

# Project Management Techniques to Improve Construction Workers' Efficiency and Productivity

<sup>1</sup>Muhammad Wayassirli Amri, <sup>2</sup>Arif Rachman Putra

<sup>1</sup> University of Islam Indonesia

<sup>2</sup>Sunan Giri University of Surabaya, Indonesia

## ARTICLE INFO

### Article history:

Received 9 April 2022

Revised 7 June 2022

Accepted 29 June 2022

### Key words:

Project management,  
Productivity,  
Efficiency,  
Construction,  
Technology,  
Communication,  
Risk management.

## ABSTRACT

The application of effective project management techniques in the construction sector can improve worker productivity and efficiency through structured and systematic management. Techniques such as Work Breakdown Structure (WBS), Critical Path Method (CPM), and the use of technology such as Building Information Modeling (BIM) help maximize the use of resources, reduce risks, and optimize time and budget management. Effective communication, quality management, and worker motivation also play an important role in improving team performance. Implementing a construction project in which every managerial element-including careful planning and the use of the right tools-can ensure the project runs smoothly and is completed according to schedule. Not only that, continuous monitoring and evaluation are important to identify problems early on and reduce waste that can be detrimental to the project. Effective implementation of project management impacts cost efficiency and improves the overall quality of the project. Emphasis on technology and proper risk management are the keys to success in facing the challenges that exist in the construction sector.

## INTRODUCTION

The construction industry is a very important sector for a country's economy. Good project management in this sector plays a key role in increasing work productivity and efficiency. Competent project managers are expected to manage resources, time, and budget effectively, so as to meet project targets as expected. Improving the productivity of construction workers is a major challenge that requires a systematic and structured approach in every stage of the project, from planning to execution (Chien, 2016). With efficient project management techniques in place, it is expected that the productivity of construction workers can increase significantly, which in turn will also have a positive impact on the smooth running and completion of the project.

The construction sector in particular is often faced with difficulties in terms of managing limited time and resources. Applied project management techniques, such as the use of the WBS or CPM, can help plan, organize, and control every aspect of the work. The implementation of good project management is known to have great potential in increasing worker productivity, but there are still

many construction projects that experience delays and waste due to inefficiencies in implementation (Azhar, 2013). This shows that project management techniques need to be continuously adjusted and updated to meet the demands of increasingly complex project dynamics.

One of the main problems faced in the construction sector is the inability to plan and manage time appropriately, which often leads to delays in project completion. This can affect workers' productivity as they have to work under high time pressure, which can reduce performance and quality of work. Not only that, inefficiency in the use of resources, be it workers, materials, or equipment, often leads to significant cost wastage. The inability to utilize the right project management technology or tools is also often a major cause of these problems (Kwak & Anbari, 2009).

Another issue is related to poor communication between project managers and workers. Ineffective communication can lead to miscommunication in terms of tasks to be completed, as well as changes that occur within the project. This has the potential to decrease efficiency and increase errors made by workers, which will ultimately reduce overall productivity.

\* Corresponding author, email address: [arifrachmanputra.caniago@gmail.com](mailto:arifrachmanputra.caniago@gmail.com)

Modern communication tools such as project management software applications are available, but not all construction projects have been able to optimize their use to the fullest (Sweis et al., 2014).

Increased productivity in the construction sector has a direct impact on project efficiency and successful on-time completion. High productivity means maximum utilization of time, workers, and resources, which in turn reduces wastage and ensures every stage of the project goes according to plan (Djaelani et al., 2021). With the high demand for infrastructure development and other construction projects, it is imperative to ensure that project management is optimized to avoid major losses. A good project management system is able to identify risks early on, plan schedules more accurately, and manage resource allocation wisely (Badewi, 2016). Addressing these issues in project management is important to increase profits, and to support the sustainable development of the construction industry and create a more efficient working environment for workers.

The objective of this research is to identify and analyze the application of project management techniques that can improve work productivity and efficiency in the construction sector. It is important to analyze various approaches that can be implemented to improve operational effectiveness, which in turn can improve project quality and outcomes. By understanding effective methods of planning, time management, and resource utilization, it is expected that approaches can be found that can reduce waste, speed up the work process, and improve the overall output of construction projects.

## RESEARCH METHOD

The research method with a literature study approach is one of the effective ways to explore various concepts and findings relevant to the topic of project management in improving the productivity of construction workers. Researchers in this approach collect and analyze various available sources of information, such as academic journals, books, industry reports, and articles from conferences (Mardikaningsih & Darmawan, 2013). The aim was to provide an understanding of best practices in project management that can contribute to efficiency and productivity in the construction sector. This literature study identifies management techniques that are already implemented, and evaluates the challenges, solutions, and implications faced in the implementation of these techniques (Huang & Zhang, 2015). The literature study approach can thus provide a comprehensive overview of the various perspectives that exist in the related literature.

