

A Review Paper on Assessment and Impact of Role of Project Manager on Cost and Time Control in Construction Projects.

MS. Prajakta P. Khopade¹, Dr. Rahul V. Kajave²

¹PG student, civil (Construction Management), Tatyasaheb Kore Institute of Engineering and technology, Warananagar, Pin-416113, Maharashtra, India

²Assistant Professors, Dept. of Civil Engineering, Tatyasaheb Kore Institute of Engineering and Technology, Warananagar, Pin-416113, Maharashtra India

Abstract - The construction projects are inherently complex, often involving numerous stakeholders and facing the risk of cost and schedule overruns. Skilled project managers are crucial in mitigating these risks and ensuring projects are completed within budget and on time. This study aims to explore the impact of project manager role on cost and time control in construction projects. Drawing from a comprehensive literature review, which includes insights from various scholars on project management, project success factors, and risk management, this research seeks to address the gaps in current knowledge. The problem statement underscores the need for research in this area, emphasizing the critical role of project managers in navigating the complexities of construction projects. The objectives and methodology outline a mixed-methods approach, involving surveys, interviews, and data analysis, to investigate the factors influencing cost and time control and the effectiveness of project manager skills. By examining the challenges faced by project managers and identifying best practices, this study aims to provide valuable insights for improving project management practices in the construction industry.

Key Words: Role of project manager, Cost and Time control, Construction projects, Cost overruns, Delay in construction projects, etc

1. INTRODUCTION

In construction projects, keeping costs under control and sticking to schedules can be really tough. There are lots of different people involved, which makes things even more complicated. But that's where a good project manager comes in. They're like the captain of the ship, guiding everyone and making sure things stay on track. Their experience and skills are super important for avoiding problems and making sure the project gets done on time and within budget. This introduction talks about why having a skilled project manager is so crucial for successful construction projects.

Some of the ways in which project manager expertise can impact cost and time control in construction projects.

i. Cost planning and estimation: Experienced project managers are better able to accurately estimate the costs of a project taking into account all relevant factors such as

labour, materials, equipment, and overhead. They are also more likely to be able to identify potential cost savings opportunities. This can help to prevent cost overruns and ensure that projects are completed within budget.

ii. Scheduling: Experienced project managers are able to develop realistic and achievable project schedules. They are also able to monitor and track progress against the schedule and make adjustments as needed. This can help to prevent schedule overruns and ensure that projects are completed on time.

iii. Risk management: Experienced project managers are able to identify and assess potential risks to the project, and they are able to develop and implement mitigation strategies. This can help to prevent cost and schedule overruns caused by unexpected events.

iv. Communication and coordination: Experienced project managers are able to communicate and coordinate effectively with all stakeholders involved in the project. This helps to ensure that everyone is on the same page and that the project is moving forward smoothly. This can help to reduce delays and cost overruns caused by miscommunication and coordination problems.

Some examples of how project manager expertise can have a positive impact on cost and time control in construction projects:

- A project manager may be able to identify and negotiate better prices with suppliers and contractors.

- A project manager may be able to develop more efficient work flows and processes.

- A project manager may be able to anticipate and mitigate potential risks, such as bad weather or delays in obtaining materials.

- A project manager may be able to build and maintain strong relationships with stakeholders, which can help to resolve conflicts and keep the project on track.

Overall, the benefits of hiring and retaining experienced project managers far outweigh the costs. Construction

companies that invest in project manager expertise are more likely to be successful in delivering projects on time and within budget.

2. LITERATURE REVIEW

i. Ali Ghorbani (2023): This article discusses a comprehensive review of the competencies and leadership profile of successful construction project managers. It discusses the essential skills and qualities that project managers need to achieve their goals within budget, time, scope, and quality. The article covers how project managers can develop their leadership skills to better manage their teams and overcome common challenges that they may face. The paper emphasizes the importance of combining knowledge, skill, leadership, ability, and personal attitude for successful project completion. It also highlights the dynamic and uncertain nature of projects and the need for trained, competent, and experienced project managers in all projects-oriented organizations.

