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Knowledge capability flows in buyer-supplier relationships

Challenges for small domestic suppliers in international contexts

António Carrizo Moreira
Universidade de Aveiro, Aveiro, Portugal

Abstract

Purpose – The purpose of this paper is to understand how suppliers have managed to accumulate knowledge in their relationship with large multinational clients.

Design/methodology/approach – The methodology was based on four case studies' qualitative data, collected from semi-structured, in-depth interviews. The buyers were selected among the largest MNEs of the electronics, automotive and footwear industries and the suppliers were selected among the set of SMEs supplying to those MNEs. The objective was to assess the supplier's knowledge transfer-oriented capabilities and the buyer's interaction-oriented capabilities in the SBR.

Findings – The paper highlights the important leading role of the client in the buyer-supplier relationship involving SMEs as well as the knowledge-sharing atmosphere of successful cooperative relationships. Although it confirms the advantages of alliances for SMEs, knowledge transfer-oriented capabilities, are used by SMEs in order to sustain client satisfaction and to strengthen their core competencies. Despite all efforts of SMEs, if clients are not willing to use interaction-oriented capabilities, buyer-supplier relationships are doomed to failure.

Research limitations/implications – One practical implication is that, if SMEs are adequately supported by public policies, it is possible to transfer knowledge from more advanced to less endowed economies . The main limitation stems from the fact that it is not possible to claim generalisation as the research is the result of a series of four case studies.

Originality/value – The paper uses dyadic relationships as a viable option to compensate internal knowledge deficiencies of SMEs in their relationship with MNEs. It complements former research as little is known about the importance of alliances in the context of knowledge acquisition and learning in SMEs. It contributes to the SME scientific literature by investigating how SMEs learn from their alliance partners.

Keywords Buyer-seller relationships, Knowledge management, Learning, Small to medium-sized enterprises, Knowledge sharing

Paper type Research paper

Introduction

The importance of rapid technological changes, the shortening of life cycles and global competition have made knowledge management a key process for sustaining competitive advantages in dynamic environments (Nonaka and Takeuchi, 1995). Small and medium-sized enterprises (SMEs) competing in today's knowledge-based economy are facing new strategic challenges as they need viable knowledge development options to compensate for their internal knowledge deficiencies.

Scholars and policy-makers have long been interested in studying foreign direct investment (FDI). Although most of the literature has been concerned with the establishment of new affiliates in host countries, the importance of attracting FDI as a

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means to obtain advanced technology and knowledge is crucial for catching-up countries.

O'Donnell and Blumentritt (1999) have contributed to understand the important roles of corporate strategy and of the level of technology of the subsidiary in the competitiveness of nations. While Bartlett and Goshal (1986) argued that multinational enterprises (MNEs) seek to tap host-country sources of knowledge to enhance their stock of knowledge assets, Moreira (2005) found that inward FDI could benefit indigenous firms competencies. Clearly, FDI provides good opportunities for learning and acquiring knowledge: the network surrounding the subsidiary (McEvely and Zaheer, 1999) and the supplier-buyer relationship (SBR) (Moreira, 2005) are important factors in the acquisition and integration of external knowledge.

A series of factors such as fragmenting and demanding markets, intense international competition and rapidly changing technologies paved the way for a radical transformation of the SBR as a consequence of FDI. For instance, adversarial relationships and technology-transfer-based mechanisms are giving way to close co-operative relations and learning-based mechanisms (Lynn, 1998; Dyer, 1996; Håkansson and Johansson, 2001).

The role of clients as lead firms in governing the SBR represents a window of opportunity for domestic suppliers in less endowed economies as they are given the opportunity to access to technologies and best practices of their multinational clients and to enhance their capabilities (Humphrey and Schmitz, 2001).

Research on knowledge has favoured large firms (Doz and Hamel, 1988; Dyer and Singh, 1998; Inkpen and Dinur, 1998; Contractor and Lorange, 2002) and little emphasis has been put on SMEs (Liao *et al.*, 2003; Van Gils and Zwart, 2004). Research on knowledge capability flows and on the importance and implications of suppliers is scarce (Ernst and Kim, 2002; Varum, 2005). Therefore, the focus on suppliers (especially from less-favoured regions) and their relationships with large international clients seem to be appropriate for examining the links between clients and buyers in the supply chain. Moreover, the focus is on how suppliers have managed to accumulate knowledge in their relationship with their clients and how the clients are contributing to the development of their local suppliers. Accordingly, in order to fill this gap this study explores firms' knowledge-oriented and interaction-oriented capabilities in SBRs.

Knowledge

According to Davenport and Prusak (1988), knowledge is the dynamic integration of experiences, values, information and ideas that provide a framework for evaluating and incorporating new experiences and information. This knowledge can be explicit, tacit, autonomous or systemic (Nonaka and Takeuchi, 1995). Each of these dimensions can be source of competitive advantage and value creation (Spender, 1996; Grant, 1996a). Knowledge management can be seen as process that blends human knowledge and information assets available in an organization so that each individual comprehends them sufficiently to create added value. Several processes need to be managed and optimized using systemic approaches: knowledge creation, renewal and usage (Bhatt, 2000; Wiig, 1997) and knowledge acquisition and transformation (Bhatt, 2000).

Organisation's knowledge can be generated either internally or externally, (Caloghirou *et al.*, 2004). As both are necessary for firms to expand their knowledge stock, firms should be focused in organisational learning processes by which knowledge is increased and transformed into their knowledge system.

According to Nonaka and Takeuchi (1995) and Grant (1996a), knowledge management includes three main bodies that should be integrated within the organisation's knowledge: the generation, transfer and utilisation of knowledge.

Knowledge and knowledge-related capabilities are considered as a crucial source of competitive advantage (Grant, 1996b). Although Nonaka and Takeuchi (1995) and Nonaka *et al.* (2000) have conceptualised the theory of knowledge creation through the SECI process and the Ba concept, Nonaka and Toyama (2003) contend that we are still far from a general understanding of the process in which an organisation creates and utilises knowledge.

According to the traditional organisation theory, the firm is viewed as an organisation-processing machine that takes and processes information from the environment. In this way a manufacturing firm may brake down its production process into several simple tasks in order to accomplish its final objective, which is a very passive and static view of the organisation. This view fails to capture the interactive, dynamic process between the members of the organisation and the external environment. Additionally, the hyper-competitiveness of the knowledge economy (D'Aveni, 1994) has forced many firms to tap their resources and knowledge from the networks of inter-organisational relationships they are involved with (Rothwell, 1994; Powell *et al.*, 1996).

Knowledge management has become a key-business concern as organisations are viewed as knowledge producing, sharing and dissemination entities (Cecez-Kecmanovic, 2005; Grant, 1996b). Knowledge creation has addressed how the focal firm learns from the partner by gaining access to skills/resources it does not possess (Mowery *et al.*, 1996; Simonin, 1999). Knowledge absorption has focused on the firm's capacity to internalise knowledge (Cohen and Levinthal, 1990; Szulanski, 1996). Collaborative knowledge has focused on the development of skills for the formation of collaborative alliances (Simonin, 1997).

