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Jaciane Cristina Costa
PPGA - UFRGS, jccosta@ea.ufrgs.br

Mariana de Freitas Dewes
PPGA - UFRGS, mfdewes@ea.ufrgs.br

Antonio Carlos G. Maçada
Federal University of Rio Grande do Sul, acgmacada@ea.ufrgs.br

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IT Outsourcing as a Source of Open Innovation

Jaciane Cristina Costa

PPGA - UFRGS
jccosta@ea.ufrgs.br

Mariana de Freitas Dewes

PPGA - UFRGS
mfdewes@ea.ufrgs.br

Antônio Carlos Gastaud Maçada

PPGA - UFRGS
acgmacada@ea.ufrgs.br

ABSTRACT

Outsourcing has been considered as an important source of innovation, nowadays. The paradigm of open innovation suggests that valuable ideas may occur either inside or outside the company, as in the Information Technology (IT) outsourcing. In view of the emerging paradigm of open innovation, this paper analyzes the IT outsourcing process as an external source of open innovation. This research has a qualitative approach, adopting the strategy of studying multiple cases. The unit of analysis are three large companies, reference in their niches and acknowledged for their successful IT outsourcing practices. Results show that IT outsourcing is heavily influenced by costs reduction; however, innovation is perceived in the working methods resulting from the outsourcing process, being explained by the open innovation theory, since the source is external.

Keywords

Open Innovation, Information Technology, Technology exploration, Brazil, Innovation.

INTRODUCTION

"Innovation has always been a challenging and risky business" (Chesbrough, 2011). This phenomenon has developed from a small club of innovation practitioners, most of them active in high-tech industries, to a widely discussed and implemented innovation practice. Simultaneously, a small community of management researchers has recently developed into an established research field. This is reflected by several special issues on open innovation, for example, R&D Management 2006, 2009, and the International Journal of Technology Management 2010a, b (Gassman, Enkel and Chesbrough, 2010). Innovators must co-create with customers and/or suppliers to create to deliver more meaningful experiences, with higher added value (Chesbrough, 2011).

Simultaneously, there is the outsourcing adoption by organizations, in a pace never seen before (Miozzo and Grimshaw, 2008; Barthélemy, 2001; Lacity; Willcocks, 2001; Lee, 2001). Within this scenario the IT outsourcing is highlighted.

In the last few years, outsourcing has been considered as an important external source of innovation, however it has been little appreciated within the innovation process (Theys, 2003, p.2). After Henry Chesbrough published the book *Open Innovation: The New Imperative for Creating and Profiting from Technology*, in 2003, there was an increase of interest in research about Open Innovation, which presents a new paradigm for studying innovation in organizations.

The paradigm of open innovation suggests that valuable ideas may occur either inside or outside company, giving similar importance to external ideas and means to market as to internal ideas and channels to market. Companies considered by Chesbrough (2003) as practitioners of the open innovation model include IBM, Intel and Procter & Gamble (P&G), which present aspects and characteristics of open innovation.

In its core, open innovation shows that knowledge is widely spread and that even the most capable organizations in R&D must identify and use external sources of knowledge as a central process in innovation. Nonetheless, most research about innovation examines only individual characteristics or analyzes the company from a static and isolated perspective (Rogers 1995; Van de Ven et al, 1999); also, many authors focus on a specific kind of innovation.

Seeking to establish the relation between IT outsourcing and innovation, this paper has raised the following question: How can IT outsourcing be an external source of innovation? To answer this question, the objective of this paper was to analyze IT outsourcing as an external source of open innovation.

IT OUTSOURCING AND OPEN INNOVATION

Technological innovation has achieved a leading role and has been disseminated by Schumpeter, an economist from the 20th century, through the Economic Development theories. Such distinction is due to the positive effects of process and product innovations in economic development. (Andreassi, 2007).

Innovations are grouped, according to Francis and Bessant (2005) in four basic topics: Product, process, market and working methods.

The present research focus on the concept of innovation in working (or organizational) methods, which is the implementation of a new organizational method in the company's business practices. It aims to improve a company's performance by reducing business or transactional costs, stimulating satisfaction in the working place (as well as working productivity), getting access to non-transactional assets (such as non-encoded external knowledge) or by reducing supply costs. This is related to the way the company responds to information and changes coming from an external environment, and how this information is processed within the internal environment (Francis and Bessant, 2005).

