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The impact of social capital and technological uncertainty on strategic performance: The supplier perspective

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ABSTRACT

Social capital is a valuable asset for companies that stems from access to resources made available through buyer-supplier relationships. Many studies have investigated the antecedents and/or the impact of cognitive, relational, and structural dimensions of social capital on some performance measure. Our study extends this research by considering the moderating effect of technological uncertainty on the relation between social capital dimensions and the strategic performance of suppliers. A sample of 88 European industrial suppliers is used to test the hypotheses. Analysis shows a positive, significant impact of cognitive social capital, but failed to confirm the expected influence of the relational and structural dimensions. No moderator effects were found in the analysis, although we did find a positive association between technological uncertainty and strategic performance. This finding suggests that technological uncertainty can stimulate suppliers to develop new products and to enter new markets.

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1. Introduction

Interorganizational relationships are generally considered an important source for competitive advantage and value creation (e.g. Osborn et al., 1997; Krause et al., 2007). Social Capital Theory emphasizes the role of a firm's social network for gaining competitive advantage (Carey et al., 2011; Koka and Prescott, 2008). Social capital has been defined as the sum of resources embedded within and derived from a network of relationships (Nahapiet and Ghoshal, 1998; Granovetter, 1992). Social Capital Theory has become a useful theoretical lens for examining buyer-supplier relationships. McGrath et al. (2005) have investigated how social capital might contribute to mutual benefits for both parties within buyer-supplier relationships. Other studies have examined the effects of social capital on different performance measures (Krause et al., 2007). Nahapiet et al. (1998) proposed three dimensions of social capital: the cognitive dimension (shared ambition, vision, and values), the relational dimension (trust, identification, and obligation), and the structural dimension (strength and number of ties between actors).

Most studies expected and investigated the positive effects of social capital. An exception is the study of Villena et al. (2011) who

studied the 'dark side' of social capital in buyer-supplier relationships. They concluded that excessive levels of social capital could lead to a decrease in performance for both parties. Most prior research has only examined the influence of one or two social capital dimensions on performance (cf. Carey et al., 2011). Some researchers have focused on the effect of relational capital (e.g. Cousins et al., 2006; Walker et al., 1997), others on the effects of relational and structural capital (e.g. Lawson et al., 2008; Moran, 2005). We investigate the effects of the three dimensions of social capital on performance (cf. Krause et al., 2007).

Many scholars have emphasized the need for quantitative approaches to empirical studies on social capital in general (e.g. Meehan and Bryde, 2014). Most empirical studies on social capital however, are carried out from the buyer's perspective. Few studies were set up to investigate social capital from a suppliers' perspective. Johnson et al. (2013) explored the impact of social capital on the capabilities for supply network resilience. Their study provides an illustration of the links between resilience and social capital in the context of a crisis response. Lee (2015) investigated the effects of green supply chain management on supplier performance through social capital accumulation. A recent conceptual study by Schiele et al. (2015) emphasized the link between social capital and supplier satisfaction, also from a supplier perspective. The limited number of studies from the supplier perspective warrants further investigation.

Supplier relationships have been recognized as a source of competitive advantage, as suppliers can contribute valuable

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tradable resources (Clauss and Spieth, 2016). Buyers tend to consolidate their supplier base to a smaller number of key suppliers (Eggert and Ulaga, 2010). Purchasing professionals that aim to successfully manage their supplier relationships should take the supplier perspective into account on issues like attractiveness and satisfaction (Schiele et al., 2012). A similar reasoning can be put forward regarding social capital in buyer-supplier relationships. The results of our study are likely to be of interest to buyers. How do social capital dimensions relate to the strategic performance of suppliers? Which dimension relates most strongly to performance? Suppliers may become selective with respect to the involvement of and collaboration with their customers (e.g. Schiele et al., 2012). From a risk management perspective, it is clear that buying companies have a vested interest in the strategic performance of their suppliers and the role of social capital. Professional purchasers must understand how their business partners develop and use social capital, critical to the success and continuity of the supply network.

Performance can be defined in terms of improving operational efficiency, but also on the more strategic creativity of actions (cf. Nahapiet and Ghoshal, 1998). Most studies in this area have focused on the impact of social capital on operational performance in terms of costs, quality, lead time, flexibility, and delivery (e.g. Cousins et al., 2006; Lawson et al., 2008; Whipple et al., 2015). However, more recent studies have included strategic benefits such as product innovation, market creation, and technological development (Villena et al., 2011; Im and Rai, 2008; Sanders, 2008; Terpend et al., 2008). Since we are mainly interested in the continuity and success of suppliers, we limit the performance measure to the strategic performance of suppliers.

In addition, recognizing that (industrial) buyer-supplier relationships are embedded within a broader context, we also test for the moderating effects of technological uncertainty on the relationship between social capital and strategic performance. External uncertainties play an important role in shaping the interactions and performance of companies (Land et al., 2012; Lu and Chan, 2004). Technological uncertainty refers to the instability, complexity, and unpredictability of a relevant technology and its development in the future (Bstieler, 2005). Technology is important for the success of new product development, and meeting customer needs and preferences (Augusto and Coelho, 2009). However, studies have not put much focus on potential moderating factors (Villena et al., 2011), such as technological uncertainty, on the relationship between social capital and strategic performance. The main research question of this study is: what is the impact of social capital dimensions on the strategic performance of suppliers and what is the moderating effect of technological uncertainty?