Knowledge capabilities are viewed from the dynamic capabilities perspective, which is a further extension of the resource-based view of the firm. Within this dynamic approach both knowledge and learning have the following intangible characteristics: are valuable and rare, and have imperfect imitability, imperfect substitutability and limited mobility (Barney, 1991; Amit and Schoemaker, 1993). As a consequence, the capacity of a firm to renew its competencies and resources depends on the articulation of the firm's internal resources to the changing business environment.

The literature on knowledge capabilities involves key concepts in the development, integration, communication and sharing of knowledge that can be separated on two main streams: knowledge transfer-oriented and interaction-oriented capabilities (Kreis-Hoyer and Gruenberg-Bochard, 2006).

Knowledge transfer-oriented capabilities depend on both the firm's absorptive capacity and the firm's transmissive capacity (Husman, 2001). The absorptive capacity refers to the firm's ability to understand the knowledge received by the partner and internalise this new knowledge as part of the firm's own knowledge stock (Cohen and

Levinthal, 1990). On the other hand, the transmissive capacity refers to the capacity of the firm to effectively communicate knowledge to other firms (Husman, 2001).

The absorptive capacity enables firms to scan the evolution of all technological progress and adopt it in order to remain at the forefront of relevant knowledge. The higher the absorptive capacity of the firm, the better the firm is at both understanding the knowledge received and preparing the knowledge transfer (Husman, 2001). In interactive learning processes, the absorptive capacity underpins the knowledge base of the firm, which in turn is essential for the recombination of the internal knowledge with partners' knowledge. Clearly, the absorptive capacity can be considered a dynamic capability that influences the firms' ability to build other organisational capabilities and thus, an enabler of superior performance (Lubatkin *et al.*, 2001).

Although building a strong absorptive capacity is important, learning from external entities is also important (Vanhaverbeke *et al.*, 2002). In turbulent environments alliances seem to be the most preferred option *vis-à-vis* merger and acquisitions (Davenport and Prusak, 1988; Inkpen, 2002).

Alliance-building with suitable partners is interesting for organisational learning: it accelerates capability development, it reduces time and risk involved in developing new products and technologies, it creates synergistic effects leading to new knowledge that neither partners could access independently and it reduces costs and risks among partners (Grant and Baden-Fuller, 1995; Doz and Hamel, 1988). The complementarity of both partners is important in order to avoid opportunistic behaviour (Mody, 1993)

Interaction-oriented capabilities are those mechanisms that help firms to engage in the acquisition, sharing and dissemination of the external body of knowledge (Gruenberg-Bochard and Kreis-Hoyer, 2005). The mutual understanding and trust that emerge between partners is an important mechanism to configure, share and implement interaction-oriented capabilities.

One of the effects on interaction-oriented capabilities is that the knowledge base of the partners in a learning alliance is larger than the knowledge base of the firms not involved in a learning alliance (Shoenmakers and Duysters, 2006)

Knowledge capabilities in networks, alliances and SBRs

The importance of vertical networks has been emphasised by Lamming (1993), Ford *et al.* (2003) and Araújo *et al.* (1999) due to the complementarity of the resources and activities of their actors and to their evolving nature.

The importance of learning in SBR has been studied by Von Hippel (1988) and Simonin (1997, 1999). Recent works on catching-up countries indicate that close co-operation and learning are very important in the supply-chain (Humphrey and Schmitz, 1996; Costa and Queiroz, 2002; Moreira, 2005).

Ford *et al.* (2003) claim that the definition of relational objectives is essential for the management of the supply base. For Araújo *et al.* (1999) the quality of the relationship is strongly influenced by the technical interdependencies between buyers and clients. From the client's point of view the following resources were put forward to deepen the co-operation with suppliers (Lamming, 1993; Hutt and Speh, 1998; Håkansson *et al.*, 2004):

- the increase of the flexibility and the capacity to take on new opportunities;
- the reduction of transaction and production costs; and
- the access to specialised technical knowledge.

Several authors have presented alliances, networks and SBRs as interesting options to tap for internal knowledge shortcomings (Mothe and Quélin, 2000; Simonin, 1997; Inkpen, 1998; 2002; Koza and Lewin, 2000; Van Gils and Zwart, 2004). Nevertheless, the importance of alliances in the context of knowledge acquisition and learning involving SMEs is still very little (Liao *et al.*, 2003; Van Gils and Zwart, 2004).

The academic literature on knowledge has favoured large firms (Contractor and Lorange, 2002; Allen *et al.*, 2007, Doz and Hamel, 1988; Dyer and Singh, 1998; Inkpen and Dinur, 1998; Kale *et al.*, 2000) and no single theory on knowledge has been put forward involving small firms (Atherton, 2003). Another criticism about knowledge alliances is that those studies tend to value the selection of partners in order to learn from them. Nevertheless, one question remains: can SMEs select their partners or are SMEs selected by them?

Kale *et al.* (2000) and Inkpen and Dinur (1998) have identified the following main objectives in learning alliances:

- the acquisition of useful knowledge for the design and management of alliances;
- the access of knowledge and skills of partner firms;
- the access and/or internalisation of critical competencies of partner firms; and
- the generation of knowledge that can be used for both firms to improve their strategies and operations.

The interaction between MNEs and their local suppliers is conditioned by expectations and former experiences of both actors (Brennan and Turnbull, 1999; Dubois and Pedersen, 2001). Buyers normally interfere with suppliers' practices and performance imposing quality standards and audits, product and process specifications and delivery/logistics characteristics that are difficult for suppliers to fulfil. Accordingly, suppliers are pressed to upgrade its technological capacity in order to remain reliable suppliers. On the other hand, buyers need to transfer technical, managerial and knowledge capabilities/skills to their buyers in order for them to comply with international, best-practice standards.

The knowledge base is important for both the client and the supplier. For the multinational client the focus hinges on stimulating change so that the suppliers can meet specifications to compete at international, best-practice standards. For the supplier the challenge is on developing a learning strategy in order to add value in this dyadic relationship and therefore secure its position in the international supply chain. This interactive relationship is based on a reciprocal approach. The supplier emphasises an absorptive capacity approach in order to acquire new capabilities and to develop internal organisation learning processes (Mowery *et al.*, 1996; Cohen and Levinthal, 1990) and therefore by enlarging its knowledge base and the knowledge potential of the dyad. The client emphasises an interactive-oriented capability approach in order to help the supplier to capture, share and apply external knowledge (Gulati, 1998; Simonin, 1999).

According to Inkpen (1998) alliances and SBRs provide firms with an unique opportunity to leverage their strengths with the help of the partner's knowledge. Although the research on knowledge has grown steadily during the last decade, especially on large firms and on high technology sectors, little is known about knowledge acquisition and learning processes among SMEs (Liao *et al.*, 2003; Van Gils

and Zwart, 2004). Research involving alliances between SMEs and large firms is also scattered. Therefore, this research project aims at widening the existing literature on SME knowledge alliances and also at identifying identify the knowledge capability flows between MNEs and SMEs in SBRs.

