

Required IT-Related Capabilities For The Utilization of New Opportunities in Creating Interorganizational Competitive Advantage

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Required IT-Related Capabilities For The Utilization of New Opportunities in Creating Interorganizational Competitive Advantage

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ABSTRACT

Developments in information technology (IT) are perceived to promote interorganizational cooperation within and across industry boundaries. IT-enabled cooperation has challenged the creation of interorganizational competitive advantages, as conceptualized in the Relational View (e.g., Dyer and Singh, 1998). The relationship between IT and the conversion of inter-firm value-creating opportunities into interorganizational competitive advantage is still unclear. In this paper, we have developed a conceptual framework regarding the relationship between IT and interorganizational resource complementarity, which is an important determinant of interorganizational competitive advantage. Our analysis suggests that cooperating organizations need to develop three distinctive but interrelated capabilities in order to effectuate interorganizational resource complementarity with regard to IT. We propose that these capabilities form a pre-condition for achieving interorganizational competitive advantage by means of IT-enabled interorganizational relationships. Preliminary support for our framework and proposition is provided by a case study of an interorganizational relationship between a large European financial services firm and a major European telecommunication firm.

Key words: interorganizational competitive advantage, capabilities, and information technology.

1. INTRODUCTION

Developments in Information Technology (IT) are perceived to be a major driver of interorganizational cooperation, both within and across industry boundaries. IT, here defined as technologies that are used for the collection, processing, storage, and transmission of data (c.f. Rockart and Short, 1989; Scott-Morton, 1991; Venkatraman, 1994; Boisot, 1998), has extended the possibilities for organizations to leverage their strategic assets, capabilities and competencies over traditional organizational borders (Hensmans et al., 2001; Tapscott and Caston, 1993). Conjointly with trends like globalization, deregulation and changing customer demands (Flier et al., 2001; Langevin, 2000), developments in IT have given rise to the establishment of a growing number of interorganizational relationships (e.g., alliances and joint ventures), especially in services sectors like banking, telecommunications, transport and trade (Kang and Sakai, 2001). These developments challenged the dominant focus from gaining competitive advantage within firms towards a growing interest in the ability to leverage external resources and create value in coordination with other firms (Dyer, 1996), and the establishment of *interorganizational competitive advantages* (Dyer and Singh, 1998).

The deployment of IT within these interorganizational relationships has received growing attention from researchers. In general, the focus has been on new forms of interorganizational cooperation that have been enabled by the use of IT (e.g., Henderson and Subramani, 1999; Venkatraman, 1997; Venkatraman and Henderson, 1998; Hsiao and Ormerod, 1998; Mowshowitz, 1994; Rayport and Sviokla, 1996; Cash and Konsynski, 1985; Rockart and Short, 1989; Flier et al., 2001). It has been

widely acknowledged that developments in information technology can be an enabler of interorganizational cooperation (e.g., Stern and Craig, 1971). This is, among others, attributable to the fact that developments in IT diminish the importance of location and time (Rayport and Sviokla, 1996; Canoy et al., 2001) and increase the capacity for acquiring, storing, and processing of data and information (Boisot, 1998; Canoy, et al., 2001), thereby enabling coupling and integration of processes (Venkatraman, 1994), and lowering transaction costs (e.g., Kumar and Van Dissel, 1996; Evans and Wurster, 1999).

In addition, several authors have considered potential problems emanating from the utilization of IT within organizations and within interorganizational relationships (e.g., Kumar and Van Dissel, 1996; Beynon-Davis, 1995; Sauer, 1993, 1999; Galliers and Baets, 1998; Robey and Boudreau, 1999; Scott-Morton, 1991; Yetton et al. 1994; Hsiao, 2000). In summary, as is the case with the deployment of IT within individual organizations (Hsiao, 2000), we suggest that partners in interorganizational relationships are also confronted with problems stemming from the development, implementation and deployment of IT. These problems may contribute to the disappointing performance of such relationships (Parise and Henderson, 2001), and inhibit the establishment of intended interorganizational competitive advantages.

This article is an attempt to advance our understanding of the relationship between IT and interorganizational competitive advantage. We focus on the relation between IT and an important determinant of interorganizational competitive advantage, namely interorganizational resource complementarity (Dyer and Singh, 1998; for an overview of resource complementarity see Milgrom and Roberts, 1990, 1995). This relation will

be approached from an information-processing point of view (e.g., see Newell and Simon, 1976; Burton and Obel, 1998; Carley, 1995; Galbraith, 1973; Masuch, 1990).

We start by signaling that merely investing in IT may not necessarily improve productivity or profitability (Tippins and Sohi, 2003), and technology itself does not necessarily create a competitive advantage (Powell and Dent-Micallef, 1997), as it can be commoditized through competitive imitation and acquisition (Clemons and Row, 1991). Then, we take the viewpoint that effectuation of interorganizational resource complementarity by means of IT requires processing of data that are embedded in complementary resources. From our analysis it follows that cooperating groups of employees need to develop three distinctive but interrelated capabilities in order to effectuate interorganizational resource complementarity by means of IT. We suggest that these capabilities give rise to competence building on an interorganizational level. In other words, we suggest that cooperating partners should jointly develop a relational competence to effectuate interorganizational resource complementarity by means of IT. Preliminary support for our proposition is provided by a pilot case study of an interorganizational relationship between a large European financial services firm and a major European telecommunication firm.

