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Knowledge Exchange and Social Capital in Supply Chains

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Knowledge Exchange and Social Capital in Supply Chains

Abstract

Purpose: To contribute towards a better understanding of the impact of social capital on knowledge exchange within supply chains. An exploratory case study approach is used to identify the effects of social capital across multiple organizational levels and to consider how these effects relate to the mode of supply chain governance.

Methodology: A comparative case study investigation was undertaken of two Indonesian automotive component suppliers. Qualitative research methods were used with data collection involving semi-structured interviews with 64 participants at three different levels within each company (senior managers, middle managers and shop floor staff).

Findings: Comparisons between the cases highlight the major consequences that internal differentiation within organizations had in moderating the effect of social capital upon knowledge exchange in supply chains. Social capital had both enabling and inhibiting effects and these were dependent upon how social capital was constituted within and between organizations. Interaction effects between levels and with the mode of governance adopted were also important.

Research implications: Future research would benefit from a multidimensional analysis of social capital in supply chains which considers potentially disparate and contradictory effects which may be apparent when social capital is examined at different levels of analysis and in relation to different modes of governance.

Originality: The paper uses in-depth exploratory case research to complement existing survey-based work and contributes to the further conceptualization of relationships between social capital, knowledge exchange and modes of governance in supply chains.

Keywords:

Supply chain, knowledge exchange, social capital, case study research

Knowledge Exchange and Social Capital in Supply Chains

1. Introduction

Knowledge exchange between firms has become increasingly important for companies needing to keep pace with increased competition, product innovation, and the growing rate of change in new products and technologies (Liu *et al.*, 2013, Nooteboom, 2000). In supply chains, a company's ability to leverage knowledge that resides within the network of contracted and interacting firms has the potential to improve not only company performance, but also the effectiveness of the supply chain as a whole (e.g. Lambert *et al.*, 1998, Barratt, 2004, Ketchen and Hult, 2007, Squire *et al.*, 2009). Particularly important in this respect is the opportunity to learn from technical flows of knowledge associated with product design and process engineering. Knowledge exchange is therefore important – not only in the process of knowledge acquisition by firms (e.g. Nooteboom, 2000), but also in order to improve innovation potential (e.g. Swan *et al.*, 1999).

Since knowledge sharing often involves not only the exchange of explicit information but also the sharing of tacit understandings (Grant, 1996, Tsoukas, 1996), facilitating knowledge exchange in an inter-firm network requires close relationships between network members (Squire *et al.*, 2009, Kim *et al.*, 2015). However, a clear tension exists between the need for close relationships and the application of governance structures which potentially limit the scope and fluidity of social interaction (e.g. Ghoshal and Moran, 1996). While this tension has been well-researched, there has been comparatively less attention paid to the

organizational conditions surrounding the relationship and their specific effects on knowledge exchange. Instead, the tendency in much of the supply chain literature has been to focus upon organizational level interactions, with the presumption that each participating firm is a more or less unitary entity. Organizations involved in supply chain interactions, however, are inevitably differentiated both vertically (strategic, operational) and horizontally (through specialization and departmentalization) (Bresnen, 1996). That can have a major impact upon the distribution of knowledge within the firm (Tsoukas, 1996) and the conditions affecting knowledge exchange processes (Hardy *et al.*, 2003). Research clearly indicates, for example, that the quality of relationships in different parts of the company can have an important bearing upon the processes and outcomes of supply chain interaction (e.g. Whipple *et al.*, 2015). Consequently, it is important to have a good understanding of how processes of knowledge exchange may be shaped, moderated or otherwise influenced by internal differentiation.

To explore this issue, a social capital perspective is adopted to investigate how companies engaged in supply chain transactions manage their relationship-specific assets and knowledge exchange processes. Social capital has been viewed by many as a means of creating value for companies collaborating in a supplier-buyer relationship (e.g. Cousins *et al.*, 2006, Ketchen and Hult, 2007, Krause *et al.*, 2007, Villena *et al.*, 2011). It has also increasingly been seen as an important conduit through which information and knowledge is shared (e.g. Li *et al.*, 2014, Zhou *et al.*, 2014). However, rarely has such work considered how this relational construct promotes or inhibits knowledge exchange within or between different

levels of analysis within the supply chain (e.g. between senior management, middle management, or shopfloor teams). It is also rare to find research that explicitly separates out consideration of the effects of social capital's structural, cognitive and normative dimensions (Nahapiet and Ghoshal, 1998).

An explanation for these omissions can be found in the heavy reliance on large scale survey methods to explore social capital effects (e.g. Krause *et al.*, 2007, Villena *et al.*, 2011, Li *et al.*, 2014, Zhang *et al.*, 2015, Kulangara *et al.*, 2016, Leem and Rogers, 2017). While survey methods allow the identification of general patterns, they inevitably obscure some of the in-depth processes (and tensions) within individual organizations that influence social capital and knowledge exchange. There are, of course, potential challenges in identifying *ex ante* levels of interaction within and between companies (especially perhaps in small firms and non-manufacturing settings). However, there is clearly potential value in conducting in-depth research into the effects of internal conditions upon these processes and in gaining further insight into how they may or may not complement the mode of governance adopted (cf. Payne *et al.*, 2010).

This paper therefore aims to contribute towards a deeper understanding of knowledge exchange in supply chains. It does so by reporting the results of exploratory research into how social capital within the buyer-supplier relationship influenced knowledge exchange at multiple levels and across different dimensions (Nahapiet and Ghoshal, 1998). It also explores how these relationships were, in turn, related to the mode of contractual governance. As the most effective way of capturing such complex inter-relationships, in-depth case study research was undertaken (cf. Eisenhardt, 1989; Eisenhardt and Graebner,

2007). Two manufacturing component suppliers in the Indonesian automotive industry were selected to provide a comparison of firms operating in the same context but facing quite different antecedent internal and external conditions. In-depth analysis of the cases suggested that internal organizational relations had an important moderating influence upon social capital and knowledge exchange processes. The findings also point to a more complex relationship than might be expected between social capital, knowledge exchange and systems of governance and power.

