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A Theoretical Approach to Netsourcing Research

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ABSTRACT

NetSourcing has recently gained some importance in the IS literature. However, although the customer side of Netsourcing has drawn a lot of interest, its supply-side remains under-researched. One of the challenges faced by Netsourcing vendors is the difficulty in sourcing the components of the infrastructure on which they rely. This paper proposes to investigate the sourcing strategies used by Netsourcing vendors in order to access the different infrastructural components. The paper uses Transaction Cost Economics (TCE) and the Resource-based View (RBV) to predict in order to predict the possible sourcing modes for each component. However, when trying to validate these using a series of cases studies, the outcome was that an important part of the predictions were not verified. The author concluded that although TCE and RBV are important theories for IS research, their combination has the potential to yield even stronger results.

Keywords

Netsourcing, IS Outsourcing, Transaction Cost Economics, Resource-based View, Strategic Alliances, IT Infrastructure, Firm Boundaries

INTRODUCTION

The term Netsourcing was coined by Kern et al. (2002b, p. 1) as *"the practice of renting or 'paying as you use' access to centrally managed business applications, made available to multiple users from a shared facility over the Internet or other networks via browser-enabled devices."* Although this area has drawn substantial attention in recent years, it has previously existed in several other formats such as Application Service Provision (ASP) and Managed Service Provision (MSP) (Jayatilaka et al., 2003 ; Susarla et al., 2003 ; Tebboune, 2003). With the increase in focus on new IT sourcing strategies such as Utility Computing (Rappa, 2004 ; Carr, 2009), research is coming to a consensus that the future of IT in organizations will be more utility-like.

Much of the Netsourcing literature has focused on the consumer-side of the model. Studies such as those by Kern et al. (2002a) and Jayatilaka et al. (2003) attempted to investigate the parameters that potential customers take into considerations in order to evaluate the Netsourcing option. On the other hand, very little research has been done on the supply-side of Netsourcing; due the novelty of the model, most research was concerned with its acceptance among the business community, and it is only natural to concentrate of the customer-side perspective.

This paper attempts to study the supply-side of Netsourcing, by focusing on the sourcing strategies adopted by vendors in order to acquire the different components necessary to deliver their services. The paper begins by giving an overview of the supply-side of Netsourcing, then an investigation of the sourcing strategies is attempted using Transaction Cost Economics (TCE) and the Resource-based View (RBV). A conclusion regarding the use of both TCE and RBV is then presented.

THE SUPPLY-SIDE OF NETSOURCING

Netsourcing presented several challenges to the adopting customers. Among these challenges were customers' unfamiliarity with the model, concerns over the security of the hosted data, as well as concerns over the reliability of the model (Kern et al., 2002b). On the supply-side, however, other challenges can also be found. One concern was related to the differentiation strategies needed by Netsourcing vendors (Tebboune, 2003); as many vendors attempt to deliver the same applications, there is a clear risk of *"vanillarisation"* of the model. Moreover, the technological infrastructure backing the Netsourcing model can be viewed as a complex technology, where according to Kern et al. (2002b, p. 84), *"a Netsourcer's key capabilities and*

business areas are the cross-integration and management of the various components of the Netsourcing infrastructure, the ultimate goal being a solution for the customer".

Looking at the infrastructure required for running the Netsourcing model, the components are generally related to networking, hosting, computing architecture, and software (Dewire, 2000 ; Kern et al., 2002b ; Toigo, 2002 ; Smith and Kumar, 2004). Due to the wide spectrum of the different configurations the Netsourcing model can take (Kern et al., 2002a ; Kern et al., 2002b), it is difficult, and of little use, to cite all the capabilities required for its delivery, and thus a more abstract representation is needed. In a more generic definition, Toigo (2002) presents a model of the required technologies for the provision of IT services, as represented in Figure 1. Toigo (2002) explains that an IT service requires five different generic components: data storage, server, network, application, and management; data storage provides the required space for storing data, as well as stored data access and data sharing, whereas the server component represents the computing infrastructure, which contains the hardware used for data processing. Moreover, the network allows the interconnection and interoperation of distributed servers, as well as providing access to applications and data for remote users. The application component represents the programs used to support business processes, which vary in many ways according to their use and their architecture, and therefore have direct impact on the requirements that need to be met by the other components described above. Finally, the management component deals with orchestration of the other four components; in the case of Netsourcing, this is the core component, where vendors need to optimize the interaction between the other components in order to ensure a successful delivery.

