A Matter of Coherence: The Effects of Offshoring of Intangibles on Firm Performance

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ABSTRACT Offshoring of intangibles is a global production strategy based on the decision to externalize intangible activities to foreign countries. In the present work we test the existence of a positive relationship between offshoring intangibles and firm performance. To reap the full benefit of offshoring, firms are required to integrate and coordinate activities and knowledge; integration and coordination become difficult when activities are knowledge intensive as in the case of intangibles. We argue that the positive relation between offshoring intangibles and performance is strengthened if firms retain part of the knowledge related to the offshore outsourced activity, which reduces the risk of knowledge fragmentation and eases coordination and control. Our analysis suggests that some coherence between what a firm outsources abroad and what it offers positively moderates the relationship between offshoring intangible activities and firm performance.

KEY WORDS: Offshoring, intangible activities, coherence, capabilities

1. Introduction

It is becoming common practice for firms to delocalize parts of their internal production processes to other countries. This practice, called offshoring, is resulting in a global realignment of jobs. Initially, offshoring was motivated largely by cost reductions: production processes were delocalized to low-cost countries with little attention paid to losses in quality or reputation (Slack and Lewis, 2002; Rottman and Lacity, 2006). The current approach to offshoring is for firms to delocalize both low and high value activities and, in some cases, activities that are central to their core business (Sako, 2006). There are some important examples of this phenomenon related to a variety of sectors and companies: pharmaceutical
firms in New Jersey are increasingly outsourcing research and development (R&D) to firms in India whose researchers studied in the best Western universities; DuPont, the giant chemical company, offshored legal work to Asia; and General Electric offshored the task of combing annual reports, clinical trials data and medical publicity material to prepare its defence for a pharmaceutical liability lawsuit, to a team of lawyers and medical professionals in India (Engardio, 2006). Also, other high-end services are attracting attention. With Western companies under pressure to pare costs, they are looking to companies in India to take on an array of jobs—from market research to product design, engineering services, legal support, and content development for publications. (Kazmin, 2009: 2)

In the special issue where the present paper is included, this practice of externalizing has been labelled “offshoring of intangibles” (Grimaldi et al., 2010), a term that refers to the delocalization to foreign suppliers, of highly knowledge-intensive activities, such as software development, R&D, product design and professional services (Kotabe and Swan, 1994; Bounfour, 1999). Specifically, this paper investigates offshore outsourcing, which is the practice of externalizing parts of the internal production process to firms located in a different country. Debate among academics, practitioners and policy-makers on this practice, is receiving prominence because it is affecting the global economic scenario in terms of competition, employment, innovation processes and the competitive advantage of economic systems (Venkatraman, 2004; Amiti and Wei, 2006; Couto et al., 2006; Mahnke and Özcan, 2006; Maskell et al., 2007). As Mol et al. (2005) point out, while there is a growing body of studies that explores the relationship between performance and outsourcing, and make-or-buy decisions generally (e.g. Leiblein and Miller, 2003), the effect on performance of offshoring knowledge-intensive activities is seldom addressed. The evolution of this phenomenon—particularly towards the inclusion of intangible activities—is not well understood (Manning et al., 2008). The majority of the literature addresses decisions related to tangible activities (Walker and Weber, 1978; Monteverde and Teece, 1982; Harrigan, 1986) although there are some notable exceptions, specifically Pisano (1990), who analyses external R&D acquisitions, Novak and Eppinger (2001), who study outsourcing of the design of automotive components, and Bounfour (1999), who investigates to what extent outsourcing of intangibles constitutes a source of competitive advantage.

The need to explore how the delocalization of intangibles affects firm performance becomes crucial in the context of offshoring, where cultural and geographical distance may make control of the delocalized activities more difficult to manage. Delocalization of intangible activities poses challenges to the coordination of knowledge flows, for example. The literature suggests that to facilitate coordination and control, firms need to retain the knowledge incorporated in the offshored activity (Prencipe et al., 2003; Jacobides and Winter, 2005): by retaining in-house knowledge, firms are better able to control the efficiency of the offshoring process. To explore this issue, we make use of the concept of coherence (Teece et al., 1994; Piscitello, 2004), which looks at the dynamic interconnectedness between the firm’s sourcing decisions and its downstream activities. We claim that, to benefit fully from offshoring intangibles, firms must retain some of the activities externalized: this facilitates the coordination and integration of the complex flows of knowledge between offshorer and offshoree.

In line with the literature on outsourcing, we acknowledge the importance of maintaining in house parts of the capabilities related to the outsourced activities. We extend this
literature by exploring the relatedness between buying and selling, based on the idea that firms benefit from appropriate coordination of the offshored activities and the markets served. The novelty of our approach lies in our investigation of the coherence that exists between production inputs and outputs, which enhances the possibilities for the firm to integrate capabilities and knowledge, and reduces the strategic vulnerability that is generated by the handing over of parts of its activities to another organization. This coherence mitigates transaction uncertainty since the outsourcing firm has the tools and the abilities required to achieve and maintain accurate and appropriate control.