As can be noticed, innovation in working methods is a kind of innovation that can occur due to IT outsourcing and does not actually mean improvement or innovation in a company's existing product. It is an external innovation which can bring competitive advantage, being validated in the market, through its adoption by other companies, then becoming an innovation.

In a nutshell, innovation brought by IT outsourcing depends on the role of IT in the company. If it is a software company, IT is its main product; therefore innovation in this company is intrinsically connected to IT. On the other hand, in companies where IT has a supporting role, the kinds of innovation most likely to occur are those related to processes and working methods.

For Chesbrough (2003, 2006) companies can and must use external as well internal ideas and introduce them to the market, because in doing so they improve their technology and processes whilst outsourcing their IT, besides creating the possibility of acquiring knowledge and resources from external players. Innovation is not restricted to products, but also includes techniques and processes (King et al, 1994), and as projects grow in complexity, they cannot be restricted to a single organization (Westergren and Holmstrom, 2008).

In the open innovation paradigm the technological basis of research may be either internal or external, and new technologies may be introduced to the process in several stages. Besides, projects can be taken to the market in several ways. The difference is that along the process technology is introduced either in the research (R) or development (D) stages; likewise, ongoing research may be used along the whole process, through spin-offs, licensing to external markets, or even innovation to its own market. The process is called open innovation because there are many ways to organize the flux of ideas, from inside to outside or from outside to inside the company (Chesbrough, 2006).

Chesbrough (2006) points out the differences between open innovation and the conventional paradigm of innovation: the importance given to external knowledge, compared to internal knowledge; the centralization of the business model to convert R&D into commercial value; the intentional leave of knowledge and technology fluxes, growth in the number of innovation third parties and the rise of new measures to evaluate innovation performance and capability.

The variety of innovation concepts in the IT world and its influence in the project, production and use of IT within organizations, deems it important to know how these concepts are related to one another (Wang, 2009). To perform this analysis, it is necessary to know that innovation emerges and evolves beyond the organization's boundaries and that there are several concepts related to the issues of IT innovation and IT outsourcing.

Under this paradigm, innovation is defined as the organizational application of new IT (Swanson, 1994; Wang, 2009). There are several organizational, technological and environmental factors which contribute to the adoption of an IT innovation (Wang, 2009). Generally, large organizations, which are more diverse, with more technical competence and high administration, operate within diverse contexts, with several kinds of competitors; they have a more favorable perception to innovation, and are more likely to adopt a bigger number of innovations (Fichman, 2004; Wang, 2009).

But, according to Wang (2009), "the analysis confined within the boundaries of each organization adopting an innovation is improper to clarify the IT innovation process". Currently, research on innovation has little to offer regarding cause and effect produced by the innovation and its consequences in the adoption and diffusion of these IT innovations (Wang, 2009).

Innovation obtained through an external source, a third party IT service supplier, foresees collaboration and knowledge exchange between organizations (Westergren and Holmstrom, 2008; Chesbrough, 2003, 2006). Customers, suppliers and third parties can contribute to innovation through knowledge exchange.

The Open Innovation paradigm is based on the idea of using internal and external knowledge to speed up internal innovation. To Chesbrough (2006, p. 1) "Open Innovation processes combine both internal and external ideas in architecture and systems, giving value to everyone either internal as well as externally involved".

As the importance of IT innovation has grown, a better understanding of the process has become necessary (Westergren and Holmstrom, 2008).

METHOD

The present paper has a qualitative nature, being classified as exploratory and descriptive. During the definition of the research model, a qualitative approach was chosen due to its capability of providing answers about the complexity of IT outsourcing and open innovation aspects. Within the coverage of qualitative methods, we applied a multiple case study research methodology.

The unit of analysis of this research was the IT service contractor (IT outsourcing) and the process of IT outsourcing as a source of open innovation was analyzed (technology exploration/exploitation).

To take part in the analyzed cases, three companies have been chosen in accordance with the requirements of this research:

- They outsource a great deal of their IT;
- They are considered by the media as leading companies regarding their IT outsourcing processes;
- They are regarded as full outsourcing companies;
- They are regarded as stable global players;
- They have agreed to take part in this study; and
- They all hired IBM, this way it is possible to verify if there is a difference of perception between these three companies.

The focus of this study is the relation between a company which outsources its IT and the IT service provider. To do so, data were collected from two different sources:

- Primary data: Interviews with each one of the IT managers (CIOs) of the hiring companies;
- Secondary data: News about the analyzed company and its IT outsourcing process, annual reports, IT outsourcing agreements.

