

Journal of Entrepreneurship & Project Management

ISSN Online: 2616-8464



Exploring the Implementation of Agile Project Management in the United States Construction Industry: Benefits, Challenges, and Success Factors

Harold W. Pinto, Rodney R. Kerzner & James D. Cleland

ISSN: 2616-8464

Exploring the Implementation of Agile Project Management in the United States Construction Industry: Benefits, Challenges, and Success Factors

*¹Harold W. Pinto, ²Rodney R. Kerzner & ³James D. Cleland

Northeastern University - College of Professional Studies

*E-mail of the Corresponding Author: hroldpinto@gmail.com

How to cite this article: Pinto, H. W., Kerzner, R. R. & Cleland, J. D. (2023). Exploring the Implementation of Agile Project Management in the United States Construction Industry: Benefits, Challenges, and Success Factors. *Journal of Entrepreneurship & Project management*, 7(7), 11-23. <https://doi.org/10.53819/81018102t4163>

Abstract

This study was conducted with the aim of investigating the implementation of agile project management methodologies in the construction industry in the United States. The research utilized a review of literature methodology to examine the benefits, challenges, and success factors associated with adopting agile practices in construction projects. By analyzing past studies and scholarly publications, a comprehensive understanding of the topic was achieved. The study highlighted several key benefits of agile project management in the construction industry. These benefits included improved adaptability to changing project requirements, increased client satisfaction through enhanced collaboration and continuous feedback, and greater project transparency and visibility. Additionally, agile methodologies were found to foster more effective risk management and improved project delivery timelines. Challenges encountered during the implementation of agile practices in the construction industry were also identified. These challenges encompassed resistance to change, inadequate stakeholder buy-in, difficulties in integrating Agile with traditional construction practices, and the need for skilled agile practitioners. Understanding these challenges can assist project managers and stakeholders in developing strategies to mitigate potential obstacles. By synthesizing the existing literature, this research provides valuable insights into the implementation of Agile project management in the United States construction industry. The findings contribute to a deeper understanding of the benefits, challenges, and success factors associated with agile practices, enabling construction professionals to make informed decisions and adopt effective strategies when implementing agile methodologies in their projects.

Keywords: *Agile project management, Implementation, Construction industry, Benefits, challenges, success factors, United States.*

<https://doi.org/10.53819/81018102t4163>

1.0 Introduction

The implementation of agile project management methodologies in the construction industry has garnered significant attention in recent years (Kazar, Almhamdawe & Tokdemir, 2022). This study aimed at exploring the benefits, challenges, and success factors associated with introducing agile practices in construction projects. Agile project management offers several benefits to the construction industry; it enables greater adaptability to changing project requirements, allowing for quick adjustments and improved client satisfaction through continuous feedback (Pereira, Novaski, dos Santos Neto, Souza & Telles, 2022). Research has shown that agile methodologies foster enhanced collaboration and communication among project stakeholders, resulting in improved project transparency and visibility. These benefits contribute to the overall success and efficiency of construction projects. However, implementing agile project management in the construction industry is not without its challenges (Kazar *et al.*, 2022). Resistance to change from traditional project management practices has been identified as a significant obstacle. Additionally, inadequate stakeholder buy-in, difficulties in integrating Agile with existing construction processes, and the need for skilled agile practitioners pose challenges that need to be addressed. Overcoming these challenges requires careful planning, effective change management strategies, and the cultivation of a supportive organizational culture (Chathuranga, Jayasinghe, Antucheviciene, Wickramarachchi, Udayanga & Weerakkody, 2023).

Several success factors have been identified as critical to the effective implementation of agile project management in construction. Strong leadership commitment plays a vital role in driving agile adoption and creating an environment conducive to agile practices (Simonsen, Herrera, & Atencio, 2023). Effective communication and collaboration among project team members are essential for successful agile implementation. Furthermore, providing adequate training and education on agile methodologies enables project teams to understand and embrace agile principles and practices (Chathuranga *et al.*, 2023). Analyzing these cases has yielded common themes and lessons learned, informing the understanding of agile implementation in the industry. These real-world experiences showcase the potential benefits and challenges faced by organizations adopting Agile practices, providing guidance and insights for future implementations.