2. Theoretical background

Improving levels of knowledge exchange between buyers and suppliers – particularly where some degree of creative interaction is required – is considered not only desirable but essential (e.g. Nooteboom, 2000). Knowledge exchange between contractual partners is, however, extremely difficult to achieve (e.g. Yli-Renko *et al.*, 2001), as it often requires close relationships between the parties (Squire *et al.*, 2009, Kim *et al.*, 2015). Firms may be reluctant to become too close and share knowledge with their partners as they need to protect their unique knowledge base (Zhou *et al.*, 2014). The application of appropriate formal governance on the part of buyers might help reduce the perceived risks of investment in a supplier-buyer relationship (Cooper *et al.*, 1997, Mentzer *et al.*, 2001). It may also help overcome the ‘stickiness’ that can inhibit inter-firm flows of knowledge (Szulanski, 1996). However, formal governance can also inhibit the social interaction that is necessary to enable effective knowledge exchange based

on mutual tacit understandings (Ghoshal and Moran, 1996). While relational contracting offers an alternative way of promoting knowledge exchange, that too has its disadvantages (Zhou *et al.*, 2014), including the potential loss of intellectual property rights as a result of knowledge 'leakiness' (Szulanski, 1996). Consequently, there is no single prescription about how best to mobilize and exploit knowledge within supply chains (Nooteboom, 2000).

Nevertheless, an emphasis upon the relational aspects of supply chain interaction has led to a good deal of attention being directed towards the impact of social capital upon processes of knowledge exchange (Yli-Renko *et al.*, 2001, Villena *et al.*, 2011, Hung *et al.*, 2013, Li *et al.*, 2014, Whipple *et al.*, 2015). Social capital represents the ability of actors to gain significant benefits by virtue of their social connections and membership of social networks (Inkpen and Tsang, 2005). It captures the effects of many features of social context (such as trust, norms, and common value systems) which facilitate individuals' interactions in networks of relationships. While an emphasis upon social inclusion means that social capital also has exclusionary effects (e.g. Villena *et al.*, 2011), the main focus of research has been on its potentially beneficial effects on the motivation and ability of supply chain partners to share knowledge. Consequently, social capital is an important relational component of supply chain interaction that can enable or inhibit knowledge sharing (Tsai, 2000, Kwon and Adler, 2014).

Adopting a social capital perspective is also consistent with more socialized approaches to knowledge which question whether it is possible to treat knowledge simply as a commodity that can be generated and shared (e.g. Nonaka and Takeuchi, 1995). Instead, such alternative approaches argue that it is

important to acknowledge the influence of social processes through which knowledge is constituted and mobilized (Brown and Duguid, 2001, Tsoukas and Vladimirou, 2001). In a supply chain context, that means focusing upon the joint practices and social interactions occurring within and between participating organizations as conduits through which knowledge is exchanged. An emphasis upon these aspects of knowledge also opens up to greater scrutiny the effects of power relations within supply chains insofar as they shape the generation, sharing and use of that knowledge. Indeed, knowledge is a potentially powerful resource within a transactional relationship that is already bounded by relations of contractual and organizational power (Hardy *et al.*, 2003).

The wider literature on social capital focuses on structural relations and the general patterns of connections between actors, emphasizing the value that comes through the relational norms that are developed through intense social interaction (e.g. Burt, 1992). In addition, Nahapiet and Ghoshal (1998) highlight the importance of a cognitive dimension of social capital, which refers to shared ways of knowing and understanding based upon individuals' professional and social backgrounds. The resultant multi-dimensionality of social capital provides a comprehensive framework for examining the ways in which social interaction between actors in supply chains may or may not lead to knowledge exchange (Krause *et al.*, 2007, Zheng, 2008).

However, the study of social capital and knowledge exchange in supply chains to date tends to be limited in two main ways. First, there is little research that explicitly examines whether social capital operates in the same (beneficial) way irrespective of the precise inter-personal or inter-group relationships to which it

applies (Krause *et al.*, 2007, Aggarwal *et al.*, 2011, Whipple *et al.*, 2015, Kulangara *et al.*, 2016). Li *et al.* (2014), for instance, suggest that stronger social capital between supplier and buyer is needed to help each company access valuable resources. But they do not break this down to see how it works at different levels of analysis within or between firms. Nor do they elaborate on how social capital may or may not facilitate knowledge exchange across levels within the same organization (see also Liu *et al.*, 2013). Research on project partnering, for instance, has noted how the strategic intention to collaborate may fail to be replicated in close working relationships at an operational level (Bresnen and Marshall, 2000). The importance of studying social capital at multiple levels of analysis is certainly acknowledged by some authors (Squire *et al.*, 2009, Payne *et al.*, 2010, Kwon and Adler, 2014). However, the dominance of large-scale survey methods inevitably militates against the in-depth exploration required to tease out such effects.

Second, there is rarely any consideration of complications arising from the multifaceted nature of social capital (Nahapiet and Ghoshal, 1998). Even when explicitly considered, the presumption is that the dimensions of social capital apply at firm level (Li *et al.*, 2014, Kulangara *et al.*, 2016) and/or that they simply co-vary (e.g. Johnson *et al.*, 2013). What, though, of other possibilities? For example, do shared cognitions between counterparts in different organizations compensate for any lack of relational norms encouraging knowledge flows between organizations? There is clearly a *prima facie* case for exploring further how different social capital dimensions impact upon processes of knowledge exchange at different organizational levels.

