Offshore Sourcing of Software Development Projects: 
Towards a Maturity Model Proposal for Offshore Insourcing

Rafael Prikladnicki (PhD candidate) 
Pontifícia Universidade Católica do Rio Grande do Sul – PUCRS 
Ipiranga Avenue, 6681 – 90619.900 – Porto Alegre – RS, Brazil 
rafael@inf.pucrs.br

Jorge Luis Nicolas Audy (Supervisor) 
Pontifícia Universidade Católica do Rio Grande do Sul – PUCRS 
Ipiranga Avenue, 6681 – 90619.900 – Porto Alegre – RS, Brazil 
audy@pucrs.br

Daniela Damian (Co-supervisor) 
Department of Computer Science 
University of Victoria, Canada 
danielad@cs.uvic.ca

Abstract. Information Technology (IT) offshore outsourcing is a non-reversible trend due to its cost implications, and as a result, target of much inquiry in different areas of knowledge. We propose to focus research efforts on a smaller niche within that larger set of questions: those organizations involved with offshore insourcing, where companies create their own software development centers for internal demand purposes (wholly-owned subsidiary). Although offshore insourcing bypasses some of the tough contracting difficulties found in organizations that are involved with traditional offshore outsourcing, a whole different set of issues is created. However, some of the “new” issues that surface a particular organization may have already been dealt with by more experienced organizations. We propose the creation of a maturity model that will not only identify best practices along different maturity stages but also help to benchmark against similar organizations. The preliminary research suggests that there is a consistent sequence of phases that this type of IT offshore sourcing follows.

Keywords. Offshore Sourcing, Offshore Outsourcing, Offshore Insourcing, Distributed Software Development, Maturity Model

1. Introduction

Software has become a vital component of almost every business. Success increasingly depends on using software as a tool for competitive advantage (Herbsleb et. al., 2001). More than a decade ago, many organizations began to experiment with remotely located software development facilities (Carmel, 1999) also called Distributed Software Development - DSD) seeking lower costs and access to skilled resources. Economic forces are relentlessly turning national markets into global markets and spawning new forms of competition and cooperation reaching across national boundaries.

This change is having a profound impact not only on marketing and distribution but also on the way products are conceived, designed, constructed, tested, and delivered to customers. For these reasons, DSD has attracted a large research effort in software engineering (Karolak, 1998; Carmel, 1999; Herbsleb et. al., 2001; Carmel et. al., 2002; Prikladnicki et. al., 2003; Prikladnicki et. al., 2004; Carmel et. al., 2005; Prikladnicki et. al., 2006). The search for such competitive advantage forces organizations to search for external solutions in other countries. The two main options include offshore outsourcing (contracting services with an external organization located in another country) as well as offshore insourcing (contracting with a wholly owned subsidiary also located in another country). The first has become fairly common, but difficulties abound in trying to develop a relationship with an unknown foreign partner that is time and geographically distant. Such issues have led select organizations to create their own
software development centers in countries like India, Russia, Brazil, Ireland, etc. Although some of the key difficulties do remain (cultural differences, trust maintenance, and coordination across time and space), a crucial variable is removed: the concern with partner responsiveness, accountability, behavior under pressure and other contract-related issues.

That allows us to concentrate on the true task at hand of understanding the relationship across subsidiaries without the artificial veil caused by contract related behaviors. However, this bypassing brings into relief a whole different set of issues. In particular, what is a “new” issue for an organization entering such arrangement is in fact something already been dealt – in a variety of ways – by organizations that have started earlier. The offshore insourcing concept affects not only how cultural differences and closely linked issues such as trust development and maintenance are managed across the units, but also how distributed coordination, task allocation, project management, software development activities such as architecture definition, analysis, design, modeling, and also strategic application choices and other equally important concerns are perceived and acted upon. Ultimately, one of the main purposes of this thesis is to shed light in this type of relationship by developing a maturity model for such endeavor.

In the next section we present a literature review. Section 3 presents related studies. Section 4 presents the research question, objectives and expected results. Section 5 presents a detailed description of the research methodology. Finally, section 6 presents preliminary ideas and results, and section 7 presents conclusions.

