 1.79. This result is consistent with the respondents' strong demand for entrepreneurial training and education when asked about measures that could enhance entrepreneurial culture.

It is important to emphasize the fact that, as shown in Figure 8, consultants and advisers of spin-offs, individuals who work closely with the co-founders of these companies, have a higher perception than researchers and entrepreneurs themselves in terms of how capable they are to manage their own ventures. This discrepancy can be attributed to the tendency for individuals to underestimate their own capabilities in areas where they lack expertise.

Nevertheless, it is clear that there is a knowledge gap among researchers who aspire to initiate and manage their own ventures, and actions need to be taken to address this issue.

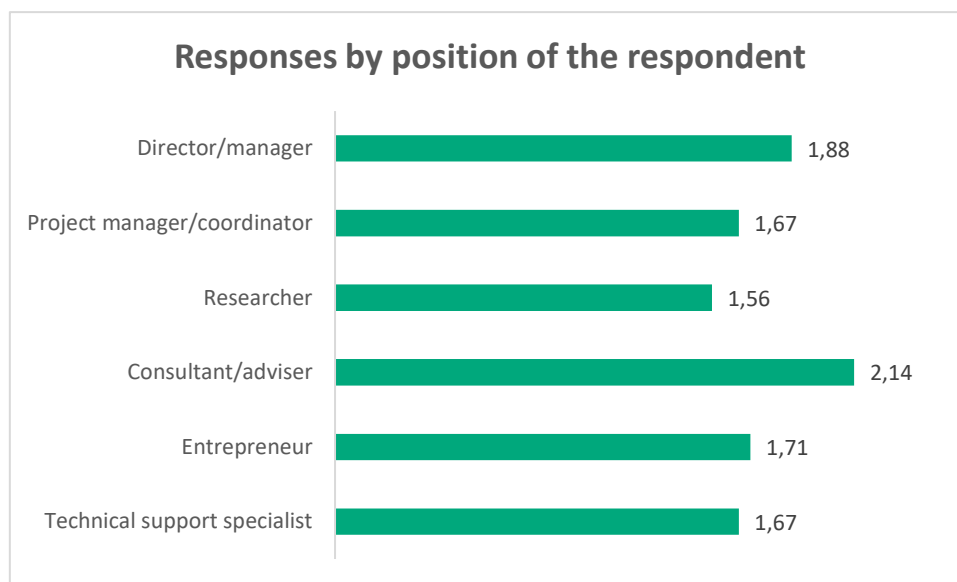


Figure 8. Average score of the responses by position of the respondents.

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

In this question, participants were asked to select four options from a predefined list of items. Strategy, sales and negotiation, finance, leadership and team management, and legal, are the areas where training is most required, as can be seen in Figure 9. In comparison to other options, these five areas appear to be significantly more relevant, and this should be duly considered when planning training and education programs for researchers interested in launching their own companies.

When examining the responses by the participant's profile and the type of organisation they work for, a common viewpoint emerges, with a similar distribution among the various options. However, it is worth noting that finance is the most relevant topic for participants that already work at spin-offs. This is a significant observation because these professionals have first-hand experience with the real issues faced by researchers who have initiated their own ventures.