To support our argument empirically, we use data from an original dataset constructed by merging secondary data on firm performance with data from a survey related to the offshoring of intangible activities. Our results show that offshoring intangible activities has a positive effect on firm performance, and confirm our hypothesis that coherence between offshored activities and firm’s output reinforces the positive effects of the offshoring of intangibles on firm performance.

In Section 2 we review the literature on offshoring: we summarize the most important contributions to provide a complete understanding of the topic. Section 3 develops our analytical framework and proposes testable hypotheses. Section 4 provides a description of our methods, and Sections 5 and 6 present the results and a discussion of the empirical findings.

2. The Practice of Offshoring in the Context of Intangibles

Increasing numbers of firms are moving parts of their activities abroad, outsourcing internal processes to firms located in foreign countries, which is described as offshore outsourcing. The concept of offshoring needs to be defined: offshoring refers to the process of sourcing business functions across national borders, and can include both internal company activities and outsourced activities (Manning et al., 2008). In our research, we focus on offshore outsourcing. We start from the assumption that offshore outsourcing is not a simple purchasing decision involving foreign suppliers, since all firms buy in some elements of their operations; instead it is the strategy of external purchase to substitute for internal activities. Thus, offshore outsourcing produces discontinuities in internal production (Gilley and Rasheed, 2000). We consider this strategy in the context of intangibles. According to the OECD (1992), intangible investments cover all long-term expenses apart from the purchase of fixed assets. This includes a wide-ranging list: investments in technology (R&D expenditure, acquisition of technology through patents and licences), training, production organization, labour relations, development of technological and business relations with other enterprises, suppliers and customers, marketing, investments in information systems and software (Bounfour, 1999).

Analysis of the literature on offshoring, outsourcing and intangibles, allows us to identify four key drivers of the firm’s decision to offshore intangible activities: (i) cost reduction; (ii) access to skilled talent and specialized technologies; (iii) increased efficiency and flexibility in work organization; (iv) access to new geographical markets.

Cost Reduction

In exploring the relationship between offshoring of intangibles and firm performance, we draw on the literature on make-or-buy decisions, where the buy decision equates to vertical
disintegration of the firm (Ulrich and Ellison, 2005). Transaction cost economics (TCE) identifies the following factors in defining the rationale for offshore outsourcing: importance of asset specificity, length of relationship, and uncertainty and frequency of transactions (Coase, 1960; Williamson, 1975, 1985; Teece, 1986; Dietrickx and Cool, 1989). Based on how these features are combined, firms choose among insourcing, outsourcing and offshore outsourcing. TCE asserts that make-or-buy decisions are motivated by efficiency considerations. When efficiency is the primary aim, the main determinants of offshoring are risk reduction, cost savings and access to low-cost foreign labour (Khan and Fitzgerald, 2004). Ellram et al. (2008) explore and test the theoretical grounding of TCE in the context of offshoring services and prove its efficiency in explaining offshoring decisions, while demonstrating that cost savings are the main rationale.

**Access to Skilled Talent and Specialized Technologies**

Recent studies highlight that the possibility to access skilled talent around the world is emerging as a new strategic driver of offshoring, especially in the context of knowledge-intensive activities (Howells, 1999; Farrell et al., 2006; Bunyaratavej et al., 2007; Lewin and Couto, 2007; Manning et al., 2008). Analysis of the results of global surveys on offshoring (e.g. ORN—Offshoring Research Network) highlights the increasing number of offshoring projects involving qualified personnel. A major driver of the “global race for talent” (Florida, 1997, 2005; Lewin and Peeters, 2006) is the increasing difficulty firms perceive (or experience) in finding the necessary talent in the USA and Western Europe, due to the stagnating or decreasing numbers of US and Western European graduates with science or engineering Master’s and PhD degrees (Lewin et al., 2008).

At the same time, the development of geographical clusters specialized in science and technology in developing countries is increasing, with Bangalore in India being the most notable example. Two factors underpinning this phenomenon are increased government investments to transform higher education systems, and the return of qualified nationals who have completed their degree training in the USA or Western Europe. Since the mid-1980s, scholars, such as Freeman, Nelson, Rosenberg and Lundvall, have been pointing to the importance of country-specific factors for developing technological innovation, referring to the interaction of these factors as the “national innovation system” (NIS). The NIS concept has been used to describe the performance of the most economically successful countries in the post-Second World War period, such as Japan, and is being applied increasingly to other countries and areas (Nelson and Rosenberg, 1993; Archibugi and Michie, 1997). By offshoring intangibles, firms can benefit from the national development trajectories of the host countries and profit from their science and technology infrastructures.

**Increased Efficiency and Flexibility in the Organization of Work**

In the long run, in-house production can increase the firm’s commitment to a specific type of technology, and reduce flexibility. Offshoring, on the other hand, implies the employment of a contractual labour force that increases the flexibility in the firm’s work organization (Sanchez and Mahoney, 1996). Modular design often facilitates outsourcing (Schilling and Steensma, 2001; Tiwana, 2008a, b), although it requires certain conditions
to be met. First, suppliers and customers need to share knowledge about how to implement modularity; second, a common language is required to specify features and functions; third, there needs to be a means of confirming that output meets requirements; and fourth, there needs to be a capable supplier base (Chesbrough, 2003; Ernst, 2005; Grote and Taube, 2007). In terms of the specific context of offshoring intangibles, increased standardization, modularization and commoditization of advanced business services is simplifying the global division of labour in this area (Helper and Khambete, 2005; Blinder, 2006). Firms are more able to standardize and modularize new product development and innovation processes (Manning et al., 2008), and the global coordination of resources accelerates time to market (Carmel and Agarwal, 2006).

