

The international orientation of academic entrepreneurship: the role of relational, human and psychological capital

Academic
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Received 23 June 2021
Revised 27 October 2021
19 December 2021
8 February 2022
Accepted 15 March 2022

Abstract

Purpose – Scholars have emphasized intellectual capital's importance for universities in obtaining competitive advantages and creating value. The purpose of this paper is to identify the influences of two components of intellectual capital, relational and human capital at the international level, and psychological capital on international orientation of academic entrepreneurs, and the mediating effects of international relational and human capital.

Design/methodology/approach – On the basis of a literature review, a theoretical model is proposed to explain the relationship between the studied variables. Our hypotheses are tested on a sample of 173 academic spin-offs of Spanish universities using bootstrapping methodology.

Findings – The results show that the international market relational capital and international human capital of academic entrepreneurs influence their international orientation, and that their psychological capital is directly, and indirectly, related to international orientation through international human capital and international market relational capital.

Practical implications – This study provides a better understanding of the antecedents of the international orientation of academic entrepreneurs, which would provide an important contribution to the literature on intellectual capital, academic entrepreneurship and internationalization. The achieved results highlight important implications for training of academic entrepreneurs and for managers and management teams of companies willing to enter, or even those already operating in, international markets.

Originality/value – In this study, the international orientation of academic entrepreneurs is explained through the psychological capital that is studied jointly with two components of intellectual capital, relational and human capital at the international level. Although some recent work has focused on the study of the internationalization of academic spin-off, this line of research is still incipient.

Keywords International orientation, International relational and human capital, Psychological capital

Paper type Research paper

1. Introduction

Knowledge transfer from universities to industry has become a strategic issue for universities, the economy and society (Siegel *et al.*, 2007; Caldera and Debande, 2010). One way of transferring knowledge is through academic entrepreneurship, which refers to the creation of companies by academics (academic spin-offs, ASOs). ASOs have been defined as new companies that have been created to commercially exploit knowledge, technology or research results that have been developed within a university (Pirnay *et al.*, 2003; Evers *et al.*,

Funding: This work has been co-financed by the 2020-2023 ERDF Operational Programme and by the Department of Economy, Knowledge, Business and University of the Regional Government of Andalusia. Project reference: FEDER-UCA18-107689 titled "Analysis of the influence of the Andalusian, Spanish and European entrepreneurial ecosystems on the internationalization process of Andalusian academic spin-offs, and its impact on innovation results.



2016). Studies on ASOs have increased over the years, as the creation of these companies promoted economic and social development, employment and innovation (O'Shea *et al.*, 2014; Fernández-Alles and Ramos-Rodríguez, 2021).

Academic entrepreneurs of ASOs, defined as scientists with an entrepreneurial perspective to exploit their research results commercially, emerge as key protagonists (Etzkowitz, 1998; Guo *et al.*, 2019). They usually have a vocation for international markets, due to their international experience derived from their training abroad, mobility and their international research activity. Their networks of international relations with foreign universities, colleagues and other R&D centers can provide resources for internationalization. Therefore, ASOs also contribute to the internationalization of the economy (Rodríguez-Gulías *et al.*, 2016). Although works on academic entrepreneurship and internationalization have increased, these are still scarce (Björnali and Aspelund, 2012; Bialek-Jaworska and Gabryelczyk, 2016; Civera *et al.*, 2019). In this context, the analysis of the international orientation of academic entrepreneurs, and the impact of their intellectual and psychological capital on this orientation, constitutes an opportunity.

Drawing on the works of Knight and Cavusgil (2004), Knight and Kim (2009) and Cho *et al.* (2017), international orientation has been defined as a managerial vision and a proactive organizational culture, which support the development and utilization of organizational resources to achieve objectives in international markets. Previous studies have focused on analyzing the impact of the international orientation on the international performance and speed of entry of organizations into these markets (Machado *et al.*, 2016). These works highlight that international orientation is related to success in international markets (Aspelund *et al.*, 2007; Knight and Kim, 2009; Sorensen and Madsen, 2012; Baronchelli *et al.*, 2015; Moen *et al.*, 2016). Therefore, the success of entrepreneurs will largely depend on their ability to become competitive through international orientation (Ratten *et al.*, 2007; Frešer *et al.*, 2020). In the literature on international entrepreneurship, relational and human capital have been considered (Ng *et al.*, 2012; Senik *et al.*, 2014; Baum *et al.*, 2015; Matricano, 2016; Mariani *et al.*, 2018; Passaro *et al.*, 2018). In addition, there is a third capital, the study of which is beginning to appear in this literature; this is psychological capital (Khilji *et al.*, 2010; Dauth and Tomczak, 2017; Mathews, 2017). Relational, human and psychological capital, incorporate intangible resources provided by the people involved in an entrepreneurial venture, especially those in the top management team (Envick, 2005). Relational capital focuses on “who you know”, human capital refers to “what you know” and psychological capital reflects the view of oneself, “who you are” (Goldsmith *et al.*, 1997; Luthans and Youssef, 2004; Envick, 2005). Thus, psychological capital could reflect a person's view of his or her ability to use relational and human capital successfully (Envick, 2005).

Although relational and human capital have been studied in the literature on internationalization (Evers and O'Gorman, 2011; Ng *et al.*, 2012; Laurell *et al.*, 2013; Senik *et al.*, 2014; Baum *et al.*, 2015; Baronchelli *et al.*, 2015; Baier-Fuentes *et al.*, 2018), and the literature on entrepreneurship is beginning to analyze relational, human and psychological capital together (Zhao *et al.*, 2020), there are no papers that study these three capitals, as antecedents of international orientation in the context of ASOs.

Therefore, based on academic entrepreneurship and international literature, the resource-based view and network theory, the aim of this paper is to analyze, in the ASO context, the effect of international relational, international human and psychological capital on the international orientation of academic entrepreneurs and the role that international relational and human capital play, in the relationship between psychological capital and international orientation.

Our results contribute to the literature in several ways. First, calls from several academics for more research on the internationalization of small- and medium-sized enterprises (SMEs) have been answered (Coviello, 2006; Autio *et al.*, 2011; Bianchi *et al.*, 2017). Second, this study

provides a better understanding of the antecedents of the international orientation of academic entrepreneurs and the roles relational and human capital play in the model in the relationship between psychological capital and international orientation, which would provide an important contribution to the literature on intellectual capital, entrepreneurship and internationalization. Third, this paper includes the relationship of psychological capital with the international orientation of academic entrepreneurs, which has not been previously analyzed. Moreover, psychological capital is studied jointly, with relational and human capital at the international level. The call of some authors, who consider that empirical research is needed to measure the aggregate effect of these of capitals (Envick, 2005), is thus answered. The study also responds to calls for empirical research related to the internationalization of ASOs (Evers *et al.*, 2016).

The paper is structured as follows. First, the theoretical background that is the basis for the hypotheses is outlined. After the description of the methodology, the results are presented. Finally, discussion, conclusions, implications, limitations of the study and proposals for future research are presented.

