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Role of Engineering Project Management in Successful Project Completion Globally

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ABSTRACT

In the globalization era, the radical progress in technical and digital system are causing rapid progress of public and private organizations as well as the structural complexity of managing projects in the engineering field. The present study focuses to review the role of engineering project management skills in managing a project for successful completion. Various literature related to the study topic has been reviewed systematically. The various factors responsible for successful completion of a project are framed as a model which would be useful for the engineers as well as other project managers or leaders as well as other stakeholders for understanding the systematic way of project management practices with the aim to successfully complete a project. The model highlighted the top three factors were project planning with stakeholders, time, budget and quality and leadership style and practices.

Keywords: Project, Management, Engineering, Skills, Project Planning, Project Success Factors

1. INTRODUCTION

In the globalization era, the radical progress in technical and digital system are causing rapid progress of public and private organizations as well as the structural complexity of managing projects in the engineering field. A study revealed that certain projects with higher complexity faced challenges in the absence of guidance and customization required for project management practices (Hjelmbrekke et al., 2017). According to Galbraith (2014) and Lawrie et al. (2016), organizations undertake projects with the goal to achieve business gains that are steered by dynamic market sites and organizational strategic planning. Project management of an organization enables to evaluate, prioritize, and select projects or programs that effectively suit the business goals (Confido et al., 2018).

The academicians and practitioners often discuss about success of projects as more and more innovative project methods being employed (Bharadwaj and Vara, 2008). Success of project is multifaceted and ambiguous which changes over the project and life cycle of product (Muller and Turner 2007). A project is successful when the project fulfils the specifications of a project and after completion the stakeholder and clients are satisfied (De Wit 1986).

1.1 Objective

Considering the importance of the study of project success in the globalization era, this paper focuses to review the role of engineering project management skills in managing a project for successful completion.

2. METHODOLOGY

Various literature related to the study topic has been reviewed systematically. The present study sources

are secondary materials. The secondary related materials such as published research articles, thesis, reports, and blogs of both national (India) and international authors have been downloaded in two files, namely "articles" and "thesis and reports".

3. REVIEW OF RELATED LITERATURE

Each downloaded literature was reviewed thoroughly about the study objectives, study methodology, findings, conclusions and recommendations. The review of most related literature to the present research study has been presented in the following sections:

3.1 Project Success Factors

There are various factors responsible for successful completion of project as mentioned by the authors from India and from abroad. The Key factor to successful completion of a project is proper planning (Samset and Volden, 2016; Williams et al., 2019). According to Zwikael, (2009), project planning is the configuration of objectives and goals to be achieved within the project timeline and the necessary resources that are required to accomplish the objectives of the project. Irfan et al., (2021) conducted a survey-based study with a sample of 260 project engineers of the public sector organizations operating in Balochistan. The study assessed the role of project planning and the project manager's competency in project success in the context of project management. The results of the study revealed that planning and competency had a significant positive impact on the success of public sector projects. Technical skills, project management knowledge, and organizational approach are the important aspects during planning phase (Gomes and Yasin, 2012).

The three aspects to success of a project are time, budget and quality (Nixon et al., 2012; Globerson and Zwikael. 2002). However, these dimensions are not sufficient to measure project success. Quality of project management processes, leadership styles and satisfaction of project stakeholders are other dimensions leading to success of project (Baccarini 1999; Schwalbe 2004). According to Lutkevich (nd.), project planning is crucial at every phase of a project. It lays out the scopes, objectives, goals and time schedule. The author (Lutkevich, nd.) also mentioned that planning facilitates project managers to turn an elusive idea into reality. The three major parts of a project plan are the scope, budget and timeline (Lutkevich, nd.). Chua et al. (1999) had given the importance of budget and adequate funding for project and also qualified project team with competence for project success.

According to Veliu et al., (2017), the leadership style is the most established factors to influence the behavior and attitudes of employees including commitment to the organization. Their study assessed the effect of different leadership styles on employee performance in an organization. The study sample unit was the medium and large sized private enterprise manager in Kosovo. The result of the study clearly indicates that transformational leadership is correlated with employee performance. The findings also reflected that employee performance was mainly relying on leadership which can play a vital role to determine the employee's performance. "Effective leadership is a two-way process that influences both individual and organisational performance" (Mullins, 2016). Mullins (2016) also mentioned in his book that "leaders adopt a more personal and active attitude towards goals and creates excitement in work and develops choices that give substance to images that excite people". According to him styles of leadership is the way in which the functions of leadership are carried out and the behaviour adopted by managers towards subordinate staff (Mullins, 2016). Ahmed et al. (2013) highlights the significance of leadership skills that are crucial for project managers while managing projects effectively and efficiently. Both leadership and management have their own traits and purposes which are necessary for success of an

increasing multifaceted business milieu (Kotter, 1990). The study conducted by Suryadinata (2023) in the Mega Kemayoran area found that democratic leadership style was applied in the area and the result highlighted that there was a positive impact of leadership style on the performance of employee. Table 1 shows the name of the authors considered in their research papers the effect of leadership styles on employee and organizational performances as an important management strategy to service quality and organizational commitment.

