Abstract

Objective: This research describes and validates how business incubators act as dynamic mechanisms that promote the innovation capacity of companies.

Methodology: There are two parts. First, a review of the literature related to entrepreneurship, mainly from reports of organizations focused on entrepreneurship such as Funcas, GEM, European Commission, Spain Emprende, etc... and, second, a Delphi analysis was carried out by entrepreneurship experts with different training and professional experience, from business incubators of the Community of Madrid, as it is the effect of business incubators on the innovation capacity of companies in Madrid that is under study.

Results: The experts believe that the projects created in the business incubators are innovative projects that allow the implementation of technological advances or new forms of business organization reducing costs and development time. Their main purpose is to seek and help innovative projects that create a much more solid and dynamic business ecosystem and to lower the level of uncertainty. Therefore, the relationship between business incubators and innovation capacity (CTI) is clear, as they are among the best tools to allow innovation capacity to grow continuously and effectively, without the need for large investments.

Limitations: As with any qualitative study, despite the attempt to quantify the results through the arithmetic mean, the results are restricted to interpretation, as the subject studied is of social interest but is not a topic of mass dissemination. To broaden responses and ensure the quality of our study, the Delphi methodology was chosen, and this restricts the number of respondents. Although we tried to expand the profile of our panel as much as possible, any bias and subjectivity that may exist cannot be removed completely. Due to
the cultural background, age or gender of the experts, this methodology is very dependent on the wording of the questions and how they are interpreted.

**Practical implications:** This research allows for a greater understanding of the capacity for innovation of business incubators in Madrid, based on the opinion of experts in the areas of business incubators and entrepreneurship, with the main purpose of learning more about the functions and advantages of business incubators. Thus, entrepreneurs can better benefit from them and both private and public institutions can promote them.

**Keywords:** Entrepreneurship; innovation; business incubator; entrepreneur.

**JEL codes:** L26, L3, O32.

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文章摘要

研究目的：本研究描述并验证创业服务中心如何充当动态机制，换言之，成为加强企业创新能力的工具。

分析方法：研究分为两部分，第一部分为对有关创业的文献进行综合回顾，主要翻阅针对有关促进创业的组织之报告，例如Funcas、GEM、欧洲委员会、España Emprende等……第二部分，我们以德尔菲法，对提供不同培训和拥有不同专业经验之创业专家进行了分析。他们来自马德里自治区不同的创业服务中心，皆因研究目的是要分析创业服务中心对马德里各企业创新能力之影响。

研究结论：专家认为，在创业服务中心所创建的项目具有创新性，其以新颖的形式来组织企业，从而减低成本和开发时间。其主要目的是寻找并协助在孵化的项目，建立更加坚实和活跃的企业结构，并降低不确定性水平。因此，创业服务中心与创新能力之间的关系是显然易见的，皆因它们是能持续及有效地提高企业创新能力而无需大量投资的工具之一。

研究局限：有如任何定性研究一样，纵然我们曾尝试通过算术平均值的计算来量化结果，分析结果也是存有限制性的解释。虽然研究题目具有社会意义，但它并不是一个大规模传播的题目。为了扩大回应样本的范围和确保我们研究的质量，我们采用了德尔菲法进行分析。尽管已尽力扩大所选定小组之范围，却不能完全避免可能存在的偏见和主观性。皆因文化背景、专家的年龄或性别，以及该分析方法是非常视乎问题之表达方式及其阐释方法。

实际应用：这项研究让我们加深了解马德里创业服务中心如何影响企业业务创新能力，有推广大众创业服务中心的功能，让更多人得知其好处，并让更多企业家可以从此获益，从而确保公共和私人机构都支持创业服务中心之服务。

关键词：创业、创新、创业服务中心、企业家。

JEL 分类号：L26, L3, O32。
1. Introduction

The latest data provided by the report of the Savings Bank Foundation, Funcas, assessing business incubators, indicate that there are currently over 4000 business incubators in the world. The United States leads the way with more than 1000 incubators (Funcas, 2019). In the case of Spain, a total of 549 incubators were identified in 2018, compared to 481 in 2017 and 277 in 2016 (Funcas, 2019). This great growth is in line with the importance that the Chambers of Commerce have attached to the development of business incubators since 2007, due to the continuous increase in the unemployed population as a consequence of the economic crisis up until 2013 (GEM, 2017). This situation led to the development of an entrepreneurial culture and business incubators at the beginning of the 21st century, much later than in other European countries, promoted by both public and private entities (National Institute of Statistics, 2018).

The results of the GEM study (2018) show that the economic recession in Spain is not only due to the economic crisis and lack of technical means or funding, but also to cultural aspects that inhibit entrepreneurship, such as fear of failure (De-Pablos-Heredero and Blanco, 2013). A reality of Spanish culture is “taking refuge in more stable and secure jobs rather than taking risks” (Amway Global Entrepreneurship, 2017). This mentality has a very negative impact on an economy in crisis, since it causes many people to become unemployed when there are job cuts. This is the case in Spain with an increase of more than 5 points in unemployment compared to the active Spanish population from 2007 to 2008. When the number of subcontracted jobs decreases, the active population decreases on a large scale (Spanish National Institute of Statistics, 2018).

Numerous studies clearly show that business incubators create many organisations with a high likelihood of survival and enable costs to be reduced (Funcas, 2017; Funcas, 2018; Funcas, 2019; GEM, 2017; Spanish Chamber of Commerce, 2017; Avie, 2017), providing a great opportunity for new entrepreneurs whose resources tend to be limited. According to the Funcas report (2017), the likelihood of a company surviving its first three years of life is just over 50%. However, incubators and accelerators can raise that percentage to 90%.