The remainder of the paper is structured as follows. In section 2, the concept of interorganizational competitive advantage is addressed. In our analysis we focus on one particular determinant of interorganizational competitive advantage, namely interorganizational resource complementarity. Subsequently, in section 3, we elaborate on the role of IT in effectuating interorganizational resource complementarity. Our analysis reveals that the impact of IT on interorganizational

resource complementarity is mediated by three interrelated capabilities. We suggest that these capabilities give rise to interorganizational competence building, forming a pre-condition for achieving interorganizational competitive advantage. In section 4 we illustrate our proposition with results from a case study. We conclude with a brief summary and directions for further research.

2. INTERORGANIZATIONAL COMPETITIVE ADVANTAGE

In this section, we pay attention to the concept of competitive advantage. Subsequently, we provide a description of interorganizational resource complementarity, one of the determinants of interorganizational competitive advantage.

Competitive advantage

Several bodies of existing research on competitive advantage take the competitive position of individual firms or organizations vis à vis its competitors as a starting point. Proponents of the Resource Based View (e.g., Barney, 1991; Penrose, 1959; Wernerfelt, 1984), for instance, argue that the ability to obtain competitive advantage is explained by the unique resources of a firm, which should be difficult to imitate, rare, and non-substitutable (see Barney, 1991; Dierickx and Cool, 1989; Lippman and Rumelt, 1982; Reed and DeFilippi, 1990; Peteraf, 1994). Industrial organization theories (e.g., Porter, 1980, 1985, 2001), on the other hand, attempt to explain the ability to gain competitive advantage by the position of individual firms within an industry.

In contrast to both of the aforementioned perspectives, in this article we adopt a relational view, as the ability to leverage external resources and the creation of value in coordination with other firms has become a key source of competitive advantage (Dyer, 1996), and returns to resources obtained within interorganizational relationships over and above their opportunity costs when deployed for individual firms appear to be important sources of inter-firm profitability differences (Peteraf, 1994; Grant, 1996). When considering competitive advantage, we thus shift the focus from individual firms towards relationships between firms. This coincides with the assertion of (Dyer and Singh, 1998: p. 87) that “idiosyncratic inter-firm linkages may be a source of competitive advantage”, and that “a firm’s critical resources may span firm boundaries”. One of the determinants of interorganizational competitive advantage is complementarity of resource endowments (Dyer and Singh, 1998). In the remainder of this section, we focus on this determinant.

Interorganizational resource complementarity

Interorganizational resource complementarity relates to a common motive provided by managers and researchers for the establishment of interorganizational relationships (Child and Faulkner, 1998). It refers to the fact that organizations often establish interorganizational relationships to leverage specialized resources and capabilities¹ of other organizations, which they do not possess or control themselves (Quinn, 1992; Venkatraman, 1997; Sanchez and Heene, 1996) and which they can not develop rapidly or cost-efficient themselves (Henderson and Subramani, 1999).

¹ A firm’s resources are defined as “stocks of available factors that are owned or controlled by the firm” (Amit and Schoemaker, 1993: p. 35). Resources involve both tangible resources, like machinery or financial assets, and intangible assets, like markets and client-bases, reputation, image and knowledge. Capabilities exist of ‘the capacity to deploy resources, usually in combination, using organizational processes, to effect a desired end’ (Amit and Schoemaker, 1993: p. 35).

Interorganizational resource complementarity thus regards all resources that are *addressable* (Sanchez and Heene, 1996) by cooperating organizations.

Before we proceed with the description of the relation between IT and interorganizational resource complementarity, we need to make an important distinction between effectuated and non-effectuated resource complementarity, which is often omitted in literature. Effectuating interorganizational resource complementarity involves re-combination of existing resources outside the firm (e.g., Harrison et al. 2001; Rothaermel, 2001), and implies that the value stemming from an actual interorganizational combination of resources is exceeding the value that would result from the deployment of resources within individual organizations (Amit and Schoemaker, 1993; Peteraf, 1994; Dyer and Singh, 1998).

However, *existing* interorganizational resource complementarity is not always *effectuated*. We suggest that this underutilization can be explained by at least four factors. First of all, interorganizational resource complementarity might not have existed at all. Management might have made mistakes in its evaluation or assessment of the degree of resource complementarity. Second, cooperating organizations might not have been able to effectuate interorganizational resource complementarity because they did not possess or develop the capabilities required to do so. Third, managers might not acknowledge that interorganizational resource complementarity exists (for instance, because of ignorance or a lack of knowledge on another organization's resources). Finally, managers might prefer to forego advantages associated with interorganizational relationships, for instance because of strategic reasons.

