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To what extent are PhD students intrapreneurs? A study from a gender perspective

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Abstract

Research on intrapreneurial intention (INI) has gone from strength to strength over the past few years. However, some collectives like PhD students have not received the attention they deserve. Accordingly, this study aimed to determine the INI of PhD students from a gender perspective. Their tendency to display innovative and risk-taking behavior was analyzed based on a sample of 393 PhD students. The results evince significant gender differences in this regard.

KEYWORDS
academic entrepreneurship, innovation, gender, intrapreneurial intention, PhD students, risk-taking

JEL CLASSIFICATION
I23, J16, L26, O32

1 | INTRODUCTION

The entrepreneurial phenomenon creates employment (Iwu et al., 2019; Soria-Barreto et al., 2016) in different productive sectors (Jones et al., 2017). The increase in entrepreneurial initiative underscores that business education is a continuous object of promotion in education centers (Herman, 2019; Liu et al., 2019) connected with the entrepreneurial spirit of innovation (Sánchez et al., 2017).

Education policy-makers believe that training in entrepreneurial skills is essential for the development of the younger generations (Rippa et al., 2020). Universities should act strategically to become effective socioeconomic agents (Klofsten et al., 2019), thus setting themselves up as entrepreneurial universities (Cerver et al., 2020) and generating academic spin-offs (O'Shea et al., 2008).

Academic spin-offs are companies started up by professors and predoctoral and postdoctoral students based on knowledge generated by academic research (Borges & Filion, 2013). Indeed, "regardless of whether there is a direct contact between the academics who are involved in the spin-offs or not, the existence of these spin-out companies in the local setting is a source of learning and norm creation" (Clarysse et al., 2011; p. 1089).

The growing number of spin-offs is having an increasing impact on the society (Cabrera-Blanco et al., 2020; Fuster et al., 2019; Rodríguez-Gulías et al., 2017). However, this reality depends on the publication of many academic works that strike the right balance between its dual nature in the ongoing debate: the scientific and the entrepreneurial due, respectively, to its academic origin and the necessary business vision. The study of this dualism is still the object of scientific debate, with possibilities for research and theoretical innovation (Mathisen & Rasmussen, 2019; Sheng & Shiquan, 2020).

There is evidence of the relationship between spin-offs and intrapreneurial intention (INI) (Valka et al., 2020). This relationship is underpinned by spin-off personnel's innovation generated within organizations (Monge & Briones, 2016). The distinction between the role of general employees and academic staff, plus the quality of the final work, is fundamental for organizations of this type

(Almeida, 2021; Ben-Hafaïedh et al., 2021). Nevertheless, there are still works addressing the identification and analysis of the organizational factors that favor the sustainability of spin-offs based on intrapreneurial actions (Walter et al., 2006).

Initially occurred with entrepreneurship and entrepreneurial intention (EI), on which many studies have been performed (García-Río et al., 2020; Pérez-Fernández et al., 2020), INI is now a field in expansion (Feola et al., 2019). This growing interest in research on INI has resulted from the realization that the intrapreneurial behaviors of the employees of organizations should be aligned with their business management and development strategies (Baena-Luna & García-Río, 2021; González-Serrano et al., 2019; Moriano et al., 2014). Behaviors of this type help organizations to place people at the center of their management, which are then considered as an organizational source (sometimes unique) of innovation and identification of new opportunities for exploitation (Ebner et al., 2008; Gawke et al., 2017; Hornsby et al., 2009).

The importance of these issues for PhD students contrasts with the scant number of scientific works addressing the intrapreneurship phenomenon in the context of its potential professional development beyond the academic field (Bienkowska & Klofsten, 2012; Muñoz et al., 2020). For this reason, this study addresses INI and its necessary connection with the consolidation of entrepreneurial initiatives deriving from academic knowledge, namely, the spin-offs. Moreover, the analysis is performed from a gender perspective (Baruah & Ward, 2015), thus allowing for gaining new knowledge of two emerging fields (intrapreneurship and gender), which are not always focused on in research works (Baena-Luna & García-Río, 2021).

In this article, the analysis of INI is based on the evidence that the academic entrepreneurial environment has a huge influence on the potential EI of PhD students and on their professional future (Bienkowska et al., 2016; Douglas & Fitzsimmons, 2013; Muñoz et al., 2020). Identifying this intention is essential for gauging and evaluating the different professional options open to this collective, beyond university and research communities (Muscio & Ramaciotti, 2019).

