European Entrepreneurial Regions

Regional ecosystem mapping: Region of Catalonia

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European Entrepreneurial Regions

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EXECUTIVE SUMMARY

The start-up ecosystem of Catalonia is considered as one of the most dynamically evolving European ecosystems over the last 5 years. Catalonia is ranked as the 3rd favourite start-up hub for business founders and 20% of European founders create their start-ups in Barcelona and the 4th leading European city for capital investment in start-ups. Catalonia is home of more than 1,300 start-ups that have created 13,800 jobs in leading industrial areas such as Industry 4.0, life sciences and mobile & software and in the leading sectors such as food industry (2,459), chemical industry (1,164) and motor vehicles (3,001).

Regarding its maturity, the Catalan start-up ecosystem has considerably developed in recent years, considering the increased number of local and international founders, local tech start-ups and venture capital investors, accelerators and incubators. Additionally, Catalonia has a wide variety of business support organisations, a fairly well-developed technological and research infrastructure along with the presence of internationally recognized clusters and business associations from different sectors (see Figure 1). There is also significant increase in the number of e-commerce and SaaS start-ups based in Catalonia. Moreover, in terms of start-up output, there are up to 1,000 tech start-ups in Catalonia and this number is three times higher than the global average of tech start-up output. In terms of the start-up exit value, Catalonia has one of the highest when compared globally.

2 Why Catalonia for startups (2019) Generalitat de Catalunya, ACCIO
3 SaaS: Software as a Service is a software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted (Wikipedia)
4 Barcelona Start-up Ecosystem report (2017) Startup Genome
The leading sectors of Catalonia are internationally well-performing, which is evidenced by the fact that Barcelona is ranked as the top Global Smart City in the world in 2015 and the 2nd Smart City in the World in 2016 according to Juniper Research, 2016. In the area of life sciences, Catalonia is home of the biggest Spanish pharma companies such as Almirall, Esteve, Ferrer, Grifols and Uriach. Thus, high internationalisation of Catalonia, along with a growing number of tech start-ups, industrial multinationals and significant presence of foreign companies contributes to the attractiveness of Catalonia for FDI, international talent and entrepreneurs. In general, in terms of global connectedness of the Catalan start-ups, the region performs higher than the world average. Despite the strong global connections with other leading ecosystems, the challenges to strengthen international cooperation and to increase the export of Catalan start-ups to global markets remain.

Table 1: Updated SWOT analysis for the North Brabant entrepreneurial ecosystem

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
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<tbody>
<tr>
<td>- High internationalisation, with an increasing number of industrial multinationals and significant presence of foreign companies. Barcelona remains one of the world’s most attractive cities for foreign investment, particularly in R&amp;D, in design and in development &amp; testing since 2003; - Catalonia is the third-most important EU country by a number of scientific projects per million inhabitants, it has a wide network of centers for the generation and application of</td>
<td>- Lack of financial support services for the entrepreneurs; funding access, particularly lack of public financing and investment to entrepreneurs and newly created businesses. - Comparing to other leading European regions, strict regulative environment, particularly high bureaucracy when it comes to the creation of new businesses (time and high costs);</td>
</tr>
</tbody>
</table>

European Entrepreneurial Regions - regional ecosystem mapping: Region of Catalonia

- Knowledge and scientific and technological infrastructure of great international prestige.
- Catalonia, with 0.1% of the world’s population, accounts for 1% of global scientific production and 2.2% of EU-15 scientific production.
- One of the highest GDP in the EU, long industrial tradition, the industry is highly diversified, growing number of large and medium-sized enterprises. Catalonia is a pioneering region and an international reference for cluster policies.
- Simplified legislative framework and regulatory procedures that affect businesses.
- The Public-private network of public support for entrepreneurship.
- Increasing attractiveness for FDI, talent and entrepreneurs.
- The presence of high-quality universities recognized at international level and public research centers in the region.
- International excellence in some sectors, for instance, digital sector, industry 4.0 and MedTech.

Oppportunity

- Barcelona as a platform for establishing and developing the businesses and networks of innovation, and as a centre for managing business in southern Europe and the Mediterranean area.
- Due to Catalonia’s optimal geostrategic position as a connector between the European and Asian economies, the development of the Mediterranean rail corridor creates opportunities for attracting goods traffic from Asia and destined for Europe.
- The Catalan R&D system is a centre of attraction for researchers of international prestige and is fully interconnected with European networks and platforms and international networks (stable research and innovation cooperation) with Israel, Massachusetts, USA.
- Catalonia has a wide industrial base with an extensive network of research and technology centres highly competent in the ICTs which has high potential to develop applications for the industry.
- Sustainable urban development ("smart city"), where the region occupies an excellent position and have become international benchmarks.

Threat

- Governance can be improved: firstly, a growing number of actors and a lack of coordination between them. Secondly, strict and costly fiscal environment, thus lack of fiscal incentives for economic actors.
- Despite its high performance in science, knowledge and technology, it has a comparatively low level of knowledge and technology transfer;
- The relative shortage of human resources with knowledge and capacities in the area of technologies and strategic management & planning.
- Inflexibility in the education and research system resulting in difficulties of performing joint research projects and mobility.

- Strong competition at European level, metropolitans such as Dublin, London, Paris, Viennaeetc. thus, providing better (more favourable fiscal conditions and financing for new businesses);
- Increasing competition to attract talent at international level.
- Medical tourism is one of the key pillars in the international growth of the Catalan health industry. Its healthcare sector is internationally renowned for its management of health services and primary care, as well as for training and applied R&D.
- Social services are an important economic sector in the region, the that has a very direct effect on employment.
- Increased coordination with other start-ups ecosystem and innovation financing sources for them.
- Technology diffusion around international companies along with the promotion of innovation and technology-based global value chains.

The following opportunities for interregional cooperation have been highlighted by regional stakeholders:

- Creating a network with entrepreneurial agents, research system and policymakers in order to launch joint R&D projects and learn about the initiatives of other regions to boost collaboration of start-ups_SCALE-UPS with the R&D system;
- Networking among scaling-up specific facilities and platforms;
- Promoting co-investment across regions through establishing a network of investors;
- Sharing good practices in the area of retaining, training and mentoring C-level talent and collaboration on building international team matching;
- Cooperation in the development of leading industrial areas such as Industry 4.0, Life Sciences and Mobile & Software and supporting these sub-ecosystems;
- Sharing good practices in the area of improving the regulatory framework (eg. tax) towards creating favourable conditions and incentives to boost collaborative project between start-ups and research;
- Collaboration with other regions to learn their practice in processing joint projects and applications and their experience in supporting and promoting (by the local governing agencies, research institutions, business) joint R&D projects and cooperation;
- Cooperation in the further development of state support measures to facilitate cooperation in the area of start-ups & research & investment.
1 INTRODUCTION

This report has been prepared in the framework of the project entitled ‘Fostering collaboration through mapping, analysing and interlinking of European Entrepreneurial Regions’ launched by the European Commission’s Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs and the Executive Agency for Small and Medium-sized Enterprises (EASME). This project is funded by the COSME programme.

The objective of this project is to strengthen the impact of existing actions aimed at further developing start-up and scale-up support. It aims at fostering collaboration across the European Entrepreneurial Regions (EER) and developing and implementing concrete collaborative action plans that will foster scale-ups and entrepreneurs along common thematic priorities.

This project builds on the long-standing experience of the EER initiative of the Committee of the Regions. The EER label has been awarded to regions for the commitment and policies to make their region one of the most resilient and ambitious places in Europe with forward-looking actions. Strategic topic areas are identified based on mapping, analysing and interlinking of EER labelled regions.

In this context, the objective of this report is to map the regional entrepreneurial ecosystems of the participating EER regions focusing on the analysis of their actors, policies and market-enhancing services and also exploring the potential linkages within and across the regional entrepreneurial ecosystems.

The following 10 EER labelled regions participate in this project:

1. Catalonia,
2. Central Macedonia,
3. Flanders,
4. Île-de-France,
5. Lombardy,
6. Lower Austria,
7. Marche,
8. North Brabant,
9. Northern & Western Region, Ireland
10. Western Greece.

The project is implemented by Technopolis Group, Idea Consult, Ismeri Europa, Infyde, the University of Athens and SPI.

* https://ec.europa.eu/growth/smes/cosme_en
2 THE ACTORS IN THE ECOSYSTEM

2.1 The role of entrepreneurs

2.1.1 Overview of the entrepreneurial dynamics

In Catalonia, start-ups account for 0.5% of all active companies and the number of start-ups is rapidly increasing particularly in the area of medical technologies and research. There are 2,092 scale-ups identified through the analysis of the Crunchbase data. In terms of start-up output, there are up to 1,000 tech start-ups, this number is three times higher comparing internationally and Catalonia demonstrated the fastest growth rates in start-up exit value in 2017 by achieving 60 exits over the last five years. Regarding the role of scale-ups in the region, its number is not dynamically growing, as most of the start-ups reaching the next phase, they leave the region looking for more investment in bigger markets. Generally, during the desk analysis and fieldwork, it was identified that the Catalan ecosystem is more focused on the creation and development of start-ups, yet when they reach the scaling-up phase, they start dealing and developing on their own, basically, they focus on the best internationalisation option.

In general, the start-up ecosystem of Catalonia employs nearly 10,000 workers in total, showing a total turnover of some €1,300 million. 50% have a turnover under €250,000, 29% between 250,000 and €1 million, 18% between €1 and 5 million, and 3% over €5 million.