2. Theoretical Basis

2.1. Distributed Software Development

In the last decade large investments have enable the move from local to global markets in the process of creating new competition and collaboration forms (Sengupta et. al., 2006; Boehm, 2006). In the same period of time, the global software market has undergone several crises: not only a large number of project failures have plagued the industry, but also the increasing demand for new systems has been strongly affected by scarcity in appropriate competences. In such environment, DSD provides a feasible alternative. Several factors have accelerated this trend (Carmel, 2005):

- The need to have a global resource pool to successfully and cost-competitively employ resources, wherever located;
- The business market proximity advantages;
- The quick formation of virtual corporations to exploit market opportunities;
- Pressure to improve time-to-market by using time zone differences in “round-the-clock” development;
- The increasingly modular design has reduced transactions costs – that is, the cost of coordinating software development and support work between two or more parties. More modular software production eases the burden of synchronizing, communicating, traveling, monitoring, providing feedback, and enforcing contracts;
- Technologies for managing work across geographic distances have been matured.

Organizations search for competitive advantage in terms of cost, quality and flexibility in software development, looking for productivity increases as well as risk dilution (Prikladnicki et. al., 2006). Many times the search for these competitive advantages forces organizations to search for external solutions in other countries (offshore sourcing). The key existing challenges are related to strategic issues; cultural issues; technical issues; and knowledge management (Herbsleb et. al., 2001).

Offshore outsourcing provides a feasible alternative to implement DSD and concurrently take advantage of the lower cost inherent in other markets. In the next section, we will discuss further the concepts behind offshore sourcing, and immediately afterwards some of the shortcomings in traditional offshore outsourcing and how the implementation of a wholly owned subsidiary arrangement is able to get around many of them.
2.2. Offshore Sourcing

Offshore sourcing (or offshoring) of IT work is increasingly occupying the attention of IT managers in U.S.-based firms. The term “offshore sourcing” includes both offshore outsourcing to a third-party provider as well as offshore insourcing to an internal group within a global corporation (Robinson et. al. 2004; Carmel, 2005).

A common misconception, according to Carmel (2005) is that all offshoring involves outsourcing. Some authors even say that the global application of outsourcing is offshoring. But this is not true. While outsourced processes are handed off to third-party vendors, offshore processes can be handed off to third-party vendors or remain in-house. Then, the definition of offshoring also includes organizations that build dedicated captive centers of their own in remote, lower-cost locations (Figure 1).

Figure 1. A Taxonomy for Distributed Software Development

In fact, offshoring, or offshore sourcing, is similar to offshore outsourcing when companies hire overseas subcontractors, but differs when companies transfer work to the same company in another country, characterizing the wholly-owned subsidiary (WOS) approach. And the process of transfer work to the same company in another country globally distributed is also known as offshore insourcing software development. Insourcing can also be defined as the opposite of outsourcing, that is, insourcing is often defined as the delegation of operations to an internal entity. It is a business decision that is often made to maintain control of certain critical competencies. Also, it's when companies set up their own "captive" process centers overseas, taking advantage of their cheaper surroundings while maintaining control of their back-office work and business processes. In other words, you can have outsourcing without the offshore element, but you can also have offshore without the outsourcing element.

Alternatives to purely contractual relationships do exist. But the issues discussed are related to the relative perceived power between client and service provider. Although they can be partly addressed in a contract, ultimately a disagreement in a contract is likely to be ironed out so much later in court that for the purposes of solving an immediate issue it is practically irrelevant. Moreover, different service providers have been rated on their quality by many sources; however, the more highly rated ones are sometimes more expensive, to the point where the much touted cost advantage can disappear. On the other hand, the balance of power is completely different in a WOS relationship with the headquarters for internal software development. Not only the headquarters are the “de facto” boss, but there is also a clear interest on both sides to create and keep a long-term relationship. One of the consequences is that there is no concern or doubt on responsiveness, compliance, cooperation or even commitment on the level existent on traditional offshore outsourcing. But other concerns are still present: not only the time and space separation are still there, but there is also an explicit “personalization” of the relationships.
3. Related Studies

Some studies have been developed about offshore sourcing, and distributed software development. Specifically, three studies have proposed maturity models for the outsourcing environment (Carmel et. al., 2002; Morstead et. al., 2003; Hyder et. al., 2004). Two of them talk very briefly about the offshore insourcing context (Carmel et. al., 2002; Hyder et. al., 2004). These studies are presented in this section.