Cases were analyzed through the case study protocol which covers the interview script and the analyzed documents. The semi-structured interview script consisting of nineteen questions was built based on the reviewed literature on IT outsourcing and Open Innovation.

As interviewees, IT managers (CIOs) of these companies were chosen. Interviews were typewritten and their contents analyzed using the content analysis technique. Details regarding to the selected cases are presented in the next section.

RESULTS

In this section, we start by approaching three different cases, describing the company, the outsourcing process and the IT open innovation. Afterwards, a comparison among the cases was carried out, showing the beginning of the IT outsourcing process, the outsourcing trigger, the identified open innovation and the kind of innovation resulting from the IT outsourcing process, advantages of the IT supplier's technology and the opening of the hiring company's technology.

Gerdau Case

Gerdau Group started in 1901, with the Pregos Pontas de Paris factory, in the city of Porto Alegre, Rio Grande do Sul, Brazil. Currently, the corporation is the 13th largest iron producer in the world and is also the leader in the segment of long iron bars in the Americas. It has 337 industrial and commercial units besides 5 joint ventures and four associate companies, being present in 14 different countries: Argentina, Brazil, Canadá, Chile, Colombia, Spain, The USA, Guatemala, India, Mexico, Peru, Dominican Republic, Uruguay and Venezuela. Gerdau provides iron to construction, industrial and agricultural sectors.

IT outsourcing

IT outsourcing at Gerdau started in 1997, with process reengineering, which aimed to reduce time and idle processes besides assisting on SAP implementation. At this very initial stage outsourcing's main objective was reducing costs. Cost reduction happened mainly because all the IT structure remained with Gerdau, just manpower was outsourced. This stage of outsourcing lasted almost until 2000, when full implementation of ERP was concluded, that is, until the demand for development was finally over.

In 2005 Gerdau started outsourcing its IT, to minimize security issues with third parties and problems with labour rights. Costs have apparently become higher. Impelled by the need of both hardware maintenance and modernization as well as a huge growth of the corporation, in 2007 Gerdau has signed an agreement with IBM that maintains Gerdau's servers and Data centers centralized in Hortolandia – Sao Paulo State.

The criteria used to choose IBM were because it is a hardware manufacturer and because it is a global player (global provider) like Gerdau, although in the USA, the company still has another IT service provider.

At this stage cost has not meaningfully dropped, and besides providing the whole IT structure IBM also replaces Gerdau's equipment.

According to the interviewee there are two important variables in the agreement with IBM, length and scale of the agreement. The contract with IBM will last 6 years, however an agreement does not last that long, it is generally renegotiated before that. A limitation of this agreement is that in the same place (Hortolandia, SP) there are two data centers, one with 40% and another with 60% of the operations. This new agreement has permitted IT growth inside Gerdau, which has grown a lot due to acquisitions, thus the need for IT has also increased.

Open Innovation and IT outsourcing

It is noticed, through the collected data, that the main innovation resulting from the outsourcing process was the innovation in working methods. New kinds of agreement, structuring and service performance were developed, greatly changing the sector and the processes of IT area in the company, being considered the main benefit of outsourcing. Another kind of benefit brought by this agreement is that the demanding rate, which started by being stipulated in contract, became higher than when the whole IT was internal. Another innovation was the speed to increase the quantity of machines or even replace them, that is, the scale foreseen in the agreement.

In a nutshell, through studying this case it has become clear how important IT outsourcing is as a source of innovation, mainly innovation of working methods. It is noticed that in this case there was more IT development, through the knowledge and service provided by the IT Service Provider.

The Yara Case

Yara Fertilizers started to operate in 1905 with the first nitrogen-based fertilizers production in the world in Notodden, Norway, under the name of Norsk Hydro. Between 1999 and 2003, Hydro Agri acquired Adubos Trevo, the third largest fertilizer producer in Brazil. Currently, Yara has offices in about 60 different countries, with 160 infrastructure sites spread around the world, and 50.000 workers.

IT Outsourcing

Yara has started its outsourcing process in 2006 (on a global basis) and according to the interviewed CIO there is actually innovation with the IT outsourcing process, mainly regarding the company's internal processes. The decision for a high rate of outsourcing was corporate. The outsourcing process has started in Europe and was adopted by the units in Brazil afterwards. In 2007, a global provider was selected, and IBM was chosen and hired in January 2008. The result of this process was a comprehensive downsize in the IT area and all the functions and processes of the sector which were outsourced. But other functions and processes that did not exist before have been created with the outsourcing.

