

The use of cluster resources

A dynamic capabilities approach

NUNO CARDEAL, CELINE ABECASSIS-MOEDAS & NELSON ANTÓNIO

ABSTRACT: *The cluster literature acknowledges the existence of resources that are shared by firms in the same cluster. The literature on dynamic capabilities argues that in the context of capability development, firms need to develop different business models and to define their firm boundaries in complementary ways. We use a multiple case study approach to analyze how three small and medium sized firms (Portuguese footwear manufacturers) belonging to the same cluster, but with different business models, exploit cluster resources. We find that the same resources are not used in the same way or for the same purpose. Our inductive investigation leads to two propositions: non-strategic shared resources are used by cluster firms in similar ways, and for the same objectives; strategic resources, which relate to the firms' business models, are used by each firm differently and for different purposes.*

Key words: Strategic Management, Dynamic Capabilities, Clusters

TÍTULO: A utilização de recursos partilhados em clusters: Uma abordagem de capacidades dinâmicas

RESUMO: *A literatura de clusters reconhece a existência de recursos que são partilhados pelas empresas do cluster. A literatura das capacidades dinâmicas argumenta que no contexto do desenvolvimento das capacidades, as empresas necessitam de desenvolver diferentes modelos de negócio e de definir as suas fronteiras de empresa de forma complementar. Utilizamos uma abordagem de múltiplos estudos de caso para avaliar como é que três empresas portuguesas fabricantes de calçado, pertencentes ao mesmo cluster, mas com diferentes modelos de negócio, exploram os recursos do cluster. Descobrimos que os mesmos recursos não são utilizados da mesma forma e com os mesmos fins pelas empresas.*

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A investigação indutiva levada a cabo conduziu a duas proposições: os recursos partilhados não estratégicos são utilizados pelas empresas do cluster de forma semelhante; os recursos estratégicos, que estão relacionados com os modelos de negócio, são utilizados de forma diferente, e com diferentes fins, pelas distintas empresas.

Palavras-chave: Gestão Estratégica, Capacidades Dinâmicas, Clusters

JEL: L10; L16

INTRODUCTION

The Dynamic Capabilities (DC) literature is quite recent and focuses mainly on conceptual developments (Ambrosini and Bowman, 2009; Barreto, 2010; Di Stefano et al., 2010; Wu, 2010). While there is some consensus that DC are related to the development of new capabilities in changing environments, the literature pays little attention to how these capabilities are developed. Teece (2007) proposed the notion of micro-foundations of DC, which highlights the importance of defining the firm's boundaries in order to manage complementary assets and platforms when developing a business model. This notion applies to industries exposed to rapid technological change, resulting in the development of new technologies that do not achieve industry dominance.

Firms in clusters tend to be small or medium sized enterprises (SME) (Pike and Sengenberger, 1990) specialized in particular activities or specific parts of the value chain. The cluster literature is in agreement on the importance of semi-public resources (available to cluster firms) (Wu et al., 2010) for the performance of the individual cluster companies and the cluster as a whole. However, the literature does not explore the use different cluster firms make of these resources.

In the context of clusters and cluster resources, we investigate how firms in the same cluster but with different business models take advantage of shared resources. Our research question is: *How do firms in clusters use shared cluster resources?* To answer this question, we conduct a multiple case study of three firms in the same cluster. The analysis shows that cluster resources that have no direct impact on the critical variables of the business model are exploited by all companies in similar ways. However, cluster resources that impact critical attributes of the firms' business models are used differently by each firm. These findings allow us to propose a model for the use of shared cluster resources.

This study makes several contributions. First, it analyzes the use of cluster resources in a dynamic environment by firms that have recently developed (dynamically) dif-

ferent business models aimed at adapting to environment changes (dynamic capabilities); this provides empirical support for the work on DC. Second, the findings on the use of cluster resources show that their mere existence is not sufficient for firms to achieve competitive advantage. Firms use strategic shared resources as complements to their internal capabilities in order to obtain competitive advantage. Non-strategic shared resources are used mainly to avoid competitive disadvantages.

LITERATURE REVIEW

The increasing number of industries undergoing dynamic change (Miller and Shamsie, 1996) and at an accelerated pace (Hamel and Prahalad, 1989) underpin the Resource-Based View (RBV) of the firm (Barney, 1991; Penrose, 1959; Wernerfelt, 1984). Since 1997, studies have highlighted the importance of maintaining a competitive advantage through the mechanisms of isolation (or ownership) of valuable, rare and inimitable resources (and skills) (Espino-Rodríguez and Padrón-Robaina, 2006). Some of these views have been challenged by authors (Eisenhardt and Martin, 2000; Fiol, 1991; Langlois and Robertson, 1995; Teece et al., 1997) who focus on the dynamics of markets as opposed to the static characteristic of the RBV. This second strand of studies provides an alternative approach to the sustainability of competitive advantage that is consistent with an emerging recognition among managers that firm success requires more than productive research and development (R&D) departments, and includes better product introduction cycles, the adoption of best practice, and the production of better quality products.

