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A Resource Based View
of the Information Systems
Sourcing Mode

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Information Systems Sourcing Mode [*]

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Résumé / Abstract

Cette recherche tente de mesurer le lien entre le mode de gestion d'une activité (gestion interne ou impartition) et la valeur de l'activité d'une part, et la présence des ressources requises dans l'entreprise d'autre part. L'objectif est de mieux comprendre les facteurs sous-jacents à une décision d'internalisation ou d'impartition d'une activité. Deux cas sont présentés. Ces cas traitent de développement de systèmes informatiques. Ils permettent d'illustrer le pouvoir explicatif du modèle. Les données illustrent bien comment le modèle proposé peut être utilisé pour prédire le mode de gestion approprié d'une activité de développement de systèmes informatique.

This paper studies the relationships between the choice of a sourcing mode for information systems, the value of the resources used in systems development activities and the presence of those resources at sufficient level within the firm. The objective is to better understand the factors underlying the decision to keep the development of an information system inside the firm or to entrust it to an outside partner. A sourcing model is proposed using the resource-based theory. Two case studies drawn from a larger study are used to illustrate the concepts used in the research model. Data from these two projects illustrate how the model could be used to predict the sourcing mode retained by the managers for each project, given the availability of the necessary resources and the strategic value of the future system.

Mots Clés : Théorie fondée sur les compétences, développement de logiciels, impartition, gestion de projets de développement de systèmes

Keywords: Resource-based theory, software development, outsourcing, management of software development projects

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1. Introduction

The strategies used to acquire information systems (IS) have long been an object of interest for information systems researchers and practitioners alike. Basically, companies can get their systems from two sources: internally, from the IS function that can provide for the development, maintenance and operation of their systems; or from external suppliers, by outsourcing all or part of the delivery of these services. The use of either of these sources involves decisions fraught with potentially threatening consequences for the firm, and may put at risk its future capacity to adapt in a turbulent environment.

This paper briefly describes the nature of the problem surrounding the choice of a sourcing mode for IS services and analyses two main factors influencing this choice. The first part positions this problem in the stream of research on the use of IS for strategic purposes. The second part describes the theoretical framework chosen to study the phenomenon, proposes a research model and provides a short description of the research plan and the analysis strategy used for the study. The third part consists in a summary of two case studies illustrating the relevance of the proposed model. Follows a brief discussion on the results and their significance for research and practice.

2. Nature of the Problem

Since the beginnings of computerization, information technologies have been viewed as playing a supporting role for the various organizational functions. During the 1980s, IT were also studied as instruments for implementing strategic initiatives. The competitive forces model [28] is probably the framework most frequently used for this type of study. In the 1990s, however, the ability of IS to deliver strategic systems capable of providing a sustained competitive advantages has been challenged. These advantages, when they materialize, prove transitory if not null, or transform themselves into "strategic necessities" [9]. For IT to play a meaningful role at the strategy level, Henderson and Venkatraman [16] assert that IS strategies must be closely aligned with organizational strategies. To that end, those IS functions traditionally centered on users' requirements should shift their focus to the support of business objectives. This change of perspective underlines the fact that, from a strategic point of view, the defining competencies of the IS function are not limited merely to the capacity to develop sophisticated applications, but also include the mastering of certain organizational abilities. These abilities are essential to achieve synergies between the main activities of the firm and the IS function. Thus, IS function resources must not only be oriented by the firm's strategies and integrated into its processes, but must also be based on a knowledge of its core competencies and on its potential to seize business opportunities when they arise [17].

Acknowledging these new requirements for the IS function and taking into account the increasingly severe budget constraints placed on them, several companies have taken a second look at their IS function structure. In this context, the outsourcing of the IS function is often proposed as an effective strategy to either lower IS costs or to refocus on the core activities or the firm. The argument generally put forward to support this realignment, in addition to providing better access to advanced technologies, is that the handing over of all or part of the IS services to specialized suppliers may in fact generate substantial savings. This view of outsourcing has not won unanimous support, however. For some, IT

are nothing more than a simple production factor easily available on the market. In their view, the relevant question is how IT can be acquired in the most economical way possible [18]. For others, however, such outsourcing represents a risk that has been badly evaluated by both researchers and managers. Hence, the fundamental skills needed to create a future range of competitive products cannot be "rented" by means of outsourcing [29]. They argue that several companies give up their basic competencies unwisely when they cut their investments in what they believe, wrongly, to be simple cost centers. Although outsourcing might lead to the hasty launching of a competitive product, it would contribute very little to the creation of the competencies needed to maintain supremacy in the long term.