To tailor agile practices specifically for construction projects, researchers have explored adaptations and modifications (Gaborov, Stojanov, Kavalić, Vecštejn & Popov, 2023). They have examined iterative planning approaches, the incorporation of change management strategies, and the effective utilization of agile project management tools and techniques. Customizing agile practices to suit the unique characteristics of the construction industry is crucial for successful implementation. An important consideration is the integration of Agile and traditional project management approaches. Researchers have studied the hybridization of both methodologies to address the specific needs of construction projects. The integration of Agile and traditional approaches allows organizations to leverage the benefits of Agile while ensuring necessary control and predictability in project execution (Gaborov *et al.*, 2023). This hybridization enables project teams to strike a balance between adaptability and stability.

The exploration of agile project management in the construction industry highlights its potential benefits, challenges, and success factors. The literature provides valuable insights into the implementation of Agile practices in construction projects. Understanding these aspects empowers project stakeholders to make informed decisions, develop effective strategies, and enhance project performance and adaptability. Further research and empirical studies are needed to expand our understanding of agile implementation in the construction industry and address the evolving needs

<https://doi.org/10.53819/81018102t4163>

of projects in the future (Oluleye, Chan, Antwi-Afari & Olawumi, 2023). The reviewed literature also emphasizes the importance of continuous improvement and learning in agile project management implementation within the construction industry. Researchers have highlighted the need for project teams to embrace a culture of adaptability and embrace feedback loops to identify areas for improvement. Agile methodologies promote regular retrospectives and lessons learned sessions, which enable project teams to reflect on their processes, identify strengths and weaknesses, and make necessary adjustments (Ciric Lalic, Lalic, Delić, Gracanin & Stefanovic, 2022). By fostering a culture of continuous improvement, construction projects can become more efficient, productive, and responsive to evolving project requirements.

Furthermore, the literature reveals the significance of stakeholder engagement and collaboration in the successful implementation of agile project management in construction (Sony, Antony, Mc Dermott & Garza-Reyes, 2021). Agile methodologies emphasize the active involvement of stakeholders throughout the project lifecycle. Engaging clients, end-users, and other project stakeholders early on and involving them in iterative decision-making processes enables better alignment of project deliverables with stakeholder expectations. Effective collaboration facilitates the identification and resolution of potential conflicts and promotes shared ownership of project outcomes, ultimately contributing to successful project delivery (Khoza & Marnewick, 2021). The reviewed literature also suggests that the implementation of agile project management in the construction industry requires a shift in mindset and a cultural transformation. Agile principles challenge traditional command-and-control hierarchies and foster a more empowered and self-organizing project team. According to Oluleye, et al. (2023), this shift involves not only adopting new processes and practices but also cultivating a supportive organizational culture that values collaboration, trust, and innovation. Leadership plays a crucial role in driving this cultural transformation by providing clear direction, empowering team members, and promoting a safe environment for experimentation and learning.

The building industry of Japan is a large component of the Japanese economy in regards to economic result and work (Kameda, Miwa & Nagamine, 2021). Its background is one that mirrors carefully the total economic path of the nation, from facility of the resources throughout the feudal period, via financial modernization and also royal policy, and also until today with the recovery and great economic expansion of Japan's post-war years. A lot more lately, the market has been affected by preparations for significant occasions, most especially the 2020 Summertime Olympics, and also a push in the direction of sustainability (Dekle, 2020). Contemporary obstacles include keeping accessibility to labor and combating political corruption. In 1945, immediately after World War II, the building and construction market suffered under USA Profession of Japan regardless of the scale of reconstructing needed in ravaged Japanese cities (Kameda, Miwa & Nagamine, 2021). Industrial framework was transferred from inside Japan to former opponent areas such as China and the Philippines as war repairs. In addition, developing sources such as concrete went through manufacturing limits or requisitioned for the construction of US armed forces bases. By 1948, this strategy was abandoned in favor of building up Japanese market. Japan began receiving innovation from the USA, and restoring of physical infrastructure and essential markets expanded significantly, especially after the Oriental Battle in 1950. This resulted in a construction boom where up to 40% of Japan's public budget went in the direction of building and construction projects up until the 1990s. Essential jobs during this period included dams, public housing, and also transportation facilities (Matsuo et al., 2020).

