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## **Mission statements and performance: An exploratory study on science parks**

Science parks play an important role in the promotion of innovation. Their objective is to act as a bridge between universities and the industry with the support of public administrations. However, the specific role of a Science Park might vary depending on environmental context. For that reason, the mission statement of Science Parks can greatly differ from one another. This study examines how Science Parks define their mission statement and explores the relationship between mission, management involvement and performance. The study adopts a qualitative approach using as empirical setting Spanish Science parks.

Keywords: Science parks; mission statement; strategy; knowledge transfer; Spain

### **1. Introduction**

Research and innovation are of paramount importance to enhance productivity, competitiveness, and growth. Aiming at becoming an innovator leader, Europe has put both research and innovation at the heart of its economic strategy by setting the goal of reaching a 3% R&D intensity by 2020 (European Commission, 2013). A reinforced innovation policy has therefore been implemented in European countries, narrowing the gap between industry and science and facilitating the knowledge flow from academia to industry's front line. To this end, different support infrastructures such as business incubators and science parks (SPs) have been created. While the former accelerate the establishment of young firms and support them to survive during their start-up stages,

the latter are powerful drivers of industrial, economic, and social development.

Although both business incubators and SPs are indispensable policy instruments, for the purpose of this study we concentrate on the analysis of science parks.

According to the United Kingdom Science Park Association (UKSPA), a science park is a business support and technology transfer initiative that (1) encourages and supports the start-up and incubation of innovation-led, high-growth, knowledge-based businesses, (2) provides an environment where larger and international businesses can develop specific and close interactions with a particular center of knowledge creation for their mutual benefit, and (3) has formal and operational links with centers of knowledge creation such as universities, higher education institutes, and research organizations. This translates into saying that the different agents that interrelate in the territory following the Triple Helix model – industry, universities, and public administration – are all equally responsible for promoting a culture of innovation. In this setting, SPs acquire a leading role, being placed at the interface between industry and academy (Malairaja and Zawdie, 2008). Due to physical proximity, in SPs, university-industry interactions are boosted, promoting the establishment of synergies between research centers and businesses located in the park. As such, SPs act as catalysts for regional and national economic growth (Link and Scott, 2007).

Given the strategic relevance of SPs, European Cohesion Funds have been called upon to support their establishment and development (Nauwelaers et al., 2014). Although all SPs pursue similar objectives, their design and operation strategies may differ (Berbegal-Mirabent et al., 2017). This is so because SPs are somehow embedded in their regional contexts, meaning that each park is expected to respond to case-specific regional needs. This situation implies that SPs face dissimilar realities, are provided with different levels of resources, and consequently have different opportunities for

creating and disseminating knowledge. Therefore, SPs may have different missions as the specific characteristics of the region—culture, industry fabric, and economic wealth—somewhat influence SPs' mission statements.

A mission statement is a declaration of an organization's reason for being that reveals what the organization wants to be and whom it wants to serve (David, 1989; Bart et al., 2001; Noy, 1998). The concept of mission statement was developed in the early 1980s when academics and managers recognized the importance of having a mission statement in all types of organizations (Hamel, 1996). Going a step further, Palmer and Short (2008) pointed out that mission statements provide an important reflection of organizational identity, showing the purpose and reason for the organization's existence.

Previous literature on SPs has placed little attention on how parks define themselves (Phan et al., 2005). Following Drucker (1974) we believe that there is a need for a better understanding of mission statements and that this topic is of interest in the context of science parks (Bigliardi et al., 2006). In this respect, we argue that an effective and well-developed mission statement can help align SPs' goals with a better exploitation of the knowledge generated.

This exploratory study, contributes to the existing literature on SPs in two main ways. First, we dive deeper into how SPs define themselves. To do so we qualitatively analyze the mission statements of SPs using Pearce and David's (1987) eight components and Bart's (1997) work on mission stakeholders. Content analysis is used to extract information from the mission statements. Second, based on how the mission statement is defined, we establish different typologies of SPs and try to establish a connection between technology transfer outputs and how the mission statement is written. An exploratory cluster analysis is the methodology chosen for the identification

of behavioral patterns across SPs. Finally, we examine the alignment between how SPs formulate their mission statements and what managers think about them.