ii. Dr. Md. Mahfuzul (2022): Project management and project success are two key concepts in project management research. Scholars and practitioners around the world are still seeking the best definition of project success and the most effective project management methods. This article reviews different perspectives, models, hypotheses, and solutions on project success factors. It also discusses the methodologies used in previous studies and other aspects of project success factor propositions. The article integrates theories, knowledge, and ideas from a variety of research methodologies to explain project success. This approach provides a clearer understanding of the subject and helps to evaluate the quality of data collected. It also encourages the use of information gathered from project management practice to understand the link between project productivity and project success.

iii. U.Sindhu Vaardini (2016): In this research find out Cost overrun is considered as one of the most important problems that encumber projects progress, since it reduces the contractors profit leading to enormous losses, and leaving the project in great troubles. Construction cost is one of the peak criteria of success of a project throughout its life cycle and is of high concern to those who are involved in the construction industry. This paper describes the state of art of the research on cost overrun factors in the construction projects. From the reviews, an attempt is made to cultivate a robust and practical schema for interpreting the overrun in project cost based on the factors. The questionnaires were collected and analyzed using various methods to find the most significant factors are Frequency Index, Severity Index, Importance Index Method and Relative Importance Index method.

iv. Dr. Mounir El Khatib (2022): Project management is essential for ensuring that all risks associated with a particular project are eliminated or minimized. BIM (Building Information Modeling) is a technology that can be used to mitigate project risks throughout the project life cycle, from planning and design to construction management. BIM provides a collaborative platform for all project stakeholders to access and share information in real time. This can help to identify and address risks early on, before they cause delays or cost overruns. BIM can also be used to simulate different project scenarios and identify potential risks, which can help project managers to develop mitigation strategies. Despite the effectiveness of BIM in mitigating project risks, its use in the construction industry is still relatively low. This is likely due to a number of factors, including a lack of awareness of the benefits of BIM, the cost of implementing BIM software, and the need for training for project staff. The article argues that BIM is the most appropriate method for mitigating project risks in the construction industry. It provides a number of examples of how BIM has been used to successfully mitigate risks on real-world projects.

v. Faisal Alshammari (2020): Project managers play a crucial role in the success of construction projects. They must possess a wide range of skills, including teamwork, effective communication, resource management, planning, training, and risk management. These skills are essential for coordinating project delivery and ensuring that projects are completed on time, within budget, and to the required quality standards. The literature review has identified several skills that are important for project managers, and the type of project determines the specific skills that are required. Project managers involved in complex projects need to have strong skills to handle their team and every project participant.

vi. Laura Montalban Domingo (2023): Production planning is a key element for success in building project management. This research aims to analyze how the implementation of LPS and the construction management experience of the project manager and the construction site foreman individually influence project management's success, getting minimum time and cost deviations. In this work, newly built single-family house projects were analyzed. Quantitative and qualitative analyses, based on the Mann-Whitney U test and qualitative comparative analysis method, respectively, were performed to constrain both the individual and combined effects of LPS, the project foreman, and the project manager in terms of cost and time deviation as measures of project management success. The results highlight that foreman's experience is required condition to maintain cost deviations under 10%. Overall, this study may help construction organizations to improve their managerial practices at construction sites.

vii. H.C.O. Unegbu (2022): A study of 221 contractors, clients, and consultants from ten construction companies in Nigeria found that project management practices have a significant impact on project performance measures. The highest relationships were found between customer satisfaction and project success, project performance and project success and stakeholder management and project success of the 20 hypotheses tested 14 were validated with path coefficients greater than 0.1. Three hypotheses were changed and three were rejected. Two additional relationships were discovered that promoted the convergence of the structural equation model. Construction companies should invest in training and resources to improve their project management practices. They should also establish a system for regularly monitoring and evaluating their project performance. By identifying and addressing areas for improvement, construction companies can increase their chances of delivering successful projects on time, within budget, and to the required quality standards.

viii. Hemanta Dolo (2014): It provides insights into the roles of key stakeholders in construction projects and how they can contribute to better cost performance. The research identifies 73 attributes associated with cost performance and uses a relative importance weighing technique to identify key areas for improvement. The findings are based on feedback from senior industry professionals and are applicable to the construction industry in Australia. The file highlights the importance of effective management of factors affecting cost overruns within the roles and responsibilities of clients, consultants, and contractors. It provides valuable insights for anyone involved in construction projects and interested in improving cost performance.