The purpose of the study is to investigate the importance of social capital dimensions within buyer-supplier relationships. Our study contributes to the current body of knowledge on buyer-supplier relationships. First, our study extends previous research by investigating the influence of all three dimensions of social capital on the strategic performance from the supplier perspective. Second, we examine the contingent effect of technological uncertainty on the relationships between social capital dimensions and strategic performance. The findings of our study provide insights into the role of social capital within buyer-supplier relationships, and the (moderating) effect of technological uncertainty.

2. Theoretical background

2.1. Strategic performance in buyer-supplier relations

Krause et al. (2007) made a distinction between operational performance (costs, quality, flexibility and lead-times) and strategic performance (long-term issues like competitiveness, product development and new markets). The operational performance emphasizes the gains in terms of costs, quality, flexibility, lead-times, order processing, and on-time delivery (Cousins et al., 2006; Lawson et al., 2008; Whipple et al., 2015). Strategic performance reached beyond these operational gains and is related to long-term issues like competitiveness, product development and new markets (e.g. Sanders, 2008). Strategic performance focuses on added value in terms of product development and the creation and finding of new markets. Many studies on the effects of social capital are limited to measures of operational performance (e.g. Whipple et al., 2015; Cousins et al., 2006; Lawson et al., 2008). Few studies include measures of strategic performance (e.g. Villena et al., 2011; Im and Rai, 2008; Sanders, 2008; Terpend et al., 2008). As indicated, our study will focus on the more strategic gains of suppliers to be attributed to social capital within buyer-supplier relationships.

The nature of competition among firms is changing due to more volatile customer demands, shorter product lifecycles, the Internet, new business models, and many environmental challenges. These strategic outcomes are highly dependent on the collaboration of companies in supply chains. Strategic gains of collaboration like product development and market creation are crucial (e.g. Sanders, 2008). More and more companies have turned to customers and suppliers, engaging into appropriate partnerships and collaboration. Many supply chain management studies have recognized that value creation involves all parties in a specific chain and does not limit itself to processes of one specific company. Suppliers, manufacturers and customers play a crucial role in the process of value creation (e.g. Stevens, 1989; Tan et al., 1998). Often, buying organizations take the lead in organizing cooperation within supply chains (Villena et al., 2011).

Investigating a large sample of manufacturing firms in the UK, Carey et al. (2011) found that social capital positively impacted cost and innovation performance. According to Nahapiet and Ghoshal (1998), performance differences between firms may represent differences in their ability to create and exploit social capital. Johnson et al. (2013) reported on the influential role of social capital in facilitating capabilities (i.e. flexibility, velocity, visibility, and collaboration) for supply chain resilience. Lawson et al. (2008) found evidence supporting their hypothesis on the relationship between social capital and performance improvements. Social capital is an inter-organizational resource that contributes to both operational buyer performance and operational supplier performance (Whipple et al., 2015). The strategic relevance of social capital has been recognized in many studies. However, no studies have investigated the impact of social capital dimensions on the strategic performance of suppliers.

2.2. Social capital theory

Social capital theory has its roots in sociology and political science where it describes and explains the preferential treatment and cooperation between individuals and groups (e.g. Putnam, 1995). Social networks provide access to specific resources that are valuable to group members. Social capital theory has been adapted and used in organizational studies, directing attention to the role of a firm's social networks as a source of competitive advantage (e.g. Baker, 1990; Burt, 2000). The social capital embedded in the organization reduces transaction costs and assists members in

achieving organization goals more effectively (Hung et al., 2014). Supply chain management literature acknowledges that characteristics of such social networks contribute to the explanation of performance differences between companies (Koka and Prescott, 2008; Matthews and Marzec, 2012). Social capital refers to the (actual and potential) resources embedded within, available through, and derived from networks of relationships (Nahapiet and Ghoshal, 1998). Social capital refers to the ability of companies to secure benefits from networks (Hughes and Perrons, 2011). Social capital resides in relationships, and relationships are created through exchange (Bourdieu, 1986). The same reasoning applies to buyer-supplier relationships. Many different kinds of benefits can be distinguished, such as access to knowledge, resources, technologies, markets, and business opportunities (Inkpen et al., 2005). The term 'social capital' is used by analogy with the term

'economic capital', referring to some form of (measurable) benefits. The analogy is said to be misleading (Bollier, 2001), since social capital is not depleted by use, unlike economic capital. The opposite appears to be true: social capital is depleted by non-use ("use it or lose it").

In a seminal paper, Nahapiet et al. (1998) proposed three dimensions of social capital: .

- A cognitive dimension which represents shared meaning and understanding between actors.
- A relational dimension which refers to trust, friendship, respect, and mutuality established by regular interactions between actors.
- A structural dimension which refers to the frequency of interaction, the frequency of contact between the various

Table 1
Social Capital Theory in buyer-supplier studies.