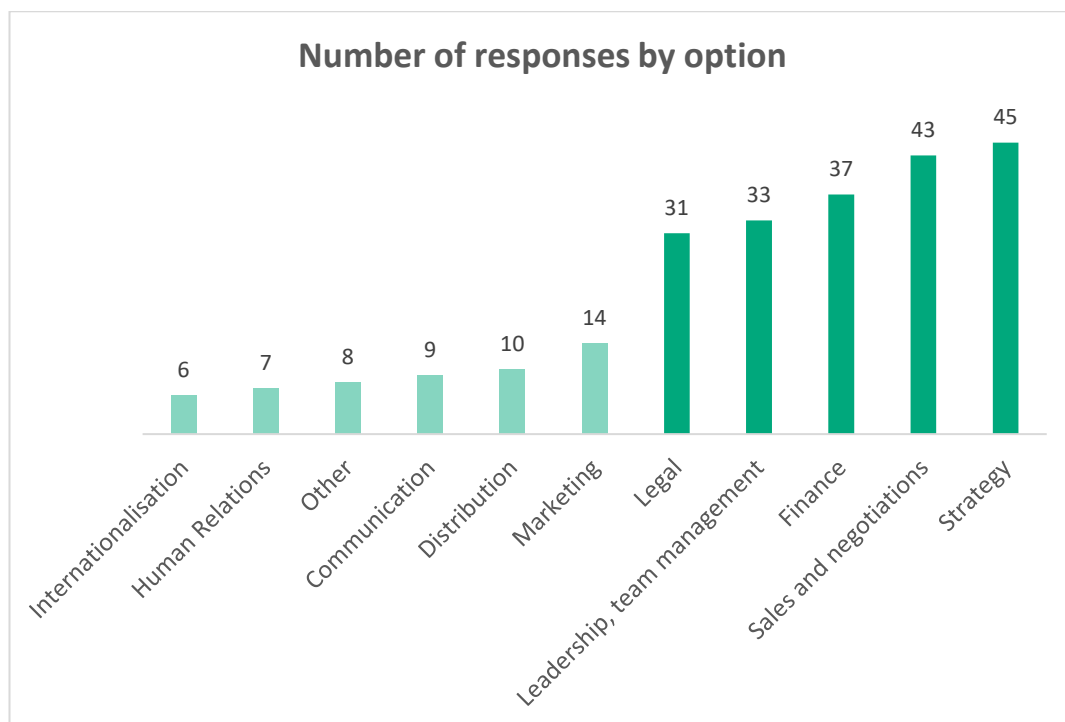


Figure 9. Number of responses by option.

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

This open-ended question received responses from all participants, each offering at least one suggestion. The suggestions have been categorized and presented in Table 1. Among the various categories, "training and business education" emerges as the predominant category, with approximately 50% of all the measures falling into this category. This underscores the significance of providing training and education to enhance entrepreneurial skills among public researchers.

Table 1. Suggested measures to improve the entrepreneurial skills of public researchers.

Category	Responses
Training and Business Education	<p>Most of the suggestions here involve providing specific courses on various business-related topics for researchers. Some even propose making these courses mandatory at different educational levels, including Ph.D., master's, or even at the basic school education level. There are also more specific and innovative ideas, such as establishing mentoring and training programs led by experienced entrepreneurs, and involving researchers in entrepreneurial projects to provide them with hands-on, real-world experience.</p> <p>Furthermore, it has been emphasized that personalized educational programs are crucial. General entrepreneurship training might be too broad and theoretical, potentially causing researchers to lose interest in the subject. Tailored, practical education appears to be a preferred approach.</p>
Recognition and Incentives	<p>Participants believe that there is a lack of incentives and recognition for researchers, which can hinder their entrepreneurial careers. These suggestions focus on motivation rather than skills themselves. Promoting an entrepreneurial career through various forms of recognition, such as enhancing one's CV, providing economic and academic incentives, or even offering relief from excessive workloads, could motivate researchers to explore venture creation. This, in turn, would contribute to improving their entrepreneurial skills. Without this initial interest and motivation, the success of other initiatives may be limited, as researchers may not engage with entrepreneurial activities.</p> <p>Some participants have suggested, for instance, that in order to be recognized as a research group of excellence, they should have at least one spin-off created. However, this idea could be challenging to implement since there is a substantial amount of basic research that does not have the creation of spin-offs as its primary objective.</p>
Collaboration and Business Connections	<p>Establishing a closer connection with the real world and businesses is seen as a valuable approach to gaining entrepreneurial skills. Some participants suggest that researchers interested in this field should have the opportunity to undertake placements in private companies, similar to the research placements they typically do in other research labs.</p> <p>Additionally, creating stronger relationships and promoting mentoring from the business world to researchers would assist them in gaining valuable experience and knowledge from influential individuals who can play a significant role in their entrepreneurial endeavors. This practical exposure to the business world can be instrumental in developing entrepreneurial skills.</p>
Spin-Off Acceleration Programs	<p>Some suggestions are related to the establishment of specific incubation and acceleration programs for spin-offs. In addition to the training provided to participants in these programs, acceleration and incubation programs offer entrepreneurial researchers the opportunity to connect with other professionals facing similar situations. This networking aspect allows them to share their experiences in comparable situations, which can be highly beneficial. It has been emphasized that these programs should provide physical spaces and offices for researchers to work from. This facilitates interactions among them and creates a conducive environment for collaboration. Moreover, it is crucial to implement specific measures aimed at forming multidisciplinary teams, recognizing the importance of diverse skill sets in the success of entrepreneurial ventures.</p>

Conclusions for this section

It is evident that relevant stakeholders in Aragón believe that researchers aspiring to become entrepreneurs face challenges in accessing talent and forming multidisciplinary teams for launching their ventures. Additionally, there is a perception that researchers may not possess adequate knowledge to effectively manage their own ventures. These perceptions align with the measures suggested to improve the entrepreneurial skills of researchers, as a significant portion of the suggestions relates to enhancing educational programs.

