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Relational and cognitive social capital: their influence on strategies of external knowledge acquisition

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Abstract

This paper tries to analyze the relationship between external knowledge acquisition strategies and the relational social capital generated by firms in their relationships networks. The study is based on an empirical research applied to a sample of Spanish companies from biotechnology and pharmaceutical industries. The paper mainly focuses on the effect of trust, as the basic component of relational social capital, on two types of knowledge acquisition strategies: alliances and direct purchases of external knowledge. Moreover, this paper proposes an interaction effect of a company's cognitive social capital on the relationships between relational social capital and alliances as a method of knowledge acquisition. The argument is that shared visions and common values could moderate the relationship between trust and the acquisition based on narrower relationships between agents. The results of the study show that, although relational social capital has a significant influence on both types of strategies (alliances, direct purchases), such influence is more important for the case of alliances, although it is not finally affected by the interaction between cognitive and relational social capital.

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1. Introduction

External knowledge acquisition is a process with increasing relevance in the ambit of Organizational Knowledge Management (OKM), given its strategic impact on business processes and performance²⁸. In dynamic environments, firms continuously should incorporate external knowledge to its business processes as for them is complex and inefficient to develop internally all the knowledge that is necessary for successful competition¹⁰.

From an academic perspective, the number of studies of the effects of knowledge acquisition methods in innovation and competitive advantages based on technology has grown in the last few years. In particular, several studies have focused on analyzing *inter-organizational* relationships or social capital as a way to acquire external valuable knowledge^{e.g., 61; 41; 52; 49; 39}. From a practitioners' perspective, many companies show a strategic concern on the way they can access to valuable knowledge of their networks' agents¹².

On the other hand, *inter-organizational* social capital as antecedent of external knowledge acquisition has also obtained an increasing attention in the last few years. According to Nahapiet and Ghoshal⁴⁵, social capital includes many aspects of social context, such as interaction and social ties –structural social capital–, trusty relationships –relational social capital–, and systems of shared values systems, which facilitate individual actions in a specific context –cognitive social capital–⁴⁵. However, few studies examine how the different components of *inter-organizational* social capital –relational and cognitive specifically– have direct or indirect influences in external knowledge strategies⁴⁴.

The specific aim of this paper is, on the one hand, to analyze the role of the relational dimension of social capital on knowledge acquisition strategies. On the other hand, to analyze the interaction effect of cognitive social capital and relational social capital on such relationship. We propose a moderating effect as there is a lack of studies that analyze relationships between dimensions of social capital in the ambit of external acquisition strategies. This is important since both types of social capital could be key antecedents to obtain competitive advantages based on external knowledge acquisition. In this regard, the combined effect between trust and common cognitive schemes between agents in a network could reinforce the tendency of a firm to choose alliances rather than direct purchases in order to acquire external knowledge for the achievement of competitive goals.

The paper is structured as follows. First, we explain theoretical aspects related to knowledge acquisition strategies and relational and cognitive *inter-organizational* social capital issues. Secondly, the conceptual links between these topics will be analyzed. After establishing hypotheses based on a literature review, methods, sample, data, and the study's main results will be offered. Finally, the paper will show a number of conclusions, limitations and avenues for future research.

2. Knowledge acquisition, and relational and cognitive social capital

Knowledge acquisition refers to the identification and capture by a firm of knowledge from its environment⁵¹. Such knowledge can especially be useful for organizations that operate in dynamic and innovative environments, as they continually need additional knowledge to complement their internal knowledge pool². Therefore, in innovative settings, even the largest and high-tech companies require external knowledge to be up-to-date and maintain flexibility in order to face changing conditions.

