A Discriminant Model for Classifying Software Project Performance

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ABSTRACT

Project managers are concerned about completing the projects on time and cost. IT projects across the globe are notorious for their time and cost overruns. This paper presents output from a comprehensive study on software development risk and project outcome with respect to the projects executed by software companies in India. Based on the data collected from over 300 projects, the authors developed a discriminant model for predicting the project outcome category based on risk scores of a project. The discriminant models developed are seen to possess adequate prediction accuracy to be used in practice. The models can help the project managers in early detection of likely project failures and hence to initiate appropriate counter strategies.

KEYWORDS

Cost Overrun, Discriminant Analysis, India, Software Project Risk, Time Overrun

INTRODUCTION

Significant cost and time overruns are reported from software development companies that specialize in commercial software development. The latest “chaos” report (2011) from Standish Group research shows that 66% of projects are either “challenged” or downright failures, leaving only 34% of projects to be considered successful. Jørgensen and Moløkken-Østvold (2006), challenge this findings and suggest that failure rates for software development projects could be up to 85%. The effects of project failure are not just monetary but may also affect its competitiveness of its sponsor in the market.

Many researchers have explored the linkages among project outcome and risk (Wallace, 2004; Nidumolu, 1996). But most IT studies have evaluated IT projects in mature IT organizations located in the United States. Linkages between the software development risks and the various dimensions of system success are to be developed and reported from all parts of the world (Na et.al, 2006). Whenever research was conducted in emerging economies, particularly where cross-cultural research indicates likely differences in behavior or practices, differences were observed in risk factors - Na et.al, 2006) in Korea, Mursu (2000) in Nigeria, Mann et.al., (2002) in Thailand, Shan Liu et. al., (2009) in China and Thomas et.al. (2011) in India.

This paper presents output from a comprehensive study on software development risk and project outcome with respect to the projects executed by software companies in India. Growth and development of Indian software industry has gained worldwide attention and India has established her position among the market leaders in global software development. As India is projecting itself as an ideal offshore destination from the cost and execution point of view, it is important that we develop insights on the impact of software project risk on project outcome of software development projects executed in India. The specific objectives are

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• Categorize software development projects executed in India into different categories based on project success
• Develop a discriminant model for predicting the project outcome category based on risk scores reported from a project

BACKGROUND

Project Outcome Measures

Software development projects include a range of categories including new development, modification, re-engineering and maintenance. They all result in the development and delivery of software products (Pressman, 1997). Majority of the software companies operate in a project mode.

A project is usually deemed as successful if it meets the desired requirements, is completed on time and is delivered within budget (Powell and Klein, 1996). A number of success criteria have been developed and empirically tested for IS projects. The triple criteria of project success – meeting cost, schedule and performance targets - have been widely used by researchers to analyze project success (Barki et. Al, 2001; Nidumolu, 1995; Deephouse, 2005; Wallace, 2000; Ravichandran, 1996). Meeting requirement is a subjective measure whereas time and cost overruns are objective measures. Studies are reported based on both subjective and objective measures (Nidumolu, 1996; Wallace et al., 2004b; Rai and Al-Hindi, 2000). Though subjective measures like meeting the original specifications, reliability, easy to use, portability, maintainability, documentation and flexibility are very important from the project success perspective, they present difficulties with standardization and comparison (Na et.al, 2006; Gray et al., 1999; Vallett and Condon, 1993). This study is confined to project performance in terms of time and cost performance only.

Software Development Risk

Risk is typically described as some kind of an event that may or may not occur, coupled with a negative consequence that follows if the event occurs (Dedolph, 2003). A software project risk points to an aspect of a development task, process or environment, which if ignored will adversely affect the success of the software project (Barki et al., 1993; Boehm, 1991; Charette, 1996; Lyytinen, et. al., 1998; Jiang and Klein, 2000). The reasons for variations in success can be attributed to risk factors which are technical, economic and behavioural in nature (Barki et. al., 1993; Lyytinen, 1988). Risk in software project may eventually lead to inadequate software operations, software re-work, implementation difficulty, delay or uncertainty (Boehm, 1991).

Many researchers argue that it is the residual risk, the risk that remains after all the project planning and continues through latter stages of a software project, which decide the fate of the project outcome. (Nidumolu, 1996; Na et al., 2004). The most common methods for risk identification have been the use of risk factor checklists (Boehm, 1991; Barki et. al. 1993; Schmidt et. al. 1996; Keil et al, 1998; Tiwana and Keil, 2004; Cuellar and Gallivan, 2006; Costa et. al., 2007). These checklists present a list of all potential risks to the project manager and force him to check and decide which risk factors are applicable in that particular project.

Structural models linking risk and project outcome are developed by researchers collecting data from software projects from various industries (Wallace, 1999; Jiang et. al. 2000). The linkages among risk, risk management and project outcome have been attempted using different approaches (Barki et al, 2001; Deephouse et al, 2005). Residual risk research has shown the intervening role of residual risk between coordination mechanisms and performance (Nidumolu, 1995; Na et al, 2006).
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