This reasoning can certainly be applied to the IS field, insofar as the outsourcing of certain IS activities can involve the loss of technological or organizational competencies that are crucial in ensuring the long-term competitiveness of the company [31]. Outsourcing of systems development is particularly sensitive to this risk [2]. The expertise related to IS development activities includes not only technical skills (i.e.: mastering development methods) but also, organizational competencies and a thorough knowledge of the specific context of the business processes. Being specific and tacit in nature, these competencies are difficult to codify and cannot be transmitted easily from one individual to another, or from one company to another, except by transferring the individuals who possess them. This is even more critical when activities are systemic, when they have many links with other activities in the firm. Outsourcing of systemic activities can lower the potential of a firm to innovate [19]. The loss of such competencies through an inadvertent outsourcing decision could potentially have disastrous effects on the future capability of the firm to innovate and adapt to a turbulent environment. On the other hand, and for the same reasons, their acquisition through outsourcing poses major difficulties in the absence of the outright purchase of the external supplier and the subsequent integration of his personnel within the purchasing firm. To get a better grasp of the mechanisms at play in this kind of situation, it was thought that the resource-based theory offered a sensible framework to further study the problem.

3.   Theoretical Background

The resource-based theory is grounded on certain concepts that need to be outlined. According to Barney [6], a company's resources include all the credits, organizational characteristics, processes, aptitudes, information and knowledge controlled by the company and enabling it to conceive and implement strategies to improve its effectiveness. The fundamental postulate of this approach is as follows: leveraging the resources and the core competencies that the company possesses can generate a sustained competitive advantage which, in turn, translates into better performances. Dierickx and Cool [10] argue that if the resources of a company are unevenly distributed between the members of an industry, and if these resources are difficult to imitate or substitute, then the company can implement competitive strategies that other companies will be unable either to conceive or to implement, since they do not have access to an equivalent set of resources. Implicitly, this argument assumes that the company possess a certain amount of these resources and that it can effectively use them to carry out its strategic objectives. Many authors have successfully used the resource-based view of the firm in their studies [27,11,22,24]. These studies illustrate the usefulness of the research framework. It is particularly

2

well adapted to the present research, since it focuses on the strategic considerations of the company when it is developing and using what was termed the "skills or knowledge sets" comprised in an organization's information systems [30].

4. The Strategic Value of Core Competencies

The value of a given set of resources can be conceived only through the activities that they contribute to support or realize and, by extension, through the products that emanate from these activities. Indeed, their contribution to a sustained competitive advantage is valuable inasmuch as they make it possible to conceive and accomplish activities that increase the performances of the company in an appreciable way, either by neutralizing the threats or by allowing it to exploit opportunities that arise. These resources help the company attain a competitive advantage by increasing its operational efficiency, either by automating certain key activities or by supporting congruence and complementarily between these activities.

The strategic value of a company's resources is reflected in the value added to the product. The following example illustrates this point. The value of the talents of a singer is intangible: one cannot measure it directly. This value manifests itself only through the artistic act of the performer. This value becomes tangible (and measurable) when the fans agree to pay for a copy of the songs or to attend a show. In a similar way, the value of the firm's resources, in the context of an IS project, can be estimated in relation to the anticipated value of the information system resulting from the development activity in which these resources take part. The anticipated value of the future system can thus be used as substitute measurement for the strategic value of the resources that help create it. This use of a substitute measurement (proxy variable) is analogous to the use of the small number of suppliers to estimate vertical integration or the degree of asset specificity in Economics [8], or the concept of user satisfaction to approximate the degree of effective utilization of a system in the IS field [4].

5. Research Objectives

Using the resource-based theory as a framework, the objective of this research is to explain information systems sourcing decisions in relation to the resources the firm has in its possession and the strategic value of those resources as measured by the strategic value of the system itself. Specifically, the objective is to answer the following question:

Can the choice of an information system sourcing mode be explained by the availability of the appropriate resources within the firm and the strategic value of those resources?