2. Literature review and hypotheses

2.1 International orientation

International orientation, drawing on the works of Knight and Cavusgil (2004), Knight and Kim (2009) and Cho *et al.* (2017), has been defined as a managerial vision and a proactive organizational culture, which supports the development and utilization of organizational resources, to achieve objectives in international markets. Some investigations have highlighted the importance of international orientation in internationalization (Machado *et al.*, 2016; Cho *et al.*, 2017). International orientation leads to the efficient use of the organization's resources, since internationally oriented companies can allocate specific resources that are essential for sales to be generated in international markets and enable the efficient use of the company's resources (Knight, 2000; De Brentani and Kleinschmidt, 2004; Cho *et al.*, 2017). Therefore, the international orientation of the entrepreneur and top management teams becomes a key factor for the success of organizations in international markets (Knight, 2001; Aspelund *et al.*, 2007; Knight and Kim, 2009; Sorensen and Madsen, 2012; Baronchelli *et al.*, 2015; Moen *et al.*, 2016).

International orientation has different implications for the internationalization process. Knight and Kim (2009) state that having an international entrepreneurial orientation implies that the organization explores new opportunities, and has an aggressive and entrepreneurial attitude toward international markets. Knight and Cavusgil (2004) used the term international entrepreneurial orientation, reflecting on the innovative capacity and proactivity of a company to reach foreign markets. The study by Moen *et al.* (2016), in line with Knight's study (2001), states that companies with a high international orientation are those that actively seek international opportunities, see the world as their market, adapt their products to international operations, communicate their international ambitions throughout the organization and develop the necessary resources for international activity. Sorensen and Madsen (2012) expound that international orientation leads to a greater capacity to interpret key information on international markets. Cho *et al.* (2017) state that international orientation leads to a greater knowledge of opportunities, potential customers and competitors in international markets. In conclusion, international orientation is associated with innovativeness, managerial vision and a proactive competitive posture. Thus, following Baronchelli *et al.* (2015), for an organization to succeed internationally, the management team must possess high levels of international orientation.

A large body of literature has analyzed the relationship between international orientation of managers, or management teams, and different indicators of international performance,

such as exports and international presence. International orientation has been related to company performance in international markets, highlighting that it is a consistent predictor of export performance (Zou and Stan, 1998; Knight and Kim, 2009; Sorensen and Madsen, 2012; Moen *et al.*, 2016). In the same line, other authors report that international orientation is positively related to the export performance of SMEs (Javalgi *et al.*, 2011). The international orientation of companies and their managers allows them to gain knowledge that can lead to improved efficiency which, in turn, allows the growth of international sales (Autio *et al.*, 2000; Cho *et al.*, 2017).

In previous literature, the incidence of international orientation has been analyzed by distinguishing two patterns of internationalization: gradual and born-global. According to the gradual internationalization process, international orientation would positively affect the speed of internationalization of companies (Knight and Cavusgil, 2004; Oviatt and McDougall, 2005). A key factor of accelerated internationalization in SMEs, which is considered an antecedent of this phenomenon, is the strong orientation of executives or managers toward foreign markets (Zahra, 2005; Kyvik *et al.*, 2013; Machado *et al.*, 2016). With respect to the born-global phenomenon, scarce literature has analyzed the effect of international orientation, despite its importance (Escandon-Barbosa *et al.*, 2019). According to some empirical studies (Nummela *et al.*, 2004; Danik and Kowalik, 2013; Machado *et al.*, 2016; Escandon-Barbosa *et al.*, 2019), the vision and orientation of managers could explain this form of entry into international markets. Knight and Cavusgil (2004) state that international entrepreneurial orientation may be especially important for born-globals because it appears to drive them to develop high-quality goods that are technologically advanced, and which are associated with their international success. This is relevant to born-globals because it appears to engender specific innovation-based strategies that, in turn, drive superior international performance. Based on Escandon-Barbosa *et al.* (2019), international orientation could be a predictor of early internationalization of born-global companies.

Against this background, and taking into account that the academic entrepreneur founder of an ASO has a strong vocation to internationalize, either gradually or rapidly at the outset (Andersson and Berggren, 2016; Fernández-Alles and Ramos-Rodríguez, 2021), it seems appropriate to study the antecedents of their international orientation. A specific analysis should be made of the role played by the three intangible capitals, international relational and human capital and psychological capital, and their relationship with the international orientation of academic entrepreneurs.

2.2 The relational, human and psychological capital and international orientation

Academic entrepreneurs tend to have a vocation for internationalization, which explains not only why they consider entering their ASOs into international markets as part of their growth but also why many of them are born-global (Björnali and Aspelund, 2012). Some explanatory reasons for their internationalization lie in the types of products and services marketed by ASOs, and in the markets and sectors in which they are oriented (Fernández-Alles and Ramos-Rodríguez, 2021). However, the characteristics of the academic entrepreneur, in terms of their intellectual capital, undoubtedly seem to be determinant in the international expansion of ASOs. Thus, the international experience and training, and the networks of international relations derived from their scientific activity, and the mobility of these academics, could act as precursors of the orientation of the academic entrepreneur toward international markets.

At the international level, the literature highlights that, in order to operate and succeed in international markets, top managers of companies must possess a global mindset that encompasses the three capitals: relational, human and psychological (Beechler and Javidan, 2007; Dauth and Tomczak, 2017).

Relational capital refers to the ability of actors to derive benefits by virtue of their networks or other social structures, which can lead to improved organizational performance (Zhao *et al.*, 2020). Relationship networks, and interaction with individuals from other cultures, both inside and outside the organization, are necessary for senior managers to have an international orientation (Hiller and Hambrick, 2005; Li and Tang, 2010; Piaskowska and Trojanowski, 2014). The work of Oviatt and McDougall (2005) shows that firms can acquire knowledge about foreign markets by accessing networks formed by people with international experience and expertise. There are numerous papers that analyze the influence of relationship networks with internationalization and claim that these networks positively impact the mode, speed and extent of internationalization (Laurell *et al.*, 2013; Senik *et al.*, 2014; Baum *et al.*, 2015; Sekliuckiene, 2017). Networks of relationships reduce uncertainty and risk, facilitating access to international markets and providing financial support and market learning support (Baum *et al.*, 2015). They also enable the identification of foreign partners (Shirokova and McDougall-Covin, 2012), commercial and political knowledge (Schweizer *et al.*, 2010), as well as the gaining of reputation, trust and commitment, to be able to exploit opportunities in these markets (Shirokova and McDougall-Covin, 2012; Sekliuckiene, 2017). Due to this, the so-called “network theory of internationalization” arises, which states that companies immersed in a network of relationships have a competitive advantage that enables them to enter foreign markets more easily (Coviello and Munro, 1997; Holmlund and Kock, 1998). According to this theory, internationalization is significantly influenced by the networks that firms possess, and, those they are able to obtain (Antoldi *et al.*, 2011; Kim, 2017). Therefore, according to this view, the relationship networks of organizations, even in those with limited resources, can enable and support internationalization processes (Wright *et al.*, 2007; Kim, 2017). Some authors have shown that the advantage of having a network of relationships could even make up for the lack of experience in international markets (Gajowiak, 2013).