Access to New Markets

The last factor identified in the literature as a driver of offshoring is the possibility to gain access to new markets (Carmel and Agarwal, 2006). This was the key driver of internationalization when the world economy was characterized by the production of physical goods, and being geographically close to the customer facilitated export and access to new markets. To reach some customers, firms typically needed to establish a local production presence for reasons related to the nature of their business (e.g. service industries such as food retail or banking), local country tariffs and import restrictions (e.g. the auto industry) (Farrell, 2004), and to hit local “price-points” (produce at prices that enable sales in low-wage countries) (Kirkegaard, 2005; Mann, 2005). Also, knowledge of local specificities is required for entry to some new markets (Eppinger and Chitkara, 2006), and offshoring some activities may facilitate the acquisition of important local knowledge. Farrell (2004) recalls the many consumer electronics multinationals that initially were attracted by China’s huge customer base and which now are taking advantage of its low costs to produce goods for export.

The combined effects of these drivers can lead to increased efficiency in production process management, which impacts on firm performance. Therefore, we propose the following hypothesis:

Hypothesis 1: Offshoring of intangible activities positively affects firm performance.

3. The Importance of Coherence in the Practice of Offshoring Intangibles

Scholars of the resource-based view, point out that, in designing their boundaries, firms have to maintain a focus on the activities and capabilities that are considered core to their business in order to achieve an advantage over competitors (Teece et al., 1997; Eisenhardt and Martin, 2000; Jacobides and Winter, 2005; Jacobides et al., 2007; Parmigiani, 2007). According to the resource-based view, firms should focus on products that best fit their current resources and knowledge, and buy in those that can be produced more efficiently externally (Kogut and Zander, 1992; Conner and Prahalad, 1996; Grant, 1996). However, an externalization strategy entails the need for accurate control and monitoring of the activity externalized. This has been studied in the context of outsourcing but, as suggested by Govindarajan and Gupta (2001), this reasoning applies also to the practice of offshore outsourcing, where controlling and integrating activities is even more complex, due to cultural and territorial distance.
In addition, if the activities offshored are high value added, as in the case of intangibles, the characteristics of these activities makes implementation of this strategy even more difficult: intangibles are more difficult to evaluate than tangible activities (Sussland, 2001; Goldkuhl and Styvén, 2007) and the knowledge involved in their production is more complex to manage, transfer and replicate without direct observation (Nonaka and Takeuchi, 1995; Hussi, 2004; Youngdahl and Ramaswamy, 2008). In dynamic sectors, where product and market conditions change rapidly, the firm has to be able to pass new information to outsourced firms in a timely fashion, in order to allow for the offshoree to make appropriate adjustments (Bettis et al., 1992). The challenge for the offshorer is to coordinate the continuous flow of information, knowledge, activities, processes and capabilities from offshoree to offshorer and vice versa (Gupta and Govindarajan, 2000).

Scholars in innovation management research show that to successfully control and monitor outsourced activities, firms need to retain part of the capabilities in house in order not to lose the underlying knowledge (Prencipe et al., 2003). These studies explore the interrelation between the firm’s knowledge and production boundaries, demonstrating that firms operating and selling goods in a market, even if they do not produce the goods themselves but outsource some components, need to retain part of the knowledge required for the management of their offer (Prencipe, 1997; von Tunzelmann, 1998; Brusoni et al., 2001). In line with this reasoning, we would suggest that inappropriate externalization of productive activities runs the risk of losing the capability to control them, and losing the full advantages of an outsourcing strategy.

The positive relation between offshoring intangibles and performance will be strengthened if firms retain part of the knowledge related to the offshored activities, in order to reduce the risk of knowledge fragmentation and to ease coordination and control. The knowledge retention process is facilitated if the firm is operating in a market where the offshored activity is the output of its production process. In this case, the firm will have information and research data on buying patterns, changes in expected demand and market conditions, which enable a better understanding of market characteristics. In line with this reasoning, firms selling intangibles retain in house part of the knowledge underlying the activities they offshore. We label this dynamic “coherence”, extending the concept proposed by Piscitello (2004). Piscitello defines a “coherent” firm as a firm that is characterized by a high degree of interconnectedness between the company’s technological competencies and its downstream activities (Piscitello, 2004: 757). The particularity of this approach is that it considers both upstream and downstream production process activities, which is an extension of the traditional focus on internal resources and capabilities. The reasoning underlying the concept of coherence has roots in several research streams including learning dynamics, path-dependency, depth and scope of technological opportunities, and structural characteristics of the selection environment (Teece and Pisano, 1994; Markides and Williamson, 1996; Patel and Pavitt, 1997; Dosi et al., 2000; Piscitello, 2000; Tsai, 2000). Coherence relates to the firm’s capability to generate and exploit synergies and complementarities within its structure (Milgrom and Roberts, 1995) and to integrate dispersed knowledge (Foss and Christensen, 1996). Accordingly, we argue that firms that display a coherence between their offshored and downstream activities will be better able to capture the positive effects of the offshoring strategy. In other words, coherence positively moderates the relationship between intangibles offshoring and performance. This leads to the following hypothesis:
Hypothesis 2: Coherence between offshored activities and firms’ output positively moderates the relationship between offshoring of intangible activities and firm performance.