Regarding specific areas, participants have identified strategy, sales and negotiation, finance, leadership and team management, and legal matters as the most relevant topics for researchers looking to improve their entrepreneurial skills. Notably, finance appears to be the area where researchers who have already started a spin-off encounter the most challenges. This observation is important because it underscores that the lack of financial knowledge is revealed through practical experience.

While participants have proposed various suggestions to enhance researchers' entrepreneurial skills, it appears that recognition and incentives should be the initial steps to motivate and encourage researchers to establish their own businesses. Without a strong desire and motivation to initiate entrepreneurial endeavours, researchers may not be inclined to work on improving their business skills.

3.1.4 Regulatory and legal framework

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

In this question, participants were asked to indicate their familiarity with the legislation related to spin-offs using a scale from 1 (very unfamiliar) to 4 (very familiar). This question received the second-highest average score in the entire survey, with an average rating of 2.63. This suggests that, in general, stakeholders in Aragón are quite familiar with the legislation pertaining to spin-offs.

Interestingly, professionals working in universities and research centers, as well as individuals associated with spin-offs and consultants closely engaged with entrepreneurs, exhibit the highest level of knowledge about this legislation, as shown in Figure 10. This is understandable as they are directly involved in the process of creating spin-offs and therefore require a deeper understanding of the specific legal framework that applies. In terms of profiles, entrepreneurs also display a high level of familiarity with this legislation, with an average rating of 3.14 in this question.