Third, it is also apparent that social capital and forms of governance can inter-relate in complex ways. There is a strong view within the literature that social capital will help supply chain partners appropriate value, providing it is effectively managed and governed (Bessant *et al.*, 2003, Carey and Lawson, 2011). However, formal contracts that help buyer and supplier establish confidence in each other may inhibit the social interaction required across different levels of the relationship for knowledge to be effectively shared. Existing studies do indicate that forms of governance can have an influence on social capital development and that this, in turn, can affect knowledge exchange (e.g. Zhou *et al.*, 2014). But they rarely examine any more complex scenarios when one considers the multi-level and multi-faceted nature of social capital.

This paper attempts to start filling these gaps in understanding by posing two main questions which form the basis for in-depth exploratory research. First, how does social capital facilitate or inhibit knowledge exchange within a supply chain relationship at different levels of analysis and how are these processes interconnected? Second, what effects do modes of governance and the nature of contractual relationships between partners have upon any social capital effects on knowledge exchange? To capture the multi-dimensional nature of social capital, Nahapiet and Ghoshal's (1998) framework is used to tease out the effects of structural, cognitive and relational dimensions. The main intention of the research is to help refine our understanding of the effects of social capital in enabling or inhibiting knowledge exchange within supply chains.

3. Methodology

As already noted, a good deal of existing research into social capital in supply chains makes use of large scale survey methods (e.g. Cousins *et al.*, 2006, Krause *et al.*, 2007, Villena *et al.*, 2011, Li *et al.*, 2014). While such research is important in identifying statistically generalizable patterns, it inevitably relies upon single reports from key informants and can thus obscure from view the complex processes that occur within individual organizations. Case study research provides instead a method that captures in a more holistic way the complexities of interaction within particular settings (Bryman, 2012). Moreover, in allowing *analytical* generalizations to be made from examination of within-case relationships (Yin, 2014), its role extends to theory building (Eisenhardt, 1989, Eisenhardt and Graebner, 2007).

The use of case studies is increasingly common in supply chain management research (Dubois and Araujo, 2007) and comparative case analysis offers a means of avoiding an over-reliance on idiosyncratic cases, whilst introducing greater variety in circumstances (Bryman, 2012, Yin, 2014). To this end, two companies (Company-A and Company-B) were selected from the population of Indonesian automotive component suppliers to represent different degrees of interdependence in supplier-buyer relationships (high and low). Indonesia was chosen as an exemplar of an emerging economy in Asia. Exploring supply chain interactions in that context would allow the research to be sensitive to, and capture, any distinct local cultural influences on patterns of knowledge exchange.

The automotive sector was chosen for several reasons. First, automotive supply chains are of historic economic importance to many economies, are often well established and characterized by high levels of interdependence amongst buyers

and suppliers (Smitka, 1991). Second, they have received considerable attention from both academic researchers and practitioners, as exemplars of supply chain interaction (e.g. Soosay *et al.*, 2008). Third, as a high growth and highly competitive market, the automotive sector is considered important to Indonesia's economic development (Aswicahyono, 2000).

Consistent with the use of multiple mixed methods in qualitative case study research (Bryman, 2012), the primary data source was qualitative semi-structured interviews (in the Indonesian language), supported by direct observation, focus groups, archival data (e.g. official documents) and informal conversations. While the research was intense and highly qualitative, there were insufficient resources to support a full ethnography and, without any intended direct intervention or change to working practices, action research was considered inappropriate (cf. Bryman, 2012). All data were collected by the first author who was fully trained in the use of qualitative research methods and whose first language was Indonesian.

Interviews ranged across three levels within the firm – from senior managers involved in establishing supply contracts; to middle managers charged with their implementation and delivery; to shopfloor staff involved in production. Interviews focused upon processes of knowledge exchange and perceived social and organizational enablers and barriers. Respondents were asked about: design and production processes in their part of the organization (including non-routine, project activities); demands and constraints (commercial, technical, organizational) on production; knowledge requirements for product and/or process improvements; and typical technical problem-solving activity (drawing

on specific examples). Respondents were also asked about working practices and routines, relationships with customers and social relationships (networks, norms and values) within and beyond their immediate area of work. The wide range of interviews conducted ensured that as complete as possible a picture of activity was produced. Accounts were cross-checked to ensure consistency in interpretation and to allow any differences in view to be accommodated and fully explored (cf. Eisenhardt, 1989; Yin, 2014). The interviews ranged between 45-120 minutes and were recorded and transcribed. Repeat visits and interviews were used where appropriate and the companies were visited a number of times over the course of a year. In total, 64 participants were interviewed. Table 1 below gives a full breakdown of respondents by company and by group/level (managerial, non-managerial and buyer/supplier representatives):

[Table 1]

Data analysis involved an iterative process of data collection and emerging case interpretation involving all three authors (Miles and Huberman, 1994). NVivo software was used and a coding frame was developed that combined open and axial coding methods (Strauss and Corbin, 1990). This allowed the data to be coded according to the concepts of interest (e.g. social capital dimensions), while also allowing any emerging concepts of importance to the study to be captured (e.g. power effects). Data were coded initially by the first author before being cross-checked by other authors for consistency in interpretation (Eisenhardt and Graebner, 2007, Yin, 2014). In what follows, social capital and knowledge exchange processes are explored at company, management and shopfloor levels

within each case, after which a cross-case comparative analysis is developed and discussed.

4. Research findings

Basic information about each company is summarized in Table 2 below, which includes details of the structure of each company's production department and the staff interviewed at managerial level (plant managers and supervisors) and shopfloor level (foremen and operators). Senior directors provided much of the company level information.

