


# Internationalization of Spin Off From the Perspective of Its Client Capital

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## ABSTRACT

This paper analyses in detail the influence of customer relationships on the internationalization of university spin-offs. Relational capital is a source of sustainable competitive advantage for these types of companies given the innovation and technological development they generate. From the background, a management model has been designed and implemented to conclude that customer relations exert a positive influence on the internationalization of university spin-off. The perceived satisfaction of customers has a special incidence, and moreover, it is important to have a wide portfolio of them establishing strong links. It will provide information about their needs and may affect their loyalty.

## KEYWORDS

Business Management, Customer Capital, Intangibles, Relationships, Relevant Information, Sales Abroad, Strategic Model, Technology Firms

## INTRODUCTION

It is important to highlight that, despite the large number of authors who have studied relational capital, there is no generally accepted definition of the concept, and it has not been included either in all existing models for the management and measurement of intellectual capital. Relational capital refers to formal and informal relationships developed by the companies, either internally or externally, through their owners, managers, and employees (Federico *et al.*, 2009). From the Knowledge Theory framework, relational capital is presented as the main sustainable competitive advantage source for firms (Grant and Baden-Fuller, 2004). As a result, its study is essential in our current economy, characterised by being highly dynamic, and where internationalisation appears to be essential for the survival of both large and small companies.

Some authors indicate when referring to relational capital that companies do not operate in isolation but are integrated in a relationship network to create value (Ma *et al.*, 2009; Manolova *et al.*, 2009) and, particularly in the case of ICT industry (Morandi and Sgobbi, 2011). This network

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of relationships with other companies, with social or economic firms, with the society as a whole and specifically with customers, generate very valuable relational assets for the company (Yilmaz and O'Connor, 2012). These assets are difficult to be copied or replaced and can turn into essential strategic resources for the generation of a sustainable competitive advantage for the companies and, in particular, for university spin-offs (Barney, 2007; Chisholm and Nielsen, 2009). Therefore, to access the developed technology, they need a broader market than the domestic one to market their products/services. That is to say, the internationalisation of spin-offs can be seen from very early on, even from their own incorporation, through a progressive process. Moreover, international customers can provide to the company a large amount of information on foreign markets.

University spin-offs exert a role as transmitters of knowledge from the universities. Besides, they have a future prospect, derived from their innovation and technological development, and due to this, the essential role played by the university in the current globalised context, contributing to the economic growth, to the creation of sustainable jobs, and to the competitiveness in international markets is widely accepted (Audretsch, 2013).

As can be checked, there is much literature on the concepts of relational capital, relationship networks, internationalisation, and university spin-offs. However, the joint analysis of all of them in just one research analysis in detail the characteristics of the relationships, is an interesting challenge which we would like to tackle in this paper. Specifically, we focus on one of the main factor, the relationship with their customers, to obtain competitive advantages or to generate value (beyond financial performance, Jelfs and Smith, 2021) for their internationalisation providing companies important clues for better management.

Currently having good relationships with customers is of great importance for a company to be able to face with greater success the possible contingencies derived from the economic situation, affected by a global health crisis. In that way, the loyalty and trust of customers become key assets for companies.

## BACKGROUND AND OBJECTIVES

The different intellectual capital theoretical models tackling the study of relational capital do not coincide when integrating all of its elements or as regards the used terminology either. Some authors refer to relational capital as customer capital (Edvinsson, 1992-93; Kaplan and Norton, 1996; Onge, 1996, Roos *et al.*, 1997; Gogan and Draghici, 2013), others talk about social capital (Camisón, Palacios *et al.*, 2000), and some other expressly mention the term relational capital (Bontis, 1996, Euroforum, 1998; Roos *et al.*, 2001; CIC, 2003, 2011).

Deriving from all studied literature on relational capital, customers are one of the most influential elements, used in the most relevant models (Edvinsson, 1992-93; Kaplan and Norton, 1992-96; Brooking, 1996; Bontis, 1996; Onge, 1996; Sveiby, 1997; Stewart, 1997; Roos *et al.*, 1997; Euroforum, 1998; Camisón *et al.*, 2000; Flostrand, 2006; Chen, 2008; CIC, 2003, 2011; Gogan and Draghici, 2013). Besides, most of these works focus on the relevance of this relationship, except for some models such as the Nova Model (Camisón, Palacios and Devece, 2000), Intellect Model (Euroforum, 1998), and Intellectus Model (CIC, 2003, 2011), which analyse the relevance of the relationships with other agents.

It is important to point out the fact that the Nova Model (Camisón *et al.*, 2000) explicitly features for the first time the relationships of the company with technological centres or universities, which is very important for this research focused on the study of spin-offs. These relationships with universities have been implicitly included in certain previous studies, as the Intellect Model (Euroforum, 1988), including them within the element “interrelationships with other agents”, together with relationships with Public Administrations, environment, etc. Despite this, they are not studied in detail, unlike in Camisón *et al.* (2000).