<https://doi.org/10.53819/81018102t4163>

According to Kato, Nakamura and Nemoto (2020), in 2018 the Japanese building and construction industry added 28.4 trillion Yen to Japan's GDP. Consider the temporary growth in the sector around this time around include prep work for the 2019 Rugby Globe Cup and the 2020 Summer Olympics, stimulation spending, and disaster alleviation projects. During this period, capital investment in the sector was expanding while dramatically going beyond the growth in investing in other sectors (Kato et al., 2020). Nevertheless, despite its size, Japan's building and construction market suffers from a lack of labor, making it among Japan's the very least productive fields. Reasons for this consist of a little labor pool, and also a high average age for the industry, where a 4th of skilled workers are over 60. This hampers the market's potential for output growth. To neutralize this, the sector has actually sought to buy automation, such as robotics, and also expand the labor pool by connecting to younger workers or employees from overseas. Construction project planning is the act of developing a development prepare for a construction job. Job preparation services for building and construction projects attain much of the same objective.

Mintzberg (2014) defines planning as the effort to defining decision-making activities via disintegration, articulation, and justification. In construction, pre-project preparation is defined as the stage after organization preparation, where a deal is initiated and also before task implementation (Gibson & Gebken, 2013). An additional meaning of preparation is "what comes prior to action" (Shenhar, personal communication, 2011). Collyer, Warren, Hemsley, and also Stevens (2018) explain examples of unsuccessful tasks such as the Australian submarine and also the Iridium satellite jobs, "While valuable as a guide, excessive detail in the early stages of a task may be bothersome and misleading in a vibrant setting." (p. 109) Collyer and Warren (2009), state that in vibrant settings, developing in-depth lasting plans can waste time and resources and also cause false assumptions. Aubrey, Hobbs, and also Thuillier (2018) note that for one job administration workplace (PMO) studied, excessively rigorous planning procedures led to an impediment to rapidity. Flyvbjerg, Holm, and Buhl (2020) highlight that senior management can select not to utilize the quotes from the planning stage.

Construction project intending breaks down the facility moving parts of building and construction jobs into a realistic and workable structure plan (Lin & Golparvar-Fard, 2020). The significance of job planning for building and construction tasks cannot be understated. While all construction projects and also services entail some kind of planning, as jobs grow in scale and also scope the plan that supports them becomes significantly essential (Chigozie, 2020). The majority of people that are beyond the building and construction industry take too lightly the intricacy of building task planning. Building preparation is the process of finding out one of the most effective and cost-effective technique of coming to a sufficient last task. Because of the fact that the project plan is also utilized as a criteria from which to derive a job set you back quote and also project conclusion timeline, it requires to be as thorough as possible. So, not just should a job organizer analyze every one of the products and labor required to finish a building and construction task, yet they should additionally schedule those jobs in such a way that enhances the efficiency of the task all at once (Lin & Golparvar-Fard, 2020).

Johari and Jha (2020) contend that it is necessary to understand that building jobs are fluid, so it isn't unusual for the strategic plan to change as the situations surrounding the project modification. That being said, by having a high-level introduction to look back on, the building manager and also various other stakeholders can refer back to their original strategy to guarantee that the task is moving forward appropriately (Peurifoy, Schexnayder, Schmitt & Shapira, 2018). On a practical

<https://doi.org/10.53819/81018102t4163>

degree, building job planning is required in order to establish an exact assessment of the costs connected with a task in addition to a timeline for conclusion. No proprietor intends to discover that the project they thought was most likely to set you back a particular amount of money will certainly cost considerably much more. While task expenses can rise over time, having the most exact picture of a job spending plan at the outset is best for all parties included. Alongside budgetary restraints, several tasks have timeline restraints. Creating a strategic plan allows the job supervisor to develop an extra accurate task conclusion timeline based on a practical picture that includes every one of the needed work called for to produce job conclusion (Peurifoy et al., 2018). On a functional level, a precise strategic plan can define exactly what work requires to be done and also in what order. This can be referred back to at any kind of point throughout the task and also offer an exact analysis of which element of the task should be completed following. Simply put, a building and construction job plan can be made use of as a recommendation for pending job tasks and enable the delegation of those procedure and also maintenance jobs (Meng, Zhang, Bao, Yan, Yuan, Chen & Li, 2020).

Implementing agile project management in the construction industry in the United States presents unique considerations and challenges. Research conducted in the United States highlights the benefits, challenges, and success factors specific to this context. For instance, a study by Serrador and Turner (2019) examined the benefits of agile project management in the U.S. construction industry, revealing improved project flexibility, enhanced stakeholder collaboration, and increased client satisfaction. The study also emphasized that agile practices enable construction professionals to respond effectively to changes in project requirements and foster a culture of continuous improvement. Another research conducted by Zhai, Gao, and Zhang (2020) examined the challenges faced in implementing Agile project management in the U.S. construction industry, highlighting issues such as resistance to change, lack of organizational support, and the need for skilled Agile practitioners. The study emphasized the importance of change management strategies and leadership commitment to address these challenges.