[Table 2]

4.1. Company-A

4.1.1. Company level

Company-A regularly engaged in knowledge exchange in both their routine and non-routine activities. Routine product supply issues as well as production performance improvement issues were discussed at weekly visits by Customer-A. These visits were considered by staff to be indicative of tight control that was exerted by the customer. As one production manager described it:

With Customer-A, [the discussion is] how we try to develop the line... They relate their own experience as a learning process for us and [we] try to implement it... Manufacturing improvements are suggested by Customer-A visiting every week.

While control was tight, managers nevertheless felt that there was a mutual recognition of the benefits of performance improvement and a joint commitment to accomplishing this goal. Moreover, managers at each company felt there was trust and helped each other out – solving problems directly, rather than escalating them to higher levels. As the marketing manager remarked:

(the customer's engineers) trust us because they know our background... Company-A's reputation helps... It's not the key, but it can open them up to us. Maintaining such a relationship is important ... They will not blow a problem up.

Managers' mediating role in resolving any problems also played a critical role in aligning activities within the supply chain. Not only did this help connect the two parties structurally and cognitively, it also helped reinforce relational bonding between representatives of the two companies.

In non-routine tasks, such as one-off projects, longer-term cooperation to pursue mutual improvement was important and, as a result, knowledge exchange occurred more frequently. In one joint project, for instance, Customer-A had allowed Company-A plenty of time to consider the project's benefits and consequences. This reciprocity was construed by Company-A as being important in reducing project uncertainties and encouraging innovation. The project manager explained:

Customer-A is not too stiff, not too mechanistic... so we are more creative... "If this cannot be like this, okay, [make it] like this." ... We become more creative, [it's] more possible for us to find solutions.

The result of this flexibility was that engineers from both companies were given time and space to interact and come up with creative solutions to problems based upon their shared ways of thinking. This ability to connect appeared to reinforce shared cognition and trust between them. Consequently, the companies were able to promote knowledge exchange through infusing structural arrangements with relational qualities.

A similar approach was applied by Company-A to its suppliers. Systems were applied that not only aimed to ensure supplier performance (in terms of quality, cost, and delivery), but also to promote intense communication with the aim of better aligning supply chain activities.

4.1.2. Management level

Structurally, relations amongst managers within the firm were quite flexible and appeared to facilitate spontaneous knowledge exchange and immediate decision-making. According to one production manager, communication between managers across departments was mainly informal, and would be followed up with formal meetings as necessary. This helped keep knowledge flowing and production activities aligned with supply chain needs. Evidence of this was found in the *kaizen* program, where managers in their daily activities continually strove to generate continuous improvements. This was underpinned by company values promoting cooperative behavior that were deeply ingrained in managers' behaviour. As one supervisor explained:

The core value has altered our paradigm... to promote positive values...

Blaming each other is lessened... everybody wants to find a solution...

Blaming each other does not work anymore, it cannot solve problems.

Alongside company values, systems were in place in the production department which encouraged teamwork. One supervisor explained, for instance, how work targets were cascaded down to him and then to foremen and operators. If operators failed to meet the targets, everyone bore the consequences. This created interdependence amongst production team members and promoted teamwork to accomplish work targets.

In dealing with more complex assignments such as improvement programs, engineers had a direct line of communication with shopfloor staff – rather than having to go through management. This meant that both parties could learn directly about each other's needs. Here, the core value of not placing blame also came into play and helped the project team and workforce develop a stronger mutual understanding. In this way, structural aspects of the relationship were augmented with strong cognitive connections and supporting relational norms, which helped ensure that improvements were generated.

4.1.3. Shopfloor level

At shopfloor level, frequent informal activities helped create strong bonds amongst workers. Within groups, senior operators were important in building the group culture. Social norms meant that there was an underlying respect for senior colleagues and this led to operators normally talking to their senior operator

before talking to their leader. At the same time, there was some mutuality in the relationship: some seniors were willing to help their juniors by, for example, communicating their ideas to the foreman. As one foreman explained:

Sometimes (*senior operators*) communicate ideas to me after the break: “Sir, yesterday when we chatted... there was an idea of making a hanger. What do you think sir? Can we try this idea?” ... Because not all operators have the courage to talk to the foreman

Senior operators therefore performed a mediation role that was used to communicate ideas and this was welcomed by both the foreman and junior staff. The conduct of each individual was underpinned by an expectation that improvement ideas would be appreciated by the company. Knowledge exchange thus seemed to be facilitated as part of generating improvement ideas; and discussing ideas during breaks had become a habit amongst operators (cf. Orr, 1996).

However, bonding did not unambiguously help create new ideas and learning. This was particularly so when improvement proposals were manipulated for different purposes. Some seniors, for instance, gave ideas to their juniors to help ensure that they were recruited as permanent workers in order to ease their own workload. One foreman explained:

We give ideas to them (*i.e. junior operators*) so that they can get good marks... because we need good operators

Moreover, the desire to maintain group harmony could sometimes become a barrier to the generation of improvement ideas – as one operator suggested:

I've even experienced a problem with a [senior] operator... [He] didn't agree with my idea... It caused a lot of conflict, especially with the older colleague, who didn't like [it]... I was spoken to rudely by him.

A shared desire to maintain group harmony thus compelled many workers to conform to social norms to avoid potential conflict that would otherwise have arisen. Nevertheless, despite these aberrations, the bonding amongst workers generally ensured that improvement activities continued to occur on the shopfloor. By involving workers in improvement programmes, knowledge exchange occurred more intensely between workers and their leaders. In other words, these programmes were able to benefit from the consistency between the structural, relational and cognitive connections that developed between workers and management.

