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Faraway, so close. Division of labour, supplier relationships and outsourcing strategies.

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Abstract

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Abstract

Outsourcing is a viable strategy, increasingly used by firms to lower costs, to access new technologies and capabilities, to gain flexibility and to be able to focus on distinctive and core capabilities. However, the resolution to outsource a specific activity it is only the first step of a series of important decisions that we define as “outsourcing strategies” and that constitute the central focus of the present work. In exploring outsourcing strategies, we identified the existence of a continuum of possible outsourcing strategies, positioned between to extremes poles: on one side, we have a very close relationship between supplier and client; on the other side we observe a clear and rigid division of tasks, roles and duties: no overlapping of knowledge nor capabilities is present. The empirical setting of the study is the offering of integrated solutions, where we assist to the elimination of the traditional division between service and manufacturing. Adhering to solutions, firms are called to offer products and services together, as a unique package. Due to its novelty, this represents an ideal context to observe the dynamics taking place. Relying on an original dataset of 102 firms operating in the IT sector in Europe, this paper explores the rationales behind outsourcing decisions, investigating type of activities externalized, and firms' relationships with suppliers in an outsourcing processes.

Keywords: firms' boundaries, outsourcing strategies, suppliers' relations, solutions

1. Introduction

The increasing complexity of products and services, the demand of customers for the latest technologies and the high competitive pressure, increased the use of outsourcing as a strategy to reduce costs and access to specialized knowledge located outside firms' boundaries, and augment flexibility. Although research has greatly deepened our understating of the advantages and disadvantages of outsourcing, we still know preciously little on how firms define their outsourcing strategies. (Bounfour, 1999, Gilley and Rasheed, 2000, Holcomb and Hitt, 2007, Maskell et al., 2007, McIvor, 2008, Miozzo and Grimshaw, 2011, Rothaermel, Hitt and Jobe, 2006, Wüllenweber et al., 2008). Whenever firms decide to make use of outsourcing, they are called to take decisions regarding their closeness with suppliers in terms of knowledge, capabilities and sensitive information to be shared and the organizational solutions to be adopted. This theme is of central relevance to the managerial literature (Gulati, 1998, Kapoor and Adner, 2011, Parmigiani, 2007, Parmigiani and Mitchell, 2009).

In this work, we focus on firm's outsourcing strategies – i.e. the mix of decisions that defines the types of relationships with the suppliers, the capabilities to retain in house or to share.

According to extant literature – e.g. transaction cost economics and resource based view - outsourcing decisions are influenced by firms' (i) endogenous factors – such as resources and strategies – and (ii) exogenous factors – such as technical characteristics of the production process. We intend to investigate the impact of such factors on firms' outsourcing strategies.

Boundaries can be shaped in a number of ways, spanning from a close interaction with the suppliers, involving high level of knowledge sharing, to a rigid division of tasks, where rules and roles are clearly identified. Outsourcing strategies may be positioned in a continuum where the two extreme points are represented by two opposite situations: on one side, we have low integration among firms and a rigid division of labour, firms are distant from both the cognitive and the organizational viewpoints; on the other side, there is high integration among firms and blurred division of labour: cognitive and organizational boundaries are imprecise. In this paper, we aim to address the following research questions: how do endogenous and exogenous factors influence firms' outsourcing strategies? In a client-supplier relationships, who does what? And who knows what?

We grounded the analysis in a fast evolving industry: IT solutions (Davies, 2004, Oliva and Kallenberg, 2003), where the offering is constituted by a customized bundle of products and services. Offering a solution drove the elimination of the traditional division between service and manufacturing: adhering to it, firms are called to offer products and services together, as a unique package. More specifically, ERP systems comprising hardware, software, and technical

support are offered as solutions. Clients do not buy single components from different firms, but they purchase a complete ERP system from a single supplier that provides software and hardware as well as consultancy services, post sale assistance, system customization, and hardware maintenance (Foote et al., 2001, Galbraith, 2002). The offering of solutions poses a number of challenges for firms that need to integrate different activities, often performed by diverse firms. In fact, the activities included in a solutions are often developed in collaboration with external suppliers and the solutions provider has the responsibility for the integration and for the final delivery (Windhal and Lakemond, 2006). Thus, looking at the solutions phenomenon it is possible to study outsourcing strategies adopted in an evolving context.

The paper is organized as follows. In the next section we review significant contributions from the literature. We will then describe the two types of configurations and the factors that define them. Then, using data from a sample of IT solutions providers, we subject the hypotheses to empirical analysis to determine how the balance between “faraway” and “so close” is determined. A description of our analytical approach follows, along with a discussion of the results. We conclude with a summary of the main contributions arising from the analysis.

2. Theoretical background

2.1. The boundaries of organizations

When Coase (1937) first developed the transaction cost approach (TCE), his contribution constituted a major departure from the dominant neoclassical economic orthodoxy. Infringing the assumption that every firm is characterized by the same production function, Coase (1937) argued that firms will externalize activities only if the transaction cost savings are greater than any production costs. The emphasis of TCE approach is on the transactions themselves: the opportunity to internalize or externalize an activity depends on the characteristics of a given transaction (Coase, 1937, Coase, 1960, Williamson, 1975). As Joskow (1988) pointed out, one of the most important contributions of TCE is its comparative perspective – that is, its recognition that a wide range of arrangements can be made to govern transactions. Markets and hierarchies roughly define the two extremes of a variety of resource-allocation arrangements. But a rigid separation between markets and hierarchies exists neither in practice nor in the literature. The decisional process is more complex and, once the production process is moved outside the firm’s boundaries, firms are called to define also types of the relationship with the suppliers. Firms are supposed to define how close to be with its suppliers and, more importantly, how much knowledge, capabilities, and sensitive information to share.