Dynamic markets

While some industries are fairly static (with infrequent change), most modern industries are exposed to dynamic environments in which change occurs more or less rapidly and not always in the expected direction. Changing environments are the enemy of property-based resources (Miller and Shamsie, 1996). The increased number of industries experiencing change and the pace of change led to the RBV, a concept based on DC (Teece, et al., 1997). This new approach, which has its origins in the theories of Penrose (1959) and Teece (1982), is concerned with the notion of competitive advantage which requires the exploitation of existing internal and external capabilities, as well as the development of new capabilities – mainly because of the increasingly fast pace of change (Hamel and Prahalad, 1989).

Dynamic Capabilities

Firms need to generate and implement organizational and management innovations to complement product and process innovation in order to leverage and maintain competitive advantage (Teece, 2007). Teece (2007) points to an emerging

consensus that resources combined with the firm's operational capabilities help to maintain technical adequacy. DC, on the other hand, relate to high level activities that involve the capacity of managers to sense and take advantage of opportunities, to avoid threats, and to combine and recombine specific and/or co-specialized assets to meet the changing needs of customers, to sustain and increase external fit, and to create the conditions for long-term profitability for investors. DC are related to the continued growth, survival, and good levels of business performance over time. DC (Collis, 1994; Teece & Pisano, 1994; Teece, et al., 1997) are the potential (not imitable) capacity to solve problems systematically, and are based on the ability to identify opportunities and threats, to make timely, market-oriented decisions, and to change the firm's resource base (Barreto, 2010).

The literature on DC focuses on conceptual work, and provides little empirical support for this notion, which represents a relatively new area of knowledge (Ambrosini and Bowman, 2009; Barreto, 2010; Di Stefano et al., 2010; Wu, 2010). A Special Issue of *Industrial and Corporate Change* (2010) is dedicated to DC, but none of its seven articles is empirical. However, some efforts have been made to find empirical support for the notion of DC. In 2009, a Special Issue of the *British Journal of Management* focused on DC, and included several empirical papers using case study and quantitative methodologies applied to pharmaceutical companies (Bruni and Verona, 2009; Macher and Mowery, 2009; McKelvie and Davidsson, 2009; Narayanan et al., 2009; Newey and Zahra, 2009).

The lack of consensus on what DC are (Arend and Bromiley, 2009; Prieto et al., 2009) has led to the development of numerous definitions. For example DC:

- "... are the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p. 516);
- "DC are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die" (Eisenhardt and Martin, 2000, p. 1107);
- "... is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness" (Zollo and Winter, 2002, p. 340);
- "... are the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s)" (Zahra et al., 2006, p. 918);
- "... are a firm's behavioral orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and

reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage” (Wang and Ahmed, 2007, p. 35);

- “... are the capacity of an organization to purposefully create, extend, or modify its resource base” (Helfat et al., 2007, p. 1);
- “... are enduring routines, systems, and processes that are visible, known, and managerially intended as a means to achieving new resource configurations” (Døving and Gooderham, 2008, p. 845);
- “... is the firm’s potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base” (Barreto, 2010, p. 271).

Teece (2007) claims that the micro-foundations of capabilities are a key element in their building process. However, the idea is applied to industries exposed to the opportunities and threats associated with rapidly changing technologies; although a global marketplace for the exchange of know-how and technology exists, it is undeveloped and, from a technical viewpoint, change is systemic. Based on Teece (2007), Petit and Hobbs (2010) and Ellonen et al. (2009) apply this thinking to industries characterized by high levels of uncertainty (software and hardware; financial services) and by a highly dynamic environment (publishing).

Teece (2007) identifies three main dynamic capabilities: (1) to detect opportunities; (2) to take advantage of the opportunities; and (3) to manage the threats and to reconfigure. The first two correspond to the mobilization of the necessary resources, and the definition of strategy and organizational infrastructure to exploit opportunities. The third corresponds to the continual renewal of resources and capabilities in order to maintain competitive advantage (Katkalo et al., 2010).

The identification of opportunities allows decisions to be taken about the directions for change. According to Teece (2007), there is considerable evidence that corporate success depends heavily on organizational innovation (e.g. business model design). To leverage this dynamic capability, Teece (2007) identifies four micro-foundations: developing customer solutions and the business model; selecting decision-making protocols; proposing firm boundaries that complement and control technological platforms; and building loyalty and commitment among customers.

Selecting and developing the business model as a micro-foundation of DC

The function of the business model is to articulate the value proposition, select appropriate technologies and attributes, identify appropriate market segments, establish a value chain, and estimate cost structure and potential profit (Chesbrough and Rosembloom, 2002). The essence of the business model is to define how the com-

pany creates value for customers, to persuade customers to pay for this value, and to translate this payment into profit (Teece, 2010). Selecting, adjusting and/or improving the business model are complex and require creation, adjustment, and alignment capabilities and sometimes the capability needed to replace the existing business model (Teece, 2007).

