

Impact of organisational climate and demographics on project specific risks in context to Indian software industry

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Abstract

Software development in an organisation is often delimited with a number of risks at both macro and micro level. Numerous researchers have focused on abrogating these risks by advocating various mitigation strategies at organisational and technological levels. However, the understanding of how demographics and organisation climate factors can reduce the software risks is largely anecdotal. It is a well known fact, that organisation climate influences the individual's ability in perceiving the risks affecting the software projects. The present study conducted on 300 software practitioners, aims to identify organisational climate dimensions and risk dimensions in Indian software industry through factor analysis. It also establishes empirical relations between the two dimensions with the help of regression analysis. This research is useful for both academicians and practitioners who are struggling to ensure success of the project by developing novel approaches for mitigating risks in software projects.

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1. Introduction

The software and services industry in India has become a growth engine for the economy, contributing significantly to the increase in the GDP, urban employment and exports, to achieve the vision of authoritative and resilient India. Today, the Indian software industry contributes 5.8% towards GDP with 45% of incremental urban employment (both direct and indirect) and is expected to grow by 16% and log revenues of USD 60 billion in 2010 (Nasscom, 2009). The Indian software industry enjoys a very distinct advantage of a stable political environment, favourable government policies, a large base of English speaking graduates, healthy relationship with existing global clients, telecom infrastructure and NASSCOM (National Association of Software and Services Companies, a strong industry lobbying body) (Budhwar, 2005).

It seems that the Indian software industry is experiencing a smooth sailing. But a close look reveals a completely different picture; high level of attrition, lack of trained software engineers, miscommunication of requirements, and no or less experience in handling similar projects (Anudhe and Mathew, 2009; Gopal et al., 2002; Nidomolu and Goodman, 1993) are some of the issues that are affecting the budget (cost overruns), schedule (late deliveries) and the quality (poor reliability and user dissatisfaction) of the product and services being offered by the Indian software companies.

Numerous researches have been conducted on identifying the causes of failure or delay of the software projects and equal amount of time has been spent on recommending methods and models to combat these causes (Anudhe and Mathew, 2009; Costa et al., 2007; Gopal et al., 2002; Hoodat and Rashidi, 2009; Kwak and Stoddard, 2004; Nidomolu and Goodman, 1993; Ropponen and Lyytinen, 2000). In India, most of the studies conducted have focused on the outsourcing aspect of the Indian software industry, where various issues such as cross cultural issues, macroeconomic issues and project specific issues in outsourcing have been detailed out (Anudhe and Mathew, 2009;

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Babar et al., 2007; Delmonte and McCarthy, 2003; Krishna et al., 2004; Nicholson and Sahay, 2001; Rainer and Hall, 2004; Tafti, 2005). However, not much work has been done on various dimensions relating to software development work in India. Software development is no doubt a part of outsourcing but still is one of the major revenue generating sources of most of the Indian software companies. Arora and Athreye (2001) and Athreye (2005) have tried to identify various issues impacting the Indian software companies both at macro, micro and project specific level. However, a comprehensive list of risks affecting the Software Development Life Cycle in Indian software industry is still missing.

During the literature review, one interesting aspect that came across was the provision of a resilient organisational climate to ensure the project's success. It is a well known fact that an open, trusting and robust climate in an organisation promotes freedom of expressions, mutual trust, team cohesiveness, team member proximity, team autonomy, domain-relevant and creative-thinking skills. These to a great extent affect the individual's ability in perceiving the issues or risks affecting the software projects.

Numerous studies have pointed out the effect of organisation's climate on the motivation, job satisfaction and the overall performance of the software developers and the project's outcome (Doherty and King, 2003; Faraj and Sambamurthy, 2006; Geethalakshmi and Shanmugam, 2008; Warkentin et al., 2009 and Xu and He, 2008). But there are hardly any empirical studies that identify the key organisational climate factors that contribute towards the project's success in the Indian context. Moreover, not much work has been done to elicit out any relation between the organisational climate factors and the software risk factors. Therefore, there is a dire need for a systematic and comprehensive work that studies the moderating affect of organisation's climate on the project specific risk factors.