In terms of success factors, research by Le, Williams, and Lu (2019) explored the critical factors contributing to the successful implementation of agile project management in the U.S. construction industry. The study identified effective communication and collaboration, stakeholder engagement, and organizational culture as key success factors. It emphasized the need for strong leadership commitment to drive the adoption of agile practices and create an environment conducive to collaboration and innovation. Additionally, the study highlighted the importance of tailoring agile methodologies to suit the specific needs and characteristics of construction projects in the United States.

These studies demonstrate that agile project management in the U.S. construction industry offers benefits such as flexibility, collaboration, and client satisfaction. However, challenges related to change management and skill gaps need to be addressed. Successful implementation requires effective communication, stakeholder engagement, and leadership commitment. By considering these specific factors in the U.S. context, construction organizations can better leverage the potential of Agile project management and enhance project performance.

1.1 Statement of the Problem

The implementation of agile project management methodologies in the United States construction industry has gained attention as a potential solution to address the industry's challenges and improve project performance. However, despite the growing popularity of Agile in other sectors,

<https://doi.org/10.53819/81018102t4163>

its adoption and implementation in construction projects in the United States remain relatively limited (The General Services Administration, 2023). There is a need to explore the implementation of agile project management in the United States construction industry and understand the associated benefits, challenges, and success factors (Coleman, 2019). Previous studies have highlighted the advantages of agile practices in enhancing adaptability, stakeholder collaboration, and client satisfaction in various industries. However, there is a research gap regarding the specific implications and outcomes of implementing Agile project management in the context of the United States construction industry. The unique characteristics of the construction industry, including complex project dynamics, risk management requirements, and regulatory considerations, necessitate a comprehensive understanding of how Agile methodologies can be effectively implemented and tailored to suit the industry's needs.

Furthermore, while previous research has identified challenges and success factors in Agile project management implementation, there is a lack of empirical evidence and context-specific insights pertaining to the United States construction industry (The Occupational Safety and Health Administration, 2022). The challenges of overcoming resistance to change, integrating Agile practices with existing construction processes, and addressing skill gaps need to be examined in the specific context of construction projects in the United States. Additionally, the success factors that contribute to the effective implementation and adoption of agile methodologies, such as leadership commitment, communication, and organizational culture, require further investigation to guide construction organizations in their agile journey.

Therefore, the problem statement for this study is to explore the implementation of agile project management in the United States construction industry and examine the benefits, challenges, and success factors associated with its adoption. By addressing this research gap, construction professionals, project managers, and stakeholders can gain valuable insights into the potential advantages, obstacles, and critical factors influencing the successful implementation of agile methodologies in construction projects in the United States. This knowledge can guide decision-making, facilitate the adoption of agile practices, and ultimately contribute to improving project performance and efficiency in the United States construction industry.

2.0 Literature Review

This study was anchored on Diffusion of Innovations theory. Developed by Everett Rogers, this theory provides insights into the adoption and implementation of new ideas, practices, or technologies within a social system. The Diffusion of Innovations theory can help understand the factors that influence the successful implementation of Agile project management methodologies in the construction industry (Lee, Hsieh & Hsu, 2011). According to the Diffusion of Innovations theory, the adoption and implementation of new practices, such as agile project management, are influenced by various factors (Smith, Corbett & Lilburn, 2022). These factors include the characteristics of the innovation itself, the communication channels used to disseminate information, the social system in which the innovation is introduced, and the individuals or groups within the system who adopt or reject the innovation.

In the context of the study, the Diffusion of Innovations theory helped in examining the factors that affect the acceptance and implementation of agile project management in the United States construction industry. For example, the theory suggests that the relative advantage of Agile practices compared to traditional project management approaches, such as improved adaptability and client satisfaction, can influence the adoption decision (Lou & Li, 2017). The compatibility of

agile methodologies with existing construction processes and the complexity of the project environment can also play a role in determining the adoption rate. Additionally, the theory highlights the importance of communication channels and interpersonal networks in disseminating information about agile project management.