3. IT & INTERORGANIZATIONAL RESOURCE COMPLEMENTARITY

Research on the exploitation of IT by individual organizations in order to achieve competitive advantage is relatively well advanced (e.g., DeSanctis et al., 2001). Nonetheless, our understanding of how IT influences performance remains limited (Berndt and Morrison, 1995). In addition, as far as we know, the impact of IT on the creation of competitive advantages in an interorganizational context has received only modest attention. In this section we address this gap, by discussing the relation between IT and interorganizational resource complementarity.

In general, interorganizational resource complementarity is believed to be higher when IT is deployed more extensively (c.f. Whittington et al., 1999). In other words, IT is supposed to enhance the synergy-sensitivity of resources and capabilities that are addressable by individual organizations. In addition, the assembly, combination and coordination of complementary resources often take place by means of IT (Venkatraman and Henderson, 1998). IT is thus regarded as one of the mechanisms by which the deployment of potentially complementary resources and capabilities in interorganizational relationships is shaped. This is supported by findings from Powell and Dent-Micallef (1997), who found that IT enhances performance only when it is used to leverage preexisting, complementary resources.

The effectuation of interorganizational resource complementarity (see Kumar and Nti, 1998) by means of IT depends on the partner-organizations' competence to jointly combine, co-ordinate and deploy their resources (Sanchez, 2001). It relates to a firm's relative abilities to use resources (Sanchez, 2001), and touches upon the dynamic

capabilities of organizations, that is, their “ability to integrate, build and reconfigure” internal and external routines and processes in order to enable the deployment of resources (Teece et al., 1997). In the remainder of the section we discuss the role of IT in effectuating interorganizational resource complementarity. In order to obtain a clear picture of the relationship between IT and interorganizational resource complementarity, we need to distinguish between data, information and knowledge.

Data, information, and interorganizational resource complementarity

Let us start with a definition of data. In general, data are defined as the properties of things; they discriminate between physical states of those things (Boisot, 1998). As data are properties of things, they are embedded in the resources of organizations. Let us give a few examples of data on addressable resources of organizations. Data on gender, for instance, discriminate between male and female customers, while data on interest rates, the period over which capital is available, and the conditions under which an organization has capital at its disposal constitute data on capital resources. In this article, data are thus considered as more or less objective facts. This position is justified by the fact that IT is used to process categorical data. Besides, the data serving as input for IT systems and the information that is part of the output of IT systems is often devised in such a way as to limit divergent interpretations. In other words, objectivity is to a large degree inherent to the design of information systems.

We view IT as a mechanism for information processing. Information systems and technologies consist of a set of institutionalized routines and processes for processing data (Teece et al., 1997). They enable the structuring and diffusion of data between members of organizations and have the potential to enhance communication,

assimilation, storage, processing and retrieval of data (Rockart and Short, 1989; Boisot, 1998). But how does this relate to interorganizational resource complementarity?

The deployment of IT requires that partners in interorganizational relationships provide data about their resources. Those data are used as input for IT. The data-inputs are subsequently transformed into data-output. A large part of this output should consist of information, which is a subset of data that is perceived as meaningful (Boisot, 1998) by members of, in this case, the partner-organization. On the basis of this information, members of the partner-organization decide how to adapt the deployment of their resources and capabilities. This data-processing loop is reflected in Figure 1 (C stands for codification of data that are embedded in resources).

Insert Figure 1 here

In summary, data about each organization's resources figure as input for information systems and technologies. The processing and transfer of data between organizations by means of IT enables them to combine, reconfigure or integrate resources in order to effectuate interorganizational resource complementarity. In this respect, the deployment of IT within the relationship accounts for the interconnectedness of resources, by making relevant data on those resources available to partner organizations in the relationship. Until now, we discussed the utilization of data as inputs for information systems. But effectuation of interorganizational resource

complementarity by means of IT does not only require input. Organizations also need to design optimal configurations of information systems and technologies. We therefore have to move one stage further, from data and information to knowledge.

Knowledge and interorganizational resource complementarity

We define knowledge as “the set of expectations that an observer holds with respect to an event” (Boisot, 1998: p. 20). Our definition of knowledge suggests that “knowledge resides in individuals”. Knowledge is considered “a property of agents predisposing them to act in particular circumstances” (Boisot, 1998: p. 12). When organizational members absorb new data, which are considered relevant by them, their knowledge or set of expectations is modified (Van den Bosch et al., 1999). From the description above it appears that knowledge differs in several ways from data and information (see Table 1).

Insert Table 1 here

We thus adopt a perspective on knowledge as being highly subjective. From this viewpoint, expectations of individuals lead them to act in a particular way, while information consists of data on which these expectations are based. The latter might be the same for several persons, whereas knowledge is considered to be specific to the individual. Of course, one could adopt many other perspectives on knowledge. In this article, a subjective view on knowledge is adopted, as the creation of value by means of information systems in interorganizational relationships is suggested to depend on the expectations actors in such relationships have of which data about complementary

resources should be acquired, stored, and processed. Expectations of interorganizational actors eventually determine which data are gathered and stored, and how interorganizational information systems are designed in order to process these data.