In a general way, from the perspective of the resource-based approach, the less the appropriate resources are present within the firm, the more the firm will seek to overcome this weakness by calling upon external expertise. Conversely, the more the appropriate resources are present, the more the firm will seek to boost and exploit this expertise. On the other hand, the lower the strategic value of these resources, the more the company is justified in parting with them through outsourcing. Keeping assets

3

with a low strategic value would monopolize resources that could be put to better use elsewhere. Conversely, the higher the strategic value of the assets, the more the company is justified in preserving and exploiting them internally. The advantages are, in this latter case, the achievement of higher-than-average performances, the safeguarding of key process confidentiality, a better control over their realization and the minimization of the risks of developing dependencies towards an external supplier. Consequently, interactions between these two factors (*Strategic value* and *Presence of appropriate resources*), depending on whether they simultaneously take values located on a "high – low" continuum should have a foreseeable impact on the sourcing mode chosen: in-house development in the former case (**C**onservation), outsourcing in the latter (**O**utsourcing). This contingency is illustrated by the O-C axis in Figure 1.
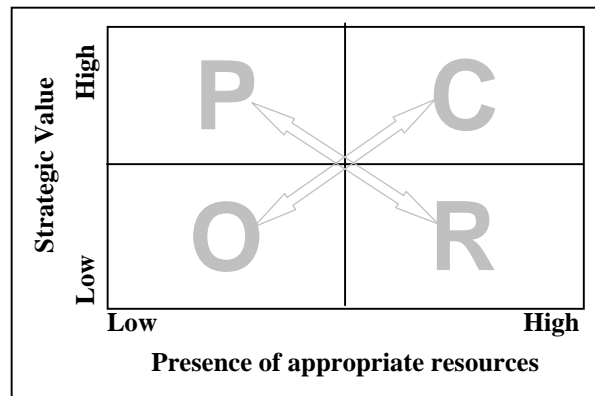

Figure 1: Model of IS sourcing

The situation becomes more complicated, however, when these two factors take opposite values. Which sourcing mode is retained, for example, when *Presence of appropriate resources* is low and when *Strategic value* is high? Conversely, what do managers do when the *Presence of appropriate resources* is high and *Strategic value* is low? This possibility is illustrated by the P-R axis in Figure 1. In the situation of high *Presence of appropriate resources* and low *Strategic value*, the model proposes that an acceptable solution would be to share the information system with potential competitors, thus recuperating some of the investment (**R**ecuperate). This mode of sourcing can take at least two forms. In the first one, the company creates a new entity (a joint venture) with associates in order to further develop and to exploit the information systems in question. A second form consists in developing the system by itself and selling part of its surplus capacity to competitors without asking them to be formally associated with its development or operation. The Colonial Group of mutual funds of Boston illustrates this situation [25]. The company developed a sophisticated portfolio accounting system. Realizing that such a system could be marketed without harming its strategic objectives, Colonial Group created an affiliate, whose mission was to distribute and further develop the system, thus offsetting part of its development costs.

4

In the situation of low *Presence of appropriate resources* and high *Strategic value*, the model suggests that a satisfactory solution would be to enter into a partnership (P) with an external supplier who is in possession of the needed resources to realize the project. This mode of sourcing can be formalized through an explicit contract or through a joint venture in which both partners provide significant resources. For example, it can be agreed that the consulting firm will provide the technical expertise and the supervisory staff for the project whereas the client company will provide the business processes expertise and the infrastructure. Mixed teams will then collaborate throughout the project to complete the desired applications. In another form of arrangement, it can be agreed that the supplier has the prime responsibility for the initial phases of the project. Progressively, as the project moves forward, the client company's personnel would then join the supplier's teams and gradually transfer the intrinsic knowledge to bring the project to fruition and eventually, exploit it. In short, the critical aspect of this sourcing mode is that the client company seeks to obtain more than a satisfying information system from its partner, as it would be the case in an outsourcing deal. In fact, the company seeks to get the effective co-operation of the supplier and to lower the inherent risks of the project by sharing in the profits (and the possible losses).

6. Methodology

The issues surrounding outsourcing of information technology (IT) have been studied most frequently with the tools provided by Organizational Economics [18,3,20,15 and 26]. These studies are based, at least partially, on the workS of [1, 5 and 32]. These approaches suggest that measurement problems, uncertainty, asset specificity, frequency and the origin of the investments play a critical role in sourcing decisions. The political dimensions have also received extended coverage, most notably in Lacity and Hirschheim [18]. Using a series of case studies, they showed that although economic rationality was often alleged, political behaviour could often explain outsourcing decisions. Finally, strategic implications of IT outsourcing were also studied [21, 23].