In spite of the detailed analysis on relational capital implemented by some of the aforementioned papers, the Intellectus Model (CIC, 2003, 2011) could be classified as one of the most comprehensive models, although it does not expressly mention internationalisation or a specific adaptation for spin-offs, which will be studied in this paper, although it includes a version for SMEs. Other studies prove how relational capital has an impact on financial performance, specifically in the case of IT firms (Kanishka and Raman, 2021) and how opportunity-oriented spinoffs exhibit higher post-entry growth rates (Civera *et al.*, 2020).

As regards the RBV- *Resource Based View* companies, the relevance of these valuable, unique, and inimitable resources is highlighted. Knowledge and, specifically, tacit knowledge, is one of the key resources of companies (Barney, 1991). This can increase through the relationships of the company with knowledge-based institutions, as for example, universities or research centres.

Thus, through relational capital, firms can promote their internationalisation process. Maintaining internal and external relationships is a very positive factor providing the company with certain advantages. It increases its resource base, both as regards financial and non-financial resources, provides a larger access to information, decreasing the failure possibilities due to the knowledge of the market situation and the possible competitors.

Internationalisation is essential nowadays, to the extent that some spin-offs are internationalised almost from the very beginning, the so called *born global* companies. Due to the developed technology, they need a broader market than the domestic one to market their products/services. That is to say, the internationalisation of spin-offs can be seen from very early on, even from their own incorporation, through a progressive process.

In the technological sector, establishing a network of relationships with other companies, social or economic firms, or with society in general makes the internationalisation process much quicker (Hollensen, 2014).

Many papers on networking in the technological sector of spin-offs can be highlighted (Hoang and Antoncic, 2003; Nicolau and Birley, 2003a, b; Perry-Smith and Shalley, 2003; Pérez and Sánchez, 2003; Subramanian and Youndt, 2005; Inkpen and Tsang, 2005; Landry *et al.*, 2006; Laursen and Salter, 2006; Walter *et al.*, 2006; Ozgen and Baron, 2007; Tödtling *et al.*, 2009; Welbourne and Pardo del Val, 2009; McFadyen *et al.*, 2009; Huang *et al.*, 2012; Villanueva-Felez *et al.*, 2014; Steinar, 2014), but in most cases, they do not cover an international context. However, the literature contains an extensive analysis on the relationship between technological innovation and internationalisation (Fonfría, 2010), which can be also applied to the rest of types of EBTs, where spin-offs are included, as well as the relevance of strong and reliable relationship networks to obtain a good performance in international activities (Federico *et al.*, 2009) and, more specifically, in the internationalisation of SMEs (Johanson and Vahlne, 2003, 2009; Ojala, 2009 and Fletcher and Harris, 2012). However, these studies do not expressly refer to the effect of those networks in the internationalisation of the spin-offs, as many of them focus on their degree of innovation. This makes this paper different to the rest of existing literature, as it jointly tackles the study of relational capital, relationship networks, university spin-offs, and business internationalisation, as these companies are usually considered within an international sphere due to their marketed products (Chiesa and Piccaluga, 2000) and with a high collaborative attitude to integrate themselves in relationship networks (Fariñas and López, 2007).

As a result, this research focus on the main factor, the relationship with customers, analysing in detail that influence to obtain competitive advantages or to generate value for the internationalisation of university spin-offs providing these companies important clues for the better management of that kind of relationships in an international context.

From all this, the following initial hypotheses can be presented.

**HYPHOTHESIS 1:** *Relationships with customers positively affect the internationalisation process of university spin-offs.*

This research goes beyond this, investigating the influence of the relationships with customers in the internationalisation of university spin-offs, which is not explicitly included in any research up to now.

Networks allow us to delve deeper into how previous relationships are configured. According to several studies, relationship networks temper the entry risks into foreign markets (Musteen et al., 2010), are useful to find potential partners in other countries and help identify new business opportunities (Sharma and Blomstermo, 2003; Fernhaber and Li, 2013; Child and Hsieh, 2014), reduce investment costs and integration time (Lin and Chaney, 2007), thereby contributing to a quicker internationalisation (Kontinen and Ojala, 2011; Child and Hsieh, 2014), as they offer the necessary knowledge on new market opportunities (Batas and Liu, 2013). From this, the following hypothesis to be verified in this work is derived.

The companies have discovered through their customers new market niches, identifying in this way new business opportunities, and, at the same time, have been able to access foreign markets more easily thanks to having a contact network which has allowed them to reduce investment costs and integration time, as well as to obtain prescribers of their products abroad and collaboration and distribution agreements. All of this has contributed, as has been mentioned in the previous paragraph, to a quicker internationalisation thanks to the knowledge obtained by the firms on new business opportunities.