Objectives and methodology of the study

As mentioned in previous sections the knowledge capability flows in SBR is multifaceted and depends on the varied approaches followed by different actors in diverse economic settings.

The importance of this study lies in the complementarities between MNEs and local SMEs. If domestic SMEs can internalise knowledge in their relationship with MNEs, then FDI policies can be used to diminish the technological gap between not only firms but also nations. Consequently, the dyadic MNE-SME relationship can be used to strengthen the competitive advantages of SMEs as well as to transfer knowledge capabilities from developed countries to less favoured ones. Although finding a solution is certainly beyond the scope of this work, this research will hopefully help to clarify the SME-MNE relationship.

The purpose of this paper is to understand whether/how foreign MNEs in Portugal have shaped knowledge capability flows to indigenous Portuguese SMEs and to assess those patterns. The study will try to identify how indigenous SMEs have evolved through time acquiring and accumulating knowledge and how MNEs are contributing to the transfer of knowledge capability flows to domestic firms.

The methodology used to carry out this research was explorative in nature and was based in four case studies' qualitative data, collected from semi-structured, in-depth interviews. Case studies were used to address relational and context-specific factors. Therefore, the objective of this work is to find out the major contribution of both actors in SBR and to pave the way for subsequent studies dealing with the intricacies of less-favoured settings involving small and medium-sized firms.

As the purpose of the paper is to explore situations that are not clear and may have different outcomes, the case study design is recommended (Yin, 1994).

Firms were selected from different industries – electronics, footwear and automobile – in order to maximise the possible differences between cases. The buyers were selected among the largest MNEs of the previously mentioned three industries and the suppliers were selected among the set of domestic firms supplying to those MNEs.

While the identification of the producers was carried out through secondary information, the identification of the suppliers was based on information released by MNEs during the interviews.

The gathering of data was carried out through *in loco*, semi-structured, tape-recorded interviews at both MNEs and suppliers' sites. The use of semi-structured interviews allowed the researcher to explore the interviewees' points of view as well as to understand the knowledge capability flows at inter-firm level.

Four case studies have been selected to address the specificities in the upgrading capabilities in the SBR in order to evaluate organisational and inter-firm learning and to explore the different methods and practices found.

Description of case studies

The ensuing cases were conducted taking into account NPD projects and quality management practices between domestic suppliers and large multinational firms. The objective was to assess the supplier's knowledge transfer-oriented capabilities and the buyer's interaction-oriented capabilities in the SBR.

Firm A (FA)

It is a family business with 32 employees that produces stamped metallic parts for several multinational companies of the electronics industry. Its main client is a German car-radio multinational company. Its engineering and quality department has seven resident engineers of which three of them work closely with this client. FA has been co-operating with its main client in the development of new products. It fulfils the ISO 9002 standards and its two main clients consider FA as the preferred supplier.

As FA produces metallic stamped piece-parts it usually follows its client' specifications regarding new product proposals. About two to three of its new products are derivatives and all the development phases, from concept to ramp-up production, are led by the car-radio producer. FA is involved in the NPD process after its client has started the product concept phase but before the prototype phase. There is plenty of information exchange with its main client in terms of product cost, product quality, production processes and NPD procedures. JIT delivery is currently on practice (FA's premises are less than a mile away from its main client).

The NPD process is technically co-ordinated by the multinational client and within FA by a project manager (the head of the engineering and quality department) who implemented a cross-functional team that oversees the entire project.

During the NPD project, problem-related information is both required informally and formally. The former takes place when, for example, employees at FA report problems to project and functional managers. As a consequence, when the project manager calls a meeting to obtain a better solution and to spread information about results/changes to other functional areas the informal share and dissemination of information and knowledge is present. The formal way takes place during the three-stage process meetings with the client and at the review meetings held every two months in order to detect and correct any errors between project phases.

FA has managed to acquire knowledge on a project-by-project basis from its multinational client as all information from product cost, product quality, pilot production and ramp-up production is formally acquired through documents. Internally, the client's generated documentation has opened a window of opportunity for generating explicit knowledge through an interaction-oriented learning, which is used for the generation of future NPD projects.

Internally, and due to the small size of FA, face-to-face meetings between individuals, functional managers and the project manager are extensively used to embed both the tacit generated knowledge internalised by all internal meetings and the explicit knowledge internalised by the contact with the multinational client.

The creation of brand new solutions is quite difficult for FA as stamped metallic parts are one of many components of the car-radio (the client's final product), that it is also part of the car dashboard, which is designed and developed by the car manufacturer project team. Although FA is committed to strengthen the relationship

with its client, it foresees an evolution towards a product-specialist/partner relationship as being difficult due to the following two facts:

(1) Car-radio development decisions take place two levels downstream in the supply chain.

(2) Car-radio metallic parts are not considered as strategic parts in the design phase.

Therefore, it can be argued that although FA has a reactive product development type due to the non-strategic nature of the component, it has managed to abandon a dependent strategy and to increase value for its clients in the supply chain.

In terms of quality, FA initiated a quality management programme in the early 1990s and in 1998 received the ISO 9002 certificate and the ISO 9001 in 2003.

Although FA's quality management system was initially developed as a response to the pressure exercised by its multinational clients, FA's culture went through a major turnaround as quality management programs allowed not only the internalisation of quality practices into the firm but also the sharing of the practices among all members of the firm. In short, writing the procedures helped to externalise a great deal of tacit knowledge existing among employees and allowed the firm to improve its absorptive capacity as it could respond more adequately to the challenges posed by its multinational clients. Finally, it underpinned FA's transmissive capacity to efficiently communicate knowledge internally and externally.

Firm B (FB)

FB is an SME located in northern Portugal. It produces prototypes and specialised solutions based on automation for a diversified group of clients. Its main customers belong to the automobile and electronics industries. Its innovation department has seven people.

FB was founded in the 1980s by three former employees of a multinational company who signed a supply agreement with their former employer. Although at the beginning FB was strongly dependent on its former employer as 90 per cent of its production went straight to that client, it managed to diversify its client base and in 2005 produced a wide range of automation equipment/solutions for several multinational companies in Portugal and abroad.

FB has a diversified portfolio of clients and defines its core competence as the creation of prototypes and automation-based solutions, the competence to solve its customers' problems being its main competitive advantage. The following products exemplify FB's competencies:

- two integrated production flow-lines for a German firm, which involved one subsidiary in Portugal and another in Germany;
- a transformation and recycling unit for a Portuguese hospital; and
- an automated flow-line for a Japanese car manufacturer in Portugal.