A firm's orientation regarding the kind of external knowledge that wants to acquire and the way that such knowledge will be transformed and applied by the firm will have a crucial role to decide the strategy and knowledge acquisition mode²². In addition, the environment, business strategy, social capital level, or internal knowledge availability are other antecedents of the acquisition strategy^{15;5}. Anyway, although not all the knowledge from outside of an organization is likely to be acquired by a firm⁵⁴, OKM literature has proposed different options through firms can carry out knowledge acquisition in order to get their acquisition goals. In general, the organizational literature consider two large blocks of acquisition strategies: (1th) alliances; and (2nd) direct purchases of external knowledge.

Firms can use cooperation agreements or alliances[†] in both exploitative and explorative ways²⁹. In general, alliances can facilitate the access and acquisition of complex and specialize technological knowledge, although they frequently need to learn in some extent⁵³. Alliances strategies include university collaborations^{20; 6}; joint ventures and non-equity partnerships, usually promoted by government institutions²⁰; and cooperation arrangements with competitors, customers and suppliers⁶.

On the other hand, direct purchase of external knowledge strategies are the fastest method for knowledge acquisition¹⁶. External knowledge can be acquired in three different ways^{20; 10}: (1th) engagement in external R&D and direct technology acquisition –e.g. equipment, licensing, consulting activities; (2nd) recruitment of staff with specific knowledge; (3th) and acquisitions of other companies –total or partial–.

Regarding social capital, it is a heterogeneous and complex construct⁹. Nahapiet and Ghoshal⁴⁵ originally provide the broadest social capital perspective[‡]. On the one hand, it allows a firm to identify social capital as a multidimensional construct. On the other hand, it enables the consideration of both a firm's relationships with external agents –*inter-organizational* social capital– and internal ties between its members –*intra-organizational* social capital. This perspective is followed in this paper and social capital will be defined as “the sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by a firm”^{45, p. 243}. Several scholars consider this approach precise in order to characterize social capital in an organizational context^{34; 25; 9; 63; 13; 1; 3; 32}. Moreover, the dimensions suggested by Nahapiet and Ghoshal⁴⁵ – structural, relational and cognitive– seem to synthesize the economic aspects of the concept in the sense of being the origin of both Ricardian rents (control of unique networks), and relational ones (exploitation of relational routines).

The structural dimension of social capital refers to the characteristics of the network such as the strength of the links, or its density. The relational dimension refers to intangible assets generated in the relationships between network agents such as trust and integrity. The cognitive dimension refers to shared values and common assumptions (visions, interests, working techniques, business culture) that are established by the members (agents) of a network that enable them to understood behaviors, needs and requirements for contact engagement, which it was previously mentioned as common cognitive scheme. As Tsai and Ghoshal⁵⁵ suggest, there are indubitably connections between all the three dimensions, particularly between the relational dimension and the other two. Trust and trustworthy can be motivated through social interaction and progress based on it^{26; 27; 30; 45}. Shared goals and culture, and other elements such as shared values or vision as expressions of cognitive social capital also favor the development of trusting relationships, which it is associated with strong ties⁵⁵. Consequently, from this point of view, the addition of the three types of social capital in a single construct could hinder the achievement of solid conclusions about the social capital effect on different competitive aspects of firms.

In this respect, although several studies analyze specific relations, this paper focuses on the analysis of the effects of relational and cognitive social capital on acquisition strategies in the specific context of high-tech companies (biotech and pharmaceutical firms). Such relationships have not been the profusely analyzed in social capital literatures²¹. We consider that direct and moderating effects between these two dimensions can shed light on the way knowledge acquisition is carried out by firms when they have to choose among different acquisition methods, which in part (an in turn) will depend on the characteristics of a company's network.

Inter-organizational relational social capital refers to the behavioral aspects in the networks relationship, which can favor (or hinder) intangible assets for resources exchange⁶¹. Among them, trust has typically been considered as a positive result from interactions and an important intangible asset for firms in the network^{45; 34}. Trust can be considered both an antecedent and a consequence of multilateral agreements between the agents of a social system⁹. On the one hand, trust allows agents to reduce opportunism⁵⁹. Likewise, trust can improve the level of

[†] Cooperation agreements can be formal or informal. Formal arrangements have clear intangible property rights, while for informal collaborations, typical of small and medium firms, cooperation is implicit and the signing a contract that avoids opportunistic behaviors is not necessary.