The performance of this hypothesis is assumed to be true, as it can be said that those companies with larger networks can be internationalised before and be more successfully (Oviatt and McDougall, 1995; Coviello, 2006).

The positive effects of the networks derive from their own nature. The relationships of the company with the different actors, such as consumers, suppliers, competitors, allies, public administrations, etc., provide it with essential information to design its internationalisation process. Each of these individual relationships will connect itself with other relationships, thus defining the contact network of the company.

It is important to examine the configuration and characterization of the networks. In this way, depending on the commitment of the company, this may belong to *open networks* (with weak links, with the exchange of information among several actors) or *closed networks* (with strong links, focused on social exchange and trust) (Hilmersson and Jansson, 2012). The existence of strong links between the company and the rest of agents of the network provides larger benefits to the company. Among these benefits, we can highlight an easier transfer of detailed information and tacit knowledge, an increase on the level of trust and an increased support among the actors involved in the relationship (Lechner et al., 2010; López-Fernández, M. et al. 2010).

Our research delves deeper than the rest of analyses of the available literature, as it analyses in depth the existence of strong or weak links in the degree of knowledge of the agent, the intensity of the relationship or the level of trust, as well as the existence of personal or professional links. Thus, to contrast the influence of the development of strong links on the success of the internationalisation, the following hypothesis is proposed:

**HYPOTHESIS 2:** *Having strong links with customers positively affect the internationalisation process of university spin-offs.*

On the other hand, the acquired degree of undertaking, the degree of knowledge and shared information, the cooperation level or the shared beliefs and visions are analysed to a higher extent.

In the same line, together with the commitment of the company in the different relationships established with the agents of the network, the time invested in these relationships and the used resources affect the corporate internationalisation process. As a result, it is necessary to analyse them, as both concepts (time and resources) affect the strength or weakness of the links established

by the company with the rest of agents of the network, as was defined by Granovetter (1973). This leads us to the following hypothesis:

**HYPOTHESIS 3:** *The degree of commitment, time devoted, and resources used by the company to establish, develop, or maintain relationships with customers positively affects the success of the internationalisation process of university spin-off.*

As regards the type of relationship developed between the company and the rest of agents of the network, different types of networks can be identified: *formal or professional networks* (with customers, suppliers, competitors, allies/collaborators, and public institutions), very relevant in the process of the creation of knowledge and technological innovation performed by spin-offs (McFadyen *et al.*, 2009); and *informal or social networks* (with friends and family), essential in the success and development of this type of companies, allowing the access to the necessary information and resources supplied by the different agents from the environment of the company (Walter *et al.*, 2006; Huang *et al.*, 2012).

Focusing on the way in which the company establishes itself in a foreign market, it may establish relationships *directly or dyadically* (a direct relationship between the seller and the buyer, exercising greater control over its product and obtaining greater access to information, which implies greater risks and costs) or *indirectly or triadically* (a relationship with a third party that acts as an intermediary between the seller and the buyer, resulting in the isolation of the seller from the foreign market, and thus it obtains less knowledge) (Sandberg, 2014).

In light of this theory, due to the uncertainty of entering foreign markets, indirect relationships are presented as the best option to reduce risks. They can be more useful in the first steps of a company in its internationalisation process due to the lack of knowledge and experience, but also convey an isolation of the seller from the foreign market, preventing in this way the company from acquiring knowledge on such market. Direct or dyadic relationships, though they entail higher risks and costs, provide the company with a higher control of its product, access to the information, and a higher protection of its rights. Consequently, it would be interesting to formulate the following hypothesis:

**HYPOTHESIS 4:** *Formal and direct relationships with customers positively affect the internationalisation process of university spin-offs.*

In conclusion, for this study, relational capital is defined as the set of knowledge adding value to the organization and adding itself to the firm derived from the relationships of the company with the different market agents, as well as with the society in general.

In this way, we intend to analyse the influence of the relationships established by the company, in particular in the case of university spin-offs, with customers in their internationalisation processes; all of this through the study of relational capital and Network Theory.

The relationship network models (part of the Network Theory) expressly refer to relationships with customers, both those which consider an international perspective and those which do not. But what is really important, as has been previously mentioned, is that these network models provide a more general overview of the relational capital, considering the different ways in which these actors can interact, taking into account, among others, their degree of interaction, their links, the processes and operational mechanisms of the network, its diversity, positioning, and the increasingly more complex changes.

# METHODOLOGY

After the conclusions obtained from the analysis of the available literature, the following model, shown in Figure 1, has been designed. This model enables an analysis of the influence of the relational capital of the customers in the internationalisation of university spin-offs.