Study	Setting and perspective	Expected results	Empirical findings
Nahapiet and Ghoshal (1998)	A conceptual study identifies three dimensions of SC and the mechanisms that link SC to the creation of new intellectual capital Organizational perspective	SC facilitates the development of intellectual capital through the conditions necessary for exchange and combinations. The study describes relationships between SC dimensions and mechanisms and processes for intellectual capital creation.	n.a.
Inkpen and Tsang (2005)	A conceptual study to the role of SC dimensions in the transfer of knowledge. Organizational perspective	The study identifies the links between three SC dimensions for three network types and the conditions that facilitate knowledge transfer.	n.a.
Krause et al. (2007)	A survey study of 373 U. S. firms in the automotive industries Buyer perspective	A positive relationship between the three SC dimensions and buyers' performance improvements (cost, quality, delivery, flexibility).	Support for the impact of SC dimensions on buyers' performance. The findings suggest that the relationships of structural and relational SC vary depending on the type of performance improvement.
Lawson et al. (2008)	A survey study of 111 procurement executives in UK manufacturing firms Buyer perspective	Supplier integration and supplier closeness are antecedents of relational SC. Structural and relational SC are positively related to buyer performance improvements.	Testing the hypotheses in a structural model provides support for the expected impact of structural and relational SC.
Carey et al. (2011)	A survey study of 163 medium-to-large UK manufacturing firms Buyer perspective	Cognitive and structural SC are positively related to relational SC. Relational SC is positively related to buyer cost and innovation improvements.	Regression analyses indicate that relational SC fully mediates the effect of cognitive SC on performance, and partially mediated the effect of structural SC.
Villena et al. (2011)	A survey study of 132 Spanish firms. Buyer perspective	SC dimensions have an inverted curvilinear relationship with performance.	The results confirm that either too little or too much social capital hurts performance.
Sen and Cowley (2013)	A case study of 12 SMEs in the Australian Gold Coast. Buyer perspective	The study investigates the expected contribution of stakeholder theory and SC theory for understanding corporate social responsibility within SMEs.	SME owner-managers view CSR as an opportunity to increase SC in order to compensate for their limited resource capabilities.
Johnson et al. (2013)	A case study of three tiers of the supply chain involved in the response to a UK rail crash. Supplier perspective	SC dimensions positively impact four formative capabilities (flexibility, velocity, visibility, collaboration) in building supply chain resilience.	The data suggest that SC dimensions play an influential role in facilitating formative capabilities for supply chain resilience.
Meehan and Bryde (2014)	A survey study of 135 procurement professionals. Buyer perspective	SC dimensions are positively related to sustainable procurement activity.	Stepwise regression only recognized structural SC as a significant predictor of sustainable procurement.
Horn et al. (2014)	A field study of 82 purchasers in a German OEM in the automotive industry. Buyer perspective	Cognitive and structural SC are positively related to relational SC. Relational SC is positively related to global sourcing project success.	SEM procedures (SmartPLS) provide support for all of the expected results.
Hung et al. (2014)	A survey study of 160 Top 1000 Taiwanese manufacturing firms. Buyer perspective	SC dimensions are positively related to knowledge sharing, which in its turn is positively related to green management performance.	The results of PLS analysis indicate that SC impacts green management performance via enhanced knowledge sharing.
Roden and Lawson (2014)	A survey study of 163 relationships between UK manufacturing firms. Buyer perspective	Cognitive and structural SC have a positive association with relational SC.	Regression analysis indicate that cognitive and structural SC have a positive relationship with relational SC.
Lee (2015)	A survey study of 207 supplying firms in South Korea. Supplier perspective	Structural and relational SC are positively related to supplier's environmental performance and to supplier's operational performance.	SEM indicates that environmental and operational supplier performance can be improved through SC accumulation.
Schiele et al. (2015)	A conceptual study on SC theory and supplier satisfaction. Supplier perspective	SC dimensions have a positive impact on supplier satisfaction.	n.a.
Whipple et al. (2015)	A survey study of 108 buyers and 109 suppliers from manufacturing U. S. firms. Organizational perspective	SC (as a second order factor) mediates the relationship between collaborative process competence and operational performance.	A dyadic comparison of buyers and suppliers in a structural model suggests that collaborative competence without building SC does not improve operational performance.

departments in both organizations and the number of contacts between various levels within both organizations.

Nahapiet and Ghoshal (1998) further argue that structural social capital results from the structural configuration, diversity, centrality and boundary-spanning roles of companies in a (supply) network. Cognitive social capital refers to the similarity between parties in organizational culture, business philosophy, goals and vision. Relational social capital represents personal relationships, which develop through a history of interactions, i.e., the extent to which trust; obligation and mutuality exists between the parties (Krause et al., 2007). Studies have reported positive effects of social capital dimensions on a variety of performance measures (see Table 1). The impact of social capital also depends on contingent and moderating factors (Maurer and Ebers, 2006), such as relationship specific adaptations as opposed to exogenous environmental factors over which managers have little or no influence. Competences to manage collaborative initiatives are likely to impact social capital and company performance (Whipple et al., 2015).