The relationship between incubators and CTI is clear, as analysed by Funcas (2017), because if economies are to grow continuously and effectively it is essential for them to encourage entrepreneurial activity. Therefore, it is necessary to bear in mind that business incubators constitute some of the best instruments that contribute positively to innovation capacity and business development (Florida High Tech, 2016). Moreover, they play a fundamental role in the development of society because they enable the creation of companies, employment and national growth (GEM, 2017).

The aim of this paper is to describe and validate how business incubators help to develop the innovation capacity of companies as dynamizing mechanisms, from a descriptive proposal, through a review of the literature related to the area of study.
consulting reports and previous papers, and in a qualitative manner, through a Delphi process compiled by the author with a panel of experts.

2. The relationship between business incubators and innovation capacity

Today’s economic situation has significantly reduced the opportunities of finding salaried employment (Expansión, 2018). Therefore, it is necessary to rely on other types of initiatives to reduce the high rates of unemployment suffered by the economy.

For this reason, the European Commission has developed measures to facilitate entrepreneurial activity via the Europe 2020 strategy (European Commission, 2011), to reduce the administrative burden, improve access to funding, reduce the time and cost of creating companies, etc. (Avie, 2017; Spanish Chamber of Commerce, 2017; Funcas, 2017; GEM, 2017; Funcas, 2018; Funcas, 2019). The InnoPolicy Trend Chart identifies more than 1100 measures, including business incubators, to encourage entrepreneurship (Autio and Klofsten, 1998; Rice, 2002). The ultimate purpose of business incubators is to provide services and resources to new entrepreneurs to facilitate the difficult and risky task of creating a business, accompanying and guiding them from its creation and throughout its development until they become independent (Nuez and Górriz, 2008).

The main benefits of the activity undertaken in business incubators are:

- To employment. A country with newly created companies means economic growth and new jobs. These can be of two types: entrepreneur-employer (self-employment), and jobs for potential employees (Ferreiro, Mendoza, Calzada & Aubert, 2018). In this process, business incubators are a key factor in promoting the creation of companies (García, 2018). It is a fact that the jobs created by new companies are few, if not non-existent (autonomous or limited companies that do not hire) (Funcas, 2019). However, a year and a half following their creation, companies begin to hire workers to satisfy the growth of the company and demand. A report by Panorama Laboral of the Community of Madrid (2018) shows that business incubators are a very efficient tool for potential job creation (Ferreiro et al., 2018).
- A study by Florida High Tech shows the impact of its incubation programmes since 2009. Of these, they highlight that business incubators have created 3120 direct and indirect jobs in just two years (Florida High Tech, 2016).
- To innovation. They do not need to be for products / services alone, but often offer new business models and/or ideas.
- For a company to survive and continue competing in today’s market, it is essential to make continuous innovations and improvements, to the point of complete transformation or reengineering of business processes (De Pablos...
New competitors, which are growing daily, are among the market factors that demand this, either because they offer a product/service that is better or more adapted to customer needs, or for other reasons. These factors promote the economic growth of the area (De Pablos Heredero et al., 2019). The administrator of the Business Incubator of the Santiago de Compostela Chamber of Commerce, which ranks first in the Funcas 2019 – 2020 ranking and third in the ranking of business incubators according to data provided by that report, states that business incubators are not just a hosting area (space) or centre for processing administrative processes. They also accompany the entrepreneur throughout the process: from the moment they enter the incubator until they leave with the business created, helping them to create business ideas, choose the most appropriate, complete the paperwork and administrative procedures, training, mentoring, and seeking of funding through all possible routes (Cano, 2019).

- To productivity. Entrepreneurs are people who are willing to work longer hours and more efficiently, since their income is directly linked to their work (Carree and Thurik, 2003). In this regard, it is the purpose of incubators to provide new businesses all the means available for them to achieve maximum productivity, since, in their first few years they will tend to have very low efficiency and effectiveness. This may be the cause of many business failures, as they cannot compete with large businesses and find their niches (Zamora, 2018).

- Growth and economic development. The increase in the number of entrepreneurs and new businesses, driven in turn by business incubators, stimulates the growth and economic development of a given area because they increase and facilitate the movement of capital, resources and capabilities in the area. This puts the national economy of a country in a better position compared to other countries (De Mattos, 2017).

Yet there are disadvantages as well as advantages, one of the main being the increase in competition that reduces profits per company, as well as putting many companies at risk that are unable to establish themselves in the market (Motta, 2018).

In this paper, through a review of the literature and consultation with experts in the field of incubators and entrepreneurship, we will examine the advantages of incubators to check whether practice matches theory.

3. Methodology

The Delphi method is a prospective procedure that aims to collect information through the participation of a group of experts, based on the discussion of a defined problem (Turoff, 1975). This option was chosen because it is a method for
structuring a group communication process, which has an effective result that allows a group of individuals, as a whole: to deal with a complex problem (Linstone and Turoff, 1995). According to Mengual (2011), one individual tends to have lower reliability than a homogenous group of people on equal terms. Therefore, the Delphi method is ideal, as Pareja (2002) indicates, for studying topics where the information obtained in different time horizons is not clear. We selected this method mainly because the subject that we are studying - business incubators - is a concept not yet familiar to most of the population. This is why, to ensure the quality of our study, we have focussed on experts in the field, and therefore despite the disadvantage of subjectivity and a limited panel, the quality of the responses is undoubtedly far superior to questionnaires answered by people unfamiliar with the subject.

