Upstream linkages between TNCs and local suppliers: evidences from Portugal

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Abstract: This paper explores the development of long-term, close relationships that are likely to influence the relationship between Transnational Corporations (TNCs) affiliates and their local suppliers. Based on the interdependencies between six industrial foreign subsidiaries and 26 local suppliers, it is possible to conclude that the complementarity between local suppliers and their TNC clients depends on two dynamics:

- on the technological trajectory created by the supplier towards the upper steps of the technological competence
- on the technological trajectory created by the transmissive capacity of the TNC client that helps their suppliers on their organisational transformation.

Keywords: industrialisation; Transnational Corporations; TNCs; Foreign Direct Investment; FDI; small-and medium-sized firms; vertical coordination; technological capabilities; Portugal.

Reference to this paper should be made as follows: Moreira, A.C. (2008) `Upstream linkages between TNCs and local suppliers: evidences from Portugal', *World Review of Science, Technology and Sustainable Development*, Vol. 5, No. 1, pp.28–48.

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1 Introduction

The erosion of barriers to international flows of goods, knowledge, and products has brought about new challenges for all firms as well as for public policy, namely in developing and sustaining competitive advantages in the international arena.

Foreign Direct Investments (FDIs) by TNCs exercise a crucial role all over the world. Despite its importance, there is still some controversy regarding FDI and its consequences. Those that contend that FDI affects host countries negatively defend that TNCs jeopardise the technological leadership of indigenous firms and drive them out of business. Others contend that multinationals drive local firms out of competition in host countries. Those supporting FDI argue that it should be considered as a beneficial factor as it is a source of capital, technology and new knowledge, especially for developing countries.

Although the controversy remains, the public debate on globalisation has focused its interest on the effects of TNCs on host countries, namely on clustering with local suppliers.

The impact of FDI on indigenous firms has been addressed from two different perspectives: while the first focuses on vertical spillover effects, i.e., throughout the value chain, the second one focuses on horizontal spillovers, i.e., to other firms and sectors. The conclusions of both strands point to opposite directions.

Although Wheatherspoon and Reardon (2003) and Farina and Reardon (2000) contend that the presence of foreign firms has negative implications on local suppliers, as they cannot comply with higher standards of supplied products, Gow and Swinnen (1998) and Dries and Swinnen (2004) found positive vertical impacts on domestic companies in the adoption of new technologies and in improved access to finance and product quality.

Hu and Jefferson (2002) and Liu (2002) found positive spillover effects because of benefits accrued from the introduction of new products and technologies and personnel turnover and diffusion to domestic firms. While Kokko et al. (1996) and Konings (2001) conclude that there are no significant effects, Aitken and Harrison (1999) defend that there is a negative effect on horizontal spillovers owing to the shrink of market share 'imposed' on local companies.

The establishment of backward vertical linkages between foreign investors and host country suppliers is at the core of the main concerns among policy-makers either in developing or in developed countries (Altenburg and Mayer-Stamer, 1999; Schmitz and Nadvi, 1999; Belderbos et al., 2001; Costa and Queiroz, 2002; Dries and Swinnen, 2004).

The aim of this paper is to address upstream industrial linkages between TNCs and their local suppliers and is specifically concerned with how local suppliers evolve in their relationship with their clients.

2 The transnationals

There is a vast literature about multinationals (Porter, 1986; Bartlett and Goshal, 1990; Ferdows, 1997). One common aspect of these classical studies is that they are centred on TNCs affiliates and use different typologies to characterise TNCs affiliates and the way the organisational alternatives are tackled vis-à-vis headquarters strategies.

The increasing globalisation of business has placed a major burden on most multinational structures towards the integration of their globally dispersed, value-adding activities. As a consequence, many foreign subsidiaries originally set up as a means of tackling host government policies and avoiding tariffs have undergone dramatic changes because this major economic shift made such operations increasingly uncompetitive. Accordingly, many subsidiaries' roles and expectations are broadening/narrowing according to their functional and/or product responsibility.

The role of subsidiaries has also been extensively studied. Bartlett and Goshal (1990) addressed affiliate roles and characterised their strategic importance, taking into account the strategic importance of the local environment and the affiliate's level of resources and capabilities, in four different ways: *Leaders*, *Contributors*, *Implementers* and *Black Holes*.

Birkinshaw (1996) shed new light in the evolutionary roles of subsidiaries mandates. He studied the changes (gain, development and loss) that occur over the life of a subsidiary mandate and concluded that firm-specific capabilities (distinctive value-added activities) and country-specific advantages (strategic-relatedness) are the most important reasons why some mandates are maintained and lost. Therefore, if a subsidiary wants to evolve over time from *black holes* or *implementers* to *contributors* or *leaders*, they must underpin their evolution on their distinctive capabilities and on their strategic-relatedness to the corporate business.

Andersson and Forsgren (1996) assessed subsidiaries embeddedness and concluded that the depth of interdependence with local counterparts – suppliers, customers, Higher Education Institutions (HEI), etc., might influence the degree of embeddedness and the degree of control of subsidiaries.