ix. J. Sobieraja and D. Metelskib (2023): This research article titled "Identification of the key investment project management factors in the housing construction sector in Poland" explores the crucial factors that influence project management in the housing construction industry in Poland. The study surveyed 192 companies and used exploratory factor analysis to identify the key factors affecting project management success. The analysis revealed four pivotal factors: activity of companies in the market environment, pro-social policy of the state, highly advanced technologies, and the use of appropriate market relations. Additionally, factors such as selecting an experienced project manager, thorough risk evaluation, flexible project planning, and employee knowledge and competencies were found to be significant. The study recommends adopting PRINCE2 methodology and investing in new technologies and academic partnerships to enhance project management in the housing construction industry in Poland. Further quantitative research is suggested to analyze the impact of these factors on project performance.

x. Maryam Elmezain (2020): His study investigates the relationship between project manager's skills and project success. The authors surveyed 400 project managers in Cairo, Egypt and found that project manager's technical, conceptual, political, and human skills are all significantly related to project success. They also found that project manager's age is not a significant factor in project success. The authors argue that project success is subject to a set of comprehensive project managerial skills. They also argue that it is important to distinguish between project manager's age and experience and not to consider project manager's age as a determinant of project success.

xi. Mounir El Khatib (2022): Program management is becoming increasingly complex, and program managers need specialized skills and knowledge to overcome the challenging tasks they face in ensuring that all projects and program components are moving according to plan. This research paper explores and studies the usage of simulation tools in program management and investigates whether program management can benefit from existing project management simulation tools. It also examines how current simulation tools can be enhanced for program management and whether separate software is needed or whether it is better to enhance current software. The study uses observation to explore these questions and come up with appropriate recommendations and suggestions. It will define simulation tools in general, their objectives, pros and cons, challenges and opportunities, and provide a sample of project management simulation tools. The study will then use research methods such as surveys and questionnaires to interview program managers and get an understanding of their requirements for simulation tools. The study is qualitative due to the lack of secondary data. It is expected that the study will provide a better understanding of the program manager's requirements for simulation tools and make recommendations on how to improve the usage of simulation tools in program management.

xii. Raj Kapur Shah (2016): This paper investigates the challenges of delay and cost overrun in construction projects, emphasizing their negative impact. By analyzing three case studies from Australia, Ghana, and Malaysia, the study identifies key factors causing delays and cost overruns. Each country exhibits unique influential factors, such as planning deficiencies in Australia, payment delays in Ghana, and contractor-related issues in Malaysia. The research underscores the necessity for tailored measures to address diverse delay factors, emphasizing the importance of country-specific strategies for mitigating project delays and cost overruns in both developed and developing nations within the construction industry.

xiii. Sofiat O. Abioye (2019): The construction industry faces a number of complex challenges, including cost and time overruns, health and safety issues, productivity declines, and labor shortages. AI has the potential to revolutionize the construction industry by addressing these

challenges. The article reviews the current state of AI applications in the construction industry, examining the different AI techniques being used and identifying the opportunities and challenges for AI adoption. The authors identify a number of key AI applications that have the potential to improve construction efficiency, safety, and profitability. The article concludes by discussing the pathway to realizing the full benefits of AI in the construction industry. This includes addressing the challenges of data availability and quality, as well as developing AI solutions that are tailored to the specific needs of the construction industry.

3.OBJECTIVES

- i. To identify the most critical factors that impact on cost and delay for selected construction project.
- ii. To carry out data analysis using Relative Importance Index method.
- iii. To identify the key competencies, skills and tools of project managers that are most important for cost and time control.
- iv. To assess the impact of project manager role on cost and time control in construction projects.

4. METHODOLOGY

- i. Finding the most critical attributes of cost and delay with the help of specific case study by questionnaire survey.
- ii. Analyze and ranking the factors which impact cost and delay by Relative Importance Index method.
- iii. Observe the way of incorporation of various tools and programme used by project manager in various activities.
- iv. Construction projects located in Kolhapur have been chosen for the data collection purpose of the study.

5. SCOPE OF THE WORK

Conduct a comprehensive review of the existing literature on project management expertise and its impact on cost and time control in construction projects. This will help to identify the gaps in the literature and the key areas that need to be investigated. Develop a research design that is appropriate for the research question and objectives. This may involve a quantitative study, a qualitative study, or a mixed-methods study. Analyze the collected data to identify patterns and trends. This may involve using statistical software or qualitative data analysis software. Discuss the findings of the research and draw conclusions about the impact of role of project manager on cost and time control in construction project. Develop recommendations for improving project manager expertise in cost and time control.

