Managing Software Risks in Maintenance Projects, from a Vendor Perspective:
A Case Study in Global Software Development

Srikrishnan Sundararajan, Department of Systems and Operations, SCMS Cochin School of Business, Kochi, India

M. Bhasi, School of Management Studies, Cochin University of Science & Technology, Kochi, India

K.V. Pramod, Department of Computer Applications, Cochin University of Science & Technology, Kochi, India

ABSTRACT

Global software development exposes projects to the challenges arising from geo-cultural spread of the team and delegation of project ownership. Therefore, risk management in global software development receives attention from many researchers today. The primary focus in this paper is an investigation of risks associated with the maintenance of information systems by teams distributed across geographical locations, cultures, and vendors. Here the authors present the case study of a large offshore outsourced program that maintained a portfolio of business applications for a fortune 500 US client. The program exhibited a wide variety of characteristics typical of maintenance projects. The study investigated the risks, risk resolution techniques, lessons learned and best practices adopted in the program, from a vendor perspective. The findings provide useful insights into understanding and responding to the challenges in initiating, transitioning and managing global software maintenance projects.

KEYWORDS

Global Software Development, Offshoring, Outsourcing, Software Engineering, Software Maintenance, Software Project Management, Software Risk

INTRODUCTION

Risk can be defined as an uncertain event or condition that has a negative effect on project outcome (Boehm & DeMarco, 1997; PMI, 2008). As a result of globalization, in-house software projects have given way to global software development (GSD), where multiple teams spread across geographical locations and cultures work together as a team. Risks associated with GSD, is a key area of research that receives attention from various perspectives today, e.g., knowledge sharing in offshore outsourced projects (Solli-Sæther & Karlsen, 2014), software development methods (Sundararajan, Bhasi, & Vijayaraghavan, 2014), project management (Colomo-Palacios, Casado-Lumbreras, Soto-Acosta, García-Peñalvo, & Tovar, 2014), business models (Jain & Khurana, 2013), delegation (Zhang, Tremaine, Milewski, Fjermestad, & O'Sullivan, 2012), software development risk management model (Thomas & Bhasi, 2012), knowledge integration (Ahuja, Sinclair, & Sarker, 2011), and global virtual team management (García Guzmán, 2010), to mention a few.

Once a software application is developed and deployed, it is continually modified (Lehman, 1979) until it is retired. Jones (Jones, 2007) identifies and defines 23 different forms of "work" that are undertaken to support software applications during the maintenance phase. Some of these works involve changes to software application, e.g., repairing defects, regulatory changes, and enhancements to business functionality. The software changes are accomplished through the following activities

- requirements study, design, construction, testing and implementation. This study focuses on risks associated with maintenance works that involve software changes.

What are the specific risks to be addressed in transitioning a software maintenance program to an offshore development centre (ODC) and its subsequent management from the local project manager's perspective? In this paper, we report a case study undertaken to investigate the above question. At first, we prepared a consolidated checklist of software development and management risks based on existing literature. Using this as the guiding instrument, we undertook the case study of a complex ODC program that exhibited varied characteristics typical of ODC maintenance projects. The ODC program provided application management services upon a multiple technology platform, to support the business of a fortune 500 US client. The objectives of the program were the following – ensure that "the client applications are at their peak performance with minimum downtime", "provide a reliable and available application eco-system with a proactive 24x7 monitoring", and undertake maintenance works as described above. The client fully funded the provision of the service and the ODC was dedicated to the client. The subsequent sections in this paper describe the research method, findings and inferences.

THE RESEARCH METHOD

Prior studies in software risks have used methods such as survey of IS professionals, Delphi study, case studies, and action research among others. Personal experience in IT industry forms the source for some studies. In this paper we report the case study of a large offshore outsourced maintenance program. The study addresses the following research questions:

1. What are the key software risks associated with offshore-outsourced software maintenance projects, from vendor perspective?
2. How are these risks managed?

The scope of the study included risks associated with the technical aspects, methods, and procedures used in software maintenance projects, from a vendor perspective. Other constraints such as the contractual, organizational and operational factors that are generally outside of the direct control of the local management (Carr, Konda, Monarch, Ulrich, & Walker, 1993) were out of scope. We plan to investigate and integrate these dimensions through future studies.

Literature Survey

From a survey of literature on software development and management risks, we prepared a checklist of key software risk items applicable to ODC projects. The works included (Zhang et al., 2012; Ahuja et al., 2011; Persson, Mathiassen, Boeg, Madsen, & Steinson, 2009; Iacovou & Nakatsu, 2008; Lacity & Rottman, 2008; Oshri, Kotlarsky, School, & Willcocks, 2007; Carmel, 2005; Sam & Bhasi, 2008). The risk checklist was further revised and consolidated based on reviews by senior IS professionals. The final checklist of risk items is shown in Table 1.

The Case Study Protocol

Based on discussions with senior IS professionals, we selected an ODC program that exhibited a wide variety of typical characteristics associated with IS maintenance (see Table 2). The ODC program was managed by one of the top five IT vendors in India. A three member team of IS professionals with more than 15 years of experience conducted the study. A program-manager, two team leads and a technical architect were selected for interviews. The risk checklist acted as a guideline to maintain the focus of the discussion. Three rounds of discussions were conducted. The first round consisted of personal interviews of around two hour's duration each. We also obtained relevant project documents

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