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Adaptive Hybrid Software Project Management in Bangladesh's Software Industry: Navigating the Cultural Transformation and Ensuring On-Time Delivery

By

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Autumn, 2024

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October 28, 2024

Dissertation submitted in partial fulfillment for the degree of Master of Science in Software Engineering

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

We hereby declare that this graduate report is the result of our independent efforts undertaken during our postgraduate studies. All materials and sources utilized in this document have been properly acknowledged. To the best of our knowledge, this report has not been submitted for evaluation in any other academic course. We have ensured that it is free from plagiarism and have adhered to international academic standards, with all sources cited appropriately in our university project.

_____ _____

Signature Date

_____

Name

Acknowledgement

We begin by expressing our deepest gratitude to Almighty Allah for His guidance throughout our academic journey at Independent University, Bangladesh. We are immensely thankful for the unwavering support and invaluable contributions of our dedicated faculty. In particular, we extend our heartfelt thanks to Dr. Mahady Hasan, our supervisor and mentor, whose insight and guidance were instrumental in our Master's program. His dedicated mentorship during our graduate thesis has been invaluable. We are also profoundly grateful to Ms. Sabrina Alam, Ms. Nujhat Nahar, and Ms. Farzana Sadia for their continued support and guidance for research work. Our appreciation extends to our co-authors and friends at IUB for their collaborative efforts. Finally, we owe a heartfelt thanks to our family members, friends, and loved ones for their unwavering support and encouragement to fulfill this project.

Md Mahbub Alam and **Sabrina Islam Priti**

Letter of Transmittal

Mahady Hasan, PhD, UNSW
Associate Professor
Independent University, Bangladesh
Department of Computer Science and Engineering

Subject: Graduate Project Report Submission Letter, Autumn 2024

Dear Sir,

We, Md Mahbub Alam (ID: 2331868) and Sabrina Islam Priti (ID: 2331865), are currently enrolled in the Graduate Thesis Course for the Autumn 2024 Semester. We are pleased to submit our graduate thesis, which encapsulates our experiences and learning throughout the Master of Science in Software Engineering program at Independent University, Bangladesh (IUB). The primary objectives of our thesis were to gain practical knowledge of industry trends in software engineering, conduct in-depth research, and familiarize ourselves with various technological aspects through case studies and real-world scenarios, including research and development, requirements engineering, software quality assurance, architecture, and process engineering.

Furthermore, this thesis provided us with valuable insights into industry best practices and the latest advancements in software engineering. Collaborating with industry professionals during this project has enhanced our understanding of how theoretical concepts are applied in practice. We sincerely hope for your approval of our report and greatly appreciate your consideration. We look forward to your feedback and suggestions for further improvement.

Sincerely,

Md Mahbub Alam
2331868@iub.edu.bd
Sabrina Islam Priti
2331865@iub.edu.bd

Evaluation Committee

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Chapter 1

Introduction

1.1 Overview

The software industry in Bangladesh has been rapidly evolving, fueled by a surge in demand for technology solutions and the government's support for digital transformation initiatives. As the industry matures, software firms face the dual challenge of adapting to cultural shifts while ensuring timely project delivery. This manuscript explores the integration of hybrid project management methodologies as a means to navigate cultural transformation and enhance the punctuality of project completion within the Bangladesh software industry. Hybrid project management, blending aspects of agile and traditional methods such as waterfall, presents a valuable solution. By merging the structured predictability of traditional approaches with the flexibility of agile techniques, it can effectively tackle cultural challenges and enhance project delivery schedules.

Cultural transformation is essential for software firms to thrive in the global market. This transformation involves shifting from rigid, top-down management styles to more inclusive, team-oriented approaches. Hybrid project management encourages this cultural shift by promoting collaboration, transparency, and continuous feedback.

Timely delivery is a critical success factor for software projects. Delays can lead to increased costs, client dissatisfaction, and reputational damage. In Bangladesh's competitive software industry, maintaining a track record of on-time delivery is essential for retaining clients and gaining new business.

Hybrid project management can enhance on-time delivery by providing the flexibility to adapt to changing requirements while maintaining a clear project roadmap. The iterative nature of agile practices allows teams to identify and address issues early, reducing the risk of major setbacks. At the same time, traditional planning and control mechanisms ensure that projects stay on schedule and within budget.

This report aims to investigate how hybrid project management can facilitate cultural transformation and improve project delivery in Bangladesh's software industry. The

research objectives include:

1. Analyzing the specific cultural challenges faced by software firms in Bangladesh and how they impact project management.

2. Evaluating how well hybrid project management practices overcome these cultural barriers.

3. Analyzing the effects and challenges of hybrid project management on timely project delivery and identifying essential success factors .

4. Offering practical recommendations for software firms to implement hybrid project management successfully.

As Bangladesh's software industry continues to grow, adapting to cultural changes and ensuring timely project delivery will remain critical challenges. Hybrid project management offers a viable pathway to navigate these complexities, providing a structured yet flexible framework that can accommodate the unique cultural dynamics of the region. This thesis seeks to enhance understanding of hybrid project management in Bangladesh and provide insights to foster positive advancements in the industry

1.2 Contribution of the thesis

This thesis offers valuable contributions to the field of project management, especially within the context of Bangladesh's software industry. By exploring the integration of hybrid project management approaches, the thesis addresses key challenges faced by software firms, offering practical insights and recommendations for improving cultural adaptability and ensuring timely project delivery. The followings are the primary contributions of this research.

1. *Analysis of Cultural Dynamics:* This thesis provides an in-depth analysis of the cultural dynamics that influence project management practices in Bangladesh software industry. By identifying specific cultural barriers such as hierarchical organizational structures, communication challenges, and resistance to change, this research offers a nuanced understanding of how cultural factors impact project execution. This analysis design as a valuable source for academics and practitioners seeking to understand the intersection between culture and project management in developing economies.

2. *Framework for Hybrid Project Management Implementation:* The thesis develops a robust framework for implementing hybrid project management methodologies tailored to the unique needs of Bangladeshi software firms. This framework combines agile and traditional project management elements, providing a balanced approach that leverages the strengths of both methodologies. The framework outlines key practices, tools, and processes that enable software firms to navigate cultural transformation and enhance project efficiency.