Selecting firm boundaries to manage complements as a micro-foundation of DC

In regimes of rapid technological change, the definition of firm boundaries is important and can be considered decisive to the implementation of a business model (Teece, 2007). Decisions related to the definition of firm boundaries need to take account of the need to build capabilities, particularly if critical capabilities are not well distributed across the industry. In some cases, their definition may require that alliances are established to allow learning and to contribute to the development of new capabilities (Collis and Montgomery, 1995). The role of complementary resources and co-specialization have also been acknowledged to be important to the innovation process generally, and business model development in particular (Wheelen and Hunder, 2010). The firm's ability to access, combine, and exploit externally available (held by other companies or institutions) resources, can be considered a DC (Mota and Castro, 2004), or a micro-foundation of DC, particularly in relation to implementing business models (Teece, 2007).

Cluster: context, resources and capabilities

Firms in clusters (Porter, 1990) or industrial districts (Marshall, 1919; Piore and Sabel, 1986), tend to be small and specialized in specific parts of the value chain, referred to as flexible specialization (Piore and Sabel, 1986). In most cases, firm boundaries are similar in each part of the value chain. In contrast to the logic of significant vertical integration, in which competitive advantage stems from the development and use of resources internal to the firm, companies in clusters are often small, family-owned firms. Their competitive advantage stems from how the firms are organized within the logic of specialized articulation (Pike and Sengenberger, 1990) or cooperation (Hanna and Walsh, 2008), and how they access and manage the resources and capabilities of other firms in the cluster and use them to improve their performance (Morales, 2001, 2002) and compensate for the lack of internal resources almost inevitable in small firms (Viljamaa, 2011). Thus, indirect capabilities, have particular relevance in the context of clusters (Molina and Martínez, 2008).

Several studies focus on the relevance of cluster resources, shared resources, or semi-public resources (Wu et al., 2010) and higher order capabilities (Foss, 1996) for the performance of both the individual cluster firms and the whole cluster. These ele-

ments exist at cluster level and are available only to companies that are part of the cluster. The resources of each of the firms in the cluster are ultimately shared by all the cluster companies, which makes them semi-public resources that have an impact on the performance of the whole cluster (Hervás and Albors, 2007). Research shows that shared while resources are important for cluster firm performance (Becchetti and Rossi, 2000; Camisón, 2004; Morales and Martínez, 2003; Wu, et al., 2010), they also contribute to the performance of the whole cluster (Giner and María, 2002; Hervás and Albors, 2007; Lawson, 1999; Morales, 2002). Molina and Martínez (2008) find that some resources have more positive impacts on firm performance, and suggest that firms with stronger ties to other firms in the cluster develop a distinctive capability related to the advantages of the shared resources. However, Camisón (2004) argues that the existence of shared resources and capabilities does not automatically imply improved performance of the cluster firms: they need to be capable of internalizing those resources. The internal strategic resources and capabilities of the firm are a variable that moderates the effect of shared resources on firm performance (Camisón, 2004) and firms' competitive advantage (Wu et al., 2010). These findings are consistent with Tallman et al. (2004) regarding the ability of firms to use knowledge cluster resources.

Although there is some agreement about the relevance of shared resources for the performance of individual cluster firms and the cluster as a whole, there are no studies that address the extent to which, or how, firms use these shared resources. The literature does not explain how firms use shared cluster resources based on their different business models and strategies, or their implementation.

Strategic and non-strategic shared resources

The RBV assumes that the firms in a given industry are heterogeneous with regard to the strategic resources they control. Dierickx and Cool (1989) refer to strategic assets to describe the resources that can be a source of competitive advantage. The VRIN (Valuable, Rare, Inimitable, Non-substitutable) framework (Barney, 1991) posits that the firm has a competitive advantage when it possesses valuable, rare, imperfectly imitable and non-substitutable resources.

Non-strategic resources are non-VRIN resources that are required for the continued existence of firms (Pan et al., 2007). They may establish competitive parity if used efficiently, or induce competitive disadvantages if the performance efficiency of their use is less than that of their competitors (Barney and Wright, 1998).

Shared cluster resources are not rare since they are available to all the companies in the cluster. If a resource is not rare, then the question of imitability and substi-

tutability does not arise (Barney, 1991). Depending on the use the firm makes of a resource, it is valuable if : (i) it permits the exploitation of opportunities and/or the neutralization of threats (Barney, 1991); (ii) it enables the firm to do things that lead to economic value (Fiol, 1991); (iii) it has some capacity to generate profits and prevent losses (Miller and Shamsie, 1996). The concept “valuable” therefore is contingent (Bowman and Ambrosini, 2007). That is, while certain resources may have the potential to create valuable services, the value of these services will remain latent until the firm has the appropriate capabilities to deploy them (Newbert, 2008). We can conclude that the value of shared cluster resources differs among the firms in the cluster. It depends also on the business model implemented by the firm (as a result of previously identified opportunities and the way the firm organizes to generate profits) and on the capability of the firm to deploy it. We define strategic shared resources as resources that have an effect on the implementation of the firm’s business model.

