Technology Related Risks on Virtual Software Development Projects

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ABSTRACT

Virtual software development projects have a greater reliance on technology than traditional co-located projects because of the need to leverage technology to facilitate or enhance communication among virtual team members. The goal of this research was to determine whether technology-related risks pose a greater risk to virtual projects than to traditional projects. Seven technology-related risks were identified from the literature, individual interviews with IT practitioners, and a focus group. Then 154 practitioners, primarily project managers, participated in an electronic survey that explored the impact of these factors. Results indicate two technology-related risks exhibited a significantly greater impact on virtual IT projects. Project managers need to be aware that (1) traditional project risks can have greater impact on virtual projects, and (2) of the technology-related risk factors, inexperience with the company and its processes and inadequate technical resources have been shown here to pose a greater threat to virtual projects than to traditional projects.

Keywords: Project Management, Project Risk, Risk Management, Technology-Related Risk, Virtual Project

INTRODUCTION

Not surprisingly, the use of virtual Information Technology (IT) project teams has been growing. Reasons include the increased use of outsourcing and off-shoring, as well as a shortage of skilled resources in particularly narrow specialties, and a need to access those resources wherever they reside (Aspray et al., 2006; Barkhi et al., 2006; Jones et al., 2005). However, virtual teams can have their own issues. Pare and Dube (1999) reviewed literature on virtual teams and found one of the “key challenges” that face virtual project leaders was communication (Dube & Pare, 2001). Oshri et al. (2008) in their research on globally distributed teams found the management of dispersed teams to be more challenging than the management of traditional co-located teams. One of the reasons for this may be an increase in technology-related risk on virtual team projects.

This research considers whether technology related risks are greater for virtual IT projects than for traditional co-located IT projects. The research is based in the following two factors: (1) Technology-related risks are recognized as threats to Information Technology projects in general; (2) Virtual information technology projects by their nature are compelled to supple-
ment or replace face-to-face communication, and typically they do this by leveraging the use of technology. In the Background section that follows, we discuss each of these two factors in greater depth.

**BACKGROUND**

**Technology-Related Risks**

Project risk has been researched previously; however, much of that research focuses on traditional co-located projects. In this research, technology was found to be a major category of risk. Boehm (1991), one of the first to rank risk factors, referenced technology as “straining computer-science capabilities” (Boehm, 1991). A few years later, Barki et al. (1993) conducted a large study which identified risks (uncertainty factors) which were grouped into five areas, the first being “technological newness” (Barkhi et al., 2006). Within that category, the following specific risks related to issues with technology implementation on a project were recognized: need for new software, need for new hardware, and technical complexity. Likewise, several years later a Delphi study revealed “introduction of new technology” as one of a universal set of risk factors (Keil et al., 1998). Finally, Wallace (1999) conducted a survey whose results revealed six categories of risk. “New technology” was found to be a specific risk found in the Project Complexity category (Wallace, 1999). Project risk, especially that related to technological implementation, has not been researched as thoroughly on virtual projects. Instead, much of prior literature in this area has focused on investigating virtual team characteristics, such as trust, conflict and communication (Jones et al., 2005; Kirkman & Mathieu, 2005; Lipnack & Stamps, 1997).

**Virtual Projects Leverage Technology for Communication**

Many virtual projects use some form of technology, specifically information and communication technologies (ICTs) to facilitate or enhance communication among team members as they perform various tasks such as exchange of documents via email, team meetings via videoconferences, joint creation and finalizing of requirements documents via configuration management software, and scheduling via joint online calendars. While any project may use these tools, heavier reliance on technology for communication is a characteristic of virtual projects. Table 1 lists a wide variety of ICTs used to keep virtual project teams functioning effectively (Hamblen, 2009; Kroenke, 2010; Merriam-Webster, 2010; Robb, 2002; Malhotra & Majchrzak, 2005).

**METHODOLOGY**

The research reported on in this article is a subset of a larger study that sought to identify critical risk factors for virtual software development projects. The primary research tool was a survey, chosen after a review of prior literature on research methods used to study risk on traditional software projects. There were several prior researchers who identified project risk factors, by using a survey as the research tool, including Boehm (1991), Barki (1993), and Wallace (1999).

The research process consisted of several steps. First, a review of literature was conducted to identify project risk factors from literature. Prior literature also uncovered a survey questionnaire by Wallace (1999) which was used to develop the questionnaire for this research study. The next step was face-to-face interviews, which were conducted with project management practitioners using the first version of the questionnaire. Open-ended questions in the questionnaire were used to validate the list of risks identified from the literature and to identify additional risk factors from the practitioner point of view. Rich data was collected from the practitioners as they described the major challenges they encountered in a specific project. Some of the pertinent project manager insights are shared later in this document. Interviews were followed by an electronically facilitated