3.1. Carmel et. al., 2002

Offshore organizations have improved their software development and project management capabilities. In the study conducted by Carmel et. al. (2002), offshore IT sourcing was identified as a maturation process. The 4 dimensions of the SITO (Sourcing of IT Work Offshore) staged model are: offshore bystander, offshore experimenter, proactive cost focus, and proactive strategic focus. Each stage is characterized by a set of strategic imperatives and internal firm dynamics. The offshore insourcing is referenced in stage four. The authors suggest that technology companies in stage four have different organizational structures and mechanisms. They have accumulated considerably more experience in offshore IT sourcing, but they usually preferred to own their IT units, sourcing from within their firms. The main characteristics of those organizations are:

- Sophisticated marketing efforts: since they are not part of the domestically located core IT function, they need an active and aggressive marketing strategy;
- Distinct organizational functions: some of these firms used their offshore IT units for software product R&D, internal information system work, and providing IT professional services to other firms. Some firms can support all types of software work, while others can support one or two;
- The value of vertical integration: these firms prefer the “build versus buy” argument, and they also prefer having vertical integration and an internal locus of control. Moreover, the ramp-up time is shorter because internal contracting is simpler, insourcing have advantages in the areas of security, confidentiality, and maintaining proprietary knowledge. Finally, internal IT professionals use standard software engineering tools, methodologies, and work process, which reduce the project management problem.
- On the other hand, problems do exist and benchmarking with other organizations in similar situations can improve the addressing of these problems, one of the objectives of our program of research.

3.2. Morstead et. al., 2003

Morstead et. al. (2003), proposed a model for offshore organizations. This model, called OMM (Offshore Maturity Model), has as main purpose to show to the organizations the level of maturity of its processes, metrics, people, technology and relationship. The difference from this model to others is the relation between the investment cost and the maturity level. The model has five maturity levels, described as following:

Level 1 – Staff Augmentation: in this level the organization start the offshore operation, having as purpose to only to increase the number of people involved in software development activities, without increasing the cost.

Level 2 – Turnkey: in this level, the organization develops offshore projects in order to start the relationship with distributed teams. There is an initial concept of risks on offshore projects. The infrastructure tends to be limited and there are no short-term benefits. The main characteristic of this level is the opportunity for the organizations in developing its managers to work in offshore environments.

Level 3 – Integrated: in this level, the offshore organization starts to develop not only coding activities, but also design and project activities. The offshore organizations are in synchronicity with the headquarters. Also, there is some process and team integration activities.

Level 4 – Managed: in this level, many activities are moved to the offshore organizations, and the data collected (metrics) is considered by both sides for improvement.
purposes. Also, the integration is consolidated to a metric oriented model, and the focus is in the quality and speed of the product developed, and the quality of the processes.

Level 5 – Optimized: in this level, the offshore organization is an important part of the whole business. Also, the headquarters start to see more financial returns, the human resources start to become more specialized, and the process is improved frequently.

Despite this model is a maturity model for offshore development, the author doesn’t make clear the difference between offshore outsourcing and insourcing for the activities proposed. Also, the author says that the model is limited, because it doesn’t have details for the day-by-day activities. But when used with models like CMMI (focused in a specific domain), the model is interesting to identify risks in offshore environments. And the model offers a support for an organization in order to establish an offshore operation.

3.3. eSCM-SP

According to Hyder et. al.(2004), the eSourcing Capability Model for Service Providers (eSCM-SP) is a “best practices” capability model with three purposes: (1) to give service providers guidance that will help them to improve their capability across the sourcing life-cycle, (2) to provide clients with an objective means of evaluating the capability of service providers, and (3) to offer service providers a standard to use when differentiating themselves from competitors. The model was developed by a consortium led by CMU. According to the authors, the existing frameworks do not address all of the critical issues in eSourcing (IT-enabled Sourcing). The version 1.0 was released in 2001. Currently, the version 2.0 is composed by 84 practices that address the critical capabilities needed by IT-enabled service providers. The practices are distributed along three dimensions: Sourcing Life-cycle, Capability Area, and Capability Level.

The Sourcing Life-cycle is divided into Ongoing, Initiation, Delivery, and Completion. The Capability Areas provide logical grouping of practices, and are divided into Knowledge Management, People Management, Performance Management, Relationship Management, Technology Management, Threat Management, Contracting, Service Design & Deployment, Service Delivery, and Service Transfer. The Capability Levels are divided into the following:

Level 1 – Providing services: according to the authors, the capabilities on this level may vary widely. Some service providers may have almost none of the practices implemented, while other may have many of them, including some practices at capability level 3 and 4. But since they have not fully implemented all of the level 2 practices, they will still be at risk of failure in some areas not implemented.