Important for our line of reasoning is, that we assume that data and information are embedded in resources, while knowledge resides in individuals. This has two important implications. First of all, only knowledge that can be made explicit (e.g., see Polanyi and Prosch, 1975, Kogut and Zander, 1992; Nonaka and Takeuchi, 1995; Grant, 1996) by codifying it into data, for instance by writing it on paper, can eventually result in input for IT². Second of all, as the output of the information systems should consist of data that are relevant or meaningful to the employees of the cooperating partners, knowledge is needed to integrate, build and reconfigure information systems and technologies.

The ability of organizations in interorganizational relationships to integrate, build and reconfigure information systems and technologies can be regarded as a dynamic capability (Teece, 1997), or as a specific form of an alliance capability (Kale et al., 2002). Without this capability, organizations can not perform meaningful activities with the data and information they possess about their resources. In other words, the routines and processes that constitute information technologies should process data derived from resources and capabilities in a meaningful way.

² We argue that tacit knowledge will hardly result in input for information technology. Only after externalization, the process of articulating tacit knowledge into explicit concepts (Nonaka and Takeuchi, 1995), the codification of knowledge into data is possible. However, this is a difficult and time-consuming process.

Preferable IT configurations are those configurations that enable organizations to utilize the data on each other's resources in a way that contributes to the effectuation of interorganizational resource complementarity. Organizations decide about IT configurations on the basis of knowledge about requirements and specifications, which IT deployed within the relationship has to suffice in order to effectuate interorganizational resource complementarity. This knowledge has to be made explicit in terms of data. The codification of knowledge does not have to be limited to data on optimal or preferable IT configurations. It can also involve knowledge on resources and capabilities that is codified and used as input for information systems or information technologies. For example, knowledge possessed by an employee of an organization about the availability of a product can be codified into data (1=available versus 0=unavailable), which can be used as input for an information system.

To recoup, members of cooperating organizations have to be capable of codifying knowledge into data that can be used as inputs for information technology and they have to be capable of codifying knowledge into data that serve as a basis for the development, implementation and deployment of IT configurations. Finally, the employees in these cooperating organizations have to be able to share (at least part of) this knowledge with each other, so that technological interfaces between the companies can be developed. If this is not the case, different parts of IT developed by each organization will not facilitate the required processing of data provided by each of the partners, leading to a lower degree of effectuated interorganizational competitive advantage. In summary, we propose that the ability of organizations to effectuate interorganizational resource complementarity by means of IT is dependent on the development of three capabilities:

1. **Data Design Capability.** This is the capability of members of organizations to codify knowledge about resources and capabilities into data. These are often data that can assist the partner-organizations with their decision on how to adapt the deployment of their resources towards each other. The question here is “which data on our resources and capabilities do we have to provide as input for IT in order to maximize effectuated interorganizational resource complementarity?”;
2. **IT Configuration Capability.** This is the capability of members of organizations to codify knowledge about interorganizational IT configurations into data. The question here is “which data on the optimal IT configuration do we have to provide to assure that the data on resources and capabilities can be processed so that effectuated interorganizational resource complementarity is increased?” These data encompass specifications, functionalities and crucial attributes of the IT configuration that are required to effectuate interorganizational resource complementarity;
3. **IT Coordination Capability.** This is the capability of members of organizations to share and combine their knowledge on resources and IT configurations with each other. Whether organizations possess or develop this capability depends on the extent to which cooperating organizations develop coordination processes to transfer data on resources and IT configurations between employees, both within and across organizational borders. These processes could encompass transfer of information between employees who need to build IT configurations and employees who need to deploy IT on an operational basis. The question here is: “how do we make sure that the knowledge on resources and IT configurations possessed by the members of our organizations is shared?”

From those capabilities it appears that possessing knowledge on appropriate IT configurations and possessing knowledge on relevant attributes of resources and capabilities is not enough. Partners in interorganizational relationships also need to be able to codify this knowledge into data, and transfer knowledge and information between members within and across organizational borders. The three capabilities distinguished above give rise to the development of an interorganizational or relational competence. We refer to this competence as the *competence to effectuate interorganizational resource complementarity by means of IT*. This is depicted in an integrated framework in Figure 2. Furthermore, it has led to the proposition below.

Insert Figure 2 here

The competence increases the strategic value of organizational resources (Sanchez and Heene, 1997) by improving effectuated interorganizational resource complementarity. It is different from the “IT competence³” distinguished by Tippins and Sohi (2003: p. 748) in that it explicitly addresses *how* IT can enable companies to achieve interorganizational competitive advantage.

³ Tippins and Sohi (2003) defined IT competency as “the extent to which a firm is knowledgeable about and effectively utilizes IT to manage information within the firm. They do not explicitly address resource complementarity in their definition and operationalize IT competency by three components: IT knowledge, IT operations, and IT objects. We believe our distinction between Data Design Capability, IT Configuration Capability, and IT Coordination Capability provides a clearer view on the relation between interorganizational resource complementarity (a potential source of competitive advantage), IT, and cooperating firm’s joint competency to deploy IT in order to effectuate interorganizational competitive advantage.