Recently, strategy and innovation scholars started exploring the structure of relationships among agents in an industry. Empirical research on a variety of empirical contexts – e.g. computers (Baldwin and Clark, 2000), text books (Schilling, 2000), and mortgage banking (Jacobides, 2005) - suggests that industries are moving towards an increasing disintegration and specialization. From this viewpoint, not only is it important to investigate the decision of a single firm but also analyze the entire structure of the supporting value chain (Jacobides, Knudsen and Augier, 2006). The attention is toward the stable and evolving relationships along the value chain, focusing on the patterns of the division of labour amongst different types of actors and the associated set of “rules and roles” that emerges (Dalziel, 2007, Fixson and Park, 2008, Pisano and Teece, 2007). The structure of industries so defined both influences and is influenced by how firms develop, share, and integrate labour and knowledge. New dynamics, such as a transition from vertical integration to vertical disintegration, accelerate and alter consolidated boundaries divisions. This shift poses new challenges for the integration of heterogeneous knowledge bases and the effectiveness of established knowledge integration mechanisms (e.g., systems integration). By describing the division of labour and interactions among players, it is also possible to gain some understanding of how organizations evolve and are transformed (Ferraro and Gurses, 2009, Jacobides, 2006).

2.2. Resources, capabilities, and outsourcing

Firms are different because their capabilities mixes are heterogeneous (Penrose, 1959). Firms exhibit heterogeneity in their capabilities configurations, which arises from the specific contingencies that they are called to face (Siggelkow, 2001). As Dierickx and Cool (1989) have pointed out, the difficulties of building and imitating capabilities largely depend on the stock of knowledge and capabilities. Even if firms are sufficiently aware of the required capabilities base to be able to be successful and survive in the market, path dependence and organizational inertia tend to lower their ability to perfectly adhere to the ideal configuration (Dietrickx and Cool, 1989, Hannah and Freeman, 1984, Winter, 1987). In line with this reasoning, firms that operate in the same business follow different paths and exhibit heterogeneous capabilities configurations (Ceci and Masini, 2011, Gresov and Drazin, 1997, Payne, 2006). Their offers are influenced by these configurations, which also affect their outsourcing strategies.

3. Hypotheses development

3.1. Faraway, so close: two extreme points of a variety of outsourcing strategies

The decision to outsource tasks is only the first step of a long series of strategic decisions that firms take to define their boundaries, decisions that have profound impact on firms competitiveness. Decisions that firms must take are not only whether to outsource or not but also how and to whom and which capabilities to retain in house: we define this mix of decisions as outsourcing strategies. Such decisions are particularly relevant in sectors where knowledge and capabilities to be integrated are numerous and different (Brusoni, Prencipe and Pavitt, 2001, Jacobides and Billinger, 2006, Kapoor and Adner, 2011, Patel and Pavitt, 1997, Pisano, 1990). The aim of this work is to understand how outsourcing strategies are influenced by endogenous and exogenous factors. This reasoning is graphically illustrated in the analytical model reported in Figure 1. In such model exogenous and endogenous factors are linked to the typology of outsourcing strategy that they enable. The two typologies represents two extreme poles of a continuum of outsourcing strategies that firms might adopt: Figure 2 reports a graphical illustration of the two opposite poles of this continuum.

Figure 1 and Figure 2 about here

In the first case (faraway), firms opt for market-based relationships, with little overlapping of labour, capabilities, and rigid separation of activities. The outsourcer has higher control over externalized activities. Higher control and rigid labour division limit supplier opportunism (Conner and Prahalad, 1996, Demsetz, 1968, Takeishi, 2002). This outsourcing strategy is more appropriate for simple and well structured problems (Farjoun, 1994, Macher, 2006).

In the second case (so close), firms opt for closes integration with the suppliers with an cognitive and administrative overlapping (Das, Narasimhan and Talluri, 2006, Petersen, Handfield and Ragatz, 2003). A closer interaction with the suppliers facilitates the development of similar capabilities (Borys and Jemison, 1989), lowers the risks of technological uncertainty (Kapoor and Adner, 2011), facilitates knowledge sharing (Bonaccorsi and Lipparini, 1994, Parmigiani, 2007). This solution is more appropriate for ill structured and complex problems (Macher, 2006).

In exploring these two outsourcing strategies, we shall focus on two decisions taken by the firms: (i) use of concurrent sourcing and (ii) type of relationships with the suppliers. Firms adopt a concurrent sourcing approach when there is an overlapping of activities and knowledge with the suppliers (Bradach and Eccles, 1989, Gulati and Puranam, 2006, Harrigan, 1986, Parmigiani, 2007). Concurrent sourcing has its own specific characteristics; it is not a mix of make and buy but it represents a discrete choice made by the firm. A number of studies investigated the adoption of concurrent sourcing in diverse sectors (Bradach, 1997, Cassiman and Veugelers, 2006, He and Nickerson, 2006, Rothaermel, Hitt and Jobe, 2006). Parmigiani (2007) investigated the reasoning behind concurrent sourcing relying on transaction cost

theory, neoclassical economics, and firm capabilities theoretical approaches. Her study showed that the choice of concurrent sourcing is positively influenced by (among the others): firm's and supplier's scope economies, and expertise. Parmigiani (2007) showed that the strategy of concurrent sourcing is not positioned in a continuum between the make or buy decision but it represents a third choice that allow the achievement of advantages that differ from the ones identified for outsourcing or internalization (Helfat and Eisenhardt, 2004, Jacobides, 2008).