*Figure 2: Estimation of the size of the ecosystem (2019)*

<table>
<thead>
<tr>
<th></th>
<th>N of companies</th>
<th>% of total companies (in the share of the figure of the Structural Business Statistics, 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-ups</td>
<td>3396</td>
<td>0,5%</td>
</tr>
<tr>
<td>Scale-ups</td>
<td>2092</td>
<td>0,3%</td>
</tr>
<tr>
<td>Innovative companies</td>
<td>2833</td>
<td>0,4%</td>
</tr>
<tr>
<td>Total</td>
<td>662,992</td>
<td></td>
</tr>
</tbody>
</table>

Source: Analysis of Crunchbase data

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7 Crunchbase is a platform for finding business information about private and public companies. Crunchbase information includes investments and funding information, founding members and individuals in leadership positions, mergers and acquisitions, news, and industry trends. Originally built to track startups, the Crunchbase website contains information on public and private companies on a global scale. [https://www.crunchbase.com/](https://www.crunchbase.com/)

8 Barcelona Start-up Ecosystem report (2017) Startup Genome
Regarding the structure of the start-up ecosystem, the leading industrial area is **Industry 4.0**, tech start-ups are the most numerous representing 17%, Industry 4.0 in Catalonia is in its early stages and many pilot projects still have to be scaled up, thus:

- 82.7% of the companies identified employ fewer than 50 people and only 3% are large companies
- 44% of the companies are exporters and 13% have a foreign subsidiary.
- 41% of all companies are in the data and connectivity segment, and these segments with the highest aggregate revenue are control and automation, and data and connectivity (35%, each).

**Life sciences** are one of the fastest growing (98% in 3 years) part of the start-up ecosystem, currently accounting for 13% of a total number of start-ups. In 2017, the life science sector in Catalonia almost reached $19 Billion; making the region a leader in clinical trials.

The third largest share (11%) of start-ups are concentrated in **Mobile & software** and the number of companies has grown by 4.5% in 2018 showing a 27% growth rate since 2013. The sector’s key characteristics are as follows:

- 96.8% of companies are services-oriented, while the rest are manufacturing companies.
- 91.8% of companies have less than 10 employees.
- Catalonia holds a leading position within Spain (22.3% of total Spanish ICT companies) in this area.

Furthermore, these three sectors are considered as a motor for growth in the start-up ecosystem of Catalonia. As for the business growth model of start-ups e-commerce & marketplace represents 45% of all start-ups, yet the SaaS model has increased by 5 percent concerning 2017 and has risen from 17 to 22%.

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12 Why Catalonia for startups (2019) Generalitat de Catalunya, ACCIO
In terms of the investment dynamics of Catalonian start-ups, three out of four start-ups find investment, and around 79% of start-ups at pre-seed and seed phases (up to € 1 million) and 21% of them are at post-seed phase (over € 1 million – A.B.C. series).

2.1.2 Horizontal assessment

The collaboration between the actors of the ecosystem differs depending on the type of actors:

- One of the key features of the start-up ecosystem of Catalonia is the closely interlinked collaboration among agents such as start-ups from different industrial areas and sectors, incubators and accelerators, big corporates. The regional authority launched various actions to facilitate such collaboration throughout the ecosystem. Namely, the Barcelona & Catalonia Start-up Hub which is a connection point for all agents in the start-up ecosystem (investors, accelerators, mentors, incubators, companies and other financing platforms), co-working spaces (139 spaces in Catalonia) for all type of the actors emerged in Barcelona & Catalonia.

- There is close cooperation between corporates and start-ups in the region and large corporates are considered as one of the key drivers of the Catalan start-up’s ecosystem. On the one hand, start-ups are seen as a source of innovative ideas and therefore corporates act as key investors and accelerators, providing financial incentives as well as mentoring and learning opportunities; on the other hand, corporates are not only important customers and market for start-ups, they also support start-ups by bringing mature solutions, designing start-up models for their business and building essential networks. Among other activities (mentoring, training mentioned above) as well as the organization of collaborative events, platforms and meeting places, large companies are actively involved in corporate venturing through different programmes for start-ups to work on certain innovative projects, to perform research and tests in their facilities. Usually, at the end of such programmes, based on the results, project impact and performance of start-ups, on the one hand, corporate decides whether they are...
interested in working with start-ups and financing them. On the other hand, start-ups decide whether they are willing to stay under the company or to go on their own.

- Regarding the collaboration between start-ups and research entities and universities in Catalonia, there are only a few initiatives focused on the direct collaborative projects linked to I+D. Thus, “the Collider” is a pioneering tech-transfer innovation programme aiming to connect scientific and entrepreneurial talent. Another leading initiative closely linked to the research system is “Biocat”.

The main challenges and barriers of the ecosystem are in the field of the regulatory framework and human capital, particularly:

- legislation (high taxation and related insecurity, law creation, high bureaucracy)
- need for human resources with knowledge and capacities in the area of technologies and strategic management & planning. As the ecosystem is rapidly evolving, there is an increasing need for attracting talent and, ultimately, it is getting more difficult to “team matching” for start-ups.
- Coming to the barriers to scaling up in the region, one of the main barriers remain the lack of capital and investment, since a large part of the investment is aimed at the creation and development of start-ups, not scale-up. Another barrier of scale-up is also access to the talent mentioned above.

2.1.3 Assessment for the top 2 thematic synergies priorities

Regarding the entrepreneurial activity, as mentioned before, the main industrial areas are as follows: Industry 4.0, Life sciences and Mobile & Software.

Catalonia has identified the following two priority thematic areas, where it sees opportunities for synergies and collaboration with the other EER labelled regions:

- **Industry 4.0 and Mobile&Software** refer to the priority area 1 – “Digital transformation / industry 4.0 / ENMA / AI and robotics / IoT / Smart industry”
- **Life sciences** refer to the priority area 2 - “MedTech / Health and wellbeing”.

Accordingly, there are 365 companies supplying **Industry 4.0** products and services. In detail, 41.1% of companies are engaged in Data and Connectivity, 19.5% in 3D printing, 8.8% Intelligence, 5.5% in Control and Automation, approx. 20% in consulting and professional services, almost 3% in Advanced Robotics. Regarding the number of start-ups in the sector, it accounts for approx. 226 according to the estimations of Barcelona & Catalonia Start-up Hub using the data of 1.301 start-ups.

The number of **Mobile & Software** companies account for more than 15.757 in Catalonia and it has grown by 27% growth rate since 2013, although there are 141 start-ups in the sector.

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14 Please visit: www.biocat.cat/es
Regarding the local economy **Life science sector**, it consists of 280 biotech companies, 176 MedTech companies, 128 digital health companies and 125 pharma companies. Concerning the number of start-ups, according to the estimations of Barcelona & Catalonia Start-up Hub, there are 167 start-ups in the life sciences sector.\(^{17}\)

Regarding the opportunities that can be tackled through interregional cooperation are as follows:

- establishing cooperation and elaborating joint innovative and technology projects with other regions;
- scaling up specific facilities and platforms;
- sharing good practice in the area of retaining, training and mentoring C-level talent;
- capturing innovation from local companies and start-ups. This is linked to finding some opportunities in building inter-regionally distributed teams in different sectors. As well as sharing experiences to count on greater opportunities for the home market.

### 2.2 Large companies in the entrepreneurial ecosystem

#### 2.2.1 General overview of the established enterprises’ interaction with the ecosystem

As indicated before, the collaboration between corporates, large companies and start-ups in Catalonia is one of the drivers of the start-up ecosystem. Indeed, in Catalonia, large companies and corporates actively promote development and acceleration of start-ups through offering mentorship programmes, co-working places and investment.

There are more than **30 corporates engaged with start-ups in Catalonia**. One of the examples of cooperation and involvement of large corporates in the Catalan start-up ecosystem is what “Girbau Group” does. Being a multinational corporation headquartered in Barcelona, the “Girbau Group” has its working space located in the Barcelona & Catalonia Start-up Hub, where they directly collaborate and work with start-ups providing mentoring and co-working spaces. Moreover, through its Girbau LAB, they offer exploratory research and investment for new start-ups and possibility for start-ups to reach market depending on the interest of the project and its impact. **CELSA GROUP** is another example, they have different talent support programmes for entrepreneurs and start-ups in the area of the steel sector. Both “Seidor” and “Guirbau Group” are aimed at connecting start-ups and identifying solutions that may contribute to the transformation of the value chain in the industrial sector.

Other Corporate Venturing initiatives that should be highlighted are the following:\(^{19}\):

1. **Founder Institutes** is one of the largest seed start-up accelerators and offers acceleratorem programme including mentorship, networking, training.
2. **Sanofi**’s initiative “Health-U” for start-ups provides innovative solutions in the field of healthcare.

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\(^{18}\) Seidor – a multinational consulting firm in the technology sector offering solutions and services (such as consulting, infrastructure services, implementation, development and maintenance of applications, and outsourcing services), being a major service partner of SAP, IBM, Microsoft and Adobe.

\(^{19}\) Why Catalonia for innovation (2019) Generalitat de Catalunya, ACCIO.
3. Telefónica has its well-known Wayra initiative aimed at providing marketing and support of the ecosystems (Start-up accelerator of digital businesses).

4. In the tourism sector, Hotusa aims to boost travel industry start-ups through Hotusa Ventures which includes 1) Hotusa Travel Lab, 2) Hotusa Challenge, 3) Hotusa Venture Builder and 4) Hotusa Ventures fund.

5. In the industrial field, the reference in Catalonia, due to its early relationship with start-ups, is Fluidra. This company created Fluidra Accelera a few years ago. It is an accelerator that aims to generate innovation to complement the products and services of the company.

6. Ficosa and Idneo promote Onboard Ventures, an open innovation platform that works with startups. The objective of this programme is diversification in the areas such as IoT or Industry 4.0.

7. Sorigué is a reference in terms of water technology and engineering, services, construction and materials. In Corporate Venturing, its strategy involves diversification, innovation, development and talent acquisition. Start-ups are the fundamental pillar of this company strategy.

8. Gas Natural has the Innovahub at Pier01 in Barcelona. It is the meeting point with the actors of the digital and technological ecosystem that impact in the energy sector.

9. Ogilvy launched Ogilvy Upcelerator, which is managed by BIBA Venture Partners. They look for startups from multiple fields: retail, communication, Ad Tech, Mad Tech, Big Data, Data analytics, AI, Marketing tech, IoT, M2M, Fintech, Smart Devices, Consumer analytics, Mobile technology and video.

2.2.2 Horizontal assessment

The following challenges are faced by large companies in Catalonia:

- Attracting and retaining top talent. This is, in fact, one of the main assets and challenges of corporates: availability of investable teams. Although the existing proportion of professionals is higher (comparing to the past), and seasoned teams are still scarce, the capabilities are evolving very rapidly, and because it is not easy to import talent from abroad.