In the field of ASOs, the academic entrepreneur, due to training abroad, the multicultural nature of their scientific and research activity, and their international mobility, usually has an international network of collaboration within their research (Civera *et al.*, 2019), which could favor international entrepreneurship (Björnali and Aspelund, 2012; Evers *et al.*, 2016) and could lead the academic entrepreneur to maintain a managerial vision toward the achievement of international objectives. Some authors (Civera *et al.*, 2020) highlight the importance of social networks from the academic entrepreneur’s closest circles for the entry of ASOs into international markets. Mikhailova and Olsen (2016) show that international scientific and university networks promote the internationalization of products. This would seem to indicate that the academic entrepreneur’s networks of relationships, which emerged from the university context, are relevant in internationalization processes. The networks of the academic entrepreneur are classified into academic relationship networks and market networks (Fernández-Alles *et al.*, 2015). In relation to academic networks, the academic entrepreneur maintains relationships with other foreign scientists, who were born or trained in other countries. These collaborations, related to scientific activity, can have a positive impact on the internationalization of their companies (Krabel *et al.*, 2012; Libaers and Wang, 2012; Van Geenhuizen *et al.*, 2015). Foreign academics may recognize entrepreneurial opportunities that do not exist in their home countries (Krabel *et al.*, 2012). In addition, foreign academics may be more focused on obtaining resources for their research than on exploiting their own inventions (Libaers and Wang, 2012). Relationships with foreign colleagues and universities, and international R&D centers are common in these types of academic networks. Regarding market networks, although the network of relationships with market agents that these companies possess may be limited (Fernández-Alles *et al.*, 2015), previous academic collaboration with foreign universities and international R&D centers can foster strategic alliances, customer relationships, access to distribution channels, finding solutions for new

product development, the possibility of monetizing R&D investments, know-how and intellectual property that derive from the internationalization of these ASOs (Bialek-Jaworska and Gabryelczyk, 2016) (see Figure 1).

Therefore, the international academic and market relational capital of the academic entrepreneur could lead them to have a managerial vision and a proactive organizational culture, which support the development and utilization of the resources of their company toward the achievement of international objectives, i.e. having an international orientation. The first hypothesis is proposed:

- H1.* There is a positive relationship between international relational capital (academic and market) and international orientation in academic entrepreneurs.

According to the resource-based view, organizations possess rare and valuable resources that become a source of competitive advantage (Stoian *et al.*, 2011) and provide the basis for internationalization strategies (Knight and Cavusgil, 2004; Hwang, 2010). These resources can be both tangible and intangible. Within the intangible resources are the knowledge, experience and characteristics of managers (Ruzzier *et al.*, 2006; Kamakura *et al.*, 2012; Kim, 2017). Therefore, among these resources are human and psychological capital.

Human capital refers to knowledge, skills or competencies, derived from education, experience and specific identifiable skills (Luthans and Youssef, 2004; Zhao *et al.*, 2020). In order for top managers to have an international orientation, it is necessary to enhance human capital through training and experience abroad (Hiller and Hambrick, 2005; Li and Tang, 2010; Piaskowska and Trojanowski, 2014). Several papers have highlighted the impact on the internationalization of their firms of the human capital of managers and entrepreneurs, their training or educational level and their international experience (Dauth and Tomczak, 2017; Volonté and Gantenbein, 2016). International experience can be derived from work experience resulting from international mobility, education or training abroad, or even from spending a vacation period in other countries (Carpenter *et al.*, 2003; Björnali and Aspelund, 2012). Companies can increase the level of international orientation of their top management teams, by hiring members with international working experience or international educational experience (Herrmann and Datta, 2005; Baronchelli *et al.*, 2015). Other authors establish that international experience endows the manager with a personality and perceptions that positively influence international orientation so that international background and orientation would explain internationalization (Herrmann and Datta, 2005).

In the field of ASOs, the academic entrepreneurship, and the teams that promote the creation of ASOs, often obtain funding to be able to carry out their research through international grants and research programs. On many occasions, these involve the establishment of international collaboration and stays abroad that benefit their training and expertise. This international training and experience can accelerate the internationalization process, as it facilitates the recognition of entrepreneurial opportunities, a greater innovative capacity and creativity that benefits the development of new ideas in these markets (Van Geenhuizen *et al.*, 2015; Bialek-Jaworska and Gabryelczyk, 2016; Civera *et al.*, 2020). In addition, many of these entrepreneurs develop international

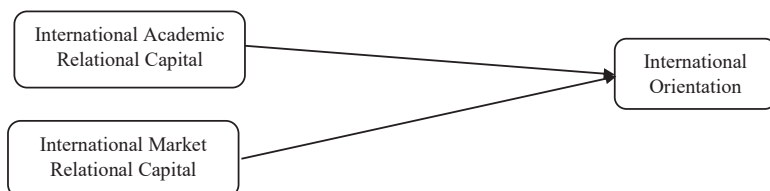


Figure 1.
Hypothesis 1

transfer activities, such as patents, which give them credibility in international markets, enhancing their entry into these markets when they decide to start a business (Bialek-Jaworska and Gabryelczyk, 2016). Similarly, scientists with more international experience obtain higher productivity, in terms of publications and patents, which increases their credibility in international markets (Civera *et al.*, 2020). This prior international experience could even compensate for both the lack of training in international business and the absence of business management experience in these markets (Fernández-Alles and Ramos-Rodríguez, 2021) (see Figure 2).

Consequently, the international human capital of the academic entrepreneur could lead to a managerial vision and a proactive organizational culture, which supports the development and utilization of the resources of their companies toward the achievement of international objectives, i.e. having an international orientation. Therefore, the following hypothesis is proposed:

H2. There is a positive relationship between international human capital and international orientation in academic entrepreneurs.

Regarding the third capital, psychological capital, some authors have argued that individual characteristics play a fundamental role in entrepreneurship (Turkina and Thai, 2015; Kim and Noh, 2016; Daou *et al.*, 2019; Steinbrink *et al.*, 2020) and in the decision-making processes of internationalization (Wally and Baum, 1994; Oviatt *et al.*, 2004; Saghebi *et al.*, 2019). Among these individual characteristics are: respect for cultural differences; willingness to face, learn and adapt to other cultures; knowing how to recognize different points of view; but there are also other characteristics, such as self-confidence, optimism, hope and resilience (Dauth *et al.*, 2017). These latter characteristics make up the so-called psychological capital, which is defined as a positive state of development of the individual that includes having confidence (self-confidence) to put in the necessary effort to carry out challenging tasks; having a positive state (optimism) about present and future success; persevering toward goals (hope) and, when necessary, reorienting the way to achieve them; and, finally, facing and adapting (resilience) to new situations, when problems and adversities arise, in order to achieve success (Luthans *et al.*, 2007a). Psychological capital has been studied in its relationship with entrepreneurial success and entrepreneurial intention (Luthans *et al.*, 2007b; Wright and Cropanzano, 2007; Baluku *et al.*, 2016; Zou *et al.*, 2016; Kim, 2017; Zhao *et al.*, 2020). This capital produces strong entrepreneurial motivation, which positively affects the entrepreneurial decision-making process (Baron *et al.*, 2016; Zhao *et al.*, 2020). For entrepreneurs, psychological capital is a determining factor in entrepreneurship, so even when entrepreneurs face a shortage of relational and human capital, they rely on themselves to get the job done, i.e. on their psychological capital (Hmieleski and Carr, 2008; Zhao *et al.*, 2020). Some theoretical works refer to the importance of this capital in the internationalization of companies (Khilji *et al.*, 2010; Dauth and Tomczak, 2017; Mathews, 2017). These works highlight that the personal characteristics of the manager or entrepreneur, among which are their psychological capital, have been related to the mindset, culture and global leadership and, therefore, to the internationalization of organizations. Likewise, the dimensions of psychological capital can positively influence entrepreneurship and entry into international markets. Since the entrepreneur must exhibit high levels of self-efficacy (Prodan and Drnovsek, 2010), for the sake of