As regards the elements of the model, the relationships with customers are going to include the relationships with the different customers demanding the products of the company and potential customers, which are essential for the firm and through which valuable information on the market can be obtained. Flostrand (2006) points out the fact that the relationships with customers can be the main assets for the companies. This interest is shown in some of the first studies on the topic, where the study of the relationships of the relational capital did not reach any further than to the relationships with customers, even calling it customer capital (Chen, 2008).

As suggested by Cegarra Navarro and Sánchez Polo (2007), the relationships with other agents of the environment, especially with customers, constitute a significant base for the “relational learning”, essential for a competitive success.

In the case of internationalisation, international customers can provide to the company a large amount of information on foreign markets.

From the model shown in Figure 1, the main variables and indicators for each of its elements are defined, according to the literature (Peces, 2020). An analysis is implemented with the sample of companies listed below, obtaining a reduced questionnaire with the characteristics shown in Table 1, which correspond to the indicators of Table 1.

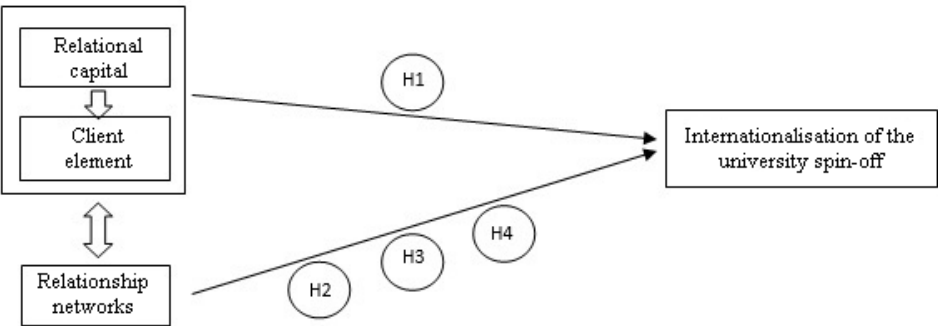
The final questionnaire (Table 1) is divided into three sections: internationalisation (with three open questions), elements of the relational capital, customers, and relationship network perspective, both parts with 20 Likert style questions, each of the questions with a 5-point scale (1, no influence; 2, not much influence; 3, moderate influence; 4, enough influence, and 5, very much influence).

Table 2 below shows the main indicators associated to the questionnaire shown in Table 1.

## Selection and Description of the Sample

The study refers to university spin-offs of the Region of Andalusia, in Spain. The data have been obtained through the request for information on the phone and/or by email to the *Red OTRI* offices in the Region of Andalusia. The initial database obtained with the existing population of spin-offs undergoes a new filter so as to check whether those spin-offs are internationalised or not, the SABI database is checked (Iberian Balance Analysis System, according to its initials in Spanish) and the spin-offs are also directly contacted. Thus, we found a population of thirty-six internationalised

Figure 1. Influence of relationships with customers



**Table 1. Sections, elements, variables, and items of the final questionnaire**

Sections	Elements	Variables	No. Items
Internationalisation	Internationalisation (INT)	International activity	3
Relational Capital	Relationships with customers (CRCL)	Loyalty Satisfaction Quality of the relationship Relevant customers	12
	Relationships with suppliers (CRPR)	Response capacity Quality of the relationship	10
	Relationships with competitors (CRCP)	Competitor base Quality of the relationship	7
	Relationships with allies/collaborators (CRAC)	Quality and results of the relationship with domestic allies/collaborators Quality and results of the relationship with international allies/collaborators	11
	Relationships with public bodies and entities (CREP)	Influence in the internationalisation Agreements/collaborations	5
	Reputation and image of the company (RI)	Brand recognition Perceived reputation	8
Relationship networks	Networks with customers (RCL)	Establishment of links	8
	Networks with suppliers (RPR)	Acquired commitment, used time and resources	8
	Networks with competitors (RCP)	Type of existing relationship	8
	Networks with allies/collaborators (RAC)		8
	Networks with public entities and bodies (REP)		8

spin-offs. 14 spin-off firms from the region of Andalusia answered the questionnaire, obtaining in this way a response rate of 39% (see Table 3).

The studied companies operate in different activity areas within the technological sector. 50% of the companies operate in the area of biotechnology and agroindustry. The rest develop activities related to ICTs, engineering and consulting, renewable energies, and aeronautics and automotive sector.

As regards the age of the companies, 64.28% of them were incorporated more than 10 years ago, 21.43% more than 5 years ago, and 14.29% in the last 5 years. In the same way, 50% of those spin-offs are micro-companies (they have less than 10 employees); 35.72% are small companies (with less than 50 employees), and 7.14% are medium sized companies (less than 250 employees), whereas just one of them, which represents 7.14% of our sample, has more than 800 employees.

As regards the international activity of the studied companies, 21.43% has been operating abroad for less than 5 years, 28.57%, for more than 5 years, and 50%, for more than 10 years. 28.58% of those companies develop their international activity in less than 5 countries, 35.71%, in more than 5 countries, and the remaining 35.71% are present in more than 10 countries.