- Need to promote innovative business models through enhancing and promoting partnerships between corporates and innovative start-ups. Considering the presence of multinational corporations and a growing number of large companies in Catalonia, large companies have to constantly look for new models and innovative ideas in order to keep a leading position in the market.

- Moreover, in conditions of a rapid digital transformation and evolution of technologies, large companies can’t always adapt just as quickly, therefore, start-ups are a source of innovative ideas and latest technologies etc.

- Additionally, another challenge of large companies is the existing high mobility of certain professionals/talent. So, they must constantly be seeking for certain professionals and dealing with their brain drain.

2.2.3 Assessment for the top 2 thematic priorities of the region

In the framework of the in-depth matrix of synergies, the following two priority areas identified by Catalonia:
1. **Digital transformation/industry 4.0/ADMA/AI & Robotics/IoT/Smart industry**
2. **MedTech/Health and wellbeing**

Accordingly, the figure below presents the **main companies** and sectors that have made the main progress in the application of Industry 4.0’s technologies.

**Figure 4: Main companies contributed to the application of Industry 4.0’s technologies**

![Image of main companies](image)

Source: Why Catalonia for Innovation (2019). Elaborated by ACCIO based on interviews made by ACCIÓ. IDESCAT

**Figure 5: Leading companies in the life sciences sector in Catalonia**

![Image of leading companies in the life sciences sector](image)

Source: Why Catalonia for Innovation (2019). Elaborated by ACCIO based on interviews made by ACCIÓ. IDESCAT

Although, the automotive and pharma value chains are of critical importance to Catalonia, where the region leads in research, engineering and support services, including the presence of automotive OEM development centres in Spain, most of the engineering units of the suppliers and the entire ecosystem of technical services. Yet, as mentioned by ACCIO, there is still a need for companies and manufacturers of moulds and matrices, new materials and plastic injection.

Regarding the pharma sector value chain in Catalonia, as it is seen above, there are several leading multinationals, large companies, SMEs and research and technology centres.
are investments in R&D, new technologies (application of Industry 4.0), yet the challenge is rather between R&D and market, transferring R&D results and giving them socioeconomic value. There is a need in increasing investment focused on the technology and knowledge transfer, as well as there is a need to support business growth, moving from start-up to scale up. Therefore, it is critical for the region to create opportunities in the further development of cooperation between participating regions in the fields of R&D transfer in the pharma sector.

2.3 Research System and universities

2.3.1 General overview of the research and higher education system in the region

Education, in Catalonia, is considered as one of the government’s strategic priorities and the Catalan government promotes a high level of university research-related activity and technology and knowledge transfer.

Key facts about the research system and universities of Catalonia:

- Barcelona is the only European city with 2 business schools ranked among the continent’s top 10 (Financial times, 2017)
- Barcelona is the 5th European city in scientific production (UPC, 2016)
- The Catalan university system is the 3rd in Europe, only behind the Netherlands and Switzerland (The Times Higher Education, 2015).
- Barcelona is the 4th European city for scientific production (UPC, 2015).
- Three Catalan public universities (UAB, UPF & URV) are among the Top 50 universities under 50 years old in the world.
- More than 1,050 degrees and masters, with more than 236,000 university students, Catalonia has one of the highest student populations in Europe.
- Six subjects taught in Catalan universities are in the Top 50 of the worlds, including Economics, Engineering and Veterinary Science.
- UB & UPC are ranked 69 and 87 among the top 100 innovative universities in Europe (Reuters Top 100: Europe’s Most Innovative Universities, 2018).

Applied and basic research groups supporting technology transfer and the network of scientific and technology centres represent the base of Catalonia’s research and innovation system. The leading scientific facilities are presented below:

- **Scientific Park of Barcelona (PCB)** promotes research, knowledge transfer and innovation in the public and private sectors via smart space, technology and relations management. At the moment, more than 2,500 highly qualified researchers work at PCB. The Park is currently home of three research institutes and about 100 companies and other organisations.
- **Institute of Chemical Research of Catalonia** is committed to research in two main areas: catalysis and renewable energy, knowledge and technology transfer to the

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20 Why Catalonia for innovation (2019) Generalitat de Catalunya, ACCIO.
21 Why Catalonia for innovation (2019) Generalitat de Catalunya, ACCIO.
chemicals-, pharmaceutical- and energy industrial sectors and that of training the future generation of scientists by offering high-quality educational programmes.

- Biomedical Research Park Southern Europe is a leader in Biomedical investigation, and includes 6 six centres located in the park and conducts science of excellence in a wide diversity of fields, with a critical mass of 1,500 people originating from 50 different countries, and its accumulated R&D budget of approximately €90 million per year and cutting-edge scientific equipment.

- **ALBA Synchrotron** is a synchrotron light laboratory in the fields of Molecular biology, environmental sciences, materials sciences and earth sciences.

- According to the Nature Index, the **Institute of Photonic Sciences (ICFO)** is ranked as a top research institution of the city of Barcelona and according to the Nature Publishing Index Global Ranking, ICFO is ranked as one of the best research institutions in the world in the fields of physics and astronomy.22

In the context of industrial research, a key player in the Catalan innovation system is **Eurecat**, the leading technology centre in Catalonia, a result of the integration of Ascamm, Barcelona Media, Bdigital, Cetecom, Cetemmsa, CTM, CTNS and Maqcentre. Eurecat provides excellence in industrial research, technological transfer and multi-disciplinary development.

2.3.2 Horizontal assessment

Despite the region’s good performance and results in the area of R&D and education, the following challenges have been identified concerning the involvement of universities and research organisations in the start-up ecosystem:

- Joint projects with universities and research organisations are slowly proceeding due to the lack of flexibility from the part of the research system;

- Lack of public support tools in order to facilitate cooperation within the research circle start-ups & research & investment;

- Lack of flexibility in terms of technology bias;

- Tax issues related to joint R&D projects – legal conditions should be facilitated.

In terms of opportunities that can be tackled through interregional cooperation, the key insights are as follows:

- sharing and learning good practices in the area of improving the legislative framework (tax issues) towards creating favourable conditions and incentives to boost collaborative project between start-ups and research. Along with this, also creating opportunities to launch joint projects between start-ups and research system between participating regions.

- collaboration with other regions to learn their practice in processing such joint projects and applications and their experience in supporting and promoting (by the local

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22 The Nature Publishing Index is a global overview of research outputs of institutions based on the tracking of the number of articles published in Nature journals. Created in 2009, it publishes annual rankings that allow tracking publication outputs by institution (universities, government research institutes and private sector companies) and by country.
governing agencies, research institutions, business) joint R&D projects and cooperation.

- cooperation in the further development of state support measures to facilitate cooperation within the research circle Start-ups & Research & Investment.

2.3.3 Assessment for the top 2 thematic priorities

This section provides a brief overview of the research and innovations strengths in Catalonia highlighting the following aspects:

- Horizon2020
- Inter-regional projects
- Patent applications

**Horizon 2020**

Catalonia has received a total of €1,019.5m from the EU’s Horizon 2020 Programme, i.e. 2.7% of total funds granted and nearly twice as much as would correspond to it based on population 1.5% of the EU).

In terms of entity type, companies have been the top beneficiaries of funding, accounting for 25.1% of the totals received.23

*Table 2: Horizon 2020 funding by entity type*

<table>
<thead>
<tr>
<th>Entity type</th>
<th>No.</th>
<th>Grant (Cm)</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies</td>
<td>464</td>
<td>256.1</td>
<td>25.1%</td>
</tr>
<tr>
<td>SMEs</td>
<td>400</td>
<td>204.8</td>
<td>80.0%</td>
</tr>
<tr>
<td>Research associations</td>
<td>44</td>
<td>224.8</td>
<td>22.1%</td>
</tr>
<tr>
<td>Universities</td>
<td>12</td>
<td>217.9</td>
<td>21.4%</td>
</tr>
<tr>
<td>Public research centres</td>
<td>34</td>
<td>164.6</td>
<td>16.1%</td>
</tr>
<tr>
<td>Other associations</td>
<td>59</td>
<td>54.9</td>
<td>5.4%</td>
</tr>
<tr>
<td>Innovation and technology centres</td>
<td>2</td>
<td>51.5</td>
<td>5.1%</td>
</tr>
<tr>
<td>Public administration</td>
<td>48</td>
<td>49.6</td>
<td>4.9%</td>
</tr>
<tr>
<td>Total</td>
<td>663</td>
<td>1,019.5</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% of Spain</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>29.1%</td>
</tr>
</tbody>
</table>

In terms of the sectoral distribution of Horizon2020 resources in the period of 2014-2017 in Catalonia, the following specialisations are highlighted:

- According to the analysis of ISMERI, Catalonia is considered as a region with one of the most diverse specialisations and hence a capacity to integrate different health technologies. Thus, in the fields of Health, the region is specialised in basic medical research, biomedical tools and devices, drugs and therapies, E-health, public health and policy, regenerative medicine and advanced therapies. Yet it is not specialised in medical diagnostics.

- Similarly, in the area of Environment, Catalonia has a diverse specialisation and particularly it is specialised in Climate change and environmental risks, Environmental control and monitoring, Knowledge and environmental policies and Sustainable resource management.

- In the area of research in ICT, the region has diverse specialization and capacity to integrate different ICT and telecommunication technologies. Yet, it is specialised on the following: Advanced computing, Cognitive systems and AI, Content technologies, Telecommunication architectures and systems. It is not specialised in Innovative components and equipment.

- In the area of Advanced manufacturing, Catalonia is specialised in High performance manufacturing, it shows weak specialization in Digital factories and it is not specialised in Adaptive, smart, zero-defect manufacturing and green manufacturing.

- In terms of specialisations in transport technologies, Catalonia is specialized only in Rail transport and it is not specialised in road and waterborne transport, smart mobility technologies.

- Regarding the research areas of Energy, the region is specialised in Energy storage, Grid technologies, it has a weak specialisation in Power plant efficiency & sustainability and Hydrogen and fuel cells.

- Regarding the key research areas of Security, Catalonia is highly specialised in Crisis & emergency management, as well as it is specialised in Protection of critical infrastructures and Security of citizens. Yet, it shows a weak specialisation in border security.

- In the area of Agri-food, Catalonia shows specialisation in Health and functional claims and Innovative food processing.