We would suggest that investigating how firms in clusters use shared cluster resources should provide a better understanding of the extent to which different business models are associated with different forms of use of shared cluster resources. It should improve the understanding of the applicability of the micro-foundations of DC, related to the definition of firm boundaries to manage complements, in a context that is different from that framed by Teece (2007).

METHODOLOGY

According to Yin (2009), a case study methodology is the most appropriate if the investigation is aimed at explaining the current situation (i.e. “why” some social phenomena occur). Yin (2009) believes that, to answer how and why questions, the assessment process does not require control of behavioral events but should focus on contemporary events. A case study method is appropriate if the phenomenon being studied is neither separable nor distinguishable from its context (Yin, 2003), and the interest is in understanding how behavior events or processes are influenced by, and influence, the context (Hartley, 2004). Based on our research question, we chose a case study methodology as the most appropriate for the present investigation.

This paper is based on a larger study that sought to identify how (dynamic) capabilities that are the source of competitive advantage for firms, are created over time. We study three footwear manufacturers to identify the capabilities that are the source of their competitive advantage, and analyze their development path in detail. These case studies can be described as elaborating the theory (Eisenhardt, 1989; Glaser and Strauss, 1967; Lee, 1999; Lee et al., 1999) and describing recent events (Eisenhardt

and Graebner, 2007). Since the aim is to develop theory, the research is essentially inductive (Hartley, 2004), based on analysis of data to explore the phenomenon of interest for which there is no adequate explanation in the theory, either because the theory does not address the particular phenomenon or because the theory does not explain it. For internal validity, the case studies were selected following a replication logic, in which a set of cases is treated as if it were a set of experiments aimed at confirming or rejecting a set of observations (Yin, 2009). The selection of multiple case studies as a research methodology seems appropriate because they typically result in better-grounded theory. When there are more cases providing support for the same theory, this is described as replication. In order to achieve greater control over the potential impacts of unexpected variations (Eisenhardt, 1989) and the effect of business activity (Rouse and Daellenbach, 1999), the companies selected are from the same industry: Portuguese footwear.

Data sources, data collection, and data analysis

Data were collected from four main sources: semi-structured interviews, companies' internal records, direct observation, and press articles (Table I). To improve external validity, data collection followed a case-study protocol for each firm (Yin, 2009).

TABLE 1
Data sources

| Source | Case/Number | | | Example |
|---------------------|-------------|--------|--------|---|
| | CALAFE | MAZONI | ABREUS | |
| Interviews | 10 | 8 | 13 | Managers, directors |
| Internal records | 24 | 48 | 57 | Sales reports, financial reports, human resources reports |
| Direct observations | 5 | 5 | 5 | Manufacturing processes; informal meetings; employees outside their working context |
| Press articles | 38 | 2 | 20 | Press releases; interviews |

Data collection occurred in 2009 and 2010. To improve feasibility (Yin, 2009), all data were entered in a database and include information on type of data, how, when, and where they were obtained and who provided them. Each element was catalogued in the case data-base. Interviews were conducted on company premises and lasted for between 40 and 100 minutes. All interviews were recorded and transcribed.

Companies' internal documentation included management reports, lists of sales and customers, company presentations, annual reports and statistical and financial information. Our direct observations were a source of valuable information that was used to triangulate data provided by respondents, and thus controls for retrospection bias, and to improve construct validity (Eisenhardt, 1989; Yin, 2009).

During the data collection period, we had access to the firms' facilities and to talk with various employees. We achieved 15 direct observations of specific inter- and intra-team problem-solving situations, and work methodologies in production. We observed employees outside the work context as well as in their job practice, which gave us a good understanding of the informal relationships within the company.

When collecting data and attempting to establish a chain of evidence, we respected the sequence of case-study questions, protocol, data-bases, and final report. Case-study reports always referred to the data sources in the data-bases (Yin, 2009). In order to improve construct validity, draft case study reports were sent to our industry informants and to industry experts for review before preparation of the final reports.

The content analysis was conducted to identify operational observations on the use made by each firm of shared cluster resources. Pieces of evidence were coded according to the specific resource analyzed. To improve construct validity, the coding process was subjected to blind coding to test coherence (Miles and Huberman, 1984). No significant variations were found. After developing the final model and the propositions, we carried out pattern matching. The empirical patterns observed were compared to the expected theoretical patterns (Trochim, 1989).

Table II summarizes the strategies used to improve the quality of the research process (see p. 41).

Research setting and cases

Since the 1970s, Portugal has been an important global manufacturer of footwear. In the 1970s and 1980s, a major Portuguese shoe manufacturing cluster (Guimarães/Felgueiras) emerged based on low labor costs. In the 1990s, there was a major relocation of production to Asia. By the early 2000s, footwear had become established as an important fashion item, and there was demand for distinctive and differentiated products. The footwear clusters had to evolve towards a more flexible and smaller production of distinctive fashion footwear, with rapid lead times. In this new industry era, factors such as flexibility, rapid response, knowledge about markets, design and marketing, have become crucial for firm success. New business models are required for firms to survive and succeed.