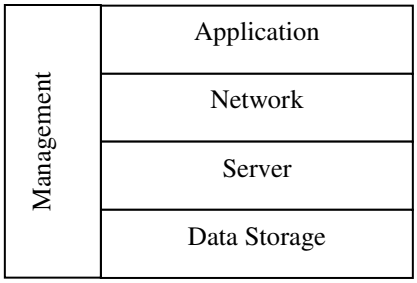

Figure 1: Infrastructural Perspective of IT Service (Toigo, 2002, p. 7)

According to Singh (1997, p. 340), a complex technology is *"an applied system whose components have multiple interactions and constitute a nondecomposable whole."* Singh (1997) further concluded that firms commercializing complex technologies face the challenge of developing multiple capabilities, but few firms have the ability to develop the broad set of competencies required. From the model presented by Toigo (2002), it is clear that Netsourcing requires some rather disparate capabilities in order to function effectively, and thus fits perfectly in Singh's (1997) definition of a complex product. Therefore, an important challenge for Netsourcing vendors is to be able to source all these components to deliver their services, which makes partnering a potentially suitable solution for having access to the needed components (Hagedoorn, 1993 ; Singh, 1997).

Partnering is not always the only suitable solution, where firms frequently consider the option of allying against other ones, such as *"do it yourself",* as named by Kanter (1989, p. 184). In other words, firms have frequently considered the option of performing the required activity internally, against the option of allying with other firms who can better perform it. This has significantly altered the whole concept of the firm, where *"good fences make good corporations"* (Kanter, 1989, p. 183) used to be the main assumption of traditional management. According to Kanter (1989), this assumption has its limitations, in that it is costly, in time and resources, for any firm acting in today's highly competitive environment to perform everything internally, even if it has the capacity to do it. As a result, competitive success became perceived as requiring the integration of multiple capabilities across internal and external organizational boundaries (Lorenzoni and Baden-Fuller, 1995). Conversely, partnering is not always commonly considered as a better option either, where according to Murray and Mahon (1993) many firms see them as *"potential traps"* that may lead to mediocrity. In fact, several cases reported failed alliances, resulting from poor collaboration between partners (Medcof, 1997). Several reasons led to such poor collaboration, mainly poor partnering skills, unbalanced intentions among the partners, and incompatible business objectives (Dacin et al., 1997).

This paper proposes to investigate the sourcing strategies used by Netsourcing vendors in order to access the different components shown in Figure 1. Depending on the background of the vendor, one or more of these components might already be available internally (Kern et al., 2002b), however it is highly inconceivable for a single vendor to own all the required elements. Moreover, the management component, as explained above, represents the core business of any Netsourcing vendor, and makes it the very reason for the vendor to exist. Thus, the management component is a prerequisite for any

Netsourcing vendor to be able to offer its services, and consequently this component will not be included in the investigation as it is assumed it will always be sourced inhouse.

Classically, many theories have been used to investigate firms' boundary choices (Barney, 1999 ; Schilling and Steensma, 2002 ; Odagiri, 2003 ; Parmigiani and Mitchell, 2009). However, two of the most widely used are Transaction Cost Economics (TCE) (Williamson, 1975) and the Resource-based View (RBV) (Wernerfelt, 1984 ; Barney, 1991); both theories have been applied to a great extent in the field of strategic management and to a lesser extent in the area of Information Systems (IS) (Cheon et al., 1995 ; Lacity and Willcocks, 1995 ; Mata et al., 1995 ; Wade and Hulland, 2004 ; Watjatrakul, 2005). The two theories have, also, seen some strong criticisms regarding their usefulness as well as usability in research (Ghoshal and Moran, 1996 ; Slater and Spencer, 2000 ; Priem and Butler, 2001a ; Priem and Butler, 2001b) but both still remain strong with very compelling foundations.