One point in common in all these studies is that the focus of the analysis is the multinational firm per se: they have addressed the subsidiary-headquarters relations and the evolutionary role of subsidiaries in the TNC system. Nevertheless, the relationship between the subsidiaries in host countries with their local counterparts remains unexplained. Equally important is that the relationship between local firms and foreign affiliates has not yet been properly addressed: it is not yet known either how foreign affiliates have contributed to the development of indigenous suppliers' technology or how the presence of 'adequate' local suppliers can contribute to the evolution of foreign affiliates and therefore underpin subsequent foreign investments.

As this paper is concerned with backward vertical linkages of TNC affiliates and is focused on the trajectory of host country suppliers, clustering and local upgrading are at the centre-stage of this paper.

The importance of clusters and locality covers three main strands. From business economics point of view, Porter (1990, 1998) emphasises the importance of the dynamism of leading firms, which arise from a constellation of local factors that underpin competitive advantage at global level. From the regional point of view, literature on innovative *millieu* (Maillat, 1996) and on industrial districts (Becattini, 1990) have focused on the importance of regional clustering as a means of localised advantages. Finally, from the innovation perspective, technological accumulation approaches have followed user-producer relationships and the systems of innovation approach (Moreira, 2005; Braczyk et al., 1998).

Although most of the literature about clustering addressed industrially developed countries, recent work has focused on developing countries (Humphrey and Schmitz, 1996; Schmitz and Nadvi, 1999; Altenburg and Mayer-Stamer, 1999) as well as on intermediate developed countries (Costa and Queiroz, 2002; Moreira, 2005), which clearly indicates that clustering activities are now commonplace in industrial activities all over the world and can be promoted by all types of firms (Altenburg and Mayer-Stamer, 1999).

This paper concentrates on well-established industrial relationships between indigenous suppliers and foreign TNCs throughout the value chain and is concerned with how suppliers evolve in their relationship with their clients. The concern with backward vertical linkages stems from three intertwined issues. First, if indigenous firms are able to accumulate technology as a consequence of their relationships with TNCs, then vertical relationships throughout the value chain can be used as a mechanism to transfer technology, know-how and to promote growth among indigenous suppliers. Second, if upstream vertical linkages are improved, then FDI could be used as a mechanism of reducing the gap between differently endowed countries. Third, buyer-supplier cooperative relationships could be used to underpin well-established exporting clusters as well as a mechanism to attract more technology-intensive FDI.

3 The Portuguese context

Although a member of the EU, Portugal is considered a *less favoured country* within the European context with relatively long established manufacturing tradition, though largely specialised in low-technology, traditional labour-intensive sectors (Lança, 2000).

The Portuguese economy is markedly dominated by a myriad of Small-and Medium-Sized firms (SMEs) and a limited number of large firms, most of them foreign affiliates. One of the consequences of this structure is that large Portuguese firms have never played a leading technological/industrial role as has happened in other European countries (Guimarães, 1998).

Simões (1993) analysed the impact of FDI in Portugal studying *how* and *what types* of TNCs rooted their factories in Portugal. Although he mentions that the interactions between FDI and science and technology networks are non-existent, the relationship with indigenous firms remained unaddressed.

A more systemic perspective is needed. Taking into account that TNCs

- are considered the main producers and organisers of knowledge-based assets and are the principal cross-border disseminators of these assets
- are coordinators of interrelated value-added networks, it is possible to argue that if industrial policy could integrate activities of indigenous suppliers in downstream activities in the value chain, it would not only open a window of opportunity for those indigenous suppliers to take part of a network of knowledge-based assets, but also increase the possibility of participating in broader, international networks.

On the same vein, Dunning (1997) contends that FDI should be focused as a *sequential* investment rather than as an *initial* one, i.e., geared not only to value activities but also associated with the setting up and sustaining of cross-border network of intra-and inter-firm relationships. Dunning's observations and the above-mentioned portrait of FDI in Portugal are key points for this paper: there has been a continuous inflow of FDI to Portugal and, though this inflow has helped the modernisation impetus of the Portuguese industry, little concern has been placed on improving upon and exploiting the links of TNC subsidiaries to indigenous firms.

4 Research questions and research methodology

Although TNCs have been important players in the globalisation process, it is not yet known how they contribute to the development of indigenous firms in host countries. Clearly, networking activities in the supply chain are of fundamental importance for both the supplier and the client: they might be of added value for both partners (Cravens et al., 1996) as well as of strategic importance in terms of resources and future alignment (Campbell and Wilson, 1996). It is also clear that a cooperative behaviour is mandatory. What is not clear is how indigenous SMEs and foreign TNCs interact with each other and how the former evolve strategically in this relationship.

Taking into account that the international business literature about TNCs has focused on:

- How local capabilities in foreign affiliates change relatively to headquarters
- How foreign affiliates' roles vary at corporate level
- Clustering activities in developed countries.

It is clear that there is a gap in the relationship between indigenous firms and their foreign clients from the intermediate developed country point of view. Two questions are related to this gap

- Are local suppliers prepared to assess the tough technological demands required by TNCs?
- Are there any cases of *value-added*, *value-creating* SME-TNC relationships?