The Resource-based approach provides a complementary perspective on outsourcing decisions. It has been used previously by Duncan [13] to evaluate the risk associated with outsourcing, even if opportunism is ruled out. She concludes her paper by suggesting avenues for more empirical work (which is still scarce). Because of this scarcity of work using this approach, a case strategy was deemed to be the most appropriate way to evaluate the fitness of the resource-based approach to explain outsourcing behavior. The two cases used for this purpose are composed of IS development projects (the unit of analysis) in large financial institutions. The research was carried out between 1997 and 1999. Data acquisition was based on a variety of data sources: documentation, direct observation, semi-structured interviews and physical artifacts. The use of varied data sources permits a certain level of triangulation [7].

Financial institutions were chosen because they are intensive users of IT. Their activities require the constant and intense support of IS and their products and services directly incorporate a high level of information. Consequently, the IT applications developed in these firms are more likely to have strategic value. The projects chosen for the case studies had to be of significant size in order to facilitate

documentation. They also cover two different theoretical situations described in the research model. Finally, the projects had been in place for at least a few months so that their success could be assessed.

An interview protocol based on the theoretical model was developed at the outset of the research and served as an interview guide. In both cases, data was gathered through semi-structured face to face interviews with top management, owners of the intended systems, senior IS managers, IS project leaders and representatives of outside firms. Information was also obtained through archival documents and field notes. Most interviews lasted one to one and a half hour. All interviews were recorded and transcribed, and the data were classified and analyzed according to the variables of the research model. All relevant documents provided by respondents have been scanned and indexed into the database. Each text was then subdivided into smaller segments, usually sentences, so that one or more codes could be assigned to each segment.

The result of this initial phase is a detailed report on each project. This report served multiple functions, including summarizing the information collected, facilitating the appropriation of the basic characteristics of the case and generating a first level of interpretation. These reports were submitted to the principals in each project for review and validation and their feedback has been taken into account in the final version of the reports.

When all the data (interview reports and documentation) were coded, the dimensions (*Strategic value and Presence of resources*) were assessed for each project and mapped. From this evaluation, it was possible to compare the chosen sourcing mode with the one predicted by the theory. A fit between the two should lead to successful development, while an absence of fit should lead to some problems (inefficiencies or more dramatically, failure of the development process). This served three purposes. First, the evaluation of the variables themselves provided a first assessment of the applicability of the theoretical model. Each variable had to be operationalized for the case study and the consistency of their evaluation, using many information sources, strengthen the confidence in the existence of these dimensions. A second purpose was the evaluation of the model itself, to assess the predicting power of the theory. Finally, this study could also serve as a first step for a larger scale research. The evaluation of the cases would enable the refinement of the model and its dimensions. Other case studies, or a survey, could be conducted to enable the generalization of the results.

7.   The Federation Desjardins

The first project concerns the development of an integrated interface for all transactional systems used by the Federation des caisses populaires Desjardins, a large savings and loan cooperative based in the province of Quebec. With more than five million members and assets of nearly $72 billion, Desjardins is a leading Quebec financial institution headquartered in Montreal. Interviews with the owner of the application (VP level), the corporate CIO, the project manager and project analysts were conducted at the company site in the spring of 1998.

Description of project. The Application Desjardins (AD) uses the metaphor of the "office" and of the "hall" with the aim of artificially reproducing the work environment of a local branch. Closely tied to a

major reengineering effort at Desjardins, this application serves as an interface between the client or the employee of the branch and the numerous information systems used by the Federation. Each graphical interface represents a virtual reality, i.e. a fictitious environment resembling the one found in a local branch.

The main objectives of the AD project were: –to allow Desjardins to differentiate itself from its competitors by offering the client, when he makes a remote transaction with Desjardins, the same environment that he is accustomed to; –to facilitate the task of the employee and to decrease the training effort to carry out that task; –to reduce to a significant degree the operating costs of Desjardins. Begun in the autumn 1995, the development was spread out over a six months period and required an investment of more than two million dollars, excluding the hardware and the subsequent diffusion of the application throughout the Federation.