Therefore, the present study aims to identify the project specific risks affecting the Indian software industry, and study the impact of organisational climate factors in annihilating these project specific risks.

2. Research problem and design

2.1. Related research

2.1.1. Software project risks

Software project risk has long been claimed to be a major cause of project failure and empirical evidence exists to support it, with high levels of risk being associated with undesirable project outcomes such as low software quality, delays and budget overruns (Bannerman, 2008; Keil et al., 2004; Masri and Rivadry, 2010; Wallace et al., 2004). The extant literature has produced a number of conceptual frameworks to explain different types of software development risk, risk management strategies and measures of software project performance (Arshad et al., 2007; Baccarini et al., 2004; Bannerman, 2008; Boban et al., 2003; Costa et al., 2007; Ropponen and Lyytinen, 2000; Shahzad and Safvi, 2010; Wallace et al., 2004). Literature review has also shown that the risk factors change overtime due to the

development of technology and organisations. That is why researchers should, from time to time, conduct rigorous risk studies. As a result, there have been various lists of risk factors with some similarities and some differences (Arshad et al., 2007). Researchers like Boehm (1989), Oz and Sosik (2000), Ropponen and Lyytinen (2000), Schmidt et al. (2001), Jiang and Klein (2001), Addison and Vallabh (2002), Smith et al. (2006), Dey et al. (2007), Verner et al. (2007), Zhou et al. (2008), Bannerman (2008), Iacovou and Nakatsu (2008) and Anudhe and Mathew (2009) have time and again identified list of various risk factors affecting the success of the software projects. Some of these researchers have used case study data to discuss the key risks impacting the projects due to the non use of risk management principles (Anudhe and Mathew, 2009; Dey et al., 2007; Zhou et al., 2008). Whilst some have used various statistical measures to identify the risks and propose their mitigation strategies (Chen and Huang, 2009; Engel and Last, 2007; Neumann, 2002; Ropponen and Lyytinen, 2000). Overall, these studies provide illuminating insights into critical risks and their mitigation, but are weak in explaining the true impact of risk management principles so elaborated in practise. A few studies have even gone further to establish systematic models of risk management (Lyytinen et al., 1998; Mathiassen et al., 1995). They all conclude that risk management efforts reduce the exposure to software risk and can thereby increase software quality and improve software development. However, due to dynamic attribute of the software development and frequently changing technology it becomes necessary for researchers to reassess and enhance the studies on risk identification and management.

2.1.2. Organisational climate

In project management, the trend is to focus on the technical issues of the project, the timeline, the project plan, the resources, budget etc. When in fact, if a project is going to fail, in most cases a good deal of the problem can be traced back to leadership, lack of teamwork and other "soft" or cultural issues (Cornelius, 2006). Diverse literature is also available which points out the effect of organisation's climate factors on the success of the project. Doherty and King (2003), Faraj and Sambamurthy (2006), Warkentin et al. (2009), Xu and He (2008), Geethalakshmi and Shanmugam (2008), Woodruff (1990), McLean et al. (1996), Rasch and Henry (1992) have pointed out the effect of organisation climate on the motivation, job satisfaction and the overall performance of the software developers and the project's outcome. According to Chan et al. (2008), Aladwani (2002), and Yen et al. (2008), developing organisational citizenship behaviours, support technologies, management advocacy, clear goals, feedback and team autonomy are the key to software project success. On the other hand, Doherty and King (2003) and Warkentin et al. (2009) advocates that organisational risks stemming from organisational culture, structure and business processes impacts the technical software development issues, creating a wide range of potential trouble points. Thus, organisations play a very crucial role in ensuring the success of the project by providing the correct set of tools needed to control and alleviate the impact of the risk factors on the project.

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