[‡] This social capital approach is the most accepted to explain the resources exchange between agents in a network from a strategic point of view.

communication for negotiation between agents⁴³. On the other hand, information and knowledge transfer through *inter-organizational* relationships usually assume the presence of trust⁵⁷. Moreover, trust can influence the level of commitment for knowledge sharing processes³⁵.

Inter-organizational cognitive social capital refers to the shared vision between a network's members, and includes collective objectives and shared mental models. Members of the *inter-network* have thus more opportunities for a free exchange of ideas and resources. Moreover, common objectives and interests contribute to reveal the potential value of the exchange and combinations of resources⁵⁵. Finally, cognitive capital is a relational mechanism that enables network members to integrate, exchange resources, and obtain relevant knowledge⁴⁹.

3. Hypotheses

Inter-organizational relationships are external sources of knowledge, since they provide opportunities for its acquisition and exploitation of knowledge^{18; 37}. Such sources of knowledge are relevant in contexts of intense relationships between organizations⁴⁹, where firms with higher levels of perceived trust –i.e. relational social capital– in their *inter-network* are more likely to acquire intentionally valuable knowledge than firms with lower levels of perceived trust.

Specifically for knowledge acquisition through alliances agreements, the greater the trust that a company perceives in its relationship's network, the higher the perceived accessibility to knowledge of other agents⁴⁵. Trust structures the interactions and mobilizes partners to contribute resources in a way that may create value to a firm⁴⁰. In this sense, trust allows the firms to participate actively in sharing and exchanging information voluntarily, and contributes to the removal of “barriers” placed to protect themselves^{8; 38}. In addition, the more complex the knowledge to acquire, the higher the level of trust necessary to engage in an alliance as a method for knowledge acquisition⁷.

On the other hand, trust allows access to key people and knowledge in an alliance⁴⁵. Furthermore, trust reduces opportunistic behaviors, allowing to informal relationships avenues for knowledge acquisition, and reduces potential conflicts between the firms⁴⁷. Finally, regarding to the influence of inter-organizational trust on knowledge acquisition from outside partners, according to Maurer⁴², it leads innovation and opens business opportunities, as the acquired knowledge is likely to trigger the development of new or improved products. Based on these statements, we establish the following hypothesis:

H1: Relational social capital has a positive influence on external knowledge acquisition through alliances relationships.

Concerning the influence of trust on direct knowledge-purchase for knowledge acquisition, a high reliability in knowledge acquisition can bring less distrust about its usefulness and integration into a firm's existing knowledge base. In addition, the existence of trust could be a decisive aspect for knowledge acquisition of the agents in the network by means of contracts (e.g., licensing, equipment) in knowledge-intensive industries. Although the parties to a contractual relationship will not always act opportunistically, the bounded rationality of management reduces their ability to distinguish firms that may behave opportunistically from those maintaining a more cooperative posture⁵⁸. This potential for opportunism represents an important threat focused on the relationship aspects of interfirm arrangements. Furthermore, the existence of relational social capital –trust– in inter-organizational relationships could be an instrument to reduce the probability of the appearance of opportunistic behaviors. This makes external knowledge acquisition an attractive option as it reduces time and efforts in contracts drafting or the establishment of monitoring mechanisms⁶². Consequently, a second hypothesis is proposed:

H2: Relational social capital has a positive influence on external knowledge acquisition through direct purchases of knowledge (in a firm's network).

Moreover, common values and shared behavior models, which are the main elements of cognitive social capital in a network³⁴, could interact with trust in order to make a specific acquisition method more effective for knowledge access. This is especially important when knowledge to be acquired by a company can be highly complex or tacit.