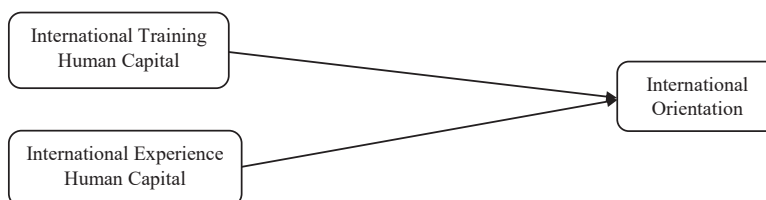


Figure 2.
Hypothesis 2

entrepreneurship and entering new markets, they must maintain persistence (hope) (Avey *et al.*, 2008) and optimism (Cardon *et al.*, 2013; Kolb and Wagner, 2015), during critical and challenging moments of the entrepreneurial process, and must cope with, and adapt to, obstacles (resilience) that arise within international markets (Beechler and Javidan, 2007) (see Figure 3).

Following on from these approaches, and from the absence of studies that focus on the psychological capital of the academic entrepreneur, it is suggested that the psychological capital of the academic entrepreneur is important in international markets. They require: self-efficacy to face the challenges that arise in these markets; optimism and high levels of hope that motivate them to seek alternatives and believe in a successful outcome regardless of the magnitude of the challenge; and, resilience, to cope with, and adapt to, the obstacles that arise in these markets. Therefore, the psychological capital of the academic entrepreneur could influence their orientation toward international markets. This capital could lead them to have a managerial vision and a proactive organizational culture, which supports the development and utilization of their companies' resources toward the achievement of international objectives. Therefore, the following hypothesis is proposed:

H3. There is a positive relationship between psychological capital and international orientation in academic entrepreneurs.

2.3 Mediating role of international relational and human capital

In the literature on entrepreneurship, the traditional capitals, relational and human capital are beginning to be analyzed, together with the new emerging capital, psychological capital (Envick, 2005; Baluku *et al.*, 2016; Zhao *et al.*, 2020). The three capitals, relational, human and psychological capital, are significant predictors of entrepreneurial success (Baluku *et al.*, 2016). Envick (2005) shows that psychological capital could reflect a person's view of their ability to use relational and human capital successfully, i.e. the ability to use traditional capitals productively. The psychological factors were strongly associated with relational capital outcomes (Steinfeld *et al.*, 2008), that is, psychological capital can enable individuals to get along with colleagues more optimistically and form a larger relational network. Similarly, it has been empirically shown that psychological capital has a positive and significant influence on relational and human capital (Iyigun and Owen, 1998; Zhao *et al.*, 2020). A developed psychological capital leads to the achievement of better relationships with others, in a successful manner, thus enabling a broad and stable network of relationships to be achieved, thereby improving their relational capital. In addition, psychological capital allows greater self-control and perseverance to acquire the necessary knowledge for a given business, thus improving their human capital (Zhao *et al.*, 2020). Other authors (Tamer *et al.*, 2014) showed that the dimensions of psychological capital, resilience and self-efficacy, have a strong relationship with relational capital, and also stated that self-efficacy is positively related to human capital. Envick (2005) states that the entrepreneur with developed psychological capital is able to mobilize and obtain relational and human capital effectively, for the success of their enterprises (see Figure 4).

Therefore, we consider that the psychological capital of the academic entrepreneur could influence their ability to acquire relational and human capital, at the international level. So, the following hypothesis is proposed:

H4. There is a positive relationship between psychological capital and international relational and human capital.

Along the same lines, Zhao *et al.* (2020) have empirically demonstrated the mediating role of relational and human capital, in the relationship between psychological capital and



Figure 3.
Hypothesis 3

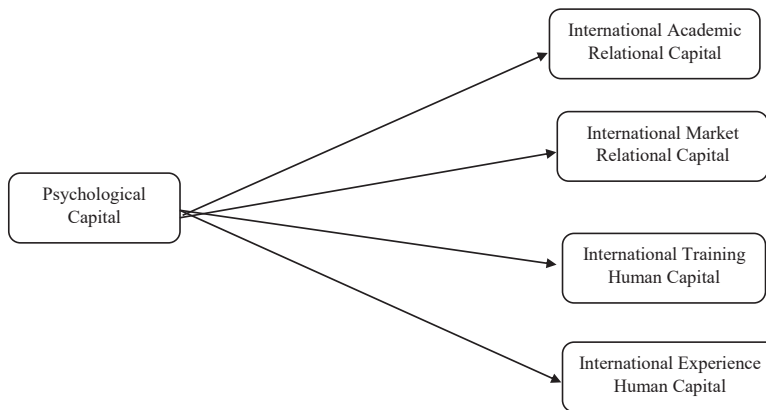


Figure 4.
Hypothesis 4

entrepreneurial intention. Consequently, taking into account the established approaches on the relationship between the three capitals and with international orientation, it is suggested that international relational and international human capital could play a mediating role in the relationship between psychological capital and international orientation. Thus, psychological capital could influence international orientation, both directly and indirectly, through relational and human capital. Therefore, it is proposed that the academic entrepreneur with a developed psychological capital, i.e. optimistic, with self-confidence, hope and resilience, could have a greater capacity to acquire relational and human capital at the international level, which could lead to an international orientation. Therefore, it is considered here that psychological capital promotes the development of relational and human capital at the international level, and, consequently, would influence international orientation. This leads to the following hypotheses (see Figures 5 and 6):

- H5.* International relational capital (market and academic) mediates the relationship between psychological capital and international orientation in academic entrepreneurs.
- H6.* International human capital mediates the relationship between psychological capital and international orientation in academic entrepreneurs.

In summary, the hypothesized relationships between the study variables are jointly presented in Figure 7.