TCE, originating from the work of Ronald Coase (1937), has seen its major development in the work of Williamson (1975), who aimed to make the theory more predictive, particularly concerning the transactions that would be organized within the firm (Madhok, 2002). In a general perspective, Williamson (1989, p. 137) explains that TCE is consistent with the view that *"economizing is the core problem of economic organization"*. It takes the transaction as the basic unit of analysis, focusing on economizing efforts that attend the organization of transactions (Williamson, 1989 ; 1991). TCE is based around two main assumptions: the presence of bounded rationality and opportunistic behaviour (Williamson, 1975 ; Aubert et al., 1996). At the transaction level, TCE relies on three dimensions according to which the transaction is described. These dimensions help to differentiate between transactions. Moreover, if these dimensions pertain simultaneously, the potential for opportunistic behaviour should be taken into consideration (Conner, 1991). These dimensions are described as follows:

- *Asset specificity:* this describes the ability of an asset to be reused for alternative purposes, and by alternative users without diminishing its value (Williamson, 1975 ; Williamson, 1989). In other words, an asset is seen as highly specific to a transaction, if it is durable and dedicated to the transaction (Aubert et al., 1996). If a firm, according to Kulkarni and Heriot (1999), possesses highly specific assets, than outsourcing an activity to a third party becomes a source of major problems, mainly contractual problems. Therefore, *"a firm with specific assets is more likely to organize the activities within its own boundaries, rather than into a transaction with a supplier."* (Kulkarni and Heriot, 1999, p. 45)
- *Uncertainty:* this refers particularly to behavioural uncertainty, including *'opportunism'* as a main concern of TCE (Williamson, 1975 ; Williamson, 1981 ; Williamson, 1996 ; Kulkarni and Heriot, 1999). Potential opportunism is considered on both parties of a contractual arrangement, where the sourcing firm may use the sourced technology for purposes other than agreed, or conversely the source firm may not provide the agreed level of service (Steensma and Corley, 2001). As this behavioural uncertainty becomes more important, the transaction costs increase as a result of the transacting parties trying to protect themselves by safeguarding the contract (Kulkarni and Heriot, 1999). Therefore, in order to mitigate such a risk of opportunism, a firm may choose to internalise the considered activity through hierarchical control.
- *Frequency of transaction:* this affects the choice of the governance mode enormously. According to Kulkarni and Heriot (1999), recurring transactions involve continuous bargaining, and thus are considered to be costly. As a result, Kulkarni and Heriot (1999, p. 45) concluded that *"increased frequency of transaction is often associated with internalisation of economic activities."* On the other hand, in the case of low-frequency transactions, firms would prefer taking the risk of opportunism and uncertainty, instead of creating a dedicated governance mechanism (Aubert et al., 1996).

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="3">Asset specificity</td></tr>
<tr><td>Low</td><td colspan="2">High</td></tr>
<tr><td rowspan="3">Uncertainty and measurement problems</td><td>Low</td><td rowspan="2">Market transaction</td><td colspan="2">Complete contract (long-term)</td></tr>
<tr><td>High</td><td>Relational governance</td><td>Internal governance</td></tr>
<tr><td colspan="2" rowspan="2"></td><td>Occasional</td><td>Recurrent</td></tr>
<tr><td colspan="2">Frequency</td></tr>
</table>

Figure 2: Transaction Cost Framework (Aubert et al., 1996, p. 54)

As a summary of the three dimensions involved in TCE, and based on the work of Williamson (1975), Aubert et al. (1996, p. 54) outlined a framework that combines these dimensions and describes the possible solutions (see Figure 2). From the framework outlined in Figure 2, Aubert et al. (1996) explained that when asset specificity is low, market transaction is the optimal solution; however, when asset specificity is high, the choice of governance mechanism depends on the two remaining

dimensions: uncertainty and frequency. When uncertainty is of a low level, long-term relational contracting is preferred; such contracts include strategic alliances and outsourcing contracts. When high levels of uncertainty are present, then internal governance should be adopted when the frequency of recurrence of the transaction is high, and relational governance (including strategic alliances and outsourcing contracts) should be adopted when transactions are occasional.