If so, can a structural approach be put forward in the networking relationships between indigenous SMEs and large foreign TNCs?

The research methodology involved four main steps. The first one consisted in the formulation of the technology capability flows mechanisms between TNCs and SMEs in the supply chain. These mechanisms are based on work done by Simões (1995) and Moreira (2005) and involved variables such as the firm's *quality policy*, *technological innovation strategy*, *production capability* and *new product development capability*. These variables are assessed in SMEs using an ordinal scale so that the differences among groups could be easily spotted. As Maroco (2003) states, ordinal variables are measured in different classes in which it is possible to define a predetermined, but not quantifiable, order. In this case, quality registration, as shown in Table 1, was measured according to three classes – no registration, International Organisation for Standardisation (ISO) 9000 in progress and ISO 9000 registered – in which one can argue that ISO 9000 registered firms have, in general, a more sophisticated quality policy than ISO 9000 non-registered firms. The remaining variables are described in the Appendix.

The second step consisted of the selection of the sample. The population of firms included two different subgroups: the clients (TNCs) and the suppliers (SMEs). The absence of major sources of information about relationships between SMEs and TNCs made the definition of the sample a major pre-occupation. Therefore, the TNCs were used as a source of information about their suppliers, which influenced the methodological approach.

Table 1 Characteristics of Indigenous SMEs

	Automakers suppliers	*Electronics suppliers*	*Shoemakers suppliers*	Σ
No. of employees				
(0–24)		3		3
(25–49)		1		1
(50–99)	2	3	3	8
(100–249)	3	3	4	10
(250 and above)	3		1	4
Sectoral patterns of innovation				
Supplier-dominated	1	4	7	12
Specialised supplier	6	3	1	10
Science-based				–
Scale-intensive	1	3		4
Relationship with clients				
Episodic contracts		5	7	12
Serial contracts		3	1	4
Shared planning	8	2		10
Production capability				
Elementary			3	8
Standard	1	5	5	7
Advanced	4	1		8
Integrative	3	4		3
NPD capability				
Absent/limited	1	4	5	10
Reactive	4	5	3	12
Active	3	1		4
Technology innovation strategy				
Traditional/dependent	1	4	6	11
Product follower	2	5		7
Product specialist	2		2	4
Innovator	3	1		4
Quality registration				
No registration		3	4	7
ISO 9000 in process		3	3	6
ISO 9000 registered	8	4	1	13
Total number of firms	*8*	*10*	*8*	*26*

The definition of the first subset of firms (foreign TNCs) was based on the following criteria:

- the relative importance of economic sectors in Portugal
- the share of TNCs operating in Portugal
- the industrial perspective of the economic sector
- the firm's size
- Pavitt's taxonomy (1984) of sectoral patterns of innovation.

Consequently, two firms of the following economic sectors were chosen: the footwear cluster; the chemical industry; the electrical industry; and the auto-industry.

The TNCs selected for the research were the largest ones in the industry. Initially, the firms were contacted by mail and subsequently by phone. An interview was scheduled with top executives in order to

- explain the purpose of the research
- address the firm about the possibility to release information about suppliers
- assess the possibility of further research
- approve the firm as part of the sample.

As the eight TNCs contacted confirmed the above-mentioned characteristics and were willing to cooperate in the field research, it was decided to approve the sample and proceed with the study. The collection of data involved tape-recorded, in-depth, semi-structured interviews and favoured a qualitative approach. The interviews addressed the following topics.

- general information about the firm
- evolution of production/operations activities and relationship with headquarters
- evolution of technological activities and relationship with headquarters and sister firms
- evolution of technological activities in upstream activities in the value chain.

The data from the second subset of firms (suppliers) were obtained from released information from TNCs. Originally, the objective was to select five suppliers from each multinational subsidiary and to reach a sample of 40 firms.

Owing to operational difficulties, it was decided to drop the chemical cluster and to proceed with the study analysing six TNCs. The final sample only included 26 SMEs: eight firms supplying automakers, ten SMEs supplying electronics TNCs and eight SMEs supplying shoemakers. As with TNCs, it was decided to proceed with semi-structured, in-depth interviews.

The third step consisted of *in loco* interviews in the six TNCs selected. This was set up to analyse the technology transfer between TNCs and SMEs in Portugal. Its main purpose was to:

- categorise the various factories visited
- categorise the technology management in TNCs
- categorise TNCs relationships with indigenous suppliers in the value chain
- set up a database of Portuguese SMEs supplying TNCs.

In loco interviews were carried out with the 26 local suppliers in order to complement the information gathered on the six TNCs. The interviews with local suppliers' executives addressed the following topics:

- general information about the firm
- evolution of production, operations and technological activities
- evolution of technological activities in downstream activities in the value chain with TNCs.

To complement the information given during the interviews, a factory tour was requested by the researcher. In all firms, the factory tour was conceded, which helped the researcher in the characterisation of all firms.

