

جامعة ميدأوشن

كلية الإدارة

قسم / تخصص ماجستير إدارة المشاريع



دور التخطيط و الجدولة في تحسين نتائج مشاريع الإنشاءات

إعداد الطالب/ علي المعلم – 222001325

سعيد الشهراني - 222001309

إشراف/ د. الفيصل حسن

العام الدراسي:

2023

المستخلص : Abstract

هدف هذه الدراسة إلى تقييم فعالية تقنيات التخطيط والجدولة التعاونية في مشاريع البناء العالمية وتحديد أفضل الممارسات لتنفيذها في الواقع العملي.

تمتلك تقنيات التخطيط والجدولة التعاونية إمكانية كبيرة في تحسين أداء مشاريع البناء، ولكنها غالباً لا يتم تطبيقها بشكل فعال بسبب عدم المعرفة بالأساليب والتكتيكات المناسبة. تسعى هذه الدراسة إلى سد هذه الفجوة من خلال إجراء تقييم شامل لهذه التقنيات وتقديم توصيات قيمة لشركات البناء.

تستخدم الدراسة منهجية البحث الكمية وستقوم بجمع البيانات من خلال استبيان عبر الإنترنت. ستركز الدراسة على تقييم تأثير تقنيات التخطيط والجدولة التعاونية على مؤشرات الأداء الرئيسية للمشاريع، مثل الجدول الزمني وتخصيص الموارد وإدارة التكاليف.

تتوقع الدراسة أن تظهر علاقة إيجابية بين استخدام تقنيات التخطيط والجدولة التعاونية ونجاح مشاريع البناء العالمية. كما من المتوقع أن تكون هذه التقنيات أكثر فعالية في المشاريع المعقدة والغامضة.

تتمتع هذه الدراسة بأهمية كبيرة لصناعة البناء، حيث ستساعد شركات البناء على فهم أهمية تقنيات التخطيط والجدولة التعاونية وطرق تنفيذها بفعالية. كما ستوفر الدراسة دليلاً مرجعياً للممارسين والباحثين في مجال البناء لفهم كيفية تحسين كفاءة وفعالية مشاريع البناء من خلال تقنيات التخطيط والجدولة التعاونية.

من أهم النقاط التي تناولتها الدراسة:

- مفهوم تقنيات التخطيط والجدولة التعاونية في مشاريع البناء.
- عواقب عدم استخدام تقنيات التخطيط والجدولة التعاونية في مشاريع البناء.
- الأنواع المناسبة من تقنيات التخطيط والجدولة التعاونية في مشاريع البناء.
- الاستراتيجيات والممارسات اللازمة لدمج أفضل تقنيات التخطيط والجدولة التعاونية في مشاريع البناء.

من المتوقع أن تخرج الدراسة بتوصيات مهمة لشركات البناء، مثل:

- أهمية تبني تقنيات التخطيط والجدولة التعاونية في المشاريع.
- أفضل الممارسات لتنفيذ تقنيات التخطيط والجدولة التعاونية في مشاريع البناء العالمية.
- كيفية تحسين كفاءة وفعالية مشاريع البناء من خلال تقنيات التخطيط والجدولة التعاونية.



Midocean University

College of Management

Department of Master of Project Management

The Role of Collaborative Planning and Scheduling in Improving Construction Project Outcomes

Prepared by: Ali Almuallem

Saeed Alshahrani

Supervised by: D. Alfaisal Hassan

Year: 2023

Table of Contents

INTRODUCTION	5
Background	5
Problem Statement	6
Aims and Objectives	6
Research Questions	7
Significance of Study	7
LITERATURE REVIEW	8
RESEARCH METHODOLOGY	9
Research Philosophy	9
Research Approach	9
Research Design	10
Study Tools and Data Collection Method and Analysis	10
Fields of Study	10
Project Timeline	11
REFERENCES	12

INTRODUCTION

Notably, the construction industry tends to operate on a global scale, with construction-related projects often involving stakeholders, diverse team members, etc. Abdul Nabi and El-adaway (2021) claimed that construction projects cannot attain success without effective planning and/or scheduling as both of these activities ensure proficient allocation of resources, cost-effectiveness, and timely project completion as well. Nonetheless, it is also considered by researchers like Li, et al. (2019) and Wuni and Shen (2020) that the construction firms fail to understand the strategies and practices to implicate effective collaborative planning and scheduling techniques. In this concern, the main tenacity of this research is to evaluate the effectiveness of the collaborative planning and/or scheduling techniques in global construction projects along with the determination of the most suitable practices for their implementation within the practical setting.