3. *Empirical Evaluation of Hybrid Methodologies:* Through empirical research, including case studies and surveys with industry professionals, this thesis evaluates the potentiality of hybrid project management in improving project delivery outcomes. The findings demonstrate that hybrid methodologies can lead to significant improvements in project delivery timelines, team collaboration, and client satisfaction. This empirical evidence adds to the body of knowledge on project management practices, highlighting the practical benefits of hybrid approaches in real-world settings.

4. *Identification of Success Factors:* The thesis highlights complex success factors that support the effective adoption of hybrid project management in Bangladesh's software industry. These factors include leadership commitment, stakeholder engagement, continuous training and development, and the integration of technology tools. By highlighting these success factors, the research provides actionable insights for software firms seeking to enhance their project management capabilities.

5. *Recommendations for Policy and Practice:* Based on the research findings, this thesis offers strategic recommendations for software firms, industry associations, and policymakers to support the widespread adoption of hybrid project management practices. The recommendations emphasize the importance of fostering a culture of innovation, investing in skills development, and creating supportive policy environments that encourage agile and hybrid practices. These insights aim to inform decision-making and drive positive change in the industry.

6. *Contribution to Global Project Management Literature:* While the focus is on Bangladesh, the insights and frameworks developed in this thesis have broader applicability to other developing countries facing similar cultural and project management challenges. By adding to the global conversation on hybrid project management, this research provides valuable insights that can be adapted and implemented across various international settings

7. *Enhancing Competitive Advantage:*The research emphasizes how hybrid project management boosts the global competitiveness of Bangladeshi software firms. By aligning project management practices with international standards and client expectations, firms can improve their market positioning and reputation. This contribution is particularly relevant for industry leaders and practitioners seeking to expand their reach and competitiveness on the global stage.

Therefore, this thesis significantly advances the understanding of hybrid project management in the context of Bangladesh's software industry, providing a comprehensive roadmap for cultural transformation and timely project delivery. The contributions of this research have the potential to drive meaningful improvements in project management practices, benefiting both the industry and the broader economy.

1.3 Organization of the thesis

The thesis is arranged into several chapters, each focusing on different aspects of hybrid project management in the Bangladesh software industry. The structure is designed to guide the reader through the research process, from the initial problem identification to the final conclusions and recommendations. This is organized into several chapters, each focusing on different aspects of the study. **Chapter 1:** Introduction sets the stage by outlining the present state of the software industry in Bangladesh, highlighting the challenges of cultural transformation, and emphasizing the necessity of punctual project delivery. **Chapter 2:** Literature Review examines existing project management background, methodologies, exploring key findings, identifies research gaps, and establishes the theoretical framework for the study from different articles. **Chapter 3:** Describes one of our published research papers titled "Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management". This chapter presents the detailed findings from the published paper and proposes the solution. **Chapter 4:** Describe another published research work title "Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Projects Management". This chapter presents the detailed challenge and impact of on-time product delivery for hybrid projects management and proposed suggestions to overcome the issues and finally **Chapter 5:** Conclusion summarizes all the findings, emphasizing hybrid methodologies' potential to drive cultural transformation and project efficiency by on time delivery while suggesting avenues for future research. The thesis concludes with appendices and references, providing additional context and source materials to support the research, thus contributing a comprehensive roadmap for enhancing project management practices in Bangladesh's software industry.

1.4 Thesis Project Management

Thesis Project Management involves the systematic planning, execution, and monitoring of academic research projects. It focuses on guiding us through the complex process of defining objectives, managing resources, and adhering to timelines, ensuring that the final thesis is completed effectively and meets academic standards. This process also emphasizes the importance of collaboration with supervisors and stakeholders to achieve the desired research outcomes.

1.4.1 WBS

A Work Breakdown Structure (WBS) is a valuable utilities for brainstorming and visualizing the detailed scope of each phase of a project. The diagram below illustrates a

top-down approach, breaking down the essential subtasks for each phase. This methodology forms the foundation for structuring the research papers.

The first phase, **Initiation and Definition**, focuses on identifying research gaps and areas that have not yet been explored. During this phase, the research idea is developed, and its potential contributions are assessed. Hypotheses and research questions are then formulated based on existing studies, allowing the authors to define the potential significance and contributions of the research papers to societal knowledge. If the research demonstrates substantial relevance, a literature review is performed to deepen the understanding of the research areas, with sources gathered primarily from Google Scholar in different Database.

The second phase, **Planning**, involves creating a project management plan that outlines the scope, timelines, and tasks. This phase includes developing knowledge, setting timelines, and formulating strategies for research processes such as data collection. The research methodology is also designed, and the necessary tools and techniques for data analysis and collection are identified. How resources are used and when used is also doing in this phase.

In the third phase, **Execution**, data collection and extraction are carried out using tools like GPT Analyst, Tableau, Drumroll, Genni AI, Sharly, ChatDoc, and MS Excel, once the methods have been identified. This allows for the visualization of the extracted data, facilitating analysis and compiling results into meaningful outcomes.

The fourth phase, **Writing**, begins after the completion of the research cycle. Authors organize their findings into an initial draft, which is then reviewed and corrected by experienced researchers. This draft evolves into a well-structured paper, which is then submitted for publication. Following external reviews by publishers, any additional flaws are addressed, making the paper ready for publication.

If the process is followed correctly, the research papers are eventually **Published** in the fifth phase, and the final thesis writing begins. The thesis is reviewed by the departmental head, and after completing the review process, the final version is submitted for defense and ready to present the defense. In summary, the WBS outlines the essential processes and sub-processes needed to complete this thesis. In chapters 3 and 4 these phases were followed to complete the published research work. The below figure 1.1 is the details for the Level 3 Work Breakdown Structure (WBS) related to conducting research and writing the thesis paper.

The figure also provides a visual representation of the various components and tasks involved in this process. Each level breaks down the main activities into manageable tasks to ensure comprehensive coverage of all aspects of the research and thesis writing. This structure helps in planning, organizing, and tracking the progress effectively, making sure that all executable areas are addressed systematically.



