

## Abstract

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This research works focuses on software project management issues in global software development (GSD) environment and specifically into the business software development in Indian outsourcing software industry. Knowledge transfer is required from onsite business user to onsite software development team and from onsite software development team to offshore team in the outsourcing environment. In this thesis, an attempt is made to find out the impact of onsite and offshore team sizing on the performance of development, re-engineering and maintenance projects in Indian outsourcing software industry for a number of considerations. Such considerations include the requirements of business knowledge, onsite and offshore training, and project characteristics of cost, schedule and quality in different phases of software development.

A knowledge based framework of software development is constructed based on literature review and expert opinion from Indian outsourcing software industry. The expert opinions are collected by qualitative method such as focus group meeting and personal interview. The framework is again verified by a large sample of expert opinions through questionnaire data collection. The verified knowledge management framework is used to construct dynamic simulation model for development, re-engineering and maintenance projects by using system dynamics. The development and re-engineering project models are simulated for various combinations of onsite-offshore manpower ratio and training extended at onsite and offshore locations in various phases of software development. The maintenance project is simulated for staffing plan at onsite and offshore locations for smooth transfer of work to offshore location without disturbing the project ticket schedule. The maintenance work is transferred to offshore location in a phase-wise manner as maintenance projects do not have different software development phases.

The simulation runs show that there is a drop in overall team productivity in GSD when offshore options are considered for development and re-engineering projects. The cost saving is marginal for the execution of development projects in outsourcing environment. But the project cost can be reduced up to 25% by employing only an offshore team for coding and testing work with

minimal business training. There could be substantial cost saving for re-engineering projects also with an accompanying loss of project schedule when an appropriate onsite-offshore combination is employed in outsourcing environment. The cost savings could be as high as 50% (with an 20% loss of schedule) when re-engineering work is sent to offshore location entirely after the completion of requirement analysis work at onsite location by providing business knowledge training to the offshore team. The maintenance project simulation results show that there should be a higher initial onsite team strength than required for maintenance ticket solving. The hiring at offshore location should be continued at constant rate to take care of attrition and reduction in onsite team strength.

***Key Words:*** *Global Software Development, Software Project Management, Business Knowledge Transfer, Software Team Dynamics, Software Project Cost, Schedule and Quality.*