ABSTRACT

Software Process Improvement (SPI) is a set of activities that lead to a better software process, ensuring higher quality software and timely delivery. The main focus of this thesis is to address the SPI research on Global software development (GSD) projects that reveals significance of GSD teams’ knowledge transfer effectiveness in the GSD projects. GSD is a knowledge intensive process of GSD teams’ (offshore/onsite) that helps in planning and designing a coherent software system to meet the business needs. Moreover, GSD teams’ knowledge transfer effectiveness is one of the key predictors for evaluating the outcome of GSD projects. In the GSD projects, where offshore/onsite teams’ are distributed and working in various geographic locations, the process of knowledge transfer effectiveness has been measured through various criterions: (a) knowledge, (b) team, (c) technology, and (d) organization factors. The main aim of this research is to explore the integration of above criterion in the context of knowledge transfer effectiveness in GSD project outcome relationship.

In SPI, this process has a three level hierarchy, where the lowest level is Personal Software Process (PSP) – which focuses on individuals, Team Software Process (TSP) - the focus is on the entire team and Capability Maturity Model (CMM) - focus is on entire management. Moreover, in this thesis knowledge transfer effectiveness criteria has been studied under PSP and TSP of GSD teams in the context of SPI to improve the level of software process in GSD projects. Furthermore, the assessment framework for the integration of knowledge, team, technology, and organization factors for evaluating KT effectiveness in GSD projects has not been adequately available in the existing literature. For this motivation, the main objective of this research is to propose an assessment framework to evaluate offshore /onsite teams KT effectiveness with reference to GSD project outcome.

The limited literature exists on the fuzzy multi-criteria decision making (FMCDM) approaches for evaluating the knowledge transfer effectiveness of GSD teams. Thus, the need to address these research gaps inspired to propose a hybrid approach based on fuzzy decision-making trail and evaluation laboratory (DEMATEL)-FMCDM presented in this thesis. Moreover, the proposed DEMATEL-FMCDM methodology
is used to determine priority weights for each evaluation criterion and rate knowledge transfer effectiveness on the GSD project outcome from software service outsourcing perspective into two dimensions: product success, (schedule, cost improvement, etc.) and service quality (personal satisfaction, and successful collaboration).

For evaluating KT effectiveness of GSD teams, three Fuzzy Multi-Criteria Decision Making (FMCDM) methodologies: (a) fuzzy Decision Making Trial and Evaluation Laboratory Model (DEMATEL) (b) Technique for Order Performance by Similarity to Ideal Solution (TOPSIS) and (c) Elimination EtChoixTraduisant la REaite (ELECTRE) have been integrated. Further, the fusion of fuzzy DEMATEL, TOPSIS, and ELECTRE has not available in the existing literature. Based on this research gap, this thesis is integrating fuzzy DEMATEL, TOPSIS, and ELECTRE approach for evaluating KT effectiveness in the context of GSD project outcome. The applicability and capability of proposed framework has been validated by software experts at a Software Organization in India. The results of this research also address that knowledge, team, and technology context factors have a positive influence on KT effectiveness and play a mediating role of relationship in SPI and GSD project outcome.

**Keywords:** Knowledge Transfer, Global Software Projects, Offshore/On-site teams, Fuzzy Multi-Criteria Decision Making, Fuzzy DEMATEL, Fuzzy TOPSIS, Fuzzy ELECTRE, Software Process Improvement.