Furthermore, cognitive social capital can contribute to amplify the effect of trust (relational social capital), attenuating opportunistic behaviors since similar interests are pursued⁴⁸. It thus seems likely that higher levels of common norms and values in a network enable trust to have a higher influence on external knowledge acquisition, especially when a firm has opted for doing it through cooperation agreements.

In addition, generated trust will result in higher levels of confidence in cooperation agreements when common norms exist, as firms will be able to anticipate more positive responses and better results by their counterparts. Likewise, the reinforcement between relational and cognitive social capital means that firms in an alliance will not have to create new cognitive mechanisms, or at least not in a great extent, to exchange knowledge as common values and understanding are already present in the relationship(s). Accordingly, a third hypothesis proposes that:

H3: Cognitive social capital has a positive interaction effect on the relationship between relational social capital and external knowledge acquisition through alliances agreements (in a firm's network).

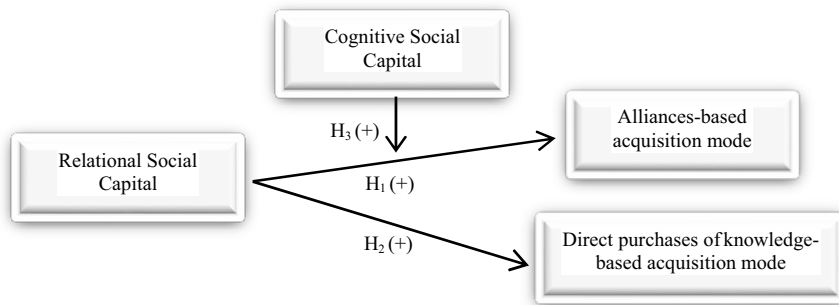


Fig. 1. Model of the relationship between relational social capital and external knowledge acquisition.

4. Methods

Biotechnological and pharmaceutical industries in Spain were selected to develop the empirical analysis of this study. First, these industries include firms developing highly innovative activities where knowledge acquisition is a necessity²¹. In addition, scientific and technological progress are frequent and constant in both sectors, and firms need to upgrade continuously their knowledge pools. Likewise, they are industries that shared common features related to discoveries and developments of new complex drugs, such as *inter*-organizational networks through which resources and knowledges are regularly exchanged, or the relationships between both industries, which frequently appear as vertically integrated.

An on-line survey was launched in March-May 2015 to 735 firms from these industries. The data on the number and information about firms were obtained from the SABI database (System for accounting information analysis in Spanish and Portuguese firms). The number of valid questionnaires we received was finally 87⁸, representing the 11.84% of response rate. This percentage can be considered acceptable as it is similar to that obtained by others studies at the organizational level^{e.g., 41; 49; 39; 24}.

Regarding the measures of variables, we used validated scales from previous studies, which were conveniently adapted to our research's context (see appendix for the list of items). For knowledge acquisition modes, alliances and direct purchases of knowledge, we utilize a measure of five and three items respectively, based on Fey and Birkinshaw²⁰, Díaz *et al.*¹⁷, and Valmaseda and Hernández⁵⁶ scales. In the case of relational social capital, two indicators proposed by Pérez-Luño *et al.*,⁵⁰ were used, trying to collect all the relevant aspects of relational trust. For cognitive social capital, we selected a four-item scale developed by Ambos and Ambos⁴, and also used by Pérez-Luño *et al.*⁵⁰. Finally, age and size were included as control variables, given that both of them have extensively been utilized by studies on knowledge acquisition strategies.

5. Statistical analysis

The Partial Least Squares (PLS) method was applied as statistical technique in order to test the hypotheses of our study. PLS is a multivariate analysis technique⁶⁰ based on variance analysis, used to model latent constructs under non-normality conditions for data and small sample sizes. The PLS path method is typically applied in two stages: (1th) analysis of the measurement model; and (2nd) analysis of the structural model.

The measurement model was estimated using confirmatory factor analysis in order to assess reliability –individual items– and validity –convergent, discriminant– of the items measures. Results (showed in Table 1) confirm that the measurement model is reliable and valid.