The literature review approach also provided an opportunity to explore the existing knowledge gaps in the field of construction project management. Analyzing various previous research, helped the researcher to be able to see how previous research suggested or failed to address the key challenges facing the construction industry regarding worker productivity. This approach also allows researchers to identify recent trends or developments in project management techniques, as well as provide a theoretical basis for further research. For example, research by O'Connor and Cagley (2014) showed the importance of using technology in project management to optimize productivity, while Huang et al. (2016) suggested that better coordination between project teams is important to reduce waste of time and resources in construction projects. Analysis from these various sources will provide valuable insights for practitioners and policy makers in the construction sector.

## RESULT AND DISCUSSION

Executing effective project management requires a structured and systematic approach, starting with careful planning. It is important at this stage to set clear and measurable objectives, and define the project scope in detail (Meredith et al., 2017). The project team should identify all stakeholders involved and understand their needs and expectations. Stakeholders being involved from the start, helps the project manager to be able to ensure that all perspectives are considered, which will help in reducing the risk of conflict later on. Planning also includes the development of a realistic schedule and proper allocation of resources, including budget, manpower, and technology required to achieve the project goals (Pellerin & Perrier, 2019).

The next stage after planning is execution, where the plans that have been developed are implemented. At this stage of implementation, effective communication is key to ensure that all team members understand their roles and responsibilities. Without good communication, miscommunication can occur leading to unneeded errors or delays, which can be detrimental to the project as a whole. The project manager should actively monitor the progress of the project and make adjustments if needed. The use of project management tools, such as collaboration and task tracking software, can help the team stay organized and focused on the set goals. Project managers should encourage a collaborative work culture, where team members feel comfortable sharing ideas, providing feedback, and addressing emerging issues together (Radjawane & Darmawan, 2022).

Project evaluation and closure is also an important part of effective project management. The next step after the project is completed is to conduct a thorough review to evaluate the results achieved compared to the original objectives. This process involves gathering feedback from all stakeholders and team members to identify successes as well as areas that need improvement. In-depth analysis of the lessons learned from this experience enables the organization to improve the project management process in the future, avoid similar mistakes, and improve quality in future projects. A good project closure also includes complete documentation, which will be a valuable reference for future projects. Following structured project evaluation and closure steps, organizations can improve overall project management effectiveness, produce more satisfactory results, and add significant value to the organization, both in the short and long-term.

The application of effective project management techniques can increase the productivity and efficiency of construction workers at various stages of the project, from planning, implementation, to completion. One of the main aspects of effective project management is careful planning, which includes scheduling, resource allocation, and setting a realistic budget (Kerzner, 2018). With this good planning, all stages of the project can run more smoothly without any delays caused by lack of coordination or poor management. This helps reduce the risk of delays caused by lack of coordination or poor management, as well as providing a clear picture of how the project will be implemented from start to finish (Khalid, 2017). Project management techniques such as WBS and CPM help identify and manage the critical path in the project, so that completion time can be estimated more accurately, and resources can be allocated optimally (Kerzner, 2017). The application of effective project management techniques such as WBS and CPM contributes greatly to improving the efficiency and productivity of construction workers throughout all stages of the project.

Effective time management using scheduling techniques such as Gantt charts and project management software can reduce delays in project completion. Gantt charts, for example, provide a clear visual representation of the timeline and dependencies between various tasks, allowing project managers to identify potential delays early (Gerald & Lechter, 2012). This is especially important in construction projects that typically involve multiple parties and many interdependent activities. This proper time management helps workers to be able to focus on their tasks without being distracted by unplanned issues, thus improving their work efficiency and productivity (Lock, 2020).

Project management techniques also include risk management, which is critical to ensuring the smooth running of a construction project. Poorly managed risks can lead to delays, waste, or even project failure (Kendrick, 2015). Seeing this, risk identification and mitigation are important aspects in every stage of the project. One frequently used method is SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis which helps the project manager team to anticipate possible obstacles and plan appropriate mitigation measures (Milosevic, 2010). Risks can also be managed using probabilistic analysis methods, such as Monte Carlo simulation, which provides more accurate predictions of the potential impact of various risk factors (Hillson & Murray-Webster, 2017). By incorporating various approaches to risk management, construction projects can be executed more prepared and resilient to uncertainty, significantly increasing their chances of success.