After identifying the research problem, the decision was made to use a panel of 15 professionals who, although with different backgrounds and experience, are all experts with proven experience in the field of entrepreneurship.

The incubators used in this article are public and managed in part by the Universidad Rey Juan Carlos and, as Ciencio and Farcellilas say, “the characteristics of business incubators vary according to the type of incubator in question” (Ciencio and Farcellilas, 2005). Of the two models of incubators classified by Grimaldia and Grandia, in turn subdivided into five categories of incubators, the first includes public incubators and business innovation centres, and the second includes private/ corporate and independent incubators. At the intersection of both models, the authors include university incubators (Grimaldia and Grandia, 2005), which are the ones we shall analyse (the incubators we have selected are detailed in Table 1). As such they share characteristics with other incubators: Support and promotion in creating companies and the provision of services to significantly increase the likelihood of success of business initiatives during their first stages (Funcas, 2019). As public incubators they also have their own specific characteristics such as: Economic objectives such as economic growth, social objectives such as the generation of companies, innovation and social development.
### Table 1. Characteristics of the incubators of the Community of Madrid under study

| Public incubators of the Community of Madrid | Location | Sectors of activity of companies hosted | Year of foundation | Managing entity | Surface area in m² |
|--------------------------------------------|----------|----------------------------------------|-------------------|----------------|-------------------|
| Vicálvaro Business Incubator               | c/ Villablanca 85, 28032 Vicálvaro (Madrid) | Information and communication technologies (ICTs) and business management consultancy | 2008              | Universidad Rey Juan Carlos | 2904.48 m² (28 offices) |
| Carabanchel Business Incubator             | c/ del Cidro, 3, 28044 Carabanchel (Madrid) | Information and communication technologies (ICTs) and business management consultancy | 2010              | Universidad Rey Juan Carlos | 6099.07 m² (31 offices) |
| Móstoles Business Incubator                | c/ Federico Cantero Villamil, 2B, 28935 Móstoles, Madrid | Space technologies, technologies and innovation | 2012              | Móstoles Council and Universidad Rey Juan Carlos | 33 offices |
| Puente de Vallecas Business Incubator      | Calle la Diligencia, 9, 28018 Puente de Vallecas (Madrid) | Information and communication technologies (ICTs) and business management consultancy | 2009              | Universidad Rey Juan Carlos | 4000 m² (23 offices) |

Source: Compiled by the author.
The questionnaire was selected as the tool for collecting qualitative information. The information was obtained through open and closed questions in order to dig deeper into the point of view of each panel member, and to gain some measurement concepts from their opinions, such as the arithmetic mean.

The Delphi method was developed in two phases: the first when the questionnaires were sent out (11 June, 2019) and the second with face-to-face or online bilateral communication to expand on the answers to the various questions. The responses received were analysed and if there was disagreement among the experts,
they were contacted to reach a consensus and finally, the definitive results of this analysis were obtained on 10 July, 2019 (Table 3):

### Table 3. Description of the first and second Delphi phase

| Name of expert                     | Date of receipt of questionnaire (first phase) | Meeting with expert (second phase)                          |
|------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| Alberto Romero-Ania                | 12 June, 2019                                 | 14 June at 10:00 in the URJC, Vicálvaro.                     |
| Luis Sosa Martell                  | 12 June, 2019                                 | 14 June at 16:00 in the Puente de Vallecas business incubator. |
| Celia Polo                         | 14 June, 2019                                 | Continuous contact by post to expand on the responses to the questionnaire. |
| Miguel Blanco Callejo              | 16 June, 2019                                 | Continuous contact by post to expand on the responses to the questionnaire. |
| José Pablo Ramírez González        | 15 June, 2019                                 | 17 June at 10:00 in the Móstoles business incubator.        |
| Alberto Galán Granero              | 15 June, 2019                                 | 17 June at 13:00 in Leganés.                                |
| Ana Asensio Ciria                  | 17 June, 2019                                 | 19 June at 16:00 in the Vicálvaro business incubator.       |
| José María González Blanch         | 17 June, 2019                                 | 20 June at 16:30 in the Carabanchel business incubator.    |
| Francisco José Blanco Jiménez      | 20 June, 2019                                 | Continuous contact by post to expand on the responses to the questionnaire. |
| Débora de Esteban Escobar          | 17 June, 2019                                 | 20 June at 16:30 in the Carabanchel business incubator.    |
| Hans Pérez Rubín de Celis          | 24 June, 2019                                 | 25 June at 12:00 in the Puente de Vallecas business incubator. |
| Carlos de Mesa                     | 24 June, 2019                                 | 25 June at 12:00 in the Puente de Vallecas business incubator. |
| Belén Castaño Sánchez              | 26 June, 2019                                 | Continuous contact by post to expand on the responses to the questionnaire. |
| Javier Marchamalo Martínez         | 28 June, 2019                                 | Continuous contact by post to expand on the responses to the questionnaire. |
| Antón García Martínez              | 01 June, 2019                                 | Continuous contact by post to expand on the responses to the questionnaire. |

Source: Compiled by the author.

The open questions of the questionnaire were: Are business incubators concentrated and specialised in Spain?; What do you think is the reason that the entrepreneurial spirit is much less developed in Spain than in other European countries?; In your opinion, are business incubators and capacity for innovation closely linked?
Please give your opinion... The questions were presented dividing the experts into three main groups: those who strongly agree, those who neither agree nor disagree, and those who disagree or strongly disagree, and we explain the most relevant diversities of opinion.

