

Risk Management in Global Software Development: A Position Paper

Rafael Prikładnicki, Marcelo Hideki Yamaguti

School of Computer Science, Pontifícia Universidade Católica do Rio Grande do Sul, Brazil

rafael@inf.pucrs.br, yamaguti@inf.pucrs.br

Abstract

The number of organizations distributing their software development processes worldwide keeps increasing, and this change is having a profound impact on the way products are conceived, designed, constructed, tested, and delivered to customers. Global software development exhibits certain features that make it fundamentally different from traditional co-located software development. As the global software development involves additional steps and decisions, these steps also impact the risk management process. The goal of this paper is to discuss some of these impacts and to suggest the development of a process taking into account the dispersion, time zone difference, and cultural boundaries, not only in the operational level, but also in the organizations tactical and strategic level. The paper discussion intends to motivate risk identification, analysis and risk mitigation as earlier as possible in global software projects, foster an efficient risk management process.

1. Introduction

In the last decade, a great investment is being made to convert national markets in global ones. This reality creates new ways for competition and collaboration [1]. However, it also faces some problems like a great number of project faults, and the scarcity of good resources. In this environment, software development organizations found in Distributed Software Development (DSD) an alternative for these problems. DSD is causing a great impact not only in the market, but also in the way the software products are conceived, designed, constructed, tested, and delivered to customers [2]. Sometimes, the search for competitive advantage forces organizations to search for external solutions in other countries, what we call Global Software Development (GSD). In this context, risk management becomes a more sensible activity with a great importance.

Risk, in software area, was represented in a systematic way by Boehm, in the 80's, through the spiral model. This

model has as principle to be iterative and risk analysis driven in each iteration [3]. The word "risk" comes from old Italian word "risicare", derived from Latin " *risicu, riscu*" which means "to dare" [4]. In this vision, to run with success to the risk needs more than good processes and intuitive think ability, it needs discipline. This discipline is called risk management.

Nowadays, risk management in software engineering is an evolution of the risk concept that evolved from the analysis in the process model to the management, which should pervade all the processes in the software lifecycle. The risks cannot be just simple details in the project, but they should be the core of the business [5]. Also, risk management have a proactively focus on preventing problems, is continuous, and concurrent.

As the global software development involves additional steps and decisions, we discuss in this paper some approaches to manage risk in global projects, trying to understand the role of all decisions taken in the strategic and tactical levels, and what it represent for the operational level. We call the operational level as the project risk management process, and the strategic and tactical levels all work concerning the decision to develop a project offshore (the long-term offshore road map is part of the strategic level, while the "which center" decision is part of the tactical level).

This paper has the following structure: section 2 presents the impact of GSD on the Risk Management Process; section 3 presents the conclusions, and section 4 presents the reference.

2. Impact of GSD on Risk Management Process

Risk management in GSD is an important and more sensible activity. In a research made by Prikładnicki [2] it was detected that the effective risk management was an alternative to solve existent problems in distributed projects. This is a result from the fact that is hard to deploy, execute and control project in GSD environments because non-technical factors such as social, cultural, behavioral, and political [6], [7]. Other studies [7], [8]

also present the same difficulties but due to technical factors such as software development process, project management, project size and complexity.

Therefore, the risk management becomes important in projects that are developed with distributed teams (from the same or different organizations). Besides, independently whether the project is developed globally or in the same city, the fact of having distant teams and using collaboration technologies and developing specific solutions to distributed projects also adds more risk factors to the projects.

In a study conducted by Karolak [9], risk management is part of any project, and risks in GSD projects tend to be more centered in not visible aspects. Also, according to the author, there are three categories of risks in GSD projects: organizational, technical and of communication. Besides, risks belong to more than one category, and these should be in the top of the priorities list.