Figure 1.1: 3rd Level of Work Breakdown Structure for Conduct Thesis

1.4.2 Gantt Chart

A Gantt chart is essential tools for project scheduling and research planning, providing a clear visual representation of activities and the time need to finish each task. The Gantt chart in figure 1.2 presented details the sequence of necessary tasks to complete out for research papers including publication and defense within a defined timeframe which was a very challenge for us specially the registration fee and fund allocation. It also includes key components such as a task list, resource used ,timeline, and bars that visually depict the research schedule effectively. The chart outlines various stages of research work and the Work Breakdown Structure (WBS), starting with identifying research gaps, developing theories, and selecting appropriate methodologies for publish the paper. It then progresses through data collection and extraction, leading to result validation. These validated results are thoroughly reviewed and referenced, making the research paper ready for publication.

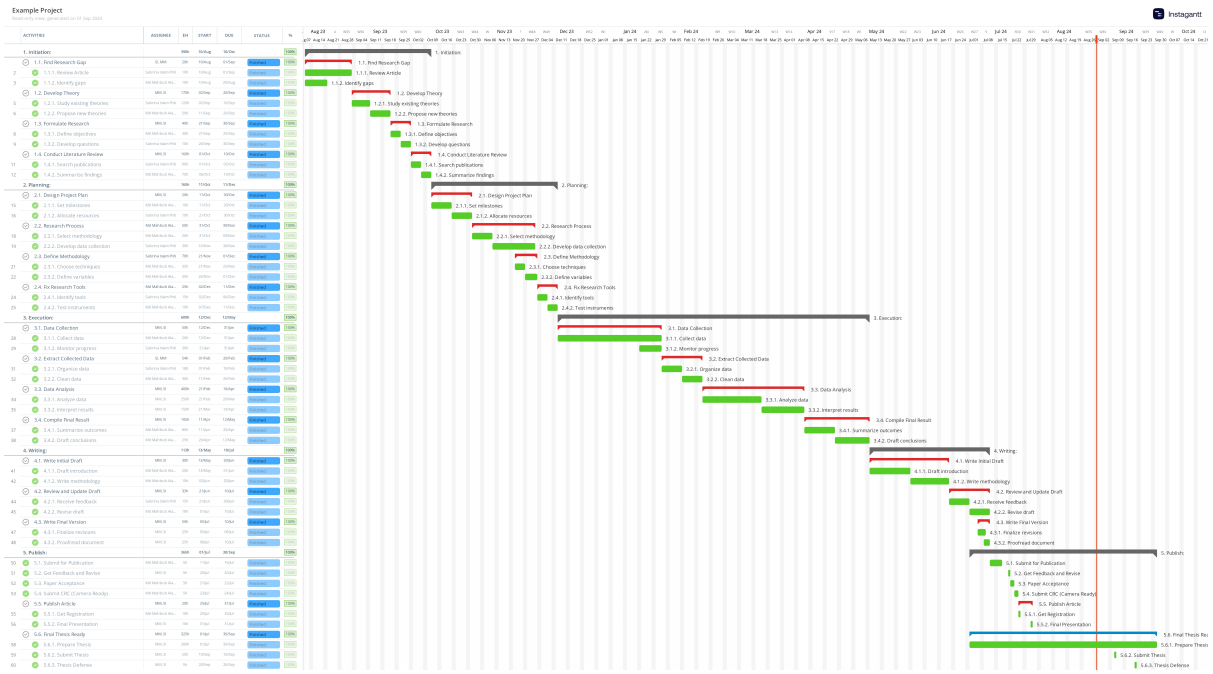


Figure 1.2: Gantt Chart

It is common for research papers to require revisions after the initial submission, as errors or areas for improvement are often identified during the review process. As these flaws are corrected, the paper moves closer to acceptance and eventual publication. Once the research is completed, the entire thesis is compiled and submitted. This Gantt chart effectively captures the timeline and activities necessary to develop two research papers, ensuring they meet the standards for publication.

Throughout the course of our project, we encountered numerous challenges across

various phases like in the initiation phase, we struggled to pinpoint a unique research gap, which led to misalignment with existing studies. During the planning stage, we found it difficult to create a comprehensive project plan and select the right methodology, introducing uncertainties that affected our timeline and resource allocation. As we moved into the execution phase, we faced setbacks in data collection due to participant availability and technical issues, complicating our data cleaning and analysis process. This not only extended our timeline but also made interpreting results more challenging. In the writing phase, we had trouble ensuring consistency and clarity throughout the document, particularly when it came to incorporating extensive feedback from reviewers, which required significant revisions.

Finally, in the publishing phase, we experienced delays due to the peer review process, necessitating further adjustments based on reviewer comments. The interconnected nature of these tasks meant that setbacks in one area impacted others, adding to our strain with limited resources and time pressures. Ultimately, these challenges significantly overcome by us and we meet the timeline as we scheduled earlier.

Chapter 2

Literature Review

In the landscape of software, project management is undergoing significant transformation, driven by cultural, technological, and organizational shifts. This literature review explores key aspects of these changes, focusing on how hybrid project management, cultural integration, and remote work practices are shaping the future of software development. In particular, the review examines the unique challenges faced by Bangladesh's software industry, the complex role of governance and leadership in optimizing risks and the growing importance of market analysis in aligning project goals with customer demands. Together, these insights provide a comprehensive understanding of the evolving strategies necessary for successful software project management in a dynamic global environment. In this chapter, we try to find out related research work and the gap of study in this area till now. We also give a brief overview of existing research related to this field.

2.1 Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management.

Bangladesh's software industry is rapidly growing, but cultural challenges often hinder project success. Traditional project management methods may not align with the dynamic nature of software development, leading to inefficiencies. By integrating local cultural norms into project practices, Bangladeshi software firms can improve collaboration, innovation, and competitiveness. The study provides practical strategies for overcoming obstacles and achieving sustainable growth in the global market. The authors [1]investigated the critical success factors (CSFs) of the agile software development model and found six different CSFs where organizational factors were most influential and project, organizational, people, and process factors have a direct impact on performance