Proposition:

If members of organizations involved in an interorganizational relationship develop Data Design-, IT Configuration-, and IT Coordination capabilities, then IT contributes positively to the effectuation of interorganizational resource complementarity and interorganizational competitive advantage.

This proposition captures the complex interaction between resources, capabilities and cognitive processes (Sanchez, 2001). It reveals that achieving interorganizational competitive advantage by means of IT and complementary resources includes managerial cognitive processes (e.g., codification of data from knowledge), endowments of resources that are potentially complementary, and organizational and interorganizational coordination processes (Sanchez, 2001). In this respect, our analysis reveals that effectuating interorganizational resource complementarity does not depend simply on ‘purchasing’ or ‘picking’ the best information systems and technologies that are available. It also involves a relational competence to effectuate interorganizational resource complementarity. In the next section, we provide an illustration of our proposition.

4. EXPLORATORY CASE STUDY: BANCA AND TELCO

We draw on evidence from a pilot case study, which involved a large European financial services firm, BANCA, and one of the major European telecommunication firms, TELCO (because of the confidential character of the results, the real names have been replaced by fictive ones). In subsection 4.1 we provide a description of the case. In subsection 4.2 we explain why BANCA and TELCO failed to effectuate interorganizational competitive advantage by means of IT.

4.1 Case description

BANCA and TELCO decided to establish an interorganizational relationship in order to provide financial services over the Internet. BANCA would benefit from access to the large customer base of TELCO. This would contribute to the company's growth and justify new investments in information technology, marketing, distribution channels and product development. Furthermore, BANCA would be able to provide part of its existing customer base with financial service products over the Internet, thereby reducing transaction costs and increasing convenience for its customers. TELCO owned one of the major Internet portals⁴ in its home country and the company increasingly felt a pressure to add new content to this portal. By establishing an interorganizational relationship with BANCA, TELCO would be able to add content and value to its Internet portal, which should result in a higher profitability of its customers. Below, we will proceed with a description of the sequence of events that took place from the moment business cases were developed until the break-up of the relationship (see Figure 3).

⁴ Internet Portals are Internet-sites that facilitate the navigation of the Internet by means of a categorization of Internet-sites. Examples are Yahoo and AltaVista.

Insert Figure 3 here

1. Development of business cases by BANCA. BANCA developed a business case in which the possibility of cooperation between BANCA and companies with a well-developed Internet portal was studied. Potential partners were selected on basis of, among others, percentages of the partners' customer base that were already part of the own customer base, customer access, geography, brand value and expected potential.

2. Idea generation & study on market developments by TELCO. Several companies in the financial services industry approached TELCO with an offer to cooperate in order to provide financial services over the Internet. The Board of Directors of TELCO acknowledged the opportunities for financial services on the web and subsequently initiated a project team to study relevant market developments with respect to the distribution of financial services on the Internet. The project team consisted of about 10 members and was situated in the department for 'telecommerce'.

3. Partner-selection by TELCO and negotiations. After identifying the opportunities, a list of 30 potential partners was formulated and analyzed. With 10 of these companies serious talks were arranged, after which further negotiations were held with 3 of them. These negotiations resulted in a rating of the potential partners on the basis of issues like commitment, fit, culture, focus and national and international strength. With each of the three parties a separate white paper session was started, in which the proposed business model and the initial structure of the cooperation were described. After accreditation of the Board of Directors, negotiations were started

with the preferred partner, BANCA. The negotiations involved the future project manager, a business trainee and two lawyers at TELCO's side as well as members of the business and legal departments from BANCA's side.

4. *Start-up of the implementation.* The joint venture was planned to operate with a high degree of independency of both partners. Therefore, the operations of the joint venture were situated outside both partner organizations. Initially, 60 persons were expected to become involved in the project. In this phase, also negotiations were started with potential third parties that had to develop the Internet-site, the user interface, et cetera.

5. *Announcement BANCA – TELCO cooperation.* The Memorandum of Understanding was signed. The first version of a business plan was part of the memorandum of understanding as well as agreements on the consequences for both parties in case of a break-up. However, not all issues were included, and negotiations, especially on profit-sharing rules were continued.

6. *Implementation first organizational structure.* The first official organizational structure was implemented. Until that time, the structure had a functional character. 38 persons had been involved in the project, of which 3 were project managers. The other 35 participants had the following backgrounds: marketing (6), business development (2), content/site (2), IT (4), ABC and third-party products (11), organization & finance (3), and country-specialists (6). In the first official organizational structure that had to be implemented, the dedication of personnel was split up into an allocation of employees in a central organization and a number of

employees in an organization per country. The number of persons that were involved in technical departments was relatively low.

7. *Introduction of 2nd organizational structure.* In a business plan, which was presented in January, a proposal for the adaptation of the organizational structure was described. This alternative organizational structure was proposed because the launch date of the Internet site was coming closer fast. A matrix structure was developed that included a product management and sales department, an IT and operations department and a marketing and content department. Especially the latter department should cooperate closely with several country-specific ‘roll-out’ departments.