Presence of appropriate resources. To carry out its project, Desjardins choose to keep the bulk of the development in-house. The company hired on a contractual basis specialized resources in visual ergonomics, graphics and object oriented development that it lacked. These specialized resources were integrated to its internal teams. Otherwise**,** Desjardins had at its disposition the necessary resources to develop the new system. Essentially, what was needed was a thorough knowledge of the core business processes of the institution and the ability to integrate the existing systems in a coherent way. Fortunately, most of these processes had recently been the subject of an in-depth revision through the ongoing reengineering effort. Several internal resources had firsthand knowledge of the reengineered processes and were available for the project. In addition, work had already started on the concept of a visual interface to symbolically represent the tasks to be achieved. The convergence of all these factors made it possible to put into place a very qualified and productive team.

Strategic value of project. For Desjardins, the project represents a significant strategic value since it impacts directly on the relation with its members. This application redefines the marketing approach for all of its products while facilitating access to its various services for employees and customers alike. The AD also affects the image of the Federation by presenting a uniform access to its services, thus providing the institution with a distinctive mark compared to its competition. By allowing the easier introduction of new services such as Access D (an Internet link to its products), this project transforms the way of doing business in the Quebec banking market. As illustrated in the following comments, this aspect is very much on managers' mind at the outset of the project.

> *"Yes, it is strategic!, The major thrust of our strategy will rest on sales. This derives directly from the board of directors' decision." (Project manager)*

The AD is also an integrative tool. Used as an interface for the diverse corporate systems, this application assembles and synthesizes information that, until now, was scattered and difficult to access either for Desjardins' employees or for the members. From this point of view, the application lets Desjardins offer more and better quality services to its members, securing the institution a better position in the market. Finally, because it facilitates access to its services, the AD helps reduce to a significant degree the overhead costs, thus making it possible to lower user's fees.

Results. The development of the system was carried out within budget and on schedule. In March 1996, as planned, the system was presented at the annual general meeting of the Federation. The application unquestionably aroused a high degree of interest amongst the Federation managers and the local branches' personnel. The managers were delighted with what they saw and pressed for its rapid deployment in the branches. The following comment by the executive in charge of the project at the corporate level is representative of users' attitude in general.

> *" It's fantastic. The client sees his business and that very often allows... before we can realize that he has changed address, he asks for us to change it, or his telephone number. There is a kind of chemistry, a partnership established between the people.."*

At the outset, Desjardins had the required resources at its disposition or could easily have access to them, specifically those with expertise in its business processes and the systems that supported them. The project is of high strategic value since it directly affects the relation with its members and impacts the way its products and services are offered. The project managers decided that in-house development, combined with punctual participation of external consultants, would be the appropriate sourcing mode. The project is a success since most of the objectives were met within budgets and according to plans. Moreover, both the development group and the users are very satisfied with the application and wish its rapid deployment throughout the whole institution.

According to the theoretical model used in this study, in the presence of a high level of resources and with a project of high strategic value, the ideal mode of sourcing would be in-house development. This mode of sourcing helps to preserve the confidentiality of critical processes, contributes to a better control on the development process and the quality of the results and also adds to core competencies within the company. The evidence collected in this case shows that it is exactly the path followed by Desjardins. Furthermore, the project resulted in a success, thus reinforcing the validity of the model.

8. The National Bank of Canada (NBC)

The second project concerns the development of an integrated system to support the monetary transfer operations of the International and Treasury divisions of the National Bank of Canada. An active social and economic institution for the past 140 years, the National Bank of Canada is today the sixth largest chartered bank in Canada with assets of $69 billion. The National Bank's head offices are located in Montreal and its Canadian network consists of 642 branches staffed by more than 16,600 employees.

The volume of exchanges between financial institutions can be enormous. Thus, ten million times per day, Canadians withdraw cash from automatic teller machines and use checks, debit cards and pre-authorized payments with the result that, at the end of the day, one financial institution can owe money to another. Worldwide, these operations exceed 100 billion dollars per day, that is to say more than 30 times the GDP of Canada. The LVTS project (Large Value Transfer System) of the NBC aims to automate and to guarantee its share of these exchanges by connecting its banking systems to the new LVTS system of the Canadian Payments Association (CPA).