- Concerning the key research areas of Construction technologies, it is specialised in Nearly zero-energy buildings and Smart and safe buildings, yet no specialisation in innovative building materials.
Next, figure below shows the distribution of funds by sectors. According to the figure, the largest part of the funds is directed to health technologies (20%), ICT (19%), advanced manufacturing technologies (13.6%) and Environment technologies (10.4%).

**Figure 6: Funds obtained (EUR million) by sector**

Source: RED © 2019 (ISMERI Europa); data can be consulted on the R&T Telescope™ (www.technology-telescope.com)

**Interregional projects**

Overview of the interregional and international projects in the area of promoting research, technological development and innovation within the top 2 thematic priorities.

**Table 3: Inter-regional projects**

<table>
<thead>
<tr>
<th>Project</th>
<th>Objective</th>
<th>Leading Partner</th>
<th>Participating regions</th>
<th>Total funding amount</th>
</tr>
</thead>
</table>
| + RESILIENT | To increase transnational activity of innovative clusters and networks of key sectors of the MED area | Veneto Region – Operational Unit for EU and State Relations | -Region of Istria, Croatia (2)  
-Marseille, Provence-Alpes-Côte d’Azur, France  
-Grándola Portugal  
-Region of East Macedonia and Thrace (REMTH)  
-Tirana, Central Albania, Albania  
-Rome, Lazio, Italy | EUR 3.278.529,80 |

24 Web: https://interreg-med.eu/
<table>
<thead>
<tr>
<th>Project</th>
<th>Objective</th>
<th>Leading Partner</th>
<th>Participating regions</th>
<th>Total funding amount</th>
</tr>
</thead>
</table>
| 4helix+25        | To increase transnational activity of innovative clusters and networks of key sectors of the MED area | SVIM Sviluppo Marche S.r.l. – Italy       | - Marseille, Provence-Alpes-Côte d'Azur, France  
                    |                                                                             |                                           | - Barcelona, Catalonia, Spain  
                    |                                                                             |                                           | - Tirana, Central Albania, Albania  
                    |                                                                             |                                           | - Lisbon, Portugal  
                    |                                                                             |                                           | - Andalusia, Spain  
                    |                                                                             |                                           | - Zadar country, Croatia  
                    |                                                                             |                                           | - Friuli-Venezia Giulia, Italy  
                    |                                                                             |                                           | - Central Macedonia, Greece  
                    |                                                                             |                                           | - Marche, Italy  
                    |                                                                             |                                           | - Central Athens, Greece  
                    |                                                                             |                                           | - Aragon, Spain  
                    |                                                                             |                                           | - Veneto region, Italy  
                    |                                                                             |                                           | - Maribor, Lower Styria, Slovenia  
                    |                                                                             |                                           | - Barcelona, Catalonia, Spain (2)  
                    |                                                                             |                                           | - Aragon, Spain  
                    |                                                                             |                                           | - Veneto region, Italy  |
| AERIAL UPTAKE26   | Improve the implementation of regional development policies and programmes, in particular, programmes for Investment for Growth and Jobs and, where relevant, ETC programmes, that support the delivery of innovation by actors in regional innovation chains in areas of | Municipality of Enschede, Netherlands    | - Province of Overijssel, Netherlands  
                    |                                                                             |                                           | - Catalonia, Spain (2)  
                    |                                                                             |                                           | - Osijek-Baranja, Croatia  
                    |                                                                             |                                           | - Rzeszow, Poland  
                    |                                                                             |                                           | - Östergötland Province, Sweden  
                    |                                                                             |                                           | - Preston, United Kingdom (2)  |

25 https://interreg-med.eu/
26 http://www.interregeurope.eu/
<table>
<thead>
<tr>
<th><strong>Project</strong></th>
<th><strong>Objective</strong></th>
<th><strong>Leading Partner</strong></th>
<th><strong>Participating regions</strong></th>
<th><strong>Total funding amount</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>AMiCE27</td>
<td>&quot;smart specialisation&quot; and innovation opportunity. To improve sustainable linkages among actors of the innovation systems for strengthening regional innovation capacity in central Europe</td>
<td>hemnitz University of Technology, Germany</td>
<td>-Liguria region, Italy (2) -Görlitz, Germany -Liberec Region, Czech Republic -Catalonia, Spain -Lower Silesian Voivodeship, Poland (2) -Zilina, Slovakia -Bratislava region, Slovakia -Region of Usti nad Labem, Czech Republic</td>
<td>EUR 2.234.307,50</td>
</tr>
<tr>
<td>Boost4Health - The Life Sciences Hub of NWE28</td>
<td>To enhance innovation performance of enterprises throughout NWE regions</td>
<td>Brabant Development Agency, Netherlands</td>
<td>-Catalonia, Spain -Wallonia region, Belgium -Copenhagen (capital region), Denmark -Apeldoorn, Netherlands -Kent, United Kingdom -Baden-Württemberg, Germany -North West England, United Kingdom (2) -Rennes, France -Loos-lez-Lille, France</td>
<td></td>
</tr>
<tr>
<td>CreaInnovation29</td>
<td>To increase transnational activity of innovative clusters and networks of key Chamber of Commerce of Viterbo, Italy</td>
<td></td>
<td>-Podgorica, Montenegro -Sarajevo, Bosnia and Herzegovina</td>
<td>EUR 1.627.450,00</td>
</tr>
</tbody>
</table>

27 http://www.interreg-central.eu/
28 http://www.nweurope.eu/
29 https://interreg-med.eu/
**European Entrepreneurial Regions - regional ecosystem mapping: Region of Catalonia**

<table>
<thead>
<tr>
<th>Project</th>
<th>Objective</th>
<th>Leading Partner</th>
<th>Participating regions</th>
<th>Total funding amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>InnoBlueGrowth</strong>&lt;sup&gt;30&lt;/sup&gt;</td>
<td>sectors of the MED area</td>
<td>- Occitanie, France - Zagreb, Croatia - Styria, Slovenia - Catalonia, Spain - Central Macedonia, Greece - Algarve region, Portugal</td>
<td>- Provenza-Alpes-Costa Azul, France - Central Greece, Greece - Podgorica, Montenegro - Catalonia, Spain - Rennes, France</td>
<td>EUR 1.562.088,24</td>
</tr>
<tr>
<td><strong>SMART</strong>&lt;sup&gt;31&lt;/sup&gt;</td>
<td>To increase transnational activity of innovative clusters and networks of key sectors of the MED area</td>
<td>National Inter-University Consortium for Marine Sciences, Rome, Italy</td>
<td>- Catalonia, Spain (2) - Nouvelle-Aquitaine région, France - Aragon, Spain</td>
<td>EUR 898.315,00</td>
</tr>
<tr>
<td><strong>TransferINN</strong>&lt;sup&gt;32&lt;/sup&gt;</td>
<td>Enhance cooperation between different actors from both sides of the border in R + D + I</td>
<td>Ecole Nationale d’Ingénieurs de Tarbes, France</td>
<td>- Mediodia-Pirineos, France - Occitanie, France (2) - Catalonia, Spain - Nouvelle-Aquitaine, France - Basque Country, Spain</td>
<td>EUR 1.705.058,25</td>
</tr>
</tbody>
</table>

Source: analysis of the Keep.eu database

Regarding S3P partnerships, Catalonia is not involved in the thematic area linked to the development of agriculture and food, yet it participates in the thematic areas linked to S3 Energy Partnerships and significantly more involved in industrial modernisation. In this context, the table below provides information on the mentioned thematic areas where Catalonia participates as a leading or participating region:

30 https://interreg-med.eu/
32 https://www.poctefa.eu/
Table 4: S3 partnership thematic areas

<table>
<thead>
<tr>
<th>Thematic area</th>
<th>Leading regions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S3 ENERGY PARTNERSHIPS</strong></td>
<td></td>
</tr>
<tr>
<td>Bioenergy</td>
<td>Lapland (FI)</td>
</tr>
<tr>
<td></td>
<td>Castile and Leon (ES)</td>
</tr>
<tr>
<td>Sustainable Buildings</td>
<td>Andalusia (ES)</td>
</tr>
<tr>
<td></td>
<td>North Great Plain (Észak-Alföld) (HU)</td>
</tr>
<tr>
<td></td>
<td>North-Croatia (HR)</td>
</tr>
<tr>
<td><strong>INDUSTRIAL MODERNISATION</strong></td>
<td></td>
</tr>
<tr>
<td>Efficient and Sustainable Manufacturing</td>
<td>Lombardy region, France</td>
</tr>
<tr>
<td></td>
<td>Catalonia, Spain</td>
</tr>
<tr>
<td>High Performance Production through 3D-Printing</td>
<td>Brainport Eindhoven-South Netherlands</td>
</tr>
<tr>
<td></td>
<td>North Portugal</td>
</tr>
<tr>
<td></td>
<td>Flanders, Belgium</td>
</tr>
<tr>
<td>Smart Regional Investments in Textile Innovation</td>
<td>Comunidad Valenciana (Spain)</td>
</tr>
<tr>
<td>Medical Technology</td>
<td>Auvergne-Rhone-Alpes, France</td>
</tr>
<tr>
<td></td>
<td>Lombardy, Italy</td>
</tr>
<tr>
<td>Photonics</td>
<td>South Netherland, the Netherlands</td>
</tr>
<tr>
<td>SME integration to Industry 4.0</td>
<td>Tuscany, Italy</td>
</tr>
<tr>
<td></td>
<td>Slovenia</td>
</tr>
<tr>
<td></td>
<td>Flanders, Belgium</td>
</tr>
<tr>
<td>Sport</td>
<td></td>
</tr>
<tr>
<td>Digitalisation and Safety for Tourism</td>
<td>Andalusia, Spain</td>
</tr>
<tr>
<td></td>
<td>Slovenia</td>
</tr>
<tr>
<td>Chemicals</td>
<td>Lombardy, Italy</td>
</tr>
<tr>
<td>Water Smart Territories</td>
<td>Aragon, Spain</td>
</tr>
<tr>
<td></td>
<td>Centre Val de Loire, France</td>
</tr>
<tr>
<td></td>
<td>Province of Fryslân, the Netherlands</td>
</tr>
</tbody>
</table>
Patent applications

Region of Catalonia has one of the highest number of patent applications in Spain. Thus, the number of Catalan patent applications to the EPO (European patent office) in 2018 was 595. Furthermore, Catalonia represents most of the European patent applications, with 33.6% of the total i.e. more than Madrid (21.1%) and the Basque Country (12.5%).