4.1.4. Summary

Through combining formal organizational measures with the harnessing of informal social processes, Company-A was able to make the best use of social capital within the firm to facilitate knowledge exchange within and across organizational levels. Strong structural connections and relational norms, as well as shared cognitive understandings, helped problem-solving activity and the generation of improvement ideas. This was further cemented through mutual interdependence across the firms and amongst the groups involved (for example, amongst engineers during joint projects). Strong bonding at shopfloor level did enhance the possibility of conflict (and this was exacerbated when workload

pressures were high). However, managers played a crucial role here in bridging levels and moderating the negative effects of the company's tight control and the impact of any collective workforce action. As a consequence, cognitive and relational dimensions of social capital were well aligned with internal structural relationships. These conditions supported the levels of knowledge exchange required for the company to meet its supply chain obligations.

4.2. Company-B

4.2.1. Company level

The relationship between Company-B and Customer-B had evolved very differently. Interaction with Customer-B was very formal, involving very limited reciprocal exchange. Long-term cooperation did not lead to closer ties, as each party tended to maintain a distance from the other. Any performance improvement had to be internally generated, as Company-B's plant manager explained:

There is no routine visit [from Customer-B]... So formally there is no development [programme]... This is purely our innovation... They provide guidance perhaps when they audit... To achieve cost reduction we have to be able... to find [our own] solutions.

Not only did this lack of a close relationship discourage any productive knowledge exchange, it also tended to encourage Company-B to internalize any problems they encountered:

Purchasing staff: If [the problem] is found in Company-B, it's better to be cooled down [by ourselves]... If the customer finds it... then it becomes tougher... They will question everything.

Welding foreman: The 'advice' from Customer-B... has to be implemented. We must do it, because they will definitely check whether we implement it or not.

Although the respondents felt that Customer-B wanted to control the problem-solving process, this was very indirect. As a result, any knowledge exchange occurred in response to Customer-B requests, rather than as part of any normalized reciprocal exchange.

In contrast, Company-B preferred to build close relationships with its suppliers, particularly those who were connected through long-term cooperation or kinship. The plant manager used cost reduction (CR) target setting as an example:

We understand the capability of each supplier... So what we do in CR ... depends on the market price of raw materials itself. Customer-B is not like that; they just ask 5%. That's it. We're not like that. We determine the CR based on the real price of materials purchased.

Consequently, pressure from Customer-B to reduce costs did not induce Company-B to apply a similar mechanism to its suppliers. The plant manager revealed that reciprocal interaction was particularly important when working to maintain relationships with long-term suppliers (and with those who were the owner's relatives).

However, such close relationships did incur costs for Company-B. There were complaints, for instance, from the shopfloor about the poor performance of some suppliers and the delays caused to production. Consequently, there was a contradiction between the tight control from its key buyer and the loose control it exercised over its suppliers, which made it difficult to achieve a smooth alignment of production across the supply chain.

4.2.2. Management level

Given this context, managers not only dealt with routine matters to fulfill customer orders, but were left to cope with the repeat problems that occurred during production. Managers tended not to mediate well between the company and shopfloor and communications were often poor – both within management and between management and shopfloor. Internal management systems also appeared to be poorly developed and implemented, as the assistant plant manager remarked:

Communication between middle management within one department is still disconnected, as well as between departments... In the meeting, well, okay, we agreed ... “This should be done like this...” [But] it was not executed... When we traced it, there was no information passed on from the meeting attendees to the shopfloor... If they miss [a target], there is no punishment. Reward and punishment is hardly found here.

An important part of the explanation for these problems lay in the fact that the company was a family business and this had created a culture of defensiveness

amongst managers. One supervisor gave an illustration of how this affected managerial behavior:

I was [assigned] to the night shift. I found eight people sleeping. According to the company rules, they should be fired. But it was being ignored by the leaders... [They] closed their eyes... I tried to discuss it with my department head, [but he said], “Well, just let us keep it [to ourselves]” ... [But] if I keep it, I let it happen.

In fact, he did report the case directly to the manager. But this only led to anonymous threats. He further explained that the reason that leaders were reluctant to get involved with this case was that one person who was caught sleeping was having an affair with a relative of the owner. This clearly made it a particularly sensitive issue! However, it was also widely reported that managers were not properly complying with internal systems anyway and that this was attributable to this particular family business’s culture. The result was that levels of trust amongst managers were low and this clearly did not encourage a willingness to exchange knowledge.

4.2.3. Shopfloor level

At shopfloor level, knowledge exchange was much more common and occurred particularly when there were technical issues that needed addressing – for example, when installing new dies. Outside work, knowledge exchange was also

identifiable within some groups, and encouraged close bonding to emerge. As one senior operator remarked:

In our group, we always gather; every time we start work, at coffee break, and lunch. We are always sharing solutions... We talk about work or non-work issues.

Some junior operators mentioned the helpful behaviour of their seniors. Their role appeared particularly important, as they encouraged interaction amongst operators and created a structural link between operators and foremen. It also appeared that some foremen had built close relationships with workers, which helped them to understand better each other's needs. One foreman explained:

We are comfortable with the operators, they are comfortable with us. So whatever we order, they will do. That makes us happy. What is asked by the operators, we try to propose [to the management]... We care about each other.

Social interaction that involved the mobilization of social capital by workers to assist each other was more clearly identifiable when they tried to cope with pressures emanating from management. However, this willingness to help rarely extended to relations with other departments. Instead, blame-placing tended to be commonplace, as one operator revealed:

Generally, [the relationship] with other departments is weak. Sometimes if our section needs to be like this, the other department doesn't respond. For

example in the pressing [section], if there is a die problem, when we report to the maintenance department, sometimes [they] don't respond.

Not surprisingly, management came in for a lot of criticism for failing to help them address unsolved problems as well as mediate their dealings with staff in other departments. As one foreman explained:

The supervisor just wants to know that everything has been done; they just want everything to be in order. So we have to think by ourselves, how to handle other departments. Sometimes we have to argue with other departments.