The fourth step consisted in the analysis of the relationship between SMEs and TNCs. It addressed both the way in which SMEs evolve in this relationship and how both types of firms complement each other's activities in the supply chain.

5 The analysis of the sample

In general, TNCs were characterised by

- the presence of rudimentary research capabilities
- a strong concentration on production activities
- an investment controlled by divisional or head offices outside Portugal.

Two important aspects should be mentioned because of their importance in the supplier–client relationship. The first one is the role of quality as a driving force in the relationship between TNCs and their suppliers, especially amongst automakers and firms of the electronic industry. Second, automakers, shoemakers and electronics cluster firms claimed to be very concerned with logistics and Just-in-Time (JIT) policies. Their importance is addressed in the fourth step of the research.

A wide range of characteristics of the sample of SMEs is presented in Table 1. In terms of employment, on average, firms supplying the automakers are the largest, with an average of 249 employees, while the smallest ones are those supplying the electronics sector, with an average of 80 employees.

The suppliers to automakers have not only a better relationship with their TNC clients, but also better technological attributes than their counterparts of the electronics and footwear industries.

An analysis of Table 1 points to the following conclusions:

- Shoe industry suppliers are, in general, the least developed of the sample, the automakers suppliers being the most developed ones.
- As originally expected, the production capability of shoemakers suppliers is quite modest when compared with that of automakers suppliers. This difference may be explained owing to two reciprocal factors: the focus on labour-intense activities of shoemakers' suppliers and the buyer behaviour of TNCs of the shoe cluster specifically oriented to the exploitation of low-cost advantage.
- The New Product Development (NPD) capability and the technological innovation strategy follow the same pattern of the above-mentioned variables, being the auto-industry suppliers well ahead of the rest of the sample.
- The relationship with clients varies extensively:
    - Indigenous firms supplying shoemakers normally have episodic contracts with their clients, which is close to what Sako (1982) called *remote* relationship.
    - Automakers suppliers have symbiotic relationships with their clients. This behaviour is underpinned on a strong quality/logistics shared management system and is very close to the *partnership* relationship proposed by Lamming (1993).

The dichotomy between firms of different industries was clear: whereas shoemakers have a loose relationship with their suppliers in upstream activities in the supply chain, automakers invest much more on a technologically and organisationally based relationship. The suppliers of the electronics industry fall in between those supplying to automakers and shoemakers. Technology seems to impose a technology-based relationship in which product quality, NPD activities, quality certification and product complexity play an important role. As just-in-time delivery, product cost and delivery reliability are among the most commonly used performance indicators by TNCs to deal with their suppliers, it can be said that technology plays an important role in the user-producer relationship in the value chain. In technology-based clusters, such as the auto-industry, the clients (TNCs) are bound to cooperate much more with their suppliers than in traditional industries, as is the case of the shoe industry, basically because firms (both the TNCs and their suppliers) belong to different technological paradigms.

As TNCs' sourcing behaviour varies according to industry, it is possible to argue that SMEs in different industries should have not only different types of relationship with their clients but also a different degree of 'induced' technological competence. An example of this 'induced' competence is shown by the variable quality registration: whereas all SMEs supplying the auto-industry are ISO 9000 quality-certified firms, in the shoe and electronics industry, the level of quality-certified SMEs is quite lower. It is obvious that the ISO certification is not important per se. What matters is that some competitive pressures are transferred from the TNC to their indigenous suppliers. Accordingly, SMEs that are able to cope with the changes imposed in this demanding environment have been able to develop firm-specific learning capabilities in terms of new organisational behaviour as well in terms of technology management characteristics. The same applies to NPD capability.

In all industries assessed, TNCs transfer part of their pressure to their local suppliers. The user–producer relationship varies extensively owing to

- the pressure exercised by TNCs to their local suppliers in upstream activities
- the suppliers' technological competence.

The producer–client relationship in the auto-industry has the following characteristics.

- Information about production lots, production capability, product quality, product cost, competitors, etc., are readily available and easily flow from client to supplier and vice versa.
- The firms' product quality policy is emphasised in the relationship. For the TNC, it is an indicator of commitment to achieving 'adequate' level of product/firm competitiveness. For the supplier, it is the only way to overcome the 'low-tech' stigma and to achieve a 'reliable' status.
- The firms' logistics policy is of fundamental importance: they ought to cope with JIT sourcing activities in order to remain competitive. Being competitive in terms of delivery reliability gives suppliers the possibility to establish a symbiotic relationship with their clients.
- NPD capabilities open a window of opportunity for future developments. While the quality and logistics policies 'assure' the actual relationship between both firms in the value chain, being involved in product development activities offers the supplier the opportunity to work on the product life cycle of the client's next generation product. Therefore, it should be regarded as a strategic one.