TABLE 2
Quality of the research process

| Tests | Case-study tactics | Research phase | Strategies used |
|--------------------|---|-----------------|---|
| Construct validity | To use multiple sources of evidence (Yin, 2009; Eisenhardt, 1989) | Data collection | Semi-structured interviews; internal records; direct observations; press articles. Data sources were triangulated aiming to reinforce the feasibility of their contents. |
| | To establish a chain of evidence (Yin, 2009) | Data collection | We respected the sequence: case-study questions; protocol; data-bases; and final report. The case-study reports were written always referring the data sources in the data-bases. |
| | Revision of case study reports (Yin, 2009) | Composition | All cases were object of a draft report that was reviewed by firms' informants as well as by industry experts. |
| | Codification process and revision (Miles and Huberman, 1984) | Data analysis | The coding processes were confronted with a blind coding to test their coherence. |
| | Pattern matching (Trochim, 1989) | Data analysis | Analyzing data, the empirical patterns observed were compared to the theoretical expected patterns. |
| Internal validity | To use replication logic in multiple case studies (Yin, 2009) | Research design | It was used when selecting the case-studies, aiming to obtain literal and theoretical replications. |
| External validity | To use case study protocol (Yin, 2009) | Data collection | We elaborated a protocol for each case-study. |
| Feasibility | To use case study databases (Yin, 2009) | Data collection | Each case-study had its own data-base where all data was catalogued. |

Guimarães/Felgueiras is the most important Portuguese shoe manufacturing cluster. The Portuguese shoe manufacturing industry is recognized as a successful case in the Portuguese economy. Portugal is ranked seventh among international exporters of shoes and is the fourth most important exporter in Europe. The Portuguese industry is mostly export based (APICCAPS, 2008).

The three case firms are located in the Guimarães/Felgueiras cluster.

Case 1: CALAFE

CALAFE's business model is characterized by its offer of solutions for small series, for small and medium retailers and stores that value quick response and good design. The brand EJECT, which has become increasingly important for CALAFE, is based on flexibility and New Product Development (NPD). The

TABLE 3
Case descriptions

| | Case 1: CALAFE | Case 2: ABREUS | Case 3: MAZONI |
|---------------------------------------|---|---|-----------------------|
| Founding Date | 1981 | 1994 | 1993 |
| Founders | Two brothers: J. Sampaio e Irmão, Lda | Two brothers, 3 rd generation in the footwear industry | Mr. Fernando Sampaio |
| Revenues (2008) (1000 Euros) | 11,979 | 7,974 | 3,842 |
| Net Profit (2008) (1000 Euros) | 52 | 24 | 9 |
| Employees | 128 | 122 | 81 |
| CEO / Leader | Mr. Carvalho (who joined the firm as an employee in 1983) and became partner 6 months later | Miguel Abreus (son of one of the founders) | Mr. Fernando Sampaio |
| Growth Rate (CAGR) | 12% in 1998-2008 | 10% in 1998-2009 | 3% in 1998-2008 |
| Brand | EJECT (founded 2001): 40% Sales and PROPHECY (founded 2007): 1% sales | GOLDMUND (established 2006) | Dark (founded 2000) |

Source: Firms' internal documents

EJECT brand achieved market recognition when it was exhibited at the Bread & Butter trade fair, to which only few firms are invited to exhibit. The firm's technology allows great flexibility of production. Its well trained employees are very versatile. For pre-sewing, the qualification is 53% (i.e., on average, each person in the pre-sewing section is qualified to perform 53% of the operations involved), 52% for sewing, 24% for pre-assembly, 20% for mounting, and 48% for finishing.

Case 2: ABREUS

ABREUS's source of competitive advantage is its ability to create value for the customer by developing new products, of reasonable quality, at reasonable cost, and in a fairly short time. The business model relies on value creation based on developing difficult and distinctive, sophisticated shoes.

Case 3: MAZONI

MAZONI's business model is based on a good quality product offer and a good level of service to clients, accompanied by relatively low prices. This business model is based on low costs.

DATA ANALYSIS: SHARED CLUSTER RESOURCES AND THEIR USE

We analyze the use of four cluster resources.

Human resources

The three case firms mostly recruit new personnel locally, often from local support institutions (e.g. Vocational Training Center for the Footwear Industry) or from the large pool of qualified employees available in the vicinity. For example, in the areas of production and support (i.e. warehouses, planning, quality control), new employees are hired locally, and most already have experience in the footwear industry. When recruiting and hiring new personnel, all three firms search among skilled (cluster) employees, with experience or training in the specific tasks required. However, there are some differences in the hiring strategies of the three firms, due mainly to the need to integrate the new personnel into the firm's own culture and internal operational aspects.