In this sense, the main objective of this article is to identify and analyze the key elements that influence the INI among PhD students. This analysis will be carried out from a gender perspective. The growing interest in intrapreneurship has not taken place from a gender perspective as it had happened before in entrepreneurship research and other disciplines (Baena-Luna & García-Río, 2021). There is no agreement on the difference between men and women in their INI. However, related to the EI of individuals, it has been found that there is a gender gap between men and women in their potential for action and entrepreneurial capacity (Sánchez-Cañizares & Fuentes-García, 2013). This fact is present in companies with high growth potential.

The most significant arguments detected in a literature review on the concepts of intrapreneurship and INI are presented in the next section. A description of the methodology employed in the empirical analysis is described in Section 3. The results are discussed in Section 4, and the final remarks follow in Section 5.

2 | THEORETICAL FRAMEWORK

In the current context of uncertainty, there is a greater awareness of how innovation and global thinking can convert the difficulties caused by the COVID-19 pandemic into opportunities (Ratten, 2021). Against the traditional vision of the entrepreneur, as a person who creates companies, there is the intrapreneur as a person who stands out for a way of working, with the ability to take individual and collective risks within organizations despite possible constraints. The behavior of intrapreneurs enables them to develop new profitable services or products for their organizations by identifying and exploiting new opportunities (Shaikh et al., 2020; Stull & Singh, 2005).

These types of intrapreneurial behaviors are increasingly sought after by the top management of organizations (Blanka, 2019; Gawke et al., 2017). The main reason behind this boom is the need to drive innovation within organizations in response to new organizational and social requirements (Ratten, 2021). A well-known definition of intrapreneurship is formulated by Antoncic and Hisrich (2003, p. 20), who define this phenomenon "as entrepreneurship within an existing organization, referring to emergent behavioral intentions and behaviors of an organization that are related to departures from the customary." These authors highlight how intrapreneurial activity is not only based on the quest for new business opportunities but also that the development of innovative actions through the identification and evaluation of new opportunities capable of generating sustainable advantages for organizations should feature among behaviors of this type (Turro et al., 2020).

The importance of intrapreneurial actions reveals spin-offs as an ideal center for developing creative actions thanks to their dual research and business nature. These spin-offs become instruments of technology transfer between universities and society through R&D&i program (Carrasco & Aceytuno, 2015; Rubini et al., 2021).

The recognition of INI places the spotlight on the potential tendency of workers to develop intrapreneurial behavior in their organizations and on determining the elements that favor their development (González-Serrano et al., 2016). However, the organizational elements are crucial to fostering such a behavior insofar as different works have addressed individual elements as being decisive in a higher or lower level of INI (Marques, Marques, et al., 2019).

Those intrapreneurs taking risks when undertaking their innovative tasks show a greater natural willingness to display intrapreneurial behavior in their organizations (Farrukh et al., 2016; Stull & Singh, 2005). Innovation and risk-taking have been regarded as essential in the literature on the entrepreneurial phenomenon and, specifically, on the entrepreneurial orientation of organizations (Covin & Slevin, 1991; Kreiser et al., 2021; Kuratko, 2014; Lumpkin & Dess, 1996). Individual and personal elements are also relevant in people's EI (Liñán & Krueger, 2013), hence their relevance in the case of the INI.

The values of individual and personal elements (identification and facilitation) as possible indicators of INI (Krueger et al., 2000) are considered to be very important in demand for people with the ability to develop intrapreneurial behaviors when undertaking their tasks

(Ireland et al., 2009). Attitudes of this type not only facilitate the identification of opportunities but also promote the renovation and rejuvenation of organizations themselves regarding their work methods (Krauss et al., 2005).

Although intrapreneurs differ from entrepreneurs, they possess a series of very closely linked and shared attributes and characteristics. Both tend to be innovative people thanks to their capacity to think outside the box and to their initiative, while also having the ability to take risks when undertaking tasks and identifying new opportunities for their organizations (Moriano et al., 2009; Sayeed & Gazdar, 2003). In many cases, this innovative attitude leads organizations to identify and exploit new opportunities and obtain competitive edges sustainable over time (Ahmed et al., 2018; Cox et al., 2018; Moriano et al., 2009; Turro et al., 2020).