Another factor responsible to lead projects successfully is a strong coordination between different stakeholders and teams involved in a project, which had highlighted by some authors (Brammer and Millington, 2004; Hsiao, 2014; De Graaf and Loonen, 2018). Coordinating stakeholders efficiently during project execution is crucial for companies (Faraj and Sproull, 2000; Conforto et al., 2013; Hernandez-Vivanco et al., 2018). In the field of engineering, systems engineering and project management domains were considered as the vital factors for engineering project success (Cook and Ferris, 2007; Philbin, 2008; Locatelli et al., 2014). Both systems engineering and project management are the prospective means to improve coordination among stakeholders, leading to control errors, budget and the project barriers (Karlsen, 2002; Rebentisch and Prusak, 2017). The paper of Xue et al., (2021) used a qualitative approach to analyse how various business unit processes could be assimilated via the systems engineering and project management processes. The authors described trough a framework, the development processes to overcome existing cultural gaps between systems engineers and project managers. The explored an option to reduce the gap between systems engineers and project managers, relying on the alignment of processes from systems engineering and project management domains. According to Ferguson (Sir) (2005), management is about control. Success gives control and control gives longevity as a manager.

Giri (2018), an Engineer in Nepal and author, also discussed in his research paper about essential skills of project success such as planning, organizing, monitoring, control, leadership, problem solving, communication, human resource management and time management. The experience, qualification and technical competence along with communication, motivating skill, team building and problem solving ability are important aspects that a project manager should possess for effective project performance (Giri, 2018).

The study conducted by Hussain et al. (2021) revealed that the personality of a project manager plays a vital role in project success. The extrovert managers who were open to execute fresh changes in the projects were found to be the major contributors towards project success. The study findings revealed that external environmental factors like political, economic, and social moderately influence the project managers' personality traits leading to project success. The study also reflected the moderating influence of external environmental factors in developing perspectives of a country where political and economic factors are more dynamic (Hussain et al., 2021).

In India: Saini (2023) conducted a review based research study stems from its alerting the Indian construction industry to the various roles that project managers to enhance project performance. The study reflected that the project manager was a vital component of the success of a construction project and has an impact at all stages of the construction process. The findings of the research study conducted by Tiwari (2022) revealed the key success factors of a project are project planning, senior management involvement, project risks, strategic orientation of project, project flexibility, and communication, which vary significantly across hybrid and agile project management methodologies. Ramesh et al. (2018) assessed project management impact to achieve success of projects in Warangal region of Maharashtra,

India. The objectives of the paper were to find out the impact of feasibility study and project success, to understand the impact of planning and activity management leads to project success and also to assess the role of human resource management and responsibilities of project manager in successful completion of project. The total sample size was 100. The result of the study reflected that the project success (dependent variable) had significant positive impact with the independent variables, such as, feasibility study, planning activities and human resource management. The study revealed the important of project management in utilization of optimal resources.

Table 1 Project success factors

Factors	Author name and year of publication
Project planning	Zwikael, 2009; Gomes and Yasin, 2012; Samset and Volden, 2016; Ramesh et al., 2018; Williams et al., 2019; Giri, 2018; Lutkevich, nd.; Irfan et al., 2021; Tiwari, 2022; Saini, 2023
Time, budget and quality	Munns and Bjeirmi, 1996; Chua et al., 1999; Globerson and Zwikael 2002; Nixon et al., 2012; Khan et al., (2013); Davis (2014); Giri, 2018; Hussain et al., 2021; Lutkevich, nd.; Saini, 2023
Management competency including managing human resources and leadership style and practices	Baccarini 1999; Schwalbe 2004; Ogbonna and Harris 2000; Gadot, 2006; Wang et al., 2010); Timothy et al., 2011; Gul et al., 2012; Shah and Kamal, 2015; Mullins, 2016; Veliu et al., 2017; Giri, 2018; Ramesh et al., 2018; Irfan et al., 2021; Tiwari, 2022; Saini, 2023; Suryadinata, 2023
Coordination between different stakeholders and teams	Karlsen, 2002; Brammer and Millington, 2004; Hsiao, 2014; De Graaf and Loonen, 2018; Rebentisch and Prusak, 2017; Xue et al., 2021
Skilled, qualified and competent project teams	Chua et al., 1999; Saini, 2023
Monitoring and control	Giri, 2018; Irfan et al., 2021; Saini, 2023
Communication and extrovert personality of project manager	Giri, 2018; Hussain et al., 2021; Tiwari, 2022
Technical facilities and skills and Infrastructure facilities	Gomes and Yasin, 2012; Majid, A. 2019

DISCUSSION

After literature review analysis of the previous studies, the various factors responsible for successful completion of a project are framed as a model in Figure 1. This model would be useful for the engineers as well as other project managers or leaders as well as other stakeholders for understanding the systematic way of project management practices with the aim to successfully complete a project. The Figure 1 clearly reflects that for successful project completion in engineering field, various factors are responsible, among which the top three factors revealed by most of the researchers were project planning with stakeholders, time, budget and quality and leadership style and practices. The project planning with

stakeholders comprised of seven steps as shown in the figure. The previous studies also had given importance to the team management and project monitoring and control as well.