Figure 5.
Hypothesis 5



Figure 6.
Hypothesis 6

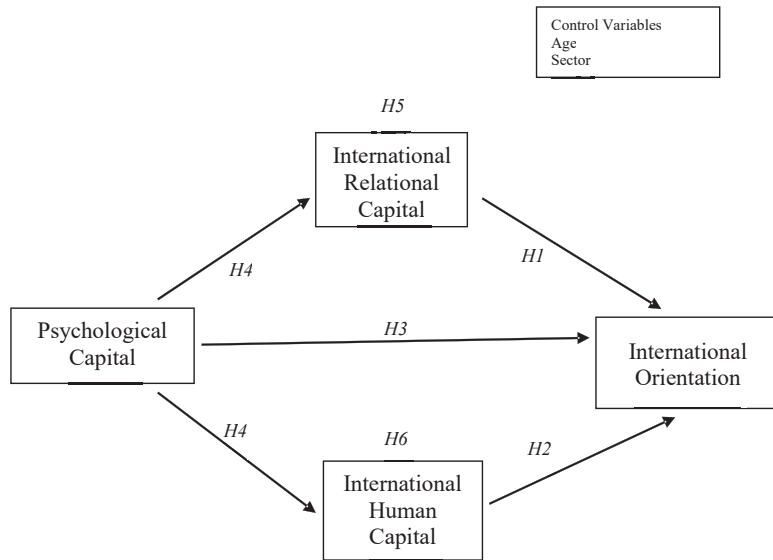


Figure 7.
Conceptual model

3. Methodology

3.1 Sample

In order to build the ASO database, the Spanish Universities' Research Results Transfer Offices Network (RedOTRI) provided the information through the Technology Transfer Offices (TTOs) included in this network. The email, telephone, name, year of constitution and the sector of activity of each of the ASOs were obtained from the managers of the TTOs. The population of this study consisted of the founding academic entrepreneurs of the 628 Spanish ASOs created by Spanish universities, during the period 2003–2018. A questionnaire was sent to each of the academic entrepreneurs and included questions about academic entrepreneurs' psychological capital, international relational and human capital and about their international orientation. We obtained a total of 173 valid responses (response rate: 27.6%). Therefore, the sample can be assumed to be representative of the total population of Spanish ASOs.

3.2 Measures

In order to estimate the proposed theoretical model, we identified and measured the following variables related with the academic entrepreneur: international relational capital, international human capital, psychological capital and international orientation, as well as two control variables, firm age and activity sector. In particular, international orientation is the dependent variable, psychological capital the independent variable, while international relational capital and international human capital are the mediating variables of our model. In addition, all the variables considered in this research were measured, based on previous research.

3.2.1 International relational capital. To measure this variable, the classification of agents by Fernández-Alles *et al.* (2015) and Sousa-Ginel *et al.* (2017, 2021) was used. Academic relational capital refers to the academic entrepreneur's relationships with academic agents, at the international level. The different items referred to the frequency of academic entrepreneurs' relationships with international academic agents. The academic agents include international university institutions (incubators, other academics, university chairs and research centers), international university TTOs and other international academic agents not included in the two

previous agents. Market relational capital refers to the academic entrepreneur's relationships with market agents, at the international level. The different items referred to the frequency of academic entrepreneurs' relationships with international market agents. International market agents include government institutions, industry agents (competitors, customers and suppliers), technology parks, venture capital and financial agents. To measure international relational capital, two indicators were used, one for academic relational capital and the other for market relational capital. The first is measured with three items, an example of which is, "Indicate the frequency of contacts with international university TTOs". The second indicator is measured with 5 items, e.g. "Indicate the frequency of contacts with international governmental institutions". In both cases, the international academic relational capital and international market relational capital items were measured, using a 5-point Likert scale (1 = less than one contact per month; 5 = several contacts per day). From this information, the mean value was calculated, as has been done by several authors (Smith *et al.*, 2005; Sousa-Ginel *et al.*, 2017).

3.2.2 International human capital. This variable refers to knowledge, skills or competencies, derived from education and experience of the academic entrepreneur in international markets (Luthans and Youssef, 2004; Zhao *et al.*, 2020). It was measured using four items, two items for international experience and two items for international training, from Sambharya (1996), Carpenter *et al.* (2003) and Björnali and Aspelund (2012). To do so, the academic entrepreneur was asked about their experience and training at the international level. Example of items are: "Indicate the extent to which you have previous experience working in international markets" or "Indicate the extent to which you have received training abroad".

3.2.3 Psychological capital. Psychological capital was measured using eight items from Walumbwa *et al.* (2011) and Luthans *et al.* (2007c). Example of items related to self-confidence, hope, optimism and resilience are: "I feel confident in setting goals and objectives in my area of work", "I see myself as a successful person in my job", "At work, I tend to see the positive side of things" and "When I have a setback at work, I have no problem recovering".

3.2.4 International orientation. The scale for international orientation was adapted from Knight and Cavusgil (2004) and Machado *et al.* (2016). Four items were employed to measure international orientation, conveying academic entrepreneurial mindset, attitude and resource allocation, with regard to international activities. Example of items are: "I tend to visualize the world as a single market", "I use human and other resources to achieve goals in international markets".

The items of the scales were measured using a 5-point Likert scale (1 = very low degree, 5 = very high degree).

3.2.5 Control variables. Activity sector and firm age were used as control variables (Franco-Leal *et al.*, 2016; Kim, 2017). The age variable was measured as the natural logarithm of the firm's age. To measure the activity sector, five activity sectors were selected, and sector 1 was chosen as the reference category, which was not included in the analysis. The rest of the categories were introduced as dummy variables.

3.3 Validity and reliability of the scales

In this study, structural equation modeling (SEM) was used in order to assure validity and reliability of the scales, using EQS 6.4 program. The reliability and validity of the measurement scales was ensured by performing a confirmatory factor analysis (CFA). The results obtained in the CFA (Table 1) show that a single factor is obtained for psychological capital ($t = 4.62$). In the case of international human capital, two factors are obtained: one referring to the international experience of human capital ($t = 5.55$) and the other referring to the international training of human capital 1 ($t = 2.14$). Finally, a single factor is obtained for international orientation ($t = 4.72$).

The reliability and validity of the scales were analyzed, following the procedure proposed by Fornell and Larcker (1981). As can be seen (Table 2), the composite reliability is greater than 0.7 in all cases, so the reliability of the scales is guaranteed. On the other hand, the

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	Psychological capital	International experience human capital	International training human capital	International orientation	Student's <i>t</i> -test
I feel confident in representing my work area in meetings with members of the management team	0.587				5.57
I feel confident in setting objectives and goals in my area of work	0.706				4.52
Right now I see myself as being pretty successful at work	0.754				6.91
If I should find myself in a jam at work, I could think of many ways to get out of it	0.88				4.25
When I have a setback at work, it is easy for me to recover and move on	0.77				6.38
I usually take stressful things at work in my stride	0.599				7.33
I always look on the bright side of things regarding my job	0.603				6.20
Indicate the extent to which you have previous experience working in international markets		0.819			2.98
Indicate the extent to which you have previous experience in the main sector in which your company operates in international markets		0.617			7.24
Indicate the extent to which you have received training abroad (Master, Doctoral degree, Foreign Stays)			0.477		9.89
Indicate the extent to which you have received business training abroad			0.893		3.03
I tend to see the world as our firm's marketplace				0.683	6.53

Table 1.
CFA (standardized solution)

(continued)

	Psychological capital	International experience human capital	International training human capital	International orientation	Student's <i>t</i> -test
The organizational culture (management's collective value system) is conducive to active exploration of new business opportunities abroad				0.907	2.59
I continuously communicate to employees that the company's mission is to succeed in international markets				0.929	2.66
I use human and other resources to achieve our goal in international markets				0.903	4.12

Note(s): Goodness of fit: $\chi^2 = 110.8743$; $p = 0.05248$; BB-NFI = 0.911; BB-NNFI = 0.961; CFI = 0.971; RMSEA = 0.053

Table 1.

average variance extracted (AVE) is, in all cases, greater than 0.5. So, it can be affirmed that convergent validity is assured.