Innovation in organizations is, by and large, the result of the generation of novel ideas by their staff. The response time for innovation depends on the viability of an idea and the perseverance of the people involved (Marques, Santos, et al., 2019). People with attributes associated with innovation, such as intellectual curiosity and creativity, are more likely to be intrapreneurs in the workplace (Camelo-Ordaz et al., 2012; Farrukh et al., 2016). The link between innovation and intrapreneurial attributes and characteristics was already noted by Pinchot III (1985) when analyzing the reality of intrapreneurship and the attributes of individual intrapreneurs.

The relevance of the tendency of intrapreneurs to display innovative behaviors gives rise to the first of two hypotheses relating to the gender approach of this study:

> **H1a.** *There are gender differences in the INI of PhD students when generating novel ideas that may result in new products or services for their organizations.*

> **H1b.** *There are gender differences in the INI of PhD students when undertaking tasks in an innovative manner in their organizations, giving rise to new ways and methodologies for doing things.*

The capacity for risk-taking of people when performing their jobs is linked to their predisposition toward searching for new opportunities and their connection with audacious decision-making (Covin & Slevin, 1991; Ireland et al., 2009; Zahra, Wright, & Abdelgawad, 2014). Intrapreneurs can take risks when undertaking and participating in tasks, even when they are not sure of obtaining successful results (González-Serrano et al., 2018; Kuratko et al., 2014; Stull, 2005). Intrapreneurs will try to identify new opportunities while accepting that this will not always be possible (Jain & Ali, 2012). To this effect, intrapreneurs will promote innovative actions in their organizations to resolve existing problems without fearing a change in the status quo (Kristiansen, 2019).

Intrapreneurs tend to be risk-taking due to a greater willingness to make decisions on actions and projects whose success is not guaranteed. However, this is not an obstacle to participating and becoming involved in actions of this type while taking the necessary risks (Hydle et al., 2014; Moriano et al., 2009). Intrapreneurs display an evident willingness to participate in risky individual and/or collective efforts (Jain & Ali, 2012). According to Adachi and Hisada (2017), women are less likely to opt for entrepreneurial actions of this type, presumably owing to their aversion to risk with people in general. The tendency to take risks is a relevant feature of intrapreneurs, which gives rise to the following two hypotheses relating to the gender approach of this study:

> **H2a.** There are gender differences in the INI of PhD students when participating in actions whose success is not guaranteed in their organizations.

> **H2b.** There are gender differences in the INI of PhD students when taking calculated and controlled risks, despite the possibility that they might fail to undertake the tasks in question.

3 | METHODOLOGY

3.1 | Sample and data collection

This study was based on the comprehensive review of the literature presented above and a descriptive and inferential methodology for testing the research hypotheses. The focused population was that of PhD students enrolled at the University of Seville in 2020–2021. The use of this type of population has been endorsed in different works (Bazan et al., 2020; Bazkiaei et al., 2020; Neves & Brito, 2020; Roy & Das, 2020; Wannamakok et al., 2020). Harrison and List (2004) observed that a collective of university students is a group with a high potential for innovating in their actions and representation.

The sample was composed of 40.46% of men and 59.54% of women in two age brackets: 26–35 years old (45.29%) and 36–50 years old (31.55%), both without statistically significant differences between the sexes. This group has more than 24 months of work experience (95.15%) without significant differences between the sexes. Practically, half of the sample had received business education (52.87% of the male respondents, and 47.01% of the female respondents). Although there was a higher proportion of men with business education at a descriptive level, there were no statistically significant differences (see Table 1).

To determine the PhD students' perceptions of INI, a specially designed email survey was administered in November 2020. In order to ensure the veracity of the respondents' answers, participation in the survey was voluntary, and their anonymity was guaranteed at all times as they were not requested to provide any personal or identifying data. In addition, the process was monitored to make sure that none of the respondents replied twice, something that might have affected the consistency and reliability of the answers to the questionnaire.

Incidental nonprobability sampling was performed in which the survey was administered to all the PhD students enrolled in the

TABLE 1 Descriptive derivations

Variables	Total		Men		Women	
	N	%	*N*	%	*N*	%
Age: 18–25	62	15.78	24	15.09	38	16.24
Age: 26–35	178	45.29	73	45.91	105	44.87
Age: 35–50	124	31.55	49	30.82	75	32.05
Age: over 50	27	6.87	13	8.18	14	5.98
Total without job experience	23	5.85	13	8.18	10	4.27
With job experience: less than 6 months.	18	4.58	5	3.14	13	5.56
With job experience: between 6–24 months.	66	16.79	21	13.21	45	19.23
With job experience: more than 24 months.	286	72.77	120	75.47	166	70.94
Total with job experience	370	94.15	146	91.82	224	95.73
Without business education	198	50.64	74	47.13	124	52.99
With business education	193	49.36	83	52.87	110	47.01

*$p < 0.05$.