RBV has emerged as an important theory in strategic management (Grant, 1991 ; Peteraf, 1993 ; Das and Teng, 2000), examining *"the link between a firm's internal characteristics and performance."* (Barney, 1991, p. 101) It also *"focuses on costly-to-copy attributes of the firm as sources of economic rents and, therefore, as the fundamental drivers of performance and competitive advantage."* (Conner, 1991, p. 121)

It adopts, according to Barney (1991), two main assumptions in analysing sources of competitive advantage:

- It assumes that firms within an industry (or group) may be heterogeneous with respect to the strategic resources they control;
- It assumes that these resources may not be perfectly mobile across firms, and thus heterogeneity can be long lasting.

These assumptions came as a critique to the view that resources are homogeneous and fully mobile, largely adopted by scholars such as Michael Porter, who focused mainly on analysing the external environment in which firms compete, and the threats and opportunities that the latter might face. As a result, it was argued that *"strategy formulation starts properly, not with an assessment of the organization's external environment, but with an assessment of the organization's resources, capabilities, and core competencies."* (Black and Boal, 1994, p. 132)

RBV relies on four dimensions, according to which resources are evaluated. These are: value, rarity, imitability and substitutability (Barney, 1991 ; Barney and Clark, 2007).

- Value: according to Barney (1991, p. 106), *"resources are valuable when they enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness."*
- Rarity: rarity is an important condition for a resource or capability to be strategic. According to Barney (1991 ; 2007), firm resources that are widely available to competing firms cannot offer either competitive advantage or sustained competitive advantage.
- Imitability: imperfect imitability refers to the difficulty in reproducing the resources that lead to the same advantage achieved by the imitated firm. This is strongly consistent with the concept of causal ambiguity, where although the resources might be reproduced, the link between the original resources and competitive advantage is so unclear that the reproduced resources may fail to offer the same value.
- Substitutability: imperfect substitutability refers to the difficulty in substituting one firm's resources for another's, and achieving the same value, and thus the same competitive advantage. This mainly is explained by the idiosyncratic character of these resources, where perfect imitation is impossible, and therefore the substituted resources will not achieve the same objectives.

In a general perspective, Das and Teng (2000, p. 40) conclude that *"resources that are not perfectly mobile, imitable, and substitutable can be obtained through alliances."* In other words, a firm enters in an alliance arrangement with a firm that owns the required resources only if it fails to efficiently source these resources from elsewhere (Das and Teng, 2000). However, rarity as explained by Barney (1991) is of prime importance. Furthermore, Barney (ibid.) defined imitability and substitutability as the ways for a resource to become mobile. Therefore, for applying RBV to the context of partnering, the main consideration is that if a resource is rare, imperfectly imitable, and imperfectly substitutable, then a firm can obtain it through alliances (Barney, 1991 ; Das and Teng, 2000).

PREDICTIONS OF NETSOURCING VENDORS SOURCING STRATEGIES

In this section, both TCE and RBV will be applied to the Netsourcing model, as depicted in Figure 1, in order to determine the likely sourcing strategies that could be used by a Netsourcing vendor for accessing the different components. In the following, each theory – TCE and RBV – will be applied independently according to their definitions explained above (see Figure 3).