4. Methods

Data

We test our hypotheses using an original dataset obtained by merging a public dataset, AIDA, with survey data. The AIDA database is developed and published by Bureau Van Dijk and provides information on the financial performance of over 200,000 Italian companies. This database is widely used in economics and management studies (e.g., Faccio and Lang, 2002; Colombo et al., 2007). We integrated the AIDA database with data from a survey conducted on a sample of Italian companies operating in the information technology (IT) and automotive sectors. The selection of sectors was on the basis of the likelihood of offshore outsourcing activities. Based on a set of preliminary interviews conducted by a partner in the research project, and on the literature, we identified NACE codes most likely to be associated with offshoring activity: 722 (software consultancy and supply); 731 (research and experimental development in natural sciences and engineering); 2852 (general mechanical engineering); 291 (manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and motorcycle engines). The firms in our sample were selected from the AIDA database on the basis of NACE code activity. This procedure yielded a sample of 352 firms.

We conducted two rounds of data collection. In the first round, a research assistant contacted all 352 firms to ask for their participation in a survey enquiring about the practice of offshore outsourcing. To ensure a good response rate, we guaranteed that data would remain confidential and would be used only for academic purposes; we provided to each firm a personalized report that benchmarked the respondent firm against a representative sample. We used telephone interviews to collect data since it allowed the researcher to complement the questionnaire data with qualitative information. The survey was conducted between April and September 2008; interviews lasted 20 minutes on average. To set up the telephone interviews, the researcher initially sent an email or fax to the sample firms, and followed this up with a telephone call one week later. In both communications, the researcher outlined the aims of the research and the content of the questionnaire, and requested a time for a telephone meeting with a representative of the firms knowledgeable about the phenomenon being investigated. A website was created to facilitate data collection. All the firms in the sample were able to access the website via a personal username and password. Interviewees could complete the questionnaire online or opt for a telephone interview; the latter proved the most popular option, with only 12.5 per cent of respondents (14 out of 112) choosing to complete the questionnaire online. The survey achieved a response rate of 32 per cent (112 responses), which is in line with other similar studies (Miller and Roth, 1994; Bensaou and Venkatraman, 1995). A second data collection round was held in October–December 2009, when a research assistant contacted the 112 first round firm respondents. Following a similar procedure to the first round, 84 firms agreed to take part in a telephone interview, a 75 per cent response rate. As a result of missing data in the matching with the AIDA database, the final number of usable observations was 67.
Empirical Context

This research is grounded in the Italian context, and all the firms in the sample are engaged in offshore outsourcing. Detailed analysis of the data provides information on the characteristics of the activities offshored and on the strategic decisions taken by firms. Tables 1 and 2 report data on offshored intangible activities. As discussed in Section 2, we use the definition of intangible activities as proposed by OECD (1992), and we include in our analysis investments in technology (R&D expenditure, acquisition of technology through patents and licences), training, production organization, labour relations, development of technological and business relations with other enterprises, suppliers and customers, marketing, investments in information systems and software (Bounfour, 1999). Table 1 shows that the majority of activities offshored are related to the design and engineering phase (60 per cent), with post-sales assistance only rarely outsourced (5 per cent of our sample) due to the language specificities of the research context. In terms of a geographical dimension, there do not seem to be specific areas where the offshoring of intangibles is concentrated; instead, the activity seems to be spread randomly across the world. For cultural and distance reasons, Eastern Europe is a popular destination for offshored activity, but other areas that are more distant both culturally and geographically, are also targets for offshoring intangibles (Table 2).

Table 3 reports the values (on a 1–7 Likert scale) for a series of items, aimed at understanding the reasons behind the decision to offshore intangible activities. Six items received scores above 4. Of those six items, five are related to the four main drivers of offshore outsourcing decisions identified in Section 2, confirming their relevance: (i) cost reduction (item: “lower cost of resources”); (ii) access to skilled talent and specialized technologies (“access to a qualified workforce”); (iii) increased efficiency and flexibility in work organization (“increase flexibility of internal processes”; “reduction of time-to-market”); and (iv) access new geographical markets (“gain access to new markets”). The decision to offshore intangibles is influenced also by favourable legislation in the destination country (“favourable taxation”), by the possibility to obtain quality improvements in service offerings (“increase the quality of post sales services”) and by group strategies (“adaptation to group strategies”).

