A Multi-Criteria Model for Planning and Fine-Tuning Global Agile Software Development Projects

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ABSTRACT

Inter-organizational Global Software Development (GSD) has become a common reality for many projects. It is well established that distance makes difficult to interact and to cooperate effectively. Scrum, a consolidated Agile methodology, emphasizes communication, reduces coordination and control overhead and has been increasingly used in a distributed fashion. Successfully planning and managing the combined use of GSD and Scrum is a complex task and requires carefully planning. Despite the importance and complexity of this type of problem, there seems to be a lack of reports, in the literature, of models that could support managers dealing with these decision contexts. This paper presents a multi-criteria decision model for planning and fine-tuning such project plans. This model was developed using cognitive mapping and MACBETH (Bana e Costa, Sanchez-Lopez, Vansnick, & De Corte, 2011). The application of the model is demonstrated, followed by conclusion and future work.

Keywords: Cognitive Mapping, Global Software Development, MACBETH, Multi-Criteria Decision Analysis, Project Management

1. INTRODUCTION

Due to numerous business reasons Global Software Development (GSD) projects have become a common reality. Organizations look for ways to reach a larger pool of skilled professionals, to optimize costs and to reduce time of delivery. Software development projects involve numerous activities that require a well coordinated effort from multiple organizational actors or units in order to be successful.

In addition to the usual challenges faced by any project, the distance between team members directly affects the process of communications and coordination, and control activities in GSD (Jimenez, Piattini, & Vizcano, 2009). In order to ensure success of the project, all members of the team have to work and cooperate effi-
ciently. According to Gray (2008), actors who envision gaining collaborative advantage from aligning with others in an inter-organizational partnership face the often-daunting prospect of trying to integrate their diverse perspectives and frequently competing goals.

Agile Development is another software engineering paradigm that has been consolidated in the past decade, bringing methodologies like Scrum, XP, FDD, Lean. Scrum is an iterative framework for managing software projects according to agile principles. It enables teams to deliver the right features on time, on budget, and with great quality (Sutherland, Viktorov, Blount, & Puntikov, 2007). Scrum helps a software development organization adapt to changing business requirements and stakeholders needs, while protecting the team from unproductive disruptions to their workflow (Sutherland, Viktorov, Blount, & Puntikov, 2007). Scrum has been used to develop complex products since the early 1990s and has been increasingly used for GSD as well. Scrum emphasizes communication, reduces coordination and control overhead; therefore it helps the management of distributed projects. The primary tools that agile processes use, to effectively solve complex problems, rely on frequent communication and quick feedback, special challenges are presented to the agile processes by GSD projects (Jimenez, Piattini, & Vizcano, 2009; Woodward, Surdek, & Ganis, 2010). Successfully managing the combined use of GSD and Scrum is not an easy task and requires carefully planning. Despite the importance of this problem, there seems to be a lack of reports, in the literature, of models that could support project managers dealing with such decision contexts.

Multi-criteria Decision Analysis (MCDA) is a discipline that aims to support decision makers facing complex problems, that requires making numerous and sometimes conflicting evaluations. A well structured MCDA model highlights these conflicts and derives a way to come to a compromise in solid and clear process. The multi-criteria approach can be accomplished by structuring the model through exploring actors interests, evaluating alternatives under different perspectives, robustness analysis against uncertainties and analyzing inter and intra personal conflicts (Takeuchi & Nonaka, 2004). While MCDA has been employed for task allocation in GSD and portfolio management we believe it may also be useful for supporting planning global inter-organizational software engineering projects.

This paper presents a multi-criteria decision model for planning and fine-tuning inter-organizational global Scrum software development projects. The remainder of the paper is organized as follows. Section 2 describes the decision setting that inspired the development of the model and discusses the challenges faced when planning inter-organizational distributed Scrum projects. The development of the model is explained in Section 3. Section 4 shows the results obtained of an example of use. Finally, Section 5 provides concluding remarks.

2. DECISION SETTING

This section presents the context that motivated the structuring of the model. A real world intervention scenario is briefly described. Challenges faced by project managers planning Inter-organizational GSD projects with Scrum are listed.

2.1. Real World Scenario

The client company is a leading banking technology specialist in Brazil working for the international and domestic markets. It has deep and broad experience in investment banking and all major asset classes, from front to back for key international and domestic platforms. The company was born as global operation and has been growing organically with development offices in London UK, São Paulo Brazil, Fortaleza Brazil and Bangalore India. Its customers are global organizations from UK, US, Netherlands, Switzerland, Brazil and Chile to mention a few. The company is the unique partner in Latin America for two major investment banking technology providers and one of the two partners for another major
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