The second aspect that defines outsourcing strategies is the type of relationship with the supplier. We define as type of relationship the contractual form adopted to regulate the exchange, as it is defined by law and by mutual agreements among firms. This aspect of outsourcing defines organizational boundaries from a formal viewpoint and helps understand its strategic role. In fact, outsourcing can be implemented with a large variety of partners and firms might be willing to share knowledge and goals or simply adopt an arm's length relationship. Decisions are complex and highly strategic, especially because they shape roles and rules behind the selected configurations (Gulati, 1998). Studies that focused on the types of relationships between partners identified a series of factors that influence such decision, such as the length of the relationship, the expected exchange of knowledge and resources and the need for efficiency and flexibility (Argyres, 1996, Borys and Jemison, 1989, Conner and Prahalad, 1996).

3.2. The role of endogenous and exogenous factors in influencing outsourcing strategies.

The aim of this work is to understand how outsourcing strategies are selected and how endogenous and exogenous factors affect such decision. Exogenous factors are technology-related and influenced by the technology underlying the activities outsourced. Firms have few degrees of freedom to modify them. Two factors fall in this category (i) the degree of product modularity and (ii) the level of process standardization. Process standardization largely depends on the technical characteristics of the process itself and the use of modularity largely depends on the development of common products interfaces. The level of product modularity and process standardization change according to the types of activity.

Endogenous factors are strategy-related: they do not depend on the technical characteristic of the outsourced tasks but they are influenced by firms' decisions. The two endogenous factors are: (i) the core-ness of the task and (ii) the frequency of how often the activity is included in the solution. These factors influence firms' strategic positioning and depend from firms' characteristics and decisions.

These four factors have been chosen considering the specificities of the IT solution. Relying on previous studies, we selected as factors the characteristics that influence firms outsourcing decisions (Ceci, 2009, Ceci and Masini, 2011, Davies, 2001, Davies, 2004, Davies, Brady and Hobday, 2006, Galbraith, 2002, Windhal et al., 2004). We know how the factors impact on the decisions whether to outsource or not but we do not know the extent to which they impact on the outsourcing strategies. A review of previous literature lead us to the development of the following hypotheses, described as follows.

Modularity of products

To capture the benefits of customization without incurring its full costs, firms might adopt modular design architectures. In modular architectures, module interfaces are standardized and must remain unchanged, for a specified period of time (Schilling, 2000). Each module performs a specific function and can be designed and improved independently. Products designed according to modularity principles can be easily interconnected and bundled (Ulrich, 1995). Modularity offers several advantages: in addition to greater specialization, it helps firms achieve flexibility and offer quick answers to the market through the introduction of new products, the extension of their product lines, and rapid product upgrading (Sanchez and Mahoney, 1996, Schilling and Steensma, 2001). Tiwana (2008) has highlighted that technological modularity may substitute for more formal control mechanisms, such as alliances, because it facilitates the decoupling of interoperating subsystems. Modularity allows firms to make extensive use of outsourcing, such that they can concentrate on downstream activities to provide more lucrative services and solutions to customers and it can mitigate the risk of technology appropriation by alliance partners, which decreases the need for intensive inter-firm interactions (Prencipe, Davies and Hobday, 2003).

Hp1: A "faraway" outsourcing strategy is preferred in the case of modular products

Standardization of processes

Standardization of process is a mechanism that facilitates control and therefore makes the decision of outsourcing viable. but it is still unclear how high standardization in processes affect the relationship with the supplier. Literature on systems integrations suggests that for unstandardized processes, a strong relationship with the supplier is preferred. In this case, the needs of integration is highly required: the different components and subsystems outsourced to external parties must fit together (Hobday, Davies and Prencipe, 2005, Prencipe, Davies and Hobday, 2003). Standardization of process requires ex ante coordination. Especially in multi

components products, there is a high need for standardized interfaces and common protocols that will facilitate the integration of the different subcomponents. Shared process-product interfaces make possible standardization across suppliers making the outsourcing possible and costly viable (Ceci, 2009, Wüllenweber et al., 2008). Therefore, common interfaces and standardized productive process facilitates the production of components that will easily work together, facilitating the division of labour between firms (Beimborn et al., 2009).

Hp2: A "faraway" outsourcing strategy is preferred in the case of highly standardized processes

Frequency

Another factor that influences decisions behind outsourcing strategy is the frequency of transactions. As the transaction cost economics pointed out, "specialized governance structures are more sensitively attuned to the governance needs of non-standard transactions than are unspecialized structures, *ceteris paribus*" (Williamson, 1985: p.60). The cost of a specialized governance structure is greater than the costs of an unspecialized structure, so the volume of the transactions plays a central role in deciding whether to adopt an ad hoc governance structure or not. In our empirical context, there is no need to ad hoc transaction meeting or dedicated agreements in the case of a one-off transaction: the use of the market is preferred because it is less expensive.