Figure 7: European patent applications by region, 2018 (% of total for Spain)

Source: assessment of ACCIO based on the data from the European Patent Office (EPO).

The total number of patent applications in Catalonia is 2810 and 35 (1.2% of total) of these applications co-applied with other EER regions and 134 (4.8% of total) co-applied with other countries.

2.4 Market services and ecosystem builders

2.4.1 General overview

In Catalonia, the number of ecosystem builders, service providers for start-ups and co-working spaces has doubled in the last four years. In Barcelona, there are more than a hundred co-working spaces that have become one of the most extensive business communities, with about 7,200 members between autonomous, start-ups, microenterprises and companies.

The main fabs, labs and hubs in Catalonia are the following:

- Pier 01 Building – Barcelona Tech City - is a meeting point for the Barcelona start up & entrepreneurial community and the largest of its kind in Europe which is managed by Barcelona Tech City. It hosts more than 100 startups and companies with more than 1,000 workers, incubators and accelerators, showrooms, co-working area and common areas devoted to innovation and collaboration.

33 Why Catalonia for innovation (2019) Generalitat de Catalunya, ACCIO.
34 According to the information provided by the Technopolis Group (co-patenting data).
35 La Vanguardia, 2017. Data provided by Generalitat de Catalunya, ACCIO. "Why Catalonia for start-ups", 2019
36 Generalitat de Catalunya, ACCIO. "Why Catalonia for start-ups", 2019
37 Regarding data with more detailed metrics (N° of supported businesses, success ration, sector specialisation), this level of information aggregation is not available.
• 3D factory incubator - Consorci de la Zona Franca and Leitat have created an incubator to promote the adaptation of 3D Printing technologies.

• Payment innovation hub – created by the union of CaixaBank, Global Payments Inc., Samsung, VISA and Arval to jointly promote R&D&I projects that bring the best and most innovative experiences in payment solutions to society.

• THE THIXN 5GBARCELONA – the space promoted by Telefónica and 5GBarcelona so that start-ups and other companies can work in an environment equipped with 5G technology.

• Barcelona fab city – is one of the leading Fab Labs aimed at the development of the Maker movement and Fab Lab Network worldwide.

• Barcelona health hub – is aimed to promote innovation in digital health and its transfer to the sector, joining start-ups, healthcare organisations, companies and investors.

• USER EXPERIENCE LAB (UXLAB) – a laboratory launched by Barcelona Activa where start-ups can test products and services, both physical and digital products.

Catalonia Trade & Investment (ACCIO) is a public agency, which is considered as the main growth partner for Catalan start-ups, specialised in accelerating and connecting them with other leading ecosystems worldwide. In this context, there is an increasing number of services offered to start-ups such as business acceleration and building connections with other international ecosystems. The agency provides services to international start-ups, for instance, they help foreign start-ups to contact Catalan incubators, accelerators and other strategic players, as well as it provides advice on funding, fundraising, start-up events, workforce. ACCIO provides the following type of services to the native Catalan start-ups:

• Connection to the other leading ecosystems such as Silicon Valley, Boston, London, Singapore and Hong Kong;

• Design and execution of internationalisation strategies for start-ups;


The services provided both for foreign and local start-ups are:

• Start-up Capital, which is a direct grant of up to 75,000 euros for recently created start-ups. This support is for tech start-ups between three months and three years of life.

• Corporates & Start-ups Open Innovation Challenge, that is, corporates offer start-ups all their capabilities to test new technologies, their infrastructures and access to the market. A new initiative “The Corporates & Start-ups Open Innovation” is organised by ACCIO within the framework of the 4YFN, which will take place in Barcelona during the Mobile World Congress 2019.

• Programmes for start-ups with business schools for less than three years old projects and it allows to choose the programme of business schools that best suits start-ups’ needs and fuse the technology with the knowledge of the business schools.

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38 Why Catalonia for innovation (2019) Generalitat de Catalunya, ACCIO.
• The initiative “Innovation through start-ups”, launched by ACCIO and free of charge, consolidated companies can identify the start-ups that best suit their needs and define the best collaboration strategy. Start-ups that participate can opt for a line of participative loans of co-investment between 50,000 and 200,000 euros.

• The "Road to" Programme offers support to Catalan start-ups and facilitates its entry to the Boston and Silicon Valley ecosystems. The Programme aims to become the reference point in scaling up of start-ups in Catalonia.

2.4.2 Horizontal assessment

In general, in terms of the existing support structures and measures in Catalonia, it is sufficiently developed and there is a sufficient number of available initiatives, programmes and events for start-ups. Financial support and incentives are mainly provided by private accelerators and incubators. It seems that the key role of the public agencies is to provide non-financial support by helping start-ups to build essential networks, providing co-working places, common areas to work, connecting them with other key players of the Catalan ecosystem. The overall well-performance and good quality of the support structure is one of the key factors driving the Catalan start-up ecosystem.

Regarding the general challenges of the Catalan ecosystem:

• despite the availability of a wide range of market services to support start-ups, there is a limited number of initiative and programmes supporting scale up. In fact, only one programme “Road to “ was identified. In the case of Catalonia, scale-ups and support measures needs to be developed, not by the involvement of local government agencies, but also incubators, accelerators, large corporations.

• another challenge is the lack of public funds to promote start-ups and scale-ups. A large part of market services is provided mostly by the private sector, while government agencies play rather a connecting or facilitating role.

• moreover, the restricting factor is not a difficulty to access the services, but rather the issues related to the regulatory framework in the region, particularly when it comes to international investment, high taxes and high bureaucracy scare international investors away (as it was mentioned many times during interviews with stakeholders). The strict regulatory framework also limits the promotion of R&D projects between business and research system, this was observed both in the area of digital industry (ICT & mobile) and health industry that of critical importance to Catalonia.

In terms of interregional cooperation, the following areas have been highlighted by the interviewed regional stakeholders:

• cooperation in the fields of sharing experience and developing joint projects to support scale-ups. Learn best practices of other regions in promoting scale-ups (especially there is a high interest of large corporations and accelerators)

• many of the stakeholders are interested in creating opportunities to launch joint R&D projects in the fields of life sciences and digital transformation.
3 FRAMEWORK CONDITIONS FOR ENTREPRENEURSHIP

3.1 Quick snapshot of the industry and economic performance

In Catalonia, the industry represents nearly 21.4 % of Catalan GDP and it is concentrated particularly in the Barcelona area. Furthermore, 1.47% of GDP dedicated to R&D. In terms of a number of companies, in total there are 618,366 companies (2017), including 37,605 industrial companies and 9,282 innovative companies, 8,642 foreign companies and 17,091 regular exporting companies. In terms of company size, in Catalonia SMEs account for 99.8% as it is seen in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Catalonia</th>
<th>% Catalonia/Spain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-businesses</td>
<td>579,588</td>
<td>18.5%</td>
</tr>
<tr>
<td>Small companies</td>
<td>23,934</td>
<td>19.8%</td>
</tr>
<tr>
<td>Medium companies</td>
<td>4,247</td>
<td>22.1%</td>
</tr>
<tr>
<td>Large companies</td>
<td>1,212</td>
<td>21.8%</td>
</tr>
<tr>
<td>Total</td>
<td>608,981</td>
<td>18.6%</td>
</tr>
</tbody>
</table>

Source: Elaboration of ACCIO based on the data from INE (National Statistics Institute) - Idescat (Statistical Institute of Catalonia) http://www.idescat.cat/economia/inec?tc=3&id=6004 & Barcelona Activa

Regarding the sectoral distribution, as mentioned before, the industry accounts for 21.4% of Catalan GDP, yet business services, commerce, energy, transport and telecommunications are all industry related activities that, together with more traditional industry, represent 50% of the Catalan GDP. As for the main industrial activities’ distribution, it is dominated by food, chemicals motor vehicles and energy sectors.
### Human capital

Catalonia represents one of the highest student populations in Europe, there are more than 1,050 degrees and masters, with more than 236,000 university students. In terms of the conditions for talent and innovation attraction compared to Europe, Catalonia is well-positioned and stands out in trademark applications, most-cited publications and employment and exports of MHT\textsuperscript{40} manufacturing\textsuperscript{41}.

However, all the agents (interviewed) mentioned that they face difficulties in finding ICT skilled workers, technicians, software engineers, developers. This challenge is even more critical when it comes to start-ups, as they do not have sufficient financial resources to attract them and to compete with others. As well as accelerators and incubators highlight the increasing needs to attract specialised personnel with advanced technical skills and C-level talent for team matching. Therefore, finding and retaining the required skills are time-consuming and costly. Almost, all the stakeholders (start-ups and accelerators particularly) in the ecosystem currently lack the right specialists.

In terms of labour costs, Barcelona has the lowest costs for production operators of all 7 locations with a total unit cost of €35,918 per annum and the lowest costs for engineers of all 7 locations with a total unit cost of €45,067 per annum.

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\textsuperscript{40} Medium-high tech manufacturing

\textsuperscript{41} Generalitat de Catalunya, ACCIO. "Why Catalonia for Innovation", 2019
According to the Barcelona & Catalonia Startup, 74% of start-up employees are local and 85% of start-up founders are local founders. Yet, Catalonia is considered as one of the most attractive cities for talent in start-ups. Technology related areas remain the most attractive functional area of start-ups for foreign employees, where the share of foreign employees’ accounts for 27%.43

Regarding the degree of freedom of regional policy, there is no evidence of limitations for regional intervention. Indeed, the regional and national talent attraction programmes are coherent. In this context, Catalonia through its public agency ACCIO promotes the talent attraction programme “TECNIOspring+” for the period 2013-2024, total budget of € 29 million covering 207 R&D contracts with experienced researchers. The Financial support for hiring experienced researchers (up to 100%) to develop applied research projects, through 2-year employment contracts with Catalan companies and TECNIO technology providers. The programme is focused on the sectors such as food industries, industrial systems, sustainable mobility, chemistry, energy and Resources, design industries and Health & life sciences.