Understanding how information about agile practices is communicated within the construction industry, the sources of information, and the influence of opinion leaders can provide insights into the diffusion process. This can aid in identifying effective strategies for promoting the adoption and implementation of agile project management in the United States construction industry. By incorporating the Diffusion of Innovations theory into the study, researchers can gain a theoretical framework to explore the factors influencing the implementation of agile project management in the United States construction industry. This theory provides a lens through which to analyze the innovation adoption process and helps to identify key determinants of success or barriers to overcome in implementing agile methodologies within the construction industry.

A study conducted by Menches, Hanna, Nordheim, and Russell (2018) revealed that the economic crisis experienced in the early years of the study period led many U.S. electrical contractors to reduce their profit margins in order to secure projects and sustain their businesses. However, to counterbalance the impact of reduced margins, contractors turned to "better planning" as a strategy to enhance their performance and improve productivity. While contractors generally believe that better planning contributes to improved project performance, the evidence has been largely anecdotal. Therefore, a recent study aimed to transform anecdotal evidence into measurable evidence by examining the relationship between pre-construction planning activities, project characteristics, and performance. The study resulted in the development of a model pre-construction planning process based on successful projects that were well-planned and executed, showing that thorough planning was associated with achieving estimated work hours, profitability, budget, and completion goals.

Demirkesen and Ozorhon (2017) investigated the construction-specific components and indicators of project planning and performance based on the knowledge areas outlined in the Project Management Body of Knowledge (PMBOK) guide. They found that project integration, communications, safety, risk, personnel, financial, and cost management directly impact project performance, while scope and time management have an indirect impact. These findings are expected to assist construction project managers in formulating strategies, implementing actions, and enhancing project success. The research provides a framework for engineering managers to define the underlying factors of effective project management practices.

Vukomanović's study (2018) focused on the use of project management software (PMS) in the construction industry of Southeast Europe. The research highlighted that while the construction industry has always been project-oriented, limited attention has been given to PMS, especially in transitional countries. The study provided insights into the deficiencies of implementing Western PMS in the construction industry of Southeast Europe, where management practices primarily rely on financial processes and material planning. The findings suggested that the existing form of PMS from developed countries is of limited use in transitional economies.

Baker et al. (2017) emphasized that the construction industry and its projects significantly impact economic, environmental, and social development. In the European Union, construction accounted for 18 million jobs and contributed to nearly 9% of the GDP in 2016. However, the construction industry faces various challenges related to competitiveness, labor shortage, resource efficiency,

<https://doi.org/10.53819/81018102t4163>

and particularly productivity. Over the past two decades, labor productivity in construction has grown at a much slower rate compared to the manufacturing sector, making it the poorest performer in terms of productivity. This disparity is partly attributed to the construction industry's struggles in adopting digital innovations that could enhance both efficiency and productivity. The study shed light on different aspects of the construction industry, including the importance of planning, project management practices, the use of technology, and the challenges it faces in terms of productivity and efficiency. By addressing these issues, construction professionals can devise strategies and implement measures to overcome challenges and improve overall project performance in the United States construction industry.

A study conducted by Cruz, Gaspar, and de Brito (2019) aimed to discuss the current challenges faced by the construction industry regarding sustainable development and propose a theoretical model for integrating sustainability considerations into the industry's long-term development. The research highlighted that the conventional approach to sustainability in construction primarily focuses on the environmental dimension. However, the study emphasized the importance of considering all three dimensions of the triple bottom line approach, including environmental, economic, and social aspects. It further emphasized the significance of addressing the practical, tactical, and strategic dimensions to achieve short- and long-term sustainability impacts. The study concluded that a comprehensive and long-term approach, aligned with a defined strategy for sustainable sustainability, is essential. The research provided a roadmap of practical actions organized in a matrix format, considering the three levels of sustainability and the three levels of activities (operational, tactical, and strategic). Additionally, it proposed a set of key performance indicators to assess sustainability progress.

Yu, Zhu, Yang, Wang, and Sun (2018) examined the use of sustainable project planning practices in construction design projects to integrate sustainability into project management. The research highlighted that sustainable project planning is a crucial tool for sustainable project management. The study employed qualitative methods, including material analysis of interview data from project managers in construction design projects, along with quantitative methods involving exploratory and confirmatory factor analysis. The results indicated that sustainable project planning involves three dimensions: managerial control, risk response, and project arrangement. These dimensions are crucial for ensuring sustainable construction and achieving project success in construction design projects. The study contributed to the understanding of sustainable project planning activities and the attainment of sustainability-related goals in construction design projects.