As regards the percentage represented by their sales turnover abroad over their total sales turnover, 28.58% present a percentage under 10%, for 21.42% of the companies, this percentage is below 50%, and for 50% of them, it is over 50%. In the same way, we can say that all companies export goods or services, whereas just 4 of them have distribution based on their own offices abroad and just 2 of the companies have their own manufacturing plants abroad.

Table 3 shows the more relevant characteristics for this study of the companies of Andalusia under analysis:

**Table 2. Variables e indicators of relationships with customers**

VARIABLES	INDICATORS
<b>Internacional activity</b>	
Existence of foreign activity	Number of years exporting Number of countries with which the company trades Percentage of foreign sales over the total sales turnover
Distribution through own offices	Years since the beginning Countries involved Porcentage over the total sales turnover
Manufacturing abroad	Years since the beginning Countries involved Porcentage over the total sales turnover
<b>Relationship with customers</b>	
Relevant customers portfolio	Increase of profitability per customer through the internationalisation
Customer satisfaction	Knowledge of the needs of the customers Percentage of loyal foreign customers/total customers Level of satisfaction of the company as regards its customers Information received by the company from its foreign customers
Customer loyalty	Repeat purchase percentage Increase of sales per customer Level of loyalty of domestic customers Order management quality
Quality of the relationship with customers	Percentage of satisfied domestic customers/total customers Customer support quality Company- domestic customer information feedback
<b>Relationship networks with customers</b>	
Establishment of links	Existence of strong links Intensity of the relationship Existence of professional links
Acquired commitment	Acquired degree of commitment
Used time and resources	Amount of time devoted to the relationship Amount of time devoted to developing the relationship
Type of existing relationship	Existence of a formal relationship Existence of a direct relationship

## RESULTS AND DISCUSSION

### CL Model: Evaluation of The Measurement Model And The Structural Model

Then, the measurement model is assessed. This model represents the relationships between the latent variables (constructs) and their corresponding indicators, and of the structural or internal model, which describes the relationships among the latent variables, in this case, Model CL which tackles relationships with customers.

#### *Evaluation Of the Measurement Model*

For the assessment of the measurement model, a difference is made between those variables treated as estimated compounds in Mode A or Reflective Mode (causality takes place from the construct to the measures) and those in Mode B or Training Mode (causal indicators form the construct by means of linear combinations) (Figure 2).

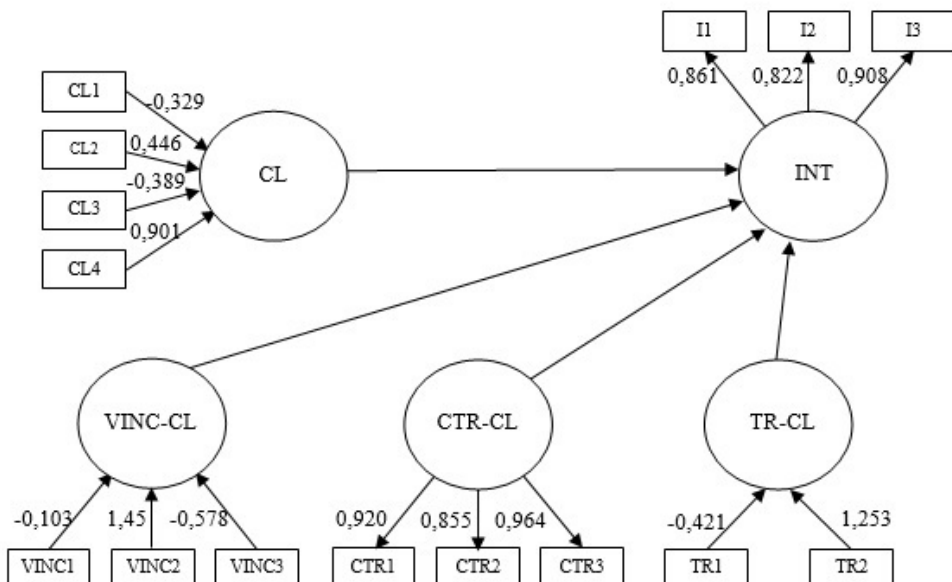


Table 3. Characteristics of the firms

Spin-Offs (S.O.)	Employees	Activity sector	Years exporting	No. of countries where they operate	Export sales/ total sales
S.O.1.	<1000	Aeronautics and Automotive	>10	>5	55%
S.O.2.	<10	Biotechnology	>5	<5	10%
S.O.3.	<10	Engineering	<5	<5	1%
S.O.4.	<10	Agroindustry	>10	>10	90%
S.O.5.	<10	Agroindustry	>5	>10	5%
S.O.6.	<10	Agroindustry	>10	>5	75%
S.O.7.	<50	Computing	>10	>5	10%
S.O.8.	<50	ICTs	>10	>10	80%
S.O.9.	<50	Biotechnology	>5	>5	50%
S.O.10.	<10	Engineering and Consulting	>10	>5	90%
S.O.11.	<250	Renewable energies	>10	>10	70%
S.O.12.	<50	Agroindustry	>5	>10	27%
S.O.13.	<10	Engineering and Consulting	<5	<5	40%
S.O.14.	<50	Biotechnology	<5	>10	60%

