A COMPARATIVE TEST OF THE EFFICIENCY, FOCUS AND LEARNING PERSPECTIVES OF OUTSOURCING

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ABSTRACT

Despite the fact that vertical integration has been a key question of management studies for more than fifty years, we still do not have a unified, coherent view of outsourcing. In particular, multiple theoretical perspectives such as transaction cost economics, industrial organization, and strategy, could explain the outsourcing decision, but the implications of these different streams have neither been theoretically integrated, nor tested simultaneously. In an attempt to disentangle the various causes of outsourcing, we suggest three different rationales for outsourcing: cost reduction, focusing on core capabilities and importing knowledge into the firm. We develop several hypotheses, which we then test on secondary data on French small- and medium-sized enterprises. Results indicate that the learning rationale appears to be the strongest factor influencing the outsourcing decision. Some performance implications of this rationale are also suggested and tested.

28 January 2003

The authors would like to thank the Banque de France, and in particular Jacques Bernard Sauner-Leroy and Laurence Lelogeais, who made the SESAME database available to us. Erin Anderson, Hubert Gatignon, Javier Gimeno, Stylianos Kavadias, an anonymous reviewer and several seminar participants at INSEAD, HEC, LBS, the Academy of Management meetings and the Strategic Management Society conference provided us with useful feedback on earlier drafts of this paper.

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Corporations appear to increasingly rely on outsourcing. For example, 86% of major US corporations outsourced at least some services in 1997, up from 52% in 1992 (A.T. Kearney consultants report, quoted in Byrne, 1996). According to Dun & Bradstreet, the market for "routine operational services" such as payroll management or IT functions doubled in size from 1997 to 2000 (quoted in Auguste, et al., 2002). Further, some surveys suggest that outsourcing is increasingly used in "sensitive" functions such as customer service, R&D or production, whereas in the past it only found widespread applications in "back-office" functions like IT, logistics and payroll management (Baden-Fuller, et al., 2000; Kimzey and Kurokawa, 2002).

In spite of the widespread use of outsourcing as an activity, outsourcing has not received extensive attention in strategy research. Perhaps this is due to the commonly held view that vertical integration and outsourcing are two sides of the same coin: when vertical integration is not needed, then outsourcing imposes itself. Yet several frameworks, often with conflicting predictions, have been formulated to predict vertical integration: transaction costs (Williamson, 1975; 1985), industrial organization (Stigler, 1951; Perry, 1989), business history (Chandler, 1962; 1990) and the resource-based view (Argyres, 1996). In addition, some recent views linking 'learning' and outsourcing have not been studied empirically.

In this paper, we test which factors best predict outsourcing. The sample is drawn from French manufacturing industry in the period 1996-1997. The paper is organized as follows. The next section reviews the main theories related to vertical integration and outsourcing. After that, the methodology and empirical setting are briefly discussed. The section thereafter discusses the results and implications.

DEFINITION AND THEORETICAL BACKGROUND

Although the use of the word "outsourcing" is widespread both in the managerial and academic literatures, definitions of the term are surprisingly rare. Van Mieghem (1999) provides one explanation by pointing out that outsourcing is a new word, appearing in the English dictionary as late as 1982. Thus, outsourcing is not a well-established, univocal term with a long tradition of use. This stands in contrast to subcontracting, which, for some industries, goes back several centuries.

In this paper, we define outsourcing as the act of transferring to another firm an activity that used to be conducted in-house, and, *by extension*, the resulting state of not conducting that activity in-house anymore. Two points are particularly noteworthy about this definition. First, we give outsourcing a precise and relatively narrow meaning describing the *flow* of an activity from within to outside the firm (Greer, et al., 1999; Maltz and Ellram, 1999; Doig, et al., 2001). However, we also acknowledge the fact that the term outsourcing is widely used as a *state* variable, this time "summarizing" at one point in time the sum of transfers of activities that took place (e.g. Lei and Hitt, 1995; Ulset, 1996; Insinga and Werle, 2000). Second, this definition implies that if the activity was *never* carried out within the boundaries of the firm, one should not use the term outsourcing, but rather speak simply about buying, or sourcing.

Three rationales for outsourcing can be identified in the literature: cost reduction, focus on core activities and learning from suppliers.

THE EFFICIENCY VIEW

A first group of theories considers vertical integration and outsourcing as a case of cost reduction. In this view, the choice of the boundaries of the firm is made on the basis of a cost–benefit analysis of alternative governance arrangements (see Harrigan, 1983; Perry, 1989; Mahoney, 1992 for comprehensive reviews). The majority of these studies make those analyses from a transaction-cost perspective (Williamson, 1975; 1985). In this view, transacting in the market (and therefore outsourcing) is considered the default option. Integration is considered to be efficient only in the presence of three factors: asset

specificity, uncertainty and high frequency of the transaction. We will briefly comment on each in turn.

First, transaction cost theory suggests that companies that are facing asset specificity in their relationships with suppliers are more likely to integrate to avoid being held up by a supplier. Specific assets lock the parties into a contractual relation with switching costs, possibly leading to costly bargaining in the case of a hold-up. Following this logic, companies may be expected to outsource in situations where the specificity of required assets is low. Thus, this view leads to a first hypothesis concerning outsourcing:

HYPOTHESIS 1: Asset specificity will be negatively correlated with outsourcing.

A second factor affecting integration in a transaction-cost framework is the presence of uncertainty. In cases of uncertainty, contracts will be more complicated to write, as parties will have to forecast multiple contingencies. Assuming boundedly rational actors, the costs of transacting in the market will increase. In addition to this, uncertainty makes control and auditing of the task performance more complicated and costly. Integration reduces transaction costs because of the possibility of appealing to a higher authority in the hierarchy. Firms therefore are predicted to internalize transactions that are subject to high uncertainty.