Measurement

This section describes the quantitative measures used in the analysis. The dependent variable is constructed by combining two performance indicators: ROE (Return on Equity)

Table 1. Typologies of intangible activity offshored

<table>
<thead>
<tr>
<th>Items</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and engineering</td>
<td>60</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>10</td>
</tr>
<tr>
<td>Software development</td>
<td>10</td>
</tr>
<tr>
<td>Post sales assistance</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
</tr>
</tbody>
</table>
and ROS (Return on Sales) (Zahra et al., 2000). ROE is the ratio of net profit to equity and measures firm efficiency in generating profits from shareholder equity; ROS is the ratio of yearly sales to assets and measures the firm’s operating efficiency for generating profits. These variables are generally accepted as measures of firm performance and are widely used in the literature. However, they can be problematic: ROE is sensitive to capital structure differences while ROS can be affected by accounting errors. It is better to refer to more than one performance measure in order to compensate for these shortcomings (Delios and Beamish, 1999). For this reason, we constructed our dependent variable, firm performance, based on a factor analysis using ROE and ROS values for the year 2008. We use the factor analysis to explore the interrelationships among ROE and ROS variables and to explain these variables in terms of their common underlying dimension (factor). The latent root criterion, which specifies an eigenvalue greater than 1, was applied to determine the factor to be extracted.

Table 2. Offshore geographical area

<table>
<thead>
<tr>
<th>Items</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Europe</td>
<td>30</td>
</tr>
<tr>
<td>India</td>
<td>20</td>
</tr>
<tr>
<td>Latin America</td>
<td>15</td>
</tr>
<tr>
<td>China</td>
<td>15</td>
</tr>
<tr>
<td>Middle East</td>
<td>10</td>
</tr>
<tr>
<td>South East Asia</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 3. Reasons for offshoring intangibles

<table>
<thead>
<tr>
<th>Reasons for offshoring intangibles</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain access to new markets                                            5.88</td>
<td>2.08</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Lower cost of resources                                               5.77</td>
<td>1.2</td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Increase the quality of post sales services                           5.44</td>
<td>2.01</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Access to a qualified workforce                                       4.22</td>
<td>2.68</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Increase flexibility of internal processes                            4.22</td>
<td>1.85</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Reduction of time-to-market                                           4.11</td>
<td>1.83</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Increase the quality of products/services offered                      3.77</td>
<td>2.38</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Favourable taxation                                                   3.55</td>
<td>2.4</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Gain access to new technologies                                       3.33</td>
<td>2.59</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Specific country characteristics (demographics, cultural ...)          3.22</td>
<td>2.04</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Low-skilled labour force in Italy                                     3.22</td>
<td>2.77</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Adaptation to group strategies                                        3.11</td>
<td>2.36</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Favourable legislation on intellectual property rights                 2.55</td>
<td>2.55</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Favourable labour legislation                                         2.55</td>
<td>1.66</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Increase internal competition                                          2.11</td>
<td>2.08</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Imitation of competitor strategy                                      1.44</td>
<td>0.88</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
The independent variables are constructed as follows. Offshoring of intangibles is a dummy variable that takes the value 1 if the firm offshored intangibles in the three-year period 2004–2006, and 0 otherwise; intangibles is a dummy variable that takes the value 1 if the firm also obtains revenue from (a) services, (b) patented and non-patented technologies or (c) royalties from the sale of technology internally developed in 2004–2006, and 0 otherwise.

We also include in the econometric models some firm-specific control variables. Since firm performance varies by size and age (Freeman et al., 1983; Bharadwaj, 2000), we control for firm size, measured as the number of employees in 2004, and for firm age through a discrete variable that takes the value 1 if the firm has been established for less than 25 years, 2 if established for between 25 and 50 years, 3 if established for 50 to 75 years, and 4 if the firm is older than 75 years. Also, since the two industries considered in this study (IT and automobiles) present various differences in terms of production processes and level of competition, which may affect firm performance, we control for firm sector, captured by a dummy variable that assumes the value 1 if the firm operates in the software (IT) industry, 0 otherwise. We account also for three other dimensions that might affect performance: firm innovation (Henderson and Clark, 1990; Garcia and Calantone, 2002), modularity (Worren et al., 2002) and international scope (He and Wong, 2004; Cassiman and Veugelers, 2006). Firm innovation is an ordinal variable that takes the value 0 if the firm did not introduce any new products or services during the three years 2004–2006, 1 if the firm introduced relatively minor changes to the existing products or services, that is, incremental innovation, and 2 if the firm introduced products or services that are new to the market, that is, radical innovation. Modularity is a proxy for the degree of flexibility in the production process. Firm modularity is a dummy variable that takes the value 1 if the firm externalized production of modular products in 2004–2006. International scope is the number of countries to which the firm exports its products and services and is a proxy for exposure to international competition. Finally, we take account of the relevance of territorial location by controlling for firm province (Evangelista et al., 2002). This variable is measured by a series of provincial dummy variables.