Level 2 – Consistently meeting requirements: service providers have formalized procedures for capturing requirements and delivering the services according to commitments made to stakeholders. Also, the infrastructure is in place to support the performance of work.

Level 2 – Managing organizational performance: service providers are able to deliver services according to stated requirements, even if the required services differ significantly from the provider’s experience. At this level, the provider is able to manage its performance across the organization, understand the targeted market services; identify and manage risk across engagements. Also, there is a formal way to objectively measure and reward personnel performance, as well as monitoring and controlling technology infrastructure. There are measurable improvements with respect to organizational objectives.

Level 3 – Proactively enhancing value: at this level, service providers are able to continuously innovate to add statistically and practically significant value to the services they provide to their stakeholders. The approach can be customized, it is possible to understand client perceptions, and predict its performance based on previous experiences. This level also provides the possibility to generate plans and control the improvements based on the providers’ benchmarks.

Level 4 – Sustaining excellence: at this level, service providers demonstrated measurable, sustained, and consistent performance excellence and improvement by
implementing all of the Level 2, 3, and 4 practices for two or more consecutive evaluations covering a period of at least two years. There are no additional practices.

It is important to notice that the authors of the eSCM-SP have consider the insourcing environment, but they define as a group within the organization, which is largely managed as an external entity, competing with external suppliers or service providers for work. And this definition is different from the one defined by Carmel (2005) and used in our research.

4. Research Question, Objectives, and Expected Results

In a study conducted at IBM by Sengupta et al. (2006), the authors have identified four areas where important research questions need to be addressed to make distributed development more effective. One of the areas is related to process and metrics. The authors identified that one of the possible research topics is the identification of some key process areas to improve the current capability maturity models for software development. Another study conducted by Ramasubbu et al. (2005) identified 24 new key process areas for managing global projects. Considering the models presented in the previous section and the two studies referenced, we found that none of the maturity models for offshore sourcing explore the insourcing environment in detail, with its specific characteristics. Also, the researches conducted by Sengupta et al. (2006), and Ramasubbu et al. (2005) are very important to identify the need for improvement in maturity models to explore the DSD environment.

For this reason, and according to the context described in the previous sections, our study was proposed in order to answer the following question: “How can we develop a maturity model or extend an existing maturity model for offshore insourcing software development, focusing in both technical and non-technical issues”? The main objective of this research then is to propose or extend a maturity model for distributed software development projects for those organizations involved in offshore insourcing environments.

To answer the question and to achieve the general objective, we intend to understand the dynamics of management the offshore insourcing, under the software development point of view. Also, the following specific goals were defined: (a) learning from and improving the theory on offshore sourcing and DSD environments; (b) to identify the main characteristics of the offshore insourcing environment; (c) to discover if there are typical milestones or repeatable decisions in offshore insourcing environments; (d) to identify how the offshore insourcing software development evolve over time. At the end of the research, we expected the following results:

- The maturity model for DSD projects in offshore insourcing environments;
- A description of the different maturity phases, with a hard specification of what characterizes each phase in terms of the key variables of interest;
- A “future view” of which issues to expect as one moves forward, and solutions that have worked for other organizations;
- The ability to benchmark the organizations against others;
- Development of action items that allow one organization to move faster to the more appropriate stage based on your needs and reality;
- Develop papers to share the model in the industry and academic communities.

5. Research Method

Historically, many of the stage models proposed (i.e. Nolan’s (1979)) have been criticized because of the inherent difficulty in testing the different stages. Therefore, most of the models, including the Capability Maturity Model (CMM) is based on a description of behaviors that when observed show that a particular organization seems to be in a particular phase or stage.