Predictions from TCE

Beginning with asset specificity, most of the components necessary for running the Netsourcing model are standardised (Broadbent and Weill, 1997 ; Bharadwaj, 2000); equipment such as server technology has reached a commonly accepted standard that leaves very little difference between the different suppliers providing such hardware (Aubert et al., 1996). This creates very little risk of a lockup effect, particularly from the suppliers' side. Consequently, the data storage and the server components are generally considered to be of very low asset specificity. Concerning network, similarly to the above described components, it is of low asset specificity. Network, in this case, is usually the Internet, and is offered by a large

number of Internet Service Providers (ISPs) and telecommunication companies. Although networking services are offered in different types and configurations, these services are not provided for particular Netsourcing delivery configurations, and are more of a standard nature. The human asset specificity in this case is a little higher, where knowledge about the application architecture, the platform that the servers run, and the number of users expected to the use the application, is important in order to provide optimised networking. Therefore, the network layer is core to the Netsourcing delivery, but of low asset specificity.

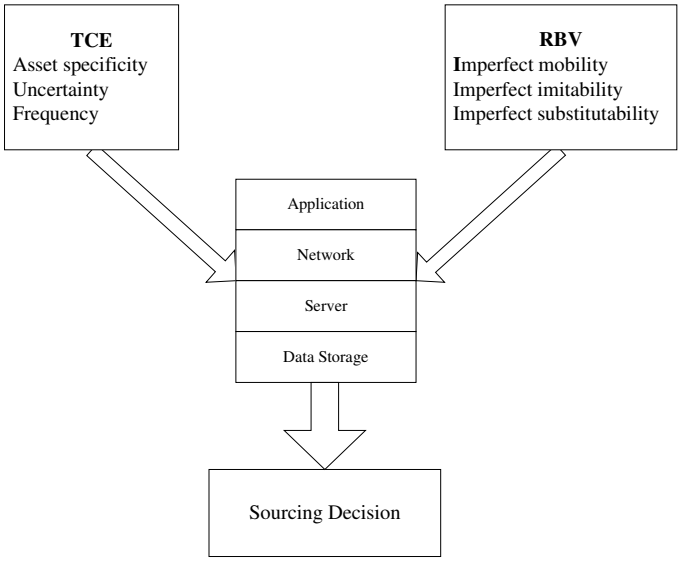

Figure 3: A conceptual model of partnering in Netsourcing

The application is core of the Netsourcing model, and consists in the basis to the service offering. The application is usually highly specific in nature, as it is directly linked to the business process to be supported, although, some categories of applications, such as e-mail, might not be as specific. Human asset specificity varies according to the type of application being offered. In this case, there are two ends of a spectrum; on one hand, an application could be of a general character, usually not industry specific, and are horizontally provided in different markets. Such applications are of low asset specificity, as they are not specifically designed and customized to particular industries or a particular business process. On the other hand, applications could be industry specific, targeted at a precise vertical or niche market. Such applications are usually mission critical, such enterprise applications (ERP, CRM, …etc.), and therefore tend to require in-depth knowledge about the business process being supported. Such applications are of high asset specificity as they are specifically designed and customised to a particular industry or a particular business process.

Regarding uncertainty, data storage, the server and the network components are indispensable for the Netsourcing vendor to be able to offer its services. Although these are of low asset specificity, they are of prime importance for the proper functioning of the model. Unless these components are kept inhouse by the Netsourcing vendor, contractors' behavioural uncertainty could raise serious problems, which leads to an increase in the transaction costs due to the further involvement of the vendor; for instance, if the contractor proves to be behaving opportunistically in performing regular data backups, the Netsourcing vendor would be pushed to increase its monitoring, raising, thus, the transaction costs. Therefore, in this case, careful contracting and ex ante consideration, as well as safeguarding measures should be considered.

The application, once it is designed and provided by the ISV, it is then run from a server, and therefore at this point, no behavioural uncertainty is apparent. However, the Netsourcing vendor needs support for the offered application, particularly if he chooses to outsource it, and thus opportunistic behaviour might rise. This is further enhanced by the need to provide regular application updates, which is a core benefit of the Netsourcing model. Again, careful measure for ex ante contracting should be taken into consideration.