Social capital theory provides a theoretical lens that can be used to examine and understand the complex nature of social exchange in (buyer-supplier) relationships (Carey et al., 2011). Supply chain management literature has recently embraced social capital theory, particularly by linking characteristics of buyer-supplier relationships to company performance (Matthews and Marzec, 2012). The impact of social capital on performance has been studied at multiple levels using different performance measures (Krause et al., 2007). Social capital is generally considered as a critical, tacit resource residing in buyer-supplier relationships. However, extant literature has paid only limited attention to social capital within a supply chain management (Whipple et al., 2015). Table 1 provides an overview of the role of social capital in buyer-supplier studies.

We see a trend toward studies that includes social capital theory. Largely, there seems to be consensus among scholars on the positive effects of social capital on performance measures. The majority of studies distinguish between the impact of the three dimensions of social capital on performance measure. All studies recognize the positive impact of relational social capital, while views differ on the impact of the other two dimensions. Some studies consider cognitive and structural social capital as antecedents of relational capital (e.g. Carey et al., 2011; Roden et al., 2014; Horn et al., 2014). Therefore, shared meaning/understanding and interactions between partners may facilitate relation development and cooperation in dyadic buyer-supplier relationships. However, most studies assume and report positive, direct effects of all three social capital dimensions on general performance indicators.

The majority of studies has been conducted from the perspective of buying organizations. The results of these studies show two alternative ways of representing the social capital dimensions: views differ on the impact of cognitive and structural social capital dimensions. From the supplier perspective, we found one conceptual study (Schiele et al., 2015), one survey study (Lee, 2015) and one case study (Johnson et al., 2013). From Table 1 we conclude that in general empirical studies report a positive influence of social capital on a variety of performance indicators. Apparently, regardless of the perspective used, there are three dimensions of social capital contributing to performance. In the following Sections 2.3–2.6 we will develop hypotheses relating social capital dimensions to the strategic performance of suppliers.

2.3. Cognitive social capital

Cognitive social capital refers to the similarity between parties

in organizational culture, business philosophy, goals and vision (Nahapiet and Ghoshal, 1998). Shared culture and similarity in goals are considered as critical aspects of cognitive capital. Shared culture includes the similarity of behavioural norms and values in buyer-supplier relationships. Shared goals indicate the level to which parties have a shared understanding and aim at mutual outcomes (Inkpen and Tsang, 2005). A similar culture stimulates parties to strive for collective rather than individual interests, which constrain all kinds of undesirable behavior (Coleman, 1990). The fact that behavioural rules, values are adapted as being the mutual standard, contribute to standardized activities within a social relationship (Gulati et al., 2000). Because of this standardized set of rules, values and norms, a more consistent joint interest will occur. This will also reduce the risk of opportunistic behavior from either one of the parties (Caniëls and Gelderman, 2010). In its turn this will lead to a higher commitment and lower costs. Finally, the synergy of joint goals and interests will strengthen each other's efforts (Jap and Anderson, 2003). Committed parties have a deeper understanding of why the relationship exists and how they can contribute to the attainment of compatible goals. Shared goals reduce the risks of any disagreements (Jap, 1999), and improve the shared gains of their "investments" for both parties involved. Such social relationships are beneficial to both parties (Tsai and Ghoshal, 1998).

A lack of common similarities in the area of culture and goals could lead to more disagreements and conflicts which will finally lead to a decrease of performance (Inkpen and Tsang, 2005). Furthermore, a lack of similarities could also undermine the development and implementation of new innovations, as parties would spend the majority of their time on solving their relational issues. One can conclude that cultural similarities and joint goals contribute to a shared vision which will lead in its turn to a better mutual understanding of the common behavioural norms, values and rules within the social relationship.

Social relations determine whether there is any common ground to come to some kind of mutual agreement with regards to the business goals and strategies. Co-operating parties that seek to improve their competitiveness will have to come to a consensus in their organizational cultures to maximize their benefits coming from their social relationship (Villena et al., 2011). These arguments suggest that the strategic performance is positively influenced by similar norms, values, goals and visions in buyer supplier relations.

Hypothesis 1. Cognitive social capital has a positive impact on the strategic performance of suppliers.

2.4. Relational social capital

Companies may develop a history of interactions and repeated transactions (Granovetter, 1985). Through this history companies may have proven their trustworthiness and may have developed interpersonal relationships and even friendships (Villena et al., 2011). Friendship, respect, and reciprocity are developed through successful repeated interactions and transactions (Kale et al., 2000). Therefore, relational social capital facilitates cooperative behavior and reduces the risks of opportunism (Parkhe, 1993). Repeated interactions may reduce the reliance on formal contracts and contractual governance (Granovetter, 1992; Zaheer and Venkatraman, 1995), while a lack of relational capital could lead to instability and reluctance to share certain information in buyer supplier relationships (Villena et al., 2011).

Relational social capital includes factors like having close interpersonal interactions, friendship, mutual respect and interaction between actors. All of these factors have been developed in an on-going series of interactions between parties (Granovetter, 1973;

Nahapiet and Ghoshal, 1998). Relational capital strengthens relationships, which implies the increasing importance of trust as one of the key factors of relational social capital (Coleman, 1990; Inkpen and Tsang, 2005). Besides trust, also friendship, respect and reciprocity within the social relation are being developed through continuous interactions (Kale and Singh, 2009). These factors are likely to contribute to the strategic performance of companies, which leads to the next hypothesis.