To provide insights concerning this issue, this study is set in Spain. Like many other European countries, Spain has strongly been hit by the 2008 global crisis. Indeed, the economic downturn has negatively impacted the intensity of business R&D. Spain faces several challenges with regard to innovation activity. First, there is a need for better coordination of research and innovation policies, as the current interaction between public and private research is insufficient (Nauwelaers et al., 2014). Certainly, there are scarce incentives for the establishment of university-industry partnerships. The low rates of business participation in R&D activities further corroborate this statement. Second, R&D intensity and innovation performance in Europe are far from the 2020 target values—the average European Union R&D intensity compound annual growth required to meet the 2020 target 2014-2020 is of 6.69%. This study, therefore, is expected to provide also some practical implications as it can help managers take advantage of the existing SPs.

The remainder of the paper is organized as follows. Section 2 offers a synthesized retrospective of SPs and their distinctive features. Next, Section 3 reviews the academic literature on mission statements and focuses on the purpose of a mission and the components it might contain. Then, Section 4 presents the method followed and describes the sample. Section 5 discusses the results. The article ends with some concluding remarks and implications for future research.

## **2. Science parks as advanced support infrastructures**

### ***2.1 Theoretical underpinnings***

Science parks play a very important role in a country's innovation system (Cooke,

2001; Zou and Zhao, 2014). They are tools for the generation of knowledge and innovation, but they cannot develop their true function if the innovation system does not work properly. Their origin dates back to 1950 in the United States, when SPs were established to foster the commercialization of university research. The first example can be found in the Silicon Valley. Today, SPs are present in 73 countries of the world trying to replicate the singularities of Silicon Valley. In Europe, science parks emerged in the '60s, being mainly established near college campuses. The science park promoted by the University of Cambridge (UK) and the Sophia Antipolis Science Park (France) were two of the pioneers.

Although SPs can be referred to by a wide variety of terms (science parks, research parks, technology parks, innovation centers, commercial incubators, business parks, and technological districts/poles) (Minguillo et al., 2015), they are popularly referred as science parks. Following the definition of the International Association of Science Parks and Areas of Innovation (IASP), we define an SP as *“an organization managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities.”* In other words, SPs are called on to play an effective role in regions by encouraging both national and regional development (Hansson et al., 2005), hastening innovation in SMEs (Albahari et al., 2018; Ramírez-Alesón and Fernández-Olmos, 2018), speeding up product innovation (Díez-Vial and Fernández-Olmos, 2014;

Vásquez-Urriago et al., 2014), promoting wealth creation and business profitability (Phan et al., 2016), generating new jobs (Löfsten and Lindelöf, 2002; Ratinho and Henriques, 2010).

Narrowing the gap between academic research and industrial activity is therefore central. Both science and industry can obtain major gains if they collaborate rather than work in isolation (Nielsen et al., 2016). Yet, it is surprising that little attention has been devoted to the organizational structure and strategic orientation of SPs—and other intermediate infrastructures aimed at speeding up technology transfer activities within science institutions (Debackere and Veugeles, 2005). Likewise, there is a lack of scholarship on either their performance or their efficiency (Albahari et al., 2013). The main reason behind this is that knowledge transfer processes within SPs are difficult to map out and generalize.

Despite the promising contribution of SPs to the regions and neighboring territories where they are located, there are critical voices that view them as following an obsolete conceptualization of such policy goals. According to Quintas et al. (1992) and Phillimore (1999), SPs rely on an outdated, linear model of innovation which assumes that scientific knowledge can be easily transferred from a research center to a firm. In a recent work, Rowe (2014) suggests a new model, whereby an SP should make itself an integral part of its local innovation ecosystem, work with it, balance the need for short-term financial returns to secure sustainability, and engage with the private sector to secure capital for development. Future research is therefore needed in order to effectively exploit the full potential of SPs.

## ***2.2 Science Parks in Spain***

SPs emerged in Spain in the '90s and spread throughout Spanish universities as a result of several policies designed to foster knowledge transfer activities. Universities started

to build up these spaces very rapidly; but strategies to make the most of these infrastructures efficiently were not always properly designed (Berbegal-Mirabent et al., 2017). The result has been a high number of SPs scattered throughout Spain. According to the directory of the Spanish Association of Science Parks (APTE), there are 64 SPs registered, 51 of which are fully operational.

