Chapter 89
Evaluation of Determinants of Software Quality in Offshored Software Projects: Empirical Evidences From India

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ABSTRACT

Successful offshoring engagements of Indian software vendors is increasingly dependent upon the quality of the projects delivered rather than cost considerations. However, delivering quality software is reliant on effective management of various organizational, technological and people aspects. This research is to identify and evaluate the determinants of quality on software projects delivered by vendors through offshoring. Data related to recently completed projects were collected through a survey of 440 project managers from Indian vendors. Based on structural equation modeling, the authors analyze the influence determinants on specific product quality attributes. It is found that, out of six determinants, technical infrastructure and process maturity have significant influence on most of the attributes of quality in offshored IS projects from India. The authors provide a set of implications for practice and directions for further research.

1. INTRODUCTION

For many years, reaping benefits from substantially lower labor costs has been reported as one of the major reasons for offshoring (Khan et al., 2003; Rottman and Lacity, 2004, Conchuir et al., 2009; Deshpande et al., 2011). Both offshore vendors and customers have realized that improving software quality is crucial in order to derive maximum value out of IT investments. Researchers have also observed that

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in view of the declining cost advantages, offshore vendors need to change focus from 'cost' to "quality" related measures of the software services provided (Carmel & Agarwal, 2002; Davis et al., 2006; Khan et al., 2009, Mukherjee, 2013, Kroll et al., 2014). The interest in the quality of software is receiving a great deal of attention as more system failures are attributable to issues in software quality (SQ) that may lead to higher maintenance cost, longer cycle time, customer dissatisfaction and loss of profits (Gopal et al., 2002; Nanda and Robinson, 2011). Researchers have also observed that SQ can determine the success in today's competitive market (Ethiraj et al., 2005; Luftman & Kempaiah, 2008; Karout and Awasthi, 2017). To effectively meet the challenges, both vendors and client organizations have to improve the quality of their development processes and techniques (Khan et al., 2017).

Many researchers have observed that software quality is one of the critical issues of the decade but there is inadequacy of empirical studies investigating the management and control of quality of software development (Jimenez et al., 2009; Gorla & Lin, 2010). They pointed out that theories and principles were being drawn from other areas; but empirical research have to be carried out. Past studies had also used a single quality construct that measured the quality of the final software product (Krishnan et al., 2000). Evaluating the software product alone seems insufficient since it is known its quality is largely dependent on the process that is used to create it (Trudel et al., 2006).

Therefore, many organizations were motivated to adopt maturity models (Pressman, 2001; Raman, 2000; Ashrafi, 2003). For example, capability maturity model (CMM) are being used by many software development organizations and by outsourcing contractors worldwide (Huang & Han, 2006, Palvia et al., 2010). According to Subramanian et al. (2007), CMM levels influence the choice of information system implementation factors such as training, executive commitment and simplicity which in turn influences software quality.

It is reported that there have been only few comprehensive studies on process characteristics that impact software quality and quantitative survey-based research is lacking on the subject (Verner & Evanco, 2005; Gorla and Lin, 2010). With the above background, objective of this research is to empirically evaluate the relationship between determinants and quality attributes in offshore software development, based on a survey of project managers and leads of software vendors in India. We have adopted the relationship between the independent variables (organizational, technological, and individual factors) and the dependent variables (characteristics of software quality), as proposed by Gorla and Lin (2010) and Curcio et al. (2016). The paper is organized as follows. The review of previous research is presented followed by research hypotheses and methodology. The next section covers the data analysis and interpretation, followed by a discussion on the impact of determinants on software quality attributes. The paper is concluded with implications for practice and directions for future research.

2. THEORETICAL BACKGROUND

Many researchers have addressed various aspects of product or service quality and identified the critical factors affecting quality management (Sureshchandar et al., 2002; Rajendran et al., 2006). Vitharana and Mone (1998) outlined efforts to identify critical factors, and proposed an instrument to measure critical factors of Software Quality Management (SQM). They proposed an instrument consisting of 57 items to measure the quality management levels in software firms which are based on six critical factors. Rajendran et al. (2006) developed a survey instrument to measure the critical factors of software quality management from customers' perspectives. Vitharana and Mone (2008) identified six critical factors of