The questionnaire is included in Annexe 1, followed by an explanation of the inspirations/justifications for the questions included:

The concept of helixes comes from the Global Entrepreneurship Monitor report (GEM, 2016), which defines them as the most important bases for the sustainable growth of the entrepreneurial ecosystem. The mechanisms are also based on the same GEM report, but from 2017.

The main areas of benefit are obtained from various sources. They are taken from reports such as GEM 2018-2019, Florida High Tech (2016), Funcas (2018 – 2019), Zamora (2018), as well as more academic papers, published by De Pablos Heredero et al. (2019), Panorama Laboral de la Comunidad de Madrid (2018), Cano (2019), Carree and Thurik (2003), De Mattos (2017) and Motta (2018), which report them under different names in their respective papers, but all of them refer to the same areas of influence relating to the development of the entrepreneur.

The question referring to the poor development of the entrepreneurial spirit in Spain in contrast to other European countries is based on recent news from newspapers such as El País (2018), El Economista (2017), Pymes (2018) and Autónomos (2018), and reports such as GEM 2017.

The questions on the missions, objectives, advantages, functions, impacts and evolution of business incubators are inspired by various studies published on incubators, such as those of the National Business Incubation Association (2012), Florida High Tech (2016), Funcas (2017 – 2018), Funcas (2018 – 2019), Funcas (2019 – 2020), NBIA (2016), GEM (2017), Expansión (2018), European Commission (2003), European Commission (2010), Spanish Chamber of Commerce, 2017 (Avie, 2017) and papers by Rice (2002) and Autio and Klofsten (1998).

The innovation capacities and variables that identify the importance of each, are based on studies conducted by Guan and Ma (2003); Yam, Guan, Pun and Tang (2004), and the relationship between incubators and innovation capacity is inspired by reports such those of the GEM (2017), Funcas (2018 – 2019), and Chamber of Commerce (2017).

4. Results

Below describing the results of the Delphi analysis, are show the experts’ overall scores and impressions for each of the questions posed.

The graph below shows the assessment of the importance attached by the experts to the relationship between the evolution of incubators and the inactive population.
Graph 1. Relationship between the evolution of incubators and the inactive population in Spain according to the opinion of the experts

Fifty-four percent of the experts consider that there is a relationship between the evolution of incubators and the inactive population (47% agree and 7% strongly agree). On the other hand, 46% neither agree nor disagree because this depends on the evolution of other factors such as the entrepreneurial culture (Galán, 2019).

The graph shows the score given by the experts to the different helixes of the entrepreneurial ecosystem.

Graph 2. Importance of the different helixes in the entrepreneurial ecosystem according to the experts

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As we can see in the graph and the table, the helixes valued as most important by the experts as having a good entrepreneurial ecosystem are the university (4.2 out of 5) and the government (4 out of 5). Most of them consider that the university is of vital importance since entrepreneurship is linked to universities (theoretical platform) (Esteban Escobar, 2019) and incubators (practical platform) (Galán and Blanco Callejo, 2019). As well as the importance of the government according to the experts, who believe that there should be government implementation to support entrepreneurial initiatives (Polo, de Mesa, Pérez Rubín de Celis and Marchamalo, 2019) since they provide the funds and decide the policies to promote entrepreneurship (Asensio and Marchamalo, 2019). It is important to promote more education and entrepreneurial culture if the state wants to improve the regional and national entrepreneurial ecosystem (Pérez Rubín de Celis and Marchamalo, 2019).

The graph shows the assessment of the different mechanisms of the entrepreneurial ecosystem.

### Helixes of the entrepreneurial ecosystem

|                          | 1 | 2 | 3 | 4 | 5 | Sum | Arithmetic mean |
|--------------------------|---|---|---|---|---|-----|-----------------|
| Non-university education | 3 | 0 | 7 | 3 | 2 | 46  | 3.07            |
| Consumers                | 0 | 0 | 5 | 6 | 4 | 59  | 3.93            |
| Private sector           | 0 | 0 | 6 | 4 | 5 | 59  | 3.93            |
| Government               | 0 | 2 | 2 | 5 | 6 | 60  | 4.00            |
| University               | 0 | 2 | 2 | 2 | 9 | 63  | 4.20            |

Source: Compiled by the author.

**Graph 3. Importance of the different mechanisms in the entrepreneurial ecosystem according to the opinion of the experts**

![Graph showing importance of different mechanisms in the entrepreneurial ecosystem.](https://ssrn.com/abstract=3560120)
Most of the experts consider that business incubators (4.53 out of 5), financing system (3.86 out of 5) and private initiative (3.73 out of 5) are the most important (Blanco Jiménez, Romero-Ania, Galán, Pablo, Asensio, Blanco Callejo and Pérez Rubín de Celis, 2019), since most important to an entrepreneur is to have access to financing and an ecosystem (business incubators, financing system, private initiatives...) that encourages entrepreneurship (Galán and García, 2019).

The graph below shows the areas of benefit most valued by experts in relation to entrepreneurial development in an economy.

Graph 4. Assessment of areas of benefit related to entrepreneurial development in an economy according to the experts

The areas to which the experts attach the most importance are growth and national economic development and innovation (4.66 out of 5) (Galán, Ramírez, Blanco Jiménez, Asensio, González, Blanco Callejo, Pérez Rubín de Celis and Castaño, 2019), especially at a regional and local level, since in Spain entrepreneurial development depends much more on the autonomous communities than on the country (Galán and Ramírez, 2019).