The use of technology in terms of resource management can also improve the productivity of construction workers. Technology-based project management tools, such as BIM, make it easier for project managers to plan and manage resources more efficiently (Heigermoser et al., 2019). BIM allows for better monitoring and coordination between various teams, and minimizes errors that can occur due to miscommunication or improper planning. Workers using BIM can get clearer instructions on the work to be done, which increases efficiency and reduces the likelihood of errors that could slow down the project (Eastman et al., 2011). 3D visualization and simulation of work sequences help workers better understand the tasks to be performed, so they can work faster and with fewer errors. When errors are reduced, the time and cost spent on repairs are reduced.

Effective communication between project managers, workers, and subcontractors in the execution stage is important to ensure that the project goes according to plan. Communication is the main bridge in conveying important information related to work schedules, design changes, material needs, and work safety standards (Drugova et al., 2021). Poor communication is often the main cause of delays and waste in construction projects. Establishing a strong and open communication system is a top priority in the implementation phase. Implementing a clear and structured communication system, such as daily meetings or the use of web-based communication applications, can speed up the flow of information and ensure that all parties involved have the same understanding of the project's progress. According to Cohen and Shih (2013), workers with better communication can work more efficiently because they know the priorities and deadlines to be met.

Effective project management techniques also focus on managing quality. In the construction industry, poor quality work can affect the overall project outcome and lead to additional costs due to necessary repairs (Winch, 2012). To ensure that quality is maintained, the implementation of a quality management system such as ISO 9001 can provide guidance on the operational standards and procedures to be followed in each stage of the work. By setting clear standards and conducting regular inspections, project managers can ensure that work is performed in accordance with established quality requirements (Juran & Godfrey, 1999). Regular inspections allow project managers to detect potential problems early and take immediate corrective action before the problem grows larger. Quality control must be thorough and continuous so that the project can be completed in accordance with technical specifications, client expectations, and applicable work safety standards.

Good project management also involves continuous monitoring and evaluation of project progress. Techniques such as Earned Value Management (EVM) allow project managers to measure project performance based on the costs that have been incurred and the time that has been used, compared to the established budget and schedule. By using EVM, project managers can identify deviations from the original plan and take corrective action before problems become bigger. Continuous monitoring ensures that all activities stay on track and that the project can be completed within the planned budget and time (Fleming & Koppelman, 2010). Continuous evaluation helps project managers anticipate risks before they become major problems, and strengthens transparency to project stakeholders. The use of EVM is not just about performance reporting, but also as a strategic tool for project planning and control.

Worker motivation also plays an important role in improving productivity in the construction sector. The physically demanding and stressful construction work environment requires managerial support (Djaelani et al., 2021). The implementation of effective project management techniques also includes managerial aspects, such as incentivizing and recognizing workers' performance. A good incentive system can motivate workers to work more efficiently and achieve set targets (Jahroni et al., 2021). For example, providing bonuses or awards based on certain achievements can spur workers to improve their performance. Workers' productivity can increase, as they feel valued for their contributions with motivation-based management (Akanbi et al., 2018). Motivated workers will show higher commitment to the project and be more responsive to managerial directives.

Effective project managers also need to pay attention to occupational safety and health aspects. Construction projects have a high level of risk of work accidents. The implementation of an occupational safety and health system is about meeting regulations, important investment in maintaining the continuity of project operations, and the welfare of the workers (Djaelani & Darmawan, 2016). Workers who work in safe and healthy conditions tend to be more productive as they are not bothered by injuries or illnesses that could affect their performance. The implementation of strict safety procedures and the provision of adequate health facilities are of paramount importance in any construction project. Good safety protects workers and increases efficiency as workers can work without worrying about the risk of injury (Hinze, 2006).

The successful project manager must also be able to manage conflicts that may arise among the project team. Poorly resolved conflicts can disrupt project progress and decrease worker productivity. Effective project management techniques require a clear and implementable conflict resolution strategy (Maiti & Choi, 2021). One approach that is often used is mediation, where an independent mediator helps resolve disputes in a constructive and productive way. This approach allows all parties to present their points of view, build mutual understanding, and reach an agreement without the need to take the issue to legal channels or greater escalation. By managing conflicts well, projects can run more smoothly, and project teams keep working with high morale (Jeong & Choi, 2015).

Information technology also plays an important role in speeding up decision-making that impacts project efficiency. Cloud-based tools and project management software allow managers to share information in real-time, manage budgets, and track project progress remotely (Bajwa & Deichmann, 2018). Right technology can make project managers faster and more accurate decisions, which can further reduce the time it takes to complete work and increase worker productivity (Zhang et al., 2015). Investing in the right information system is one of the strategic steps in improving the overall performance of construction projects.