expectancy factors. The study [2] identifies both success and failure factors influencing project implementation with Agile methods and reveals variations in non-functional tasks when applying different approaches .The study [3]surveyed two software-intensive companies through semi-structured interviews, concentrating on five-month cooperation for operationalizing process metrics using Agile software development. This paper [4]examined the challenges and strategies in integrating agile practices within traditional software development environments, emphasizing the need for aligning agile practices with existing organizational structures to ensure project success. The study [5]explored the implementation of hybrid software development methods, combining the Rational Unified Process with Scrum to maximize the strong side of both agile and traditional approaches, particularly for large-scale projects. They [6]studied the impact of agile methodologies on team dynamics and project outcomes, finding that self-organization and communication significantly enhance performance but require careful management to maintain cohesion. The authors [7] reviewed previous studies on agile practices in various industries, highlighting benefits such as increased adaptability and customer satisfaction, but also noting difficulties in industries with rigid operational dynamics. The study [8]highlighting resistance to change and insufficient management support as major challenges and suggests strategies for effective integration. . The study [9]conducted a longitudinal study on the evolution of agile methods over the past decade, noting a trend toward hybrid approaches that balance agile and traditional elements to manage complexity and change effectively. The authors [10]evaluated the effectiveness of agile project management in delivering high-quality software, emphasizing the importance of continuous feedback and stakeholder engagement for successful outcomes. The study [11]explored the use of agile management practices compared to traditional waterfall practices, highlighting a 55% success rate for agile management versus a 29% success rate for waterfall methods as well as emphasized the lower project failure rate associated with agile methods, attributing them to improved resource management and team empowerment. The study [12]conducted a survey on hybrid software development approaches, examining the integration of traditional and agile practices across 69 companies were five major combination patterns, emphasizing that hybrid approaches are now mainstream and independent of company size or industry sector. The author [13]investigated the mix of traditional and agile methods in software production, revealing a prevalent pattern of integrating agile practices within traditional frameworks. They [14] examined the factors driving the adoption of hybrid development approaches, with a focus on the "Water-Scrum-Fall" model. It also demonstrated that combining agile and traditional methods helps address the complexities of large-scale projects, particularly in industries with strict regulatory requirements. The study [15]explored the impact of agile and traditional methods on project management outcomes. The research [16] conducted a systematic review of software process tailoring, analyzing how organizations customize development methods to fit their specific needs and a combination of

agile and traditional approaches allows for better alignment with organizational objectives and project requirements. They [17]examined the role of blended software development models in large-scale projects, focusing on the Rational Unified Process combined with Scrum. The authors [18] examined the situational factors influencing software development process selections, stressing the importance of adaptable approaches that integrate agile and traditional methods . The study [19] analyzed the adoption of agile practices in various industry sectors, finding that hybrid approaches have become commonplace as organizations seek to leverage the strengths of both agile and traditional methods. They [20]developed the Model of Cultural Impact on Agile Methods (MoCA) to systematically understand how cultural factors influence the adoption and effectiveness of agile practices. This model integrates cultural dimensions, like those defined by Hofstede, with specific agile elements such as roles and practices. By analyzing 384 possible cultural-agile combinations, MoCA provides a framework for adapting agile methods to fit different cultural contexts, highlighting the need for customization to optimize team performance and project outcomes in diverse settings. The study [21]investigated the role of cultural factors in software development within Jordanian institutions, emphasizing that communication management, information distribution, and employee attitudes significantly impact project achievement . This study also highlighted the significant of aligning project management practices with local cultural norms to improve software project outcomes. The study[22] emphasized that organizational culture, leadership support, and team dynamics significantly influence developer satisfaction and productivity. Key findings highlighted the importance of fostering a culture of transparency, open communication, psychological safety, and continuous learning. The study [23] highlighted the need for revised software engineering methodologies to accommodate these differences, suggesting that understanding and adapting to cultural impacts is crucial for improving the performance of globally distributed software teams. The authors [24]explored the connection between IT department culture and the adoption of agile software development (ASD) practices, employing the competing values model (CVM) to classify cultural types. The study found that hierarchical and rational cultures adversely affect the implementation of social agile practices because of their focus on control and stability . The study [25]investigated how organizational culture and structure affect the integration of Agile software development methodologies. Applying diffusion of innovation and organizational culture theories, the study discovered that hierarchical cultures impede Agile adoption due to their rigidity and focus on control. They [26]discussed the critical role of organizational culture in enhancing customer service delivery. Their study also emphasized that a customer-centric culture is essential for creating a sustainable competitive advantage. By aligning firm-level cultural values with customer service orientation, organizations can significantly improve service experiences and foster customer loyalty. On the other hand, the authors highlighted the importance of effective communication, em-

ployee engagement, and leadership commitment in building a service culture that meets and exceeds customer expectations

2.2 Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Project Management.

The software industry in Bangladesh is evolving rapidly, but achieving on-time delivery in projects remains a significant challenge. Hybrid project management, which blends agile and traditional methodologies, offers a potential solution. By understanding these factors, software firms can implement strategies to improve efficiency and project outcomes. The study aims to provide insights into optimizing project management practices to enhance competitiveness and reliability in the global market. The authors [27] investigated sociotechnical digital transformation through a blended approach to project management , highlighting the importance of agile and traditional approaches in volatile and complex environments. They emphasized the need for agility, information restructuring, and stakeholder engagement to cope with uncertainties in digital transformation. The author [28] examined agile, traditional, and hybrid project management approaches, finding that hybrid methods were widespread and effective in achieving stakeholder success. The study revealed that hybrid approaches performed as well as agile methods, suggesting that combining methodologies offers a mature project management discipline.The study [29] conducted a systematic literature review on hybrid project management, concluding that hybrid approaches effectively address diverse project challenges. The review emphasized the need for a flexible methodology that adapts to project-specific requirements and integrates agile and traditional elements. The study [30] explored a hybrid project management approach for software modernization, focusing on legacy system transformations. The study also highlighted the benefits of using hybrid methods to combine agile flexibility with traditional rigor, facilitating smoother transitions and reducing modernization risks. The study [31]analyzed the critical people factors affecting the success of Agile software development teams, particularly focusing on team size, communication, and collaboration. The study, conducted across three Agile teams of varying sizes using Scrum, found that smaller teams (5-9 members) had higher efficiency, better communication, and stronger team cohesion. They [32] carried out a comparative analysis of hybrid IT project management by utilizing both traditional and agile approaches. The study also compared two hybrid methods that integrate Scrum into traditional plan-driven project development, such as the Waterfall model, and into the structured and widely recognized Project Management Body of Knowledge (PMBOK) . The study[33] investigated the flexible and evolving qualities in hybrid agile management models for successful outcomes in