3.3 Financial capital

3.3.1 General overview of access to finance in the region

According to the Financial Times Group (2018), Catalonia is considered as one of the most attractive Southern European regions for investment in 2018 and 2019, and Venture Capital investment in Catalan start-ups has doubled in 2018 compared to its level in 2014 and it has increased by 53% compared to 2017.

Regarding the possibilities to obtain funding for start-ups/scale ups not located in the region through the main Catalonian financing schemes, only one programme Innovac Global

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42 Note: Salary: The wage paid to an employee. Additional costs: Statutory employer social security contributions calculated as a percentage of the salary.

43 Generalitat de Catalunya, ACCIO. “Why Catalonia for Innovation”, 2019
is observed. It is a public initiative launched by the Catalan government in collaboration with ACCIO to promote start-ups with high growth potential for Catalonia. Yet, it is still rather focused on co-financing (with other private investors) Catalan start-ups to go internationally.

In Catalonia, business angels account for 36% of investments in start-ups *(Several business angels and ESADEBAN)* and foreign investors are involved in 74% of the highest rounds *(series B and C)*.44

**Figure 10:** Ranking of investors by the number of transactions, 2017-2018

Source: Barcelona & Catalonia Startup Hub based on Zephyr (Moddy’s) and specialised press. 154 investments calculated (2017-2018) and made by 202 different investors. In virtually all the rounds more than one investor at a time took part (co-investment) and therefore the graph total exceeds 100%

**Figure 11:** Ranking of investors by the number of series B and C transactions, 2017-2018

44 Generalitat de Catalunya, ACCIO. “Why Catalonia for Start-ups”, 2019
Source: Barcelona & Catalonia Startup Hub based on Zephyr (Moody’s) and specialised press. The graph has been drawn up according to the highest rounds of investment (the 27 rounds of over €5,000,000). 63 different investors took part (invested)

According to the Barcelona & Catalonia Startup Hub, 3 out of 4 Catalan start-ups have obtained financing from investors and 21% of obtained rounds of investment worth over one million. The table below shows start-up financing phases.

**Table 6: Start-up financing phases in Catalonia**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Amount</th>
<th>% share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Seed</td>
<td>&lt; €0.25 million</td>
<td>45%</td>
</tr>
<tr>
<td>Seed</td>
<td>€0.25 million - &lt; €1 million</td>
<td>34%</td>
</tr>
<tr>
<td>Series A</td>
<td>€1 million - &lt; €5 million</td>
<td>16%</td>
</tr>
<tr>
<td>Series B</td>
<td>€5 million - &lt; €20 million</td>
<td>4%</td>
</tr>
<tr>
<td>Series C</td>
<td>€20 million - €200 million</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: Generalitat de Catalunya, ACCIO. Barcelona & Catalonia Startup Hub

3.3.2 **Horizontal assessment**

In terms of main investment sectors in Catalonia, Medtech, Fintech & Insurtech and Biotech & Pharma start-ups attract higher investments (Series A+B+C) than the rest. Business services and, in this context, biotechnology had the largest R&D project size on average in terms of investment.

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45 Generalitat de Catalunya, ACCIO. Estimated by Barcelona & Catalonia Startup Hub using the data of the 953 startups that have this reported data. The names and the values of the financing phases are in line with international rates.
Regarding the availability of financial resources for start-ups and scale-ups, it was mentioned before that a large part of financial resources (mostly private) is directed to start-ups, and there is limited access to finance for scale-ups (limited evidence). Thus, there are funding, subsidies, investments from venture capital. Yet, the main challenges related to the availability of financial capital are:

- most of investment are short-term, there is a significant lack of long-term investment, particularly for scale-ups. That is one of the reasons why many start-ups reaching the next level, they leave the region looking for capital and bigger markets.
- based on the fieldwork, despite having an increasing number of FDI into Catalonia, almost all the agents highlight limited access to international finance as a constraint to growth for them. This also can be driven by the lack of knowledge about attracting and obtaining international financing.
- another key constraint mentioned, it is a lack of awareness of the regulatory issues related to financing conditions, rules and selection criteria.
- accelerators and incubators involved in supporting start-ups in finding the right investors, mention that it is extremely difficult to find financing for companies in the construction and real estate market, due to associated price-instability and their non-innovative nature.
- In Catalonia, despite a growing interest of investors in capital intensive sectors such as telecommunications, transportation, energy, start-ups in these sectors have challenges to obtain financing.

As for the opportunities for inter-regional cooperation, these are as follows:

- first of all, to increase international attractiveness through cooperation and to attract investors from the other ecosystem for start-ups in Catalonia.
- establishing an inter-regional and international network between accelerators, incubators, investors that will boost both investment inflow and promote innovation and technology exchange/transfer among the participating regions in the selected priority cooperation areas.
3.4 Infrastructure for local needs and global access

In term of infrastructure, in Catalonia, both ICT and general infrastructure is not considered as a barrier to the entrepreneurial ecosystem. Regarding the ICT infrastructure in Spain, it can be described by the assessment provided be DESI in the five areas: connectivity, human capital, the use of internet, public digital services and technology integration. Accordingly, in terms of connectivity, there has been large progress since 2015, and this progress has been driven by greater investment by telecommunication operators in fixed broadband infrastructures. Particularly, since 2014 there was a considerable growth in investment to bring optic fibre to homes, rising 30% to 5 billion euros. Regarding the use of internet, the number of internet users (“weekly” users) has increased to 75% of the population and 65% of the population use internet daily.

In Catalonia, they have elaborated a set of policies and reforms that facilitated its efforts to become a Smart and Digital City. In the frame of this strategy, Barcelona uses existing and new digital the 22@ Barcelona innovation district; corporate fiber-optic networks; wireless mesh networks; sensor networks and Public Wi-Fi networks. Regarding the public digital services, Catalonia promotes open data access for citizens at the centre of innovation public data (not subject to any legal restriction), that is publicly available through the Barcelona Open Data Portal with 326 datasets, 1116 counting historical series and 2585 counting the different formats, this initiative fosters the creation of services by the private sector which is based on public information.

Regarding the physical infrastructure, Barcelona is ranked as the 1st Intermodal logistics hub in Southern Europe that concentrates one of the major ports in the Mediterranean, a high-speed train station, an international airport, motorways linked to the European network and one of the biggest logistic zones in southern Europe.

400m consumers in Europe and the Mediterranean / Africa in less than 48 hours, with a saving of 10-15% in distribution costs compared to serving these markets from northern Europe.

According to the Global Competitiveness Report, Barcelona’s Port is among the best in Europe in terms of port infrastructure quality and 3rd Top City for air transport infrastructure quality among 7 other main European cities.

3.5 Culture

Entrepreneurial culture in Catalonia has been evolving during the last 5 years, and currently, it can be characterised with a pro-business and pro-growth environment, open to foreign investments. Indeed, it is moving towards a very open, friendly and diversity business mindset. People have become more open towards launching a new business, projects, other entrepreneurial activities and associated risks. Young people more and

46 Country level data. DESI (The Digital Economy and Society Index)
49 Generalitat de Catalunya, ACCIO. "Why Catalonia", 2019
51 Generalitat de Catalunya, ACCIO. "Why Catalonia", 2019
more choose to be an entrepreneur, and this is also driven by the fact that Catalonia, now, has a wide range of market services for start-ups (mentoring, training, investment, co-working places, financing programmes etc.). As a result, there are more and more successful experiences (cases) of start-ups and this gradually has been changing people mindset regarding the risks associated with launching a business. Indeed, it is moving towards a very open and diversity business mindset. In this context, the following incentives are done:

- lower Corporate Tax Rate than neighbouring countries (25% from 2016).
- tax deduction schemes for R&D activities (Patent box, up to 59% on R&D, 12% on innovation).
- the optimal location for international holding companies (ETVEs) thanks to its attractive Holding Tax Regime and the large Tax Treaty network available, both with the EU and Latam (Latin America).
- Employment incentives programmes (discounts on social security contributions and grants for job creation).
- 24% Flat Tax Rate applicable to expats coming to work in Catalonia (for income up to €600,000).
4 POLICY MIX FOR ENTREPRENEURSHIP

4.1 National framework for entrepreneurship support

In Spain, The General Secretary of Industry and SMEs (SGIPYME) of the Ministry of Industry, Commerce and Tourism (MI) and the Chamber of Commerce of Spain are the main national institutions responsible for entrepreneurship policies. Yet, regarding the national strategic framework to promote entrepreneurship and SMEs, the government has developed a Strategic Framework in Policy for SMEs 2030, which includes a set of policy instruments to foster entrepreneurship and industrial sectors of Spain classified by promoting institution, priority area and specific instruments. Therefore, the next table below provides an overview of the main policy instruments launched in the framework of the SMEs strategy.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Responsible Institution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training programme for youth employment in the digital economy</td>
<td>Ministry of Economy and Business</td>
<td>Grants for training activities and labour insertion, both in the area of ICT and Digital Economy in the frame of the Youth Employment Initiative.</td>
</tr>
<tr>
<td>Programme to boost the creation of Digital Transformation Offices</td>
<td>The General Secretary of Industry and SMEs (SGIPYME) of the Ministry of Industry,</td>
<td>Grants for creation and consolidation of Digital Transformation Offices to facilitate the digitalization process of the Spanish companies and digital entrepreneurship. The objective is to strengthen the support ecosystem for SMEs in the ICT sector, offering dissemination services, such as actions to sensitize SMEs in the digital transformation process and support services, such as assisting and consulting on solutions and methodologies to improve company’s management in the use of ICT. Likewise, the provision of dissemination and support services for entrepreneurs in the digital sector.</td>
</tr>
<tr>
<td>Information portals for companies and entrepreneurs</td>
<td>The General Secretary of Industry and SMEs (SGIPYME)</td>
<td>The SGIPYME has different information portals providing support for companies and entrepreneurs: the SME portal (ipyme.org), the Electronic Attention Point (paelectronico.es) and the EUGO portal (<a href="http://www.eugo.es">www.eugo.es</a>).</td>
</tr>
<tr>
<td>Business Plan of DGIPYME</td>
<td>The General Secretary of Industry and SMEs (SGIPYME)</td>
<td>This instrument supports companies to analyse their business opportunity and examine the technical,</td>
</tr>
</tbody>
</table>

