Chapter VIII

Collaborative Software Requirements Engineering Exercises in a Distributed Virtual Team Environment

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ABSTRACT

Round-the-clock work cycle, low cost of software development, and access to specialized skills have prompted many companies in the USA, Canada, and Europe to outsource some or part of their software development work to off-shore centers in countries such as India. While design, development, and testing phases that are traditionally off-shored require less interaction between clients and the off-shore consultants, phases such as requirements engineering require close co-ordination and interaction. The clients and consultants in such off-shored projects often work in a virtual team environment. In this research, our endeavor is to understand the complex issues in such a virtual project environment during the requirements definition phase of the software development cycle. In particular, we conducted an exploratory research
study, involving 24 virtual teams based in Canada and India, working collaboratively on defining business requirements for software projects, over a period of 5 weeks. The study indicates that trust between the teams and well-defined task structure positively influence the performance, satisfaction, and learning level of such distributed virtual teams.

INTRODUCTION

In the past two decades, the world has witnessed significant globalization of the process of software development. Development of software has increasingly moved away from the traditional co-located model, often called on-site development, to the off-shoring model. Cost of programmers and analysts are significantly lower in India than in the U.S., Canada, or Europe. Consequently, it makes economic sense to do a significant portion of software projects in countries such as India. Bates, Davis, and Haynes (2003) argue that using staff in low-wage countries such as India and China can cut cost of development of applications by as much as 50 to 70%.

The other benefit of increasing the offshore component of software development is that it reduces uncertainties due to government regulations regarding visas. Further, using geographically distributed development teams in a “follow the sun approach” enables an almost 24-hour software development cycle, thereby cutting down project duration (Carmel, 1999).

Given these opportunities, the delivery models used in Indian software export have seen a significant shift from the on-site to the offshore model over the past five years. For example, India has a dominant offshore software development industry with revenue of about $16.7 billion, which is growing at the rate of more than 30% per year (NASSCOM, 2005). This industry has more than 2,800 software export firms, and employs approximately 600,000 software professionals (NASSCOM, 2004).

The percentage of offshore revenue in the Indian software industry has increased from 34% in 1999-2000, to 64% (Sridhar, 2005). There has been a corresponding decrease in on-site revenue from 57% to 36%. Improved infrastructure, especially telecommunications, and the fact that Indian software companies have now become very proficient at the global delivery model, have led to clients becoming more and more comfortable with off-shoring. Coordination and communication problems typically encountered in offshore development, as discussed in Battin, Crocker, Kreidler, and Subramanian (2001), have been mitigated by the use of excellent processes and tools for software configuration management and project management adopted by Indian software companies.

In addition to clients contracting out software development projects to third-party software firms, off-shoring has also increasingly been practiced for captive purposes. Multinational companies such as Adobe, Motorola, Microsoft, and Oracle have followed this model and have set up their own Software Development Centers (SDCs) in and around major Indian cities such as Bangalore, Hyderabad, and Delhi. Battin, et al (2001) describes how a 3G Trial project was done using global engineering team at Motorola with one of the SDCs being in Bangalore, India.

Several large Indian software houses such as Infosys, Wipro, TCS, and Satyam have followed such an offshore development model successfully for over a decade. Interestingly, even within the off-shoring model, several variants exist. In the extreme