Its NPD process consists on customising solutions for its clients. FB is engaged on the creation of new solutions and has a functional project management organisation. Its approach is quite simple: the NPD process begins with the client's formal request and involves the creation of a cross-functional, inter-firm team in order to avoid ill-defined

project scopes. A feasibility study is prepared and when a pre-project is approved by the client a contract is signed. Projects last between two months and one year.

Knowledge about product/project developments started when the three owners worked for a multinational firm in which they were able to internalise the firm's knowledge as they worked in the process automation at the engineering department.

At FB they managed to apply their knowledge, when the firm was outsourced by their former employer. As the firm was growing it was possible to diffuse knowledge internally trough the SECI spiral in which the sharing and creation of tacit knowledge led to its articulation, systematisation, application and explicitation. Finally, the embodiment of this knowledge took place due to the interactions generated within FB' social structures.

As FB is project-oriented the formality of its NPD process is flexible for each contract (though there are clear internal procedures). The project team is led by a project manager who is in charge of the relationship with the clients.

Following a diversification strategy, FB has managed to deal with different realities and social structures. As a consequence, the firm has managed to acquire and internalise new knowledge on a project-by-project basis.

As the projects are contract-driven and client-oriented, functional conformance of prototypes/flow-lines involve an "atmosphere embeddedness" in which collaboration with the client's personnel shapes what they do. They also help developing a sense of communal metacapabilities as end products must be:

- functionally meaningful for the client;
- the result of a mutual engagement of different practices; and
- the result of both firms skills' commitment.

Thus, bearing in mind that each new product/project is a social practice process involving broad understanding and supportive learning, which is new for each different product/project, there are far reaching implications for learning as it involves learning-by-doing, learning-by-interacting, learning-by-experiencing and learning-by-belonging to the new reality.

FB's quality policy has been very peculiar. Since the mid 1990s the firm had implemented quality management programmes to standardise their practices. But as the company follows a project-oriented strategy it never felt the pressure of a quality ISO-certified demand. In 2001, FB changed its policy and ISO certification was considered not only a promotion of the firm's image but also an upgrading of the standardisation of the internal routines. As a consequence of this change of spirit, in 2003, FB obtained the ISO 9001 certification.

Firm C (FC)

FC is a Portuguese firm founded in the 1950s. It has about 350 employees and a sales volume of 19 million €. FC manufactures plastic parts for the automobile, electronics and home appliance industries. In the late 1980s, it started the production of parts for the auto industry. Until 1990, FC was basically a production-centred firm based on its strong product quality and product cost advantages. In the early 1990s, FC's strategic intent changed and today FC is one of the leading firms in the conception of plastic parts, with almost 80 per cent of its product portfolio being devoted to the vehicle industry.

FC has managed to evolve in the NPD process. It creates new concepts with the clients' involvement, which clearly represents an important evolutionary step in FC's technological ladder.

The firm's technology base evolved from a passive to an active product-engineering base as the firm has managed to accumulate knowledge in its relationship with its clients, which enabled FC to create new concepts for carmakers according to their volumetric constraints.

FC has managed to design and produce dashboards for two large German automakers. This means that FC has managed to evolve from an OEM to an Own Design Manufacture (ODM) approach. In the future it is expected that the firm can evolve to deeper, more intertwined relationship in the supply chain due to their design capabilities.

FC's NPD process is formalised and documented according to ISO 9001, QS 9000 and VDE 6.4 standards. This highly formalised NPD process is based on a customer-focused multifunctional team, led by a heavy-weigh product manager and takes five phases with tasks and milestones.

To obtain integration during project planning, Quality Function Deployment (QFD) and Failure Modes and Effects Analysis (FMEA) tools are implemented in order to minimise the departmental integrative problems. Equally important are the tests and prototypes made during the project, which used in conjunction with FMEA and QFD tools are accounted for more than 90 per cent of the problems detected before production ramp-up.

FC has managed to accumulate knowledge throughout time. Before 1990 FC was particularly concentrated on the acquisition of information and knowledge concerning problems of production and quality management as key success factors were related to product quality and cost. With the new strategic intent FC hired and experienced PhD to head the development and engineering department, now with 39 employees. From a project-type mix of 85/15/0 (derivative/platform/novelty) in 1990 it changed to a 12/70/18 mix in 2005. This major change was possible through informal and formal paths. Informally, the project manager facilitated the dissemination of solutions to problems through a series of meetings involving inter-functional areas at project milestones and through personnel training. Formally, demonstrations of FMEA and QFD results were extensively used at milestones and checkpoints to discuss and solve problems and to validate project results.

The dominant project manager played a fundamental role as he not only integrated all functions but also disseminated information and knowledge through functional teams. The project manager was also responsible for the continuous improvement of NPD processes. Accordingly, the quality manual, seminars displaying QFD and FMEA results were implemented to address specific problems and solutions and to integrate them in future projects.

Face-to-face contacts with external consultants and representatives of the client team were specifically addressed as opportunities to improve FC competencies/knowledge to serve the client. For example the first time FC was involved in the concept design of a dashboard all steps and milestones were recorded and subsequently analysed to study the volumetric and aesthetic focus of the client. After that FC developed performance indicators to achieve better results in future projects.

During the 1980s, FC developed quality management conscientiousness when it started supplying the automotive industry and, though some quality management programmes were implemented in the early 1990s, FC only embarked on a quality management policy certification as a response to its main client's pressure.

The different quality management programmes and certifications FC is engaged in helped the firm to familiarise itself with new quality approaches and provided an additional know-how and skills to carry out the general best-practices used on the automotive industry, which were subsequently internalised by FC. The main mechanisms used by FC's clients to transfer capability flows to FC were the following ones:

- product and process related specifications;
- annually negotiated improvement plans (cost, quality and delivery);
- quality management systems manuals;
- supplier assistance service and auditing;
- meetings and seminars; and
- training and visits.

Clearly, explicit knowledge mechanisms played a major role in the transfer of knowledge in the SBR. Nevertheless, some tacit and operational knowledge about how to carry out certain changes and to implement important improvements paved the way for the implementation of explicit knowledge.

Firm D (FD)

Founded in 1978, FD is a family firm employing 130 people. From the beginning and due to financial limitations the firm survived buying second-hand production equipment. Only in 1988 FD managed to buy its first brand new production equipment.

FD produces packages and labels, both in cartoon and paper, for the food, footwear and textile industries. Its turnover is around 10 million € and exports directly 38 per cent of its production mainly to Great Britain.

FD supplies the two largest shoemakers in Portugal, which are foreign multinational firms. As the Portuguese market is extremely competitive due to its small size, FD soon tried to internationalise. Of its market, 60 per cent of the share belongs to the footwear industry.

Although price seems to be very important due to the competition from Far-East players, quality and quick response to market seems to be differentiating factors especially *vis-à-vis* the lack of quick response from Asian competitors.

Product design is in 65 per cent of the cases derivative in nature and the other 35 per cent correspond to brand new developments. The design is the client's responsibility for the two largest multinational clients. FD receives the specifications and prepares the sample and after the client's approval the quality department takes over responsibility. When the product is developed in-house, NPD is managed by the quality department following a thee-stage process.