Uncertainty however has many components, and various contributions have demonstrated that not all components have the same impact (Balakrishnan and Wernerfelt, 1986). Yet, one type of uncertainty appears to have a systematic effect: demand uncertainty (Walker and Weber, 1987). Situations of uncertain demand will increase the likelihood of renegotiations of the initial agreement resulting in a loss of time and efficiency and exposure to opportunism of the contracting partner. These incidences increase the cost of transacting in the market. If the same transactions were managed within one firm, problems could be dealt with through the use of *fiat*. Thus, we suggest:

HYPOTHESIS 2: Demand uncertainty will be negatively related to outsourcing.

In early formulations of transaction cost economics, Williamson included also the frequency of transaction as a determinant of the degree of vertical integration. In this case, Williamson argued that for transactions with a low frequency, the cost associated

with the use of markets is lower than the cost of creating and administrating a hierarchy. Later formulations (e.g. Williamson, 1995) downplayed the role of frequency: in the absence of uncertainty and asset specificity, transactions will be governed more efficiently in a market framework, regardless of the frequency with which they occur. However, anecdotal and case-based evidence suggest that an outsourcing decision may indeed also depend on the frequency of the transaction (Bettis, et al., 1992; Venkatesan, 1992; Quinn and Hilmer, 1994). To test whether transaction frequency affects the extent of outsourcing, we will test the following hypothesis:

HYPOTHESIS 3: Frequency of interaction will be negatively correlated with outsourcing.

Two other views have complemented the transaction cost perspective to explain vertical integration: Stigler's life cycle view and Chandler's scale and scope perspective on firm growth. Stigler (1951) expanded Adam Smith's theorem that "the division of labor is limited by the extent of the market", and inferred that emerging and declining industries are likely to lack sufficient volumes to justify an extensive division of labor. To put it another way, activities with low volumes will more likely be vertically integrated because an independent firm that focuses on a single stage of the supply chain may not reach minimum efficient scale. This situation, according to Stigler, is likely to take place in emerging and declining industries. Empirical studies have found support for this hypothesis (Tucker and Wilder, 1977; Levy, 1984). Although the argument applies mostly longitudinally, there is reason to believe that the effect would also show up cross-sectionally, all other things being equal. In other words, young and declining industries would still, on average, show higher levels of integration (thus less outsourcing) than their growing and mature counterparts (Stigler, 1951, p. 190; Besanko, et al., 1996, p. 81). This suggests the following hypothesis:

HYPOTHESIS 4: Firms operating in industries in the emerging or declining stage of their life cycle will exhibit less outsourcing activity than their peers in growing or mature industries.

The final rationale for using outsourcing to reduce costs comes from Chandler's (1962; 1990) studies on the emergence of the modern industrial enterprise.

Chandler noted how the growth of these firms relied on the exploitation of economies of scale and scope. Achieving these economies required the creation of bigger size factories, and therefore a higher level of fixed costs. Once their capital intensity increased, however, companies found themselves requiring "a constant flow of materials through the plant and factory […] to assure effective capacity utilization" (Chandler, 1990, p. 24). This need to ensure throughput in turn served as a major motive for vertical integration (Chandler, 1990, p. 37-38). Stated differently, capital intensity generates efficiency gains, but also raises the break-even point to higher production volumes, thus raising the risk profile of the organization. To manage this risk, companies often choose to integrate, thus countering the increased risk with an increased amount of information about the activities of the whole value chain (Arrow, 1975), as well as more direct control (Harrigan, 1983; Richardson, 1996). This leads to:

HYPOTHESIS 5: Capital intensity will be negatively related to outsourcing.

THE FOCUSING VIEW

Outsourcing need not be exclusively driven by cost considerations; it could also be a means for companies to concentrate on their core competencies (Quinn and Hilmer, 1994; Quinn, 1999). The competence and resource-based views of the firm have argued that a firm's competitive advantage is based on a number of skills and resources that are internally built. In these views, outsourcing of core activities should only be used as a stopgap measure, a temporary solution while companies build their own internal capabilities (Dierickx and Cool, 1989; Prahalad and Hamel, 1990, p. 84). While these views do not systematically address the outsourcing decision, it may be implied that outsourcing of non-core activities is compatible with the key tenets of these views; outsourcing saves resources (time, money, managerial attention) to be used in core activities (Bettis, et al., 1992; Venkatesan, 1992; Welch and Nayak, 1992). Research by Markides (1992; 1995) on the extent of refocusing of corporations in the late eighties found that many companies that refocused also enjoyed higher performance. Thus, we suggest:

HYPOTHESIS 6: The perceived relevance of an activity to a firm's competitive

advantage will be negatively correlated with its outsourcing.

THE LEARNING VIEW

In the emerging knowledge based view of the firm, it is argued that a firm needs an ability to constantly reconfigure and update its knowledge base to sustain its position (Teece, et al., 1997; Galunic and Rodan, 1998; Eisenhardt and Martin, 2000). Viewed from this perspective, suppliers may play a key role in 'updating' a firm's competitive advantage (Matusik and Hill, 1998). Though outsourcing may undermine some of the isolating mechanisms protecting competencies, outsourcing will also supply new knowledge (Baden-Fuller, et al., 2000). That is, suppliers may possess resources that are 'complementary' to those of the firm, generating a positive externality. While suppliers can be expected to benefit from knowledge obtained from a firm, firms may also be expected to capture knowledge spillovers from its supplier base; a firm's suppliers can become a network of learning (Lorenzoni and Lipparini, 1999).