Overall, the implementation of effective project management techniques can improve the productivity and efficiency of construction workers in a structured and systematic way. From careful planning, managing time, risks, resources, to motivating workers, every aspect of project management contributes to a smooth and successful project. By paying attention to all these elements, the construction sector can overcome existing challenges and significantly increase worker productivity, which will further bring a positive impact on cost efficiency and overall project success.

## CONCLUSION

The application of effective project management techniques plays a crucial role in increasing the productivity and efficiency of construction workers at various stages of a project. Starting from careful planning, proper time management, to the use of supporting technology, each managerial element makes an important contribution to the smooth running of the project. Techniques such as Work WPS, CPM, and BIM allow project managers to optimally manage resources, reduce risks, and minimize waste. In addition, aspects of good communication, quality management, and worker motivation are also important factors that improve performance in the field. If all these elements are applied synergistically, then worker productivity will increase significantly, and projects can be completed on time with optimal quality.

## REFERENCES

- Akanbi, A. T., Oyewobi, L. O., & Akinmoladun, O. M. (2018). Examining the Effects of Motivation on the Productivity of Construction Workers in Nigeria. *International Journal of Construction Management*, 18(1), 35-45.
- Azhar, S. (2013). Building Information Modeling (BIM): Trends, Benefits, Risks, and Challenges for the AEC Industry. *Leadership and Management in Engineering*, 13(3), 241-252.
- Badewi, A. (2016). The Impact of Project Management (PM) and Benefits Management (BM) Practices on Project Success: Towards Developing a Project Benefits Governance Framework. *International journal of project management*, 34(4), 761-778.
- Bajwa, A., & Deichmann, R. (2018). How Digitalization influences Project Management Acceptance of Cloud-based Project Management Tools. *Theses*, Chalmers University of Technology.
- Changali, S., Mohammad, A., & van Nieuwland, M. (2015). The Construction Productivity Imperative. *McKinsey Quarterly*, 1-10.
- Chien, S. (2016). A Framework for Managing Construction Projects. *Journal of Construction Engineering and Management*, 142(9), 04016061.
- Darmawan, D. (2021). Objective Vagueness, Appraisal Bias, and Lack of Employee Involvement in Performance Appraisal and Job Satisfaction in Organizations, *Journal of Social Science Studies*, 1(1), 117 – 122.
- Djaelani, M., Sinambela, E. A., Darmawan, D., & Mardikaningsih, R. (2021). Strengthening the Culture of Occupational Safety and Health as a Contributor to the Formation of Construction Project Performance. *Journal of Marketing and Business Research*, 1(2), 59-70.
- Djaelani, M., Sudjai, S., Munir, M., & Darmawan, D. (2021). The Effect of Supervision, Compensation Systems, and Organizational Commitments on the Performance of Employees in Construction Services Companies. *Jurnal Ilmiah Edunomika*, 6(1), 110-118.
- Djaelani, M., & Darmawan, D. (2016). Studi Tentang Program Keselamatan dan Kesehatan Kerja (K3) Serta Kompetensi Lintas Budaya terhadap Kinerja Pekerja Konstruksi. *EBIS: Jurnal Ekonomi dan Bisnis*, 6(2), 11-17.
- Drugova, E. S., Zhelnovakova, M. F., Pomuleva, Y. A., & Kazorina, A. V. (2021). Specifics of Advertising Communication in the Construction Sector: Features, Ways to Attract Attention and Directions of Functioning. *In IOP Conference Series: Earth and Environmental Science*, 751(1), 012142.
- Eastman, C., Teicholz, P., Sacks, R., & Liston, K. (2011). *BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors*. John Wiley & Sons.
- Fleming, Q. W., & Koppelman, J. M. (2010). *Earned Value Project Management* (3th Ed.). Project Management Institute.
- Geraldi, J., & Lechter, T. (2012). Gantt Charts Revisited: A Critical Analysis of its Roots and Implications to the Management of Projects Today. *International Journal of Managing Projects in Business*, 5(4), 578-594.
- Gurmu, A. T., & Aibinu, A. A. (2018). Survey of Management Practices Enhancing Labor