6.CONCLUSIONS

In conclusion, the research highlights the critical role of project manager in controlling costs and schedules in construction projects. Skilled and experienced project managers can significantly impact project success by effectively managing cost planning and estimation, scheduling, risk management, and communication with stakeholders. The literature review emphasizes the importance of identifying and addressing factors that contribute to cost overruns and delays, as well as the need for tailored strategies to mitigate these challenges in different project contexts. By understanding the key competencies, skills, and tools required for effective project management, construction companies can invest in developing their project managers to enhance project outcomes. The study aims to contribute to the body of knowledge by investigating the specific ways in which project manager role influences cost and time control, ultimately providing recommendations for improving project management practices in the construction industry.

REFERENCES

- Ali Ghorbani (2023) "A Review of Successful Construction Project Managers' Competencies and Leadership Profile" *Journal of Rehabilitation in Civil Engineering* 11-1 (2023) 76-95.
- Dr Md. Mahfuzul Islam Shamim (2022) "Exploring the Success Factors of Project Management" *American journal of economics and business management* issn: 2576-5973 vol. 5, no. 7, 2022.
- U.Sindhu Vaardini , S.Karthiyayini , P.Ezhilmathi (2016) "study on cost overruns in construction projects" *International Journal of Applied Engineering Research*, ISSN 0973-4562 Vol. 11 No.3.
- Dr. Mounir El khatib (2022) "BIM as a tool to optimize and manage project risk management" *International Journal of Mechanical Engineering* Vol. 7 No. 1 January, 2022.
- Faisal alshammari, Khairulzan yahya and Zaiton Binti Haron (2020) "Project managers skill for improving the performance of complex projects in Kuwait construction industry" *IOP Conference series:Material science and Engineering*.
- Laura Montalban Domingo, Jose Casas Rico, Luis F.Alarcon, Eugenio Pellicer (2023) "A influence of the experience of the project manager and the foreman on project management's success in the context of LPS implementation" *Ain Shams Engineering Journal*.
- H.C.O. Unegbu, D.S. Yawas,B. Dan-asabe (2022) "An investigation of the relationship between project performance measures and project management

practices of construction projects for the construction industry in Nigeria” Journal of King Saud University – Engineering Sciences 34 (2022) 240–249.

Hemanta Doloi (2014) “Cost Overruns and Failure in Project Management: Understanding the Roles of Key Stakeholders in Construction Projects” Journal Of Construction Engineering And Management © Asce.

J. Sobieraja and D. Metelskib (2023) “Identification of the key investment project management factors in the housing construction sector in Poland” INTERNATIONAL JOURNAL OF CONSTRUCTION MANAGEMENT 2023, VOL. 23, NO. 1, 1–12.

Maryam Elmezain, Wan Hamidon Wan Baduruzzaman, Muhamad Azry Khoiry (2020) “The impact of project manager’s skill and age on project success” Brazillian Journal of operations and production Management, Vol.18, No.04.

Mounir El Khatib, Abdulrahman Alhosani, Ibrahim Alhosani, Omran Al Matrooshi, Muaid Salami (2022) “Simulation in Project and Program Management: Utilization, Challenges and Opportunities” American Journal of Industrial and Business Management, 2022, 12, 731-749
14 12. Peidong Sang, Jinjian Liu, Lin Zhang, Lingqiao Zheng, Haona Yao and Yanjie Wang (2018) “Effects of Project Manager Competency on Green Construction Performance: The Chinese Context” Sustainability 2018, 10, 3406; doi:10.3390/su10115.

Raj Kapur Shah (2016) “An exploration of causes for delay and cost overruns in construction projects: case study of australia, malaysia & ghana” Journal of Advanced College of Engineering and Management, Vol. 2.

Sofiat O. Abioye, Lukumon O. Oyedele, Lukman Akanbi, Anuoluwapo Ajayi, Juan Manuel Davila Delgado, Muhammad Bilal, Olugbenga O. Akinade, Ashraf Ahmed (2019) “Artificial intelligence in the construction industry: A review of present status, opportunities and future challenges” Journal of Building Engineering.