Not only were shopfloor members pressured to achieve work targets, they also lacked support from management and colleagues in other functions. As a consequence, it was reported that both workers and some foremen preferred collective silence in their dealings with management – for example, by manipulating the report sheet and not getting actively involved when a new type of die was being designed.

4.2.4. Summary

To sum up, Company-B faced a number of tough challenges, not only from external pressures, but also from its internal organization. While exploiting social capital appears to have been important at company and shopfloor levels in helping those groups deal with pressures from, respectively, customers and other sections that was rarely the case at management level. Management's role in mediating

relationships between levels and functions was largely absent. Moreover, close social interaction amongst groups where it did occur was largely a result of having to cope with failings within management. As a result, knowledge exchange across hierarchical levels and across functional groups was seriously inhibited. Despite sales increasing, problems with product supply kept reoccurring which led to heavy costs for the company. Clearly, there was a lack of close cognitive and relational connections not only between buyer and supplier, but also within management and between managers and others within the organization. As such, the case illustrates how weak bonding at one level had become an impediment to knowledge exchange occurring across groups and between levels.

5. Discussion

Applying Nahapiet & Ghoshal's (1998) framework that differentiates between structural (SD), relational (RD) and cognitive (CD) dimensions, the effects of social capital on knowledge exchange across the cases (both positive and negative) are summarized below.

[Table 3]

5.1. Company level

At company level, the higher level of interdependence between buyer and supplier in case A highlighted how a more structural approach could be perfectly consistent with the promotion of knowledge flows between the companies, provided that there were also strong cognitive connections as well as strong relational elements to how they operated in practice. Indeed, the interrelationship

between structural, relational and cognitive aspects was mutually reinforcing and reinforced knowledge exchange across levels. A similar control mechanism was applied by Company-A to its suppliers, which also helped ensure that knowledge flowed between the relevant parties and that activities were aligned within the supply chain. None of these conditions held in case B, where strict mechanisms applied by the key buyer were not replicated by Company-B in managing its own suppliers. Moreover, there were no compensating cognitive and relational qualities that moderated the structural relationship that existed between buyer and supplier. While there were examples of this with Company-B's own suppliers, the importance of kinship only served to distort some key commercial relationships. Consequently, these conditions negatively impacted upon the flow of knowledge within and between the companies. Whereas in both cases power was clearly in the hands of the buyer, there was greater mutual dependence in case A. Moreover, power relations between buyer and supplier played out very differently: in case A, the impact was mainly positive as power differences helped activate the social capital that enabled knowledge exchange; in case B, the impact was negative as power imbalances and internal conflict simply impeded effective knowledge exchange. The key insight from contrasting the two cases was that the same form of contractual governance (involving tight control) either enabled or inhibited knowledge exchange, depending on the moderating effects of internal conditions that encouraged the activation of social capital to cope with exogenous pressures.

5.2. Management level

At management level, differences in the cohesion of management teams across the cases were particularly crucial in influencing flows of knowledge within and between the contractual partners. Although tight control was exercised both upon and within Company-A, this was countered by the company's well-established system and culture that created an alignment of managerial interests with company goals and which gave managers sufficient autonomy to be able to take appropriate action to capitalize on good social relations within the firm. Here, structural, relational and cognitive connections helped intensify knowledge exchange. Thus, despite tight control, the internal system supported the development of social capital in ways that facilitated knowledge exchange through the strength of the culture within management.

On the other hand, the imbalance in power relations at company level found in Company-B, in the absence of any counter-acting cohesive managerial culture, tended instead to amplify tight control throughout the organization. Few attempts were made at applying any kind of relational approach. Instead, managers in this context simply either defaulted to their position power or took measures to avoid responsibility, which then worsened collaboration across levels. Consequently, knowledge exchange was seriously inhibited and the defensive culture within management exacerbated this tendency. The key finding here was that the quality of relationships within management was crucially important in moderating the impact of governance systems and thereby determining whether or not social capital within the firm could be effectively channeled and converted into performance benefits.

5.3. Shopfloor level

At shopfloor level, the cases both showed how it could be difficult for company aspirations to collaborate with their contractual partners to cascade down to shopfloor level. This is hardly surprising and there was clear evidence too of the importance of group norms coming into play. However, the cases also demonstrate key differences in how the companies managed to either overcome or exacerbate these latent conflicts. Company-A was much more effective in obtaining cooperation from its workforce to help sustain knowledge exchange. Although there was little attempt made to eliminate hierarchical differences, local cultural norms were accommodated. Supervisors and senior operators also played an important mediating role that helped preserve knowledge flow across levels and reduce potential conflicts (cf. Burt, 1997). In contrast, at Company-B, there was much more pressure on employees to achieve work targets with minimal informal interaction. The consequence was that this reinforced the solidarity of workers and encouraged them to mobilize their power – tacitly acting against the company by withholding cooperation. Furthermore, bonding within some groups promoted knowledge exchange between workers, but inhibited knowledge exchange across groups.

5.4. Social capital effects and interactions across levels

What these findings suggest is that social capital may not only enable knowledge exchange, but in certain circumstances it can act as a major inhibitor (cf. Edelman *et al.*, 2004). Depending upon where within the organization this ‘blockage’ occurs and how any such blockage is triggered, effects upon knowledge exchange within the supply chain as a whole can be quite dramatic. Furthermore, the findings also suggest that social capital processes and effects at one level do not necessarily

exist in isolation from the effects of social capital-based interaction at other levels. The exploitation of social capital to promote knowledge exchange at one level can be triggered, countered or otherwise affected by conditions found at another organizational level. Case A gives an example of where a 'virtuous circle' of social interaction was promoted through a good degree of integration between levels. Again, the mediation role played by senior operators was extremely important as it helped build cognitive and relational connections, increasing the possibility of spontaneous knowledge exchange to generate creative ideas. Case B, on the other hand, gives a good example of where a 'vicious circle' of social interaction was triggered by failures at company level and amongst management to moderate the effects of tight external controls and to build a healthy connection with the shopfloor to promote cooperation. In other words, solidarity amongst the workforce in case B (where social capital helped workers resist by withholding cooperation) arose precisely as a consequence of the weakness of social interaction at management level.