TABLE 2 Cronbach's alpha test and scale reliability

Sets of questions	Cronbach's alpha
Innovation	0.916
Risk-taking	0.846

academic year 2020–21 (2974), of whom 393 completed the questionnaire. Despite the inconveniences of this method for standardizing enquiries, it warrants noting that the volume of answers implies a reduced margin of error of 5% and a confidence level of 95%. Therefore, the results are valid for conclusions about the PhD students at a public higher education institution like the University of Seville in Spain.

The scale of INI of the university population proposed by González-Serrano et al. (2019) was the tool employed to measure INI. This study, grounded on previous research performed by Stull (2005), analyzed the tendency toward intrapreneurial behaviors based on two constructs: the tendency to innovate and take risks. The scale was ultimately composed of six items and a series of sociodemographic variables: age, sex, and previous education relating to entrepreneurship and/or intrapreneurship and prior job experience. The sex variable allowed for taking a gender approach (García-Río et al., 2020) to the INI of the study population.

Likewise, the scale employed was validated with previous studies and proved to have high internal consistency, for the results of Cronbach's alpha by set of questions (see Table 2) were above 0.7. Values higher than 0.7 are considered acceptable (George & Mallery, 2003).

3.2 | Data analysis procedure

To detect possible evaluation differences in the answers of the PhD student respondents, the inference analysis with a margin of error of 5% and a confidence level of 95% did not consider the DK/NR answers. The statistical tests confirmed the four hypotheses put forward. Specifically, the *Z*-test of proportions was employed with the dichotomous questions (reference models and intention to start up a business) and the Mann–Whitney *U* test for comparing population medians (the nonparametric test, because the results did not have a normal distribution).

4 | RESULTS

In this section, the following three INI variables are analyzed: (1) the intention to start up a business, although the company offers the opportunity to develop and manage ideas, products or services; (2) innovation; and (3) risk-taking. Likewise, the formulated questions making up both constructs were included.

The female respondents were significantly less likely to start up their own business or develop ideas, products, or services. They also showed a greater preference for developing possible ideas in a business organization. As shown in Table 3, this question reflects their lower EI (29.56% of the male respondents and 19.66% of female respondents) and no statistically significant differences in the INI of either sex (48.43% of the male respondents and 47.01% of female respondents).

Table 4 shows the median values of the two variables influencing INI, namely, innovation (5.83 men; 5.53 women) and risk-taking, which were significantly higher for the male respondents (5.33 men; 4.77 women).

5 | DISCUSSION

The results obtained substantiate the four research hypotheses. The analysis of the INI of the PhD student respondents has been very useful for substantiating the evidence in the literature in this regard and

TABLE 3 Tendency toward entrepreneurship of the PhD students

Variables	Total		Men		Women	
	N	%	*N*	%	*N*	%
Even so, I would start up my own business	93	23.66	47	29.56*	46	19.66*
I would continue to gain experience in the company	187	47.58	77	48.43	110	47.01
DK/NA	113	28.75	35	22.01*	78	33.33*

*$p < 0.05$.

TABLE 4 Elements of intrapreneurial intention (INI)

Variables	Total		Men		Women	
	Median	SD	Median	SD	Median	SD
I would try to generate new ideas that were useful for the company	5.81	1.20	6.01*	1.11	5.68*	1.25
I would try to develop new processes, products, or services	5.60	1.26	5.85*	1.10	5.42*	1.34
I would undertake my tasks in an innovative way	5.61	1.22	5.71	1.16	5.54	1.26
I would develop new ways of doing things	5.60	1.17	5.76	1.02	5.50	1.26
Innovation	5.65	1.08	5.83*	0.93	5.53*	1.16
I would try to do new things, even though they might not work	5.21	1.31	5.45*	1.19	5.05*	1.36
I would become involved in activities that might not turn out well	4.94	1.37	5.28*	1.28	4.70*	1.38
I would take calculated risks, despite the possibility of failure	4.84	1.32	5.26*	1.16	4.56*	1.36
Risk-taking	5.00	1.17	5.33*	1.03	4.77*	1.20

*$p < 0.05$.

for gaining further insights into this novel and current topic. For that reason, it makes a valuable contribution to the state of the question.