Table 1. Measurement model results.

	Reliability			Validity				
	Item	Construct	Convergent	Discriminant				
	Outer ¹ Loadings	IFC ²	AVE ³	Fornell and Larcker, and Cross-Loadings criterions ⁴				
			MARK_TRANS	COOP	COG_SC	REL_SC		
DIR_ACQ⁵		0.801	0.573	0.757				
DIR_ACQ 2	0.786			0.786	0.421	0.395	0.222	
DIR_ACQ 3	0.736			0.736	0.251	0.379	0.147	
DIR_ACQ 4	0.749			0.749	0.224	0.322	0.114	
ALLC		0.843	0.644	0.406	0.802			
ALLC1	0.822			0.228	0.822	0.259	0.352	
ALLC2	0.857			0.357	0.857	0.489	0.553	
ALLC3	0.726			0.426	0.726	0.336	0.246	
COG_SC		0.924	0.753	0.480	0.469	0.868		
COG_SC1	0.878			0.444	0.466	0.878	0.528	
COG_SC2	0.915			0.482	0.457	0.915	0.516	
COG_SC3	0.843			0.379	0.359	0.843	0.388	
COG_SC4	0.833			0.335	0.312	0.833	0.425	
REL_SC		0.924	0.859	0.220	0.515	0.542	0.927	
REL_SC1	0.934			0.208	0.497	0.483	0.934	
REL_SC2	0.920			0.199	0.451	0.524	0.920	

1. Acceptance level ≥ 0.707 ³¹. 2. Acceptance level ≥ 0.8 ⁴⁶. 3. Acceptance level ≥ 0.5 (23). 4. Diagonal elements (in italics) are the square root of the variance shared between the constructs and their measures; off-diagonal elements are the correlations among the items/constructs; for discriminant validity, diagonal elements should be larger than off-diagonal elements in the same row and column. 5. According to Cepeda and Roldán¹¹, items DIR_ACQ1 and DIR_ACQ5 were removed as they did not satisfied the individual item reliability criterion.

The structural model estimates the path coefficients. Its validity is usually checked in two ways: (1th) significance levels of path coefficients; (2nd) R² value. The significance level was obtained by bootstrapping to generate standard errors and t-values¹⁴. Regarding R², it indicates the amount of variance explained by the model. Table 2 provides the results. Specifically, for the influence of relational social capital (trust) on knowledge acquisition through alliances (H₁) and direct purchases of knowledge (H₂), positive and significant relationships are confirmed by the existence of significant coefficients, although the level of significance is lower for the second type of knowledge acquisition modes. However, the interaction effect of cognitive and relational social capital (H₃) is not significant, which it means that we did not find a moderating effect of cognitive social capital on the relationship between relational social capital and knowledge acquisition based on alliances. Regarding the predictive power of the model, according to Falk and Miller¹⁹, it shows acceptable figures for both types of knowledge acquisition

strategies, as it explains around 11% of the variance of direct purchases of knowledge, and 37.5% percent of the variance of alliances agreements.

Table 2. Structural model results.

Hypothesis	Path coefficients	T-value
H ₁ : REL_SC -> DIR_ACQ (R ² = 0.114)	0.244*	2.033
H ₂ : REL_SC -> ALLC (R ² = 0.375)	0.534***	5.356
H ₃ : COG_SC Inter. Effect -> [REL_SC -> ALLC]	- 0.150	1.015

*p<0.05 (t (0.05; 499) = 1.9647); ** p<0.01 (t (0.01; 499) = 2.5857); ***p<0.001 (t (0.001; 499) = 3.3101)

Finally, regarding the control variables, it was found only a significant positive influence of firm size on knowledge acquisition through both alliances ($\beta = 0.195$, $p < 0.05$) and direct purchases of knowledge ($\beta = 0.307$, $p < 0.05$). This impact is especially significant in case of direct purchases of knowledge strategy. Without considering size's effect, the effect of relational social capital on this acquisition mode (purchases) disappears. Given that trusty relationships are developed over time, and direct purchases of knowledge involves higher contractual requirements, it is perhaps more difficult to young firms acquire knowledge by means of this specific method based on its *inter-organizational* relational capital than older ones.