The study of the individual reliability of the indicator presented by the measurement scales for the constructs which were estimated in Mode A begin, in this case, Internationalisation (INT) and Commitment, Time, and Resources used in the relationship with their customers (CTR-CL). Reliability represents the consistency of a measurement and the loadings of the indicators with their

Figure 2. Measurement model CL



construct are examined for its assessment. The squared external loadings of an indicator show how much of the variation of an item is due to the construct and represent, at the same time, the variance extracted from that item (Hair *et al.*, 2019). Loadings need to be over 0.708. For those indicators with loadings under 0.70, the researchers need to assess the effects the depuration or removal of an item would have on the compound reliability, as well as the content of the construct (Hair *et al.*, 2019). In this case, all loadings are over 0.708 (Table 4).

In the same way, the significance of the loadings has been determined by means of the bootstrapping resampling procedure (100 subsamples, due to the size of the sample of this research), considering a minimum level of trust of 95% to confirm significance. All indicators are significant, with a confidence level of 99.9%, except for items CTR-CL1 and CTR-CL2, significant with a confidence level of 99% (Table 4).

Then, the internal consistency reliability of each construct is assessed. The traditional criterion to examine the internal consistency is Cronbach's alpha, which provides an estimate of reliability based on the intercorrelations of the observed items and whose value needs to be over 0.7 (Hair *et al.*, 2016). A different statistical analysis to assess reliability is the Composite Reliability Index, which takes into account the different values of the external loadings of the indicators and whose value ranges between 0 and 1. The larger the value, the larger the achieved reliability level. Values between 0.60 and 0.70 are acceptable in exploratory research, between 0.70 and 0.90, they are considered to be suitable for more advanced research stages. However, values over 0.90 and, in particular, over 0.95, are not desirable, as this fact would indicate that all indicators are measuring the same phenomenon and could be a non-valid measure of the construct (Hair *et al.*, 2019). Finally, Dijkstra-Henseler's rho ( $\rho_A$ ) is another consistent reliability measure whose value needs to be over 0.7 too (Nunnally and Bernstein, 1994; Dijkstra and Henseler, 2015). In this case, for all measurement indicators, the obtained result is over 0.7, showing in this way a high degree of internal consistency (Table 5).

After this, the convergent validity is assessed (degree to which a measure positively correlates with alternative measures of the same construct) by means of Average variance extracted analysis (AVE), defined as the average total value of the squared loadings of the indicators belonging to a given construct. An AVE of 0.5 or over it indicates that the construct explains more than half of the variance of its indicators (Hair *et al.*, 2019). In this case, the AVE is over 0.5 (Table 5).

**Table 4. Indicator loads, mode a**

Indicador	Cargas
I1	0.861***
I2	0.825***
I3	0.906***
CTR-CL1	0.920**
CTR-CL2	0.855**
CTR-CL3	0.964***

Note: n=100 subsample: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001; (one-side Student t-test) t (0.05;99)=1.645; t(0.01;99)= 2.327; t(0.001;99)=3.092.

**Table 5. Evaluation of the measurement ci model: estimated model, mode a**

Constructs	$\alpha$ Cronbach	Dijkstra-Henseler's rho ( $\rho_A$ )	IFC	AVE
INT	0.833	0.852	0.899	0.747
CTR-CL	0.900	0.923	0.938	0.835

To implement the discriminant validity analysis, the Fornell-Lacker criterion is used. According to this criterion, a construct needs to share more variance with its indicators than with other constructs of the model (Hair *et al.*, 2016). The obtained results show a satisfactory discriminant validity level, as off diagonal elements are below diagonal ones. In this way, for the reflective construct INT 0.235 is lower than 0.865 and 0.390 is also lower than 0.865. In the same way, for CTR-CL 0.214 is lower than 0.914 and, also 0.235 (Table 6).

Lastly, the validity of the constructs is assessed in Mode B, i.e., the relationships with customers (CL), the established links (VINC-CL), and the type of existing relationship with them (TR-CL). In the first place, the collinearity of their indicators is studied so as to observe the lack of correlation among items. To do so, the Variance Inflation Factor, whose value needs to be below 3.3, is used. In this case, the VIF values are below the established limit, and thus, there are no collinearity problems (Table 7).