8. *Development of 3rd organizational structure.* This organizational structure only involved the organization for the first country in which the internet-site would be launched and has never been operational. The suggested organizational structure was a matrix organization in which the different products that were to be sold formed the horizontal layers and ‘country specific project management’ and ‘ICT and organization’ constituted the vertical layers.

9. *Cancellation of investments in IT infrastructure.* Investments in server space and IT infrastructure were delayed from the start of the joint venture. These investments had a relation-specific character, especially for BANCA, as they could not be deployed alternatively. Finally, the investments were cancelled only shortly before the break-up of the joint venture was announced.

4.2 Inability to effectuate interorganizational resource complementarity

The dissolution of the relationship came for many people as a surprise. It could at least be described as unexpected, as the resources of BANCA and TELCO seemed highly complementary to each other. Why were BANCA and TELCO not able to effectuate interorganizational resource complementarity? In order to answer this question, we first return to the four potential reasons for deviations between existing and effectuated interorganizational resource complementarity suggested before. Three of them played a role here.

First of all, the degree to which complementarity was present within the relationship was probably lower than expected before. The value proposition that would have to be developed was not as easily realized with the existing resources of both partners as expected. Second, effectuating interorganizational resource complementarity was, according to some stakeholders in the process, cancelled because of strategic reasons. Some of them attributed this to changing market circumstances, as the Internet bubble had burst, while others blamed it on cancellation of other cooperative agreements of one of the partners. Finally, the members of both organizations did not seem to be able to develop the three capabilities that are required to effectuate interorganizational resource complementarity by means of IT. With respect to the latter, we observed the following.

IT configuration and IT coordination capability: lack of attention for IT issues

In spite of the important role of IT for the extension of financial services activities to the Internet, IT-issues received very limited (if any) attention in the business cases, discussions on market developments, partner-selection criteria, negotiations and the

memorandum of understanding. In the early phases of development of the relationship, key-figures of the commercial and legal departments were involved, while managers from the technical departments were not. The same applied for the first joint team that worked out the business plan for the joint venture in the implementation phase. An illustration of the limited attention for IT and technical issues at the beginning of the relationship was a misunderstanding about the platforms that had to be used as a basis for the required applications, which occurred after several months in the development process. BANCA had always assumed that the platform they used would also be used in the joint venture, whereas members of TELCO thought this was something that still had to be decided on.

Only in later stages of the development process, importance of the deployment of IT in the relationship was acknowledged. This can be derived from the rising prominence of IT-personnel in the three successive schemes describing the interorganizational structure. As a result, important aspects considering the deployment of IT in the relationship, like feasibility, costs and capacity requirements have probably received hardly any attention in the earlier stages of development.

Furthermore, when the joint venture was eventually located on its own location, a special IT-team was installed to address all IT-related issues. The number of employees of both partners involved in the IT-team was rather unbalanced. The team, which was initially led by an external consultant, consisted mainly of TELCO members. Only after the decision was taken to utilize the platform of BANCA in the joint venture, additional BANCA members started to participate. The unequal

presence of members of both organizations has undoubtedly hampered knowledge sharing on IT configurations and complementary resources.

The developments sketched above suggest that, although members of both organizations possessed data design capabilities, they had not been able to develop IT configuration capabilities and IT coordination capabilities. Members of both organizations hardly codified their knowledge about the interorganizational IT configuration to be used into data. Data on specifications, functionalities and crucial attributes of the IT configurations that were required to effectuate interorganizational resource complementarity were laid down on paper only to a very limited extent. In addition, both organizations did not develop clear coordination processes to transfer data on resources and IT configurations between employees, which led to misunderstandings.

IT configuration and IT coordination capability: relation-specific investments

A second problem with respect to the effectuation of interorganizational resource complementarity was the postponement of decisions concerning specific investments in server capacity and infrastructure (Williamson, 1985). The decision to make a rather huge investment in server capacity and IT-infrastructure was postponed several times, and the launch date of the project was pushed ahead. Fear about not being able to recoup the investments was one of the drivers for not executing the investments in early stages of the development process. This is suggested to have contributed negatively to the development of the IT coordination capability, as it indicated an unwillingness to commit resources to the relationship that would not be recoverable outside the relationship (Nooteboom, 2001). It hampered the development of both

partner's capabilities to select the IT configuration to be used within the relationship, and their inclination to coordinate their IT-activities with each other.

Data design-, IT configuration- and IT coordination capability: problems with independency of the joint venture from the parent companies

A third problem undermining the effectuation of interorganizational resource complementarity was the proposed independency of the joint venture from the parent organizations. As information technology of several divisions of both parents had to be connected to reach the relationships' objectives, this independence was sometimes problematic. An example of the problems that arose was that members of TELCO who participated in the relationship could not influence decisions in several divisions of the mother organization, in despite of the fact that some of these decisions were critical for the attainable scope of the cooperation. Furthermore, the independency of the parents did not facilitate information-exchange between members of both organizations. The fact that several specialized units within TELCO, which were supposed to be the exclusive supplier of marketplace- and portal platforms, were never consulted provides an illustration. Data design, coordination between the partners, and the selection and development of an appropriate IT configuration were made impossible. It appeared hard to develop a relational competence to effectuate interorganizational resource complementarity.