Hp3: A "so close" outsourcing strategy is preferred in the case of frequent activities

Core

Firms tend to specialize in activities in which they have a comparative advantage (Jacobides and Winter, 2005, Kogut and Zander, 1992, Teece, Pisano and Shuen, 1997). As pointed out by Hamel and Prahalad (1994), successful growth requires the development of adequate core capabilities. By core capabilities we mean all the capabilities that are essential for the achievement of competitive advantage for the firm (Barney, 1991, Leonard-Barton, 1992, Patel and Pavitt, 1997). Firms' core capabilities allow access to a number of markets, contribute significantly and positively to the perception that the client has of the product, and be difficult to imitate. In this way, core capabilities provide strategic differentiation for the firm (Leonard-Barton, 1992). Outsourcing strategies are influenced by capabilities configuration of firms because firms tend to retain in-house those activities that are core for their business.

Hp4: A "so close" outsourcing strategy is preferred in the case of outsourcing core activities

4. The empirical context: the IT solutions business

In an increasing number of industrial sectors, firms are moving toward the provision of bundled services and products, or solutions - often referred as integrated solutions by certain authors - (Galbraith, 2002, Kapletia and Probert, 2010, Miozzo and Grimshaw, 2011, Oliva and Kallenberg, 2003, Windhal et al., 2004). Solutions have been firstly adopted in the IT sector and nowadays we assist to their diffusion in a number of sectors (Kapletia and Probert, 2010, Windhal and Lakemond, 2006). An example from the automotive industry is Iveco, an Italian firm operating in truck and bus industry. Iveco understood that customers do not want to wholly own a quickly depreciating asset; they will prefer paying for it when it is actually on the road. This led to the development of business model innovation such as the per-kilometre contract hiring, a type of offering that led Iveco to invest in customer support, remote diagnostic tools, cost management, post sales services and spare parts management systems (Ceci, 2009). The provision of solutions is done through the offering of a bundle of activities. The activities that compose solutions (e.g., financing contracts, after-sales support, maintenance, user training, software, hardware) differ greatly among customers and require unique, highly heterogeneous knowledge bases, such that integration requirements become even more stringent and may undermine the effectiveness of previously developed mechanisms (Ceci and Prencipe, 2008, Windhal and Lakemond, 2006). The emergence of this new offering forces firms to change their approach to the definition of boundaries: they are required to incorporate new knowledge bases that go beyond traditional reservoirs and span the entire value chain or even beyond. Manufacturers need to include service elements; service firms need manufacturing elements; both must feature consulting and post-sales activities. In addition, the scope of knowledge reservoirs can shift dynamically: knowledge that was hitherto considered critical may grow unnecessary, and new knowledge bases previously considered unnecessary may be a *condicio sine qua non* for remaining competitive.

Another important characteristic of solutions that makes this context particularly appropriate for the study is the existence of a high degree of equifinality (Ceci and Masini, 2011, Davies, Brady and Hobday, 2007, Gresov and Drazin, 1997, von Bertalanffy, 1968). There is not such thing as a "best strategy" but firms compete and exist in the market adopting different approaches. The different strategic choices are not fully equivalent and this offers room for strategic manoeuvring to IS providers, who can develop different capabilities or target different markets, or both, depending on the specific objectives they aim to pursue.

5. Methods

5.1. Data collection: sampling and questionnaire administration

The data for this study were obtained via a survey of a sample of solutions providers operating in the IT sector. In the first phase of data collection, extant literature and empirical evidence were used to generate valid items to measure the constructs in our theoretical model. The literature review focused on four topics: solutions, systems integration, project-based organization, and firm boundaries (Brady and Davies, 2004, Cerasale and Stone, 2004, Davies, Brady and Hobday, 2006, Oliva and Kallenberg, 2003, Prencipe, Davies and Hobday, 2003, Williamson, 1975). This review was then supplemented with a multiple case study analysis. Ten IT solutions firms operating in Italy were examined through an analysis of documentary and archival data and interviews with project managers, marketing directors, and sales directors. Interviewees were asked to describe, for a typical solutions project, the phases, activities performed, capabilities required, organizational form adopted, level of standardization/customization of the solution, and problems and criticalities, as well as the role played by external suppliers of products and services in the provision of the solution. Together with the analysis of the literature, this allowed for the establishment of a taxonomy of solutions capabilities and the identification of items describing the characteristics of these solutions (Ceci, 2009, Ceci and Prencipe, 2008).

In the second phase of data collection, the items were coded into a questionnaire and submitted to a sample of IT solutions providers in Europe. To assure homogeneity in the sample, the survey was restricted to four countries that were representative of the overall population of IT solutions providers in Europe and offered favourable opportunities for data collection: Italy, Spain, the United Kingdom, and Sweden. To maximize the accuracy of responses, the questionnaire was prepared in the native language of the respondents (with the exception of Sweden, where English was used). The survey was written initially in English and was then translated into Spanish and Italian. The Italian and Spanish versions were then translated back into English by a second translator to check their accuracy and to eliminate inconsistencies (Bensaou and Venkatraman, 1995). Each version of the questionnaire was pretested with industry representatives to ensure that the target informants understood the wording and that the Italian and Spanish versions were valid translations.