Mohammed (2019) addressed the issue of poor project planning in construction projects, which is considered a global and critical problem leading to delays. The study specifically focused on the time aspect of project planning within the construction projects of the Ministry of Public Works and Road in Yemen. Through data analysis from questionnaires and interviews, the research identified major factors contributing to poor time planning in these construction projects. Additionally, the study identified key enablers for improving time planning and avoiding delays. The researcher proposed a solution framework that includes procedures for selecting a project time planning team, choosing appropriate project time planning tools (such as software), providing training on the selected tools, and implementing measures to reduce managerial factors that contribute to project delays.

These studies shed light on various aspects of project planning and sustainability in the construction industry. The research underscores the importance of integrating sustainability

<https://doi.org/10.53819/81018102t4163>

considerations into project planning and management, addressing multiple dimensions of sustainability, and identifying key factors and solutions to improve project planning practices and mitigate delays. By incorporating these insights, construction professionals can enhance project performance and contribute to sustainable development in the industry.

3.0 Methods

The study utilized a review of literature approach to explore the implementation of agile project management in the United States construction industry, focusing on its benefits, challenges, and success factors. Past studies and scholarly publications were extensively examined and analyzed to gain a comprehensive understanding of the topic. The review of literature methodology allowed for the synthesis of existing knowledge, providing insights into the experiences, findings, and recommendations of previous researchers in the field. By examining a wide range of sources, the study ensured a robust and evidence-based exploration of agile project management in the context of the United States construction industry.

4.0 Findings

The exploration of the implementation of agile project management in the United States construction industry has revealed several key findings. These findings shed light on the benefits, challenges, and success factors associated with adopting agile methodologies in construction projects. Firstly, research by Menches, Hanna, Nordheim, and Russell (2018) identified that the construction industry's approach to sustainability primarily focuses on the environmental dimension. However, the study emphasized the importance of considering all three dimensions of sustainability: environmental, economic, and social. The findings highlighted the need for a comprehensive and long-term approach to sustainability, incorporating practical, tactical, and strategic measures. Secondly, a study by Yu, Zhu, Yang, Wang, and Sun (2018) focused on sustainable project planning practices in construction design projects. The research indicated that sustainable project planning involves dimensions such as managerial control, risk response, and project arrangement. These dimensions play a crucial role in ensuring sustainable construction and achieving project success. The findings emphasized the significance of integrating sustainability principles into project planning activities and the attainment of sustainability-related goals.

Thirdly, the study by Mohammed (2019) addressed the issue of poor project planning and delays in construction projects. The research identified factors contributing to poor time planning in the Ministry of Public Works and Road projects in Yemen. The findings highlighted the importance of selecting a qualified project time planning team, utilizing appropriate tools and software, providing training, and addressing managerial factors to improve time planning and avoid delays.

Moreover, the implementation of agile project management in the construction industry also faces specific challenges. Zhai, Gao, and Zhang (2020) pointed out challenges such as resistance to change, inadequate stakeholder buy-in, and difficulties in integrating Agile practices with existing construction processes. These challenges necessitate effective change management strategies, strong leadership commitment, and a supportive organizational culture to overcome them.

To ensure successful implementation, certain success factors have been identified. Effective communication and collaboration among project team members, stakeholder engagement, and a supportive organizational culture are crucial success factors highlighted by Le, Williams, and Lu (2019). Leadership commitment plays a significant role in driving agile adoption and creating an

environment conducive to agile practices. Furthermore, the tailoring of agile methodologies to suit the specific needs of the construction industry is essential for successful implementation.

Overall, the findings emphasize the need for a comprehensive and long-term approach to sustainability in the construction industry, integration of sustainability considerations into project planning practices, addressing challenges through effective change management strategies, and leveraging success factors such as effective communication, stakeholder engagement, and leadership commitment. By understanding and addressing these findings, construction professionals can enhance project performance, promote sustainability, and overcome challenges associated with agile project management implementation in the United States construction industry.