The results in [Table 3](#) show that the square roots of the AVE, the data of the main diagonal, are in all cases higher than the correlations between the variables in this study. Therefore, discriminant validity is assured.

	Composite reliability	AVE
Psychological capital	0.87279168	0.50023081
International experience human capital	0.68505988	0.52586961
International training human capital	0.65812266	0.51249464
International orientation	0.91900854	0.74197342

Table 2.
Reliability and
convergent validity

	Psychological capital	International experience human capital	International training human capital	International orientation
Psychological capital	0.5259			
International experience human capital	0.4186	0.5125		
International training human capital	0.0812	0.1529	0.5002	
International orientation	0.2391	0.1989	0.0681	0.7420

Note(s): The values in the diagonal are the AVE of each factor. The rest of the numbers correspond to the existing squared correlations between factors

Table 3.
Discriminant validity

4. Results

The proposed model is represented in [Figure 8](#), in which it is proposed that psychological capital exerts a direct influence on international orientation, and that this relationship is mediated by international relational and international human capital. In order to test the proposed hypotheses, we used the bootstrapping methodology, suggested by [Zhao *et al.* \(2010\)](#) and the method by [Preacher and Hayes \(2008\)](#) to assess the mediating effects. Bootstrapping is a statistical technique that focuses on the resampling of data within a random sample. Its main use is to find an approximation to the distribution of the analyzed variable. Bootstrapping allows the bias within the analysis to be reduced or, in other words, to approximate the variance by randomly resampling the initial sample, rather than the population. This makes it easier to build statistical models by creating confidence intervals and hypothesis tests. The procedure on which bootstrapping is based is the creation of a large number of samples, by repositioning the data, taking an initial population sample as a reference. One of the advantages of bootstrapping resampling is that it has simplified statistical methods because it has replaced the construction of classical and highly complex mathematical models with calculations using specific software. This has improved applicability and/or access to other fields or studies. Specifically, the test of linear mediation was performed applying bootstrapping methodology, using PROCESS for SPSS. PROCESS is a macro for SPSS software that allows the estimation of direct and indirect effects in single and multiple mediator models (parallel and serial), two- and three-way interactions in moderation models, along with simple slopes and regions of significance for probing interactions, and conditional indirect effects in moderated mediation models with single or multiple mediators or moderators ([Hayes, 2013, 2015](#)). Specifically, in this study, Model #4 was performed, measuring the mediation effects of international relational capital and international human capital.

[Table 4](#) shows the unstandardized ordinary least squares regression coefficients with confidence interval (standard error in parentheses).

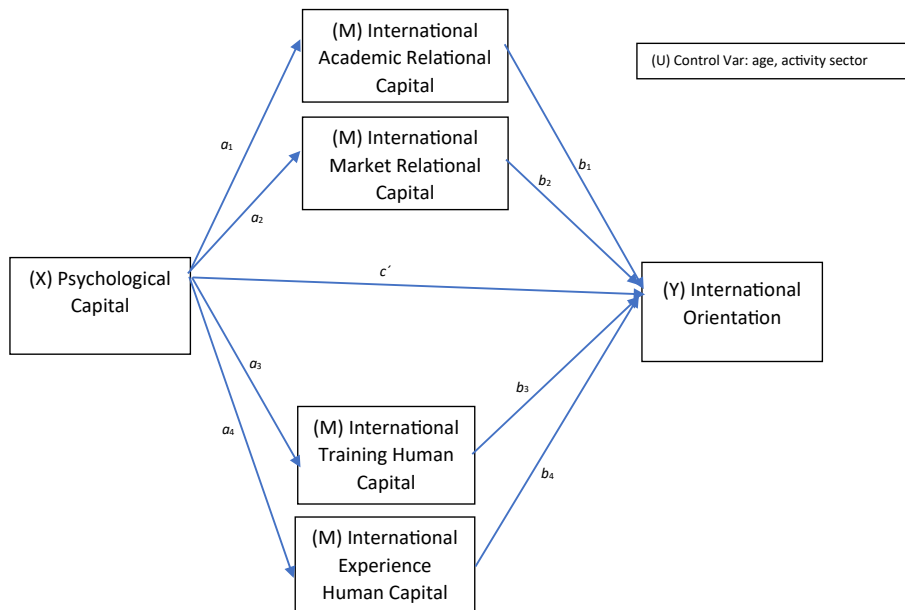


Figure 8.
Statistical model

	Model 1	Model 2	Model 3	Model 4	Model 5
	DV: International academic relational capital (M_1)	DV: International market relational capital (M_2)	DV: International training human capital (M_3)	DV: International experience human capital (M_4)	DV: international: Orientation (Y)
Paths	β (se) 95%CI	β (se) 95%CI	β (se) 95%CI	β (se) 95%CI	β (se) 95%CI
Psychological capital	0.221** (0.087)	0.238** (0.078)	0.423** (0.119)	0.401** (0.130)	0.227** (0.061)
$a_1, a_2,$ a_3, a_4 b_1	(0.048, 0.394)	(0.083, 0.394)	(0.189, 0.662)	(0.144, 0.659)	(0.106, 0.348)
International experience human capital					2.27** (0.066)
b_2					0.144** (0.066)
International training human capital					-0.029 (0.104)
b_3					(-0.235, 0.175)
International academic relational capital					0.316** (0.116)
b_4					(0.086, 0.545)
International market relational capital					0.285** (0.105)
c'					(0.078, 0.491)
Psychological capital					0.005 (0.018)
Age					(-0.031, 0.041)
U_1	0.0443	0.0571	0.0761	0.0737	-0.054 (0.034)
Activity sector	2.6128**	3.4129**	4.6400**	4.4818**	0.0566
U_2					3.3816**
R^2					
F					

Note(s): ** $p < 0.01$; DV: Dependent Variable

Table 4.
Mediation test results

Model 5, in Table 4, shows the regression coefficients when the dependent variable is international orientation.