The sample selection was based on an ad hoc sampling procedure. As there was no extant database of solutions providers, we developed a procedure to estimate this population and from that population extracted a sampling frame. We used the Amadeus database of European companies to construct the population of generic IT firms. Since firms that provide solutions are former software houses, hardware producers, and consultancy firms, we considered the following NACE codes: 3001 and 3002 (manufacture of office machinery and computers), and

7210, 7221, 7222, 7230, 7240, 7250, and 7260 (computer and related activities). We then selected a random sample of 200 firms from the population and examined their websites to ascertain whether they provided solutions. In this way, we obtained the percentage of generic IT firms that moved into the solutions business, stratified by number of employees (Table 1), and computed the population of IT solutions providers. Finally, to select the sampling frame from this population of 3,042 firms (Table 2), we randomly chose 40 firms from each country, yielding a final sampling frame of 160 firms. We obtained contacts for these firms from IT professional associations, alumni databases from business schools and universities, and distribution lists from specialized newspapers and from the House of Commerce.

Table 1 and Table 2 around here

Because respondents needed to have a direct and personal involvement in a solution project in order to answer the questionnaire, the ideal respondent was identified as a project manager who had completed at least one project with the firm. In order to guarantee that the data collected at the project level could be used as a reliable proxy for all of the firm's activities, project managers were asked to refer to a project that was highly representative of the activities of the company (i.e. within the class of projects that generated the largest proportion of revenue for the organization) (Subramaniam and Venkatraman, 2001). To increase the response rate, we guaranteed that all the data would remain absolutely confidential and would be used only for academic purposes; we also promised to provide personalised feedback benchmarking the respondent's firm against a representative sample.

Telephone interviews were chosen as the preferred mode of data collection because they allowed the researcher to complement the data from the questionnaire with qualitative information that could be used to better characterize the firms. To set up interviews, a researcher first contacted the firms in the sampling frame via e-mail and made follow-up calls one week after the first message. In both cases the researcher briefly explained the aim of the research and the content of the questionnaire and asked to arrange a phone meeting with a project manager. This administration method yielded a 64% response rate, which is higher than other studies of this nature (Bensaou and Venkatraman, 1995, Miller and Roth, 1994). The final sample contained 102 firms (Table 3.6). Of the firms that participated in the survey, 75% completed the questionnaire during the phone interviews and 10% during face-to-face interviews. For the remaining 15% of firms, the survey was self-administered, with the researcher making follow-up calls to clarify the responses as needed. To maximize the accuracy of responses, the interviews were conducted in the native language of the interviewee (again

with the exception of Sweden, where the interviews were conducted in English). A Wilcoxon signed-rank test on the firm size confirmed that the sample distribution was not significantly different from the population ($p = 0.019$).

5.2. Data analysis: operationalization of variables

The unit of analysis adopted in this paper is the activity included in the solution. Previous studies (Ceci, 2009, Ceci and Prencipe, 2008) identified 7 types of activities that solutions providers can offer. The activities are: post-sales (hardware maintenance, software assistance, software problem solving, hotline service, software upgrading, training of the user), consulting (business consulting, network and technology consulting, engineering consulting), systems integration (all these activities that create a high degree of integration between different components), software development (software design, building and testing), financial (leasing, flexible payment structure, competitive interest rate, buyout options), hardware and infrastructure manufacturing (hardware manufacturing and assembling, building works, cable and network creation), and delivering activities (software customization and installation, hardware delivery). For each solution project, we considered only the outsourced activities and, to test our hypotheses, we measured: (i) outsourcing strategies (constituting the dependent variables), (ii) the four factors influencing outsourcing strategies (representing the independent variables) and (iii) the characteristics of firms and projects (used as control variables). Since all the firms in the sample operate in the same industry, there is no need to control for sector specificities.

To investigate outsourcing strategies, we use two dependent variables that capture two distinct yet complementary aspects: type of relationship with suppliers and use of concurrent sourcing. The variable "relationship with supplier" captures the firm's type of relationship with its supplier using a nominal scale that varies from 1 to 5 (1=contractor, 2=preferred supplier, 3=strategic alliance, 4=partnership, 5=joint venture). This variable investigates outsourcing strategies from an organizational viewpoint, identifying administrative and organizational boundaries. The second variable is "concurrent sourcing", a dummy variable assuming the value of 1 if the percentage of work done internally is between 20% and 60% and 0 if it is over 60% or under 20%. "Concurrent sourcing" explores outsourcing strategies from a cognitive viewpoint, focusing on boundaries of knowledge and capabilities across firms.

As regards the independent variables, we identified four factors that influence outsourcing strategies. The exogenous factors "product modularity" and "process standardization" are measured via 5-point Likert scale that investigate the use of modular products and standardized process in the outsourced activity using the following items: "modular products have been used

for this activities” and “standardised operating procedures have been followed in this activity”. The endogenous factors are operationalized as follows: the variable “frequency” indicating the frequency of provision is also assessed using a 5-point Likert scale with the following item: “This activity is usually performed in every project in this company”. The variable “core” indicates if the activity is central for the type of offering implement in the firms and it is measured with a 5-point Likert scale with the following item “this activity is a key activity in our business”.