In a static, steady state environment, learning from suppliers is unlikely to confer a competitive advantage to a firm as everything that needs to be learned may already have been acquired. Yet, to the extent that environments are more dynamic, information exchange with suppliers could become more valuable. For example, technological uncertainty is likely to discourage integration as the possibility of a major technological breakthrough will make companies wary of committing to any given standard (Balakrishnan and Wernerfelt, 1986; Walker and Weber, 1987). Outsourcing in this case gives companies an opportunity to "wait and see" until a dominant design has emerged while suppliers make the technological investment (Anderson and Tushman, 1990).

We will test two hypotheses related to the 'learning view':

HYPOTHESIS 7: Technological uncertainty will be positively correlated with outsourcing.

HYPOTHESIS 8: Having constant information exchange with suppliers will be positively correlated with outsourcing.

In sum, the literature suggests several reasons why a firm may want to outsource activities: to improve its efficiency (reducing 'transaction' and 'production' costs); to free resources tied up in non-core activities, and to benefit from knowledge of suppliers. These reasons are not mutually exclusive. Yet, the type of outsourcing that is most often used may depend on the environment the firm is in. For example, one can expect efficiency outsourcing to be more prevalent in static environments and learning outsourcing to be more attractive in dynamic environments. In the following section, we describe the methodology we used to test the various hypotheses.

METHODOLOGY

SAMPLE

The hypotheses were tested with data coming from Sesame, a comprehensive database created in 1994 by the Banque de France, the French central bank. The database has received some attention in the management literature and has already been used for research (e.g. Cool and Henderson, 1998). Its aim is to complement the bank's financial information with industry and firm data through questions on the firm's business environment, organization, structure and strategy. In all, about 400 questions are asked. About 2000 CEOs of small- to medium-sized French firms (from 20 to 5000 employees) answer the questionnaire annually through face-to-face interviews conducted by Banque de France agents specially trained on survey techniques. These agents use a computer-aided questionnaire and rely on a user guide, which seeks to reduce the risks of misunderstanding the questions. The questionnaire has evolved over the years, and in particular was substantially edited in 1998. We used data from 1996 and 1997 (4180 observations) in this research, and we complemented the database by additional financial information provided by the Banque de France.

Several criteria were used to select our sample from the database. First, performance data were available only at the firm level and not at the business-unit level. We therefore restricted the initial sample to single-business firms, operationalized

as firms with at least 70% of their sales in a single industry (consistently with Rumelt's 1974 definition of focused firms).

Second, we excluded from the sample all firms that had indicated that their "main suppliers"[1] provided only "raw materials" (e.g. steel for a mold producer, fabric for a cloth manufacturer). The Sesame database contains data only on the main suppliers of companies. To avoid confusion between sourcing and outsourcing, we excluded the firms whose main suppliers essentially had a sourcing (or buyer-seller) relationship.

Third, we needed information on the importance of the outsourced activities (to test hypothesis 6) and information about the suppliers of these outsourcing activities. Sesame provides information on the importance of several functions for competitive success. The only activity for which Sesame provides information both on the importance and on the level of outsourcing is production. To limit our sample to companies that made use of production related outsourcing, we excluded any firm that merely acquired support services from their main suppliers, as opposed to primary activities. Through this selection process, our sample was narrowed to companies whose main suppliers provided subcontracting and intermediate and semi-finished products. Our assumption is that the higher the importance of the production function, the less a company is expected to use these suppliers.

Lastly, we only included in the final sample industries (defined at the French equivalent of four-digit SIC code) with 10 or more observations to control for industry effects. These successive selection criteria yielded a sample of 132 observations in 11 industries (see Appendix A for a list of the sectors). Table 1 gives descriptive statistics of this final sample. The average firm has less than 200 employees, sales of around FF175 million (around 26 million euros or dollars), and outsources about 16.5% of its sales volume (standard deviation: 18.5%; range going from 0 to 100%).

INSERT TABLE 1 ABOUT HERE

[1] The main suppliers are defined here as the combination of the "largest supplier" and the "next three suppliers"

MEASURES

The questions we used from the Sesame database are given in Appendix B. The *dependent variable*, the extent to which a company outsources, is measured by the ratio of outsourced activity to total sales.

The first independent variable, *asset specificity* was measured by a five-point Likert scale seeking to capture the extent to which a focal firm invested in assets specific to its main suppliers. *Demand uncertainty* was assessed by reversing a five-point scale capturing the CEO's opinion about the maximum length of time over which strategic planning would make sense. *Frequency of transactions* was gauged by a five-point scale indicating the average length of time between two contractual negotiations. This scale was also reversed to obtain a straightforward interpretation of transaction frequency. *Capital intensity* was measured by the fixed assets-to-sales ratio. Respondents were also asked to assess the *Life Cycle* of the market they were in. Four possibilities were given: emergence, growth, maturity or decline. In conformance with Stigler's theory, we combined the emergence and decline phases into a single indicator and created a dummy variable.[2]

The focus hypothesis requires us to assess the importance ("core-ness") of the outsourced activity. The Sesame questionnaire asks respondents to compare the importance of production to that of eight other activities (R&D, marketing, sales, finances, procurement, logistics, services and human resources) and rank the five most important ones from 1 to 5. Because of its rank-order nature, we converted this item to a dummy variable, measuring 1 if core was ranked anywhere in the top 5 activities, 0 otherwise.