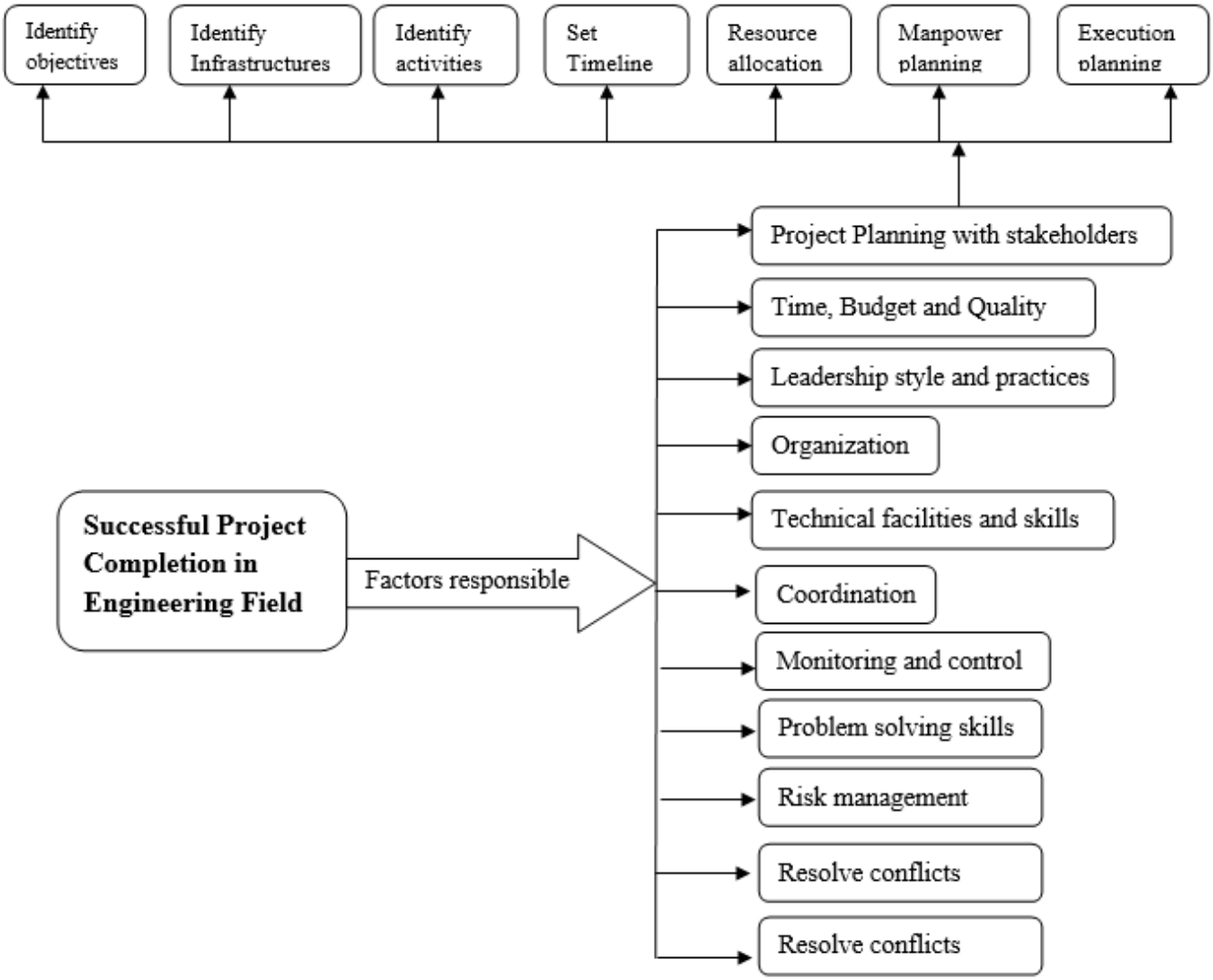

Figure 1: Model for Process to Successful Completion of Project in Engineering Field *(Source: Author)*

4. CONCLUSION

The present study is review based of various global research articles, thesis, books and blogs. Most of the studies had given prime importance to proper planning of projects, management competency, leadership style and practices, time, budget and project quality and coordination between different stakeholders and teams for successful completion of projects. Some recent research studies reflected certain discrepancies in the use of project management practices. The researchers globally recommended that procedures and approaches of projects need to be enhanced to improve project management performance for achievement of projected goals. The present study author supports the recommendation of the previous global researchers.

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