Different implications and contributions to INI theory from a gender approach can be deduced from the results. Universities have (and should have) a fundamental influence on the entrepreneurial behavior of their students (Muscio & Ramaciotti, 2019).

5.1 | Theoretical implications

Business education partially impacts the entrepreneurial actions of the PhD student respondents. This finding contrasts those of Muscio and Ramaciotti (2019), who highlight that business education is positively related to the likelihood of PhD students starting up their businesses.

The results obtained here point to gender parity as to INI. This premise is compatible with creating a university environment that favors the entrepreneurial process and is positively associated with the likelihood of PhD students implementing their entrepreneurial initiatives (Clarysse et al., 2011).

According to other empirical studies, men are more likely to create new companies than women. There was a gender difference in the INI and risk-taking of the PhD student respondents. Innovation and gender may be factors tempering their INI (H1a and H1b). The hypothesis that there are differences between both sexes when generating novel ideas resulting in new products or services (H1a, 6.01 men; 5.68 women) and the undertaking of tasks in a novel manner in their organizations, thus giving rise to new ways of doing things (H1b, 5.85 men; 5.42 women), has been borne out. Regarding both points, this was much more the case with the male PhD respondents than with their female counterparts. Therefore, gender is important for the continuity of intrapreneurship (Adachi & Hisada, 2017) when measuring the performance of the activities introduced.

The findings of this study coincide with those of previous ones in finding that risk-taking is a relevant attribute inherent to intrapreneurs (Kristiansen, 2019). This result corroborates hypotheses H2a and H2b. In the population under analysis, significant results were obtained that show that, in their organizations, the male PhD respondents participated more in intrapreneurial actions, even though there was no guarantee of success (H2a, 5.45 men; 5.05 women) and became more involved in activities that might be unsuccessful, despite taking calculated risks (H2b., 5.33 men; 4.77 women), than their female counterparts. On the other hand, it has been confirmed that researchers tend to focus on training activities and publishing in scientific journals when beginning their careers.

These two findings suggest that the female PhD respondents may be disadvantaged regarding intrapreneurial behavior at a professional level (Adachi & Hisada, 2017).

5.2 | Practical implications

The study results also have significant political and managerial implications. Firstly, the INI of the PhD student respondents was not marginal. This evidence reinforces the argument that universities are legitimate stakeholders in regional economic growth and creating jobs, income, and wealth. The results also suggest that creating an environment that fosters INI impacts the generation of entrepreneurial initiatives. Therefore, the definition and promotion of policies for supporting academic entrepreneurship could steer students toward creating companies and/or developing ideas through intrapreneurial behaviors.

On the other hand, the results endorse fledgling scientific entrepreneurship since the participation of university students in real-world scenarios, the application of their research results to a business context and business education may have an impact on their INI and their willingness to become entrepreneurs. Accordingly, the industry should be encouraged to participate in PhD programs. Further inquiries into the INI and entrepreneurship of young scientists may help promote local development and offer students more career opportunities.

These empirical results would imply that, if academia intends to reduce the gender gap in creative and entrepreneurial activities, it should recognize the role of the conditions of the entrepreneurial climate at an organizational level.

5.3 | Study limitations

Although this study has underscored several relevant political and managerial implications, it has limitations. These include the transversal nature of the database, which has made it harder to verify the robustness of the results and the cause/effect implications between the two intrapreneurial factors, on the one hand, and the intrapreneurial spirit of the PhD student respondents, on the other. The use of survey data from a sole source implies a transversal analysis, which in turn involves a certain risk of reverse causality. In this case, it should be limited owing to the sample's representativeness. Moreover, given that it is an individual study, it has been impossible to arrive at any conclusion about institutional performance.

6 | CONCLUSION

In light of the empirical results and their discussion, we have been able to draw three main conclusions from our study:

1. The intrapreneurial phenomenon and, specifically, academia's interest in those elements that favor the development of INI are experiencing an important boom.
2. The growing interest in INI varies depending on the group or collective. In the case of PhD students with a traditional academic/professional development and remote spin-offs, INI is not fostered.
3. There are gender differences in the key elements and factors of INI concerning PhD students. Specifically, men are more likely to develop ideas and implement entrepreneurial initiatives, whereas women tend to develop and implement them in an organization.

The future lines of research emerging from our study include the need to address INI in the field of public policy-making and/or in that of digital transformation. Future research could explore the university factors that influence PhD students and the relationship between institutional performance and scientific entrepreneurship. Further queries should be raised on the academic support for the scientific entrepreneurship of PhD students.

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