8

The LVTS is an electronic transfer system that can be used to transfer payments of any value, especially those that are time critical and require high levels of safety. An increased speed and safety characterize the transactions on this system, which can treat and even replace checks and paper drafts. Moreover, once received by a participating member of the CPA, the funds are irrevocable and cannot be recalled by the payer or his deposit institution, even if they are in default. This is called "finality of payment". Since the LVTS system guarantees the finality of payment, it follows that the transmitting institution must make sure that it (or its customer) has in hand the necessary funds or guarantees to cover the transfer before the LVTS operation is initiated. Therefore, each institution must develop within its own applications the necessary controls to guarantee all the transfers that it carries out. Specifically, for the NBC, the challenge was to develop the interface between the LVTS system and its own payments systems and adapt these so that they would provide the functionality required by the CPA.

Since 1994, the International division of the NBC worked with a New York consultant, the Datek Company (fictional name), for the provision of an application used for the treatment of its international payments. Actually, this application was used as an interface between International's systems of payments and the SWIFT network, the worldwide inter-bank financial telecommunication system. Meanwhile, in 1996, the CPA decided to launch the LVTS system in order to replace the old compensation system, which had become obsolete and which did not meet the international standards any more. As of April 1999, the CPA required that all large value transfers between Canadian financial institutions be forwarded on the new LVTS system. The main objective of the project was first and foremost, to fulfill the requirements of the CPA. A secondary objective was to modernize the compensation and payment functions of the Bank, both at the domestic and at the international levels, so as to project an image of service quality and to affirm the presence of the NBC on the international stage. The projected cost of the LVTS, in its initial form, was at least two million dollars and the system would incur an annual maintenance cost of 500 000 dollars. This amount did not include the development of the necessary interfaces with the in-house systems. This latter part of the project was evaluated at one million dollars. In its final incarnation, the total cost of the system came to 2,15 million dollars including the adaptation that had to be carried out on the bank's internal systems. Started in April 1998, the project was completed in February 1999, a few months behind schedule but well within budget.

Sourcing mode. At the NBC, all transfers of funds with other Canadian banks are under the responsibility of the Treasury division. Among the million or so transactions that are treated by this division on a daily basis, approximately 5 000 are considered of large value (50 000$ and more). In addition, since most of the transfers of funds received by the International division end up sooner or later on the Canadian network, the top management of the bank came to the conclusion that the Treasury division should manage the LVTS project. Consequently, this division got the initial mandate to acquire or to develop the necessary applications.

Presence of appropriate resources. This decision raised a certain number of problems, however, the first being that Treasury did not have any experience with the SWIFT system nor with any other electronic transfer systems for that matter. Indeed, until April 1998, all transfers of funds between the NBC and its Canadian counterparts were carried out manually, by means of commercial papers, and

were framed by bilateral agreements from one institution to another. Another major difficulty was related to the fact that, for the International division, the LVTS project did not have the same impact as for the Treasury division. At Treasury, large value transfers accounted for only approximately 0,5% of the daily transactions. At the International division, however, where the value of each transfer tends to be much higher, this type of transfers accounted for 95% of the transactions. Consequently, the managers of the International division strongly objected to the fact that Treasury was being put in charge of the project and they did not accept lightly to lose control over such a critical function of their day to day activities.

Thus, initially, the Treasury division managed the project on a mandate received from the top management of the bank. Since the Treasury personnel had very little experience with computer systems and disposed of very few IS resources, it turned to an external supplier, the Large Bank (fictional name), for assistance. According to the negotiated agreement, the Large Bank was to outsource the transfer of payments for the NBC on its BESS system and would take charge of the interface with the LVTS system at the CPA level. The NBC would remain responsible for the conversion of its corporate systems so that they would interface with de BESS system.

On the eve of the final agreement with the Large Bank, it was decided to ask for the opinion of the International division, since this division would be deeply impacted by the project. Based a comparative analysis of the system proposed by the Large Bank and the system already in use in the International division (the Bankmate system), it was decided to put the Large Bank offer on hold. As the IS manager of the International division explains, the proposed system did not address the needs of the Bank and would not have allowed the International division to achieve its business goals either.