According to Prikladnicki [2], the risk management in GSD projects should be done not only in the project level, but also in the organizational level. First of all, to decide if a particular project can be developed by globally dispersed teams is difficult (strategic level). Moreover, the decision of where the project will be better developed can also be a problem (tactical level). Some analysis considering the risk and benefit of projects dispersion can be necessary. A number of models are possible and appropriate under different circumstances.

Additionally, it is suggested that all the identified risks in this level should be reflected in the project development level. It means, since the risk analysis was made and the decision of distributing a project was taken, the identified risks must be passed to the project manager. In this way, the project manager can plan response actions to these risks and to add the risks of the whole project, following the risk management process defined for software development.

If we take as an example a multinational organization that has software development units worldwide (offshore software development), some strategies can be implemented. In order to have a better control of the global project allocation and planning, the organization can create a set of activities to be implemented in all projects being developed in the organization unit centers.

These activities involve since the offshore demand definition (strategic level) until the resource allocation (tactical level), what we can call as an Offshore Distribution Model. Once the project is planned and is able to be sent to the offshore centers, the project execution is started, following the organization software development process.

The Offshore Distribution Model can concentrate all strategic and tactical decisions. In this process, a risk and benefit analysis can take place in order to decide if the project can be allocated to an offshore center. Once the

decision is made, a risk assessment can be performed having as purpose to verify which center (among all organization offshore centers), can better develop each project. Once the center is defined, all resources are allocated and the project execution can take place, which is part of the operational level, following the organization – or the unit – software development process.

The project execution involves all work concerning the project development by the project team. And this process includes risk management activities. The risk management process in the operational level need to consider all risks identified in the higher levels.

For example, the risk identification activity will search for common risks and past risks in the risk repository, and may involve all project team, including the ones globally dispersed, clients and/or users. Risk identification can consider as one input a document containing information about the risk analysis and risk assessment performed in the strategic and tactical levels (Offshore Distribution Model).

3. Conclusions

Software projects are dynamics and unique, which lead to the existence of many risks that it supposed to be managed. In order to have success in all projects, organizations need to manage risks effectively. But one of the main reasons that risk management is inefficient or it is not implement in many organizations is the lack of documentation of both success and failures in projects. Only the knowledge about risk management is not sufficient.

This paper discussed the role of risk management in global software development projects, considering the strategic, tactical, and operational level of an organization that has implemented GSD. From the point of view of the strategic and tactical levels, organizations can create what we call an Offshore Distribution Model, where a risk analysis and a risk assessment can be performed in order to help in the offshore decision. This can lead to the selection of the best center for a specific project.

Additionally, from the operational level point of view, the risk management in the software development process involves the risk management concerning the project itself. But a key point in the whole process is the integration of the risk analysis and assessment done in the strategic and tactical levels (generally performed by senior managers and offshore centers directors) with the risk management process done in the operational level (performed by project managers). Despite the process to select appropriate centers to develop each project, and a process to manage risks when a project is running, the processes must be integrated to achieve an efficient risk management process for GSD projects.

In short, there are a set of inherent problems and challenges to software development. The GSD, by adding factors like geographic dispersion, temporal dispersion and cultural differences, has accentuated some challenges and added new ones to the development process. Among these challenges we can add as important ones: strategic issues, cultural issues, knowledge management and risks management.

The practice of learning from past experiences, for example, can help senior managers and project managers to plan and control risks [10]. We see a good opportunity to exploit knowledge management benefits, since we are talking about risk management in GSD, which involves some additional steps in the traditional models. And sometimes, risk management in this kind of projects can take longer than in traditional projects, because of the geographic dispersion and time zone difference.

As a result, the work in GSD environments is more problematic than in centralized ones, and the effective risk management can never be depreciated. The risk management importance must be emphasized and its participation must be more decisive in the GSD projects.

Planned follow up studies in this topic will try to analyze some software development units from multinational organizations in order to evaluate the effectiveness of its risk management process, considering all decision levels, and the strategies adopted for global projects.

3. References

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