Hypothesis 2. Relational social capital has a positive impact on the strategic performance of suppliers.

2.5. Structural social capital

Structural social capital refers to the pattern of connections between parties (Burt, 2000). Opposed to the relational dimensions, structural social capital is related to impersonal linkages within a social network (Nahapiet and Ghoshal, 1998). In order to achieve mutual benefits within buyer supplier relationships, building structural social capital is a crucial issue (Krause et al., 2007; Lawson et al., 2008). Frequent interaction between multiple hierarchical and departmental levels, for both buyers and suppliers, will lead to benefits associated with more and reliable information (Koka and Prescott, 2008). Frequent interactions between buyer and supplier personnel stimulate and promote the sharing of information, which will likely result in faster problem solving and harmonized processes (Dyer and Nobeoka, 2003). Higher management should therefore support frequent interactions that may contribute to the cooperation and the gaining of mutual benefits. Frequent interactions create close ties and encourage the exchange of sensitive information. These benefits in their turn may contribute to product development and the creation of new markets.

A very positive side-effect of the continuous cross functional interactions between different hierarchical company levels is that it will lead to unique competitive opportunities for both parties (Lawson et al., 2008). The structural dimension of social capital influences the development of intellectual capital primarily through the ways in which its various facets affect access to parties for exchanging knowledge and participating in knowing activities (Nahapiet and Ghoshal, 1998). While recognizing that these structural facets may also be systematically associated with other conditions for the exchange and combination of knowledge, one concluded that these associations are primarily derived indirectly, through the ways in which structure influences the development of the relational and cognitive dimension of social capital.

Structural capital helps in the gathering of information to come to joined activities, take care of fast problem solving, and work towards shared goals and strategies. Roden and Lawson (2014) state that parties are constantly trying to adapt to each other. The commitment of specific adaptations by both buyer and supplier than creates a safeguard, which may reduce the need for other forms of governance. The degree of making adaptations from both actors in a buyer-supplier relationship is based on the performance gains of both parties within this relation.

Hypothesis 3. Structural social capital has a positive impact on the strategic performance of suppliers.

2.6. Technological uncertainty

Organizational theory suggests that external uncertainty shapes the interactions among individuals, organizational structure, and performance (Lu and Chan, 2004). Scholars agree on the impact and importance of the external environment for managerial actions. A prominent external factor is the technological

uncertainty in the external environment of companies. Technological uncertainty refers to the instability, complexity, and unpredictability of a relevant technology and its future development (Bstieler, 2005). Hughes and Perrons (2011) concluded that the mix of weak and strong ties depends on the nature and complexity of the product. More complex products require more information exchange, more closely aligned operations and inter-firm co-operation, thereby increasing the strength of these ties. A high degree of technological uncertainty can be reflected by a rapid changing technology in the industry, a large number of new products which have arisen from new technological breakthroughs and a large number of technical developments within the industry (Bstieler, 2005). Technological uncertainty is a critical form of external uncertainty (Land et al., 2012), especially in the context of strategic management (Oriani and Sobrero, 2008) and new product development (Sicotte and Bourgault, 2008; Song and Montoya-Weiss, 2001). There is a general agreement on the importance of technological uncertainty as a factor impacting perceptions and actions of managers.

Studies on the relationships between social capital and performance most commonly focus on antecedents and direct effects, rather than on moderating factors (Villena et al., 2011). However, recognizing that buyer-supplier relationships are also embedded in a technological context, we might expect that technological uncertainty plays a role in the social capital-performance relationship. The moderating impact of technological uncertainty is based on the belief that it is relevant to an organization's product development and with that to the preferences and demands of its customers. Preferences of customers may shift preferences as a result of technological change (Jaworski and Kohli, 1993). Technological uncertainty is important for the development of new products of which the market success to a large extent relates to characteristics that meet customer needs and preferences better than those of the competition (Jeong et al., 2006). In their field study on product development practices, Song and Montoya-Weiss (2001) found a large number of relationships between variables and financial performance that were moderated by technological uncertainty. Technology factors may moderate the relationship between process execution and performance (Bstieler, 2005).

A moderating effect of technological uncertainty on the relationship between social capital and performance is expected, because under conditions of high uncertainty companies are likely to put more effort in developing and maintaining close, collaborative relationships. When technological uncertainty is high, firms are likely to invest more in buyer-supplier relationships in order to secure organizational performance. Companies that are faced with much technological uncertainty are likely in a position that they need access to technological knowledge of their suppliers. Developing social capital would seem a sound strategy for companies that have to deal with rapid and intensive technological changes and innovations. Their (strategic) performance will largely depend on their ability to acquire the latest technological developments from their supply network. In other words, the importance and impact of social capital will be relatively high in cases of high technological uncertainty. Therefore, we hypothesize a positive moderating effect of technological uncertainty on the relationship between social capital and the strategic performance of companies.

Hypothesis 4. Technological uncertainty has a positive moderating effect on the relationships between cognitive social capital and strategic performance (a), between relational social capital and strategic performance (b), and between structural social capital

and strategic performance (c).