Finally, with regards to the frequency attribute of a transaction, data storage, server, and network components are necessary to the functioning of the Netsourcing model. Although these are of low asset specificity, the frequency of their related transactions is high. Data storage, for instance, is required continuously as the users use the Netsourcing service. The application component also can be qualified as requiring high frequency of transactions, depending on the application in

question. Transactions with the software contractor are more on the support side, where the contractor has to ensure application support, and provide regular updates. Therefore, all the layers are considered to be highly recurrent.
To conclude this discussion, Table 1 summarises the key characteristics of each element of the Netsourcing model, using the TCE perspective.

Element	Asset specificity	Uncertainty	Frequency	Sourcing Mode
Data storage	Low	High	Recurrent	Market transaction
Server	Low	High	Recurrent	Market transaction
Network	Low	High	Recurrent	Market transaction
Application	High	Low/High	Recurrent/Occ.	Relational contracting

Table 1: A TCE application to Netsourcing

Predictions from RBV

Similarly to the process followed in applying TCE to the Netsourcing model, the concepts developed by Das and Teng (2000) will serve to analyse the organizing mode for each element of the model in Figure 1 using the RBV perspective.
Regarding data storage, server and network components, and as explained above, these are standardised in the computing industry. Therefore, there are no particular idiosyncrasies attached with these resources, as they are not directly linked to the business process being supported. Therefore, these Netsourcing elements are not rare, not imperfectly imitable, and not imperfectly substitutable, which excludes the option of forging a strategic alliance to source them. Unless the Netsourcing vendor initially owns these resources, internalising them may see a major financial barrier. In fact, the costs of owning data centres, for instance, are so high that justifying the investment might become a major problem. Furthermore, acquiring the firm that owns this resource may lead to internalising other unnecessary and unsuitable resources, which may result in added managerial burdens. Overall, these components, according to RBV, are better sourced through market exchange or inhouse development if financially feasible.
The application element illustrates a totally different situation. The offered application is chosen because of its uniqueness. This is particularly valid in the cases where the application is designed and targeted at a specific vertical market, where the resource becomes rare, imperfectly imitable, and imperfectly substitutable due to the idiosyncratic knowledge involved. In this case, unless the Netsourcing vendor is an Independent Software Vendor (ISV), forging a strategic alliance with the application owner is a more valid option. Furthermore, if the application is not designed for a particular vertical market, and is more targeted at horizontal delivery, than unless the Netsourcing vendor owns the application, sourcing it through strategic alliances is still the most suitable option. The rationale for that is that the Netsourcing vendor will have to develop skills specialised in delivering the application, which results in the application becoming rare, as the skills are not necessarily transferable to other software applications. Furthermore, an acquisition might be a valuable option if it does not lead to internalising other unsuitable resources, such as other applications not needed for the Netsourcing offering. Internalisation, as an option, is hardly conceivable, due to the time and costs involved in developing applications inhouse, as well as the knowledge involved (Armour, 2000).
To summarise the discussion established above, Table 2 outlines the sourcing characteristics of the Netsourcing components illustrated in Figure 1 using an RBV perspective.

Element	Rare	Imperfect imitability	Imperfect substitutability	Mode of Organizing
Data storage	No	Low	Low	Market transaction
Server	No	Low	Low	Market transaction
Network	No	Low	Yes/No	Market transaction
Application	Yes	Yes	Yes	Strategic alliance/Acquisition

Table 2: An RBV application to Netsourcing

RESEARCH METHODOLOGY

Now that the predictions using TCE and RBV have been made for the sourcing strategies of Netsourcing vendors, the next step is to investigate how existing vendors have actually sourced their Netsourcing components. For this purpose, the case study methodology has been selected as it *"examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations."* (Benbasat et al., 1987, p. 371)

The choice of study cases was determined by the need to explore a variety of cases that represent different Netsourcing settings. The first two cases (CompanyA and CompanyB) were chosen due to the differences in their partnering strategies, where the former was relying more on inhouse provision, whereas the latter was more into outsourcing. These two case studies were considered, by the author, as representing two ends of a spectrum, and the remaining case studies were chosen within this spectrum. The main issue that emanated from this phase was that not many firms accepted to participate in the research. A total of ten small-to-medium enterprises (SMEs) were considered in this research, but only six were used due to the incompleteness of the other four; the other four cases were either not suitable for the study due to their low involvement with the Netsourcing model, or to their reluctance to divulge important information about their strategic plans.