The graph shows the missions of the incubators to which the experts attach most importance.
Graph 5. Assessment of the importance of the main missions of the incubators according to the experts

For most of the experts all previous missions are important (Blanco Callejo, González, Blanco Jiménez, Romero-Ania, Ramírez, de Esteban Escobar, Castaño and Pérez Rubín de Celis, 2019). By arithmetic mean, the most important is increasing the survival rate of new companies (4.6 out of 5), followed by supporting new businesses through offers (4.53 out of 5), creating an appropriate environment (4.53 out of 5) and minimising the costs associated with entrepreneurial activity (4.53 out of 5). This means that business incubators create an environment that helps to consolidate good business ideas, that do not fail due to a lack of preparation or administrative issues (Blanco Callejo, Galán, Marchamalo, Pérez Rubín de Celis and de Mesa, 2019). They also increase the survival rate of new companies in their first few years since, in addition to training new entrepreneurs progressively accompanying them from before the creation of the company until they leave the incubators, they help to reduce start-up investment costs (Pérez Rubín de Celis and Marchamalo, 2019).

The graph shows the experts’ assessment of the different objectives of the incubators that they consider the most important.
Graph 6. Assessment of the main objectives of the incubators according to the experts

| Objectives of business incubators                                      | 1 | 2 | 3 | 4 | 5 | Sum | Arithmetic mean |
|-----------------------------------------------------------------------|---|---|---|---|---|-----|----------------|
| Promoting activity, employment and revitalising areas                 | 0 | 1 | 1 | 5 | 8 | 65  | 4.33           |
| Versatility                                                           | 0 | 1 | 2 | 4 | 8 | 64  | 4.27           |
| Providing technical and managerial support                            | 0 | 0 | 2 | 8 | 5 | 63  | 4.20           |
| Accelerating company consolidation                                   | 0 | 1 | 2 | 2 | 10| 66  | 4.40           |
| Developing associative and cooperative actions                        | 0 | 2 | 6 | 4 | 3 | 53  | 3.53           |
| Optimising and reducing costs                                        | 0 | 3 | 3 | 4 | 5 | 56  | 3.73           |
| Seeking new support or strategic partners                            | 1 | 2 | 0 | 6 | 5 | 54  | 3.60           |

Source: Compiled by the author.

There is a deal of discrepancy in the opinions of the respondents on the objectives of incubators. Quantitatively, the two most valued objectives are accelerating company consolidation (4.4 out of 5) and promoting activity, employment and revitalising management areas (4.33 out of 5) (González, de Esteban Escobar, Castaño, Pérez Rubín de Celis and Marchamalo, 2019) while others consider all the above objectives to be more or less equally important for incubators (Blanco Jiménez, Ramírez, Blanco Callejo, Asensio and Castaño, 2019).

In the graph we can see the advantages that the experts link directly to the development of incubators.
All the experts agree that all the above advantages of incubators influence the great development that has taken place in recent years (Blanco Jiménez, Ramírez, Marchamalo, Castaño, de Esteban Escobar, González, Romero-Ania and Sosa, 2019). The most important are increasing the possibility of creating companies and jobs (4.6 out of 5), facilities and services (4.53 out of 5) and consolidating ideas and projects (4.4 out of 5) (Marchamalo, Blanco Callejo and Asensio, 2019). It can be said, therefore, that business incubators open the way for any entrepreneur finding the latter difficult to approach alone or who is short on resources (García, 2019).

The graph shows the functions of the incubators that the experts consider most important.
Graph 8. Assessment of the main functions of incubators according to the experts

| Business incubator functions                                                                 | 1 | 2 | 3 | 4 | 5 | Sum | Arithmetic mean |
|---------------------------------------------------------------------------------------------|---|---|---|---|---|-----|-----------------|
| Promoting the entrepreneurial spirit                                                        | 0 | 0 | 1 | 6 | 8 | 67  | 4.47            |
| Advice and mentoring                                                                         | 0 | 0 | 0 | 3 | 12| 72  | 4.80            |
| Carrying out training actions to train everyone in various entrepreneurial skills            | 0 | 1 | 0 | 6 | 8 | 66  | 4.40            |
| Support in business plan preparation                                                        | 0 | 0 | 3 | 1 | 11| 68  | 4.53            |
| Advice and processing for the company’s constitution                                        | 0 | 1 | 2 | 6 | 6 | 62  | 4.13            |
| Undertaking networking activities                                                           | 0 | 0 | 1 | 6 | 8 | 67  | 4.47            |
| Project incubation: coworking space plus offices                                            | 0 | 0 | 1 | 6 | 8 | 67  | 4.47            |
| Acceleration of high potential projects                                                      | 0 | 0 | 6 | 5 | 4 | 58  | 3.87            |

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Most of the respondents agreed that the most important functions are advice and mentoring (4.8 out of 5), increasing the survival rate of companies (4.6 out of 5) and support in business plan preparation (4.53 out of 5). This is consistent because advice and mentoring and support in business plan preparation result in an increase in the survival rate of companies (Blanco Jiménez, Ramírez, de Esteban Escobar, Blanco Callejo, Marchamalo, Pérez Rubín de Celis and Asensio, 2019). However, the experts mention that functions such as acceleration of high potential projects (3.86 out of 5), and such as supporting new business initiatives (4.13 out of 5), are not as important, as there are already business accelerators for accelerating projects (Pérez Rubín de Celis, 2019) and incubator projects do not have to be new business initiatives (Blanco Jiménez, Ramírez and Asensio, 2019) but are often the incorporation of new working methods or new technological tools into traditional businesses (De Pablos Heredero et al., 2019), such as consultancy, management, marketing (Blanco Jiménez, Ramírez & Asensio, 2019)… According to the Madrid Emprende business incubator balance sheet of 2017, 22.5% ICT-related companies and 13% business management consultancy companies are housed in offices (Madrid City council, 2018).