Two additional variables were needed to test the learning view hypotheses. *Technological uncertainty* was measured by the average of two five-point scales measuring the magnitude of both product and production process renewal rates at the industry level. *Intensity of information exchange* was assessed by the average of two five-point scale,

[2] We also ran a regression with separate variables for emergence and decline; the empirical results did not change much.

measuring the focal firm's information exchange with its suppliers concerning production processes and costs.

A set of *control variables* was also used in the model: they include a set of dummy variables *(NAF)* to control for industry effects (SIC equivalents), and a dummy *(Group)* to control for cases where the main suppliers and the focal firm belong to the same group.[3]

ESTIMATION

As the purpose of this paper is to disentangle the different theoretical views pertaining to outsourcing, a full model was run, simultaneously incorporating all of our hypotheses. We first estimated our coefficients using ordinary least squares estimation. However, our dependent variable is limited (between 0 and 1), which means that the OLS coefficients are likely to be biased: Tobit estimation procedure corrects for this bias, and thus we also run a Tobit model (Kennedy, 1998, p. 249-251). .

INSERT TABLE 2 ABOUT HERE

RESULTS

Table 2 presents the zero-order correlations among all variables. The maximum correlation is 0.32, which does not suggest a collinearity problem. Among the independent variables, technological uncertainty and capital intensity are the only two that show some correlation with outsourcing, We should also note the correlation between the group control variable and frequency: it seems that when suppliers and clients are part of the same group, renegotiations happen only infrequently. This is consistent with a transaction

[3] We also controlled for a possible year effect; however, since the questionnaire is sent to a specific number of industries each year, it is not possible to control both for industry and for year at the same time. Consequently, we report the models with industry controls. Results did not change with a year-effect control.

cost explanation, which suggests that the use of *fiat* will reduce the need for continuous renegotiations of the contractual terms.

Table 3 shows the results of the model, incorporating all variables (standardized coefficients). Overall, the OLS model is significant (F value: 1.77, $p < 0.05$), and so is the Tobit model (likelihood ratio chi—square: 37.65, $p<0.01$). We also note that significance levels (and value of the coefficients) change only slightly between the two estimation procedures.

INSERT TABLE 3 ABOUT HERE

Control variables are insignificant with two exceptions. It appears that companies in the surgical equipment industry (NAF 331B) outsource significantly more than other companies (albeit only marginally so). Also, the Tobit estimation reveals a significant coefficient for the group variable: it seems that companies outsource *less* to suppliers in the same group than outside.

Moving to our independent variables, we see that there is little empirical support for the efficiency view, positing that firms will outsource when market solutions are more efficient than internal organization. First, contrary to hypotheses 1 and 2, neither asset specificity nor demand uncertainty has a significant effect on outsourcing. Though frequency does have a marginally significant impact on outsourcing ($p<0.1$), the coefficient shows the opposite sign from our expectations: more frequent contract renegotiations seem to increase the extent of outsourcing. This result runs counter to the original view that frequent transactions would slow outsourcing. We should note however that this coefficient becomes insignificance in the Tobit estimation, suggesting some instability of this result. Thus, hypothesis 3 is rejected. We also posited, following Stigler, that outsourcing would be more often observed in emerging and declining industry settings. We observe from table 3 that this coefficient is not significant. Thus, the life cycle view on outsourcing is not supported in the present analysis. We note however that our sample is cross sectional, measuring different industries at a different point in their life cycle. A stronger test would be to track industries longitudinally. Data limitations of Sesame may be at the origin of the non-significant result. On the other hand, we note that the parameter measuring the impact of asset intensity on outsourcing is marginally significant in the Tobit estimation,

yielding weak support for Chandler's view that outsourcing is less likely to take place if there is high capital intensity in production (hypothesis 5).

The focus view of outsourcing was tested with hypothesis 6, inversely linking coreness to outsourcing. Although showing the right sign, this hypothesis is not supported by our data. – that is, we do not find a significant relation between the extent to which a firm considers production a core activity and its degree of oursourcing. Finally, all results support the learning perspective on outsourcing. First, the hypothesis linking outsourcing to technological uncertainty (hypothesis 7) is strongly supported ($p<0.01$), and this variable has the strongest standardized OLS coefficient ($\beta = 0.26$). Second, higher information exchange leads to a higher extent of outsourcing ($p<0.05$), supporting hypothesis 8.

FURTHER ANALYSIS

In this section, we provide some exploratory insights about the consequence of outsourcing on performance. Because the first model's results supported the learning view, we tested the impact of outsourcing on performance as predicted by this view. We expected positive performance consequences for firms outsourcing in situations of high technological uncertainty and high information exchange. We did not expect performance implications in the other three possibilities, as we did not see a clear link with performance. Formally,

HYPOTHESIS 9: In conditions of high technological uncertainty and high information exchange, a higher degree of outsourcing leads to higher performance.

The sample we used for this test is the subset of companies that are above the mean for both technological uncertainty and intensity of information exchange.[4] This cut our

[4] These mean values were respectively 1.8 and 2.9 on a five-point scale

sample to 37 data points. We further tested for the presence of outliers and had to delete three more points.[5] Clearly, given the small sample, the test is merely exploratory.

The dependent variable selected to test hypothesis 9 is Return on Assets (ROA). The following variables were used as control variables: a) barriers to entry, operationalised as marketing intensity (marketing outlays on turnover), b) power of suppliers, operationalized as a five-point scale measuring their perceived negotiation power; c) powers of customers, reverting an item that measures the extent of switching costs for customers, d) a C4 index, measuring the competitive intensity in the focal industry, e) a set of variables indicating the perceived competitive position of the focal firm vis-à-vis its main competitors in the areas of production cost, selling prices and innovation. The Barriers-to-entry measure is a percentage – the other four variables are measured by a five-point perceptual scale (Appendix C lists the questionnaire items used). Zero-order correlations are provided in Table 4. The table shows that outsourcing does have a positive correlation with ROA, as does the production cost efficiency variable.