> *"In fact what [Large Bank] wanted was to do our payments. The payments are one thing. But in their business, their system of payment is hooked up with twenty-one other applications at their bank (ten local systems and eleven at the international) so as to be able to complete the chain of operations. In their proposal, they would let to us use their system plus five other applications. The fifteen other [applications which were missing], we had to return to manual mode and develop a ton of data processing applications, one way or the other. And when we began asking questions, we realized that BankMate was quite a bit more advanced than what Large Bank was offering."* (IS Manager, International Division)

As an alternative to this unacceptable solution, the International Division proposed to update and extend the BankMate application that was already in use in the division. This task could be accomplished in partnership with DATEK, the small consultant firm based in New York that owned the BankMate system. The two firms already had extensive contacts together. The BNC was contributing to the adaptation of the BankMate system for the Canadian market and in return, was getting favorable terms for the system license. This solution had its own problems, however. Indeed, the survival of the consultant firm was not guaranteed due to its relatively small size. That would have put at risk the major investments that the Bank intended to make on the LVTS project. The solution to this difficulty was the acquisition of the source codes from DATEK and the transfer of their expertise the NBC

personnel. By this strategy, the bank hoped to secure the long-term availability the system and to better control its development.

Strategic Value. Thus, for the NBC, the LVTS project had a relatively high strategic value. This evaluation diverged from one division to another, however, depending on their respective point of view. For the Treasury Division, the LVTS system was no more than an administrative application, quite useful and even necessary, but which did not have a major impact on the performance of the division. For the International division, however, the LVTS project is of a rather high strategic value. The successful implementation of the applications connecting the NBC to the LVTS and Swift systems has a direct impact on the image of the Bank and its capacity to attract new business clients and to preserve its customer base. It is the point of view which is expressed by the IS Manager of the division.

> *"Mission critical, it is extremely important! The payment system, it's the visibility of the bank at the world level. It is the credibility of the bank […] If a company comes here and is unable to make this kind of payment, it will go to another bank."* (IS Manager, International Division)

Ultimately, the top management of the Bank concurred with this evaluation. They recognized the importance to preserve the image of the bank as a large Canadian financial institution and the potential impact of the system on their major accounts. They also thought that the bank should be able to assume its own obligations towards the CPA and develop and manage its own payment systems.

Project Results. The project is considered a success since the initial objectives were achieved. The first of these objectives was to fulfill the requirements of the CPA, which the modified Bankmate system already ensured minimally. Another objective was to modernize the compensation and payments function both at the domestic and the international level. The adoption of the Bankmate system by all the services affected by the LVTS made it possible to not only achieve this goal, but to surpass it. Finally, another objective was to secure the control of the future orientations of the Bank, which the purchase of the source code and the internal development helped ensure.

In conclusion, the NBC did not possess the necessary resources to upgrade its systems of payment and compensation. Because the application was considered to be a major strategic commitment, the Bank was reluctant to contemplate the long-term dependencies that would entail the outsourcing of its transfer systems to an external vendor. This meant that the Bank had to rely on external resources, either through a partnership with a consultant or through the outright acquisition of the missing expertise in order to be able to develop the applications internally. The option finally retained by the Bank was the purchase the source codes of Bankmate from an external supplier and the integration of the knowledge possessed by the owner of this package. Thus, it became possible for the Bank to develop the new system internally. This approach proved to be a success, as most of the initial objectives were met.

9. Discussion

The sourcing model we have described in this paper focuses on two important factors affecting the sourcing decision of an IS system: its S*trategic value* and the P*resence of the appropriate resources* to develop it. Rather than focussing exclusively on the economic aspects of the project (the strategic value), the model draws attention to the knowledge dimension (*Presence of appropriate resources*) that is endogenous to any IS development. It is theorized that it is the interplay between these two factors that will best explain why, under certain circumstances, a company will choose to keep the development of a highly strategic system in-house and why, under another set of circumstances, it will seek outside assistance to develop its system. The two case studies presented above are an example of this situation. The following comparison matrix illustrates how the managers, even if they had strategically valuable projects, opted for different sourcing modes. The explanation for this difference is found in the value taken by the *Presence of required resources*, which varies significantly from one project to the other.

COMPARISON MATRIX				
Project	Strategic Value	Presence	Mode	Results
AD	**High strategic value:** •Supports an integrative function; •Affects market share; •Changes the way of doing business in this sector; •Significantly better service offered to members.	**Readily available :** •Expertise of the affected business processes available; •Access to specialized resources in ergonomics and multimedia.	**In-house development :** •Management of project kept in-house; •Substantial presence of external resources, but these resources were integrated with the internal teams and were under their responsibility.	**Complete success:** •System delivered on time and within budget; •System was very well received by users and managers alike; •Appreciable impacts on users' performances.
LVTS	**Relatively high :** •Impacts the Bank image, both at the national and the international levels; •Helps to recruit new business; •Consolidates the existing base of clients; •Ensures the NBC participation at the CPA.	**Low presence :** •Scarce in-house expertise both in the International Division and in the Treasury Division;	**Outsourcing :** •Considered transfer of dev. And operations to a vendor; **Conservation :** •Acquisition of a package; •Transfer of knowledge from supplier of package; •Internal teams take charge of the project in its final phase.	**Complete success :** •Objectives have been met; •Requirements of the CPA have been met; •Upgrading of the transfer and compensation function accomplished; •Control of a strategic application kept in-house.