The graph below shows the assessment of incubators in a company’s different capacities.
Graph 9. Assessment of the importance of the actions of incubators on the different business capacities according to the experts

Quantitatively, strategic management capacity is most valued by the experts (4.46 out of 5). Here they are all in agreement that incubators act in a very important way as they offer the necessary resources for incubated companies to have well-defined objectives and strategies in place before going to market (Pérez Rubín de Celis, 2019). In terms of R&D capacity (3.2 out of 5), the experts believe that incubators act more relatively (Blanco Jiménez, Romero-Ania, Asensio, Blanco Callejo and Polo, 2019), because projects incubated in incubators tend to be more feasible.

The graph shows the responses of the experts to the different variables we used in the study that affect a company’s capacity for innovation.
Graph 10. Assessment of the importance of the different variables in a company’s innovation capacity according to the experts

- Collaboration with competitors
- Tax incentives for innovation
- Long-term customer relationships
- Understanding market segmentation
- Development of the organisation’s brand
- Linkage with external sources of financing
- Use of government funding
- Ongoing communication between areas
- Internal resources to develop new products
- Sources of internal company ideas
- Technology acquisition and negotiation
- Knowledge acquisition and protected content
- Technology watch and know-how
- Staff training
- Testing products before they go to market
- Intellectual/industrial property protection
- Project management of new products
- Technology policy formulation
- Incorporating technology into strategies
- Market adaptation and risk acceptance
- Engaging specialist personnel
- Staff selection process

1 - No importance
2 - Little importance
3 - Moderate importance
4 - Important
5 - Very important

Electronic copy available at: https://ssrn.com/abstract=3560120
The variables that the experts consider the most important are market adaptation and risk acceptance (4.73 out of 5), ongoing communication between areas (4.53 out of 5), incorporating technology into organisational strategies (4.4 out of 5), sources of internal company ideas (4.4 out of 5), and staff training (4.33 out of 5). We see, therefore, that the most important resources for a company’s capacity for innovation are:

### Variables that impact innovation capacity

| Variables                                      | 1 | 2 | 3 | 4 | 5 | Sum | Arithmetic mean |
|------------------------------------------------|---|---|---|---|---|-----|-----------------|
| Staff selection process                        | 0 | 0 | 5 | 8 | 2 | 57  | 3.80            |
| Engaging specialist personnel                  | 0 | 0 | 4 | 7 | 4 | 60  | 4.00            |
| Market adaptation and risk acceptance          | 0 | 0 | 0 | 4 | 11| 71  | 4.73            |
| Incorporating technology into strategies       | 0 | 0 | 1 | 7 | 7 | 66  | 4.40            |
| Technology policy formulation                  | 0 | 1 | 4 | 10| 0 | 54  | 3.60            |
| Project management of new products             | 0 | 1 | 3 | 4 | 7 | 62  | 4.13            |
| Intellectual/industrial property protection    | 0 | 2 | 3 | 5 | 5 | 58  | 3.87            |
| Testing products before they go to market      | 0 | 2 | 2 | 1 | 10| 64  | 4.27            |
| Staff training                                 | 0 | 0 | 2 | 6 | 7 | 65  | 4.33            |
| Technology watch and know-how                  | 0 | 0 | 4 | 7 | 4 | 60  | 4.00            |
| Knowledge acquisition and protected content    | 0 | 1 | 3 | 8 | 3 | 58  | 3.87            |
| Technology acquisition and negotiation         | 0 | 0 | 3 | 7 | 5 | 62  | 4.13            |
| Sources of internal company ideas              | 0 | 0 | 1 | 7 | 7 | 66  | 4.40            |
| Internal resources to develop new products     | 0 | 0 | 2 | 7 | 5 | 59  | 3.93            |
| Ongoing communication between areas            | 0 | 0 | 1 | 5 | 9 | 68  | 4.53            |
| Use of government funding                      | 0 | 2 | 1 | 9 | 3 | 58  | 3.87            |
| Linkage with external sources of financing     | 0 | 0 | 3 | 9 | 3 | 60  | 4.00            |
| Development of the organisation’s brand        | 2 | 0 | 1 | 10| 2 | 55  | 3.67            |
| Understanding market segmentation              | 2 | 0 | 2 | 8 | 3 | 55  | 3.67            |
| Long-term customer relationships               | 2 | 1 | 2 | 4 | 6 | 56  | 3.73            |
| Tax incentives for innovation                  | 0 | 2 | 1 | 7 | 5 | 60  | 4.00            |
| Collaboration with competitors                 | 0 | 1 | 5 | 7 | 2 | 55  | 3.67            |

Source: Compiled by the author.
innovation are the technological resources that give rise to new products/services such as new strategies or business models and human resources. These coincide with the resources mentioned by the authors Ibarra and Herrera in their paper “Capacidad de innovación y configuración de recursos organizativos” (Innovation capacity and configuration of organisational resources) (Ibarra and Herrera, 2009).

The graph shows what the experts consider to be the main impacts related to the development of business incubators.