INSERT TABLE 4 ABOUT HERE

Regression results of the explanatory variables on ROA are reported in Table 5. The small size of our subsample limits the power of the test. Despite this, the model is significant (F value for the model: 3.12 with $p < 0.05$), and hypothesis 9 is supported ($p<0.05$). This result gives some initial support for the contingent claim: outsourcing leads to positive performance in conditions of high technological uncertainty and high information exchange with the supplier. It also validates the learning perspective on outsourcing. Given the size of this sample and the simple operationalization of the performance model, more empirical research is clearly needed, however.

INSERT TABLE 5 ABOUT HERE

[5] These two points were beyond three standard errors of the mean on each dimension, and were detected as outliers both on the standardized DFFIT and on Cook's D measures (Cook and Weisberg, 1994; Kennedy, 1998, chapter 19)

DISCUSSION AND CONCLUSIONS

Outsourcing may have been too often presented as a "one cure for all" managerial recipe. It has initially been offered as a way to cut costs, then as a way to focus the limited resources of the firm and more recently as a way to learn from supplying companies. Using data from the Banque de France on small- to medium- sized industrial firms, this study attempted to disentangle and empirically test these different theoretical views.

We found that outsourcing is more prevalent under conditions of high technological uncertainty and high information exchange. We also gained some exploratory insights into the fact that higher outsourcing under these conditions leads to higher performance. These results are consistent with the learning literature: firms can use suppliers of outsourced activities as knowledge sources, thus integrating the suppliers' competence and experience with their own to achieve superior performance. Just as firms can learn from their customers (Von Hippel, 1988), there appear to be opportunities to benefit from suppliers' knowledge.

More broadly, the results suggests that far from being just an easy solution to take care of secondary activities, outsourcing relations should be considered one source of renewal of a company's knowledge base, in addition to the other corporate development activities already identified in the literature (Eisenhardt and Martin, 2000). Companies may need to keep on investing in the activities they outsource, however. Otherwise, their ability to understand and absorb external knowledge may be limited (Cohen and Levinthal, 1990). In addition, firms that want to learn from their suppliers should also strive to create the appropriate context (in terms of incentives, attitudes and structural arrangements) to facilitate the transfer of knowledge from the supplier to the focal company: just outsourcing an activity will not ensure there is an effective and efficient transfer of knowledge (Hamel, 1991; Matusik and Hill, 1998). In a way, this perspective on outsourcing shifts attention from *what* to outsource to *how* to outsource.

The learning view also opens up the possibilities of a more nuanced approach to outsourcing, validating an observation made by Harrigan (1983) almost two decades ago. Outsourcing is not necessarily a binary decision; there is a continuum of options along several dimensions (degree, stage, breadth and form) that makes outsourcing a

multi-faceted phenomenon. In particular, the learning perspective suggests that a company can simultaneously have both outsourcing and internal production for the same activity. Performing the same activity in parallel with a valued and trusted supplier may be a very effective way to facilitate the transfer of knowledge, as members of both organizations would face similar contexts and thus would be able to understand each other better, thus creating a network of learning (Powell, et al., 1996; Gulati, 1999). True complementarities (Dierickx and Cool, 1989; Teece, et al., 1997) may yield positive effects to both buyer and supplier (Matusik and Hill, 1998; Lorenzoni and Lipparini, 1999). It may be interesting to note that while this observation is rarely made in the context of vertical integration/outsourcing, it has been stressed quite often in the context of alliances (Hamel, 1991; Mowery, et al., 1996) and supply chain relations (Dyer, 1996; Lincoln, et al., 1998; Blankenburg-Holm, et al., 1999).

The positive coefficient on frequency (though contrary to our expectations) is consistent with a learning view, too. While traditional transaction cost arguments highlight the costs associated with meeting and renegotiating a contract, frequent transactions possibly also give rise to a stable relationship, a vital prerequisite for knowledge transfer between two parties (Szulanski, 1996; Dyer, 1997). Thus, high frequency can be associated with more learning, and therefore higher performance, contrary to TCE predictions.

Finally, even our lack of results with the remaining TCE variables could be due to a learning effect, or more specifically to a lack of unlearning. Research has, to our knowledge, never made the distinction between an activity that was always fulfilled by the market ("sourcing") and an activity that was once conducted in-house and was subsequently "out"-sourced afterwards (literally: "outsourcing"). In the latter case, there may be a need for the organization to "unlearn" certain practices linked to the outsourced activity (Weick, 1979). Failure to do so would result in something akin to a "phantom limb effect" (Roos and von Krogh, 1994): believing they still possess the competence inside the organization to perform a specific activity, firms would underestimate the hold-up potential of some relationships involving specific assets. In other words, under these circumstances, firms would fall prey to an overconfidence bias (Lichtenstein and Fischhoff, 1977; Keiren, 1991), overestimating their ability to reintegrate the outsourced activity. If this were the case, then we would not expect a clear link between asset specificity and outsourcing.

Clearly, more research is needed to shed some light on this topic, as well as to understand whether other factors could be involved.

