

An optimization model to allocate most suitable team members for software development projects

Thilini Dharmasena* and Annista Wijayanayake

*Department of Industrial Management, Faculty of Science,
University of Kelaniya, Sri Lanka*

**Email: mktwdharmasena@gmail.com*

Human resource is the most important resource that creates value for the software development projects with the correct identification of knowledge and skills that need to achieve the specified scope of any given project. In this resource allocation process, there are many factors that should be considered such as time, cost, quality and scope of the project. However, this becomes more complex when the range of skills, knowledge, experience and expertise required increases. Most of the software development projects have failed since the appointment of team members to achieve the expected goals has not been appropriate. Therefore, it is more important to determine the optimal number of positions required to be filled by the most qualified employees for each project. By considering past literature and the current practices in the IT industry, it is evident that there are many problems associated with the selection of the best set of team members to meet the project goals. Practically, there is no specific methodology or system that has yet been identified to match the team members to achieve the scope of a given project as some of the requirements are subjective while the rest is objective. Therefore, the main objective of this research is to develop a model to determine the optimal number of positions required to be filled by the project, and to select the most qualified applicants for each project who would contribute the most to the achievement of the project scope and quality within the given time and budget. In this study, the Analytical Hierarchy Process (AHP) is used to compute the priority value or competency benefit value to identify the most suitable employees for different roles in the project, according to project requirements, skills and knowledge of the employees. Here, in the AHP, multi-criteria decision is used while considering both the subjective and objective criteria. In this method, all employees are given an AHP ratings score based on their competencies. Then, an integer linear programming model was developed considering the competency benefit value as the objective coefficients in the linear programming problem. Then, the team member selection and allocation were optimized by taking tangible measurement into consideration as constraints. This proposed model will assign the most suitable team members for the relevant project while considering the subjective and objective requirements. AHP together with Linear Programming model determine which position to be filled and which person to be allocated in order to optimize the quality and the scope of the project. Furthermore, the project manager can enhance the working efficiency within their project team members as it enables to select the best set of people within the given constraints. Success of this allocation process directly connects with scope and goals of the project. This model provides an effective tool to select the suitable team members while meeting the subjective and objective resource constraints, and derive maximum benefits not only for the software development project, but for the company too.

Keywords: Analytical hierarchy process, Linear programming, Human resource allocation, Software development project