software development projects . The study emphasized that hybrid methodologies combining traditional and agile characteristics lead to higher productivity and better management of complex projects. The findings suggested that adaptive and dynamic features are critical for improving project success rates. The study [34]explored the dynamics of culture change within digital transformation, emphasizing that successful adaptation requires an integrated approach combining top-down and bottom-up strategies. The study [35]investigated a hybrid management model that merges process management with project management in local administration. The study introduced a new model for the Local Economy and Employment Promotion Agency (LEEPA), which incorporates the European Foundation for Quality Management (EFQM) and Balanced Scorecard (BSC) methodologies along with the Project Management Institute (PMI) framework to enhance organizational efficiency and project results . The study [36]analyzed the combination of agile and traditional project management practices, highlighting the importance of discipline in hybrid project management. The study concluded that merging agile flexibility with the discipline of traditional project management can improve project delivery and stakeholder satisfaction, especially in complex setting . The study [37] examined the application of a hybrid project management methodology in a CIS capstone course. The study illustrated that integrating planning and sprinting techniques from both traditional and agile methodologies enriches the educational experience and equips students to face real-world project management challenges . The study [38] suggested a recommendation system for IT software project planning that utilizes a hybrid mining approach with a revised case-based reasoning (CBR) algorithm. The study emphasized the effectiveness of hybrid methods in enhancing project planning and decision-making processes by harnessing historical project data and adaptive learning techniques . The study [39]investigated the use of complexity and volatility characteristics to inform hybrid project management, stressing that comprehending and managing the complexity and volatility of projects is essential for the successful application of hybrid methodologies that leverage the advantages of both agile and traditional approaches. The study [40]examined a conceptual hybrid project management model for construction projects that merges traditional, agile, and lean practices. . The study [41]investigated project management practices for joint research and development projects between universities and industry , proposing a hybrid approach. The study highlighted the significant of aligning project management practices with the unique needs of collaborative environments. The study [42] proposed a blended project management framework combining agile and traditional methods . The Study [43]highlights the complexity of managing modern projects, especially in dynamic environments where agility is crucial. Data mining techniques, particularly association rules, are identified as valuable tools for handling such complexities. They [44]investigated the application of blended project management methods that merge agile and traditional approaches . Their systematic literature review of 71 studies found that these hybrid

methods enhance project adaptability and quality while accelerating time-to-market. However, successful implementation requires commitment, effective communication, and a supportive organizational culture.They [45]suggested a two-stage probabilistic scheduling strategy to improve on-time delivery in software projects The approach combines a probability-based temporal consistency model for pre-scheduling with a genetic algorithm for scheduling multiple software processes. Their method aims to balance project deadlines with customer needs and minimize completion times, demonstrating effectiveness in large-scale simulation experiments. The study [46]evaluated the efficiency of hybrid project management methods in IT projects. The study compared traditional and agile approaches, concluding that neither is sufficient alone for complex projects. They [47]developed a hybrid approach combining Structural Equation Modeling (SEM) and System Dynamics (SD) to investigate the impact of leadership dynamics on project performance in complex construction projects. The authors [48]investigated the impact of on-time delivery within channel integration on customer satisfaction and loyalty. By surveying 436 consumers in Konya, they found that integrating online and physical retail channels enhances on-time delivery, which positively affects customer satisfaction and loyalty. The study underscores the critical role of effective logistics and delivery strategies in multi-channel retail environments to boost customer satisfaction and loyalty. They [49]developed a hybrid project management model for construction projects, integrating traditional, agile, and lean methodologies. This model aimed to enhance flexibility, stakeholder collaboration, and project success by combining the predictability of traditional methods with the adaptability of agile practices and the efficiency of lean principles. The study [50]examined the effectiveness of hybrid project management approaches by comparing them with traditional and agile methods across various sectors, including technology-based products, education, and cross-industry projects and found that hybrid approaches, which combine the structure of traditional methods with the flexibility of agile practices, offer a balanced and effective project management strategy. However, the research highlighted the need for more empirical studies to validate the universality of these findings across different contexts and industries. The study [51]proposed a hybrid project management methodology by combining PMBOK and PRINCE2 frameworks. This integrative approach aims to leverage the structured process-based strategies of PRINCE2 and the comprehensive knowledge areas of PMBOK. The authors [52]explored how project managers customize hybrid project management methodologies by combining agile and plan-driven elements. Through empirical data from 10 case studies, they identified team type and project goal as key factors influencing methodology customization. Their findings suggest that adapting project management approaches to fit specific project needs enhances efficiency and success, highlighting the importance of flexible and context-sensitive project management strategies. The authors [53]examined the application of agile methodologies in the software industry of developing countries, focusing on

Bangladesh. Their study highlighted the increasing adoption of agile methods like Scrum, XP, and DSDM, which offer benefits such as improved customer satisfaction, better team efficiency, and faster project completion. They also noted challenges like resource constraints and cultural differences that can impact the effectiveness of agile adoption. The study suggested integrating agile methodologies with local frameworks, like ICTization, to enhance adaptability and maximize benefits. The authors [54] analyzed various Agile methodologies to determine the most suitable for the software industry in Bangladesh. Their study compared Scrum and Extreme Programming (XP) based on criteria like software requirements, construction, and testing. The authors also concluded that XP, with its emphasis on client interaction and iterative development, was better suited for the Bangladeshi context, especially for projects that require frequent requirement changes and resource optimization. The study [55]proposed a Hybrid Scrum-XP model to enhance the effectiveness of agile methodologies in Bangladesh software companies. The study combined the strengths of Scrum's structured management practices with XP's focus on strong engineering techniques to address the limitations of both methods. Through surveys of leading software firms in Bangladesh, the authors identified the benefits of this hybrid approach, including improved project flexibility, enhanced team collaboration, and increased adaptability to changing client requirements. Finally, the study[56]conducted an empirical investigation to assess the adoption and fitness of agile practices in software companies in Bangladesh. The study, which surveyed 16 prominent software companies, found that Scrum is the most widely used agile methodology. While the companies showed readiness to adopt agile practices effectively, many struggled to adhere strictly to Scrum principles. The research emphasized the need for improved compliance with agile standards to enhance software development quality and support Bangladesh's growing software industry.

Chapter 3

Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management.