Product cost, logistics and quality management systems underpin the 'operational' *modus operandi* in the supplier(SME)–client(TNC) relationship. Nevertheless, while product cost and logistics policy are strongly related to production capability, the firm's quality management system affects technological innovation strategies. NPD capabilities underpin a dynamic relationship between the supplier and the client: they give the supplier the opportunity not only to deepen its Research and Development (R&D) capabilities but also to cooperatively develop the product's next generation. Therefore, it can be said that whilst product cost and logistics management are operational variables of the user-producer relationship, product quality and new product development capabilities play an important strategic role in underpinning the evolution from a serial-contract to a symbiotic relationship. In summary, it is plausible to say that a bi-directional relationship is needed so that a complementary role between both parties is broadly and openly assumed.

6 Preliminary results and discussion

One central idea that emerges from the analysis is that the suppliers' technological competencies tend to influence the firms' strategies, which influences the future trajectory of the supplier – client relationship (which is dependent upon the NPD capabilities, quality policy, logistics policy and R&D capabilities). Equally, the client seems to have an important influence in the successful trajectory of the supplier: it can not only pull the supplier to a top-level quality paradigm, which has profound

consequences at organisational level, but can also pave the way for a deeper relationship in the value chain based on NPD capabilities.

The complementarities of supply and demand conditions seem to be interrelated in the value chain. Some supply side factors (for example, the presence of R&D competencies) soften the impact of market difficulties and accelerate the trajectory towards a smoother relationship. On the other hand, the absence of R&D competencies weakens the suppliers' technological position, which pushes them to either *traditional* or *dependent* strategies. The demand side plays the complementary role in the supply chain. The presence of less sophisticated clients tends to create an *episodic-contract* atmosphere, because the user–producer relationship is based on cost factors. On the other hand, the presence of technology-oriented clients normally 'forces' suppliers to change their strategic approach towards deeper levels of technology capabilities.

For this purpose, it can be argued that the user–producer trajectory is dependent upon two variables: the level of technological competence of the firm and the type of (dynamic) relationship.

6.1 The supply-side of the problem

To assess the technology competence of the supplier, three types of firms are put forward as shown in Table 2: the technology-oriented firm, the technology-aware firm and the low-technology firm. This typology was developed by the researcher taking into account Simões (1995) and Moreira (2005) and the following characteristics of the suppliers: production capability, innovatory capability, NPD capability, quality policy and internal technology base.

Low-technology firms lack the minimum skills to develop or acquire technological capabilities to have a clear relationship with the customer. Necessarily, those firms have troubles identifying organisational, technological and managerial solutions to their problems. The main issue for this type of firms is directly related to lack of skills that hinders they ability to accumulate knowledge and consequently their relationship with external sources of knowledge are very limited.

Technology-oriented firms operate in a complex, competitive environment and are able to compete in technological terms. They have broad market knowledge and tend to use their technological knowledge as competitive weapons. They use innovative processes of the fourth and fifth generation (Rothwell, 1993) based on strong R&D capabilities. As opposed to low-technology firms, they have developed the skills to manage a clear relationship with the customer.

The third category, *technology-aware firms*, lay in between the other two. They have some technological capabilities, but do not take technology as a strong core competence. Consequently, they lack the technological knowledge to compete using technology as a competitive weapon. They have developed some organisational, technological and managerial skills and are able to participate in a demanding environment. As opposed to low-technology firms, they have developed an important deal of competitiveness and have been able to cope with the competitive pressures of their customers in their relationship with TNCs. This demanding environment forced the firms to

- extensively assimilate the new technologies they were in contact with
- improve product quality
- improve plant layout and production practices.

As opposed to technology-oriented firms, they have not yet been able to

- develop strong R&D capabilities
- extensively replace old processes and products by new ones.

Table 2 Suppliers' Technology Competence

Technology Competence	*LOW-TECHNOLOGY FIRM*		*TECHNOLOGY-AWARE FIRM*	*TECHNOLOGY-ORIENTED FIRM*
Production Technology Stages	Basic production capabilities based on assembly skills. ***Elementary***	Process innovation leads to incremental changes in quality, cost and lead time. ***Standard***	Full production skills. ***Advanced***	Production capabilities are embedded in a wider strategic approach. ***Integrative***
Innovatory Capacity	Copy or imitation of market products. ***Weak***	Reverse engineering of products sparks product design capability. ***Limited***	Strong product innovation capabilities. R&D oriented towards products and processes. ***Reactive***	Competitive R&D. Advanced product and process innovation. Integrates functional activities. ***Active***
Launch of New Products	Totally absent or very weak. Mere product replicas. ***Occasional***	Reactive role towards clients' request. ***Frequent***	Articulates in-house technology with market needs. ***Frequent/Systematic***	Internalisation of intricacies of market needs. Strategic in nature. ***Systematic***
Road to Quality	Inspection oriented. Strong orientation towards quality control	Close relationship with clients boosts quality and reliability. Quality assurance techniques: Statistical Process Control and Failure Mode Effects Analysis	Development of quality certification. Intangible aspects of quality as team work and employees involvement	TQM – total quality management approach
Technology Environment	Suppliers of equipment are the main source of technology	Strong interface push with customers. Task environment is essential to the firm		External environment strongly influences in-house functions
Internal Technology Base	Strongly associated with investments in capital equipment. ***Production-technology firm***	Reactive role in product development. Tuned to incremental innovation. ***Passive product-engineering firm***	Active role in product development. Leading role in the creation of clients' products. ***Active product-engineering firm***	Technology competence is underpinned on advanced technologies. ***Technology-based firm***

The pattern of technology competence amongst suppliers is shown in Table 3. The differences are clear and reflect the industrial technological intensity under consideration: in the auto-industry, as most SMEs have developed an initial critical mass in terms of knowledge/technology, the multinational clients have generated a cumulative effect in organisational, technological and managerial skills, which created a virtuous cycle of development among the suppliers.

