

# Implementation of Green Project Management in the Construction

Kelvin Leo, Riri Nur Fadilah, Viridyansyah Nayuandika, Rachmat Kurnia Prayogo, Yudi Prastyo

Department of Industrial Engineering, Pelita Bangsa University, Bekasi, Indonesia

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## ABSTRACT

Green Project Management (GPM) is an innovative approach that integrates sustainability principles into the entire construction project life cycle. This research aims to conduct a literature review on the implementation of GPM in the construction industry, focusing on the concepts, principles, practices, impacts, and factors influencing the success of its implementation. This literature study reviews various literature sources, including scientific journals, books, and research reports from databases such as Google Scholar, SpringerOpen, SpringerLink, and ScienceDirect. The results showed that GPM has great potential to improve the performance of construction projects from various aspects, including environmental, social, and economic. The implementation of GPM has been proven to reduce environmental impacts, increase resource efficiency, improve the quality of life, and provide long-term economic benefits. This research also identifies several challenges in implementing GPM, such as a lack of awareness and knowledge, limited resources, and a lack of supportive regulations. Therefore, collaborative efforts from various parties are needed to overcome these challenges and encourage the wider implementation of GPM in the construction industry.

**Keywords:** Green Project Management, Sustainable Construction, Green Construction, Green Building, Green Project Management.

## INTRODUCTION

The construction industry, as one of the largest economic sectors in the world, plays a significant role in infrastructure development and community welfare. However, this sector is also a one of major contributor to environmental degradation, high resource consumption, and greenhouse gas emissions. This is consistent with (Chen et al., 2022) which conveys that increasing global industrialization and urbanization have consumed a huge amount of non-renewable energy and released a significant amount of greenhouse gases, resulting in a rise in global temperature and causing numerous environmental degradation issues. (Chen et al., 2022) also conveys that construction activities account for 36% of global energy consumption and 39% of global carbon dioxide emissions. To overcome this challenge, the concept of Green Project Management (GPM) has emerged as an innovative approach that integrates sustainability principles into the entire construction project life cycle.

GPM, as defined by (Köhler et al., 2012), is a project management approach that integrates sustainability principles into the entire project life cycle. GPM not only focuses on reducing negative impacts on the environment but also considers social and economic aspects. This definition shows that GPM is a holistic approach that considers sustainability in a broad sense. GPM is not just about “being green”, but also about ensuring that projects benefit society and contribute to sustainable economic development. This concept

itself covers various practices, ranging from the use of environmentally friendly materials, energy efficiency, and waste management, to consideration of the social and economic impacts of the project.

Previous research has shown the potential of GPM in improving the environmental performance of construction projects. For example, (Chou et al., 2017) explained that the implementation of GPM can provide significant benefits in achieving the sustainability goals of construction projects. The criteria developed in this study can help project managers identify and prioritize important aspects of GPM, such as environmental risk management, resource management, and stakeholder involvement.

However, this research also identifies several challenges in implementing GPM. One of the main challenges in implementing green project management (GPM) is the lack of understanding and awareness of GPM concepts and principles among construction industry practitioners. This is supported by (Abdelkhalik & Azmy, 2022), who state that there is a lack of management methods that address sustainable construction projects, which can be interpreted as a lack of understanding of GPM principles among construction practitioners. In addition, the implementation of GPM also requires organizational cultural change and commitment from all stakeholders, as (Abdelkhalik & Azmy, 2022) state that unspecified responsibilities between stakeholders in green building projects lead to difficulties in managing and implementing green buildings. Another challenge is the lack of adequate tools and methodologies to comprehensively measure and evaluate GPM performance.

Therefore, this research aims to conduct a literature review on the implementation of GPM in the construction industry. Specifically, this research will identify and analyze the concepts and principles of GPM practice, evaluate the impact of GPM implementation, and identify key factors that influence the success of its implementation. Thus, this research is expected to make a valuable contribution to the development of GPM knowledge and practice, as well as encourage transformation towards a more sustainable construction industry.

## **RESEARCH METHOD**

This research uses qualitative approach methods and literature review methods to review various things regarding Green Project Management, such as sustainability, green construction, green project, green building, sustainable construction, and so on related to this.

The literature review is conducted by systematically reviewing diverse literature sources, including scientific journals, books, research reports, and other related documents. The literature search utilizes relevant keywords such as “Green project management, sustainable construction, green construction, green building, and green project management.” The selected literature sources are then analyzed to identify concepts and principles of practice, as well as the impact of GPM. Additionally, this literature study identifies factors that influence the successful implementation of GPM. The literature search is performed using databases such as Google Scholar, SpringerOpen, SpringerLink, and ScienceDirect. The results of the analysis of this literature study are used to answer research questions and achieve research objectives, which aim to contribute to the development of GPM knowledge and practice in the construction industry.