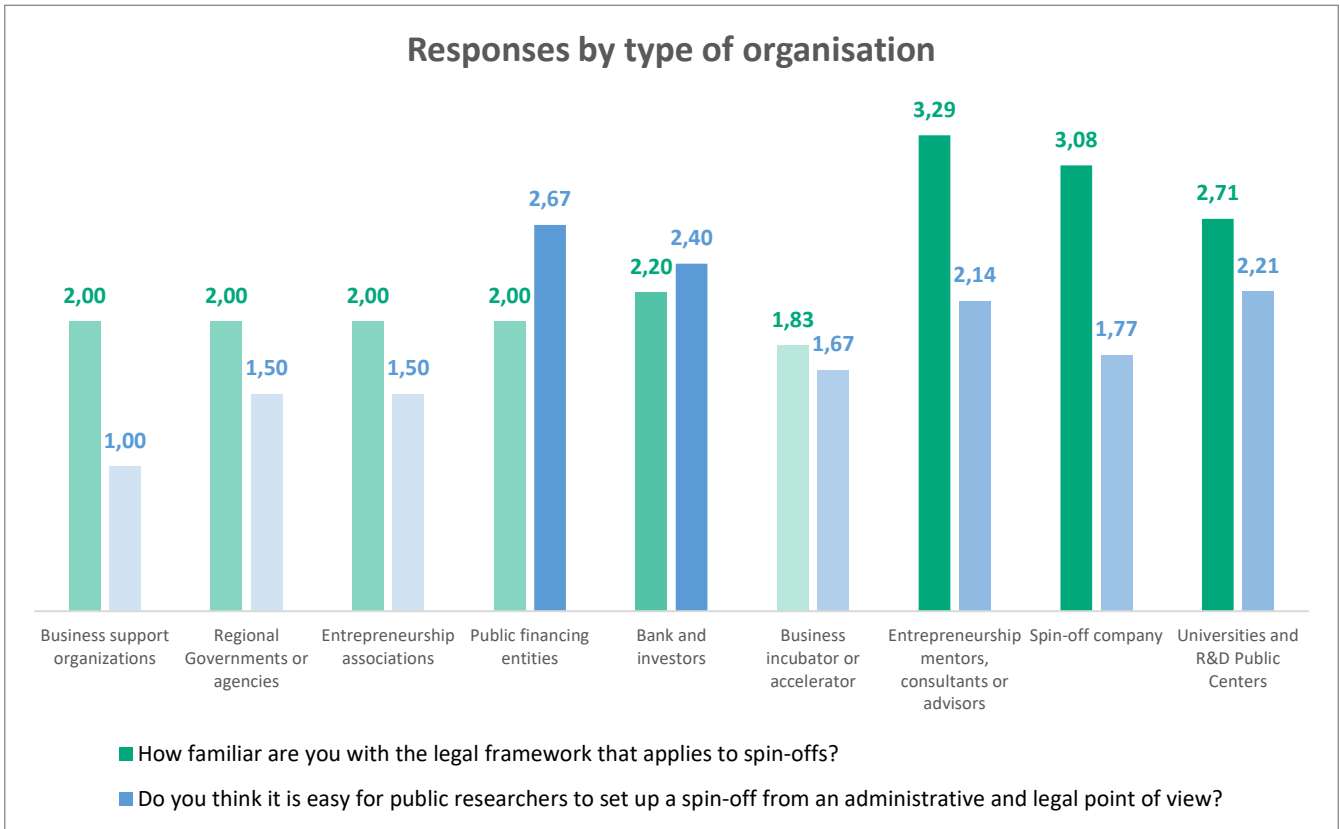


Figure 10. Average score of the responses by type of organization.

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

In this question, participants were asked to rate the difficulty of public researchers in setting up a spin-off from an administrative and legal perspective using a scale of 1 (very difficult) to 4 (very easy). On average, there is a perception that it is challenging for public researchers to establish a spin-off from an administrative and legal standpoint, with an average rating of 2.03.

It is important to note that whereas entrepreneur mentors and individuals working at spin-off do know well which is the legislation, they find that this legal framework makes it difficult for researchers to start their own ventures. Entrepreneurs, in particular, perceive that the legislation poses a barrier to researchers starting their businesses, with an average score of 1.71. These opinions are crucial because these are the individuals who directly experience the process and its challenges. Contrary, public financing entities, banks, and investors hold a more optimistic view in this regard, even though they do not engage directly in the process and may lack experience in creating spin-offs.

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

This is an open question to which participants could suggest any measure they found relevant. Out of the 64 participants, only 43 have replied, most likely because not all are familiar with the legislation.

The majority of the suggestions center on simplifying and making the legislation more flexible. The most frequently mentioned factor that participants believe should be modified is the limitation imposed on researchers regarding their shareholdings in the firm, as well as the challenges in balancing their research work with employment by the spin-off. These are the primary factors that participants feel should be eased. These suggestions align with the previously discussed measures that researchers require more incentives to initiate a spin-off. By offering researchers more flexibility in terms of shareholdings and allowing them to balance their research activities with involvement in the spin-off, they may be more motivated to start a company.

Another significant concern is the time-consuming administrative paperwork required, which could serve as a deterrent for researchers interested in founding a company. This becomes particularly challenging when multiple institutions are involved. Therefore, it is crucial for institutions to establish structures and models that streamline the administrative processes related to creating spin-offs. Also, to have legal advisors that help researchers during the creation process would be valuable.

Some participants have suggested the introduction of a spin-off law, similar to the Start-up law, that takes into account the specific characteristics and needs of these types of companies. This proposal aims to address the unique challenges and requirements that spin-offs may face, potentially streamlining their legal framework and making it more conducive to their establishment and growth.

Conclusions for this section

The legal framework regulating spin-off creation is generally well-known among the relevant stakeholders. However, it is perceived as overly complex and restrictive, representing a barrier for researchers interested in launching their own ventures. Most of the participants' suggestions align with this view, emphasizing the need for simplified and more flexible legislation. These proposed changes aim to allow researchers to hold a higher percentage of shares in the spin-off and address compatibility issues.

3.1.5 Funding and financing mechanisms

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

In this question participants had to rank their awareness on funding support mechanisms for spin-offs from 1 (Definitely not) to 4 (Yes, absolutely). The average score for awareness among participants is 2.71, indicating that they generally are aware of these mechanisms. Interestingly, as shown in Figure 11, professionals from business incubators and accelerators, and entrepreneurship advisors are more aware of these mechanisms than individuals working at spin-offs. This might be because part of their role is to keep up to date with the financing mechanisms in order to help the entrepreneurs they work with. Curiously, workers from public financing entities score low in terms of awareness. This might be due to the fact that the respondents may not be familiar with specific mechanisms designed for spin-offs, or it could be that these mechanisms are included in financing instruments targeting a broader range of companies, making it challenging to distinguish the ones specifically intended for spin-offs.