Then, the relevance (magnitude) of the weights is assessed, as well as their significance. The values of the external weights show the relative contribution of each indicator to its construct, i.e., its relative relevance to form the construct. By means of the bootstrapping procedure, the aforementioned external weights are tested to check whether they are significantly different to zero. It is important to take into account that the values of the weights of each of the formative indicators are affected by other relationships included in the model, what is known as interpretational confounding and represents a situation where the empirically observed meaning between the construct and its measures differs from the theoretically imposed meaning (Kim *et al.*, 2010).

The fact that the weights of the formative indicators are not significant does not automatically translate into a low quality of the measurement model; it is also necessary to assess the contribution or absolute relevance of a formative indicator to its construct without taking into account the rest of indicators. An indicator with a non-significant external weight but with a high external loading (over 0.50) needs to be considered as absolutely important, though not relatively important. In this case, the indicator must be maintained. On the contrary, for an indicator with a non-significant weight and an external loading below 0.5, it is the researcher who needs to decide whether to maintain or to remove the indicator by analysing its theoretical relevance (Hair *et al.*, 2019). In this case, CL2 and CL4 are significant, whether the rest of indicators are not, but have loadings over 0.5 (VINC-CL2 and TR-CL2) or very close to this value (VINC-CL1, VINC-CL3, and TR-CL1) (Table 4). Despite the fact that the relevance and magnitude of some of the weights is not the desired one (CL1 and CL3), those items are going to be maintained, as due to the fact that they are formative, each of them provides a different information and, though it may not be significant, it is theoretically relevant, as has been stated in this research.

### *Evaluation Of The Structural Model*

Once the measurement model has been analysed, the structural model proposed for this element of the relational capital, represented in Figure 3, is assessed.

**Table 6. Evaluation of the measurement cl model: fornell-lacker**

	CL	CTR-CL	INT	TR-CL	VINC-CL
CL	<i>Formative</i>				
CTR-CL	0.214	<b>0.914</b>			
INT	0.917	0.235	<b>0.865</b>		
TR-CL	0.426	0.547	0.390	<i>Formative</i>	
VINC-CL	0.551	0.593	0.510	0.42	<i>Formative</i>

Table 7. Evaluation of the measurement cl model: composite model, mode b

			Bootstrapping weight	
Constructs/Indicator	VIF	Weight	Significance	Loads
CL				
CL1	2.290	-0.329 <sup>ns</sup>	0.240	0.282
CL2	1.243	0.446 <sup>**</sup>	0.010	0.709
CL3	1.215	-0.389 <sup>ns</sup>	0.129	-0.241
CL4	2.309	0.901 <sup>*</sup>	0.012	0.758
VINC-CL				
VINC-CL1	3.190	-0.103 <sup>ns</sup>	0.895	0.456
VINC-CL2	2.800	1.450 <sup>ns</sup>	0.099	0.917
VINC-CL3	4.255	-0.578 <sup>ns</sup>	0.565	0.490
TR-CL				
TR-CL1	2.008	-0.421 <sup>ns</sup>	0.678	0.467
TR-CL2	2.008	1.253 <sup>ns</sup>	0.213	0.955

Note n=100 subsample: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001; ns: not significant (two-side Student t-test)

In the first place, the collinearity of the preceding variables is assessed. In order to do so, the same measures used in the formative measure models (values VIF<3.3.) are applied. In this case, there is no multicollinearity problem in the structural model (Table 8).

Then, the path coefficients, which represent the hypothetical relationships among the constructs, are analysed and their correspondence significance level is also examined. The magnitude of the path coefficients lies in the range -1 and +1. Those closer to +1 represent strong positive relationships and just the opposite for negative values. The closer they are to 0, the weaker will be the relationships. In the same way, the bootstrap confidence interval allows the assessment of whether a path coefficient is significantly different to 0, and, as a result, if the confidence interval for an estimated path coefficient does not include 0, the null hypothesis is rejected and a significant effect is assumed (Hair *et al.*, 2019). As the formulated hypotheses specify a positive sign for all proposed structural relationships,

Figure 3. Structural model CL

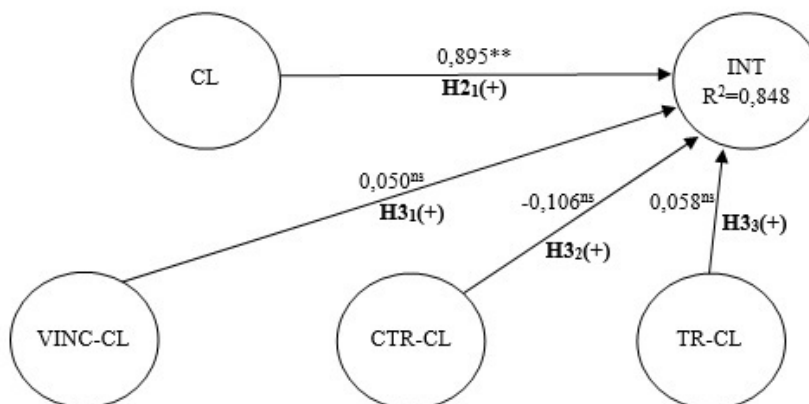


Table 8. Vif values of the cl structural model

	INT
CL	1.594
CTR-CL	2.069
TR-CL	1.927
VINC-CL	1.849

the significance of the estimated structural coefficients is implemented by means of bootstrapping, with 100 subsamples and a queue.