5.5. Interactions with governance arrangements

What the foregoing analysis also suggests is that governance arrangements alone may be insufficient to improve task-focused knowledge exchange across levels, if they are not also accompanied by internal mechanisms through which social capital can develop either within groups or between levels. In Company-A, where interdependence between buyer and supplier was high, the governance arrangements adopted did appear to be able to promote alignment with internal activities. However, their effectiveness was conditional upon internal circumstances: company culture and support systems were institutionalized and

mediation helped to ensure knowledge flow across levels. Mediators were particularly important in understanding different social norms and using that knowledge to build relational connections with workers. Structural mechanisms were thus supplemented by harnessing social norms to reinforce connections across levels.

In contrast, Company-B demonstrates how poor internal cohesion and a lack of internal integration not only failed to provide a context for social capital to have beneficial effects on knowledge exchange, but also reinforced barriers to social interaction that further inhibited knowledge exchange – with overall detrimental effects on the supply chain. Company-B thus found it difficult to align governance arrangements with internal activities. With poorly implemented internal management systems and a fragmented management culture, many task-related problems remained unresolved. Operators' social solidarity here worked against the company's interests by further restricting flows of knowledge.

5.6. The complexity of social capital and its effects in supply chains

Taken together, these findings highlight how knowledge exchange in the supply chain may be crucially related to internal differentiation and its effects on social interactions within collaborating firms. This possibility has hitherto rarely been properly explored in the existing literature, despite being raised as an issue by some commentators (e.g. Squire *et al.*, 2009, Kwon and Adler, 2014). The present study shows how social capital is not a unitary phenomenon, but can operate in different ways and at different levels within and between organizations in supply chains. Kwon and Adler (2014) point to a stream of work in the last decade that distinguishes between 'having' and 'using' social capital (through potential or

mobilized ties). Their main argument is that having access to a network is not a guarantee of gaining social capital benefits (including knowledge acquisition). The present study supports that argument and expands it by adding two critical observations. First, that social capital at different levels may not only have complementary and constructive effects, but can also have counter-acting and conflicting effects. So, for example, good inter-managerial relations can be undermined by poor relations at operational levels (and vice-versa). Second, that social capital effects at different levels may be recursively related, with the activation of social capital at one level influencing the activation of social capital at other levels (with either positive or negative effects). So, for example, a lack of cohesion at managerial level can activate greater resistance at operational level based upon group solidarity.

Any attempt to generalize from case studies is fraught with difficulties (Bryman, 2012). However, case study research is noted for its importance in contributing to theory generation (Eisenhardt, 1989; Dubois and Araujo, 2007). Indeed, the results here do suggest a number of *analytical* generalizations (Yin, 2014) that emerge from the within- and between-case analysis conducted which suggest numerous empirical possibilities and are therefore indicative of important questions for further research.

First, that knowledge exchange can be enhanced through social capital, but that social capital can also have inhibiting effects on knowledge exchange within supply chains. Social capital can occur at different parts and levels within and between organizations in a supply chain relationship and these effects may or may not be complementary and mutually reinforcing.

Second, a lot appears to depend upon the level of integration and cohesion, both structurally and socio-culturally and both internally and externally within supply chains. Socio-cultural integration has both vertical (across levels) and horizontal (across groups) elements, and achieving high levels of both may be important for effective knowledge exchange. Without good vertical integration, good horizontal collaboration might have beneficial effects on knowledge exchange (through enabling groups to cope) but may also have more negative effects (through the counter-veiling power created). Consequently, the recursive interaction between social capital processes and effects at different levels need to be better understood.

Third, these effects appear to be largely independent of the form of governance chosen, although they may have dramatic effects in either reinforcing or counter-acting its impact. So, for example, positive social capital effects that arise from internal cohesion might not only complement a relational approach to governance; they might also substitute for the lack of social capital at company level under stricter systems of governance. Conversely, poor internal cohesion that makes it difficult to exploit social capital lower down the organization could critically undermine a more relational approach to governance; but have less dramatic consequences for formal governance based upon tight control and the exercise of buyer power.

Fourth, by the same token the importance of power relations between and within organizations engaged in supply chain relationships also needs to be taken fully into account. So, for example, the exercise of buyer power may help ensure task completion but make it difficult to develop the relational qualities necessary to

promote knowledge exchange. On the other hand, even a significant power imbalance in the contractual relationship could perhaps be counter-acted by internal conditions that allow the activation of social capital that improves knowledge exchange as a coping strategy (cf. Contu and Willmott, 2003). There are, of course, many empirical possibilities given the complexities of power relations within and between organizations (Hardy et al, 2003).

Last but not least, with few exceptions (e.g. Johnson *et al.*, 2013, Li *et al.*, 2014), the supply chain literature tends not to explore how different social capital dimensions might influence knowledge exchange processes (Kwon and Adler, 2014, Kulangara *et al.*, 2016). Nahapiet and Ghoshal's (1998) framework is still an influential approach for examining knowledge sharing and creation in the supply chain (e.g. Carey and Lawson, 2011, Villena *et al.*, 2011, Chen and Hung, 2014, Kulangara *et al.*, 2016) and has been used here to throw light on how different aspects of social capital converged or diverged across the cases. Particular attention was directed to the juxtaposition of structural aspects with relational qualities and cognitive connections. Clearly, there is more to be gained by teasing out the effects of different social capital dimensions on processes of knowledge exchange within a supply chain context.