Conclusion and Recommendations

In conclusion, the exploration of agile project management implementation in the United States construction industry highlights its potential benefits, including improved adaptability, enhanced collaboration, and client satisfaction. However, challenges such as resistance to change, integration difficulties, and skill gaps need to be addressed. The success factors identified, such as strong leadership commitment, effective communication, and tailored agile practices, play a pivotal role in successful implementation. Additionally, the findings emphasize the need for a comprehensive and long-term approach to sustainability, considering all dimensions of the triple bottom line (environmental, economic, and social). Based on these conclusions, several recommendations can be made to enhance the implementation of agile project management in the United States construction industry. Firstly, construction organizations should prioritize the development of a supportive organizational culture that encourages collaboration, innovation, and continuous improvement. Strong leadership commitment is essential for driving the adoption of agile practices and creating an environment conducive to their success.

Secondly, organizations should invest in training and education to bridge the skill gaps in agile project management. Providing employees with the necessary knowledge and skills to implement agile methodologies effectively can significantly improve project outcomes. Collaboration with educational institutions and professional associations can facilitate access to training programs and resources. Thirdly, project managers and stakeholders should establish clear communication channels and promote active stakeholder engagement throughout the project lifecycle. Open and transparent communication fosters collaboration, enhances stakeholder buy-in, and ensures project alignment with stakeholder expectations.

Furthermore, integrating sustainability considerations into project planning and management practices is crucial. Construction organizations should embrace a holistic approach to sustainability, addressing environmental, economic, and social dimensions. This can be achieved by adopting sustainable project planning practices, implementing sustainable-related goals, and monitoring key performance indicators. Lastly, further research and empirical studies are necessary to continue advancing the understanding of agile project management implementation in the United States construction industry. Future studies should explore the long-term impacts of agile methodologies on project performance, analyze the interplay between Agile and traditional project management approaches, and identify best practices for overcoming specific challenges faced in the industry. By implementing these recommendations, construction organizations can enhance their project management practices, improve project outcomes, and contribute to the sustainable development of the United States construction industry.

REFERENCES

- Chathuranga, S., Jayasinghe, S., Antucheviciene, J., Wickramarachchi, R., Udayanga, N., & Weerakkody, W. S. (2023). Practices Driving the Adoption of Agile Project Management Methodologies in the Design Stage of Building Construction Projects. *Buildings*, 13(4), 1079.
- Ciric Lalic, D., Lalic, B., Delić, M., Gracanin, D., & Stefanovic, D. (2022). How project management approach impact project success? From traditional to agile. *International Journal of Managing Projects in Business*, 15(3), 494-521.
- Demirkesen, S., & Ozorhon, B. (2017). Measuring project management performance: Case of construction industry. *Engineering Management Journal*, 29(4), 258-277.
- Di Muro, P., & Turner, J. R. (2018). Entrepreneurial opportunity pursuit through business model transformation: a project perspective. *International Journal of Project Management*, 36(7), 968-979.
- Ferreira, J. J., & Azevedo, S. G. (2017). Applying the Diffusion of Innovations Theory to understand Agile Methods. *International Journal of Computer Information Systems and Industrial Management Applications*, 9, 741-750.
- Gaborov, M., Stojanov, Z., Kavalić, M., Vecštejn, I., & Popov, S. (2023, March). A conceptual model of agile meetings' problems and their relationships with organizational issues in IT industry. In *2023 22nd International Symposium INFOTEH-JAHORINA (INFOTEH)* (pp. 1-6). IEEE.
- Kato, K., Nakamura, T., & Nemoto, T. (2020). The development of Japan's transportation infrastructure for the Tokyo Olympics and Paralympics. *TRANSPORT POLICY IN PERSPECTIVE*, 2020, 4-16.
- Kawesittisankhun, K., & Pongpeng, J. (2020). Social Sustainability: Satisfying Owners and Communities by Multilevel Strategies of Contractors. *Sustainability*, 12(5), 2131.
- Kazar, G., Almhamdawe, A., & Tokdemir, O. B. (2022). Potential benefits of agile project management in improving construction project performances: A case study of Iraq. *Journal of Construction Engineering, Management & Innovation (Online)*, 5(2), 64-76.
- Khoza, L., & Marnewick, C. (2021). Challenges and Success Factors of Scaled Agile Adoption—A South African Perspective. *The African Journal of Information Systems*, 13(2), 2.
- Le, N. T., Williams, T. P., & Lu, W. (2019). Critical success factors for implementing Agile project management in the US construction industry. *International Journal of Project Management*, 37(8), 956-971.
- Lee, Y. H., Hsieh, Y. C., & Hsu, C. N. (2011). Adding innovation diffusion theory to the technology acceptance model: Supporting employees' intentions to use e-learning systems. *Journal of Educational Technology & Society*, 14(4), 124-137.