6. Brief discussion and conclusion

The development of relational social capital –i.e., trust– is a fundamental requirement for successful external knowledge acquisition in knowledge-intensive industries. However, owing to its particularities –high level of uncertainty; new product development as a strategic goal; industry regulation; a singular knowledge appropriability regime– our study shows that trust influence is greater for alliances agreements. Direct purchases of knowledge are supported by specific rules and contract enforcement clauses, which can penalize and limit opportunistic behaviors. Thereby, it is likely to reduce high levels of uncertainty and associated transaction costs when relational social capital is not very high. In this sense, in despite of the existence of low levels of trust, the formalization of contracts restricts agency problems associated to such mode of knowledge acquisition^{59; 36}. Therefore, although a strong trust between firm and its network's agents can ease communication and knowledge transfer in both cases, this is more important for external knowledge acquisition through strategical alliance mode.

The main limitation of this paper and the most surprising finding is the non-presence of a moderating effect of cognitive social capital in the relationship between relational social capital and knowledge acquisition based on alliances. This result could be caused by the way trust is generated over time through repeated interactions and the different mechanisms that exist to develop both types of social capital for a firm. Common values and a shared understanding would not necessarily lead to a higher level of cooperative engagement by reinforcing trust in relationships. These findings support partially the argument developed by Hsu and Hung³³, who found a substitution effect between cognitive and relational social capital in the ambit of projects management and their performance. In other words, these two variables could be considered in some ambits as substitutable rather than complementary. Although we have not studied relationships between cognitive and knowledge acquisition based on cooperation, cognitive social capital could also be seen as a result of cooperative behavior. Specifically, relational capital would be an antecedent of this particular knowledge acquisition mode, and cognitive social capital would be a result that arises from cooperative relationships in order for firms to learn and exchange knowledge over time.

Another limitation of the cross-sectional analysis refers to its static nature. Longitudinal studies would thus be adequate to explain long-term effects of some variables on others. Moreover, in spite of the efforts to assure robustness in the validation of the data and constructs, potential bias cannot be dismissed. Finally, the study focuses

on the biotechnological and pharmaceutical industries in Spain, whose specific characteristics may limit the possible generalization of the findings to other sectors less intensive in technological knowledge and innovation. Future studies should deepen in these relationships, as they are essential aspects for firms in order to be more innovative in knowledge-intensive sectors. The study of their effects on innovation capabilities is a future avenue in order to collect strong evidence about how social capital can become an instrument to develop competitive advantages based on innovation.

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Appendix A. Research items

Constr.	Item	My firm usually...(From 1 –strongly disagree to 7 strongly agree)
DIRECT KNOWLEDGE-PURCHASE	DIR_ACQ1	Has equities in technological development firms
	DIR_ACQ2	Hires staff with professional experience
	DIR_ACQ3	Hires external consultants
	DIR_ACQ4	Acquires technological licenses
	DIR_ACQ5	Acquires complex technology incorporated into equipment or specialized machinery
ALLIANCES	ALLC1	Develops alliances and/or cooperation agreements with universities
	ALLC2	Develops alliances and/or cooperation agreements with customers and suppliers
	ALLC3	Develops alliances and/or cooperation agreements with participates in the development of joint research projects promoted by government institutions
REL_SC	REL_SC1	Has external relationships based on cooperation and mutual trust
	REL_SC2	Has external relationships with a high grade of commitment
COG_SC	COG_SC1	Shares goals and joint-project interests with its external relationships
	COG_SC2	Shares a common vision regarding environment and successful key factors whit its external relationships
	COG_SC3	Uses similar working techniques that external agents whom it is related
	COG_SC4	Has a similar business culture and management style that external agents whom it is related