CALAFE looks for “flexible” employees able to adapt to the complexity of its daily operations. MAZONI is interested in people capable of self-controlling the quality of the operations they perform and who will be willing to work overtime to avoid production delays. In the area of modeling, in particular, ABREUS looks for people with experience of developing products for new clients who are able to understand customer needs.

Footwear Trade Association

All three companies use the Footwear Trade Association (APICCAPS) to enable participation in fairs and international events. APICCAPS has long experience in organizing exhibition and participation, in helping companies to select the most appropriate spaces, to assemble their stands, and decide on which materials to show. All three firms make similar use of this cluster resource.

Raw-materials and components

Most of the components and raw-materials required for the production of shoes are purchased from local suppliers. Wherever possible, raw materials are acquired locally but there are some differences in supplier relationships and purchasing priorities.

MAZONI purchases materials based on production needs, following confirmation of an order from a customer. This implies that suppliers need to be able to respond rapidly, an ability that relies on their management of stocks. In order to improve the responsiveness of suppliers, MAZONI has a policy of immediate payment, and works on maintaining good formal and informal relationships with suppliers:

I call my suppliers “teammates” even though they are not really. From time to time I send them gifts, not to “buy” them, but to foster a good relationship. And that gives me good value advantage in terms of supply. They like me, and give me priority.

CALAFE follows a policy of “zero stock”. CALAFE has become very flexible and able to respond in a short time. The most complex component in footwear production is soles, and particularly the type used by CALAFE. Ordering is based on already identified needs. Sometimes it is only the geographical proximity and good relations among the parties that allow materials to be available on time:

.... the soles supplier also subcontracts some operations... and this whole process is necessary to make the machine work well: we need the soles, others make the soles, and lots of tasks have to be performed by several entities. This is sometimes a snowball process. Yesterday one of our people went to pick up some soles from a subcontractor of our supplier that was performing one operation, and he took them directly to our production subcontractor, bypassing the soles supplier.

ABREUS is keen to learn from suppliers, and focuses on those that produce the most innovative solutions:

... Knowledge is fundamental and we need to learn. I have to call the right people. I know who to call. And to top it off I have people to turn to... to the best soles firm in Portugal, I work with it. The best insoles firm in Portugal is the one I work with. I only work with the best. It is them, the best ones, that I’ll learn from... and this has been my priority from the beginning...

Both CALAFE and MAZONI make efforts to develop informal relationships with suppliers. In the case of CALAFE, this is to avoid logistical problems, particularly in the supply of soles specifically designed for the company. In the case of MAZONI, these relationships are aimed at on-time delivery. Informal relationships with suppliers can become friendships that facilitate the delivery of materials in time to meet customer deadlines, which in turn supports good customer relations. ABREUS tries to work with suppliers of innovative materials and finishes, and to learn from them, which allows it to offer new and innovative solutions to customers.

Production capacity – Subcontracting

All three firms outsource parts of their production to local companies (see Table IV, p. 45), although their outsourcing policies vary.

CALAFE’s production subcontracting policy is to outsource larger series to contractors, and to keep production of small series in house. The latter include more complex models and operations where quality is critical. In some cases, some of the

TABLE 4
Firms' internal production rate

| Phase/Firm | CALAFE | MAZONI | ABREUS |
|------------------|--------|--------|--------|
| Sewing | 6% | 69% | 14% |
| Finishing | 38% | 92% | 65% |

Source: Documents and interviews

cutting, pre-sewing, and sewing phases are kept in house but the rest is outsourced. The biggest internal production series is sometimes 10 pairs of shoes and as a result the internal production line might be coping with up to 20 models at a time.

... But the biggest orders we have put into the seam line is 10 pairs! On the first day it opened (after the summer vacation), August 31, we came to work, we finished 17 models.

This situation is different from that of other footwear companies:

... People I talk to sometimes say, "Hey man, I had to get X models into production". I say, "Hey man we do it every day! Every day for many years."

MAZONI has the opposite policy towards subcontracting sewing: smaller series are outsourced, and the larger production is kept internal. In relation to subcontracting the production of entire shoes, its policy is to outsource simple, low priced models where final product quality is not an issue:

We only subcontract relatively easy and low price models, when the customer does not care if we outsource.

At ABREUS, management of subcontracting is based on the firm's knowledge of the specific skills of the subcontractors and the volume of work:

... I decide to subcontract to one factory or another based on the knowledge of our partners I have gained from previous work with them. I try to adapt the models at the seams... depending on the workloads and squeezes in terms of delivery.

However, orders for smaller and more complex models in terms of logistics (those requiring laser applications or embroidery) tend to be produced internally.

The three companies have long-term, stable commercial relationships with the sewing units that work exclusively for them. Their relationships with these units are more than just a service provider relationship. In order to maintain stable relation-

ships with the subcontractors, the three companies provide them with some technical support in the form of training (company employees go to subcontractors' facilities to demonstrate certain operations), or loans of machinery, and technical maintenance.