IT configuration- and IT coordination capability: partners possessed only slightly overlapping technical knowledge bases

A fourth bottleneck for the effectuation of interorganizational resource complementarity was that the partners appeared to possess only slight overlaps of

knowledge bases (e.g., see Lane and Lubatkin, 1998; Grant, 1996) with respect to the deployment of IT. As long as generic systems were involved, both partners understood each other well. However, especially the technology involved with banking systems was considered to be a black box by almost all participants in the IT-team. This was partially caused by the fact that information systems of BANCA were improved partially over the years. Even within the financial services firm there were only a few people that knew all the ins and outs of the information systems deployed.

Furthermore, BANCA had hardly any experience with IT required for the development and distribution of online services, while TELCO had no experience with specialized IT used by financial institutions. Moreover, BANCA seemed to be very keen on keeping its information technology and systems in its own domain and control. This resulted in a situation in which knowledge-exchange on IT architecture took place on a very high level, which prevented both parties from exchanging knowledge required for the operationalization of the joint venture. As a result, both organizations were unable to develop clear specifications, functionalities and crucial attributes of the IT configuration. Furthermore, they were incapable of sharing and combining their knowledge on resources and IT configurations with each other. This points at a lack of development of the IT configuration- and IT coordination capability, two of the three capabilities in our framework, which are required for the *effectuation* of interorganizational resource complementarity.

Our observations indicate that the three capabilities that give rise to the competence required for the effectuation of interorganizational resource complementarity by means of IT were or could not be developed fully by the members of the relationship.

Although interorganizational knowledge sharing (e.g., Lane and Lubatkin, 1998; Larsson et al, 2001, Grant, 1996) on IT configurations seemed to be one of the major problems, application of the integrated framework revealed that all three capabilities played a role within this particular interorganizational relationship.

5. CONCLUSION

In this paper, we investigated the relationship between IT and interorganizational competitive advantage from a competence perspective. We described how the development, implementation and deployment of IT within interorganizational relationships relate to the effectuation of interorganizational resource complementarity, which is one of the major determinants of interorganizational competitive advantage (Dyer and Singh, 1998). We developed an integrated framework in which the effectuation of interorganizational resource complementarity by means of IT requires three interrelated capabilities, namely a data design capability, an IT coordination capability, and an IT configuration capability. Those capabilities involve the codification and sharing of knowledge about complementary resources and IT configurations. Finally we provided preliminary support for our proposition in the form of a brief case study.

Our proposition is in line with the assertion of Tippins and Sohi (2003: p. 756) that IT-related benefits can only be realized when a firm develops IT competency and then uses it as a set of co-specialized resources to leverage other complementary resources. We extended this notion to an interorganizational level and refined the links between resource complementarity, IT, the competence view, and interorganizational performance.

Conducting more empirical studies to substantiate our proposition, and distinguishing between different types of interorganizational relationships, i.e., within and across industrial boundaries, could reveal important new insights about the impact of IT on

interorganizational competitive advantage. Furthermore, issues influencing the structuring of interorganizational relationships could be included (Luo, 2002), as formalization of IT-processes and centralization of responsibilities with respect to IT are likely to influence the process and outcome performance of interorganizational relationships (Ariño, 2003). In this respect, the issue of technological interdependency (Thompson, 1967; Kumar and Van Dissel, 1996) between cooperating organizations deserves more attention, as this factor is likely to influence interorganizational structuring and cooperation.

Finally, empirical work conducted at the moment indicates that different practices with respect to the development, implementation and utilization of IT in different industries appear to hamper the effectuation of interorganizational resource complementarity, thereby limiting the abilities of organizations from different industries to obtain interorganizational competitive advantage. Continued research on the relation between IT and interorganizational competitive advantage seems promising.

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Figure 1. Relation between data, IT & interorganizational resource complementarity

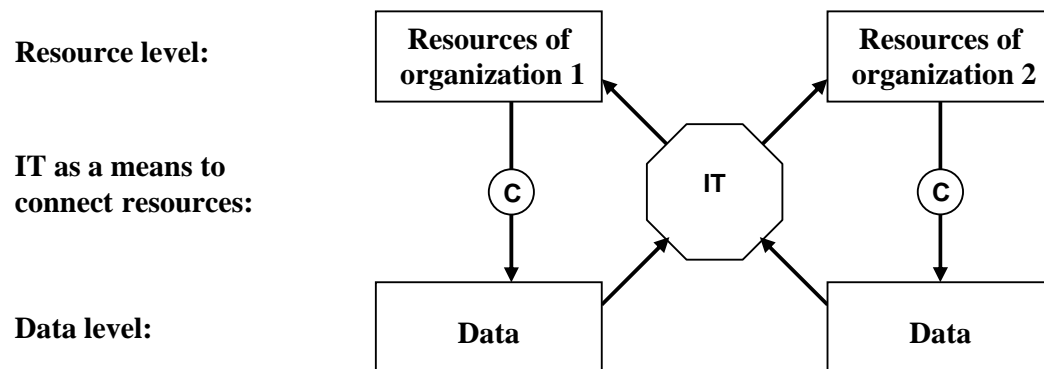


Figure 2. An integrated framework on the effectuation of existing interorganizational resource complementarity by means of IT