In conclusion, we want to stress several limitations of the study. First, we restricted ourselves to production related outsourcing; other activities may be outsourced for different reasons. Second, the sample is relatively small and restricted to eleven industries. Third, the sample does not consider firms outside France and large firms in France. In spite of these limitations, we hope this paper contributes to a more comprehensive understanding of outsourcing. We observed that firms use outsourcing consistent with a 'knowledge renewal' for companies, as they learn from their suppliers. On a theoretical basis, we have tried to integrate 'transaction-based' and 'production-based' explanations of performance differences, as recently called for by several researchers (Foss, 1999; Langlois and Foss, 1999; Williamson, 1999). Our comparative analysis lends credence to the need to test different perspectives simultaneously.

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APPENDIX A: LIST OF SECTORS

NAF CODE	DESCRIPTION
285D	Metal work: General mechanic
291C	Equipment Manufacturing: Pumps and compressors
292D	Equipment manufacturing: handling equipment
292F	Equipment manufacturing: chilling material
292H	Equipment manufacturing: Packaging machines
311A	Electrical Equipment manufacturing: Transformers (<750kW)
331B	Medical, Optical Equipment and Clock and Watch making: surgical equipment
332B	Medical, Optical Equipment and Clock and Watch making: Scientific and technical equipment
333Z	Medical, Optical Equipment and Clock and Watch making: Process control equipment
342A	Automotive Industry: Car body manufacturers
343Z	Automotive Industry: Equipment suppliers

APPENDIX B: ITEMS USED FOR THE OUTSOURCING MODEL

OUTSOURCING: The percentage of your sales contracted out is_____ %

ASSET SPECIFICITY: For your company, replacing your main suppliers will generate switching costs which are:
Low *Medium/ Low* *Medium* *Medium/ High* *High*

DEMAND UNCERTAINTY (R): What is the relevant timing horizon on which you can do strategic planning for your company? (Number of years)
1 (or less) *2* *3* *4* *5 (or more)*

FREQUENCY (R): Indicate the length of time of the contractual relations between two negotiations with your main suppliers
<3 months *3-12 months* *1-3 years* *3-5 years* *>5 years*

LIFE CYCLE: The market for this product is in the *emerging* / *growing* / *mature* / *declining* stage

IMPORTANCE OF THE ACTIVITY (R) What are the activities that are mostly contribute in maintaining your positions on the markets? (Rank from 1 to 5, maximum)

SUPPORT ACTIVITIES:	*PRIMARY ACTIVITIES:*
• *Human Resources*	• *Logistic*
• *Marketing*	• *Production*
• *Technological development*	• *Sales*
• *Finance*	• *Service*
• *Procurement*	

TECHNOLOGICAL UNCERTAINTY: In your field of activity, indicate the following measures of change for the past two years

PRODUCTION PROCESS	*0-20%*	*20-40%*	*40-60%*	*60-80%*	*80-100%*
PRODUCTS	*0-20%*	*20-40%*	*40-60%*	*60-80%*	*80-100%*

INTENSITY OF INFORMATION EXCHANGE: Your level of information concerning your main suppliers is:

PRODUCTION COSTS	*Low*	*Medium/ Low*	*Medium*	*Medium/ High*	*High*
PRODUCTION PROCESSES	*Low*	*Medium/ Low*	*Medium*	*Medium/ High*	*High*

Note: (R) indicates that the item was reversed for easier interpretation

APPENDIX C: ITEMS USED FOR THE PERFORMANCE MODEL

POWER OF SUPPLIERS	Your main suppliers have generally a high negotiation power that enables them to dictate their terms:				
	Fully disagree	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*Fully agree*
POWER OF CUSTOMERS (R)	For your main clients, replacing you with one of your competitors will entail switching costs that are				
	Low	*Medium/Low*	*Medium*	*Medium/ High*	*High*
RESOURCE POSITION:	In your main activity, which is your positioning vis-à-vis your main competitors on the following criteria:				
PRICE LEVEL:	*Inferior*	*Inferior/ similar*	*Similar*	*Similar/ superior*	*Superior*
PRODUCTION COSTS:	*Inferior*	*Inferior/ similar*	*Similar*	*Similar/ superior*	*Superior*
INNOVATION LEVEL:	*Inferior*	*Inferior/ similar*	*Similar*	*Similar/ superior*	*Superior*

TABLE 1: DESCRIPTIVE STATISTICS

Variable	Sesame population				Final sample			
	Min	Max	Mean	s	Min	Max	Mean	s
Outsourcing	0	100	10.0354	16.6642	0	100	16.5227	18.5437
Asset specificity	1	5	2.2803	1.2947	1	5	2.8106	1.3142
Demand uncertainty	1	5	2.9512	1.3049	1	5	2.8864	1.2334
Frequency	1	5	2.8444	1.2806	1	5	3.8561	1.2967
Capital intensity	0	12.60	0.4363	0.3849	0.01	1.95	0.3122	0.2780
Lifecycle	0	1	0.1476	0.3547	0	1	0.1006	0.3091
Core	0	1	0.6796	0.4667	0	1	0.5682	0.4972
Info exchange	1	5	3.1161	1.4019	1	5	3.0909	1.1254
Technological uncertainty	1	5	1.5928	0.7304	1	5	1.8068	0.8729
Sales (in 000FF)	5,199	9,214,299	192,138.27	426,379.24	15,527	1,795,568	175,983	265,373.7
Employees	17	5296	179.47	282.83	31	1151	185.4394	213.8169

TABLE 2: CORRELATIONS (FULL SAMPLE, N=132)