## **RESULTS AND DISCUSSION**

### **A. Concepts and Principles of Green Project Management Practices**

Green Project Management is a multidimensional concept with various definitions and approaches. According to (Kubba, 2010), the concept of GPM is rooted in the principles of sustainable development applied in the context of project management. GPM not only focuses on reducing environmental impacts but

also considers social and economic aspects. The principles mentioned are: Reducing resource consumption, minimizing waste and pollution, improving indoor environmental quality, life cycle considerations, and stakeholder collaboration and involvement. Then the research (Malik et al., 2023) expands the understanding of the concepts, principles, and practices of GPM by focusing on how GPM can contribute to sustainable competitive advantage (SCA) through green knowledge acquisition (GKA). The research emphasizes that GPM practices are not only about reducing environmental impacts but also about creating added value for the organization. GPM can help organizations acquire relevant green knowledge and technology, which in turn can improve operational efficiency, reduce costs, and create more sustainable products or services. This research is in line with research (Hawang & Tan, 2012) which confirms that GPM is a project management approach that integrates sustainability principles into the entire construction project life cycle. Then in further research (Hwang et al., 2017) identified several key principles of GPM, including: Reducing environmental impacts, Improving quality of life, Economic efficiency..

## **B. Success Factors and Challenges in Implementing the Blue Ocean Strategy**

The application of Green Project Management can be in the form of green construction and sustainable development. Every application of this concept will definitely have an impact, both positive and negative. In the study (Milala et al., 2022) provides qualitative evidence of the potential positive impact of GPM on the environment, social, and economic. The application of green buildings at ATBU Bauchu shows the potential for reducing environmental impacts, improving the quality of the campus environment, and long-term economic benefits.

Then (Xiao et al., 2021), explained that the effective implementation of GPM, including risk management and scheduling integrated with sustainability principles, can improve project schedule reliability, reduce costs due to delays, and increase client satisfaction. This shows that GPM has the potential to have a positive impact on the performance of construction projects, not only in terms of environment and social but also in terms of economy and management.

(Putra et al., 2021), in his research on green construction, shows that the application of Green Project Management (GPM) principles, such as the use of environmentally friendly materials, energy efficiency, and waste management, has been implemented in the Gianyar Public Market development project. The results of this study also underline the importance of using tools such as the Green Construction Assessment Model in evaluating the level of success of GPM implementation in construction projects.

Research (Firmawan et al., 2023) shows that the Jragung Dam project has implemented several Green Project Management (GPM) principles and practices, such as the use of environmentally friendly materials, energy and water efficiency, construction waste management, and environmental conservation. This research also highlights the potential benefits of GPM, such as reducing environmental impacts, increasing efficiency, and improving the project's image. This research also identifies several challenges in implementing GPM in Indonesia, such as a lack of awareness and knowledge about GPM, as well as limited resources and technology.

Research (Adiantanti & Sucita, 2020) shows that the implementation of Green Project Management (GPM) in the Apartment X project in Central Jakarta has succeeded in implementing various GPM practices, such as the use of environmentally friendly materials, energy and water efficiency, construction waste management, and improvement of indoor environmental quality. The results of this study strengthen the evidence that GPM can be effectively implemented in construction projects in Indonesia, providing real benefits for the environment, economy, and society, although there are still challenges in its implementation.

Then in the study (Widyawati, 2018) emphasized the positive impact of implementing green buildings on the environment and economy, especially through energy savings and carbon emission reductions. GPM

practices such as the use of environmentally friendly materials, energy and water efficiency, good waste management, and effective operational management contribute to achieving sustainability goals. The success of Menara BCA in obtaining GreenShip Platinum certification shows that the implementation of GPM can improve the image and value of buildings.

### C. Factors Affecting the Successful Implementation of Green Project Management

The literature study that has been conducted identifies several key factors that influence the successful implementation of Green Project Management (GPM) in construction projects. These factors can be grouped into internal and external factors.

#### Internal Factors:

- **Top management commitment:** Support and commitment from top management are crucial factors in the successful implementation of GPM. Top management needs to provide clear direction, allocate adequate resources, and create an organizational culture that supports sustainable practices.
- **Knowledge and skills:** Adequate knowledge and skills about GPM among project teams are very important. Training and capacity development need to be carried out continuously to ensure that the project team has the necessary competencies to implement GPM effectively.
- **Integration of GPM into project management systems:** GPM needs to be integrated into existing project management systems, such as planning, budgeting, and project control. This will ensure that sustainability principles are an integral part of the entire project management process.
- **Stakeholder involvement:** Active involvement of all stakeholders, including clients, consultants, contractors, and the surrounding community, is very important in the successful implementation of GPM. Effective communication and collaboration can help build trust and support from all parties involved.