In 2000, the firm obtained the ISO 9002 quality registration. In 1996, FD started the ISO certification but it was put off, due to the discrepancies between the organisational culture and the formality of the quality certification process. Only in 1999 a new push from the owner was crucial to a new pro-active approach to quality. Clearly, the

top-management saw an opportunity to flag quality as a competitive marketing weapon without disentangling the major change the operational culture shift the firm needed to go through. Although, in 1996, FD aimed at ISO 9001 the firm decided to file for the ISO 9002 certificate.

Knowledge from its MNE client has been poor. It has been particularly acquired from an informal strand whenever employees meet clients to analyse problems and information in meetings. Knowledge has come the formal way through inspection reports of batches received by the client and from the measures of conformance. The quality department has had an important role disseminating knowledge within FD as quality staff is responsible for analysing and implementing new improvements (on quality policy as well as on the NPD process).

The transmissive knowledge capacity of multinational client has been very limited as the SBR is not based on a continuous and interactive quality management practices as described on the other case studies and joint NPD is very reactive.

FD's quality policy played an important role in the formalisation of the organisational work, which helped to standardise practices and formalise processes that otherwise were kept within individuals. In this way, tacit knowledge embedded in key personnel was diffused and externalised throughout the firm.

Discussion of the cases

The main variables of the project management process for each of the four cases are grouped in Table I. Tables II-V present the main findings that involve knowledge transfer-oriented and interaction-oriented capabilities as reported throughout the case studies.

Taking into account the cases descriptions and the characterisation of organisational learning in NPD and quality management process, the following can be considered:

- The production and NPD activities of this high-precision metallic stamped parts have led FA to underpin its position in the supply chain as product-specialist with an important role as co-producer. The project milestones and the participation of FA's members in the resolution of problems posed during NPD projects allowed them to acquire problem-related information and knowledge, which can be internally disseminated among members through documents and reports as well as tacitly. In this respect, the client's coordination leading role has helped FA not only to implement corrective actions but also to keep abreast of knowledge that otherwise would have been difficult to internalise.

  Quality manuals, training and seminars were important explicit knowledge mechanisms to transfer capabilities between firms in the SBR. Internal quality audits and the ISO certifications helped the firm to standardise practices and externalise tacit knowledge embedded within personnel.

- Firm C plays an important role in the SBR as it is involved from concept definition to ramp-up production in the NPD process. Its highly formalised NPD procedures are not only very well entrenched in the firm's quality manual but also linked to FMEA and QFD tools. In this way project and post-project learning occurs as data from previous projects are used in subsequent projects. The acquisition and dissemination of knowledge is codified allowing the transference of information and knowledge between teams in different time frames.

	Firm A	Firm B	Firm C	Firm D
Product line	High precision metallic stamped parts	Wide range of automation equipment/solutions	Plastic components (dashboards) for the auto industry	Packages and labels for the textile and shoe industries
Type of dominant product/project	Derivative/follow client	Brand new solutions according to client's specific needs	Platform/novelty products	Derivative
Main phases in NPD	Three-stage process with review meetings every two months	Internal procedures uses a stage-gate-based model but formal process depends on the customer process/request	Five phases with tasks and milestones	Phases follow customer's process
NPD team coordination	Joint client's coordinator and FA's project manager	Project leader of technical department	Senior product manager	Functional manager from quality department
Formality of NPD process	Standardised according to client's NPD process	Flexible for each project, but well defined procedures	Highly formalised procedures according to NPD management manual	Flexible according to client's needs
Main quality practices/policies	Internal quality audits; Quality circles; ISO 9002; ISO 9001	Post-project assessment of level of client satisfaction; Post-project follow-up to assure performance; ISO 9001	Suggestion box; *Kaizen*; QFD; FMEA; ISO 9002; ISO 9001; QS 9000; VDA 6.4; ISO 14000	ISO 9002

Table I.
Project management process

	Absorptive capacity	Transmissive capacity	Interaction-oriented capacity
	Self learning Contacts with clients Internalisation of client's NPD process Quality management policy Internal documents internalised from client's documents Formalisation of NPD process	Tacit and explicit knowledge interchanged with clients during the NPD process Information exchange in terms of product cost, product quality, production process and NPD process NPD meetings in each NPD phase NPD and quality management documents and blueprints from clients	Leader of the BSR and eager to enlarge relationship using supplier's NPD and quality capabilities Formalisation of NPD and quality management communications channels Organic NPD structure was extended through tacit and explicit knowledge to the supplier NPD internal routines and decision-making processes made explicit to suppliers Monitoring system made explicit what to expect from the client
Important elements	Organisational characteristics Cumulativeness of knowledge transferred (quality, cost, NPD) Strategic similarities between partners Institutional co-operative environment Higher flexibility Motivated staff to respond to new challenges posed by client		FA and its client were highly depended on each other's knowledge (mutual dependency) Tacit and explicit knowledge transferred Co-operative institutional atmosphere

Table II.
Knowledge transfer and interaction-oriented capacity involving FA in its SBR

	Absorptive capacity	Transmissive capacity	Interaction-oriented capacity
	Self learning Internalisation of project capabilities from former employer Contacts with clients Internalisation of client's NPD process Internalisation of client's new projects needs	Tacit and explicit knowledge interchanged with clients during the new project process New project meetings in several phases	Embedded atmosphere with client's personnel Importance of prototypes and project results
Important elements	Organisational characteristics Cumulativeness of knowledge transferred Motivated staff to respond to new challenges posed by clients new projects Ability to internalise new knowledge from consecutive projects		Mutual trust and dependency Tacit and explicit knowledge transferred Co-operative institutional atmosphere

Table III.
Knowledge transfer and interaction-oriented capacity involving FB in its SBR

	Absorptive capacity	Transmissive capacity	Interaction-oriented capacity
	Self-learning Contacts with clients Internalisation of client's NPD process and QFD and FMEA methodologies Quality management policy and manuals Internal documents internalised from client's documents Formalisation of NPD, QFD and FMEA processes	Product and process specifications Tacit and explicit knowledge interchanged with clients during the NPD process, which involved FMEA and DFD methods Information exchange in terms of product cost, product quality, production process and NPD process NPD meetings in each NPD milestones NPD and quality documents and blueprints from clients Training and visits to client's premises	Leader of the BSR and eager to enlarge relationship using supplier's NPD and quality capabilities Formalisation of NPD and quality management communications channels Organic NPD structure was extended through tacit and explicit knowledge to the supplier NPD internal routines and decision-making processes made explicit and transferred to suppliers Monitoring system made explicit what to expect from the client Supplier assistance service Audits to FC Annual improvements plans
Important elements	Organisational characteristics Cumulativeness of knowledge transferred (Quality, Cost, NPD, QFD, FMEA) Strategic similarities between partners Institutional co-operative environment Strong technical leadership Motivated staff to respond to new challenges posed by client		FC and its client were highly depended on each other's knowledge (mutual dependency) Tacit and explicit knowledge transferred Co-operative institutional atmosphere

Table IV.
Knowledge transfer and interaction-oriented capacity involving FC in its SBR

Supplying Ford and Volkswagen yielded FC a great deal of expertise in quality management tools as they provided technical assistance suggesting changes, providing training and auditing the quality process. The difficulties faced by FC were a change catalyst as FC embarked on a total management quality programme that helped the firm to improve its performance. This initial challenge helped FC to overcome the various challenges it has subsequently faced.