The 2017 annual report of the APTE indicates that, at the close of that year, Spanish SPs had 8,013 companies and other entities installed within their perimeters. That number represented a 2.9% increase over the previous year. Employment also improved significantly, increasing the number of job opportunities inside the parks by 5% (169,337 employees). The turnover of the companies reached 27.043 million euros invoiced, 3.7% more than in 2016. Analyzing performance results by sector, information technologies led the ranking with 23.1% of the companies operating in this sector, followed by engineering, consulting and advisory (19.2% of the companies) and medicine and health (6.1%). In terms of technology transfer outcomes, SPs accumulated an investment in R&D activities of 1.072 million euros. The total number of patents granted by firms located in Spanish SPs in 2015 was 373, and 189 additional patents were registered for application.

### **3. Mission statements: Purpose and components**

Mission statements have been a focus of scholarly analysis since the late 1980s (Alegre et al., 2018). A mission statement is an enduring statement of purpose that reveals an organization's products or services, markets, customers, and philosophy (Pearce and David, 1987). Firms need to establish their goals and strategy. Having a mission statement is believed to be the first step in this strategic planning process. Only after a mission statement has been developed can appropriate objectives and strategies be formed properly in all segments of a company (Ireland and Hitt, 1992).

A mission statement is composed by a set of components. Following Pearce and David (1987), mission components can be classified in eight groups based on their content: (1) specification of target customers and markets, (2) identification of principal products/services, (3) description of the geographic domain, (4) identification of core technologies, (5) expression of commitment to survival, growth and profitability, (6) specification of key elements in the company philosophy, (7) description of the company's self-concept, and (8) explanation of the firm's desired public image.

Some years later, Bart (1997) analyzed 44 mission statements from industrial firms and identified 25 components. However, only 11 of them showed high usage. These components are: (1) organizational purpose or *raison d'être*, (2) statement of values/beliefs/philosophy, (3) distinctive competence/strength of the organization, (4) desired competitive position, (5) relevant/critical stakeholders identified, (6) statement of general corporate aims/goals, (7) one clear and compelling goal, (8) specific customers/markets served, (9) concern for employees, (10) concern for shareholders, and (11) a statement of vision.

According to Bartkus et al. (2006) the benefits of developing and transmitting the firm's strategy has not been fully determined yet. While theoretical models have been developed, the existing literature still shows limited evidence to prove their effectiveness. However, prior mission statement studies confirm that, when a mission statement is well created and implemented, it has an impact on the performance of the company, the firm's values and ethics, and its stakeholders. Thus, because previous works examining mission statements were found to be incomplete, Bartkus et al. (2006) proposed a three-approach typology to measure the quality of a mission statement. This approach considers a first measure, which examines the specific components included in the mission statement (Bart, 1997; Botterill, 1990; David, 1989; Ireland and Hitt,



1992; Pearce and David, 1987; Sufi and Lyons, 2003). The second measure focuses on the stakeholders mentioned in the mission statement (Bart, 1997; Leuthesser and Kohli, 1997). The third measure highlights its purpose or objectives (Bartkus et al., 2000): (1) the mission statement may be a public declaration of the firm's direction, stating where the firm is heading; (2) it may serve as a control mechanism by identifying boundaries that prevent a firm from engaging in unrelated or inappropriate business activities; (3) it can assist employees in making non-routine decisions by expressing the firm's values and priorities; and (4) it can motivate and inspire employees by creating a shared sense of purpose.

In recent years the debate on mission statements has now focused on examining the potential effect of having a sound mission statement on the performance of the organization. The preliminary work of Bart (1997) revealed some interesting findings. Specifically, this author focused on the impact of including the stakeholders (customers, employees, suppliers, society, shareholders) in the mission statement and the financial performance of the firm. A negative and significant relationship was found. The only exception was when the mission statement included a clause that referred to the employees. In this case, a positive relationship was observed. This study provided additional insights to the previous work of Pearce and David (1987), who found that three components—namely company philosophy, self-concept, and public image—were more often exhibited by high-performing firms. However, O’Gorman and Doran (1999) replicated Pearce and David’s (1987) work and concluded that those three components did not improve the firm’s performance, at least, in the context of Irish SMEs. As for the inclusion of financial objectives in mission statements, Bart and Baetz (1998) found a negative association with firm performance. In a more recent work, Bartkus et al. (2006) analyzed the mission statements of the companies listed in the 2001 edition of

Fortune Global 500. Their results give support to the argument that including the most critical stakeholders in the mission statement helps executives focus their efforts and, consequently, have a positive impact on the firm's performance. Additional tests revealed that the inclusion of different stakeholder groups implies different courses of action which, in turn, might have different impacts on performance.