As can be seen, the sign of the path coefficients coincides with the one proposed by the hypotheses for H2<sub>1</sub>, H3<sub>1</sub>, and H3<sub>3</sub>, but not for H3<sub>2</sub> (Table 9). In this way, H2<sub>1</sub> is accepted, confirming that the relationships with customers positively affect the internationalisation process of university spin-offs. However, H3<sub>1</sub>, H3<sub>2</sub>, and H3<sub>3</sub> are not significant, and, as a result, are not accepted. In the case of H3<sub>1</sub> and H3<sub>3</sub>, they show a positive but not significant influence. As a result, we can conclude that the development of strong links with customers positively affects the internationalisation process (H3<sub>1</sub>) but not in a significant way, just as formal and direct relationships with customers also positively affect the internationalisation process (H3<sub>3</sub>), but again, with a non-significant influence either. On the other hand, hypothesis H3<sub>2</sub> shows a non-positive influence in the internationalisation process of the acquired commitment and the used time and resources by the company when developing relationships with customers, being this influence non-significant again.

The fact that these relationships are not significant can be due to the size of the sample of this research, as the creation of links, the acquired commitment, and the used time and resources, as well as the type of established relationship influence the internationalisation process of spin-offs, as has been mentioned in this paper.

Lastly, the predictive power of the model is assessed by means of the coefficient of determination (R<sup>2</sup>), which is calculated as the squared correlation between the actual value and the predicted value of a given endogenous construct. This coefficient represents the amount of variance in a depending construct which is explained by the preceding constructs associated to it. The value of R<sup>2</sup> ranges from 0 to 1; the larger the obtained value, the larger the accuracy level of the prediction (Hair *et al.*, 2019). In this way, 84.8% of the variance in the internationalisation is explained by the model (Table 10).

Table 9. Evaluation of the cl structural model

Relationships		$\beta$	T	Percentile bootstrap 90% IC
H2 <sub>1</sub>	CL→INT	0.895**	2.873	[0.532;1,044] <sup>sig</sup>
H3 <sub>1</sub>	VINC-CL→INT	0.050 <sup>ns</sup>	0.601	[-0.475;0,104] <sup>ns</sup>
H3 <sub>2</sub>	CTR-CL→INT	-0.106 <sup>ns</sup>	0.209	[-0.317;0,594] <sup>ns</sup>
H3 <sub>3</sub>	TR-CL→INT	0.058 <sup>ns</sup>	0.255	[-0.195;0.406] <sup>ns</sup>

Note: n=100 subsamples: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01; sig: significant; ns: not significant (one-side Student t-test)

Table 10. evaluation of the cl structural model: determination coefficient

	R <sup>2</sup>	Ajusted R <sup>2</sup>
INT	0.848	0.780

## CONCLUSIONS

It can be clearly stated that the relationships with customers exert a positive influence on the internationalisation of university spin-offs. Then, the relevance given in the literature to this element of the relational capital can be confirmed. The perceived satisfaction of the customers and having a large portfolio of relevant customers is thus confirmed to have a larger weight on this influence. From this, it is possible to deduce that it is very important for the companies to work on these aspects, i.e., to suitably select their customers to be able to keep them happy.

As regards the links established by the company with its customers, the establishment of strong and reliable links has a positive effect on the internationalisation of the spin-off. Obviously, if the company has worked to select its customers appropriately, the establishment of these links would be the next step.

The information obtained by the company on its customers may trigger a best support to the customers, increasing then their satisfaction and loyalty towards the company. In the same way, the development of a direct relationship with the customers has a positive influence. Keeping a direct contact with customers will provide the company with more information on the needs of those customers.

On the other hand, as regards the acquired commitment, used time and resources in the relationships with customers, it is not possible to infer a clear conclusion. Besides, it is also necessary to control that a suitable dedication is devoted to the work with the customers to obtain the desired goals without taking away time from other essential tasks.

The fact that not all hypotheses are significant is opposed to the theoretical review, and one of the possible reasons for this could be the reduced size of the sample, as according to Hair *et al.* (2019), “an insufficient size of the sample may not reveal a significant effect actually taking place in the population”. Due to this, an interesting research basis to be applied with larger samples is proposed.

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