In the AD project, those resources were readily available in-house or through the hiring of external specialist on a contractual basis. The project being of high strategic value, the institution opted for internal development so as to minimize its risks. The situation is quite different in the LVTS project where the NBC does not have the required resources at its disposal. Because this project was also

12

considered of strategic value, the Bank was interested in keeping its development under its own control so as to minimize its dependency towards an external supplier and to keep its options opened in a changing competitive environment.

Thus, while the first case illustrated the conventional wisdom of keeping the development of a strategic application in-house, the second case presents a more complex situation. By highlighting the importance of competencies combined with the strategic value of the development project, the research model helps explain why the NBC used multiple modes of sourcing. In this particular case, at least in its initial phase, the strategic value of the system was deemed to be quite low by the Treasury (V_1). At the same time, the availability of the necessary resources was also perceived to be low (P_1). This is when the International division's point of view came into play. Once the management of the NBC realized that the project actually had a high strategic value for the bank, the "normal" sourcing mode should have been a partnership with an external vendor who possessed the required resources. That is precisely what the NBC management did by studying the Datek option. But a more attentive analysis of this option revealed that Datek's future was not guaranteed, thus putting at risk NBC's investment in the project. That conclusion led to the final configuration of the project, which was to buy the source code of the Bankmate application and to transfer the knowledge that came with it. In this particular instance, the purchase of a package can be seen as a transfer of expertise between the vendor and the NBC, enabling the bank to safely keep the development in-house. At that stage, the project was deemed to be of high strategic value (V_2) and the NBC finally had the required resources (P_2) to conduct the project in-house, as illustrated in Figure 2.
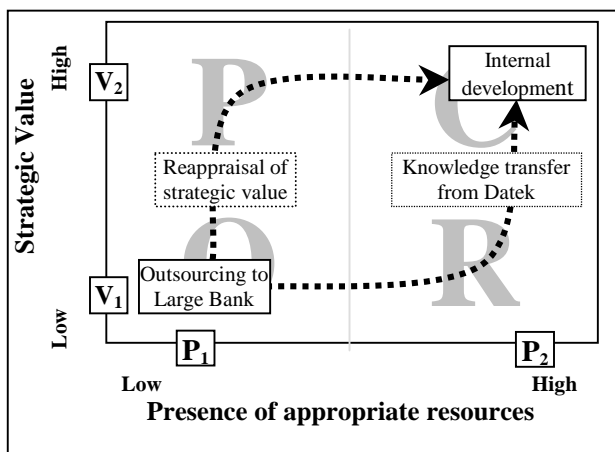

Figure 2: Sourcing mode of the LVTS Project

10. Conclusion

The results of this study have interesting repercussions for IS research and for managers who need to decide on an acceptable solution for their IS development needs. Moreover, for the IS research field, the study is one of the first attempts at operationalizing the resource-based framework. This theoretical framework, with the exception of [12, 22], has not been extensively used in IS research. Its use in this research presents a possible new approach for the study of information systems sourcing. The study has also helped clarify the concepts used in the theoretical model and identify relevant empirical referents for evaluation purposes.

For practitioners, the proposed model provides decision-makers with a more refined set of criteria on which to base their sourcing decisions. Also, it is interesting for managers to have access to a broader range of documented sourcing mode choices. In addition, by taking into account the effective availability of resources within the firm and their strategic value, managers can be more attentive to the long-term consequences of their sourcing decisions.

The resource-based theory has enabled us to formulate a model that can be used to study information systems sourcing modes. Following development of the model, a research plan was devised to identify the critical dimensions of IS development project sourcing decisions in terms of the resources required and their strategic value. Implementation of this research plan has provided the data needed to analyze the nature and intensity of the links between the various dimensions. The study should cast a new conceptual light on the phenomenon and offer additional and innovating tools for decision-makers.

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