Background

As per the views of Heigermoser, et al. (2019), the evaluation of the efficacy of collaborative planning and scheduling techniques in global construction projects is crucial for enhancing project outcomes. Bajjou and Chafi (2020) also claimed that the construction projects have the potential to surmount obstacles related to communication and coordination through the implementation of collaborative techniques such as the exchange of information, engagement of stakeholders, and integration of technology platforms. In this regard, this research finding is intended to offer comprehension of the impact of these techniques on project timelines, resource allocation, and cost management. Moreover, the identification of best practises and recommendations holds significant importance as it facilitates the effective implementation of successful strategies within the context of global construction projects. This evaluation also tends to underscore the importance of collaborative efforts within the project planning and/or scheduling techniques, such as

Critical path method, Program Evaluation and Review Technique, Fast-tracking, Crashing, Gantt Chart, Simulation, Task List, Resource Leveling, and Calendar as professed in the study of Lalmi, et al (2021). By implementing these strategies, it will be possible for the construction firms to enhance operational effectiveness, mitigate potential hazards, and achieve successful project outcomes.

Problem Statement

Despite recognising the significance of effective collaborative planning and scheduling techniques such as Critical path method, Program Evaluation and Review Technique, Fast-tracking, Crashing, Gantt Chart, Simulation, Task List, Resource Leveling, and Calendar, construction firms globally often struggle to implement them due to a lack of familiarity with suitable practices and tactics (Abdul Nabi and El-adaway, 2021) This knowledge gap hinders their ability to fully leverage the benefits of collaboration, resulting in project delays, cost overruns, and suboptimal outcomes. In this concern, this specified research entitled "Evaluating the Effectiveness of Collaborative Planning and Scheduling Techniques in Global Construction Projects," aims to address this concern by conducting a comprehensive evaluation of these techniques. Through empirical data collection, analysis, and the identification of best practices, our research will provide construction firms with valuable insights and recommendations, enabling them to bridge the gap and successfully implement collaborative planning and scheduling techniques in global construction projects. By filling this knowledge void, our research seeks to enhance project performance and contribute to the industry's overall advancement.

Aims and Objectives

The primary aim of this research study is to evaluate the effectiveness of collaborative planning and/or scheduling techniques in the global construction projects.

Moreover, the objectives crafted for achieving the research aim are:

- To assess the concept of collaborative planning and scheduling techniques in the construction projects
- To determine the consequences of lack of collaborative planning and scheduling techniques in the construction projects
- To determine appropriate types of collaborative planning and scheduling techniques (Critical path method, Program Evaluation and Review Technique, Fast-tracking, Crashing, Gantt Chart, Simulation, Task List, Resource Leveling, and Calendar) in the construction projects.
- To appraise strategies and/or practices needed to integrate the best collaborative planning and scheduling techniques in the construction projects.

Research Questions

- What is the concept of collaborative planning and scheduling techniques in the construction projects?
- What are the consequences of lack of collaborative planning and scheduling techniques in the construction projects?
- Which appropriate types of collaborative planning and scheduling techniques can be used in the construction projects?
- What strategies and/or practices are needed to integrate the best collaborative planning and scheduling techniques in the construction projects?

Significance of Study

The main significance and/or rationality of this research findings can be understood by reviewing the fact that it tends to provide a roadmap and/or guideline to the potential researchers as well as the construction managers to comprehend how they can enhance the overall proficiency and competence of the construction projects via collaborative planning and scheduling techniques.

LITERATURE REVIEW

This section of the research is intended to evaluate the views of researchers and scholars on the inclusion of collaborative planning/scheduling techniques in the construction sector while also including theories, which this research intends to address.

As per the views of Dallasega, et al. (2021), the paradigm of evaluating the effectiveness of the collaborative planning/scheduling techniques in the global construction firms is considered to be essential as it ensures the entire process of construction is carried out in strategised approach. The use of these techniques allows for a more efficient and streamlined process, reducing delays and improving quality. According to Allaoui, et al. (2019), collaborative planning practices play a significant role in this regard, as they provide a framework for effective communication among stakeholders involved in the project. In addition, such practices help identify potential issues that may arise during construction and enable proactive measures to be taken to prevent them from occurring. The benefits of using collaborative planning and scheduling techniques extend beyond individual projects since it can create positive impacts on the entire industry (Schiavi, et al. 2022). A holistic approach is needed when studying collaborative planning practices in construction projects so that one can fully understand their effectiveness in achieving better results. Social Network Theory offers a valuable perspective on the relationships and interactions among project stakeholders (Shen, et al. 2020). It emphasises the role of social connections and information sharing in collaborative planning and scheduling. By examining the network structures and communication patterns, this theory helps understand how collaboration influences project outcomes by exploring external factors, including the regulations, industry standards, and cultural expectations, influence the decision-making and practices of construction firms (Lalmi, et al. 2021). Hence, this theory can be implemented to understand how construction firms globally can learn from collaborative

planning and scheduling experiences, adapt their practices, and improve project outcomes over time.