52 www.ipyme.org
53 www.camara.es
54 Available at: https://industria.gob.es/es/Servicios/MarcoEstrategicoPYME/Marco%20Estrat%C3%A9gico%20PYME.pdf
### European Entrepreneurial Regions - regional ecosystem mapping: Region of Catalonia

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Responsible Institution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerce and Tourism</td>
<td>economic and financial viability of a company, in order to establish its business plan.</td>
<td></td>
</tr>
<tr>
<td>Platform of entrepreneurial projects with high growth potential</td>
<td>They have developed a platform to increase visibility to innovative entrepreneurs with high growth potential that will help generate value to the national entrepreneurial ecosystem</td>
<td></td>
</tr>
<tr>
<td>Strategic Plan 2017-2020</td>
<td>Spanish office of the patents and brand</td>
<td>Grants for the promotion of patent applications and utility models at national and international level.</td>
</tr>
<tr>
<td>Business Support Programme for Women (PAEM)</td>
<td>Ministry of the Presidency, Relations with the Courts and Equality</td>
<td>Its objective is to raise awareness among women towards self-employment and business activity, it is an effective instrument for the creation and consolidation of companies led by women, as well as facilitate access to financing under advantageous conditions.</td>
</tr>
<tr>
<td>Innovation programme</td>
<td>The objective is to promote the entrepreneurial spirit of women in the scientific-technological field, and integrate the gender perspective Spanish universities in the processes of knowledge transfer and in the process of creating Technology-based companies, increasing the number of university students who choose to start-up companies arising from research (spin-off).</td>
<td></td>
</tr>
<tr>
<td>Espana Emprende</td>
<td>Chamber of Commerce of Spain</td>
<td>It is designed to give support to entrepreneurs in all the phases of company development: development of the business idea, creation and processing of the company, consolidation etc.</td>
</tr>
</tbody>
</table>

Source: Strategic framework of SME policy. Ministry of Industry. Commerce and Tourism

### 4.2 Regional development policy

#### 4.2.1 Regional policy objectives

The Strategy for the Smart Specialisation of Catalonia (RIS3CAT) provides the framework for the Catalan Government in the area of research and innovation actions for the 2014-2020 period and supports the promotion of innovative projects. Its key objectives are to:

- Increase the competitiveness of the business ecosystem by reorientation of its production fabric, enhancing the efficiency of production processes, internationalisation

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55 https://empresarias.camara.es/conocenos/
56 https://innovatia83.es/
57 For more information please visit the following link: https://industria.gob.es/es-es/Servicios/Paginas/marco-estrategico-politica-PYME.aspx
58 For more information please see the following link: https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/policy-document/research-and-innovation-strategy-smart-specialisation-catalonia-ris3cat
and the reorientation of consolidated sectors towards activities with greater added value;

- Foster new emerging economic activities through research, creativity and innovation to create and develop new market niches;
- Consolidate Catalonia as an international reference in technology and digital transformation and consolidate it as European knowledge hub and connect technological and creative capacities to existing and emerging sectors in the territory;
- Improve the Catalan innovation system, increasing the competitiveness of companies and focus public policies towards promotion of joint actions for innovation, internationalisation and entrepreneurship.

In terms of sectoral focus, the RIS3 specialisation in Catalonia highlights seven leading sectors for economic growth: agri-food industries, energy and natural resources, industrial systems, design-based industries, sustainable mobility, health industries and experience-based industries. Furthermore, from the perspective of transversal technologies that transform the Catalan ecosystem, the focus is on ICT, nanotechnology, photonics, advanced materials, biotechnology and advanced manufacturing technologies. Regarding the public policy concerns in Catalonia, the digital agenda, entrepreneurship, eco-innovation, non-technological innovation and training & talent are considered as a priority.

Regarding the progress with implementing the strategy, some qualitative indicators will be published in the second half of the 2019 and the quantitative indicators are available in the Catalan language.

4.2.2 Regional policies supporting entrepreneurs and scale-ups

The policy instruments supporting entrepreneurs and scale-ups are coherent with the national and regional priorities. Catalonia has launched a wide range of initiatives and projects developed to support start-ups and entrepreneurs, yet, the table below provides an overview of the selected main initiatives.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Responsible Institution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECNIO network</td>
<td>Generalitat Cataluña</td>
<td>Grouping of the leading expert agents in applied research and technology transfer in Catalonia to promote innovation and digitalisation;</td>
</tr>
<tr>
<td>Catalan cluster of Sport industry</td>
<td>Generalitat Cataluña</td>
<td>The cluster aims to link companies and research centres to develop actions and projects that improve the</td>
</tr>
</tbody>
</table>

59 Platform for the RIS3CAT in Catalonia: http://catalunya2020.gencat.cat/ca/ris3cat/
60 Please see the following link: http://catalunya2020.gencat.cat/web/.content/00_catalunya2020/Documents/estrategies/fitxers/informe-seguiment-ris3cat-2019.pdf
61 ACCIO: https://www.accio.gencat.cat/ca/serveis/innovacio/tecnologia-per-a-empresa/tecnio/
62 Available at: http://www.indescat.org/
To foster a link between R&D system and entrepreneurship, the Generalitat of Catalonia, through ACCIO - the agency for business competitiveness, launched the TECNIO\textsuperscript{67} label. The label’s objectives are to:

- support the most qualified agents involved in technology transfer processes,
- facilitate companies to access to advanced R&D and develop new products and services,
- increase the scope of technology projects by finding the most suitable technology partners & suppliers,
- help raise companies’ competitiveness and technological innovation capacities.

Another initiative aimed to promote technological cooperation between the research system and companies in Catalonia is the \textbf{Nuclis programme} that supports research organisations and companies to develop joint R&D projects and to obtain prototypes and demonstrations of new products, processes and technologies.

Regarding, some key results, for instance, the initiative “\textbf{Start-up Catalonia}”, which was mentioned several times in this report, has been launched as a platform to connect Catalan start-ups with the other key actors of the ecosystem and currently it joins more than 1,000

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\textsuperscript{63} Available at: https://canalempresa.gencat.cat/ca/02_serveis_per_temes/financament/assessorament-financer/xarxa-inversors-privats/

\textsuperscript{64} Available at: http://catalonia.com/startups-in-catalonia/

\textsuperscript{65} Available at: http://catempren.gencat.cat/ca/inici

\textsuperscript{66} For more information please visit the following link: https://industria.gob.es/es-es/Servicios/Paginas/marco-estrategico-politica-PYME.aspx

\textsuperscript{67} TECNIO is a certification created by the Government of Catalonia, through ACCIÓ, which identifies differential applied technology providers and facilitators involved in knowledge and technology transfer processes.
start-ups up with scalable business models, applicable to global ecosystem. Furthermore, these start-ups employ around 10,000 people, have an overall turnover of 1,300 million euros and engaged in areas of Internet software and e-commerce. The Start-up Catalonia programme provides support for start-up acceleration and their internationalisation, such as, design of internationalisation strategies, mentoring, experts’ support, organization of international missions and fairs for start-ups, provision of access to other programmes and consulting activities, meetings with private sectors. However, according to the desk analysis and field works, in Catalonia only one programme is identified, that is the “Road to” programme that promotes scale-ups in particular (mentioned several times in the current report).

4.2.3 Regional entrepreneurship policy measures fostering cross-border linkages

Apart from the programmes and initiatives of regional focus, in Catalonia there are several initiatives in different areas that have an inter-regional and international dimension, for instance:

- Grant programme for international R&D projects “Nuclis INTERNACIONALS”

- Programme aimed to promote technology and knowledge transfer through the mobility of researchers (regional inter-regional and international). Grant programme “TECNIOspring+” for hiring researchers to work on R&D projects through 2-year employment contracts with Catalan companies and TECNIO technology providers.

- Brokerage events to boost International technological cooperation organized by ACCIO.

- “Inverse Missions in Catalonia” for Catalan companies and technology centers to promote collaboration with foreign entities in the area of innovation and entrepreneurship. For example, events organized in Catalonia: MWC, Smart Cities Congress, IoT World congress.

- The "Road to" is an initiative in a “scaling up” of start-ups in Catalonia. The initiative provides support to Catalan start-up to facilitate its entry to the Boston and Silicon Valley ecosystems.

4.2.4 Regional governance arrangements

In terms of the capacity of the region to design its policy instruments for entrepreneurship, there is a wide range of initiatives to provide support services adapted to the needs of the entrepreneurial ecosystem.

In the context of the regional governance system for entrepreneurship, the government of Catalonia, Generalitat de Catalunya, plays an active role in promoting entrepreneurship and innovation through the Ministry of Enterprise and Knowledge and the Ministry of Digital policy and Public Administration.

68 “Start-up Catalonia” platform: http://startupshub.catalonia.com/
69 Grants funded under the PO FEDER Catalunya 2014-2020. For more details please see the link: http://catalonia.com/innovate-in-catalonia/innovation-services/international-technological-cooperation.jsp
70 Link to the initiative: http://catalonia.com/innovate-in-catalonia/tecniospringplus/
71 Link to the initiative: https://www.elreferente.es/tecnologicos/accio-road-barcelona-33565
Under the ministry level, several public agencies manage the implementation of actions stimulating entrepreneurship and innovation. These are, ACCIO - business competitiveness and external promotion agency and Barcelona Activa – a development agency of Barcelona City Council to support entrepreneurs, innovation, professional improvement and job creation.

4.2.5 Assessment of the regional policies for entrepreneurship

According to the analysis performed and as well as the evaluation of agents interviewed, the challenges that could be met by public interventions at the regional level are as follows:

- Lack of collaborative R&D projects between start-ups and universities which is derived from the slowly proceeding university projects and their rigidity due to administrative barriers. Thus, public support tools are needed in order to foster technology and knowledge transfer in the region. In fact, the desk-analysis and fieldworks, evidence that there are only a few initiatives and projects in the area of start-up & research system collaboration, these are mainly “the Collider” project and Biocat initiative.