This research is exploratory, where the main research methods are case study (Yin, 2001) and surveys (Oates, 2006). The data collection will involve questionnaires, documental analysis, and interviews, according to Oates (2006). Considering the data analysis, the qualitative part will be based on content analysis as proposed by Krippendorf (2003). The quantitative part will be based on statistical methods, as suggested by Oates (2006), focused on clusters analysis. This study also involves collaboration with researchers from the U.S. and
Canada. For this reason, we have identified some challenges on data collection and data analysis, since it is part of a multi-university, multi-country research program (Evaristo et. al., 2005). One of the underlying issues that permeate this research program is the existence of different cultures across the multiple sites. For this reason, we have developed a less biased approach to qualitative data methodology where research team members do not share the same culture. We recognize the need to develop a new approach to category development, taking into account the physical distribution, language differences and cultural diversity of the research team. First, considering the English based data, the Brazilian researchers will develop categories based on the transcripts of the interviews conducted. Separately, yet concurrently, the U.S. and Canada researchers will create categories using the same subset of interview transcripts. The category agreement will be worked out via email and voice mail calls. We believe that agreement on the development of categories will improve the likelihood that cultural biases on category development going forward will play a less significant role in our study. Considering the categories on the Portuguese based data, the Brazilian researchers will use the original transcripts in Portuguese, where other researchers will work with transcripts translated into English. Again, there is a need to reach an adequate level of reliability on these categories. One obvious limitation is the amount of resources involved. Transcription and coding is time consuming. In this case, however, we are adding a few additional layers to an already labor intense effort. First, the translation of the transcriptions originally conducted in Portuguese (about half of the data) is likely to be expensive; second, recognition of the fact that translation of the meaning of words can suffer, which would compromise the quality of the interpreted transcripts. But we believe that the approach proposed will address some of these problems.

5.1. Research Plan and Stages

Figure 2 presents the main stages in the study, with a proposed schedule. Each stage was divided in three steps, and are explained in the following sections.

**Stage 1: Exploratory:** The first phase of this research is an exploratory study where we will understand more about industrial practices on DSD and offshore sourcing as a whole. We want to increase knowledge where typically practice has preceded theory, and the goal is to identify critical attributes for organizations that are involved with distributed projects activities,
focusing the offshore insourcing environment. It involves three main steps. In step one theoretical review will be conducted, considering concepts and the state of the art of DSD, offshore insourcing, software development process, software quality, and maturity models for offshore sourcing software development. Also, the exploratory study will be conducted in four organizations, using case study as the research method, as proposed by Yin (2001), and software projects as the unit of analysis. The output of this step will be the theoretical review, and a set of attributes identified in the organizations, focusing the offshore sourcing types and its differences, challenges, strategies, technical issues (software development process, software quality, software project management, etc.), non-technical issues (structure and management style, trust, culture, etc.) and possible maturity points for offshore insourcing. These sets of case studies will be conducted (according to Yin (2001), and Krippendorff (2003) using several data collection methods, allowing for triangulation of data and therefore increasing the result reliability and quality. In particular, we will use semi-structured interviews and document analysis. Basically, questions relating to the variables proposed in Evaristo et. al. (2005) will be prepared with two objectives: first, to arrive at a qualitative understanding of the phenomenon, its causes and effects; second, to use that understanding to inform future choices of case studies and to develop an efficient and parsimonious subset of relevant variables and their measurement for the subsequent stage of the study. In the second step, we will evaluate existing offshore sourcing maturity models and its suitability in two organizations studied in step one. We will apply two of the maturity models (those that explore the offshore insourcing environment), using an instrument for evaluation, searching for possible gaps. Our assumption is that the models are not fully applicable to the insourcing environment, based on the maturity points identified in step one. As the output of this step, we expect the identification of a set of characteristics that offshore insourcing organizations have and the existing maturity models are not considering. The results will be consolidated in the step three, where, based on the results found, a decision will be taken, considering the extension of an existing maturity model or the development of a new one. The extension include (1) the improvement of the capability maturity model integration for software development (CMMI) to incorporate some key process area for distributed development (focusing in offshore insourcing); or (2) the improvement of one of the maturity models for IT sourcing presented.

Phase 2: Confirmatory: In order to validate the results found in the exploratory stage, a confirmatory stage will take place (steps four to six). The fourth step has two main goals: to validate the maturity points identified, and to group them into maturity levels. To achieve the goals, a survey will be applied in order to validate the maturity points (attributes), mapping its characteristics on a global level. This step will allow for verification of the attributes developed during the first stage. The survey will be based on a set of variables resulting for the first stage and will be made available to participating organizations through the web. As a result, the step five is then the model proposal (new model or an improvement in an existing model). This model will be based not only on the theoretical and empirical data, but also on the extensive combined experience of the researchers in this area. Finally, in the sixth step of the confirmatory stage, we are planning the model testing. To do that, we are planning the execution of case studies as we applied in the second step in the first stage. At that time, two existing models were applied and gaps were identified. In this step, we will apply the proposed model and see if the gaps are still there.