The highly formalised five-phased NPD procedure, with tasks and milestones, facilitates the acquisition, analysis and dissemination of product-related information, which underpins project-based learning. Another successful policy implemented by FC is that after the finalisation of a specific project, specific errors are circumscribed to the product/process and QFD and FMEA are subsequently re-assessed.

- FB's dominant product type requires a focus on project/system solutions. Different specific technologies/knowledge are integrated into the project solution in such a way that the real challenge of the project leader is making knowledge accessible to project members as the system functionality plays a crucial role.

	Absorptive capacity	Transmissive capacity	Interaction-oriented capacity
	Self-learning Contacts with clients Internalisation of client's new products needs Quality management policy	Tacit and explicit knowledge interchanged with clients during the new project process New project meetings in several phases	Leads the BSR but it is not willing to enlarge the relationship with FD Formalisation of NPD practices is very reactive. No organic relationships was formalised in upstream activities No monitoring system was implemented Atmosphere between actors is closer to market transactions than to an alliance
Important elements	Organisational characteristics Cumulativeness of knowledge transferred Motivated staff to respond to new challenges posed by clients new projects Ability to internalise new knowledge from consecutive projects		Co-operative institutional atmosphere was never reached Knowledge sharing atmosphere is hardly present

Table V.
Knowledge transfer and interaction-oriented capacity involving FD in its SBR

Despite the importance of the atmosphere embeddedness creation during the project, post-project learning is not a crucial issue for FB, as each project represents a different solution according to the client's needs and, quite often, subsequent projects have hardly any connection to the previous ones.

Quality management tools, though important to codify and standardise practices and processes, are seen as an important quality-based image creation tool.

The interaction-oriented capability of FA and FC's clients made possible the generation of a co-operative atmosphere between the supplier and the client. The tacit and explicit knowledge interchanged during the NPD process and through quality documents, audits and visits to clients' premises sparked off the knowledge transfer flows between the client and the supplier. Finally, the absorptive capability of the suppliers enabled the FA and FC's learning ability to internalise NPD, QFD, FMEA and quality management processes.

- Clearly, FB and FC behave differently regarding project and post-project learning approaches. While FB uses face-to-face contacts, meetings and clients' knowledge to create a system solution, FC uses more explicit knowledge as documents, FMEA and QFD reports to transfer knowledge between teams. Regarding post-project learning, FB's project specificity suggests that tacit knowledge is used to address future projects, while FC's projects knowledge absorption and transference for future projects is a key issue for the firm's survival, which is why FMEA and QFD reports and other documents are so important to transfer knowledge for future projects.

  Interaction-oriented capabilities of FB's client are poorer than FA and FC's. In this respect, while FA and FC's BSRs are continuously held, FB's relationships are based on a project by project base with different clients

- Although FD has a formal approach to manage in-house design activities its NPD relationship with its main multinational clients is derivative in nature.

  Despite its strong competencies in the production of packages for several industries, FD has not yet managed to convince its multinational client to accept its in-house product design capabilities and therefore follows a reactive strategy based on the client's requests.

  Although the internal accumulated experience of FD in the food industry is strong due to the safety standards requirements and to the importance of package communication, FD's main multinational clients have not been willing to take full advantage of FD's strong packaging capabilities.

  Regarding quality management policy the situation is very particular. On one side FD's multinational client has neither exercised strong pressures for quality standards achievements, as in the auto or electronics industries, nor introduced operational support or training. On the other side FD's disbelieve and passive acceptance of ISO quality management system has not yet helped the adequate integration and embodiment of new quality practices. Bluntly put, reciprocity has never been achieved in the BSR with its main multinational client.

  As a consequence, as interaction-oriented capabilities are very poor and a knowledge sharing atmosphere has never been achieved, FD's absorptive capacity has never been challenged as much as in the other case studies.

The case studies analysed present different realities. On the one hand, the relationship faced by FD seems to be the one with the less enriching environment for a learning-based strategy as FD and its multinational client have a task, input-based relationship that hinders an adequate share of knowledge. On the other hand, the relationship of FC, in the supply chain, with its multinational client is strongly enriched by a learning-based strategy that has underpinned FC's position over time.

In general, most of the learning, either tacit or explicit, has been used to improve the competitive position of the suppliers in the SBR through a strong client's interaction-oriented capability. NPD projects have underpinned the share of tasks and knowledge creating a borderless space in the relationship, which stimulates the share of knowledge-specific situations and underpins a transmissive capacity between both firms. In regard to this, FC's NPD teams have managed not only to learn more than the other three cases analysed but also to diffuse knowledge throughout the organisation. In addition, quality management systems helped to standardise practices and depersonalise processes in all firms. The strong quality conscientiousness of FC may be explained by the high level of pressure carmakers exercise, which helped FC to formalise a quality management policy, which by no means, were present on the other three situations.

In general, all suppliers were eager to internalise knowledge generated by the contracts held with their clients. Nevertheless, despite the strong willingness observed among suppliers a co-operative, knowledge sharing atmosphere is only reached when clients deploy strong interaction-oriented capabilities.

Conclusions and implications

This paper studied the importance of knowledge transfer-oriented and interaction-oriented capabilities in SBRs involving SMEs with their multinational clients. Although the analysis has highlighted successful co-operative relationships

involving SMEs and the knowledge-sharing atmosphere around successful cases, it also shows the important leading role exercised by powerful clients.

Taking into account earlier research findings (Liao *et al.*, 2003; Van Gils and Zwart, 2004), the results of this paper not only confirm the advantages of alliances for SMEs, but also has implications for theory and practice. Although it is clear that knowledge-sharing relationships are normally initiated by SMEs in order to sustain client satisfaction and to strengthen their core competencies, this work concludes that successful knowledge transfer among SBRs depends on the contextual setting in which takes place: firstly, they fitted best when both firms are tuned to a co-operative atmosphere based on mutual trust and dependency and secondly, they are doomed when clients do not deploy strong interaction-oriented capabilities with their suppliers.

As described before, suppliers have effectively internalised knowledge from their relationships with their multinational clients. Suppliers' strategy aimed at being an attractive and competent partner for their clients underpinning this strategy on the development, integration and sharing of knowledge within the organisation. This absorptive capacity ensured a continuous improvement of the supplier's knowledge-base in terms of NPD and quality practices, which increased its capacity to transmit knowledge to their clients, also promoting its potential to steer an on-going relationship embedded in an enlarged and dynamic experience.

