

## **ABSTRACT**

*The Indonesian shipbuilding industry plays a crucial role in supporting the development of national maritime infrastructure. However, many shipyards still face project management challenges due to the limitations of conventional, manual, and unintegrated approaches, which are prone to delays, cost overruns, and technical miscommunication. These issues are further compounded in large projects such as the construction of a 300-foot deck barge. In this context, the adoption of Building Information Modeling (BIM) becomes relevant as a digital solution to optimize the efficiency of time, costs, and overall project documentation.*

*This study aims to compare the effectiveness of conventional and BIM approaches in barge construction project management. The study focuses on three main variables: project duration (time), actual costs, and technical documentation. The theoretical framework in this study is based on the concepts of operations management, project management, and BIM technology as a digital transformation strategy. These theories form the basis for the rationale and relevance of the variables used in the study.*

*The research method uses a comparative quantitative approach, with descriptive statistical data analysis techniques and two-sample independent t-tests. Data are drawn from the documentation of 15 barge construction projects from 2022–2024 at PT. SKY Pulau Batam. The operationalization of the variables was divided into: construction method (conventional/BIM), actual project duration, actual costs relative to the Budget (RAB), and documentation (number of drawing revisions and RFIs). Data validity was supported by the company's documentation sources.*

*The results showed that the BIM method significantly improved project implementation efficiency. The average duration of a full BIM project was 20% shorter than the conventional method. The variance between actual costs and the RAB decreased to  $\pm 0\%$ , while the conventional method experienced a deviation of up to  $+10\%$ . Project documentation was also more accurate, as evidenced by a significant reduction in drawing revisions and delayed information requests.*

*Based on these results, this study concludes that implementing BIM can be an effective strategy for improving the efficiency, accuracy, and transparency of shipbuilding projects. Practical implications: The results of this study can serve as the basis for recommendations for developing internal company policies, planning digital technology investments, and strengthening the competitiveness of the national shipbuilding industry.*

*Keywords: Project Management, BIM, Deck Barge, Time Efficiency, Project Efficiency, Cost Estimation, Shipyard, Digitalization.*