The interviews conducted in this research were all either semi-structured or unstructured (Denzin and Lincoln, 1998). The semi-structured interviews were the main source of data, where it was necessary to keep some level of passivity (Walsham, 1995). The semi-structured interviews were the main source of data, where it was necessary to keep some level of passivity (Walsham, 1995) (see Appendix A for more details). The research is designed around the key concepts from TCE and RBV, and due to the complex nature of these concepts, it was judged important not to involve interviewees with them. Moreover, integrating these concepts in the interviews would limit the interviewees' responses, who will limit their stories to the explanation of these concepts. Therefore, the main purpose of the semi-structured interviews was to extract facts from the different interviewees, then map the different theoretical concepts onto those. The unstructured interviews were mainly complementary to the semi-structured ones, and generally took place over telephone conversations or during informal sittings (see Table 4.4). All the semi-structured interviews were tape recorded, and transcribed subsequently.

As an illustration, for instance, CompanyA's vice president stated, regarding their data storage component: *"… we have a supplier that provides us with storage, but we are in a contract that we signed two years ago, and it is now extortionate because a) it was a hype to the bubble, b) hardware costs within have gone to the floor, so we are trying to get out of that and we will take on storage ourselves as well…"* This translates into low asset specificity for data storage; in fact, as admitted by this executive, as data storage hardware costs dropped enormously, it became financially possible for CompanyA to internalise its data storage operations. Therefore, although it is an important component of the Netsourcing model, data storage, in this case, is still regarded as non asset specific.

Furthermore, the managing director of CompanyC stated: "*…because in our contracts we guarantee 99% of time of our service, and so obviously we have a very high level of confidence in the ability to deliver a reliable product, and their reliability is based on two things, our application as well as how the application is hosted…so we have to make sure that USi and us are very much in synch about what our requirements are… additionally, we have got what customers require, we have certain levels of integration and documentation about the security and the reliability of the service…"* This statement clearly demonstrates that although the asset specificity here is very low, the company still needs to ensure high standards of its operations, which increases the uncertainty and measurement problems associated with these.

FINDINGS AND DISCUSSION

Table 3 below summarises the sourcing modes of all the Netsourcing components in the studied cases, compared to the predictions made based on TCE and RBV.

Both the data storage and the server components have been further detailed (compared to Tables 1 and 2) by adding a hosting element to each. This was necessary in order to accommodate the level of detail acquired from the case studies.

Table 3 highlights some major differences between the predictions made in and the actual sourcing modes found in the studied cases. In fact, 47% of the actual sourcing modes (the shaded cells in the table) do not match the predictions made. An important conclusion to draw at this point is that the two theories – TCE and RBV – were not successful in predicting all the appropriate governance modes for sourcing the different Netsourcing components. Although the predictions based on the two theories were not expected to fully match the actual outcomes, mainly due to the negative correlations experienced with past studies, such as Lacity and Willcocks (1995) and Aubert and Weber (2001), failure to predict 47% of the sourcing modes appears too high.