The distinction between exogenous and endogenous factors has been tested with empirical analysis using a principal component analysis (PCA). This is a statistical technique used for data reduction that allows us to explore similarities across the identified elements. We identified two components (see Table 3) that confirm our theoretical distinction between endogenous (core and frequency) and exogenous (modularity and standardization) factors. Factor loadings exceed the recommended cutoff value of .60. We performed an analysis of variance (ANOVA) to investigate the behaviour of variables across activities. ANOVA is a statistical test of whether or not the means of several groups are all equal. The use of multiple two-sample t-tests would result in an increased chance of committing a type I error; since our aim is to compare 7 groups, the use of ANOVAs is preferred. Results show us that, in exogenous factors (product modularity and process standardization), effects are found to be significant ($p = 0,058$); it implies that the means differ more than would be expected by casualty alone. Therefore we can say that their values varies according to the types of activities and each activity imply a specific level of modularity or standardizations that is originated by the nature of activity itself. On the other hand, in the case of endogenous factors (core and frequency), effects are found to be not significant ($p = 0,57$), and then differences between means are not great enough to identify differences among the activities. This confirms our reasoning, exogenous factors are influenced by the underlying technology and their values are different according to the types of activity, while endogenous factors are not dependent from the type of activity and their values are not influenced by characteristics of activity.

Table 3 and Table 4 around here

The four control variables used in the models (increase in outsourcing, firm size, client size and project length) have been measured, respectively, as difference between the percentage of outsourcing activities the year of the analysis (2005) and 5 years before (2000); the firm’s annual turnover; the turnover of the solution’s client; and the length of the project selected by the interviewee as representative of the activity of the firm.

5.3. Data analysis: analytical approach

We tested the data obtained from the respondents for common method variance (CMV) using Harman's single-factor test (Podsakoff et al., 2003) and found no evidence of CMV. The correlations are generally low (Table 5). We test the hypotheses by fitting an ordered logistic regression model (1) and a linear logistic regression model (2). Due to the qualitative nature of the dependent variable "relationship with supplier", we use an Ordered Logit Model for Model 1. In model (2), the dependent variable is binary (concurrent sourcing: 0; 1). Table 6 reports on the results.

$$Y = \alpha + \beta_1 \text{ standardization} + \beta_2 \text{ modularity} + \beta_3 \text{ frequency} + \beta_4 \text{ core} + \beta_5 \text{ increase in outsourcing} + \beta_6 \text{ firm size} + \beta_7 \text{ client size} + \beta_8 \text{ project length} + \varepsilon \quad (1)$$

$$Y = \alpha + \beta_1 \text{ standardization} + \beta_2 \text{ modularity} + \beta_3 \text{ frequency} + \beta_4 \text{ core} + \beta_5 \text{ increase in outsourcing} + \beta_6 \text{ firm size} + \beta_7 \text{ client size} + \beta_8 \text{ project length} + \varepsilon \quad (2)$$

Table 5 and Table 6 around here

Model 1 (Table 6) yields the following results: two out of four independent variables have a significant effect over the dependent variable "relationship with supplier". The two exogenous variables have a positive impact: standardization of processes (+0,454) and product modularity (+0,305), positively impact on the dependent variable "role of suppliers" while the two endogenous factors (the variables "core" and "frequency") are not significant. The hypothesis Hp1 and Hp2 are not confirmed, being the direction of the impact the opposite from the hypothesized one: this finding is in contrast with previous literature. As regards Model 2 (Table 6), analysis of the results of the logit regression shows that "product modularity" has a positive impact (+1,054) over the choice of the firm to engage in concurrent sourcing while the variable "process standardization" has a negative impact (-0,808). Similarly to Model 1, none of the endogenous factors, the variables "core" and "frequency", is significant.

6. Discussion of hypotheses

The analysis of the two models, as briefly discussed above, suggests that not all the hypotheses are supported. As regards Hp1 (A "faraway" outsourcing strategy is preferred in the case of modular products), we expected the variable "product modularity" to have a negative sign. In fact, "product modularity" has a positive impact in both models. The use of modular product facilitates the division of labour: this pushes firms toward and increase of the use of outsourcing.

Moreover, modularity helps in dealing with complex problems, enabling division of labour also in complex systems, but such complexity requires to a strong integration with the suppliers. Our results suggest that the use of modular products within a solution requires close integration among players: this is due to the need to develop common interfaces to facilitate the functioning of different modules. Therefore, we can affirm that modularity facilitates the outsourcing of activities but, once activities are outsourced, firms prefer to have a close relationship with the suppliers. .

Hp2 (A “faraway” outsourcing strategy is preferred in the case of highly standardized processes) is only partially supported. The variable “process standardization” has an impact on both dependent variables but its role is ambiguous: in fact it negatively impacts on the use of concurrent sourcing (Model 2). This result supports Hp2 suggesting that the standardization of processes increases separation of knowledge boundaries: process standardization facilitates control and it reduces the need of sharing knowledge and sensitive information. In model 1, standardization of processes positively impacts on the dependent variable “role of suppliers”, not supporting Hp2. The variable “role of suppliers” measures the structure of firms’ boundaries from an organizational viewpoint while the variable “concurrent sourcing” is more focused on knowledge and information sharing. Our results suggest the existence of overlapping of organizational boundaries across companies: the standardization of processes (as in the case of product modularity) facilitates the use of outsourcing (as TCE suggest) but, among all the possible configurations of outsourcing strategies, a strong relationships with the partners is preferred.