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The software industry in Bangladesh has experienced rapid growth, driven by a skilled workforce and favorable market conditions. However, as the industry continues to evolve, software firms face a unique challenge: reconciling traditional cultural values with modern project management methodologies[57]. Bangladeshi culture, marked by factors such as hierarchical distance, risk aversion, group orientation, and temporal perspective, can considerably affect project management practices[58]. For instance, high power distance may hinder open collaboration, and averse attitudes toward uncertainty might clash with the adaptive nature of agile methodologies. To overcome these obstacles, software companies are embracing hybrid project management, an approach that merges conventional and agile practices.[59]. Hybrid project management offers a way to tailor project methods to cultural norms while retaining the flexibility and benefits of both approaches[60]. By embracing this hybrid model, software firms aim to strike a balance between cultural values and efficient project execution, ensuring continued growth and success in an industry driven by innovation and rapid change[61]. This paper aims to explore the cultural challenges faced by software firms in Bangladesh's growing industry and investigate the potential of hybrid project management as a solution. The objectives and purpose of the study will be discussed by the 4 RQ's in section 3.2.1.

This paper is structured in the following manner: Section 3.1 provides the problem

statement, Section 3.2 details the research methodology, and Section 3.3 presents our results analysis. Finally, Section 3.4 outlines the proposed solution

3.1 Problem Statement

The nature of the problem centers around the challenge of managing cultural transformation while implementing effective project management practices within Bangladesh's software industry[62]. This challenge emerges from the intersection of traditional cultural values and the rapidly evolving demands of the technology landscape. Bangladeshi culture, defined by aspects such as hierarchical distance, risk aversion, group orientation, and temporal perspective, may clash with the flexible and responsive characteristics of contemporary project management methodologies[63]. Navigating this complex terrain requires software firms to find ways to integrate cultural norms with efficient project execution, ensuring that projects are delivered on time, within budget, and with the desired quality[64]. As the industry continues to grow, addressing this problem becomes crucial for achieving successful project outcomes while respecting and leveraging the rich cultural fabric of the nation.

3.2 Research Methodology

This section details the methodology employed in the research. The study aims to explore the cultural transformation challenges faced by software firms in Bangladesh and how these firms can effectively integrate traditional values with modern project management methodologies through the adoption of hybrid project management practices. The methodology encompasses a mixed-method approach, combining both qualitative and quantitative data collection and analysis techniques. This section provides transparency into the research process, the strategies applied, and the criteria used to select the most relevant and effective methodological approaches.

3.2.1 Purpose of the Study

The purpose of the study is to explore the challenges faced by software firms in Bangladesh due to cultural transformation as they integrate modern project management methodologies with traditional cultural values.The research intends to investigate the influence of cultural aspects such as hierarchical distance, risk aversion, group orientation, and temporal perspective on project management practices. By assessing these challenges, the study aims to offer a comprehensive framework that blends traditional and agile practices through hybrid project management. The ultimate goal is to offer practical strategies for successfully navigating cultural transformation, ensuring efficient

project execution, and fostering industry growth within the unique cultural context of Bangladesh as well as overcome the maximum challenges and hence we try to find the answers of the following research questions:

RQ1: *How do age, gender, and job roles affect the cultural transformation in hybrid project management for software companies?*

This research question seeks to explore the impact of demographic factors such as age, gender, and job roles on individuals' perceptions of cultural transformation within software firms in Bangladesh. It examines whether different demographic groups have varying levels of acceptance or resistance to the cultural changes required for implementing hybrid project management practices. Understanding these differences can help tailor communication and training strategies to better align with the specific needs and concerns of diverse employee groups, ultimately facilitating smoother cultural transformation.

RQ2: *How do software company size and structure influence cultural transformation in adopting hybrid project management?*

This research question examines the influence of a firm's size and organizational structure on the effectiveness of cultural transformation when adopting hybrid project management in Bangladesh's software industry. It explores whether smaller, more agile companies are more adaptable to cultural changes compared to larger firms with established hierarchies and processes. Understanding these dynamics can help develop targeted strategies to facilitate successful cultural transformation across different types of organizations, ensuring smoother adoption of hybrid project management practices.

RQ3: *What challenges and How do cultural factors affect hybrid project management in Bangladesh software firms?*

This research question discusses the challenges that cultural dimensions such as power distance, uncertainty avoidance, and collectivism pose to implementing hybrid project management in Bangladesh. This chapter highlights how these cultural factors can impact collaboration, decision-making, and adaptability, which are critical for successfully adopting hybrid methodologies. This RQ directly seeks to investigate these impacts, making it essential for understanding how cultural transformation can be managed in the context of hybrid project management in the next subsequent section.

RQ4: *What strategies can suggest for improving and overcoming the challenge of cultural transformation with hybrid project management***?**

In the same way, this research question gives solutions to navigate cultural challenges, emphasizing the need for tailored training, leadership advocacy, and incremental adoption of hybrid practices. This RQ is related because it aims to explore specific strategies that can facilitate cultural transformation, ensuring that hybrid project management practices are effectively adopted and implemented within Bangladeshi software firms in the below subsection.

3.2.2 Data Collection

The data collection process for this study involved a combination of qualitative and quantitative methods to ensure a comprehensive understanding of the cultural challenges and project management practices within Bangladeshi software firms. Primary data was collected by structured interviews with key stakeholders, including project managers, team leaders, and software engineers from various organizations within the industry. These interviews were designed to explore their experiences with cultural transformation, their adoption of hybrid project management methodologies, and the specific challenges they encountered.

Additionally, surveys were distributed to a broader audience within the industry to capture quantitative data on the prevalence and impact of cultural dimensions such as power distance, uncertainty avoidance, and collectivism on project outcomes. The survey questions were carefully crafted to quantify these cultural factors and assess their influence on the effectiveness of traditional and agile project management practices.

Secondary data was also collected through an extensive review of existing literature, including academic journals, case studies, and industry reports, to contextualize the findings and compare them with global trends in hybrid project management. This mixed-method approach allowed for triangulation, enhancing the reliability and validity of the study's results.