Most of the respondents consider that promoting growth and economic development (4.66 out of 5), creation of companies (4.4 out of 5) and increased employment (4.4 out of 5) are the main positive impacts of business incubators on society, especially public incubators, since their main purpose is socio-economic: to encourage the creation of new companies that will create new jobs and thus improve the regional economy (Blanco Callejo, Asensio, Romero-Ania and Castaño, 2019). We can confirm this impact with the creation of 853 jobs and a turnover of 16.6 million euros by the Madrid business incubator network (Madrid City Council, 2018).

5. Discussion and conclusions

The development of incubators started in the 1950s with the creation of the first in 1951, the “Stanford Research Park” in Silicon Valley, in order to allow the transfer of technology developed in universities to companies, as well as to bring university talent to companies. However, the terminology was not consolidated until the
mid-1980s, specifically in 1985, with the creation of the National Business Incubation Association (NBIA) in the United States (the largest private business incubation organisation in Europe). In the European Union, the first business incubators were set up in the United Kingdom in 1975 with the main aim of stimulating job creation (more than 180,000 jobs) (Toril and de Pablo Valenciano, 2009). As the number of incubators increased in Europe so did the number of their aims according to their specific characteristics and objectives, but they had the common aim of generating economic activity and employment and revitalising the areas in which they were set up. They were instruments for synergy generation that benefited incubator owners, incubators, their clients and their environment (Clarysse, Wright, Lockett, Van de Velde and Vohora, 2005).

The first incubator appeared in Spain in 1987 in Vizcaya, created by BEAZ (Bizkaiko Empresa eta Aurrerapen Zentrua) with the main purpose of promoting innovative projects in the business field (Ortega, 2012). And the first incubator to appear in Madrid was in Getafe in 1992, the “Centro Municipal de empresas P.I. “Los Angeles”. However, incubators did not start to grow widely until 2005, with the creation of the Economic Development Agency Madrid Emprende by the Madrid City Council, whose pillars of action are specified in Ortega Cachón (2012).

We can state, therefore, that the development of incubators in terms of both time horizons and number has varied greatly depending on the country. However, despite their specific individual characteristics the general objectives and purpose of incubators are usually the same: To promote entrepreneurial talent, improve business infrastructure, support innovation in SMEs and to promote foreign investment (Ortega, 2012).

The results of our study conclude the same: 54% of the experts consider that the relationship between the evolution of incubators and the inactive population are related (47% agree and 7% strongly agree), which coincides with the data of the Funcas report that identifies in Spain a total of 549 incubators in 2018, compared to 481 in 2017 and 277 in 2016 (Funcas, 2019). This great growth is partly due to the great importance that the Chambers of Commerce have awarded the development of business incubators. From 2007 in Spain there was a continuous increase in the unemployed population up until 2013 (GEM, 2017), when these figures begin to decrease. And it was these figures that led to a great development in entrepreneurial culture and business incubators in Spain at the beginning of the 21st century, as they play a relevant role in job creation and development (GEM, 2018).

Furthermore, both the respondents (Galán, Ramírez, Asensio, Marchamalo and García, 2019) and the results of the GEM study (2018) show that Spain’s economic recession is not only due to the economic crisis but also because Spanish people find it very difficult to become entrepreneurs, for reasons such as a lack of entrepreneurial culture. Entrepreneurs were not differentiated from businessmen in Spain until the end of the 19th and beginning of the 20th century, and both were defined as wealthy capitalists who exploit workers, and therefore very frowned upon (Galán, Ramírez, Asensio, Marchamalo and García, 2019). There was a lack of technical means and
funding, a lack of an environment promoting entrepreneurship (Blanco Jiménez, Ramírez, Asensio, Castaño, Pérez Rubín de Celis and García, 2019), and risk aversion and fear of failure (Ramírez, Asensio & Castaño, 2019). Spain is a conservative society where mistakes are punished, causing the Spanish population to take refuge in more stable (Castaño, 2019) and secured jobs (Amway Global Entrepreneurship, 2017). As a consequence, there is little room for entrepreneurship/private initiative (Castaño, 2019). This can be confirmed with the increase by more than 5 points in unemployment compared to the active Spanish population from 2007 to 2008 when the number of subcontracted jobs decreases. The active Spanish population is reducing on a large scale (Spanish National Institute of Statistics, 2018).

As for the concentration of incubators in Spain, most experts consider that they are highly concentrated in the large cities (Galán, 2019) where there is more business fabric, more industry and greater promotion of entrepreneurial culture (Asensio, Galán, Romero-Ania, García, Polo, Blanco Jiménez and Ramírez, 2019): Madrid, Levante area, Basque Country, Galicia… According to NSAB figures, 65% of incubators are concentrated in Madrid and Barcelona, 8.5% in the emerging poles of Valencia and Bilbao (NSAB, 2018) compared to less concentration in regions such as Castilla – León, Castilla – La Mancha, Andalusia (Asensio, 2019)… This is confirmed by the Funcas report: in 2017, there were 5 incubators in Castilla – León, 3 in Castilla – La Mancha 3 and 8 in Andalusia (Funcas, 2018). Several experts believe that the philosophy of business incubators should be promoted throughout the country (Marchamalo, 2019) by the regional administrations, since talent and innovation are not restricted to the big cities (Castaño and Marchamalo, 2019).

The 5 helixes assessed in the GEM report as pillars of the entrepreneurial ecosystem are academia, private sector, consumers/people, government and education (GEM, 2016). The result of our study coincides with the result of this report, which considers “education” a fundamental pillar for the generation of entrepreneurs (GEM, 2016) and in turn the raw material for the wealth of a country (Guerra, 2007).