Data collected through interviews and analyzed documents indicate Yara's outsourcing as full outsourcing, as the company has outsourced the whole infra-structure, networks, servers, hosting, and service desk. At Yara's IT sector, in Porto Alegre, Brazil, there are between 20 and 30 outsourced employees and more than 100 in the whole country.

The company works with projects, therefore it selects and hires providers to develop systems according to its needs and this definition of process, selection and hiring, besides following the implementation and controlling the service rate, has become a new working method which has generated expertise at Yara.

As for the decision of keeping internal or outsourcing, it was observed that the costs of internally developing the processes are apparently lower, as the answers are faster, and many times it seems more expensive to outsource, but internal IT may sometimes have non-written costs. The main benefit identified after a year of outsourcing was reduction of structure, and consequently of some costs, with 8 internal employees to serve 16 of Yara's factories in Brazil.

Regarding the adoption of IT outsourcing, the interviewee points out that, in Rio Grande do Sul, there are three highly developed companies: Yara itself, Springer and Gerdau; these companies are considered to commit to full outsourcing. As for other companies there is still much resistance to IT outsourcing and just a small part of this sector is outsourced. An interesting aspect raised by the interviewee was that the Brazilian government is not prepared to tax some kinds of outsourcing practices thus generating even more cost reduction.

Open Innovation and IT outsourcing

Innovation with Yara's IT outsourcing was mainly related to internal processes. It has become clear through the collected data and it was pointed out by the interviewee as the main innovation. Another advantage of outsourcing is knowledge transfer and learning in the company which has been, in a certain way, tacit.

With outsourcing the company has also benefited with the upgrade of its equipment and with standardization, demanding therefore less effort and training from the support team. As a result of this process, there was huge cost reduction. According to the interviewee, the renewal of the company's industrial park represented a technological innovation.

When asked about the main changes "and possible innovations" resulting from the outsourcing process, the interviewee highlighted that: "The tripod process, people and technology, has changed. We have new roles, new functions that we could never have imagined, there is change in the way we do things, and the computers, systems, changed the technology we have."

To summarize, in this case innovation resulting from outsourcing was in the working methods and technology exploration is evident, that is, innovation resulting from the absorption of processes and knowledge originated inside the outsourced IT company.

Springer Carrier Case

Springer & Co. was created in 1934 as a representative of commercial refrigerators, and its name originated from its founder, Charles Springer. In 1983, Springer Refrigeração S.A. joined Carrier Corporation through a joint venture, becoming Springer Carrier do Nordeste S.A. Currently it is the largest air conditioner manufacturer in Brazil and it has about a thousand workers in its two plants, one located in Canoas, Rio Grande do Sul, and another in Manaus, Amazonas.

IT Outsourcing

Springer started its IT outsourcing process between 2004 and 2005, when it hired IBM to update its systems and hardware. The decision to outsource was taken due to the necessity of updating (hardware and software) that the company passed through. This decision resulted in outsourcing the whole infrastructure, infrastructure support and application support. The result was downsizing of internal positions and employees either for having become superfluous or for being unable to adapt to the new technology. The company maintains outsourced SAP application hosting with IBM and all its web systems hosting of which interact with SAP. For management and maintenance, the configuration of the SAP application is provided by another company.

Several benefits resulting from outsourcing were pointed out, such as always having up to date computers (hardware). The company pays per each access point, which is replaced every 36 months at the most. Another benefit is not needing to maintain its own employees to manage the problem of replacing or increasing access points, giving more speed and flexibility to the company.

The company has its data center outsourced with IBM, however printing and desktops are with another company. Before 2004 the company had other IT outsourcing agreements, but there was not a standard, there were many small third parties. At this stage the company has reduced the number of third parties in IT to four.

As for full outsourcing, the interviewee has said that it is still hard to hire a single IT company capable of properly answering to all its needs. Regarding IT outsourcing agreements, the company is quite demanding and agreements are quite stringent defining the expected service rate and fines if the IT provider does not comply with the rules.

IT outsourcing performed by the company is successful and has allowed better management of the IT sector. The Brazilian IT is the IT center in Latin America, covering operations in Brazil, Mexico, Argentina and Chile. The team currently comprises eight internal employees and another 27 outsourced employees.