Establishing lasting relationships with subcontractors is seen as advantageous by all three companies because it allows the development of mutual expectations, which in turn influences mutual knowledge. This mutual knowledge leads to a better distribution of orders by subcontractors, minimizing quality or lead time problems.

Both CALAFE and ABREUS prefer to outsource the sewing for larger series, but for different reasons. For CALAFE, the subcontracting of larger series demonstrates the importance the firm gives to the profitability of subcontractors. CALAFE concentrates on the more complex models, leaving the simpler ones to be manufactured by partner companies. This affects the productivity and profitability of the contractor, and promotes loyalty to CALAFE, which is crucial for its ability to achieve fast response to market demands. Due to logistics issues, ABREUS also subcontracts larger series and items for which production requires non-traditional operations.

MAZONI subcontracts the sewing of smaller series, focusing on internal productivity, which is fully consistent with the need to keep costs low. MAZONI subcontracts the whole production only of simple non-complex shoes, where quality is not problematic. By producing complex models internally, the firm can control the critical variable of quality in its business model. Exceptions to MAZONI's subcontracting policy occur when there are tight delivery deadlines which the firm is anxious to meet.

DISCUSSION

The objective of this research is to contribute to knowledge on DC in the specific context of clusters, and particularly how different companies, implementing different business models, use shared cluster resources. To study the problem, we formulated the following research question: *How do firms in clusters use shared cluster resources?*

Each of the three companies studied have implemented different business models in recent years (Tables V and VI, p. 47-48).

We identified the business models of the three case study firms, which belong to the same cluster, have similar firm boundaries, and are exposed to the same shared

TABLE 5
Firms' business models

| Firm | Business Model | Key attributes | Human resources | | Raw-materials/ components | | Production capacity : | |
|--------|---|--|---|---|--|---|---|--|
| | | | Operational observation | Rationale | Operational observation | Rationale | Operational observation | Rationale |
| CALAFE | Small series targeting small and medium footwear retailers that value fast response and design. The brand EJECT benefits from flexibility and distinctive new product development capability. | Flexibility NPD Very fast response | Hiring people that can better adapt to the complexity of daily operations | To assure operational flexibility and very fast response | Development of informal relationships with soles suppliers | To assure on-time delivery in order to keep very fast response to customer orders | Subcontracting of the larger series. To keep on subcontracting even when there is no production orders to keep internal production line working. Vertical integration of the production of the most complex models. | To maintain the productivity and hence the profitability of the contractors. To keep the contractors loyal to the firm helps maintain the very fast response. |
| | | | Hiring modelers that already know the needs of new customers | To improve the NPD processes | To learn from suppliers To buy from the most innovative suppliers | To use different materials and finishes in order to deliver distinctive shoes | Vertical integration of the production of the models that need nontraditional operations. Vertical integration of the production of the smaller series | To guarantee the logistics of the operation |
| ABREUS | Solutions for difficult and distinctive shoes. | Innovation New materials and finishes NPD | | | | | | |
| MAZONI | Good quality products and a good customer service, delivered at relatively low prices. | Productivity Industrial process quality Product quality Low costs On-time delivery | Hiring people able to self control the operations they perform and are available for extra work hours | To assure the product quality, low costs and delivery schedules | Development of informal relationships with suppliers Timely payment of suppliers' purchases based on customers' orders | To assure on-time raw-material delivery to guarantee on-time delivery of final goods to customers | Subcontracting of production of the smaller series Subcontracting of production of the lower price shoes as well as of the simplest Subcontracting to guarantee delivery dates | Producing the longer series internally keeps productivity high and reduces production costs These products have no major quality issues In extreme situations the firm contracts the production of larger series or of the more complex and quality demanding products to deliver the final goods on-time. |
| | | | | | | | | |

TABLE 6
Use of cluster resources by firms

| | Human resources | Footwear Trade Association | Raw-materials and components | Production capacity |
|---------------|---|---|---|--|
| CALAFÉ | Access to Vocational Training Centre of the Footwear Industry Access to local qualified employees Ability to cope with complexity. | APICCAPS (Footwear Trade Association) organizes firm participation to international events | Purchasing through the development of informal relationships with soles suppliers | Subcontracting of the larger series. Subcontracting even when there are no orders to keep the internal production line working. Vertical integration (no subcontracting) of the production of the most complex models. |
| ABREUS | Access to Vocational Training Centre of the Footwear Industry Access to local qualified employees Knowledge of the customers' needs | APICCAPS (Footwear Trade Association) organizes firm participation to international events | Purchasing from the most innovative suppliers | Vertical integration of the production of the models that need nontraditional operations. Vertical integration of the production of the smaller series. Subcontracting of the others. |
| MAZONI | Access to Vocational Training Centre of the Footwear Industry Access to local qualified employees Ability to self control for the performed operations Availability to work extra-hours | APICCAPS (Footwear Trade Association) organizes firm participation to international events | Purchasing Just in Time based on customers' orders | Subcontracting of the smaller series. Subcontracting of the production of the cheapest and simplest products. Subcontracting to guarantee delivery dates. |

cluster resources. The data collected help to explain how the companies use these shared cluster resources.