- Despite the region’s good performance in creating a business-friendly environment, the regulatory framework, particularly taxation and related insecurity, law creation and bureaucracy remains as one of the key issues that should be addressed by the regional administration.

In terms of interregional collaboration, stakeholders consider the following opportunities to elaborate joint projects:

- In the area of technology and knowledge transfer, it would be useful to create a network with entrepreneurial agents, research system and policymakers and promote joint R&D projects. Moreover, it was mentioned several times, that some of the main challenges of a relatively low level of technology and transfer in Catalonia is the regulatory framework, therefore it would be interesting for the region to share experience in this field, and to learn what other reference regions have done in terms of creating favourable regulatory and legislative framework to promote cooperation between entrepreneurs and research systems, promote participation of business in R&D, number of joint R&D projects etc. It is interesting to know what policy measures and initiatives other regions have launched to boost collaboration of start-ups/scale-ups with the R&D system.

- Talent attraction is of growing importance for Catalonia; indeed, the region has launched different programmes (mentioned previously) aimed to attract international researchers, other specialists with required skills. Yet, the region’s interest in collaboration is the further development of joint projects and creating possibilities of building international team matching. As well as to learn other practices and initiatives towards increasing attractiveness of regions for international talent.

- Create and promote co-investment across regions through establishing a network among ecosystems of participating regions and promote joint activities of investors. This will help to increase the visibility and attractiveness of regions for international investors and entrepreneurs.
5 REGIONAL SWOT AND CONCLUSIONS

5.1 Maturity of the regional ecosystem

The analysis shows the maturity of Catalan start-up ecosystem through an overview of the entrepreneurial dynamics, the presence and role of the ecosystem agents, investment rounds, performance of its leading sectors and collaboration, among others. The Catalan start-up ecosystem is considered as a mature ecosystem dynamically moving towards sustainability. This is resulting from the following insights in terms of a systematic renewal of new companies, the output of Catalonia’s average tech start-up is three times higher than the international average and the start-up exit value is one of the highest comparing internationally. Furthermore, the availability (increasing number) of both local and international funds and investment for start-ups, the presence of market services for start-ups (accelerators, mentors, co-working places etc.), indicate the maturity of the ecosystem, creating favourable conditions for ecosystem development and its gradual path towards sustainability.

Catalonia has become increasingly attractive for international founders, investors, big corporates and Barcelona is ranked as the top Global Smart city world in 2015 and the 2nd Smart City in the World in 2016 according toJuniper Research, 2016.Catalonia is home for the biggest Spanish companies in the area of life sciences, med technologies etc. The world’s most innovative companies have presence in Catalonia. Despite its high internationalization and attractiveness for FDI, Catalonia remains behind in terms of attractiveness for promising international startups or scaleups comparing internationally.

This analysis shows that the ecosystem of Catalonia follows more a market-driven model, where regional actors such as large companies are important drivers of start-ups and where the government plays an important role mainly as a facilitator between all types of agents in the ecosystem.

Table 9: Maturity of the ecosystem

<table>
<thead>
<tr>
<th>Stage of EE</th>
<th>Does the system rely more on:</th>
<th>Nascent</th>
<th>Evolving</th>
<th>Mature</th>
<th>Sustainable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market-forces</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy interventions</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 Updated regional SWOT as basis for inter-regional collaborations

The following presents the updated regional SWOT based on the indications obtained during the information gathering and study visit carried out for this region.

72 Such as Microsoft, Samsung, IBM. Marriot, Renault, P&G, Toyota, Siemens etc. (Why Catalonia for innovation, 2019. ACCIO)
Table 10 Updated SWOT analysis for the North Brabant entrepreneurial ecosystem

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>- High internationalisation, with an increasing number of industrial</td>
<td>- Lack of financial support services for the entrepreneurs; funding access, particularly lack of</td>
</tr>
<tr>
<td>multinationals and significant presence of foreign companies.</td>
<td>public financing and investment to entrepreneurs and newly created businesses.</td>
</tr>
<tr>
<td>Barcelona remains one of the world’s most attractive cities for foreign</td>
<td>- Comparing to other leading European regions, strict regulative environment, particularly high</td>
</tr>
<tr>
<td>investment, particularly in R&amp;D, in design and in development &amp; testing</td>
<td>bureaucracy when it comes to the creation of new businesses (time and high costs);</td>
</tr>
<tr>
<td>since 2003;</td>
<td>- Governance can be improved: firstly, a growing number of actors and a lack of coordination</td>
</tr>
<tr>
<td>- Catalonia is the third-most important EU country by a number of</td>
<td>between them. Secondly, strict and costly fiscal environment, thus lack of fiscal incentives for</td>
</tr>
<tr>
<td>scientific projects per million inhabitants, it has a wide network of</td>
<td>economic actors.</td>
</tr>
<tr>
<td>centers for the generation and application of knowledge and scientific</td>
<td>- Despite its high performance in science, knowledge and technology, it has a comparatively low</td>
</tr>
<tr>
<td>and technological infrastructure of great international prestige.</td>
<td>level of knowledge and technology transfer;</td>
</tr>
<tr>
<td>- Catalonia, with 0.1% of the world’s population, accounts for 1% of</td>
<td>- The relative shortage of human resources with knowledge and capacities in the area of technologies</td>
</tr>
<tr>
<td>global scientific production and 2.2% of EU-15 scientific production.</td>
<td>and strategic management &amp; planning.</td>
</tr>
<tr>
<td>- One of the highest GDP in the EU, long industrial tradition, the</td>
<td>- Inflexibility in the education and research system resulting in difficulties of performing joint</td>
</tr>
<tr>
<td>industry is highly diversified, growing number of large and medium-</td>
<td>research projects and mobility.</td>
</tr>
<tr>
<td>sized enterprises. Catalonia is a pioneering region and an international</td>
<td></td>
</tr>
<tr>
<td>reference for cluster policies.</td>
<td></td>
</tr>
<tr>
<td>- Simplified legislative framework and regulatory procedures that</td>
<td></td>
</tr>
<tr>
<td>affect businesses.</td>
<td></td>
</tr>
<tr>
<td>- The Public-private network of public support for entrepreneurship.</td>
<td></td>
</tr>
<tr>
<td>- Increasing attractiveness for FDI, talent and entrepreneurs.</td>
<td></td>
</tr>
<tr>
<td>- The presence of high-quality universities recognized at international</td>
<td></td>
</tr>
<tr>
<td>level and public research centers in the region.</td>
<td></td>
</tr>
<tr>
<td>- International excellence in some sectors, for instance, digital sector</td>
<td></td>
</tr>
<tr>
<td>- Industry 4.0 and MedTech.</td>
<td></td>
</tr>
<tr>
<td>Opportunity</td>
<td>Threat</td>
</tr>
<tr>
<td>- Barcelona as a platform for establishing and developing the businesses</td>
<td>- Strong competition at European level, metropolitan such as Dublin, London, Paris, Vienna etc.</td>
</tr>
<tr>
<td>and networks of innovation, and as a centre for managing business in</td>
<td>thus, providing better (more favourable fiscal conditions and financing for new businesses);</td>
</tr>
<tr>
<td>southern Europe and the Mediterranean area.</td>
<td>- Increasing competition to attract talent at international level.</td>
</tr>
<tr>
<td>- Due to Catalonia’s optimal geostrategic position as a connector between</td>
<td></td>
</tr>
<tr>
<td>the European and Asian economies, the development of the Mediterranean</td>
<td></td>
</tr>
<tr>
<td>rail corridor creates opportunities for attracting goods traffic from</td>
<td></td>
</tr>
<tr>
<td>Asia and destined for Europe.</td>
<td></td>
</tr>
<tr>
<td>- The Catalan R&amp;D system is a centre of attraction for researchers of</td>
<td></td>
</tr>
<tr>
<td>international prestige and is fully interconnected with European</td>
<td></td>
</tr>
<tr>
<td>networks and platforms and</td>
<td></td>
</tr>
</tbody>
</table>
- International networks (stable research and innovation cooperation) with Israel, Massachusetts, USA.
- Catalonia has a wide industrial base with an extensive network of research and technology centres highly competent in the ICTs which has high potential to develop applications for the industry.
- Sustainable urban development ("smart city"), where the region occupies an excellent position and have become international benchmarks.
- Medical tourism is one of the key pillars in the international growth of the Catalan health industry. Its healthcare sector is internationally renowned for its management of health services and primary care, as well as for training and applied R&D.
- Social services are an important economic sector in the region, the that has a very direct effect on employment.
- Increased coordination with other start-ups ecosystem and innovation financing sources for them.
- Technology diffusion around international companies along with the promotion of innovation and technology-based global value chains.
REFERENCES


Generalitat de Catalunya, ACCIO (2019). Why Catalonia for innovation. Provided by ACCIO


Start-up Catalonia platform: http://startupshub.catalonia.com/

Start-up Genome (2017) Barcelona Start-up Ecosystem report. Available at: https://startupgenome.com/all-reports (Accessed 02.08.2018)

APPENDIX A : IN-DEPTH MAPPING INTERVIEWS

Table 11: List of interviewees in Catalonia

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
<th>Date of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscar Sala</td>
<td>MWC Ventures BCN</td>
<td>July 17th 2019</td>
</tr>
<tr>
<td>Andres Manso</td>
<td>INCUBIO – accelerator</td>
<td>July 17th 2019</td>
</tr>
<tr>
<td>Ignasi Costas</td>
<td>RCD- Law <em>firm</em></td>
<td>July 17th 2019</td>
</tr>
<tr>
<td>Maria Hidalgo</td>
<td>NUCLIO – VC investor</td>
<td>July 18th 2019</td>
</tr>
<tr>
<td>Quino Fernandez</td>
<td>CONECTOR – accelerator</td>
<td>July 18th 2019</td>
</tr>
<tr>
<td>Jordi Naval</td>
<td>BIOCAT- <em>cluster</em></td>
<td>July 18th 2019</td>
</tr>
<tr>
<td>Kasia Adamowicz</td>
<td>SeedRocket – accelerator</td>
<td>August (telematic)</td>
</tr>
<tr>
<td>Oriol Pasqual</td>
<td>IQS Tech Factory – centre for entrepreneurship</td>
<td>August (telematic)</td>
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