Open Innovation and IT Outsourcing

When asked about IT outsourcing introducing innovation at Springer, the interviewee was categorical and presented a very different point of view comparing to the other analyzed cases. To the interviewee it was IBM that has obtained innovations resulting from the IT outsourcing performed at Springer, due to the high level of security requirements and processes of the company. This may be explained by the fact that Springer is part of UTC conglomerate (United Technology Company), which works with aerospace technology and has a very rigorous security, process and requirements (governance) policy. This has led IBM to introduce adaptations to answer to all the necessary requirements for becoming a provider.

Due to Springer's necessities, IBM's data center in Hortolândia has gone through a demanding audit, with a global security committee which would review and update the group's security policy every term. Nonetheless, the interviewee recognises that even so, it is possible to achieve incremental innovation resulting from the IT outsourcing process. The interviewee has regarded the innovation in IBM services to attend Springer, resulting from the IT outsourcing process brought from other companies, as incremental, not radical.

This case is different from the others, as larger externalization of technology was noticed, that is, the hired company (IBM) has developed innovations from knowledge and processes acquired from the hiring company (Springer).

Discussion and cases comparison

Figure 1 presents the analyzed cases. Aspects regarding IT outsourcing and Open Innovation are highlighted.

	Case 1 – Gerdau	Case 2 – Yara	Case 3 - Springer
Beginning of the IT outsourcing process	Stage One in 1997. Current IT outsourcing started in 2007	Worldwide in 2006. In Brazil in 2008.	Began the process in 2005.
Motivation for outsourcing	Cost reduction and process re-engineering	Strategic corporate decision. There were cost and structural reductions.	The necessity of updating (hardware e software), cost reduction and speed
Open Innovation identified	Yes, resulting from IT outsourcing	Yes, resulting from IT outsourcing	Yes, resulting from IT outsourcing
Kind of innovation resulting from the IT outsourcing process	Working methods	Working methods	Working methods
Exploring the IT provider's technology	Yes	Yes	Yes (partially)
Exploiting the technology of the hiring company	No	No	Yes

Figure 1. Cases comparison

In this comparison it is observed that the main trigger to IT innovation is cost reduction. One type of innovation was identified in each case, resulting from the outsourcing process, according to the collected data. The innovation identified was in working methods, that is, incremental innovations which do not impact the companies' main product. As for exploring the IT provider's technology, the IT provider brings the idea, knowledge or process that introduces innovation to the company that outsources its IT, fact that was pointed out in the three studied cases. Technology externalization of the company hiring the IT provider was observed only in the third case, which means ideas, knowledge or processes that allow innovations to be introduced in the company that provides IT.

This fact shows that the company's influx of internal ideas which are externally used and the arrival of external ideas which are internally used, showing the importance of the IT outsourcing role as a source of open innovation.

FINAL CONSIDERATIONS

The results show that IT outsourcing is greatly influenced by cost reduction, but even so open innovation resulting from the outsourcing process is perceptible. Besides, it was possible to identify that innovation can occur either in the hiring or in the hired company, which innovates by providing services to the customer company. Such conclusion corroborates the information from Westergren e Holmstrom, (2008) and Chesbrough (2003, 2006) that innovation obtained through an external source foresees the collaboration and the influx of knowledge between organizations.

We noticed that the cases are different, but it is evident in each one of them that IT outsourcing facilitates innovation processes in their working methods, as the generated innovation is not directly connected to the company's product.

At Yara and Gerdau innovations obtained through IT outsourcing were highlighted, that is, exploring technology from the hiring company, present outside the company to be used inside. On the other hand, in Springer's case it was identified that the hired IT service provider has taken advantage of the technology from the hiring company by innovating its products and processes. Thus, it is possible to state that many times the hired company obtains innovation for its products through interaction and adjustments resulting from the needs and knowledge of the hiring company and its process, that is, externalizing technology that exists internally being absorbed and used by other companies.

Summarizing, we may conclude that:

- a) The IT outsourcing process has brought innovation to each analyzed case (open innovation);
- b) Identified innovations were those related to working methods;
- c) Taking advantage of the technology has happened in two of the analyzed cases, and in a lower rate in the third case;
- d) Externalizing technology was observed in the third case.

It may be noticed that the relationship between IT outsourcing and innovation is not clear and companies are still unable to use the full potential of the outsourcing process as a source of open innovation. As for research limitations, there is the fact that all interviewees are CIOs without the opinion of anyone else involved. This limitation is an opportunity to continue this research in the future. Regarding the question raised by this research, "How can IT outsourcing be an external source of innovation?" this research revealed that IT outsourcing may bring about knowledge exchange and innovation either to the hiring or to the hired company.

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