Automation of Team Formation in Software Development Projects in an Enterprise: What Needs to Improve?

W. A. C. Prashandi
Informatics Institute of Technology
No 57, Ramakrishna Road,
Colombo 6, Sri Lanka
+94 (0) 77 7299393
chathuminiwij@gmail.com

Abarnah Kirupananda
Informatics Institute of Technology
No 57, Ramakrishna Road,
Colombo 6, Sri Lanka
+94 (0) 76 8209749
abarnah.k@iit.ac.lk

Abstract— **With the increasing advancement of economic globalization, optimization of human resource allocation plays a significant role in the development of software development enterprise as software development is a human-intensive activity. Major contributors that affect the outcome of software projects are mainly personnel assignment decisions. There is an increasing need to assign the right team to a project from the very beginning of the project. The task of formation of an optimal team for a software development project is a crucial and a very complex task to be handled manually. If not handled properly, it may result in failure of processes, strategies and plans which may finally lead to the failure of complete software development project.**

The rationale of this study is to gather knowledge on the previous research that have been carried out in this problem domain and to analyze them in order to identify their benefits and limitations in addressing the problem. This is the initial phase of an ongoing research and the knowledge acquired would be utilized to propose a new solution that fills in the gaps in existing approaches in the literature.

Keywords—team formation, software development project, human resource allocation

I. INTRODUCTION

Formation of an optimal team for a software development is notoriously a difficult task. The mistakes made when assigning employees to projects could result in serious consequences. The productivity and efficiency of the employee would decrease due to the feeling that their skills and potential are not being utilized well [1]. Proper team allocation would bring a lot of benefits to the project such as reduced time to market, increased quality, reduced cost, reduced risk and so on [2]. It is evident in the literature that the problem of optimal team formation has been addressed by applying different approaches. The complexity of the problem is mainly caused by the conflicting nature of the factors that affect the success of team formation which is described in Section II A. This study is conducted to gather and analyze findings from previous research using a systematic method. The results of this study will be used in an ongoing research that is focused on building a tool that supports team formation in software developments projects by filling in the gaps in the available work.

Rest of the of the paper is organized as follows. After a brief overview of domain, human resource allocation in software development projects in the section II, section III describes the methodology the authors used to gather knowledge for this paper. Section IV summarizes the results of analysis of existing literature while section V presents limitations of available work related to team formation of software development projects. Section VI presents the gap analysis of the available work and section VII concludes the paper suggesting some future improvements that must be done.

II. HUMAN RESOURCE ALLOCATION IN SOFTWARE DEVELOPMENT PROJECTS

Proper allocation of employees to a project is a vital issue for a successful software development project. Most of the time a set of employees are manually selected from a pool of available employees for the project [3]. Usually, the decision makers such as software project managers assign employees to tasks based on their experience, intuitive, and subjective perception [4]. The factors that influence employee allocation are difficult to quantify and estimate [5]. In addition, the required performance and potential may not be available due to employee turnover and the speed at which technology is evolving [6].

A. Factors to consider when software development teams are formed

The following is a summary of the findings from the literature survey about factors that affect the success of team formation in software development context.

1) Skills and soft skills: Human characteristics of software developer can be categorized as skills, capabilities and experience. While both technical knowledge and experience is important, "soft skills" of team members also play a huge role when it comes to software engineering projects. Authors of [7] state that analytic, problem-solving, commitment, responsibility, eagerness to learn, motivation and teamwork are the most valued ones for team members. Quantifying such information is not easy but is very important towards the success of a project [3].

2) Personality: Human resource allocation to software development projects is a complex task as it deals with the human characteristics of software developers and their contribution that build up team level characteristics [8]. Personality, team work, coordination, conflict and cohesion in a team are important factors to be considered in team formation. Some of the social psychology factors that affect team building are introversion, extraversion, sensing,

16