

# SCRUM IN CONSTRUCTION INDUSTRY TO IMPROVE PROJECT PERFORMANCE IN DESIGN PHASE

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**Abstract-** This research explores integrating Scrum, an Agile project management framework, from IT into construction. Traditional construction management falls short in meeting evolving client needs, leading to increased project risks and reduced performance. Through literature review and analysis, this thesis uncovers Scrum's benefits and limitations. Case studies, interviews, and literature reveal its potential in mitigating risks and enhancing project performance, particularly in the design phase. Ultimately, this study identifies Scrum's advantages in construction project design, predicts Agile's future in the industry, and offers recommendations for further research.

**Index Terms:** scrum in construction industry to improve project performance in Design Phase.

## I. INTRODUCTION

Project management plays an extremely integral role in construction projects throughout all phases from design to onsite construction. There are two major reasons for this: the high degree of the project complexity and the magnitude of project uncertainty. Decades ago, architects were rarely involved in construction process and phases besides the design phases. However, as the industry developed, so have the roles of architects. According to Gandhi (2014), architects are expected to be equipped with a comprehensive set of skills, including having a strong understanding of the real-estate market, post-construction demands planning, and coordination and control of diverse stakeholders and new construction technologies. Therefore, project management skills are highly needed by contemporary architectural and construction firms.

This thesis lays the groundwork for investigating how management can enhance construction project performance compared to traditional methods. Through literature review and real-world case studies, it examines Scrum's potential. Further empirical research, including surveys and interviews, will provide insights into its impact on project deliverable quality.

## II. LITERATURE REVIEW

Incorporating Scrum elements into building design projects enhances flexibility and team collaboration, while organizations benefit from adopting lean, agile, and sustainable approaches for robust supply chain strategies. Success in logistics, production, and risk-prone projects is showcased by Agile Design and Management (ADM), emphasizing its broad applicability. Agile methodologies accelerate project execution, particularly benefiting interdisciplinary design teams. Encouragement for theory-driven research aims to deepen understanding of agile and Scrum practices, contributing to software development's scientific discipline. Agile-Lean methods prove optimal for enhancing sustainability and overall supply chain resilience, while policy shifts are urged to promote Building Information Modeling (BIM) usage in construction, highlighting integration benefits with Agile and BIM.

## III. OBJECTIVE

1. Architecture is described as 20% design and 80% management, emphasizing the crucial role of effective project management in construction.
2. In construction, where innovation and creativity are paramount, each project's unique nature demands careful planning and adept handling of changes.
3. Measuring project performance is challenging in the construction industry, particularly during the design phase, requiring optimization strategies.

4. The construction industry faces ongoing challenges due to poor project performance, impacting timelines and market expectations.
5. The research aims to investigate Agile Scrum's application in improving project performance, with a specific focus on the design phase.
6. The methodology involves a literature review for proposal development and subsequent use of surveys, questionnaires, and interviews for focused data collection during the research.

#### IV. RESEARCH GAP

While the implementation of Scrum in the construction industry to improve project performance shows promising benefits, there exist notable research gaps that warrant further investigation. One significant gap lies in the lack of comprehensive empirical studies specifically focusing on the application of Scrum methodologies within construction projects. Existing literature primarily consists of theoretical discussions and anecdotal evidence, with limited empirical data to support the efficacy of Scrum in this context.

Furthermore, there is a dearth of research examining the scalability of Scrum practices to suit the unique complexities and challenges inherent in large-scale construction projects. Most studies focus on smaller-scale or pilot projects, leaving a gap in understanding how Scrum can effectively address the complexities of larger and more intricate construction endeavors.

Additionally, there is a need for research exploring the integration of Scrum with other prevalent methodologies in the construction industry, such as Building Information Modeling (BIM) and Lean Construction. Understanding how these methodologies can complement each other and enhance project outcomes remains largely unexplored.

Moreover, while some research touches upon the benefits of Scrum in improving project performance metrics like cost and schedule adherence, there is a lack of in-depth analysis into its impact on other critical factors such as safety, quality, and stakeholder satisfaction.

Addressing these research gaps through rigorous empirical studies and interdisciplinary research efforts will provide valuable insights into the effectiveness of Scrum in improving project performance within the construction industry, ultimately facilitating its wider adoption and implementation.

#### V. CONCLUSION

IT and software development fields gained significant benefits from applying the Agile approach. The objective of this thesis is to deeply explore and analyze the advantages of implementing Scrum in construction projects in the design phase. It is important to drive a project. Management in the construction industry forward. Potentially, the study and research of this new framework could create a revolution in terms of project management throughout the entire construction industry. As indicated in the research, preliminary steps have been taken by many project management practitioners in the field to improve project performance. Agile project management methodologies effectively increase the involvement of the clients. Through the way designing and processing the Agile approach, the participation of the client will be improved to create more custom satisfaction. And the early engagement of the client makes the design phase smoother. Scrum, as an Agile framework, provides a collaborative project managerial perspective. Another major benefit brought by applying Agile to the construction project in design phase is the team efficiency. Since project team members are given appropriate levels of authority, the personnel are more motivated. This ultimately improves the project performance as team members feel more motivated to perform at their best. In addition, Agile provides the bottom-to-top process which creates a work environment with transparency and increases the share of real-time information and feedback. Since the people become more aware of their responsibilities, tasks and goals, the project deliverables are better produced. Recently, it is gradually being applied to a range of project types within the construction industry. The benefits of applying Agile to construction projects are becoming evident to practitioners and gradually revealed. By applying Scrum, interactions with the client, individual accountability, team collaboration, etc. have been improved. A complex construction project can thus better address changes and conquer risks with an adaptive Agile approach. However, Scrum as an advanced tool still needs further adjustments, modifications and development in order to be applied better to the construction industry. Although the Agile Scrum as an iterative system is easy to implement, the features of the construction projects still require a new Agile approach to make changes accordingly. In sum, the application of Agile Scrum framework in construction projects during the design phase can improve the project performance in many ways. Further development of the Scrum in construction is still necessary in order to provide more benefits.

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