The GEM report states that the mechanisms that most facilitate the development of entrepreneurs’ actions are an efficient and effective network of business incubators, a good financing system, a government with good government practice, private initiatives and institutions that promote entrepreneurship (GEM, 2017). And the experts state that business incubators, a financing system and private initiative are the most important mechanisms (Blanco Jiménez, Romero-Ania, Galán, Pablo, Asensio, Blanco Callejo and Pérez Rubín de Celis, 2019), since funding is most important to an entrepreneur (financing system), and access to government aid/public services for business, which companies as private entities would otherwise be unable to access (business incubators) (Galán, 2019) and to have a start-up to support entrepreneurial initiatives (Asensio and Marchamalo, 2019): put up funds, promotion policies, … (Government) (Polo, de Mesa, Pérez Rubín de Celis and Marchamalo, 2019). With the other helixes, there is more discrepancy, some consider that the consumer is a key element for an enterprise to end up as a business (Blanco Callejo, González, Ramírez,
Sosa and García, 2019), while others consider them less important (Asensio, Galán, and Blanco Jiménez, 2019) as they are very much linked to the market, but are not as important as other agents (Blanco Jiménez, 2019). In the private sector there are also different opinions, some of the experts consider them very important since collaboration between companies allows open innovation (Blanco Jiménez and García, 2019), while others consider them less important (Asensio and Galán, 2019).

As regards the importance of mechanisms in the entrepreneurial ecosystem, Cantillón (1977) had already stated that it was entrepreneurs who made the market develop correctly, and therefore it is necessary to create suitable ecosystems to encourage supply and demand. This study shows likewise: A good ecosystem (business incubators, financing system, private initiatives…) that promotes entrepreneurship is essential for the development of companies (Galán and García, 2019), and business incubators are a key element for the development and creation of an efficient and effective entrepreneurial ecosystem, since they help in mentoring the entrepreneur and with financing, which is the most difficult part for entrepreneurship (de Mesa, 2019). Furthermore, “business incubators are an excellent initiative that allows companies to “make mistakes cheaply”. In other words, the environment provided by incubators helps future entrepreneurs to refine good business ideas, or even to modify certain models, by pivoting and creating models that are more appropriate to the demands and needs of consumers (Blanco Callejo, 2019). Rubín de Celis (2019), considers that “business incubators are mechanisms that help and govern the business not only in the areas where they are located but also at a local level by providing tax payments and generating direct and indirect employment” (Peréz Rubín de Celis, 2019). Therefore, the development of a good network of incubators is one of the most important challenges that an economy must face in order to efficiently encourage entrepreneurial activity (Cantillon, 1755). Incubators allow for a reduction in information, administrative and training costs, thus encouraging new entrepreneurs to set up companies, as well as making entrepreneurship more accessible to the general public (Funcas, 2019), with the consequent positive consequences/impacts on society: an increased number of companies and employment, growth and with it, greater economic development (Blanco Callejo, Asensio, Romero-Ania and Castaño, 2019). The experts agree that the major impacts are (Blanco Jiménez, de Esteban Escobar, Ramírez, González, Marchamalo and Pérez Rubín de Celis, 2019) increased innovation capacity (de Mattos, 2017) both at a private and societal level (De Pablos Heredero et al., 2019), promoting increased productivity (Carree and Thurik 2003)... According to the experts, above all at a regional and local level, but also at a national level (Galán, Ramírez, Blanco Jiménez, Asensio, González, Blanco Callejo, Pérez Rubín de Celis and Castaño, 2019).

This paper shows that the functions defined by NBIA (2016) are important and even very important in incubators (Blanco Jiménez, Ramírez, de Esteban Escobar, Blanco Callejo, Marchamalo, Pérez Rubín de Celis and Asensio, 2019). However, not all of them have the same importance, as the main purpose of incubators is to
improve the economy by creating new companies and employment (González and Asensio, 2019) unlike accelerators. There are also experts who consider that incubators are not closely linked to the above functions (Galán and Polo, 2019). They only distinguish two groups of functions associated with two main objectives: helping survival and collaborating in business innovations (Galán, 2019).

Of the organisational capacities directly associated with technological innovation, sources selected by Guan et al. (2003) who compile 6 sources or dimensions: R&D capacity, resource management capacity, organisational learning capacity, strategic management capacity, marketing capacity and organisational capacity (Guan, Ma, 2003; Yam, Pun and Tang, 2004), the study results show that for most of the experts, strategic management is where incubators play a very important role.

Some of the experts believe that projects created in incubators are innovative (Galán and Romero-Ania, 2019), but not only technological innovations lead to new products or services, new business models or business procedures can also be considered business innovations (De Pablos Heredero et al., 2019). Other experts also consider that incubators have little to do with innovation capacity (Asensio, Polo and Sosa, 2019), since they consider that not all incubator projects are technological/innovative, there is a lot of traditional business, especially in the public business incubators of the Madrid City Council managed by the Universidad Rey Juan Carlos (those considered in this study), except the Móstoles incubator (Asensio, 2019), which receives funding from the European Space Agency. Therefore, incubated projects are more focused on technological innovations (Ramírez, 2019).

We can conclude that, according to the Delphi analysis, business incubators have a strong influence on technological and innovation capacity at both a national and a regional level. Their positive effect is the increased creation of companies in the innovation and technology sector, one of the weakest sectors of the Spanish economy, without the need for major investment.

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