3. Methodology

Data collection took place through an electronic survey amongst a sample of managers employed at European manufacturing companies. The sample frame consisted of 290 companies that were randomly picked from the client list of a global provider of electronic purchasing solutions (Hubwoo). A draft version of the questionnaire was pre-tested on a small number of respondents (pilot study). The final version of the questionnaire was administered online. In order to achieve a high response rate, of at least 25%, a personal letter accompanied the invitation to complete the questionnaire. After a week non-respondents received a kind reminder with the request to complete the survey within the next 5 days. The survey resulted in 88 useable responses, which corresponds with an effective response rate of 30.3%.

The variables in the hypotheses were measured as multiple-item constructs on 5-point Likert-scales. All operationalizations were derived from measurement scales that were used and validated in other academic studies. The appendix shows the items that have been used for the construction and measurement of the variables. For reasons of validity factor analysis has been performed on the items, which has resulted in deleting the first item of the cognitive social capital constructs. The remaining factor loadings indicated that the items that were supposed to be correlating indeed correlated with each other. In addition, Cronbach's alpha's showed satisfactory levels. The variable constructs were calculated as the mean of its items' scores. The correlation matrix shows that relational social capital is significantly associated with relational capital and structural social capital (see Table 2). To avoid multicollinearity, correlations between the independent variables should be between 0.70 and -0.70 (Field, 2012). This standard was met.

4. Results

4.1. Response

A total number of 88 completed questionnaires were received, which resulted in an effective response rate of 30.3% (88/290). We included some background variables in order to get an insight in sample characteristics. Company size was measured by questions about the number of employees and 2013-sales in Euros. About 32% of the respondents were employed at companies with an annual sale less than 5 million Euros, while 38% worked at larger companies with more than 500 million Euros sales. A similar distribution is found in the number of employees (see Table 3 and 4).

Respondents were asked to indicate their job title that reflects the position in their company. About 19% of the sample consisted

Table 2
Correlation matrix.

	1.	2.	3.	4.
1. Strategic performance				
2. Cognitive social capital	0.286 ^b			
3. Relational social capital	0.262 ^a	0.354 ^b		
4. Structural social capital	0.152	0.123	0.342 ^b	
5. Technological uncertainty	0.363 ^b	0.061	0.141	0.455 ^b

^a $p < 0.05$.

^b $p < 0.01$.

Table 3
Sales (in million Euros).

	Percentage
Less than 5 million Euro	31.8
5–10 million Euro	3.5
10–25 million Euro	8.2
25–100 million Euro	11.8
100–500 million Euro	7.1
More than 500 million Euro	37.6

Table 4
Number of employees.

	Percentage
10–50	24.1
51–100	6.0
101–200	10.8
201–500	8.4
501–1000	3.6
> 1000	47.0

of company owners. Almost 26% held a position in sales, 34% a general management position, and the remaining 21% was employed in another position. All respondents were involved in activities and decisions regarding the supply chain management of their company. In addition, we measured the number of years the respondents have been working with their current employer. The number of working years for the company reflects the respondents' knowledge and competence (Land et al., 2012; Villena et al., 2011). In our study the average number of working years for their current employer was just 8 years, which justifies sufficient knowledge and competence from the respondents to complete the questionnaire.

4.2. Hypothesis testing

Multiple regression analysis was used to estimate the impact of the three social capital dimensions on strategic performance. Table 5 presents the results of the regression analysis. Although the F-value of the model is statistically significant at $p < 0.05$, it should be noted that the fit of the model is rather poor. No more than 8.5% of the variance in the dependent variable could be explained by the explanatory variables of the model. It appears that only cognitive social capital has a positive, significant impact on strategic performance. No statistical support was found for the hypotheses that assumed a relationship between strategic performance and relational social capital (H2) and structural social capital (H3).

To complete the statistical analyses, we have added moderator

Table 5
Multiple regression analysis.

Dependent variable	Strategic performance			t
	Unstandardized coefficients	Standardized error	Standardized Beta	
Variables				
(constant)	2.261	0.491		4.605 ^a
Cognitive social capital	0.183	0.091	0.221	2.016 ^a
Relational social capital	0.181	0.131	0.160	1.382
Structural social capital	0.065	0.100	0.070	0.644

^a Indicates significant at $p < 0.05$. Adjusted $R^2 = 0.085$, F-value = 3.677^a, $n = 88$.

Table 6
Regression analysis with technological uncertainty.

Independent variables	
<i>Direct effects</i>	
Cognitive social capital	0.180 (2.041) ^a
Relational social capital	0.135 (1.036)
Structural social capital	0.064 (0.613)
Technological uncertainty	0.263 (3.113) ^b
<i>Moderator effects</i>	
Cognitive social capital × technological uncertainty	−0.085 (−0.656)
Relational social capital × technological uncertainty	0.034 (0.183)
Structural social capital × technological uncertainty	−0.002 (−0.020)
<i>Intercept</i>	1.455 (2.662)
ΔR ²	0.073
Adjusted R ²	0.158
F-value	3.331
N	88

Note: unstandardized coefficients are reported, t-values are reported between parentheses

^a $p < 0.05$.

^b $p < 0.01$.