		Out-sourcing	Asset specificity	Demand uncert.	Freq.	Lifecycle	Capital intensity	Core	Tech. uncert.	Info exchange	Group	NAF285D	NAF291C	NAF292D	NAF292F
Asset specificity	Correlation	-0.03													
	Sig. (2-tailed)	0.74													
Demand uncert.	Correlation	0.09	-0.06												
	Sig. (2-tailed)	0.25	0.45												
Frequency	Correlation	0.10	-0.15 †	0.02											
	Sig. (2-tailed)	0.21	0.07	0.79											
Lifecycle	Correlation	0.02	-0.14 †	-0.02	-0.09										
	Sig. (2-tailed)	0.79	0.08	0.76	0.26										
Capital intensity	Correlation	-0.20 *	0.08	-0.11	-0.16 †	0.07									
	Sig. (2-tailed)	0.02	0.35	0.18	0.06	0.41									
Core	Correlation	-0.10	0.13	-0.10	0.09	0.00	0.32 **								
	Sig. (2-tailed)	0.21	0.11	0.21	0.30	1.00	0.00								
Tech. uncert.	Correlation	0.19 *	0.04	-0.02	-0.15 †	0.00	0.08	0.03							
	Sig. (2-tailed)	0.02	0.59	0.77	0.07	0.99	0.35	0.76							
Info exchange	Correlation	0.13	0.11	-0.11	-0.14 †	0.09	0.12	-0.04	0.00						
	Sig. (2-tailed)	0.12	0.16	0.18	0.08	0.29	0.17	0.62	1.00						
Group	Correlation	-0.09	0.14 †	-0.02	-0.31 **	-0.04	0.05	-0.07	0.10	0.14					
	Sig. (2-tailed)	0.29	0.08	0.79	0.00	0.66	0.58	0.37	0.24	0.10					
NAF285D	Correlation	-0.09	-0.06	0.26 **	0.09	-0.06	0.25 **	0.04	-0.15 †	-0.18 *	-0.16 *				
	Sig. (2-tailed)	0.27	0.43	0.00	0.29	0.47	0.00	0.66	0.06	0.02	0.05				
NAF291C	Correlation	0.13	0.07	-0.03	-0.02	-0.10	-0.09	-0.01	0.09	0.03	0.18 *	-0.11			
	Sig. (2-tailed)	0.11	0.40	0.69	0.77	0.20	0.32	0.86	0.26	0.69	0.02	0.17			
NAF292D	Correlation	-0.04	-0.04	-0.03	0.12	0.05	-0.13	-0.20 *	-0.07	-0.01	-0.01	-0.11	-0.09		
	Sig. (2-tailed)	0.59	0.63	0.69	0.15	0.55	0.13	0.01	0.42	0.92	0.92	0.17	0.25		
NAF292F	Correlation	0.03	-0.05	-0.07	0.00	-0.03	-0.13	0.01	-0.09	-0.06	-0.08	-0.12	-0.10	-0.10	
	Sig. (2-tailed)	0.73	0.53	0.42	0.98	0.67	0.12	0.94	0.29	0.47	0.33	0.15	0.23	0.23	
NAF292H	Correlation	0.15 †	0.00	0.04	0.04	0.00	-0.15 †	-0.14 †	0.11	-0.05	-0.12	0.10	-0.08	-0.08	-0.08
	Sig. (2-tailed)	0.07	0.96	0.61	0.62	0.96	0.07	0.09	0.20	0.58	0.15	0.24	0.32	0.32	0.30
NAF311A	Correlation	-0.10	0.01	-0.11	-0.10	-0.02	0.21 *	0.16 *	0.15 †	0.02	0.07	-0.11	-0.09	-0.09	-0.09
	Sig. (2-tailed)	0.22	0.89	0.16	0.21	0.80	0.02	0.05	0.07	0.78	0.40	0.19	0.27	0.27	0.26
NAF331B	Correlation	-0.07	0.02	0.14 †	-0.06	-0.03	0.02	0.03	-0.01	0.06	0.06	-0.11	-0.09	-0.09	-0.10
	Sig. (2-tailed)	0.37	0.85	0.09	0.47	0.74	0.78	0.69	0.87	0.43	0.50	0.17	0.25	0.25	0.23
NAF332B	Correlation	0.04	-0.07	-0.07	-0.08	-0.06	-0.08	-0.15 †	0.01	-0.02	0.05	-0.14 †	-0.11	-0.11	-0.12
	Sig. (2-tailed)	0.60	0.36	0.42	0.32	0.43	0.35	0.07	0.91	0.77	0.56	0.09	0.16	0.16	0.14
NAF333Z	Correlation	-0.02	0.01	0.04	0.12	0.07	-0.13	-0.06	0.02	0.04	-0.12	-0.10	-0.08	-0.08	-0.09
	Sig. (2-tailed)	0.82	0.92	0.60	0.14	0.39	0.12	0.46	0.81	0.67	0.13	0.21	0.30	0.30	0.28
NAF342A	Correlation	0.06	0.02	0.03	0.04	0.23 **	-0.08	0.22 **	0.01	0.13	0.08	-0.12	-0.10	-0.10	-0.11
	Sig. (2-tailed)	0.50	0.76	0.74	0.66	0.00	0.35	0.01	0.89	0.12	0.33	0.12	0.20	0.20	0.18
NAF343Z	Correlation	-0.06	0.12	-0.21 **	-0.12	-0.03	0.28 **	0.10	-0.03	0.05	0.04	-0.12	-0.10	-0.10	-0.10
	Sig. (2-tailed)	0.44	0.13	0.01	0.13	0.67	0.00	0.23	0.67	0.52	0.59	0.15	0.23	0.23	0.22

† Correlation is significant at the 0.1 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

TABLE 2 (CONTD.)