Since the independent variable included in the model, offshoring of intangibles, potentially is a choice variable, correlated with unobservables relegated to the error term, we could have endogeneity problems. More efficient firms are more likely to decide on a strategy of offshoring of intangibles, which could cause an endogeneity problem. Specifically, this problem could originate from omitted variables related to management self-selection, which affects both the choice to offshore intangible activities and performance (Wooldridge, 2002: 50–51). To deal with the problem of endogeneity, we identify a set of instrumental variables for our endogenous variable. Because the instruments must not suffer from the same problem as the original repressor, this entails identifying ones that are both strong (i.e. affect the firm’s decision to offshore intangible activities) and valid (i.e. uncorrelated with the error term in the structural equation). We selected two types of instruments: (i) three variables aimed at describing the firm’s local context; and (ii) one firm level variable. For the firm’s local context, we consider the airport infrastructure, measured as the number of embarked and disembarked air travellers per 100 inhabitants, the total amount of tax paid on production activities (IRAP) by region, and number of firms over population for each province. Airport infrastructure can be considered a proxy for regional infrastructure facilities for long distance transportation and also a measure of regional
openness (Gambardella et al., 2008). Tax paid provides a measure of regional legislation or taxation. Number of firms over population for each province describes the richness of the entrepreneurial environment to which the focal firm is exposed (Brenner and Greif, 2006). These three variables are likely to influence the offshoring decision, but are unlikely to be related to the error term in the structural equation. At firm level, we consider the variable corporate group, which takes the value 1 if the firm belongs to a corporate group, and 0 otherwise. As described in the empirical context, firms indicate adaptation to group strategies as one of the drivers of offshoring of intangibles.

We chose this variable among other firm level factors identified in the empirical analysis, since it is the one least likely to be correlated with the error term in the structural equation. We use the Sargan chi-square test statistic to test for overidentifying restrictions, to check the validity of the instruments described above. The hypothesis we test is that the chosen instrumental variables are uncorrelated to the set of residuals and, thus, can be considered acceptable and sound instruments. The set of instruments passed this test and therefore are valid for this criterion.

5. Results

Descriptive Results

Table 4 provides descriptive statistics and a correlation matrix of the variables. Analysis of the correlation matrix shows that most correlations are low. In models I and II, the variance inflation factors (VIF) associated with each regression coefficient show a range from 1.16 to 1.56 (model I) and from 1.18 to 1.91 (model II). These values are lower than the typically recommended threshold of 10 (Belsley et al., 1980); thus, we do not seem to have problems related to multicollinearity. Specifically, we observe that offshoring choices are not correlated to industry type, firm size or age. In addition, merging data from diverse sources allows us to reduce the risk of common method variance (CMV). For all the self-reported measures, we test for CMV using Harman’s single factor test (Podsakoff et al., 2003). The results (available on request) show no evidence of CMV.

Econometric Results

We estimate the models using a general linear model (GLM) regression, and include a robust option for estimating standard errors using Huber–White sandwich estimators. This procedure is considered to be very useful for dealing with minor problems related to heteroscedasticity, normality or observations with large residuals (Wooldridge, 2002). The results are presented in Table 5. Model I provides support for Hypothesis 1 (HP1: Offshoring intangible activities positively affects firm performance). The parameter for offshoring (computed as a predicted variable from the first-step fractional response estimation) is significant and positive for explaining the dependent variable: therefore, firms that choose to offshore intangible activities appear to have higher levels of performance.

To find empirical support for Hypothesis 2 (HP2: Coherence between offshored activities and firms’ output positively moderates the relationship between offshoring of intangible activities and firm performance), we introduce an interaction term, Offshoring of intangibles * Intangibles. We find the moderator term is positive and significant for explaining
Table 4. Descriptive statistics and correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Firm performance</td>
<td>2.18e–09</td>
<td>0.776</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Offshoring of intangibles</td>
<td>0.094</td>
<td>0.213</td>
<td>0.054</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Intangibles</td>
<td>0.479</td>
<td>0.503</td>
<td>0.050</td>
<td>0.565</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Offshoring of intangibles</td>
<td>0.039</td>
<td>0.137</td>
<td>0.117</td>
<td>−0.039</td>
<td>0.312</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intangibles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Firm size</td>
<td>130.12</td>
<td>119.95</td>
<td>−0.090</td>
<td>0.125</td>
<td>−0.159</td>
<td>−0.300</td>
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</tr>
<tr>
<td>6 Firm age</td>
<td>1.945</td>
<td>1.926</td>
<td>0.042</td>
<td>0.032</td>
<td>−0.111</td>
<td>−0.310</td>
<td>0.059</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Firm sector</td>
<td>0.164</td>
<td>0.373</td>
<td>−0.198</td>
<td>−0.076</td>
<td>0.073</td>
<td>0.347</td>
<td>−0.027</td>
<td>−0.457</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Firm innovation</td>
<td>0.929</td>
<td>0.621</td>
<td>0.059</td>
<td>−0.145</td>
<td>−0.223</td>
<td>−0.058</td>
<td>−0.042</td>
<td>−0.165</td>
<td>0.112</td>
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<td></td>
</tr>
<tr>
<td>9 Modularity</td>
<td>0.055</td>
<td>0.229</td>
<td>−0.019</td>
<td>0.389</td>
<td>0.285</td>
<td>0.019</td>
<td>0.228</td>
<td>−0.064</td>
<td>−0.118</td>
<td>−0.081</td>
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</tr>
<tr>
<td>10 International scope</td>
<td>1.959</td>
<td>2.150</td>
<td>0.249</td>
<td>0.104</td>
<td>−0.068</td>
<td>−0.228</td>
<td>0.131</td>
<td>0.396</td>
<td>−0.374</td>
<td>0.034</td>
<td>−0.115</td>
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</table>

*a* A predicted variable from the first-step fractional response estimation.
firm performance (see model II). Therefore, selling intangibles directly strengthens the relation between offshoring of intangibles and firm performance. We observe that coherence between the offshored input and the firm’s output increases the impact of offshoring of intangibles on firm performance. A central issue in the field of competitive strategies is that the firm possesses unique capabilities that are difficult to transfer: the preservation and development of those capabilities allows the firm to maintain its advantages and facilitates coordination and control of offshored activities. Coherence between the offshored input and the firm’s output guarantees the preservation of skills that facilitate knowledge integration and coordination.