Table 3 Technology competence among SMEs

	Automaker suppliers	*Electronics suppliers*	*Shoemakers suppliers*	Σ
Technology-oriented firms	3			3
Technology-aware firms	5	5	4	14
Low-technology firms		5	4	9

In the other two industries, the suppliers have not yet managed to develop a critical mass in their relationship with their multinational clients and, consequently, the cumulative effects in organisational, technological and managerial skills is not as profound as in the auto-industry. Thus, it seems that if SMEs are to take full advantage of TNCs contribution, a minimum level of technology/knowledge is needed to develop an adequate absorptive capacity.

6.2 The demand side of the problem

The analysis of the relationships between TNCs and their local suppliers strongly suggests three major types of relationships, based on the characteristics put forward in Table 1: ***symbiotic***, ***serial-contracts*** **and** ***episodic***.

In a ***symbiotic*** relationship, both firms understand the perception of their complementary role: the supplier has evolved technologically in such a way that it leverages its client's capabilities in core areas. The sharing of information is very fluid in nature and is the result of a long-term, evolutionary, and complementary role between both firms.

The ***episodic*** relationship corresponds to an almost absent interrelationship basically due to a twofold problem:

- The supplier, normally a low-technology firm, lacks or has been unable to upgrade the organisational capability to respond to demanding clients.
- The client has not been able (or willing) to nurture a closer relationship in upstream activities in the supply chain.

As a consequence of this twofold problem, a long-term, bi-directional relationship is not implemented not only because of potential inequalities between suppliers and clients, but also owing to organisational discrepancies. The role of the client is of fundamental importance: even when suppliers are willing and able to internalise technology and to create a deeper relationship with their clients, without a proper client involvement a bilateral relationship will never be reached.

The ***serial-contracts*** relationship is clearly an intermediate situation between the contingent and the symbiotic ones. Nevertheless, it is very important because it shows the important role clients play in leveraging the supply chain relationship. The clients are characterised by relying on the suppliers' in-house competencies and attributing them a complementary role. Consequently, instead of using opportunistic behaviour, they engaged in the upgrading of the relationship with the external sources, though dependence is clearly avoided.

The relationship between the patterns of technology competence and the type of supplier–client relationship is represented in Table 4, which clearly shows a strong relationship between both variables. Thus, it is plausible to say that some clients (TNCs) have managed to leverage their upstream linkages with their suppliers through the cultivation of a global process of innovation and continuous improvement, which involved the introduction of lean concepts such as the shortening of lead time (production and delivery), the improvement of logistics systems and the introduction of quality standards. Some suppliers were eager to follow their clients closely, adopting an innovative response in order to protect the relationship with them. Consequently, those indigenous enterprises that were able to evolve and adapt to their client's generated change secured an important competitive advantage that helped them to accelerate the trajectory towards a closer, symbiotic relationship. On the other hand, those firms unable to catch up with new environmental conditions remained low-technology firms in a contingent relationship with their clients.

Table 4 Type of relationship and the patterns of technology management

	Contingent relationship	*Serial contract Relationship*	*Symbiotic relationship*	Σ
Technology-oriented firms			3	3
Technology-aware firms	4	3	7	14
Low-technology firms	8	1	–	9

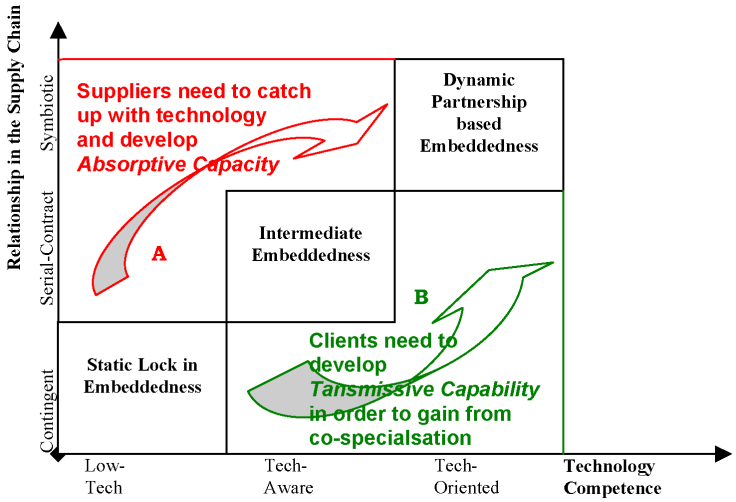
Equally important, a symbiotic relationship will hardly be achieved even when the technological competence of the supplier is 'adequate' without the active involvement of the client. This is what happens with certain indigenous suppliers of the shoe and electronics clusters whose relationship in the value chain is hindered by the absence of an active commitment of the TNC client. Consequently, the complementary role is limited by the reduced involvement of one of the parties.