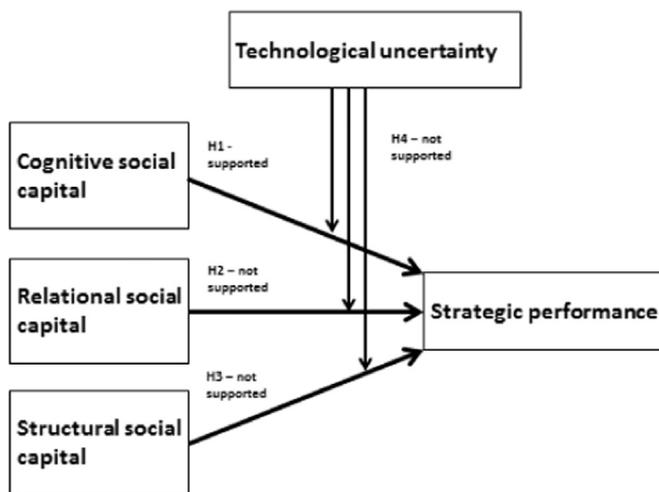


Fig. 1. Conceptual model with supported and not supported hypotheses.

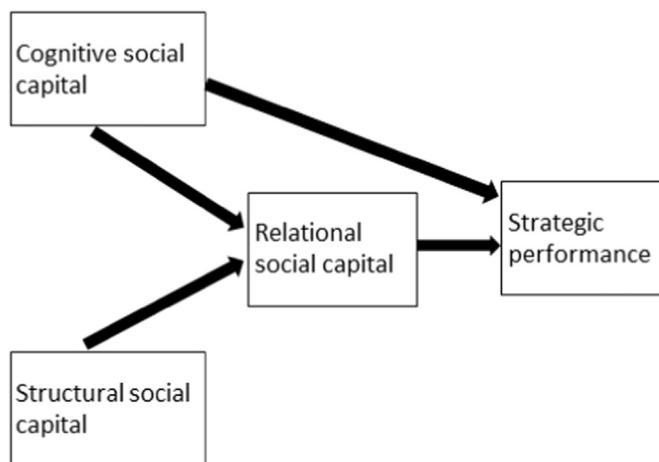


Fig. 2. Alternate model for social capital dimensions and strategic performance.

terms to the multiple regression model. We hypothesized moderator effects of technological uncertainty to the relationships between the social capital dimensions and the strategic performance of companies. After centering the variables (cf. Aiken and West, 1991), we tested the three moderating effects. As Table 6

shows, none of the moderating effects has a significant impact with a reliability of 95%. To conclude, we did not find statistical support for Hypothesis 4. However, we did find a significant correlation between technological uncertainty and strategic performance. Apparently, suppliers that are faced with a high level of technological uncertainty outperform suppliers in a less volatile environment. The moderator analysis suggests a direct, positive effect of technological uncertainty. The fit of the model has improved, considering the notable increase of the explained variance (from 8.5% to 15.8%). Fig. 1 shows the conceptual model with the supported and not supported hypotheses.

5. Discussion and implications

The literature review revealed that most empirical studies on social capital are set up from the buyer perspective. We have addressed this gap by taking a supplier perspective on social capital. This perspective specifically allows investigating the impact of social capital on market performance. Performance in buyer studies most commonly focus on indicators such as lead times, delivery flexibility, cost improvements, and quality. In contrast, strategic performance in our study includes the understanding of markets/customers and developing new products and markets.

Ours is one of the few quantitative studies that examines the impact of the three different social capital dimensions on strategic performance. Based on correlation as well as regression analysis we conclude that the cognitive dimension has more impact on the strategic performance of suppliers than the other two dimensions. Cognitive social capital appears to have a direct, significant impact on strategic performance, in line with previous research (e.g. Krause et al., 2007; Johnson et al., 2013; Hung et al., 2014). It should be noted that cognitive dimension is an understudied dimension of research on social capital. Social capital has generally been studied with a focus on the structural dimension or the relational dimension (e.g. Jonsson, 2015). Our findings confirm the conclusion of De Carolis and Saporito (2006) that particularly cognitive social capital is important for business growth. Cognitive social capital promotes inter-organization learning (Lee et al., 2008) and increases the willingness to engage in dialogue (Liao et al., 2005).

We did not find a significant impact from relational and structural social capital on performance, contradicting previous studies (e.g. Carey et al., 2011; Krause et al., 2007; Lee, 2015). An explanation might be that either too little or too much social capital can hurt performance, as suggested by Villena et al. (2011). Case study research could be aimed at more thoroughly investigating the relationships between the social capital dimensions. Our data do not support the expected moderating effect of technological uncertainty. We did find a significant, positive association between technological uncertainty and strategic performance. This outcome suggests that technological uncertainty stimulates suppliers to develop new products and to enter new markets. Perhaps in contrast to common belief, this external uncertainty is not necessarily harmful. Technological uncertainty forces companies to speed up their adaptation and react to changing circumstances (cf. Land et al., 2012).

Perhaps the three social capital dimensions should not be handled as independent variables. Correlation analysis indicated that relational social capital is associated with cognitive and structural social capital. This outcome is consistent with previous studies that assumed specific interrelationships between the dimensions. These studies view cognitive and structural social capital as antecedents of relational capital (e.g. Carey et al., 2011; Horn et al., 2014; Roden et al., 2014). Cognitive social capital appears to promote the development of relational social capital (cf.