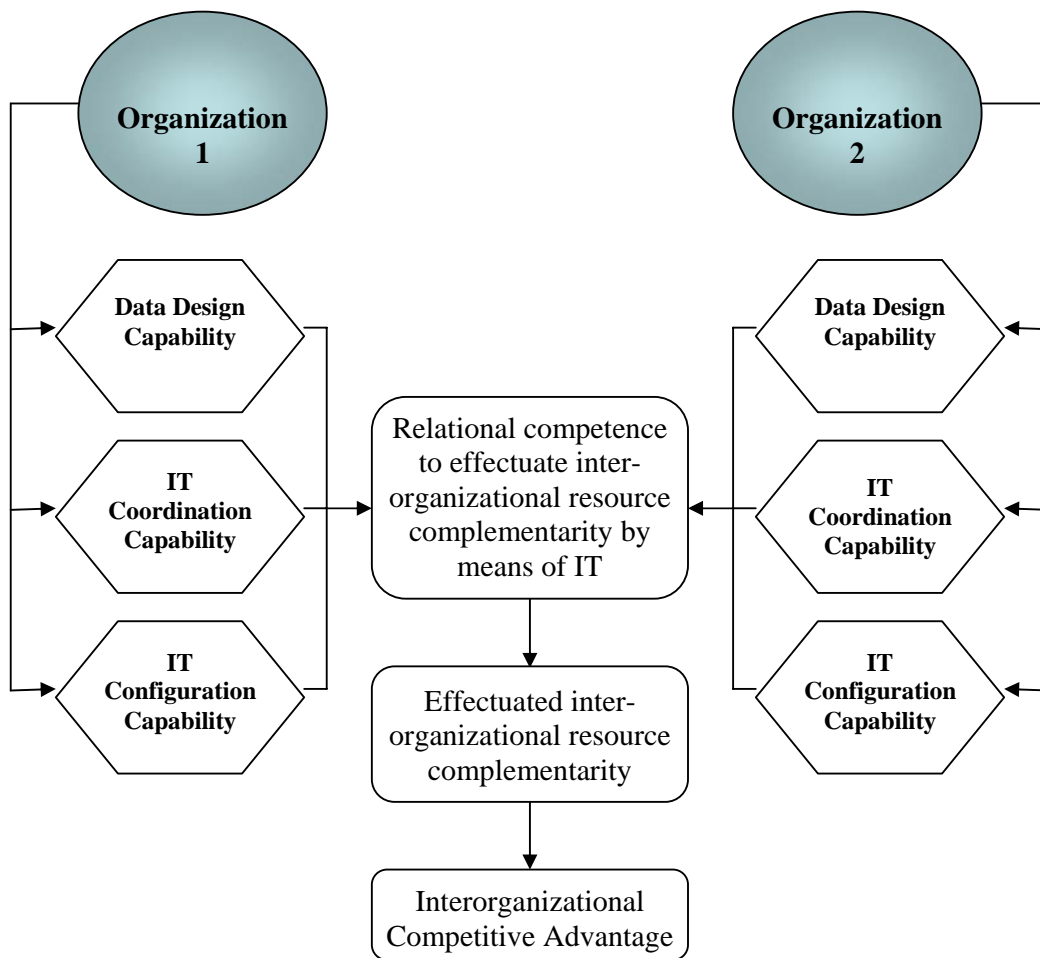


Figure 3. Reconstruction of the development of the interorganizational relationship



Source: Press releases, internal documents, interviews. Adopted from Vlaar et al., 2003

^a The data referring to the actual times of the described events and activities are, because of the confidential character of the research project, adapted. However, the passing of time and phasing have remained in tact.

Table 1: Data, info, knowledge and interorganizational resource complementarity

Concept	Definition	Relation of concepts with interorganizational resource complementarity
Data	Properties of things	Data describe the properties of resources and the environment of organizations
Information	A subset of data, which is perceived as meaningful by an agent	Information consists of the subset of data on resources and the environment that are relevant for the partner-organization
Knowledge	The set of expectations that an actor holds with respect to an event	Knowledge exists of a set of expectations that a partner-organization holds with respect to the deployment of resources and capabilities in the relationship. These expectations are based on information about the environment and the properties of resources and capabilities of both the own organization and the partner-organization(s). The expectations determine the organizations' decisions on the deployment of its resources and capabilities within the relationship

Source: adapted from Boisot, 1998

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