Results of Models 1 and 2 do not support Hp3 (A “so close” outsourcing strategy is preferred in the case of frequent activities) and Hp4 (A “so close” outsourcing strategy is preferred in the case of outsourcing core activities): the variables “core” and “frequency” are not significant. We tested the effect of these variables on the decision if to outsource or not, and we found a significant relation (details available upon request). However, these two variables have no role in influencing outsourcing strategies: neither the type of relationship with the suppliers nor the use of concurrent sourcing depends from their values. This is an important result: the variables “frequency” and “core” represent decisions taken by the firms; their not significance suggests that firms alone have a scarce impact on the outsourcing strategies. Outsourcing strategies are shaped by the characteristics of the activities and not by the strategic choices of the firms.

Among the control variables, it is worth noting that the variable “increase of outsourcing” (that is computed as the difference between the percentage of outsourcing activities the year of the analysis and 5 years before and measure the tendency toward an increasing use of outsourcing) positively impact on the use of concurrent sourcing (+2,563). This shed further light on the

understanding of concurrent sourcing, also from a dynamic viewpoint. In fact, we believe that the concurrent sourcing is seen by the firms as a way to implement capacity outsourcing (Fine, 1998). Firms internally own resources and capabilities but, as the demand for their business increase, they prefer to outsource part of the internal processes to remain flexible without investing in its structure to increase the ability to internally source every activity.

7. Conclusions

Outsourcing is a viable strategy, increasingly used by firms to lower costs, to access new technologies and capabilities, to gain flexibility and to be able to focus on distinctive and core capabilities (Bettis, Bradley and Hamel, 1992, Brusoni, Prencipe and Pavitt, 2001, Holcomb and Hitt, 2007, Mol, Tulder and Beije, 2005, Rothaermel, Hitt and Jobe, 2006). However, this strategy must be carefully adopted: it is a risky strategy that, in the long term, might lead to losses in core technologies and capabilities and to the movement of internal knowledge outside the firms' boundaries. The resolution to outsource a specific activity it is only the first step of a series of important decisions that we defines as "outsourcing strategies" and that constitute the central focus of the present work.

In exploring outsourcing strategies, we constructed an analytical model (Figure 2) that exemplifies the existence of a continuum of possible outsourcing strategies, positioned between to extremes poles: on one side we have a very close relationship between supplier and client, there is high level of knowledge sharing, organizational and administrative boundaries are not clearly defined. On the other side we observe a clear and rigid division of tasks, roles and duties: no overlapping of knowledge nor capabilities is present. Departing from this model, we explored how firms select where to position their activities along this continuum and we considered the roles of four factors: two of them ("core" and "frequency") are the results of firms internal set of capabilities and resources while the other two ("process standardization" and "product modularity") are largely influenced by the characteristics of the productive process and the technologies underlying a specific activity.

The main findings are threefold: firstly, high levels of product modularity and process standardization lead to close interactions among players, contrarily to what we expected. We know from previous contributions that the use of modular product and standardized process facilitate division of labour: activities that present such characteristics can be straightforwardly outsourced but integration is still needed. Therefore firms easily outsource modular and standardized activities, also if they rely on core knowledge or capabilities: outsourcing becomes a viable option from a technical viewpoint but some of the strategic issues still remain. Firms prefer to develop a close relationship with the supplier: in this way they are able to retain some

of the production in house to increase the control and to not lose important capabilities and resources.

Secondly, empirical results show clearly that endogenous factors do not influence outsourcing strategies. The role of endogenous factors in shaping firms boundaries is largely known, there is a large amount of empirical evidences and theoretical justifications that agree on the central role played by the factors “core” and “frequency” in influencing outsourcing decisions. However, in the present study we focused on the outsourcing strategies, i.e. how close firms want to be with their suppliers. This decision looks independent from endogenous factors and the final configuration of relationships is much more influenced by exogenous factors: technological aspects and characteristics of the productive process determine the outsourcing strategies. This is coherent with Fixson and Parker (2008) that suggested “the existence of multiple linkages between product architecture and industry structure” (p. 1296): the structure of the product influences the outsourcing strategies more than firms’ inner characteristics.

Finally, it is evident that empirical results are distant from what the previous literature proposed. In fact, only one hypothesis is supported. We believe that this suggests that the “So Close” configuration is not a position in between “make” and “buy” but it is a third, independent option, that imply different strategic decisions and rationales for the firms. Considering the marginal role that previous literature plays in explaining this phenomenon, we believe that this is an interesting avenue for future research.

The results present few limitations. First, the analysis is based on a small sample, which raises the issue of low statistical power. The target population of this study was narrowly defined to include a homogeneous set of firms, which may limit the generalizability of the research. Second, the study is subject to some data limitations: data were gathered at one point in time, so no inferences of causality can be conclusively established. Another consequence of our data-gathering approach is that whilst the analysis provides a very good static picture of the firms studied, it offers limited information about their evolution over time. These observations point toward several avenues for future research. Follow-up empirical studies are called for to confirm our hypotheses, these should be extended to different industry sectors. It would also be interesting to replicate this analysis in the near future to assess whether the described strategies proved to be successful in an evolving context.