	Data Storage		Server		Network	Application
	Operations	**Hosting**	**Operations**	**Hosting**		
Predicted	**Market**	**Market**	**Market**	**Market**	**Market**	**Inh./Alliance**
CompanyA	Inhouse	Alliance	Inhouse	Alliance	Alliance	Market
CompanyB	Inhouse	Market	Inhouse	Market	Market	Inhouse
CompanyC	Inhouse	Alliance	Inhouse	Alliance	Alliance	Inhouse
CompanyD	Market	Market	Market	Market	Market	Inhouse
CompanyE	Inhouse	Market	Inhouse	Market	Market	Inhouse
CompanyF	Inhouse	Market	Inhouse	Market	Market	Inh./Alliance

Table 3: The sourcing modes of the Netsourcing components in the studied cases

Looking more closely at the way both TCE and RBV have been applied in order to predict the sourcing strategies, it is clear that these have been used here independently. However, if applied jointly, it is argued that both theories can have complementary explanations, where according to Leiblein and Miller (2003, p. 842), *"[w]hile TCE focuses on the relationship between characteristics of isolated transactions and the likelihood of ex post opportunistic behavior, the RBV emphasizes how the opportunity to create competitive advantage by exploiting unique firm-level attributes affects the value of the incentives, administrative controls, and adaptation mechanisms offered by competing forms of organization."*

The results of this is research highlighted several concerns regarding the operationalisation of both TCE and RBV. In TCE, asset specificity over powers the other two attributes – uncertainty and frequency – (Williamson, 1975 ; Aubert et al., 1996 ; Mahnke et al., 2005), whereby when asset specificity is low, sourcing should always be from the market, disregarding the other dimensions. However, what was very noticeable in this research is that uncertainty played an important role for sourcing decisions in many of the studied cases, even when asset specificity was low. For instance, For instance, CompanyA, CompanyB, CompanyC, and CompanyE all chose to produce data storage- and server-related operations inhouse. All of the interviewed executives from these firms confirmed that the reason for insourcing those transactions was mainly to be able to take control on the Netsourcing delivery, which translates into higher uncertainty. Thus, although the same executives admittedly, in this example, considered these components to be of low asset specificity they still insourced them contrary to what TCE dictates (see Figure 2).

Moreover, on the RBV side, researchers have claimed that the complementarity between resources is extremely important to the extent that the whole can be far greater than the sum of the parts. Bharadwaj (2000, p. 172), for instance, discussed the strategic value of IT capability and argued that *"[a]lthough the individual components that go into the infrastructure are commodity-like, the process of integrating the components to develop an infrastructure tailored to a firm's strategic context is complex and imperfectly understood"* In this research it was clear that the complementarity between the different components of the Netsourcing model was of prime importance, where the failure of one eventually leads to the collapse of the whole service delivery. This could be described as the *'Netsourcing capability'*.

When both TCE and RBV are combined, it could be argued that the overpowering nature of uncertainty under TCE is explained by the effect it has on the Netsourcing capability; in order for a vendor to maintain a high level of Netsourcing capability, the uncertainty surrounding the individual components has to be neutralised. In conclusion, it could be argued that the combination of both TCE and RBV has showed that two parameters play a major role in Netsourcing decisions: uncertainty, and resource complementarity of the Netsourcing components (Netsourcing capability), and thus the following propositions can be suggested:

Proposition 1: Netsourcing vendors will internalise or ally for transactions that are surrounded by uncertainty due to their effect on the Netsourcing capability:

Proposition 1.1: Netsourcing vendors will internalise the transactions when it is financially possible, and the access to the capability in question is possible

Proposition 1.2: Netsourcing vendors will ally for transactions when it is financially not possible to internalise it, and the access to the capability is not possible.

Proposition 2: Netsourcing vendors will use the market for transactions that are not surrounded by uncertainty.

CONCLUSION

This research has attempted to investigate the sourcing strategies of Netsourcing vendors. Two theories – TCE and RBV – were applied in order to predict the potential sourcing strategies employed by Netsourcing vendors, and it was concluded that although each theory, independently, could not explain the full extent of the decisions taken by the studied companies, when combined their explanatory power can be improved tremendously. This can have some interesting repercussions on IS research, particularly that the latter's recent focus has been on the complementarity of IT-based resources and business processes (Doherty and Terry, 2009). Consequently, this research has proved that not only TCE and RBV are very useful theories, but when combined their power can be even more so.

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