The local subsidiary embedded relationship can be addressed from a localised learning perspective following two different approaches, as presented in Figure 1: a ***Static, Lock in Embeddedness*** and a ***Dynamic, Partnership-Based Embeddedness***. By its very nature, a *static, lock in embedded relationship* has a very limited strategic scope: on the one side, the buyer is not willing to implement deeper upstream activities in the value chain and, on the other, the suppliers' production and technological capabilities are very limited. By its very nature, the buyer–supplier relationship is contingent in nature.

In the other extreme, the *dynamic, partnership-based embedded relationship* is based both on the indigenous firms' technological capabilities and learning dynamics and on the clients' knowledge base.

A *static*, *lock in embedded* relationship is composed by low-technology suppliers with limited absorptive capacity. The suppliers normally belong to low-tech industries and usually lack the technological capabilities to cope with tough specifications imposed by their clients. The buyers are normally specialised in traditional low-tech goods, with low wages, productivity and specialisation. In most of the cases, the buyers select those suppliers that can, or already, comply with a given threshold of productive capabilities. Rarely, TNCs cooperate with their indigenous suppliers in order for them to identify bottlenecks in operations activities. On the same token, limited advice on manufacturing, logistics, training and quality is given to potential local suppliers.

Figure 1 Types of SME–TNC interactions



The *dynamic, partnership embedded relationship* is composed of technology-oriented firms (both indigenous SMEs and foreign TNCs) with high levels of absorptive capacity, which underpins the knowledge gap reduction with other agents and the implementation of symbiotic relationships throughout the value chain. As flows of knowledge are diffused in an embedded relationship, suppliers are able and willing to network with other agents and thus technological leaps in product and/or process might lead to a collaborative approach between suppliers and clients to identify and solve common problems in all operation activities. This embedded relationship is encouraging for both firms: suppliers are given the opportunity to

- master particular technologies relevant to their clients
- internalise technological change and adapt their organisational structures to accommodate it
- implement a strategy to secure the new relationship in order to pave the way for a synergistic behaviour in the value chain.

On the other hand, clients might concentrate on their core activities and take advantage of the co-specialised knowledge and technology of their suppliers.

The evolution from one degree of embeddedness to the following one depends on the mutual interest of both firms, the local supplier and the TNC client: the

complementarities in the value chain will not be achieved and firms will be in situation B without the proper involvement of the client even when suppliers are able to deal with tougher quality demands, shorter production and delivery times, robust information systems, strong NPD capabilities and robust R&D capabilities, as shown in Figure 1. Equally, the complementarities with demanding, technology-oriented clients will not happen without the supplier commitment to master specific knowledge and technology and the supplier–client relationship will fall to position A, as shown in Figure 1.

As a conclusion, it can be said that the local subsidiary embeddedness depends on two dynamics. The first is the technological trajectory, created

- by the mastery of specific knowledge and technology
- by the development of an absorptive capacity, which helps indigenous suppliers to diminish the impact of market difficulties and accelerates the trajectory towards the upper steps of the technology competence.

The second, which plays a complementary role, is the technological trajectory created

- by the presence of more demanding, partnership-oriented clients
- by the presence of TNCs with transmissive capacity that help their suppliers build the capabilities for ongoing organisational transformation.

Although technology is an important variable, what really makes the difference in the evolution from one type of embedded relationship to the following one is the combination of the two dynamics: it generates a learning ability and an organisational competence among suppliers, which underpins a dynamic complementarity between indigenous suppliers and their multinational clients in the value chain.

7 Conclusions

Quality management seems to underpin the supplier–client relationship in two ways: first, it is the bedrock of the indigenous firms' capability to supply products reliably, and second, it is the first step to develop a more fluid relationship in the value chain. The lack of proper quality systems hinders the evolution from a static, lock-in relationship to a dynamic, partnership-based one. NPD capabilities are important as well: they underpin a bi-directional relationship, based not only on operational performance, but also on technological capabilities, which creates a more trustworthy environment between the supplier and the client.

One conclusion seems to be clear: the user–producer relationship seems to be technology-dependent and sector-specific. The greater the technical complexity of the product and the subsystems involved in the relationship, the deeper seems to be the relationship between both partners, which explains different endowment characteristics in the quality-logistics-NPD activities in different firms of different industries.

The client plays an important role: the greater the technology intensity of the industrial sector, the greater the likelihood the clients are bound to cooperate with their indigenous suppliers. In another vein, the presence of strong technologically oriented TNCs is of fundamental importance as a pull mechanism in the upgrading of the type of relationship with their suppliers as they facilitate the transfer of technological

competencies and knowledge, which underpins a dynamic partnership-based relationship with their clients.