Interaction-oriented capabilities – as the participation in NPD review meetings, fulfilment of procedures and milestones, stage-gate reviews, joint quality seminars, on-the-job training, lean production techniques, among others – exposed suppliers to new practices that further resulted in brand new organisational routines. First, in the further dissemination and application of management knowledge at inter-firm level, and secondly, in the generation of a better mutual understanding and trust that paved the way for a smoother SBR.

Although there are clear differences between the four cases analysed in the previous section the interactive-oriented capacity of foreign clients have sparked the intensification of general knowledge – general concepts such as total quality management, FMEA, etc. – and change knowledge – operating knowledge regarding certain processes such as how to analyse a quality system, how to implement quality circles or how to deploy NPD review milestones. This interactive-oriented capacity has been slow and costly as it requires careful interpersonal involvement and extensive learning-by-doing and learning-by-interacting and non-codified knowledge in the generation of new organisational routines at firm and inter-firm level.

Some of the differences between FD and the other three suppliers can be attributed to the lack of a strong involvement of FD's client in its interaction-oriented capacity when compared to the involvement of the other suppliers' clients. This different involvement in the SBR may be explained by the internal clients' capabilities, by the client's commitment in developing a win-win, symbiotic relationship with their suppliers and by the internal suppliers' capabilities.

Although interaction-oriented capabilities played an important role in SBR the supplier's absorptive capacity was crucial in the integration of external knowledge and in the acquisition and deployment of new capabilities that enabled the development of an internal organisational learning process that ensured the continuous improvement of the supplier knowledge base, also complementing the client's knowledge.

The adaptability of the SBR is much more successful when both firms behave as learning companies. This is reached when complementary knowledge ensures the mutual understanding between both firms and when the supplier yields an attractive position to participate as partner. Thus, the client must be willing to co-operate with the buyer in upstream activities in order that the interaction-oriented capabilities could be in action and the suppliers capable to learn and internalise knowledge from the relationship.

A practical implication in international contexts is that FDI can play a crucial role in diminishing the gap between less endowed economies and more advanced countries if public policies are tuned to support domestic suppliers in their relationship with large foreign MNEs.

This study has serious limitation: as it is based on a series of case studies its results cannot be generalised to all types of SBRs. Thus, the sample should be enlarged and include broader industrial settings and other types of relationships.

References

Allen, J., James, A. and Gamlen, P. (2007), "Formal versus informal knowledge networks in R&D: a case study using social network analysis", *R&D Management*, Vol. 37 No. 3, pp. 179-95.

Amit, R. and Schoemaker, P.J. (1993), "Strategic assets and organizational rent", *Strategic Management Journal*, Vol. 14, pp. 33-46.

Araújo, L., Dubois, A. and Gadde, L.-E. (1999), "Managing interfaces with suppliers", *Industrial Marketing Management*, Vol. 28, pp. 497-506.

Atherton, A. (2003), "The uncertainty of knowing: an analysis of the nature of knowledge in a small business context", *Human Relations*, Vol. 56 No. 11, pp. 1379-98.

Barney, J.B. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.

Bartlett, C. and Goshal, S. (1986), "Tap your subsidiaries for global reach", *Harvard Business Review*, Vol. 64 No. 6, pp. 87-94.

Bhatt, G. (2000), "Organizing knowledge in the knowledge development cycle", *Journal of Knowledge Management*, Vol. 4 No. 1, pp. 15-26.

Brennan, R. and Turnbull, P.W. (1999), "Adaptive behavior in buyer-supplier relationships", *Industrial Marketing Management*, Vol. 28, pp. 481-95.

Caloghirou, Y., Kastelli, I. and Tsakanikas, A. (2004), "Internal capabilities and external knowledge sources: complements or substitutes of innovative performance?", *Technovation*, Vol. 24, pp. 29-39.

Cecez-Kecmanovic, D. (2005), "A sensemaking theory of knowledge in organizations and its application", in Davis, J., Subrahmanian, E. and Westerberg, A. (Eds), *Knowledge Management: Organizational and Technological Dimensions*, Physica-Verlag, Heidelberg, pp. 55-74.

Cohen, W. and Levinthal, D. (1990), "Absorptive capacity, a new perspective on learning and innovation", *Administrative Science Quarterly*, Vol. 35, pp. 128-52.

Contractor, F. and Lorange, P. (2002), *Cooperative Strategies and Alliances*, Elsevier, Amsterdam.

Costa, I. and Queiroz, S. (2002), "Foreign direct investment and technological capabilities in Brazilian industry", *Research Policy*, Vol. 31, pp. 1431-43.

D'Aveni, R.A. (1994), *Hypercompetition: Managing the Dynamics of Strategic Manoeuvring*, The Free Press, New York, NY.

Davenport, T. and Prusak, L. (1988), *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Boston, MA.

Doz, Y. and Hamel, G. (1988), *Alliance Advantage*, Harvard Business School Press, Boston, MA.

Dubois, A. and Pedersen, A.-C. (2001), "Why partners do not fit into purchasing portfolio models", *Proceedings of the 10th IPSERA International Conference, Jönköping*.

Dyer, J.H. (1996), "Specialised supplier networks as a source of competitive advantage: evidence from the auto industry", *Strategic Management Journal*, Vol. 15, pp. 271-91.

Dyer, J.H. and Singh, H. (1998), "The relational view: cooperative strategy and sources of interorganizational competitive advantage", *Academy of Management Journal*, Vol. 23, pp. 660-79.

Ernst, D. and Kim, L. (2002), "Global production networks, knowledge diffusion, and local capability formation", *Research Policy*, Vol. 31, pp. 1417-29.

Ford, D., Gadde, L.-E., Häkansson, H. and Snehota, I. (2003), *Managing Business Relations*, John Wiley & Sons, Chichester.

Grant, R.M. (1996a), "Toward a knowledge-based theory of the firm", *Strategic Management Journal*, Vol. 17, pp. 109-22.

Grant, R.M. (1996b), "Prospering in dynamically-competitive environments: organizational capability as knowledge integration", *Organization Science*, Vol. 7, pp. 375-87.

Grant, R.M. and Baden-Fuller, C. (1995), "A knowledge-based theory of interfirm collaboration", *Proceedings of the Academy of Management Conference, Vancouver, BC, August*, pp. 17-21.

Gruenberg-Bochard, J. and Kreis-Hoyer, P. (2005), "The development of 'knowledge-networking capability' in small and medium sized enterprises", paper presented at the VVI ISPIM Annual Conference, Porto, June 19-22.

Gulati, R. (1998), "Alliances and networks", *Strategic Management Journal*, Vol. 19, pp. 293-317.

Håkansson, H. and Johansson, J. (2001), *Business Network Learning*, Elsevier, Oxford.

Håkansson, H., Henjesand, I.-J. and Waluszewski, A. (2004), "Rethinking marketing", in Häkansson, H., Harrison, D. and Waluszewski, A. (Eds), *Rethinking Marketing – Developing a New Understanding of Markets*, Wiley, London, pp. 1-12.