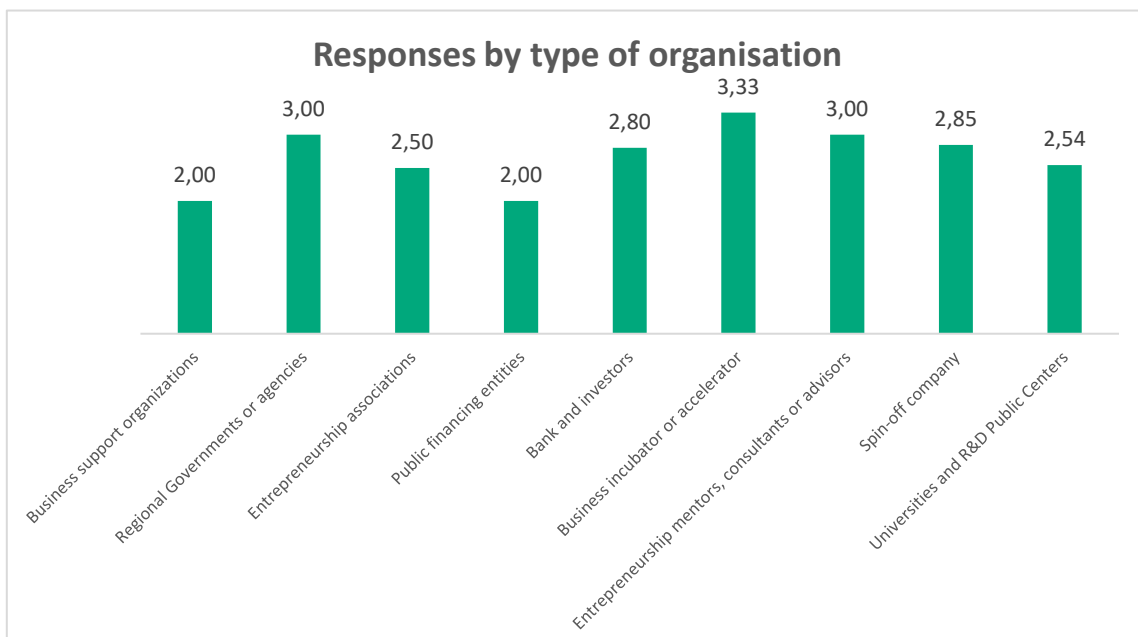


Figure 11. Average score of the responses by type of organization.

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

While participants are generally aware of funding mechanisms, they believe that public researchers, in contrast, may not know where to access this funding, as seen in Figure 12. This perception is consistent across various professional profiles and organisations.

It is worth noting that entrepreneurship advisors are the exception, with 57% of them stating that they know where to obtain funding. However, only 30% of professionals working at spin-offs report having this knowledge. This finding might be surprising but underscores the importance of improving awareness among researchers, particularly those in spin-offs, regarding where and how to access funding for their ventures.

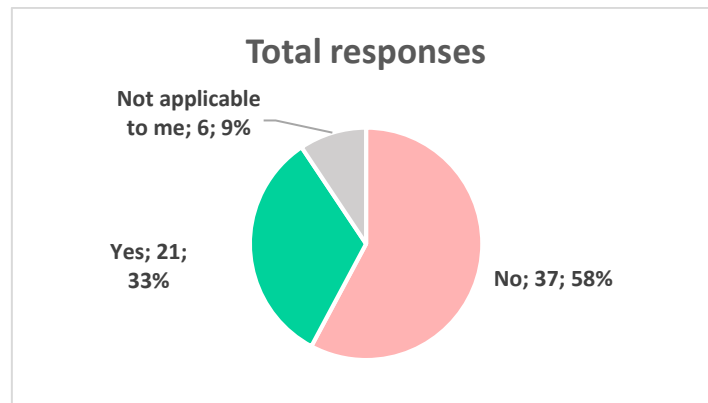


Figure 12. Number of responses by option.

- **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...)?**

Out of the 64 participants, 55 have replied to this open-ended question. The responses indicate that the main issue with public funding is not the amount available, but rather the complexity of the application and justification processes. These complexities discourage some researchers from applying for public funding. Simplifying administrative procedures and making it easier for researchers to access such funding is a key recommendation.

In contrast, private investment is seen as a significant challenge. Researchers often lack knowledge about private investment and have limited connections to these actors. Additionally, private investors, regardless if they are private individuals or institutional, does not use to have specific funding instruments targeting spin-offs or connections with universities and research institutions. This situation may be exacerbated by the preference of many investors for more mature companies. The lack of tax and governmental incentives for investing in early-stage, research-intensive companies also contribute to the challenge of attracting private investment.