Table 5: Correlation matrix

	Mean	St.Dev	1	2	3	4	5	6	7	8	9	10
1 Concurrent Sourcing	0.310	0.463	1.000									
2 Role Suppliers	2.470	1.103	0.008	1.000								
3 Process Standardization	3.940	1.066	-0.258	0.225	1.000							
4 Product Modularity	3.727	1.059	0.191	0.282	0.265	1.000						
5 Frequency	4.155	0.952	-0.016	0.064	0.216	0.258	1.000					
6 Core	4.322	0.960	0.028	0.143	0.153	0.238	0.381	1.000				
7 Increase of Outsourcing	0.023	0.172	0.227	0.021	-0.141	0.092	0.043	0.029	1.000			
8 Size of the firm	979	3.102	-0.002	-0.023	0.237	0.015	-0.116	-0.047	-0.037	1.000		
9 Client Size	2.195	0.856	-0.220	0.039	0.044	-0.121	-0.080	0.024	-0.046	0.259	1.000	
10 Project Length	1.968	0.814	0.122	-0.248	0.025	-0.270	0.023	-0.208	-0.138	0.188	0.154	1.000

8. Tables and figures

Figure 1: Analytical Model and Hypotheses

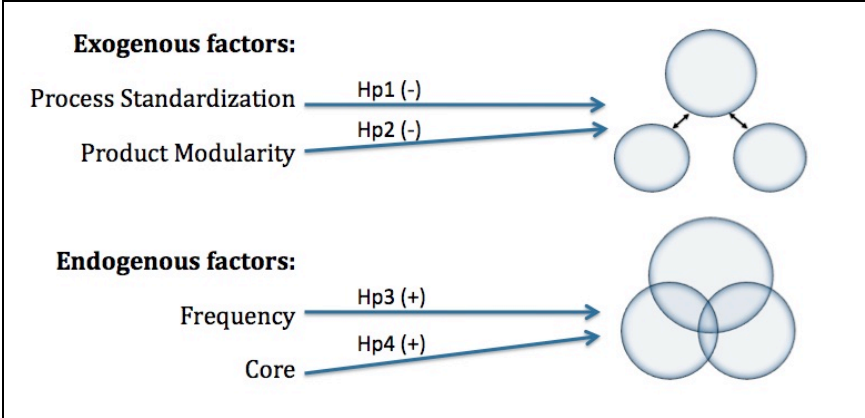


Figure 2: Faraway, so close: two extreme points of a variety of outsourcing strategies

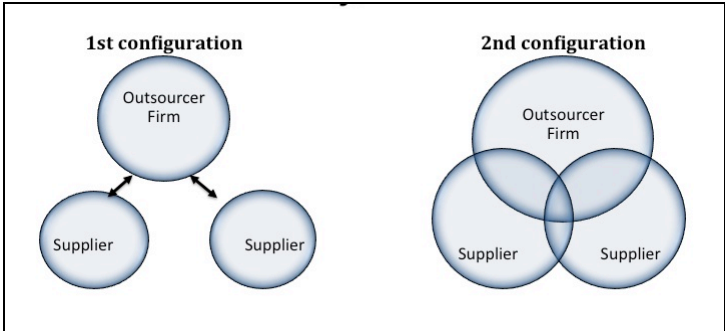


Table 1: Distribution of Firms Providing Solutions

No. of employees	% of Firms offering Solutions
20 to 99	47%
100 to 499	50%
500+	100%

Table 2: Population and Sample Characteristics

	Location	No. of employees			Total
		20 to 99	100 to 499	500+	
<i>Firms operating in the IT sector</i> (source: Amadeus database)	Italy	895	293	65	1253
	U. Kingdom	1,791	792	202	2785
	Sweden	610	131	29	770
	Spain	813	301	56	1,170
	Total	4109 (69%)	1517 (25%)	352 (6%)	5978
<i>Firms offering Solutions</i>	Italy	421	147	65	632
	U. Kingdom	842	396	202	1,440
	Sweden	287	65	29	381
	Spain	382	150	56	588
	Total	1932 (63%)	758 (25%)	352 (12%)	3042
<i>Sample</i>	Italy	20	6	4	30
	U. Kingdom	16	4	7	30
	Sweden	12	7	4	23
	Spain	11	5	3	19
	Total	62 (61%)	23 (22%)	17 (17%)	102

Table 3: Principal Component Analysis

Scoring coefficients for orthogonal varimax rotation		
Variable	Comp1	Comp2
Frequency	0.7089	-0.0259
Core	0.6794	-0.0038
Product Modularity	-0.1014	0.7790
Process Standardization	0.1596	0.6265

Table 4: Oneway Anova

Strategy-related act. (comp1)		Tech-related act. (comp2)	
F ratio	Prob>F	F ratio	Prob>F
0.78	0.5887	2.52	0.0234
mean group diff. are not significant		mean group differences are significant	

Table 6: Ordered Logit Model 1 and Logit Model 2

	Model 1		Model 2	
	DV: Role of Supplier		DV: Concurrent Sourcing	
	Ordered Logistic Reg.		Logistic Reg.	
	Coeff.	<i>S.E.</i>	Coeff.	<i>S.E.</i>
Process Standardization	.454 ***	.148	-.808 ***	.210
Product Modularity	.305 **	.140	1.054 ***	.289
Frequency	-.067	.157	-.373	.273
Core	.061	.147	.239	.260
Increase of Outsourcing	.037	.749	2.563 **	1.085
Size	-.000	.000	.000	.000
Client Size	.224	.159	-.747 ***	.247
Project Length	-.416**	.173	1.017 ***	.293
<i>N</i>	212		212	
<i>Log Likelihood</i>	-280.059		-86.527	
<i>PseudoR2</i>	0.055		0.260	
<i>LR chi2</i>	32.84		60.88	

Note: one-tailed tests: * p < .10; ** p < .05; *** p < .01.

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