Humphrey, J. and Schmitz, H. (1996), "The triple C approach to local industrial policy", *World Development*, Vol. 24 No. 12, pp. 1859-77.

Humphrey, J. and Schmitz, H. (2001), "Governance in global value chains", *IDS Bulletin*, Vol. 32 No. 3, pp. 19-29.

Husman, T.B. (2001), *Efficiency in Inter-organisational Learning: A Taxonomy of Knowledge Transfer Costs*, WP2001-4, Department of Economics and Strategy, Copenhagen Business School, Copenhagen.

Hutt, M.D. and Speh, T.W. (1998), *Business Marketing Management: A Strategic View of Industrial and Organizational Markets*, Dryden Press, London.

Inkpen, A. (1998), "Learning, knowledge acquisition, and strategic alliances", *European Management Journal*, Vol. 16 No. 2, pp. 383-97.

Inkpen, A.C. (2002), "Learning, knowledge management, and strategic alliances: so many unanswered questions", in Contractor, F. and Lorange, P. (Eds), *Cooperative Strategies and Alliances*, Elsevier, Amsterdam, pp. 267-89.

Inkpen, A. and Dinur, A. (1998), "Knowledge management processes and international joint ventures", *Organization Science*, Vol. 9 No. 4, pp. 454-68.

Kale, P., Singh, H. and Perlmutter, H. (2000), "Learning and protection of proprietary assets in strategic alliances: building relational capital", *Strategic Management Journal*, Vol. 21 No. 3, pp. 217-38.

Koza, M. and Lewin, A. (2000), "Managing partnerships and strategic alliances: raising the odds of success", *European Management Journal*, Vol. 18 No. 2, pp. 146-51.

Kreis-Hoyer, P. and Gruenberg-Bochard, J. (2006), "The use of knowledge in interorganisational knowledge-networks: an empirical investigation", *International Journal of Technology Management*, Vol. 33 Nos 2/3, pp. 196-213.

Lamming, R. (1993), *Beyond Partnership: Strategies for Innovation and Lean Supply*, Prentice-Hall, London.

Liao, J., Welsch, H. and Stoica, M. (2003), "Organizational absorptive capacity and responsiveness: an empirical investigation of growth-oriented SMEs", *Entrepreneurship Theory and Practice*, Vol. 28 No. 1, pp. 63-85.

Lubatkin, M., Florin, J. and Lane, P. (2001), "Learning together and apart: a model of interfirm learning", *Human Relations*, Vol. 54, pp. 1353-82.

Lynn, G. (1998), "New product team learning: developing and profiting from your knowledge capital", *California Management Review*, Vol. 40 No. 4, pp. 74-93.

McEvely, B. and Zaheer, A. (1999), "Bridging ties: a source of firm heterogeneity in competitive capabilities", *Strategic Management Journal*, Vol. 20, pp. 133-56.

Mody, A. (1993), "Learning through alliances", *Journal of Economic Behaviour and Organization*, Vol. 20, pp. 151-70.

Moreira, A.C. (2005), *Acumulação Tecnológica no Relacionamento com Multinacionais. A Experiência Portuguesa*, Publismai, Maia.

Mothe, C. and Quélin, B. (2000), "Creating competencies through collaboration: the case of Eureka R&D-consortia", *European Management Journal*, Vol. 18 No. 6, pp. 590-604.

Mowery, D., Oxley, J. and Silverman, B. (1996), "Strategic alliances and inter-firm knowledge transfer", *Strategic Management Journal*, Vol. 17, pp. 77-91.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-creating Company*, Oxford University Press, New York, NY.

Nonaka, I. and Toyama, R. (2003), "The knowledge creating theory revisited: knowledge creation as a synthesizing process", *Knowledge Management Research and Practice*, Vol. 1, pp. 2-10.

Nonaka, I., Toyama, R. and Konno, N. (2000), "SECI, Ba and leadership: a unified model of dynamic knowledge creation", *Long Range Planning*, Vol. 33, pp. 1-31.

O'Donnell, S. and Blumentritt, T. (1999), "The contribution of foreign subsidiaries to host country national competitiveness", *Journal of International Management*, Vol. 5, pp. 187-206.

Powell, W., Koput, K. and Smith-Doerr, L. (1996), "Interorganizational collaboration and the *locus* of innovation: networks of learning in biotechnology", *Administrative Science Quarterly*, Vol. 41, pp. 116-45.

Rothwell, R. (1994), "Towards the fifth-generation innovation process", *International Marketing Review*, Vol. 11 No. 1, pp. 7-31.

Shoenmakers, W. and Duysters, G. (2006), "Learning in strategic technology alliances", *Technology Analysis and Strategic Management*, Vol. 18 No. 2, pp. 245-64.

Simonin, B.L. (1997), "The importance of collaborative know-how: an empirical test of the learning organisation", *Academy of Management Journal*, Vol. 40 No. 5, pp. 1150-74.

Simonin, B.L. (1999), "Ambiguity and the process of knowledge transfer in strategic alliances", *Strategic Management Journal*, Vol. 20, pp. 595-623.

Spender, J.C. (1996), "Making knowledge the basis of a dynamic theory of the firm", *Strategic Management Journal*, Vol. 17, pp. 45-62.

Szulanski, G. (1996), "Exploring internal stickiness: impediments to transfer best-practices within the firm", *Strategic Management Journal*, Vol. 17, pp. 27-43.

Van Gils, A. and Zwart, P. (2004), "Knowledge acquisition and learning in Dutch and Belgian SMEs: the role of strategic alliances", *European Management Journal*, Vol. 22 No. 6, pp. 685-92.

Vanhaverbeke, W., Duysters, G. and Noorderhaven, N. (2002), "A longitudinal analysis of choice between technology based strategic alliances and acquisitions in high-tech industries: the case of ASIC industry", *Organization Science*, Vol. 13 No. 6, pp. 714-33.

Varum, C.A. (2005), "International buyer-seller relationships, transfer of knowledge and local suppliers' capability", in Tavares, A. and Teixeira, A. (Eds), *Multinationals, Clusters and Innovation. Does Public Policy Matter?*, Palgrave, London, pp. 234-52.

Von Hippel, E. (1988), *The Sources of Innovation*, Oxford University Press, Oxford.

Wiig, K. (1997), "Knowledge management: an introduction and perspective", *Journal of Knowledge Management*, Vol. 1 No. 1, pp. 6-14.

Yin, R.K. (1994), *Case Study Research: Design and Methods*, Sage Publications, London.

About the author

António Carrizo Moreira received his degree in Electrical Engineering and a Master in Management from the University of Porto, Portugal. He holds a PhD from UMIST (now University of Manchester), England. He is Assistant Professor at DEGEI, University of Aveiro, Portugal. António Carrizo Moreira can be contacted at: amoreira@ua.pt