Other than this, the study of Abdul Nabi and El-adaway (2021) claimed that there are various scheduling and planning techniques used in the construction, such as the critical path method that helps in determining the longest/shortest time to complete the project. Another technique is based on Program Evaluation and Review Technique, which emphasise on supervising the project whereas; the Fast-Tracking, and Crashing ensure the completion of the project in a rapid manner and preventing failure respectively. Techniques and tools such as Gantt Chart, Task List, and Calendar are often used to keep a record of all the tasks to be completed within the construction project within the assigned data. Similarly, resource leveling is used to enhance the overall process of resource allocations to enhance the overall proficiency of the construction project.

RESEARCH METHODOLOGY

This section of the research is intended to present an overview of the data collection processes applied to gather data on evaluating the efficiency of techniques of collaborative planning and/or scheduling within the global construction industry

Research Philosophy

The paradigm positivism-based research philosophy has been proposed for this study as it will help in evaluating the positive relationship, which exist between techniques of collaborative planning/scheduling and success of construction projects.

Research Approach

A deductive research approach will be applied by the researcher with the primary motive to deduce the existing data to validate the hypothesis i.e. *there is a positive relationship between collaborative planning/scheduling and success of construction projects.*

Research Design

A quantitative research design will be followed within this research with the primary motive to attain statistical and/or measurable data to evaluate the crucial impact of implicating collaborative planning/scheduling for elevating the success of construction projects (Mohajan, 2020).

Study Tools and Data Collection Method and Analysis

A primary data collection method based on online survey has been deemed suitable for this research as it will help in attaining more in-depth and comprehensive yet measurable/statistical data to statistically evaluate the relationship between collaborative planning/scheduling and success of construction projects as per the research of Dzwigol (2020). Moreover, SPSS will be used as the tool as per the guidance of Bauer, et al. (2021) to evaluate the collected survey results via descriptive analysis based on frequency test results and correlation test results to determine how different techniques of collaborative planning/scheduling can influence the performance of the construction projects and Google Scholar – Google Scholar is a search engine for scholarly literature, including articles, theses, books, and conference papers.

Fields of Study

This research is situated within the field of Construction Management, focusing on improving the effectiveness of collaborative planning and scheduling techniques in global construction projects. It also draws upon insights from Engineering Management to ensure the technical feasibility of proposed solutions, Information Technology to leverage technological tools for collaboration, and Social Sciences to understand the human factors influencing implementation.

PROJECTE TIMELINE

[illegible]

REFERENCES

- Abdul Nabi, M., & El-adaway, I. H. (2021). Understanding the key risks affecting cost and schedule performance of modular construction projects. *Journal of management in engineering*, 37(4), 04021023.
- Allaoui, H., Guo, Y., & Sarkis, J. (2019). Decision support for collaboration planning in sustainable supply chains. *Journal of Cleaner Production*, 229, 761-774.
- Bajjou, M. S., & Chafi, A. (2020). Empirical study of schedule delay in Moroccan construction projects. *International Journal of Construction Management*, 20(7), 783-800.
- Bauer, G. R., Churchill, S. M., Mahendran, M., Walwyn, C., Lizotte, D., & Villa-Rueda, A. A. (2021). Intersectionality in quantitative research: A systematic review of its emergence and applications of theory and methods. *SSM-population health*, 14, 100798.
- Dallasega, P., Marengo, E., & Revolti, A. (2021). Strengths and shortcomings of methodologies for production planning and control of construction projects: a systematic literature review and future perspectives. *Production planning & control*, 32(4), 257-282.
- Dzwigol, H. (2020). Innovation in marketing research: quantitative and qualitative analysis.
- 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.
- Lalmi, A., Fernandes, G., & Souad, S. B. (2021). A conceptual hybrid project management model for construction projects. *Procedia Computer Science*, 181, 921-930.

- Li, L., Li, Z., Li, X., & Wu, G. (2019). A review of global lean construction during the past two decades: analysis and visualization. *Engineering, Construction and Architectural Management*, 26(6), 1192-1216.
- Mohajan, H. K. (2020). Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment and People*, 9(4), 50-79.
- Schiavi, B., Havard, V., Beddiar, K., & Baudry, D. (2022). BIM data flow architecture with AR/VR technologies: Use cases in architecture, engineering and construction. *Automation in Construction*, 134, 104054.
- Shen, W., Yang, C., & Gao, L. (2020). Address business crisis caused by COVID-19 with collaborative intelligent manufacturing technologies. *IET Collaborative Intelligent Manufacturing*, 2(2), 96-99.
- Wuni, I. Y., & Shen, G. Q. (2020). Critical success factors for management of the early stages of prefabricated prefinished volumetric construction project life cycle. *Engineering, Construction and Architectural Management*, 27(9), 2315-2333.