**6. Discussion**

Using original empirical data from a sample of Italian firms, this paper has investigated the effect on performance of the firm’s decision to outsource offshore intangible activities. We show the existence of a positive relation between offshoring of intangibles and performance and we prove that this positive relation is reinforced if the firm is also a provider of intangibles. The discussion of results is presented under implications for theory and implications for practice.

**Implications for Theory**

The research described in this paper provides two contributions to the academic debate in terms of shedding further light on offshoring in the specific context of intangible activities and

<table>
<thead>
<tr>
<th></th>
<th>Model I</th>
<th>Coeff.</th>
<th>SE</th>
<th>Model II</th>
<th>Coeff.</th>
<th>SE</th>
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<tr>
<td>Offshoring of intangibles(a)</td>
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<td></td>
<td></td>
<td>2.150***\ [0.206]</td>
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<td>Intangibles</td>
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<td>0.247*\ [0.129]</td>
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<tr>
<td>Offshoring of intangibles(a) * Intangibles</td>
<td>3.774***\ [0.717]</td>
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<td>0.001*\ [0.000]</td>
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<tr>
<td>Firm size</td>
<td>0.001**\ [0.000]</td>
<td></td>
<td></td>
<td>0.001**\ [0.000]</td>
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<tr>
<td>Firm age</td>
<td>0.194***\ [0.073]</td>
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<td>0.125*\ [0.070]</td>
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<td>Firm sector</td>
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<td>-0.145\ [0.193]</td>
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<td>Firm innovation</td>
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<td>0.069\ [0.100]</td>
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<td>Modularity</td>
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<tr>
<td>International scope</td>
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<td>0.033\ [0.023]</td>
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<td>Provincial dummies</td>
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<td>OK OK OK OK</td>
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<tr>
<td>Constant</td>
<td>-0.335\ [0.059]</td>
<td></td>
<td></td>
<td>-1.362***\ [0.156]</td>
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<td></td>
</tr>
<tr>
<td>No. of obs.</td>
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<td>67</td>
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<tr>
<td>Log likelihood</td>
<td>-24.158</td>
<td></td>
<td></td>
<td>-20.001</td>
<td></td>
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<tr>
<td>Model F</td>
<td>3.18***</td>
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<td>3.48***</td>
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<tr>
<td>R-squared</td>
<td>0.792</td>
<td></td>
<td></td>
<td>0.816</td>
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<td></td>
</tr>
</tbody>
</table>

\(a\) A predicted variable from the first-step fractional response estimation.
Two-tailed tests: *\(p < 0.10\); **\(p < 0.05\); ***\(p < 0.01\). Standard errors in brackets.
the relationships between the offshoring of intangible activities and firm performance, contributing to the debate on the role of capabilities and knowledge.

First, this study broadens our understanding of offshoring of intangibles. Due to offshoring being a recent development, we do not know whether the theories developed for other contexts are applicable to offshoring. Our study shows that existing theories on capabilities and intangibles are valid. Since Coase's work (1937), researchers have been debating the advantages of vertical disintegration. Our findings show that, in the context of intangibles, firms seem to benefit from an offshoring strategy. We provide empirical evidence to support the importance of delocalization of intangible activities to foreign countries, for firm competitive advantage. The possibility to exploit external economies of scale, increased competition amongst suppliers and greater flexibility for responding to the rapid changes in demand (Ulrich and Ellison, 2005) are some of the benefits deriving from this strategy that explain our results. Furthermore, successful offshoring guarantees improvements to products and costs, and achievement of potential market share (Bettis et al., 1992), which is considered a necessary condition for firms to remain competitive. As highlighted in the literature review, this new phenomenon of offshoring has been investigated using several different theoretical lenses; this study examines it from a TCE perspective and also from the perspective of the resource-based view. Whereas these views differ in a number of respects, in the case investigated in this paper, their complementarities are constructive. Scholars agree that both capabilities and transaction costs matter: the latter are short run, while the former involve an evaluation of the firm's competitive advantage (Langlois, 1992; Foss, 1993; Poppo and Zenger, 1998; Jacobides and Winter, 2005). Theoretical predictions suggest the importance of finding a balance between these theories since offshoring of intangibles both decreases transaction costs and increases the need to maintain a link between the activities offshored and the firm's internal capabilities. The literature review identifies four main rationales for offshoring intangibles (cost reduction, increased efficiency and flexibility in work organization, access to new markets, and access to skilled labour and specialized technologies), whose relevance is confirmed by the empirical evidence.