In the specific area of research and knowledge transfer activities, it is worth highlighting the works of Philipps (2013) and Jungblut and Jungblut (2016), both focusing on the German context. While the former examines the mission statements and self-descriptions of German institutes and government research agencies, the later does so for German universities. The overarching conclusion is that differences among institutions are observed. However, performance is not found to be correlated with how the mission statement is articulated. Similarly, the study of Fitzgerald and Cunningham (2015) addresses this issue, by exploring the components of the mission statements of university technology transfer offices (TTOs) using Pearce and David's (1987) eight components. Their results indicate a moderate but positive correlation between patents granted and number of mission statement components. Two dominant mission components were found, referring to *who* are the target customers/markets and *what* the business is the business about (products/services).

To conclude, we argue that there is no clear guideline on how mission statements should look like. Yet, given their relevance as strategic tools that emphasise an organisation's uniqueness and identity, further research is needed. In this vein, we believe that a well-developed mission statement can assist in aligning SPs' goals with the creation and dissemination of knowledge transfer. Specifically, the use of a mission statement by a SP may be helpful in establishing the strategy of the park and in defining its business model.

## **4. Data and methods**

### ***4.1 Data and sample***

Among the 64 parks registered in the Spanish Association of Science Parks, 51 are fully operational (full members), 10 are under development (affiliate members), 1 is an entity that have an interest in creating a park (collaborator members), and there are 2 additional honorific members.

Klemm et al. (1991) observed that mission statements are seen by managers as having a more important role internally than externally. This observation is shared by others authors, who have found that many companies do not publicize their missions outside the company, either on their webpages (Bart, 2001) nor in their annual reports (Leuthesser and Kohli, 1997). Based on this premise, a questionnaire was designed.

Before sending the survey to respondents, a panel of three experts reviewed the consistency of the survey and the clarity of the questions. After this round of review, minor issues were fixed. In order to get better participation in the survey, we attended the Iberian Meeting'16 organized by APTE in Granada (Spain). During the meeting we explained the purpose of this study and had the chance to make direct contact with some of the directors of the Spanish SPs. Unfortunately, not all parks were represented. The survey was then sent to respondents (either the director of the park or the assistant director) and it was available from November 2016 until January 2017. Despite the interest shown when the study was presented, returned surveys were in some instances incomplete. Specifically, answers to questions referring to key performance indicators. Aiming at working with parks from which full information was available, our final sample contains 20 SPs, of which 19 are full members and one is an affiliate member. This sample includes SPs located in 11 of the 17 autonomous communities of Spain.

The survey was structured in two parts. First, respondents were asked to write the mission statement of the park they were representing and then to self-reflect on the primary objectives of the mission, with questions based on the work of Bartkus et al. (2000). Thus, using a 5-point scale (1 = completely disagree; 5 = totally agree), they should indicate (i) the degree to which the mission statement was a public declaration of the SP's direction, (ii) the degree to which the mission statement was being used as a control mechanism, (iii) the degree to which the mission statement expressed the SP's values, and (iv) the degree to which the mission statement motivates and inspires employees by creating a shared sense of purpose. Next, section 2 included indicators of performance: budget of the park, number of firms established in the park, total turnover of companies incubated in the park, employment created by the companies in the park, number of patents granted, number of spin-offs created in the park during the last 5 years, and number of spin-offs created in the park for the year in focus (2015). All data collected referred to the year 2015.

On average, the science parks in our sample were established in the early 2000s. The average budget in 2015 was of 5,300 billion euros and generated an average income of circa 490,000 billion euros. In terms of firms established, on average, each park in the sample attracted 120 companies, and the total number of companies involved was 2,392. Lastly, in terms of new jobs created, the average number is 3,685 per park.

#### ***4.2 Method***

A two-stage analysis was conducted. First, we explored which components were included in the mission statements of SPs using content analysis. In a second stage, we ran a cluster analysis to group SPs based on how they define the mission statement. Differences in technology transfer outputs due to mission statement formulation were also examined. Lastly, we investigated whether SPs' managers were aware of the

mission statement of the park their represented. The following sections provide further details on how the empirical analysis was performed.