The results give support to several of the proposed hypotheses. Hypothesis H1 proposes a positive relationship between academic and market relational capitals and international orientation. Our results show that such a relationship only exists between market relational capital and international orientation. Specifically, partial support was found for H1 (Figure 9), which establishes a relationship between international orientation and relational capital and, as can be observed (Model 5 in Table 4), market relational capital shows a positive and significant coefficient, but academic relational capital is not significant.

On the other hand, hypothesis H2 proposes a positive relationship between international training and expertise human capital and international orientation. In this case, full support was found for hypothesis H2 because both coefficients for international training and expertise of human capital are significant (Figure 10, Model 5 in Table 4).

Hypothesis H3 proposed a positive relationship between psychological capital and international orientation. As can be observed (Model 5 in Table 4), the coefficient is significant (Figure 11). Thus, support was found for hypothesis H3.

Concerning control variables, the results show no significant coefficients, for either age or activity sector.

Hypothesis H4 proposes a positive relationship between psychological capital and academic and market relational capital as well as international training and expertise human capital. As can be seen in Table 4, Models 1, 2, 3 and 4 represent regression coefficients when the dependent variables are mediator variables, that is, international academic relational capital, international market relational capital, international training of human capital and international expertise of human capital, respectively. These results point out that full support is found for hypothesis H4 (Figure 12).

Lastly, the bootstrap approach suggested by Zhao *et al.* (2010) is employed to assess the mediating effects, with the bootstrap sample set to 5,000 and the confidence level to 95%. Hypothesis H5 (Figure 13) proposes a mediating role for international market and academic relational capital, in the relationship between psychological capital and international orientation. On the other hand, Hypothesis H6 (Figure 14) proposes a mediating role for international relational and international human capital, in the relationship between international orientation and psychological capital. Table 5 shows the indirect effect of mediating variables on the relationship between international orientation and psychological capital. These results point out that there are indirect effects from international market relational capital (Boot LLCI-BOOT ULCI interval: 0.0229; 0.1579), international training of human capital (Boot LLCI-BOOT ULCI interval: 0.0096; 0.1481) and international expertise of human capital (Boot LLCI-BOOT ULCI interval: 0.0265; 0.1995). These three confidence intervals do not include 0, indicating that the indirect effects were significant, and that the mediations were established. So, partial support was found for H5 and full support for H6.

5. Discussion

The international vocation of ASOs has led us to study the background of the orientation toward international markets of the academic entrepreneurs who founded these companies. Specifically, the objective of this research is to analyze the effect of international relational, international human and psychological capital, on the international orientation of academic entrepreneurs, and the role relational and human capital play in the relationship, between psychological capital and international orientation. The results obtained totally support Hypotheses 2, 3, 4 and 6, and partially support Hypotheses 1 and 5.

The results obtained from our empirical research allow us to affirm that both international market relational capital and international human capital, directly and significantly influence the international orientation of the academic entrepreneur. This result is in line with works

that have stated that relational and human capital could lead to international orientation and internationalization of firms (Herrmann and Datta, 2005; Laurell *et al.*, 2013; Senik *et al.*, 2014; Baum *et al.*, 2015; Baronchelli *et al.*, 2015; Chen *et al.*, 2017; Sekliuckiene, 2017; Baier-Fuentes *et al.*, 2018). Therefore, the relationships that explain the international orientation of academic entrepreneurs are the networks established at the international level, with industry, technology parks, venture capital and financial agents. It seems logical that, in order to have a managerial vision and a proactive organizational culture that supports the development and utilization of the resources of these units toward the achievement of international objectives, contacts with market agents are more necessary than relationships with academics. Contrary to expectations, relational capital at the academic level does not influence international orientation directly. However, it could affect international orientation indirectly. As some

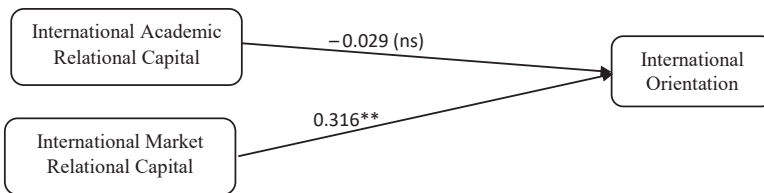


Figure 9.
Results of hypothesis
testing [H1](#)

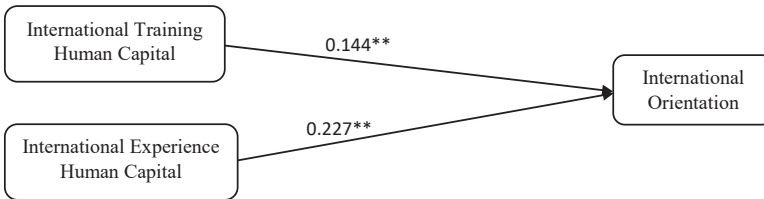


Figure 10.
Results of hypothesis
testing [H2](#)

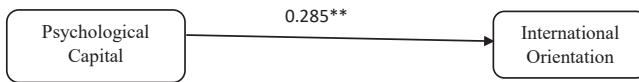


Figure 11.
Results of hypothesis
testing [H3](#)

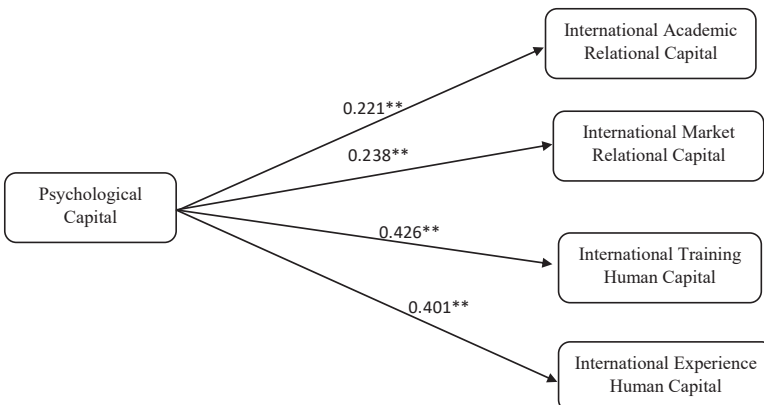


Figure 12.
Results of hypothesis
testing [H4](#)

authors have stated, it may be that academic relational capital could favor gaining market relational capital (Bialek-Jaworska and Gabryelczyk, 2016). Therefore, collaboration with academic agents, such as foreign universities, foreign colleagues and other international R&D centers, could promote the realization of strategic alliances abroad, access to international distribution channels and the obtaining of relationships with potential customers of global markets.

Moreover, the results showed a direct and significant relationship between psychological capital and international orientation. Specifically, academic entrepreneurs who are optimistic, hopeful, resilient and self-efficient will have a higher orientation toward international markets. This result is noteworthy, taking into account that the direct influence of psychological capital on international orientation has not received attention in previous studies on the academic entrepreneur population.