Second, we highlight the important intersection between offshoring of intangible activities, coherence and firm performance. In fact, in the context of intangibles, where activities are particularly complex to manage and difficult to control, our evidence highlights the importance of coherence between what the firm sells and what the firm buys. We suggest that selling the intangible activities guarantees a higher level of control over the entire process and helps firms to retain the underlying capabilities in house (Brusoni et al., 2001), reinforcing the positive relationship between offshoring intangibles and performance. The findings confirm the importance of a synergistic relationship between upstream and downstream activities. Offshoring can result in the fragmentation of activities and knowledge; coherence may reduce the difficulties associated with integration. These findings broaden our understanding of the coordination and control mechanisms that firms can adopt (Prencipe et al., 2003; Hobday et al., 2005), and identify coherence as an important element to ease the integration of dispersed activities and knowledge.

Implications for Practitioners

This study offers useful insights for practitioners and managers implementing offshoring strategies. Offshoring helps to reduce costs, increase efficiency and flexibility in work
organization, opens entry to new markets, and access to skilled talent and specialized knowledge. However, when offshoring involves intangibles, the nature of the activities increases the challenges of coordination and control and the risks of losing crucial internal capabilities. Our study has important implications for management since we show that the benefits from offshoring intangibles are amplified when there is coherence between what the firm outsources offshore and its downstream activities. On the basis of our findings, we suggest that appropriate selection of the activities to be offshored will enhance the advantages of intangibles offshoring, and reduce the risks related to coordination and control. Our results can be framed and interpreted by distinguishing between capacity and knowledge provision as reasons for offshoring. Although we do not investigate this aspect explicitly (it is an avenue for possible future research), capacity or knowledge offshoring entails links with different firm core capabilities. In the first case, capacity offshoring, the firm has the capability to provide the product/service, but chooses to outsource production for financial, space or management reasons. In the second case, knowledge offshoring, the firm lacks the appropriate knowledge or capabilities to produce the product or provide the service internally and outsourcing is less costly than developing the knowledge or capability in house (Fine, 1998). Our findings suggest that in the former case, intangible activity offshoring leads to superior performance since the relevant knowledge is retained internally.

The present study also offers insights and reflections useful for policy-makers and analysts. On the basis of the empirical evidence and theoretical reasoning provided, offshoring of intangibles has a positive effect on performance, and this positive effect is enhanced if the firm retains some distinctive capabilities in house. Scholars have highlighted the risk that offshoring countries may lose important intangible resources: countries’ intangible capital could migrate, leaving the offshorer with no distinctive capabilities (Doh, 2005; Woolridge, 2010). In the long term, offshoring could result in the erosion of core capabilities, which could result in the firm being forced out of business, with a negative impact on the competitiveness of the whole country. This reasoning reinforces our claim that, firms that decide to offshore high value-added activities, that is, intangible activities, should retain part of the underpinning knowledge in order not to lose the capabilities and resources related to their business.

Limitations and Further Research

Our results have some limitations. First, the analysis is based on a small sample, which reduces its statistical power. The target population for the study was narrowly defined to include a homogeneous set of firms, which could affect the generalizability of the research. Follow-up empirical studies are needed to support our hypotheses, and should be extended to other industry sectors. It would be interesting to replicate this analysis in the near future, to allow us to assess whether our findings are confirmed by the evolution of the practice. Second, since our data are cross sectional, no inferences of causality can be conclusively established. A consequence of our data-gathering approach is that whilst the analysis provides a very good picture of the firms studied, it provides limited information on their evolution over time. However, since the competitive landscape is shifting continuously, and sustained competitive advantage can be achieved only through continuous reorganization and reconfiguration of internal resources to match the changes in the external environment, it is likely that coherence will increase performance in the short term, as demonstrated by our
model, but will assist firms in the longer term to evolve and reorganize their internal assets, following and anticipating environmental changes. Further research is needed based on a dynamic perspective.

Another limitation is that this study considers a sample of Italian firms. The fact that Italy is a “linguistic island” may limit the generalizability of our findings on offshoring intangibles. However, most of the existing research on offshoring considers the UK and the USA as offshorers and we need to deepen our knowledge about different country patterns. The research in this paper does not pretend to be exhaustive in terms of investigating the influence of all the variables involved in an offshoring strategy, and future research could explore how cultural or geographic distance affects firm performance.

7. Conclusions

This study has increased our understanding of the relations between offshore outsourcing and firm performance. We investigated this issue in the specific case where the activities offshored are intangibles. Intangible activities refer to highly knowledge-intensive activities, such as software development, R&D, product design and professional services (Kotabe and Swan, 1994; Bounfour, 1999). In response to the two hypotheses developed and raised in this paper, we find, first, that the firm’s decision to offshore intangible activities has a positive impact on firm performance. This confirms the importance of the process of delocalization of intangible activities to foreign countries. This practice enables the firm to obtain several advantages (i.e. cost reduction, access to skilled talent and specialized technologies, increased efficiency and flexibility in work organization, access to new geographical markets), which ultimately result in increased performance.

Second, we show that the presence of coherence positively moderates the relation between offshoring of intangible activities and firm performance. In fact, our evidence highlights that selling intangible activities guarantees a higher level of control over the entire process, reinforcing the positive effect of offshoring intangibles on performance. The explanation for this finding is based on the idea that coherence between what the firm offshores and its downstream activities is important to benefit fully from cost savings and increases in efficiency provided by the practice of offshoring.

References