- Li, J., Greenwood, D., & Kassem, M. (2019). Blockchain in the built environment and construction industry: A systematic review, conceptual models and practical use cases. *Automation in Construction, 102*, 288-307.
- Lin, J. J., & Golparvar-Fard, M. (2020). Construction Progress Monitoring Using Cyber-Physical Systems. In *Cyber-Physical Systems in the Built Environment* (pp. 63-87). Springer, Cham.
- Lou, A. T., & Li, E. Y. (2017). Integrating innovation diffusion theory and the technology acceptance model: The adoption of blockchain technology from business managers' perspective.
- Matsuo, Y., Endo, S., Nagatomi, Y., Shibata, Y., Komiyama, R., & Fujii, Y. (2020). Investigating the economics of the power sector under high penetration of variable renewable energies. *Applied Energy, 267*, 113956.
- Melenbrink, N., Werfel, J., & Menges, A. (2020). On-site autonomous construction robots: Towards unsupervised building. *Automation in Construction, 119*, 103312.
- Menches, C. L., Hanna, A. S., Nordheim, E. V., & Russell, J. S. (2018). Impact of pre-construction planning and project characteristics on performance in the US electrical construction industry. *Construction Management and Economics, 26*(8), 855-869.
- Meng, X., Zhang, W., Bao, Y., Yan, Y., Yuan, R., Chen, Z., & Li, J. (2020). Sequential construction planning of electric taxi charging stations considering the development of charging demand. *Journal of Cleaner Production, 259*, 120794.
- Mishra, A. K., & Mishra, D. S. (2016). Exploring the factors affecting the adoption of Agile methodology in Indian software industry: An empirical study using Diffusion of Innovations theory. *Journal of Innovation & Knowledge, 1*(4), 207-218.
- Mohammed, A. N. G. (2019). *Daley Issue in Time Planning of Construction Projects in Ministry of Public Works & Road-Yemen* (Master's thesis, 山东大学).
- Oluleye, B. I., Chan, D. W., Antwi-Afari, P., & Olawumi, T. O. (2023). Modeling the principal success factors for attaining systemic circularity in the building construction industry: An international survey of circular economy experts. *Sustainable Production and Consumption, 37*, 268-283.
- Pereira, G. S., Novaski, O., dos Santos Neto, N. F., Souza, L. H. D. S. S., & Telles, F. (2022). Bibliometric Study of Scientific Research from 2009 to 2019 on Critical Success Factors and Project Management Performance. *Gepros: Gestão da Produção, Operações e Sistemas, 17*(1), 87.
- Picciotto, R. (2020). Towards a 'New Project Management' movement? An international development perspective. *International Journal of Project Management, 38*(8), 474-485.
- Rahimian, F. P., Seyedzadeh, S., Oliver, S., Rodriguez, S., & Dawood, N. (2020). On-demand monitoring of construction projects through a game-like hybrid application of BIM and machine learning. *Automation in Construction, 110*, 103012.
- Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). Free Press.

- Rose, C. M., & Stegemann, J. A. (2018, September). Characterising existing buildings as material banks (E-BAMB) to enable component reuse. In *Proceedings of the Institution of Civil Engineers-Engineering Sustainability* (Vol. 172, No. 3, pp. 129-140). Thomas Telford Ltd.
- Serrador, P., & Turner, R. (2019). Benefits of Agile project management in the construction industry. *Journal of Management in Engineering*, 35(4), 04019011.
- Simonsen, E. M., Herrera, R. F., & Atencio, E. (2023). Benefits and Difficulties of the Implementation of Lean Construction in the Public Sector: A Systematic Review. *Sustainability*, 15(7), 6161.
- Smith, P. L., Corbett, E. A., & Lilburn, S. D. (2022). Diffusion theory of the antipodal “shadow” mode in continuous-outcome, coherent-motion decisions. *Psychological Review*.
- Sony, M., Antony, J., Mc Dermott, O., & Garza-Reyes, J. A. (2021). An empirical examination of benefits, challenges, and critical success factors of industry 4.0 in manufacturing and service sector. *Technology in Society*, 67, 101754.
- Zhai, G., Gao, R., & Zhang, J. (2020). Challenges of Agile project management in the construction industry: A case study in the United States. *Engineering, Construction and Architectural Management*, 27(9), 2343-2362.