*Stage 1: Content analysis*

Content analysis has been used in prior studies as a qualitative research technique that allows the analysis of a written message (Bart, 1997; Biloslavo and Lynn, 2007; David, 1989; Kemp and Dwyer, 2003; Moss et al., 2011). Following the seminal studies of Pearce and David (1987) and Bart (1997) we used this technique to examine the presence of mission statements' components and stakeholders, respectively. Aiming at avoiding subjectivity when identifying and classifying the components, a keyword list was established, following a similar procedure to the one used in previous studies (Bartkus et al., 2006).

The mission statement components respond to the first measure of mission statement quality (Pearce and David, 1987; David, 1989). The components that might appear in a mission statement are: target customers and markets, products and services, geographic domain, core technologies, commitment to survival, philosophy and values, and self-concept. Table 1 contains the key terms that were used to identify each of the components. Notwithstanding, it was not possible to define a list of key terms that refer to three of the components: "core technologies," "self-concept," and "public image." In this case, the analysis was done considering the global message of the mission instead of looking for specific keywords.

Insert Table 1 about here

For the second quality measure, we followed the approach used by Bart (1997). The

stakeholder group was identified by the terms listed in Table 2.

Insert Table 2 about here

### *Stage 2: Cluster analysis*

In the second stage, an exploratory non-hierarchical cluster analysis (k-means) was used to group the Spanish SPs. Two different clusters were run: a first one, in which the clustering variables are the eight mission statement components defined by Pearce and David (1987), and a second cluster, based on the five stakeholders groups identified by Bart (1997). Our main purpose is to group SPs according to how the mission is articulated and identify patterns of behavior.

The cluster analysis is based on the Euclidean distance between vectors of the standardized values of the variables under analysis (Anderberg, 1973; Everitt, 1980). This procedure allows for classifying observations according to the similarities of organizational and environmental dimensions. To corroborate the number of clusters and the validity of the analysis, we first computed the Calinski and Harabasz (1974) statistic. This index was obtained as  $CH(K) = \frac{B(k)/(k-1)}{W(k)/(n-k)}$ , where  $B(k)$  and  $W(k)$  are the between- and within-cluster sums of squares, with  $k$  clusters. The number of clusters that maximizes the  $CH(k)$  index was 3 in both cases (pseudo-F values: 8.11 and 9.73, respectively). Therefore, both cluster analyses asked for a three-way division. Second, a discriminant analysis was used to further validate that our approach was appropriate.

## **5. Results and discussion**

As shown in Table 2, when we cluster SPs following Pearce and David (1987), the only component that consistently appears in all groups is “products and services.” Entering

into the specificity of the results, we observe that SPs in groups 1A and 2A share some similarities. Specifically, the common components are: customers, products and services, geography and commitment to survival, growth, and profitability. However, SPs in group 1A distinguish themselves from those in group 2A by explicitly expressing their philosophy and by placing special emphasis on the public image, that is, the objectives pursued by the park. By adding these two additional components into their mission, one might expect that SPs in group 1A would outperform those in group 2A in terms of performance. Nevertheless, additional descriptive measures (see Table 4) reveal that SPs in group 2A achieve higher outcomes (in average numbers). These results suggest that a meaningful mission statement does not necessarily have to include the eight components defined by Pearce and David (1987), but requires a clear focus. In the case of SPs this focus relates to a customer- and product orientation that has its foundations in the entrepreneurial nature of the parks. SPs are entrepreneurial ecosystems based on formal and informal networks between the different agents located in the park (Piqué et al. 2008) for the provision of new knowledge and cutting-edge technologies with a potential impact in their geographical area of influence. Consequently, customers and products/services offered together with the geographical scope are of paramount importance and need to be included when defining the mission statement of a SP. An effective mission statement is not determined by its length but by its focus. Otherwise, the mission would be difficult to understand and interpret, and thus there would be a misalignment between the mission and the SP ecosystem.

Insert Table 3 about here

Insert Table 4 about here

Compared to SPs in groups 1A and 3A, SPs in group 2A are highly proactive in the number of firms established and new jobs created. Likewise, for the year 2015, they exhibited a high number of patents granted and spinoffs created. Note that these results are achieved with a moderate level of resources. That is, on average, SPs in group 2A (and also those in 1A) do not enjoy high budgets. On the contrary, SPs in group 3A outperform those in the other groups in this indicator; however, their outcomes (e.g. patents, spinoffs, firms established and jobs created) are rather low. We argue that the rationale behind these results lies in the way the mission statement is formulated. When diving deeper in the mission statements of SPs in group 3A we observe that these parks clearly articulate their products; nevertheless, they do not do so when referring to the other components. In this respect, it does not become evident who their clients are, what their image is, and how they interact with the territory.