6. Conclusion

This study suggests that social capital as a relational concept operates within and between contracting firms in quite disparate and sometimes contradictory ways to influence knowledge exchange in supply chains. The development of social

capital can thus both enable and inhibit knowledge exchange. Whether and how this occurs appears, in turn, to be dependent upon: the configuration of relations within supply chains (specifically, the form of governance adopted and power-dependence relations); upon internal integration (specifically, structural mechanisms, cultural attributes and sources of social capital); and upon the interaction between these two sets of conditions. Importantly, too, the relationship between social capital across levels can be recursive and different dimensions of social capital may have differential effects on processes of knowledge exchange (cf. Kwon and Adler, 2014, Kulangara *et al.*, 2016).

Consequently, while governance mechanisms adopted in supply chains may influence knowledge exchange, they are indeterminate in their effects. Depending upon power-dependence relations and internal cultural conditions, it is just as likely perhaps that formal governance is associated with smooth flows of knowledge due to social capital effects; and that relational governance is undermined by social capital effects. What is needed therefore is a more holistic and dynamic understanding of how conditions in any particular case might combine to promote or inhibit knowledge exchange.

Taking into account the impact of such conditions not only marks out the main theoretical contribution of this paper in highlighting the complex and dynamic effects of social capital in supporting or undermining supply chain interaction, it also has important practical implications. First, for firms involved in supply chain interaction, there is not simply the need to consider the means (formal or relational) that should be used to govern supply chain transactions, taking into account their relative advantages and disadvantages; but also how well the form

of governance aligns with (and is thus supported or undermined by) the quality of relations across and between different levels within the firm. Second, companies may then need to be prepared to take practical steps to improve relations within the firm to support their supply chain interactions – particularly if they are involved in longer term relational contracting. This may include measures to promote greater cultural integration or interventions to help manage internal divisions and conflict more effectively.

Further research is needed to understand precisely how different configurations of governance mechanism and power might influence flows of knowledge within and between supply chain partners. While this research has begun to tease out the effects of different dimensions of social capital, further research could also fruitfully be directed at understanding in greater detail how they interact to affect processes of knowledge exchange in supply chain contexts. Furthermore, while the research reported here has focused attention on a particular type of supply chain and setting, there is clearly scope for examining such effects in different types of supply chain and/or socio-economic context. Clearly, though, treating social capital in supply chains as a unitary construct grossly oversimplifies its potentially complex and dynamic effects upon knowledge exchange processes.

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Table 1. Respondents by company and by group/level

	Managers	Non-managers		Buyer/Supplier representatives	Total
		Foremen	Operators		
Company-A	16 (47%)	8 (24%)	7 (21%)	3 (8%)	34
Company-B	15 (50%)	5 (17%)	8 (26%)	2 (7%)	30
Total	31 (48%)	28 (44%)		5 (8%)	64 (100%)

Table 2. Company Information

	Company-A	Company-B
Year of establishment	1976	1985
Company type	Joint venture between Indonesian and Japanese companies	Privately-owned company
Number of employees	2400	800
Sales revenue (2012)	USD260 million	USD16 million
Customer	More than 20 customers, around 85% were OEMs (original equipment manufacturers) and 15% were replacement parts market customers. 70% of its OEM output was sold to Customer-A, for whom Company-A was the principal supplier.	More than 20 customers, about 94% of sales went to Customer-B. Its products were considered easily imitable, making its market attractive to new entrants. There was less technical interdependence between the two companies than in Company-A case.
Structure of production division	At management level, a plant director managed 8 managers, each in charge of a department. Each department had 9 production sections, each led by a supervisor. Each section consisted of up to 3 production lines. Between 3 to 10 foremen headed up each production line and each foreman supervised around 20 to 30 operators. Foremen and operators are taken here to represent the shopfloor level.	At management level, a plant manager managed 1 assistant manager and 8 department heads. Each department head supervised a number of supervisors. One supervisor led 2 to 4 foremen and each foreman supervised 20 to 30 operators. Foremen and operators are taken here to represent the shopfloor level.

Table 3. Social Capital at Three Levels of Analysis

	Company-A	Company-B
Company level		
SD	Tight control from key buyer combined with relational approach (in joint projects)	Tight control from key buyer, but loose control of key suppliers (kinship)
RD	Strong bonds between buyer and supplier fieldworkers (e.g. through frequent joint problem solving)	Weak bonds between fieldworkers, as distance maintained between buyer and supplier
CD	Shared understanding developed and autonomy given to Company to generate alternatives (particularly in joint projects)	Cognitive connections between buyer and supplier poorly developed and communications perceived as one-way
Management level		
SD	Strong and supportive company culture and tight implementation of internal management systems	Fragmented culture and poor implementation of internal management systems
RD	Good sense of togetherness in accomplishing work targets amongst managers	Poor relational connections amongst managers (e.g. defensiveness, distrust and blame-placing)
CD	Strong culture helped mutual understanding develop among managers of company goals and means to achieve them	Weak culture and perceptions of unfairness created poor understanding of company goals and means to achieve them
Shopfloor level		
SD	Tightly-controlled systems combined with intensive use of formal and informal mediators (e.g. senior operators)	Poor implementation of systems and of managers' mediation role; influence of foremen as mediators
RD	Strong norms within operator groups held together by seniors	Strong norms within operator groups held together by seniors
CD	Shared values and group conformity amongst operators that led to some collective action (e.g. manipulating improvement projects), though moderated	Shared values and group conformity amongst operators that led to significant, non-moderated collective action (e.g. operators being silent and uncooperative)