The problem of many spin-off is that they do only access public funding and do not have access to all the non-monetary support provided by professional investors (connections, business advice, etc.). Encouraging private investment through incentives and creating hybrid public-private funding mechanisms that reduce risk for private investors could indeed be beneficial. These measures may help bridge the gap between public funding and private investment, enabling spin-offs to access a more diverse range of resources and support for their growth and development.

Conclusions for this section

The perception that researchers are not well-versed in accessing funding instruments for their ventures, despite being aware of them, highlights an important gap. Streamlining the administrative processes for public funding could certainly help researchers apply for and access these resources more effectively.

Additionally, encouraging private investors to create funding instruments specifically targeting spin-offs is a key step. Private investment not only provides financial support but also offers valuable guidance and mentorship, which can significantly benefit early-stage ventures. Bridging the gap between public and private funding and making it more accessible to spin-offs can foster a more supportive environment for their growth and development.

3.1.6 Business creation and consolidation

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

In this question, participants were asked to select maximum four options from a predefined list of items. A total of 238 replies have been received, and the results are presented Figure 13. The data from the survey highlights the importance of comprehensive support and guidance for researchers interested in creating spin-offs. While funding opportunities are considered vital, they are just one piece of the puzzle, and, as presented in the section above, the problem seems to lie in the access to them rather than on the availability. Legal, fiscal, and financial consultancy are also critical aspects of the process, as these can significantly affect the formation and success of spin-offs.

Moreover, the emphasis on incubation, consultancy, and training (accounting for 63% of the responses) underscores the need for strong entrepreneurial ecosystems and support networks. Researchers benefit greatly from external partners and institutions that can provide guidance throughout the spin-off creation and development journey. Creating such hubs and ecosystems is essential for fostering a more favourable environment for researchers looking to launch their own companies.

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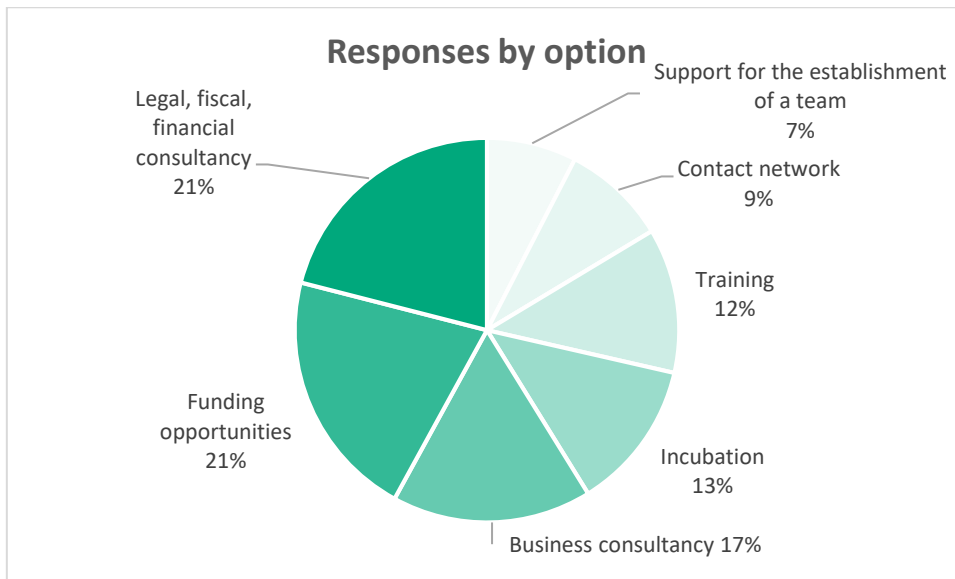


Figure 13. Number of responses by option in percentage.

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

In this question the participants could chose as many options as they wish from a pre-set list of items. The stages, presented in the survey, in a consolidation of a spin-off in sequential order are (Figure 14):



Figure 14. Stages of spin-off development.

As shown in Figure 15, most of the support programmes in Aragón target spin-off in the incubation stage. This is the stage in which spin-offs are defining their value proposition and business model, and when they usually need to find the product-market fit. This is also the stage where many start-ups face challenges and have a high risk of failure. Therefore, it is common that most of the support initiatives target companies in this stage.

What seems more surprising and could represent a weakness in the Aragón support system for spin-offs is the low number of initiatives targeting companies in the initial stage of venture building. This is the stage in which the companies are created, and the founding team assembled. Some of the most critical problems perceived by the survey participants arise in this stage, as entrepreneurs have to find the right team members and deal with the complex legal and administrative aspects of creating a spin-

off. The lack of support during this stage may act as a bottleneck for spin-off development and consolidation in the Aragón ecosystem.