The role of governments is a key point if sustainable development is to be achieved. One important implication is that capacity/knowledge building programmes involving training on quality management, new product development and logistics seem to be crucial in order to empower indigenous SMEs in the evolution from a static, lock-in embeddedness to a dynamic, partnership one. The role of industrial associations, HEI and R&D institutions, is also important in diminishing the technology gap between local suppliers and TNCs, and consequently, in creating a dynamic, partnership-based relationship throughout the value chain.

Another important implication for sustainable development of host countries is that liberal policies to attrack FDI are not enough to promote vertical spillovers in upstream activities in the value chain. The presence of foreign firms is doomed to failure if a dynamic complementarity between indigenous suppliers and their TNC clients is not achieved. If the search for partnerships depends on the complementarities between both parties, then industrial policy should address the two sides of the problem. As a consequence, industrial policies should take into account not only the attraction of FDI, but also the enhancement of local suppliers throughout the supply chain. In doing so, national authorities are not only paving the way for a reduction of the technology gap of indigenous firms vis-à-vis their multinational clients, but also influencing TNCs in their decision on *what* to produce and *where*. Equally important is the fact that once the organisational and technological mismatch between indigenous firms and TNC affiliates has been reduced, national authorities are shifting the importance of indigenous firms from *initial* investments towards *sequential* ones and thus, influencing TNCs in their decision as *where* to source their inputs from.

This study has three limitations. First, though some generalisations can be made, the results of the study cannot be extended to all economic sectors of other semi-industrialised and developing countries. Thus, the sample should be enlarged and include broader industrial settings as well as other countries.

Second, the study was based on data collected from present/actual suppliers, which gave information on how they have been able to secure a relationship with their TNC clients. But what about 'broken' relationships, i.e., those suppliers that did not manage to secure sourcing agreements with their TNC clients? Future research must address 'broken' relationships in order to properly understand the mechanisms that lead to disrupted relationships.

Third, all the analysis was based taking into account the Portuguese affiliates and their relationships with their suppliers. In fact, as mentioned before, as investment is controlled by divisional or head offices, one question remains unanswered and deserves further research: how divisional and/or headquarters policies support/hinder the upgrading of the relationship between local firms and their TNC affiliates?

Future research should also address the role of governments, industrial associations, HEI and R&D institutions as bedrocks not only for the upgrading of endogenous and relational capabilities of local firms, but also for attracting FDI. Another stream of research could address how relationship between local SMEs with their clients can affect the vicious investment–divestment cycle of FDI.

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Appendix

Variables used to characterise Relationship with Clients

Episodic contracts: The relationship with clients is characterised as episodic in nature, in which the firm offers its products and bids to get an order. A long-term relationship is not implemented because of inequalities between the supplier and the client.

Serial contracts: The firm has a strong relationship with one or several customers that 'buy' part of the production capacity. The supplier's asset-specificities moderate the degree of opportunism that can be exercised by the client firm.

Shared planning: This type of relationship can be characterised by the strong linkages developed between the producer and the client. Normally, both firms share production planning and new product development. The supplier is considered as 'preferred supplier'. The boundary between the two firms is to some degree 'blurred'.

Variables used to characterise production capability

Elementary: The firm has a limited range of up-to-date technology equipment. The firm lacks the technical capacity to apply concepts such as total quality management and JIT. The firm lacks adequate information systems for planning and controlling production.

Standard: The firm has some technologically advanced equipment and uses quality tools to improve productivity. The firm has an information system for planning and controlling the production.

Advanced: The firm has a wide range of technologically advanced equipment and uses quality tools to plan and control the production system. The JIT policy is used by the firm.

Integrative: The firm has a wide range of technologically advanced equipment. The firm integrates production, quality and logistics using information systems. Some computer–aided design/manufacturing systems are present.

Variables used to characterise NPD capability

Weak/limited: The firm does not have an active policy on the creation of new products and its competitive advantage is based on production activities. The creation of new products is basically based on imitation and copy of main competitors' products.

Reactive: The development of new products, though always present, is very dependent upon the client. The product is normally part of a system or a subsystem and consequently the firm has a reactive role in the product conception process. From the system or subsystem's point of view, the client's leading role is very important.

Active: The firm uses a proactive policy for developing new products. The competitiveness of the firm lies in its capability to create and develop new products in order to cope with the technical aspects of the market evolution. The firm's competitive advantage is achieved through the systematic launching of new products.

Variables used to characterise technological innovation strategy of the firm

Traditional/dependent: The firm has a very passive role towards innovation, which limits its strategy to a passive subcontracting behaviour and, consequently, its added value.

Product follower specialist: The firm is specialised in the production of a range of products, which are created and modified taking into account a 'bilateral relationship' with their customers. The firm participates in the product development phase, but normally the leading role is the client's responsibility.

Product specialist: In this situation though the firm is still specialised in a range of products, it cooperates with the clients in the creation and development of new products/subsystems. This cooperation led to a partnership with large clients.

Innovator: The firm is specialised in a range of products and uses its technological competencies to develop and create its own new products. This strategy is underpinned by a strong development department capable of creating brand new solutions for the market.