		NAF292H	NAF311A	NAF331B	NAF332B	NAF333Z	NAF342A
NAF311A	Correlation	-0.08					
	Sig. (2-tailed)	0.34					
NAF331B	Correlation	0.08	-0.09				
	Sig. (2-tailed)	0.32	0.27				
NAF332B	Correlation	-0.10	-0.11	-0.11			
	Sig. (2-tailed)	0.22	0.18	0.16			
NAF333Z	Correlation	-0.07	-0.08	-0.08	-0.10		
	Sig. (2-tailed)	0.37	0.32	0.30	0.20		
NAF342A	Correlation	-0.09	-0.10	-0.10	-0.13	-0.10	
	Sig. (2-tailed)	0.27	0.22	0.20	0.11	0.24	
NAF343Z	Correlation	-0.08	-0.09	-0.10	-0.12	-0.09	-0.11
	Sig. (2-tailed)	0.30	0.26	0.23	0.14	0.28	0.18

† Correlation is significant at the 0.1 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

TABLE 3: OLS RESULTS – DETERMINANTS OF OUTSOURCING

Variable	OLS		Tobit
	Coefficient	Standard	
Constant	-9.66		-17.03
	(-0.85)		(-1.37)
Asset specificity	0.05	0.00	0.09
	(0.04)		(0.06)
Demand uncert.	1.64	0.11	2.39
	(1.20)		(1.59)
Frequency	2.64 †	0.18	2.06
	(1.93)		(1.38)
Lifecycle	1.07	0.02	1.36
	(0.20)		(0.23)
Capital intensity	-10.31	-0.15	-14.11 †
	(-1.45)		(-1.68)
Core	-3.05	-0.08	-3.02
	(-0.81)		(-0.74)
Tech. uncertainty	5.60 **	0.26	6.91 **
	(2.96)		(3.34)
Info exchange	3.34 *	0.20	4.59 **
	(2.25)		(2.78)
Group	-6.74	-0.13	-12.31 *
	(-1.39)		(-2.16)
NAF285D	-5.64	-0.09	-3.68
	(-0.74)		(-0.43)
NAF291C	3.70	0.06	4.39
	(0.48)		(0.51)
NAF292D	-7.35	-0.11	-5.89
	(-0.92)		(-0.68)
NAF292F	0.46	0.01	1.88
	(0.06)		0.23
NAF292H	2.49	0.03	3.18
	(0.29)		0.35
NAF311A	-6.70	-0.10	-6.62
	(-0.90)		(-0.80)
NAF331B	-13.39 †	-0.20	-15.78 †
	(-1.71)		(-1.82)
NAF332B	-0.27	0.00	1.69
	(-0.04)		0.22
NAF333Z	-12.26	-0.17	-13.95
	(-1.43)		(-1.48)
NAF342A	-2.70	-0.05	-1.79
	(-0.35)		(-0.21)

OLS Statistics		**Tobit statistics**	
R^2	0.23	Log likelihood	-489.4659
Adjusted R^2	0.1	χ^2	37.65 **
F	1.77 *		

T-statistics in parenthesis

†: p<0.10 *: p<0.05 **: p <0.01

TABLE 4: CORRELATIONS (SUB-SAMPLE, N=34)

		ROA	Out-sourcing	Barriers to entry	Supplier power	Client Power	C4	Price position	Prod. cost position
Outsourcing	Correlation	0.33 *							
	Sig. (2-tailed)	0.05							
Barriers to entry	Correlation	-0.22	-0.14						
	Sig. (2-tailed)	0.18	0.40						
Supplier power	Correlation	-0.05	-0.13	0.11					
	Sig. (2-tailed)	0.76	0.42	0.51					
Client Power	Correlation	0.22	-0.03	0.07	-0.17				
	Sig. (2-tailed)	0.20	0.84	0.65	0.29				
C4	Correlation	0.05	-0.01	0.09	-0.09	0.20			
	Sig. (2-tailed)	0.78	0.93	0.59	0.57	0.24			
Price position	Correlation	-0.09	-0.04	-0.32 *	-0.16	0.20	0.16		
	Sig. (2-tailed)	0.58	0.79	0.04	0.34	0.21	0.33		
Production cost position	Correlation	0.39 *	-0.01	0.07	-0.21	0.12	0.12	0.27	
	Sig. (2-tailed)	0.02	0.97	0.68	0.21	0.49	0.47	0.10	
Innovation position	Correlation	0.05	0.01	-0.41 **	-0.11	-0.17	-0.36 *	-0.09	0.00
	Sig. (2-tailed)	0.77	0.97	0.01	0.52	0.30	0.02	0.59	1.00

† p < 0.1 * p < 0.05 ** p < 0.01

TABLE 5: OLS REGRESSION – PERFORMANCE IMPLICATIONS

Variable	OLS Coefficient	Standard
Constant	0.49	
	(0.76)	
Outsourcing	0.06 *	0.33
	(2.26)	
Barriers to entry	-0.03 *	-0.45
	(-2.60)	
Supplier power	0.01	0.03
	(1.93)	
Customer power	0.08 †	0.29
	(1.93)	
C4	0.00	-0.07
	(-0.45)	
Price position	-0.18 †	-0.31
	(-1.89)	
Prod. cost position	0.20 **	0.48
	(3.23)	
Innovation position	-0.09	-0.20
	(-1.08)	
R^2	0.5	
Adjusted R^2	0.34	
F	3.12 *	

T-statistics in parenthesis
†: p<0.10 *: p<0.05 **: p <0.01