To further explore what SPs' mission statements look like, we conducted a second cluster analysis, grouping SPs based on the classification scheme of Bart (1997). According to this author, a mission statement might include five different stakeholders: customers, employees, investors, suppliers, and society. Table 5 displays the results. In this case, almost all the missions from the SPs in the sample refer to the customer, corroborating our finding in the previous analysis (see Table 3). Contrarily, very few mission statements mention employees (1 out of 20) and suppliers (3 out of 20).

As previously discussed, by definition a SP aims to increase the wealth of its community. This commitment to society is not only a theoretical purpose, but it is also mirrored in the mission statements of the SPs analyzed. Therefore, we argue that there is an alignment between the theoretical definition and the practical application. As shown in Table 5, SPs in group 2B and almost all in group 1B corroborate this fact.



Insert Table 5 about here

Insert Table 6 about here

A distinctive feature of SPs in group 1B is the inclusion of investors in the mission statement. Investors are expected to help the park attract new businesses and reduce risk perception for new entrants to establish in the park. As we look more deeply into the specific performance results (Table 6) of SPs in group 1B, data reveal that, on average, these parks are the ones with the highest number of new firms located and generate the highest number of new job opportunities. Given these results, we hold that including investors within the mission statement builds trust among potential companies that are considering establishing in the park. Knowing that renowned partners (e.g. universities, public administration, business angels, and venture capitalists) are supporting the SP increases the credibility and prospects of success of the park.

As for the mission statements of SPs in group 3B, it is possible to observe that they only refer to one stakeholder: the customer. Despite this customer-focus approach, performance results are rather low, although on average SPs in this group enjoy high budgets.

Lastly, aiming at investigating managers' perceptions of the mission statements, we analyzed their responses provided in section 1 of the survey. Specifically, we compared their opinions about the role of the mission (following Barktus et al., 2006) with the results of the content analysis. Table 7 summarizes this matching.

Insert Table 7 about here

The first question (*Q1: The degree to which the mission statement was a public declaration of the SP's direction*) should be somewhat reflected in two of the components defined by Pearce and David (1987), namely “company self-concept” and “company philosophy.” Results in Table 7 indicate that managers consider their mission to express the ultimate goal of the SP; however, mission statements rarely include the self-concept and philosophy of the park (only in 15% and 40% of the cases managers reported a score equal to or above 4, respectively).

The second question (*Q2: The degree to which the mission statement was being used as a control mechanism*) can be understood as the extent to which the mission statement helps in defining the activities to be carried out, that is, the products/services to be offered. Following this rationale, results in Table 7 indicate that there is a correct alignment between managers' perceptions and how the mission statement is articulated. The degree to which the mission statement was expressing the SP's values (*Q3*) can be associated with the “desired public image” component. Results in Table 7 are inconclusive, meaning that roughly half of the SPs in the sample do include this component in the mission statement, and the managers from these parks acknowledge having this dimension in consideration.

Finally, question 4 (*Q4: The degree to which the mission statement motivates and inspires employees by creating a shared sense of purpose*) clearly refers to employees (one of the stakeholder categories identified by Bart, 1997). In this case, it is worth noting that managers interpret the mission as a tool that helps employees to perform their tasks in an efficient way; notwithstanding, the content analyses revealed that, out of the 20 SPs reviewed, only one mentioned this stakeholder group in its mission statement.

## **6. Implications and conclusions**

SPs play an important role in the promotion of innovation systems, and they typically respond to specific regional needs. SPs are mechanisms that accelerate knowledge creation and innovation by taking advantage of the knowledge spillovers resulting from the geographical concentration of research centers and businesses. If, as according to the European Commission (2013), SPs are expected to play a dominant role in the economic and social development of regions, the first step to ensure that they respond to this demand is to review their mission statements and check whether the missions are consistent with their current performance. Likewise, in a second step, it is also necessary to determine how SPs' managers interpret the mission and align it with the ultimate goal of the park.