3.2.3 Data Analysis

The data analysis procedure in this research utilized a structured approach to evaluate the qualitative and quantitative data gathered from interviews, surveys, and secondary sources. The qualitative data from interviews were transcribed and examined using thematic analysis. This technique facilitated the identification of recurring themes and patterns associated with the challenges of cultural transformation and the implementation of hybrid project management methodologies within software companies. Significant themes such as hierarchical distance, risk aversion, group orientation, and temporal perspective were investigated thoroughly to comprehend their effect on project management practices

For the quantitative data obtained from surveys, statistical analysis was conducted using software tools such as Microsoft Excel, GPT Data Analyst. Descriptive statistics were employed to summarize the data, providing insights into the prevalence of various cultural dimensions within the industry.Correlation and regression analyses were executed to assess the relationships between cultural factors and project outcomes, with particular emphasis on the effectiveness of hybrid project management practices in overcoming cultural challenges.

The results from both qualitative and quantitative analyses were then triangulated

to draw comprehensive conclusions about the interplay between cultural dimensions and project management methodologies in Bangladeshi software firms. This approach ensured that the findings were robust and provided a holistic understanding of the cultural transformation processes within the industry.

Additionally, a comparative analysis was conducted with existing literature to contextualize the study's findings within broader global trends. This helped in identifying unique challenges and potential solutions that are specific to the cultural context of Bangladesh, while also highlighting areas where Bangladeshi software firms could benefit from adopting best practices from other regions.

3.2.4 Research Method

This research utilizes a mixed-methods approach, integrating both qualitative and quantitative techniques to investigate the cultural challenges and project management practices within Bangladeshi software companies. The study is structured to provide a comprehensive analysis of the integration of traditional cultural values with modern project management methodologies, specifically focusing on the adoption of hybrid project management practices. The methodology in figure 3.1 represents the flow of research method that was developed in five stages: Background Study and scope findings, Research Design, Data Collection, Data Analysis and Final Result.

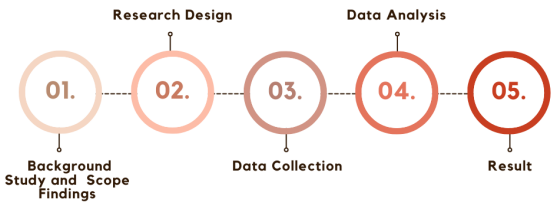


Figure 3.1: Step by step research methodology

3.3 Result Analysis

Firstly, the result analysis explores how adopting hybrid project management methodologies can facilitate cultural shifts within software firms. Secondly, the analysis examines the effectiveness of these approaches in addressing traditional challenges and enhancing organizational adaptability in the Bangladesh context, based on the survey in 15 software

companies where 55 stakeholders are participating.

3.3.1 Demographic Result

This subsection provides a detailed overview of the demographic characteristics of the study participants. This analysis includes factors such as age, gender and professional background, offering insights into the diversity and representativeness of the sample population. Understanding these demographics is crucial for contextualizing the study's findings and assessing their generalizability.

Gender and Age Group: Figure 3.2 illustrates two key visualizations for the research paper. On the left, the pie chart shows the gender distribution of the participants, where 60% are male and 40% are female. This indicates that male participants outnumber female participants, suggesting that men may be more engaged with the subject of the study, or that the sampling had a higher representation of males.

On the right, the bar chart breaks down the participants by age group, with further differentiation between males and females. The chart reveals that the 31-45 age group is the most represented, particularly among males, who dominate this category. The 21-30 and 45-above age groups are more evenly distributed between males and females, but still show a male predominance. This suggests that middle-aged adults are the primary demographic engaged with the study's subject matter, particularly men in their early to mid-career stages.

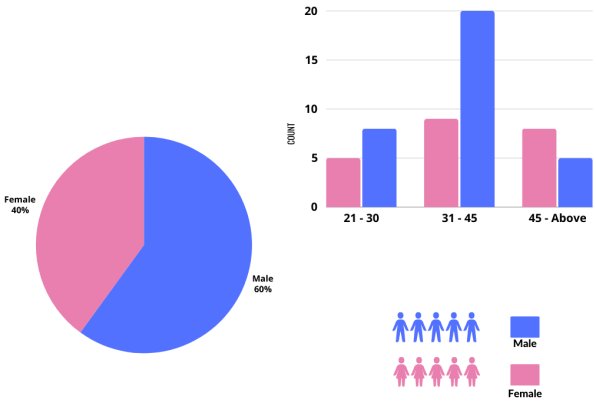


Figure 3.2: Survey participants' gender and age group breakdown

Together, these visualizations indicate that while both genders participate, there is a higher engagement from males, especially within the 31-45 age range. This could be an important demographic factor in interpreting the study's findings.

Position or Role: The survey participants were queried about their roles within the software company. Individuals occupying various positions in software firms took

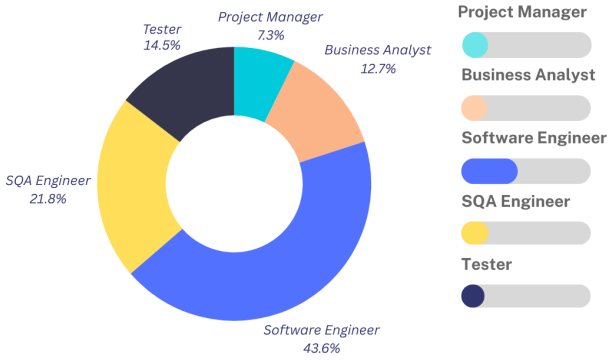


Figure 3.3: Survey Respondents' role in the software company

part in this survey. The majority of respondents were Software Developers and Project Managers, along with SQA Engineers.

As shown in figure 3.3, it depicts the role of the respondents in the software company where it shows a distribution of roles within organizations, with Software Engineers being the largest group at 43.6%, followed by SQA Engineers at 21.8%, and Testers at 14.5%. Business Analysts make up 12.7%, and Project Managers represent 7.3%. This indicates a strong emphasis on software development and quality assurance, with roles also dedicated to bridging business needs and managing projects as well as cultural transformation.

Characteristics and size of software firms: Small and medium software firms in Bangladesh exhibit distinctive characteristics that set them apart in the realm of project management. Their compact size often translates to heightened agility and adaptability, allowing them to swiftly respond to market changes and emerging opportunities[65]. However, resource constraints inherent in these firms necessitate prudent resource allocation and efficient project execution[66]. Communication pathways tend to be concise and direct due to the smaller team size, fostering effective collaboration and rapid decision-making. Despite these advantages, these firms might lack the comprehensive infrastructure of larger counterparts, often relying on a select group of experts to drive project success[67]. This blend of agility, resource limitations, streamlined communication, and specialized proficiency defines the unique landscape of small software firms and profoundly shapes their strategies for managing projects.