Also, psychological capital directly influences international relational capital and international human capital. Academic entrepreneurs with developed psychological capital will improve their relational and human capital. This evidence is consistent with prior studies on entrepreneurship (Envick, 2005; Zhao *et al.*, 2020). Therefore, developed psychological capital in academic entrepreneurs allows them to obtain a larger network of relationships, thus improving their relational capital, with both academic and market agents, at the international level. Similarly, the psychological capital of academic entrepreneurs leads to the acquisition of knowledge and experience in international markets, improving their international human capital. This finding is also important, considering that the empirical relationship between these capitals has received scant attention in the intellectual capital, international and academic entrepreneurship literature.

Finally, an important result of our study is obtained by including relational capital and international human capital as mediating variables, since the results obtained show that both

Figure 13.
Results of hypothesis testing H5



Figure 14.
Results of hypothesis testing H6



Table 5.
Indirect effect

	Effect	Boot SE	Boot LLCI	Boot ULCI
International experience human capital	0.0913	0.0436	0.0265	0.1995
International training human capital	0.0615	0.0340	0.0096	0.1481
International academic relational capital	-0.0066	0.0193	-0.0493	0.0304
International market relational capital	0.0753	0.0331	0.0229	0.1579

market relational capital and international human capital explain the relationship between psychological capital and international orientation in ASOs. Consequently, at the international level, the psychological capital of the academic entrepreneur leads to greater market relational capital and greater human capital, leading to the international orientation of academic entrepreneurs. These results are novel, as the mediating role of these capitals, in the relationship between psychological capital and international orientation of the academic entrepreneur, has not received attention in previous studies.

6. Conclusions

This paper presents an attempt at achieving improved understanding of the entrepreneur's orientation toward international markets. As has been shown in previous studies, orientation toward international markets allows for the recognition of opportunities and potential customers, sales growth and the development of new products in these markets. Therefore, taking into account that the literature shows that international orientation of the entrepreneur is an important factor for the success of organizations in international markets, the main conclusion of this paper is that psychological capital, relational market capital and human capital of the academic entrepreneur are essential factors for academic entrepreneurs to have an orientation toward international markets. Therefore, these three intangible resources, human capital (what you are), relational market capital (who you know) and psychological capital (who you are), should be considered key resources in international entrepreneurship.

A conclusion related to the impact of the psychological capital is noteworthy because the psychological capital not only directly influences the entrepreneur's orientation toward international markets but also does so indirectly through their market relational capital and human capital. Therefore, psychological capital, i.e. entrepreneurs with high levels of optimism, self-efficacy, hope and resilience, enables the achievement of better relationships with others, more successfully, thus enabling a broad and stable network of relationships to be achieved, thereby improving their relational capital. In addition, psychological capital allows knowledge and experience for international business to be obtained, improving their human capital.

This paper contributes to the network theory and literature of intellectual capital, academic entrepreneurship and internationalization. In relation to network theory, our results contribute to the analysis of the relationship networks of academic entrepreneurs in ASO outcomes, differentiating between market networks and academic networks. Paradoxically, the market networks are the ones that directly affect the international orientation of the entrepreneurs, despite the fact that they have a denser network of relationships with nearby academic agents.

On the other hand, the literature on entrepreneurship and internationalization is enriched by this research, by shedding more light on those variables that would promote the internationalization of ASOs which, by their very nature, and that of their founders, are born with an orientation toward global markets. Finally, with regard to the literature on intellectual capital, it seems clear that the profile of the entrepreneur, in terms of human, relational and psychological capital, seems to be determinant for the international projection of the businesses founded by them.

6.1 Implications

Our findings reveal several practical implications. First, the achieved results highlight important implications for public policies oriented to the training of entrepreneurial potential. It is evident in the literature that psychological capital, self-confidence, hope, optimism and resilience are states that imply behaviors, thoughts and actions that can be learned and developed in people (Bandura, 1997; Masten, 2001; Envick, 2005; Luthans *et al.*, 2007d;

Luthans *et al.*, 2015; Hizam-Hanafiah *et al.*, 2017). Therefore, universities can play an important role through training courses for entrepreneurs, which should take into account the development of programs that encourage or enhance the psychological capital of potential entrepreneurs, or even academic entrepreneurs who have created an ASO. This could lead them to have an international orientation in their enterprises and improve their relational and human capital, internationally. As the literature shows, short training interventions, such as psychological capital intervention, may be used to develop participants' psychological capital (Luthans *et al.*, 2010). In this same line, the literature shows that entrepreneurial training, provides individuals with a sense of independence, self-confidence and autonomy (Do Paço *et al.*, 2015). Consequently, through courses on entrepreneurship, one of the dimensions of psychological capital, self-confidence, can also be improved in the case of the potential entrepreneur. Second, TTOs, as units that mediate the relationships of the academic entrepreneur with the market, provide key resources, such as, assistance, consulting and training (Fernández-Alles *et al.*, 2015; Díánez-González *et al.*, 2020), could also be decisive for the academic entrepreneur's orientation toward international markets. In this sense, TTOs could assist academic entrepreneurs in recognizing international opportunities, in assessing the international commercial potential of research, in promoting training of academics in accessing foreign markets, in advising academics by sharing past experiences of the international ASOs they have assisted, in supporting the building of the credibility of ASOs in international markets, or in making their international market networks available to academics, which all seem to be key for the internationalization of these companies. Third, this article might also be of interest for managers and management teams of companies willing to enter, or even those already operating in, international markets. Such companies should take into account the importance of having personnel with developed psychological capital in their management teams, and with relational and human capital at the international level that allows them to have, or maintain, an orientation toward international markets. Fourth, practical implications at the political level can be considered. Programs developed at a political level, aimed at promoting entrepreneurship in universities and, in this case, in academics, can take into account the psychological capital variable, as a filter in the selection of participating personnel. This would achieve a better placement of resources in times when resources are scarce, and which could be directed to the training of potential entrepreneurs who not only create their own companies but also influence their international orientation, leading them to develop in international markets.

In summary, given the central role that is attributed today in universities, to entrepreneurship and the creation of ASOs, the results could be used for the design of measures enhancing psychological capital, relational and human capital at the international level to enable these entrepreneurs to be oriented toward international markets.

6.2 Limitations and future research directions

In addition to contributions presented here, a limitation must be shown. The population considered is one limitation of this study since it has focused on ASOs in Spain. Other studies need to be conducted, in different countries, to allow a comparison of the results. On the other hand, future studies might analyze whether there are gender differences in psychological capital and its relationship with the international orientation of academic entrepreneurs, since, as the literature on entrepreneurship has shown (Villanueva-Flores *et al.*, 2021), gender differences are found in psychological capital and in the relationship between psychological capital and entrepreneurial intention. In addition, longitudinal studies and qualitative work could be carried out with entrepreneurs immersed in both national and international markets, to study whether these intangible resources develop over time and to analyze the reasons for their development. It could even be interesting to analyze the interrelationship among these capitals, since a more developed relational and human capital could influence the self-

confidence of the entrepreneur, enhancing their psychological capital. Therefore, by collecting longitudinal data, this study could be enriched. Lastly, empirical researches are still needed to measure the aggregate effect of these three forms of capital. For example, futures works might study the relationship of these three capitals, relational, human and psychological, in the recognition of opportunities in both national and international markets.

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