Footwear Trade Association

All three case firms use APICCAPS mainly to facilitate participation in international fairs. This participation does not provide competitive advantage, only competitive parity. However, not participating, or doing it badly, may become a competitive disadvantage. Business associations are considered in the literature to be important for SME (Bennett and Ramsden, 2007). The shared cluster resource, APICCAPS, is used in the same way and for the same purpose by all three firms.

Our first finding is that, with respect to cluster resources that do not have a direct impact on the firm's business model, or whose use is aimed at avoiding competitive disadvantages (non-strategic resources), the firms adopt a similar strategy: APICCAPS. This non-strategic shared resource does not fall within the VRIN framework (Barney, 1991), although it is necessary for the continued existence of firms (Pan et al., 2007). It can result in competitive disadvantage if used inefficiently or in competitive parity if used efficiently (Barney and Wright, 1998).

Human resources, raw-materials and components, and production capacity

Clusters tend to have a good availability of highly qualified human resources (Marshall, 1920). Human resources availability can be considered a shared cluster resource. The right choice of personnel may contribute to competitive advantage especially in relation to their integration in the firm's processes and culture. Hiring inappropriate people for the job can lead to competitive disadvantages: need for rehiring/replacements, increased costs, lost time. Recruitment is based on different criteria in all three cases studied, but always aimed at better integration of new people in the firm's processes, which in turn are aligned to the business model.

The resources, raw-materials and components (purchase of), and production capacity (subcontracting of) are strategic shared resources for each of the three firms. They are valuable to each of them but in different ways, which is why they are used differently. They depend on complementary aspects of the three business models and other internal and external resources and organization (Newbert, 2008; Tallman, et al., 2004). This finding is in line with the results in Camisón (2004) and Wu et al. (2010), i.e. firms' internal capabilities are a variable that moderates the effect of shared resources on firm performance and competitive advantage.

Our observations showed that the three companies access differently the shared resources that have a direct impact on key attributes of the business models; this is

particularly true of human resources (hiring), raw materials and components (purchasing), and production capacity (subcontracting) (see Table V). The shared resources are used as complementary resources by the firms, and are particularly important for business model development (Wheelen and Hunder, 2010). Our observations also confirm that firms establish informal alliances with raw-materials and components suppliers and subcontractors (Collis and Montgomery, 1995) which improves the services they provide.

Propositions

One of the micro-foundations of DC is the definition and implementation of a business model. To take advantage of their business models, firms need to define their boundaries in order to manage complements (Teece, 2007). Cluster firms are usually SME, specialized in particular areas of the value chain (Piore and Sabel, 1986). Firm boundaries tend to be narrow, which allows firms to take advantage of shared cluster resources. Different companies with different business models have access to and exploit the same cluster resources. Based on our observations, we propose the following.

Not all shared cluster resources are used in the same way by cluster firms.

Proposition 1 – *Firms in clusters use the same shared non-strategic resources (which have no direct impact on the business model), in the same way, and for the same purpose.*

Proposition 2 – *Firms in clusters use the same strategic shared cluster resources (which have a direct impact on the business model), in different ways and with different purposes.*

CONCLUSION

In this paper we integrate the DC and cluster literatures to develop theory on how firms use shared cluster resources. Through a multiple inductive case-study methodology, we analyze how three firms, with different recently implemented business models, use four different shared cluster resources. We conclude that, when implementing different business models, firms in clusters make different use of strategic shared cluster resources but similar use of non-strategic shared cluster resources. Our observations, and the existing literature, allow us to propose a model of shared cluster resources use based on two propositions.

From a theoretical point of view, this paper contributes to both the cluster and the DC literatures. The cluster literature highlights the importance of shared resources

for cluster firms and the whole cluster but does not examine how or why firms use these resources and why some contribute to competitive advantage. The DC literature points to the need to select firm boundaries to manage complements when developing new business models to cope with rapidly changing environments. Shared resources in clusters are complements that firms can exploit to implement their business models. We use the DC literature to build theory in a different context of mature and well developed technology, where change is slow and in known directions.

We investigate the use of shared resources by three cluster firms that recently implemented business models aimed at adapting to changes in the environment. These firms developed (dynamic) new capabilities. By distinguishing between strategic and non-strategic shared resources, we show that the mere existence of shared resources is not sufficient to provide cluster firms with competitive advantage. In relation to strategic shared resources, firms use them differently in order to complement their internal capabilities and achieve competitive advantage. Non-strategic resources are used by the firms in the same way and for the same goals, regardless of their individual business model. They are used mainly to avoid competitive disadvantages.

The generalizability of the findings is a major limitation of this paper. We study only three SMEs and four shared resources, in one cluster. More qualitative and/or quantitative studies are needed on the same or other clusters.

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