For all the case studies, we have contacted companies in Brazil, in the U.S., Canada, and India. The condition for participation is to commit to not only a certain number of hours for the initial interviews by key informants, but also individuals’ time along the quantitative data collection to enable survey responses. Subsequent stages (not represented in Figure 2) – longitudinal or on-going – will include the organizations’ participation for continued data collection efforts using the same instrument periodically to monitor changes in the environment.
5.2. Validity Threats

Maturity models testing and validation is a challenging undertaking. For this reason, we plan to validate the proposed model using a rigorous research design, including triangulation of methods, space, strategies, and investigators. According to Oates (2006), triangulation increase the research reliability.

Considering the case studies, some people criticize them for producing knowledge that only relates to the case under study. However, we understand that the case studies will generate broader conclusions that are relevant beyond the case itself. To do that, we will conduct the research in such a way that will be possible to show that the results found in certain case studies are also found in other cases (step one and step two of stage one), as suggested by Oates (2006).

Considering the survey, the questionnaires will be planned using a formal protocol, pre-test, and pilot, and a content validity, in order to make sure that it will generate data about the concepts we are interested in (Oates, 2006).

Considering the content analysis, the data reliability will be reached by data stability (the extent to which a measuring or coding procedure yields the same results on repeated trials), and data reproducibility (the degree to which a process can be replicated by different analysts working under varying conditions, at different locations, or using different measuring instruments), both as suggested by Krippendorff (2003). As the author suggests, reliability does not guarantee validity, but unreliability limits the chance of validity. About the validity of the content analysis, all case studies are executed having a formal protocol, face validity of the semi-structured interview guides, and pre-tests of the interviews.

The model validation will be based on the research design itself, since the results found in the stage one will be validated by the survey in a global level. Then, the results and possible updates will be put together in a model to be tested in the last step of the confirmatory stage, replicating the case studies executed in the step two of the exploratory stage. With this approach, we want to confirm that the gaps identified in the exploratory stage were covered by the proposal.

6. Preliminary ideas and results achieved

The research is in the initial stage (18 months). But in the last three years, we developed some studies specifically in this area. The results were published in some outlets and conference proceedings, where the most important are (access the full list at www.inf.pucrs.br/munddos):


b) R. Prikladnicki, J. L. N. Audy, “Uma Análise Comparativa de Práticas de Desenvolvimento Distribuído de Software no Brasil e no exterior,” accepted for publication in the 20th SBES (Brazilian Symposium on Software Engineering), Florianópolis, Brazil, 2006, (in Portuguese).


7. Conclusion
Distributed Software Development dramatically impacts the way products are conceptualized, developed, tested and delivered. Therefore, the structure needed to support such environment is also completely different, both in processes as well as in technology. Details not before obvious grow in importance; this research will uncover some of these issues as well.

According to Morstead et. al. (2003), offshore IT services have the potential to save organizations 35% – 65% on their in-house costs. It is estimated that in India alone, the size of the market will grow from $10.3 billion in 2001 to $77 billion in 2008. But in a world where domestic initiatives often suffer from poor planning and cost overruns, the stories of offshore failures can be alarming. Moving an onshore process offshore is not a simple step; it’s not even a simple project. Is hard work, but it is a real and achievable goal. But the strategy carries unique obstacles. Communications, policies, methods, culture, and process details are just one facet of the unique characteristics of offshore environments. New problems emerge and many scenarios are possible, including the offshore insourcing (or wholly owned subsidiaries for internal demand).

The offshore insourcing offers the advantages of full control, since it is completely subordinate to the parent corporation. This can be attractive to either organizations that make a strategy decision of moving part of their development offshore at the policy level or those that may hope for cost reduction and higher control in the future, than it would be otherwise possible in traditional offshore outsourcing.

This project is not only a landmark study in the area of offshore insourcing with WOS, something until recently not been researched, but also has strong implications to the more traditional offshore outsourcing. The key reason is that most of the work being done in offshore outsourcing is seen under the perspective of contracting. Although very relevant, eventually such studies will need to go further past that issue – which is exactly what we are proposing.

8. References


---

This PhD research is being developed in the scope of the MuNDDoS Research Group on Distributed Software Development at PUCRS, Brazil ([www.inf.pucrs.br/munddos](http://www.inf.pucrs.br/munddos)), and it is partially supported by the PDTI program, financed by Dell Computers of Brazil Ltd., Law 8.248/91.