During the scale-up and internationalisation stages, in general companies have already validated the business model and should focus on growth and generating revenues. These two phases can be parallel and here companies require less support than the earlier stages. This is aligned with the results of the survey.

In summary, to strengthen the support ecosystem for spin-offs in Aragón, it would be beneficial to develop initiatives and programs that specifically address the needs of companies in the venture building stage, making it easier for them to navigate the early challenges of starting a spin-off.

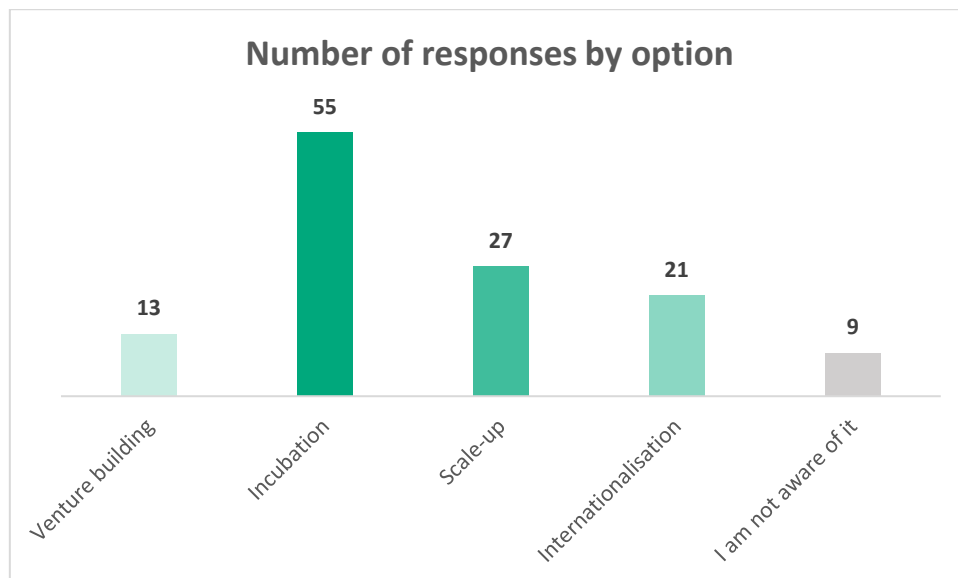


Figure 15. Number of responses by option.

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

This is an open-ended question to which the participants could list and elaborate on as many suggestions as they wish. In total, 49 out of the 64 participants have replied to this question.

There are three main areas where Aragón can make improvements to foster consolidation and scaling up of spin-offs.

- **Funding and Financial Support**

Participants strongly believe that regional policies need enhancement in this area. While there appears to be adequate funding available for spin-off incubation, the same cannot be said for companies that aim to consolidate and scale up. This limitation is not solely associated with public funding. A more comprehensive approach is required, which should include a combination of fiscal

incentives, encouragement of private investments, and the introduction of specific public instruments for companies in these stages—elements that are currently lacking in Aragón.

- **Institutional support and guidance**

This aspect is closely related to the previous section. While spin-off companies receive support and advice in various areas (business, legal, financial, etc.) during incubation programs, the challenge arises when these programs conclude. There is a lack of mechanisms for providing ongoing guidance to companies that have reached the consolidation stage. Additionally, more institutional support is needed to enable researchers, who often serve as the founders of these companies, to focus on their business activities while, to some extent, balancing these activities with their research careers.

- **Incentives and promotion of entrepreneurial culture**

Although not specific to spin-offs in the consolidation or scale-up phase, respondents have noted a deficiency in incentives and the promotion of an entrepreneurial culture. This gap is not limited to researchers alone but extends to Spanish society as a whole. To address this issue, it is essential for the government and public institutions to actively promote entrepreneurship. Given the unique situation of researchers, it is crucial to introduce incentives and recognitions that encourage them to prioritize technology transfer over academic publications, thereby fostering research-based entrepreneurship.

As some participants have highlighted, it is imperative for the government to formulate a clear and coherent strategy that unites different political parties. Such a strategy would enable the development of long-term plans and facilitate the coordination of all regional efforts towards achieving common goals in terms of spin-off creation, development and consolidation.