This study, with a markedly exploratory nature, addresses these objectives by qualitatively analyzing the mission statements of 20 SPs located in Spain. In doing so, it makes several contributions to the existing literature. First, this study offers a new approach to the study of SPs. To the best of the authors' knowledge there is only one article dealing with mission statements of parks (Bigliardi et al., 2006). However, the approach adopted in that study is slightly different as it proposes a system for evaluating the performance of science parks based on their mission. Our study takes as the starting point the work of Fitzgerald and Cunningham (2015), but applied to SPs. The original value of our work is that we go a step further by considering not only mission statement components but also other elements, namely the stakeholders and the objectives. By adopting this triple perspective we are able to determine which components and stakeholders are more commonly represented in the missions and if these have an impact on the performance of the park. As for the objectives, we tested how SPs' managers perceive the mission and whether it is expressed in a meaningful way.

Second, this study has value for SPs' managers, as mission statements are important artifacts that should effectively communicate what is the rationale of a park and unequivocally reach all potential stakeholders and an external audience. From our analysis it can be inferred that including more mission components in the mission statement of an SP does not necessarily lead to a positive impact on knowledge transfer outputs. These results are similar to those obtained by Bartkus et al. (2006), whose findings cast doubt on the notion that organizations should formulate comprehensive mission statements that include all stakeholders, components, and specific objectives. As discussed above and echoing Bartkus et al. (2006), not all of the eight components defined by Pearce and David (1987) help the firm's bottom line. On the contrary, if they are all included, there is no sense of focus. Accordingly, we suggest using short and concise mission statements that clearly articulate who the customers are, what products/services are offered, and what is the geographical domain. Other mission elements that are worth mentioning are investors and society and. As Bartkus et al. (2006) state, the presence of society in the mission shows to both internal and external stakeholders that the organization operates within socially approved boundaries and, in the case of an SP, that it intends to increase the wealth of its regional community.

Third, our results seem to indicate that managers do not place the importance they should on mission statements. As earlier discussed, there is a misalignment between what managers think the mission communicates and what the mission actually expresses. Likewise, they believe mission statements help employees to perform their tasks better, when in fact hardly any of the missions reviewed include this group of stakeholders. Therefore, we strongly recommend revising and reformulating the mission statement in order to make it more purposeful and relevant. Nevertheless, it is important to note that some stakeholders might have a strong influence over the mission of a park

and how it operates (Phan et al., 2005). SPs' managers cannot freely make decisions that shape and compromise the future of the park. However, they should be more aware of how the park is defined and what is it currently doing. As noted by Drucker (1974), missions evolve; consequently, it is of the utmost importance to revise the mission statement in order to exactly express what the SP is.

This study is not free of limitations. Although we have been able to conduct a comprehensive study, there are some restrictions that represent opportunities for future studies. Probably the main limitation refers to the size of the sample and the lack of uniform data to measure the performance of SPs. Additional research efforts might be conducted in his direction in order to investigate further the new light shed on the potential relationship between performance measures and mission statements. Another limitation has to do with the geographical scope of the analysis. We have focused on Spanish SPs. Future studies might complement this analysis by exploring other countries. However, the lack of a homogenous and rigorous procedure for collecting data might hinder cross-country analyses. Similarly, new studies should investigate the effect of mission statements on other infrastructures that support knowledge transfer activities, such as business incubators. A study comparing different mechanisms would be of great interest.

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## List of Tables

Table 1. Keywords to represent mission components

Component	Keywords
Target customers and markets	consumers, customers, clients, local government, city council, administration, nation, state, government, public administration, council, companies, university, industry, university community, technology centers, technology agents, entrepreneurs, organizations, entities, R&D units, business world, researchers, business sector, professionals, and students
Products and services	business development, innovation, talent, knowledge and technology transfer, technological development, technological infrastructures, technology, space of excellence, knowledge, value generation, knowledge management, and value-added services
Geography	worldwide, geographic area, region, and country
Commitment to survival, growth, and profitability	socio-economic development, benefits, productivity, growth, efficiency, survival, profitability, values generation, sustainable, and success
Philosophy and values	honesty, harmony, well-being, integrity, fair, responsibly, social needs, generate well-being, generate employment, cultural development and generate wealth

Table 2. Keywords to identify the different stakeholders

Stakeholders	Keywords
Customers	consumers, customers, clients, local government, city council, administration, nation, state, government, public administration, council, companies, university, industry, university community, technology centers, technology agents, entrepreneurs, organizations, entities, R&D units, business world, researchers, business sector, professionals, and students
Employees	employees, our people, work force, workers, and human capital
Investors	investors, university, nation, state, local government, city council, government, public administration, administration, partners, council, and promoters.
Suppliers	suppliers and partners
Society	national economies, environment, social goals, quality of life, world, community, global, society, generate well-being, generate employment, generate wealth, social needs, and environment