#### External Factors:

- **Government regulations and policies:** Government regulations and policies that support sustainable practices can be a strong driver for the implementation of GPM. Incentives and awards for projects that implement GPM can encourage more companies to adopt this approach.
- **Availability of green technology and materials:** The availability of affordable and easily accessible green technology and materials can facilitate the implementation of GPM. Government and industry support in the development and provision of green technologies and materials is very important.
- **Market and consumer demand:** Increasing consumer demand for sustainable products and services can encourage the construction industry to adopt GPM. Companies that can meet this market demand will have a competitive advantage.
- **Economic and social conditions:** Economic and social conditions can also affect the successful implementation of GPM. For example, in difficult economic conditions, companies may be reluctant to invest in GPM because it is considered to increase project costs.

A comprehensive understanding of these factors can help practitioners and policymakers develop effective strategies to improve the implementation of GPM in the construction industry. By overcoming challenges and taking advantage of existing opportunities, GPM can be the key to realizing sustainable development in the construction sector.

## CONCLUSIONS

Studies that have been conducted show that GPM has great potential to improve the performance of construction projects from various aspects, including environmental, social, and economic. The

implementation of GPM has been proven to reduce environmental impact, improve resource efficiency, improve quality of life, and provide long-term economic benefits. Although there are still challenges in its implementation, such as lack of awareness and knowledge, limited resources, and lack of supportive regulations, GPM is the key to realizing a more sustainable construction industry in Indonesia. Further research is needed to develop better tools and methodologies for measuring and evaluating GPM performance, as well as to address existing challenges.

## REFERENCES

1. Abdelkhalik, H. F., & Azmy, H. H. (2022). The role of project management in the success of green building projects: Egypt as a case study. *Journal of Engineering and Applied Science*, 69(1), 1–17. <https://doi.org/10.1186/s44147-022-00112-5>
2. Adiantanti, N., & Sucita, I. K. (2020). Penerapan Konstruksi Hijau pada Proyek Apartemen X di Jakarta Pusat. *Construction and Material Journal*, 2(2), 91–98.
3. Chen, L., Msigwa, G., Yang, M., Osman, A. I., Fawzy, S., Rooney, D. W., & Yap, P. S. (2022). Strategies to achieve a carbon neutral society: a review. In *Environmental Chemistry Letters* (Vol. 20, Issue 4). Springer International Publishing. <https://doi.org/10.1007/s10311-022-01435-8>
4. Chou, Y.-C., Yang, C.-H., Lu, C.-H., Dang, V. T., & Yang, P.-A. (2017). Building criteria for evaluating green project management: An integrated approach of DEMATEL and ANP. *Sustainability*, 9(5), 740.
5. Firmawan, F., Kuncoro, A. H. B., & Budiningrum, D. S. (2023). Implementasi Green Construction Pada Proyek Konstruksi Pembangunan Bendungan Jragung, Semarang. *Jurnal Teknik Sipil*, 19(2), 293–307.
6. Hawang, B., & Tan, J. S. (2012). *Sustainable project management for green construction: challenges, impact and solutions*.
7. Hwang, B.-G., Zhu, L., & Ming, J. T. T. (2017). Factors affecting productivity in green building construction projects: The case of Singapore. *Journal of Management in Engineering*, 33(3), 4016052.
8. Köhler, M. A., Silvius, M. G., van den Brink, M. J., Schipper, M. R., & Planko, M. J. (2012). *Sustainability in project management*. Gower Publishing, Ltd.
9. Kubba, S. (2010). *Green construction project management and cost oversight*. Butterworth-Heinemann.
10. Malik, M., Ali, M., Latan, H., & Chiappetta Jabbour, C. J. (2023). Green project management practices, green knowledge acquisition and sustainable competitive advantage: empirical evidence. *Journal of Knowledge Management*, 27(9), 2350–2375.
11. Milala, S. I., Danladi, A., Manga, S. H., & Ibrahim, I. (2022). CHALLENGES TO BUILDING SUSTAINABILITY; CASE STUDY OF GREEN BUILDING IMPLEMENTATION IN ABUBAKAR TAFAWA BALEWA UNIVERSITY BAUCHI, NIGERIA. *Journal of Environmental Science and Sustainable Development*, 5(2), 340–358.
12. Putra, I. P. A. W. D., Winaya, I. N. A. P., & Yasada, G. (2021). ANALISIS IMPLEMENTASI KONSTRUKSI HIJAU MENGGUNAKAN MODEL ASSESSMENT GREEN CONSTRUCTION (Studi Kasus Proyek Pembangunan Pasar Umum Gianyar). *Proceedings*, 9(1), 21–31.
13. Widyawati, R. L. (2018). *Green Building Dalam Pembangunan Berkelanjutan Konsep Hemat Energi Menuju Green Building Di Jakarta*. *Karya Lintas Ilmu Bidang Rekayasa Arsitektur, Sipil, Industri*, 13, 01–17.
14. Xiao, L., Bie, L., & Bai, X. (2021). Controlling the schedule risk in green building projects: Buffer management framework with activity dependence. *Journal of Cleaner Production*, 278, 123852.