Conclusions for this section

In addition to funding, comprehensive support and guidance across various areas (business, legal, financial, etc.) are essential for fostering spin-off creation. In Aragón, it appears to be enough initiatives aimed to help companies in the incubation stage. However, there is limited support on the venture creation phase, which can hinder and limit the number of spin-off that are created. Furthermore, participants have expressed concerns about the limited support available to companies that have successfully transitioned beyond the incubation stage. The absence of mechanisms that aid companies in consolidation and scaling-up further hampers their growth potential and the region's capacity to benefit from their success. Consolidated and scaled-up companies have the potential to make a significant impact on their local environment. They are substantial employers and catalysts for the emergence of new businesses. Additionally, they foster connections and networks that create synergies among various stakeholders.

To achieve this transformative potential, it is imperative to reach strategic agreement at regional level that allows the development and implementation of long-term policies, which foster research and knowledge bases venture creation, development, and consolidation.

3.1.7 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?**

Out of the total 64 participants, only 33 of them provided responses to this question. It is likely that the remaining participants are not aware of Aragón's Smart Specialisation Strategy (S3), as they did not respond. This implies that approximately 48% of the respondents may not possess knowledge of the specific areas of specialisation defined by the region.

Moreover, among the 33 respondents who did reply, 9 individuals indicated that they were aware of Aragón's Smart Specialisation Strategy but lacked sufficient knowledge about the spin-off ecosystem to provide a response to the question. Of those who have replied, the majority shared the belief that a significant percentage of spin-offs created in Aragón do not align with the priority areas outlined in the S3, 65% of the respondents, whereas only 35% of them believe that there is an alignment.

Conclusions for this section

Among the participants who are aware of Aragón's Smart Specialisation Strategy (S3), the prevailing consensus is that a higher percentage of spin-offs are not aligned with the priorities outlined in the strategy. Even if there are more incentives for companies in these areas, the primary factor influencing the area of activity of a spin-off is the research expertise of the founding team. While incentives and resources in the S3 priority areas may encourage companies to move in that direction, they will typically stay within their core area of research expertise. In essence, the research area of the founding team remains the dominant factor shaping the spin-off's focus.

3.2 SWOT Analysis

STRENGTHS

- . Mature entrepreneurial programs for early-stage companies (incubation).
- . Relevant stakeholders are familiar with the legal framework regulating spin-off creation, although perceived as complex.
- . Regional willingness to improve support for spin-off creation.

WEAKNESSES

- . Deficiency in entrepreneurial culture.
- . Lack of business knowledge (IP, finance, legal, strategy, etc.) among researchers.
- . Limited private investment in spin-offs.
- . Limited support for spin-off consolidation and scale-up stages
- . Difficulty in finding team members to create multidisciplinary founding teams.

OPPORTUNITIES

- . Regional recognitions and incentives for encouraging researchers to create spin-offs.
- . Establishing regional network that helps researchers to connect with relevant stakeholders.
- . Specific funding instruments for spin-offs and incentives for private investors.

THREATS

- . Limited regional power regarding the two main factors hindering spin-off creation:
 - Entrepreneurship and tech-transfer less recognized than scientific publications.
 - Legal barriers hinder the compatibility of research and work at spin-offs.

4 Conclusions and final remarks

The analysis of Aragón's landscape on Research-based spin-off Creation highlights both strengths and weaknesses. While the region possesses established public funding instruments and support programmes for incubation-stage ventures, a deficiency in entrepreneurial culture among public researchers poses a significant challenge. Barriers such as a complex legal framework, lack of incentives and recognition of the researcher's entrepreneurial activity, and challenges in business management skills further impede the region's entrepreneurial potential in terms of spin-off creation, development and consolidation.

Opportunities lie in cultivating a market-oriented mindset among researchers, recognizing and incentivizing entrepreneurial activities, and simplifying the legal framework, especially facilitating compatibility between researchers' research and entrepreneurial careers. Streamlining funding processes, encouraging private investments on this type of companies, and addressing the limited support for spin-off scale-up and consolidation phases can enhance the region's economic prospects.

However, the main challenges cannot be overcome only at the regional level. To foster an entrepreneurial culture among researchers, entrepreneurial and tech-transfer activities must have, at least, the same recognition than high-impact publications in their career development. Otherwise, researchers won't have any incentive to venture into entrepreneurial pursuits thus limiting the impact of other measures aimed at improving spin-off creation. Also, many of the challenges require collaborative efforts among relevant stakeholders, strategic agreements, and a commitment to long-term policies at the regional level.