Table 3. Science Parks by cluster, according to Pearce & David (1987)

Mission components (based on Pearce & David, 1987)	Group		
	1A	2A	3A
Target customers and markets	0.8889 (0.3333)	1.0000 (0.0000)	0.5000 (0.5774)
Principal products or services	1.0000 (0.0000)	0.7143 (0.4880)	1.0000 (0.0000)
Geography	1.0000 (0.0000)	0.8571 (0.3780)	0.0000 (0.0000)
Core technology	0.2222 (0.4410)	0.0000 (0.0000)	0.2500 (0.5000)
Commitment to survival, growth, and profitability	0.8889 (0.3333)	0.8571 (0.3780)	0.0000 (0.0000)
Company self-concept	0.2222 (0.4410)	0.0000 (0.0000)	0.0000 (0.0000)
Company philosophy	0.8889 (0.3333)	0.0000 (0.0000)	0.0000 (0.0000)
Desired public image	0.5556 (0.5270)	0.0000 (0.0000)	0.0000 (0.0000)
Observations	9	7	4

Standard deviation included in brackets.

Table 4. Average technology transfer outputs by cluster, following Pearce & David (1987) characterization. Year 2015.

Mission components (based on Pearce & David, 1987)	Group		
	1A	2A	3A
Budget of the park [M€]	3.9	5.4	7.2
Firms established in the park	96.6	192.4	44
Turnover of companies incubated in the park [M€]	584	517	44
Jobs created by the companies in the park	2,748.1	6,733.5	395.7
Patents granted	29.2	34.5	16
Spin-offs created (5 years)	22.4	35	14.5
Spin-offs created	8.8	10	4

Table 5. Science Parks by cluster, according to Bart (1997)

<b>Stakeholders</b> (based on Bart, 1997)	<b>Group</b>		
	<b>1B</b>	<b>2B</b>	<b>3B</b>
Customers	0.7143 (0.4880)	0.8750 (0.3536)	1.0000 (0.0000)
Employees	0.1429 (0.3780)	0.0000 (0.0000)	0.0000 (0.0000)
Investors	1.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Suppliers	0.2857 (0.4880)	0.1250 (0.3536)	0.0000 (0.0000)
Society	0.5714 (0.5345)	1.0000 (0.0000)	0.0000 (0.0000)
Observations	7	8	5

Standard deviation included in brackets.

Table 6. Average technology transfer outputs by cluster, following Pearce & David (1987) characterization. Year 2015.

<b>Mission components</b> (based on Pearce & David, 1987)	<b>Group</b>		
	<b>1B</b>	<b>2B</b>	<b>3B</b>
Budget of the park [M€]	3.2	3.0	10.1
Firms established in the park	201.1	89.9	53.0
Turnover of companies incubated in the park [M€]	350	775	39
Jobs created by the companies in the park	5,586.4	3,032.8	984.7
Patents granted	19.6	43	6
Spin-offs created (5 years)	32	24	19
Spin-offs created	7.6	10.2	6

Table 7. Comparing mission statements vs. managers' perceptions of the mission

<b>Mission components</b> (Pearce & David, 1987)		<b>Measures of quality of a mission statement</b> (Barktus et al., 2006)				
		Q1: The degree to which the mission statement is a public declaration of the SP's direction				
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Company self-concept	0	0	1	0	4	13
	1	0	0	0	1	1
Company philosophy	0	0	1	0	3	8
	1	0	0	0	2	6
		Q2: The degree to which the mission statement is being used as a control mechanism				
Principal products or services	0	0	0	0	1	1
	1	0	1	1	6	10
		Q3: The degree to which the mission statement expresses the SP's values				
Desired public image	0	0	2	2	5	6
	1	0	1	1	2	1
<b>Stakeholders</b> (Bart, 1997)		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
		Q4: The degree to which the mission statement motivates and inspires employees by creating a shared sense of purpose				
Employees	0	0	1	3	7	8
	1	0	0	0	0	1

Values in the second column should be read as follows: 1 indicates that the mission statement includes this component/stakeholder, 0 otherwise.