Table A1
Item scales.

Measure (on a five-point Likert scale)	Factor loadings	Cronbach's alpha	Mean	Standard deviation
Strategic performance^a		0.74	3.75	0.61
– The relationship your company has with its clients has led to more product development.	0.86			
– The relationship your company has with its clients has led to the entrance of new markets.	0.78			
– The relationship your company has with its clients has led to the development of new technologies.	0.65			
– The relationship your company has with its clients has led to better customer knowledge.	0.53			
– The relationship your company has with its clients has led to a better market understanding.	0.51			
Cognitive social capital^b		0.69	3.25	0.73
Your company and your customers share the same organizational culture in terms of norms and values.	–			
Your company and your customers share the same business philosophy.	0.75			
Your company and your customers share the same goals.	0.71			
Your company and your customers share the same vision.	0.82			
Relational social capital^b		0.66	3.67	0.54
The relationship between your company and your clients is characterized by interpersonal interactions.	0.43			
The relationship between your company and your clients is characterized by trust.	0.84			
The relationship between your company and your clients is characterized by friendship.	0.66			
The relationship between your company and your clients is characterized by mutual respect.	0.72			
Structural social capital^c		0.83	3.48	0.66
Together with your customers, your company promotes the frequency of interaction between both parties	0.82			
Together with your customers, your company promotes the frequency of contact between the various departments in both organizations.	0.84			
Together with your customers, your company promotes the number of contacts between the various levels within both organizations.	0.85			
Technological uncertainty^d		0.87	3.77	0.76
The technology in your market is changing rapidly.	0.85			
Technology changes bring new opportunities in your industry.	0.85			
Technological breakthroughs have led to new products in your industry.	0.82			
There have been a large number of technological developments in your industry.	0.82			

^a He and Wong (2004), Im and Rai (2008) and Sanders (2008).

^b Kale et al. (2000).

^c Inkpen and Tsang (2005) and Levin et al. (2003).

^d Bstieler (2005).

Jonsson, 2015).

Fig. 2 shows an alternate model in which the relationships are more in line with the correlations between the variables (see Table 2). In this illustration, cognitive and structural social capital facilitate and add to the accumulation of relational social capital, which in its turn positively impacts performance. In addition to these effects, we expect a direct impact of cognitive social capital on performance. Shared meaning and understanding lead to strategic benefits that come from exploring and exploiting new opportunities to create value (cf. Villena et al., 2011).

Our study confirms that the three social capital dimensions can be distinguished as well from the supplier perspective. Having three social capital dimensions in one model improves our understanding of how each dimension affects strategic performance. Our results suggest that a shared vision and shared understanding (cognitive structural capital) has a higher marginal effect on performance than strength of social relations (relational structural capital) and frequency and diversity of contacts (structural social capital). The present study provides a better understanding of buyer-supplier relationships and how their social capital dimensions relate to the strategic performance of suppliers. In contrast to the usual recommendations to build relationships on trust and other relational aspects (Jonsson, 2015), we advise to focus on cognitive social capital in buyer-supplier relationships, i.e. shared vision and shared understanding.

6. Conclusions and recommendations

This study explored the effects of the three social capital dimensions on the strategic performance of supplying companies. Our findings support a positive relationship between cognitive social capital and performance. The regression analysis did show

an impact of relational and structural social capital on the strategic performance of suppliers. We also investigated the moderating effects of technological uncertainty on the relationships between social capital and strategic performance. No support was found for such moderating effects, although a significant, positive association was found between technological uncertainty and strategic performance.

This study had a number of limitations, which could induce further research. The sample was restricted to supplying companies. To get more insights in the effects of social capital, future research could use a dyadic approach and include the experience and views of both buyers and suppliers. Another limiting aspect is the cross sectional nature of this study. A longitudinal study would be more suitable for investigating effects from the social networks on the performance of companies. A longitudinal study would shed more light on the interplay of the various variables under study. Future studies that are set up on a larger scale, focusing on (a larger) sample size and (a more appropriate) composition of the sample. Another avenue of future research could be investigating other external factors and uncertainties with a potential moderating effect on the impact of social capital. Future studies could include additional performance indicators, such as operational performance and other, more sophisticated measures that represent mutual buyer-supplier benefits. Finally, a deeper understanding of the impact of social capital could be gained by considering dyads of buyer-supplier relationships or even by a broader supply chain network.

The results of our study suggest that managers could benefit from the finding that technological uncertainty is positively associated with strategic performance. Together with supply chain partners, companies could try to anticipate changing technologies in order to make proper use of the options and possibilities that come with technological uncertainty. Buying companies should

direct their efforts to the cognitive dimension of social capital in order to stimulate strategic performance of suppliers. Aligning norms, values, goals, and visions with partners in the supply chain seems to be the appropriate way for suppliers to benefit from the resources that accrue from the social capital in their networks. These elements of social capital contribute to the understanding of markets and customers as well as to developing products and markets. Professional purchasers should recognize that their company can and should contribute to the continuity and success of suppliers. We advocate a focus on common goals and shared vision with cherished suppliers.

Appendix

see Table A1.

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