- Productivity in Multi-storey Building Construction Projects. *International Journal of Productivity and Performance Management*, 67(4), 717-735.
- Heigermoser, D., de Soto, B. G., Abbott, E. L. S., & Chua, D. K. H. (2019). BIM-based Last Planner System Tool for Improving Construction Project Management. *Automation in Construction*, 104, 246-254.
- Hinze, J. (2006). *Construction Safety*. Prentice Hall.
- Hillson, D., & Murray-Webster, R. (2017). *Understanding and Managing Risk Attitude*. CRC Press.
- Huang, T., Li, Q., & Zeng, S. (2016). A Systematic Review of Project Management in Construction. *Journal of Construction Engineering and Management*, 142(8), 04016047.
- Huang, X., & Zhang, X. (2015). Key Success Factors for Managing Construction Projects in China. *International Journal of Project Management*, 33(1), 44-56.
- Jahroni, Darmawan, D., Mardikaningsih, R., & Sinambela, E. A. (2021). Peran Insentif, Perilaku Kepemimpinan, dan Budaya Organisasi terhadap Penguatan Komitmen Organisasi. *Jesya (Jurnal Ekonomi dan Ekonomi Syariah)*, 4(2), 1389-1397.
- Jeong, H., & Choi, Y. (2015). Conflict Management in Construction Projects: A Case Study Approach. *Construction Management and Economics*, 33(5), 333-344.
- Kendrick, T. (2015). *Identifying and Managing Project Risk: Essential Tools for Failure-proofing Your Project*. Amacom.
- Kerzner, H. (2018). *Project Management Best Practices: Achieving Global Excellence*. John Wiley & Sons.
- Kerzner, H. (2017). *Project Management: A Systems Approach to Planning, Scheduling, and Controlling* (12th Ed.). John Wiley & Sons.
- Khalid, F. J. I. (2017). The Impact of Poor Planning and Management on the Duration of Construction Projects: A Review. *Multi-knowledge Electronic Comprehensive Journal for Education and Science Publications*, 2, 161-181.
- Kwak, Y. H., & Anbari, F. T. (2009). Impact of Critical Success Factors Across the Project Life Cycle. *International Journal of Project Management*, 27(5), 524-531.
- Lock, D. (2020). *Project Management* (11th Ed.). Gower Publishing.
- Maiti, S., & Choi, J. H. (2021). Investigation and Implementation of Conflict Management Strategies to Minimize Conflicts in the Construction Industry. *International Journal of Construction Management*, 21(4), 337-352.
- Mardikaningsih, R., & Darmawan, D. (2013). *Metode Penelitian Kuantitatif*. IntiPresindo Pustaka.
- Mardikaningsih, R. & D. Darmawan. (2021). Business Sustainability Strategies in the Facing of Regulatory Uncertainty and Managerial Challenges, *Journal of Social Science Studies*, 1(2), 111 - 118.
- Meredith, J. R., Shafer, S. M., & Mantel Jr, S. J. (2017). *Project Management: A Strategic Managerial Approach*. John Wiley & Sons.
- Milosevic, I. N. (2010). Practical Application of SWOT Analysis in the Management of a Construction Project. *Leadership and Management in Engineering*, 10(2), 78-86.
- O'Connor, P., & Cagley, J. (2014). The Role of Technology in Construction Project Management. *Journal of Construction Engineering and Management*, 140(10), 04014060.
- Pellerin, R., & Perrier, N. (2019). A Review of Methods, Techniques and Tools for Project Planning and Control. *International Journal of Production Research*, 57(7), 2160-2178.
- Radjawane, L. E., & Darmawan, D. (2022). Construction Project Worker Satisfaction Reviewing from the Role of the Work Environment and Leadership. *International Journal of Service Science, Management, Engineering, and Technology*, 1(3), 36-40.
- Shan, Y., Zhai, D., Goodrum, P. M., Haas, C. T., & Caldas, C. H. (2016). Statistical Analysis of the Effectiveness of Management Programs in Improving Construction Labor Productivity on Large Industrial Projects. *Journal of Management in Engineering*, 32(1), 04015018.
- Shehata, M. E., & El-Gohary, K. M. (2011). Towards Improving Construction Labor Productivity and Projects' Performance. *Alexandria Engineering Journal*, 50(4), 321-330.
- Sweis, G. J., Sweis, R. J., & Hammad, A. A. (2014). The Impact of Poor Communication on Construction Projects. *International Journal of Project Management*, 32(1), 100-107.
- Winch, G. M. (2012). *Managing Construction Projects*. John Wiley & Sons.
- Zhang, L., Li, Q., & Wang, X. (2015). The Role of Cloud Computing in Project Management. *International Journal of Project Management*, 33(2), 417-429.

\*Amri, M. W. & A. R. Putra. (2022). Project Management Techniques to Improve Construction Workers' Efficiency and Productivity, *Journal of Social Science Studies*, 2(2), 177 - 182.