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Risks in distributed agile development: A review

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Abstract

There has been is a growing trend in software development through distributed agile approach and so, the study of risks in such environments becomes imperative. A number of studies have discussed about the problems faced by distributed agile teams. This study attempts to consolidate the existing studies on risks in distributed agile development. It helps in uncovering the areas of risk management in distributed agile, in which extensive work has been done and also presents the type of work that needs further consideration.

Keywords: Distributed Software Development (DSD); Distributed Scrum; Distributed Extreme Programming; Global Software Development (GSD); Risks

1. Introduction

Software organizations are working under tight time constraints and development of software occurs in highly volatile environment. The unpredictability in the system requirements and changing business needs have transformed the development approach from traditional heavyweight processes to lightweight incremental and iterative methods. Hence, many organizations are adopting agile methodology for software development, which helps them to accelerate delivery schedules, adapt to the changing business needs, align business and technology goals and generate competitive advantage (Holler, 2010). Along with this, there has been a steady, irreversible trend toward the globalization of business, and of software-intensive high-technology businesses in particular. Distributed

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development involves participation of distributed teams, consisting of stakeholders from different national and organizational cultures, different geographic locations and potentially different time zones (Abrahamsson, Warsta, Siponen and Rokainen, 2003). DSD is gaining recognition because it helps in saving cost and reduces time to market. In order to reap the benefits of both the approaches, software organizations are blending the distributed development and agile approach. A survey conducted by VersionOne, states that organizations are constantly scaling agile beyond single team and single project (VersionOne, 2013). There is a growing interest in applying agile practices in distributed development to leverage the combined approaches of both the approaches (Balasubramanium, Cao, Kannan & Peng, 2006).

Distributed agile development (DAD), helps the organization to build low cost solutions to cater to the changing needs of the businesses. Although, distributed agile development is able to deliver products close to customer requirements and faster than the traditional method (Kähkönen & Abrahamsson, 2003), there are many risks and challenges involved. Distributed development has its inherent challenges due to the spatial, temporal and socio cultural differences between the distributed teams.

Combining agile approach with DSD increases the severity of risks occurring due to the fact that these two methods of software development are in contrast with each other. DSD requires formal communication amongst the teams which are distributed across the globe. Agile, on the other hand is based on informal communication with co-located teams working in close collaboration. Agile methods lay emphasis on delivering working software while downplaying the importance of formal processes and comprehensive documentation which helps the teams to adapt and react to the changes imposed by the volatile environments. Other best practices of including collaboration, face to face communication, self-organizing teams, retrospectives, showcases, etc become more challenging in the distributed model (Thoughtworks, 2008). These challenges may impact the project communication, coordination and collaboration processes, hence posing significant risks which needs to be considered for successful completion of the project. Hence, using DSD in an agile environment makes the software development process risky and difficult to manage. This study makes an effort to consolidate the research work done by the existing research studies which deals with risk management in distributed agile development.

2. Research Method

The objective of the study was to identify the research work done in the area of risk management Distributed Agile Development (DAD) and classify them based on the identified criteria. The classification will enable the researchers and the practitioners to view existing studies based on categories created and hence identify the areas in which relevant work can be done. The existing literature was reviewed from two perspectives, one based on the type of studies available and the other based on the activities in software development process in which the risks occur. For classification based on the type of studies, we considered five different types of studies which describe the risks in DAD projects and present the relevant solutions too. There are 'Theoretical or Conceptual Studies' which are based on the understanding of the theme from experience or reference of other work. Besides conceptual studies, we have used research studies which have consolidated 'Published Literature on risks in DAD'. Then we have studies which have 'Consolidated existing Case Studies' which are already published. Next, we have 'Empirical Studies' which represent findings based on direct evidence or experiment and 'Industry Reports', which discuss about the experience in practice.

While there are studies which deal with overall risks and challenges in DAD projects, there are other studies which provide us with a limited, but a deep view of risks in a particular software development activity in DAD. For classification based on software development activities involved, we have considered two broad areas, namely, 'Software Development Life Cycle (SDLC)' and 'Project Management'.

The studies obtained were primarily from the following search sources:
Online Libraries: IEEE Digital Library (http://www.computer.org), ACM Digital Library (portal.acm.org/dl.cfm), Science@Direct (http://www.sciencedirect.com), Springer (http://www.springer.com/)
Publishers of Books: McGraw Hill, Pearson Publication, Addison Wesley.
Web sites: The researchers referred to web sites maintained by agile practitioners who have done pioneering work in this area.

Apparently, the reputation of these sources assures the quality of the literature review done in the areas.

The keywords used for identifying the studies which provide an overall view of the risks in DAD projects were: 'Risk management in Distributed Agile', 'Risks in Distributed Agile', 'Challenges in Distributed Agile project',