Moving on the pie chart in figure 3.4 that illustrates the distribution of companies based on employee count, highlighting that 33.3% of companies have 51-100 employees, making this the largest group, indicative of many medium-sized organizations that balance resource capacity with agility in hybrid project management. Following this, 26.7% of companies fall into the 101-200 employee range, suggesting these larger medium-sized firms may have more structured processes and resources. Companies with 10-25 employees make up 20% of the sample, indicating that smaller firms are also actively participating,

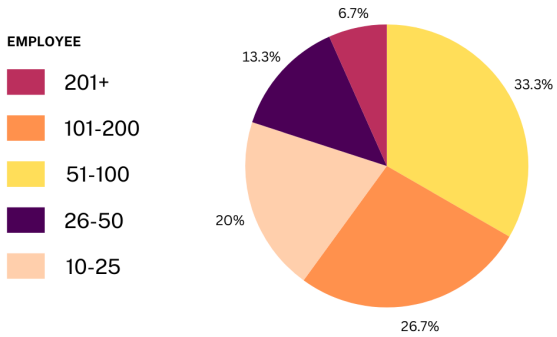


Figure 3.4: Survey respondents' company size

potentially facing challenges like limited resources. Firms with 26-50 employees account for 13.3%, reflecting a mix of flexibility and structure. Only 6.7% of companies have more than 201 employees, representing large enterprises likely equipped with established processes and extensive resources. This diversity in company sizes provides insights into how organizational scale affects project management practices and factors influencing cultural transformation in the Bangladesh software industry.

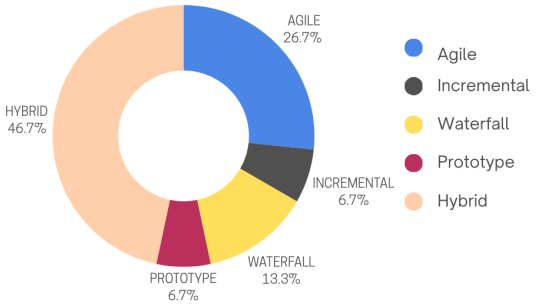


Figure 3.5: Survey respondents' by SDLC model

Shifting focus in the figure 3.5 which shows a donut chart depicting the use of different project management methodologies among software firms in Bangladesh. Hybrid project management is the most popular, adopted by 46.7% of firms, highlighting its role in balancing traditional and modern practices for managing cultural and operational challenges. Agile is the second most used at 26.7%, valued for its flexibility. Waterfall is preferred by 13.3%, offering structured, predictable processes, while Incremental and Prototype methods are each used by 6.7% of firms. This distribution reflects the industry's emphasis on adaptable and responsive project management approaches to drive cultural

transformation from traditional to hybrid mode.

3.3.2 Exploratory Analysis

Firstly, this subsection delves into the preliminary findings gathered from the initial analysis of data, offering insights into emerging patterns and trends. Secondly, this phase serves as a foundation for deeper investigations, helping to shape hypotheses and guide subsequent research directions. The results are not conclusive but provide a valuable starting point for further exploration.

Researchable Issues: The main issue to address revolves around effectively managing cultural transformation while implementing project management practices within the context of Bangladesh's software industry. This issue stems from the clash between traditional cultural values, characterized by factors like high power distance, uncertainty avoidance, and collectivism, and the demands of modern project management methodologies, such as agility, adaptability, and individual accountability[68]. The challenge is to navigate this complex landscape, ensuring that cultural nuances are respected while enabling efficient project execution and successful outcomes. This requires devising strategies and approaches that bridge the gap between cultural norms and project management practices, fostering a harmonious integration that supports growth, innovation, and collaboration within the industry.

Challenges faced by the companies: The software firms in Bangladesh face a range of challenges and major issues in their pursuit of effective project management within the context of cultural transformation. One of the foremost challenges is reconciling traditional hierarchical cultural norms with the decentralized and collaborative nature of modern project management methodologies[69]. This often leads to communication gaps, hindered decision-making, and resistance to change. The collectivist cultural inclination towards teamwork may clash with the individual accountability and autonomy required by agile practices[70]. Additionally, the preference for stability and aversion to uncertainty in Bangladeshi culture can impede the adoption of agile methodologies that thrive on adaptability and continuous improvement[71]. Moreover, the present-oriented cultural orientation might conflict with the forward-looking and iterative planning aspects of project management[72]. These challenges underscore the need for innovative solutions that address the intricate interplay between cultural dimensions and contemporary project management approaches, ultimately paving the way for achieving project success in this changing environment [73].

Hence, the Pie chart in figure 3.6 shown above illustrates the significance of various challenges for cultural transformation faced by software firms in Bangladesh in the context of adopting hybrid project management practices. The chart breaks down the challenges into four categories: resistance to change by 25%, communication barriers by

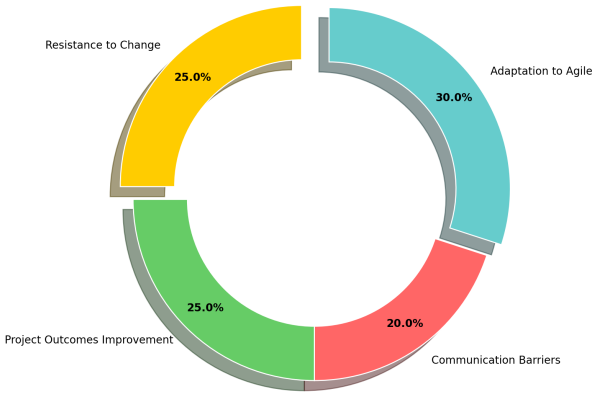


Figure 3.6: Major challenges faced by software firms for cultural transformation

20%, adaptation to agile methodologies by 30%, and project outcomes improvement by 25%, highlighting their respective proportions in terms of impact or focus areas. This visualization offers a clear and straightforward representation of where efforts and strategies might need to be concentrated to facilitate smoother transitions and better out

On the other hand, cultural dimensions and transformation examine how cultural factors influence the approach to managing projects within the country. It explores the ways in which local values, communication styles, and hierarchical structures shape decision-making, team dynamics, and project execution. Understanding these cultural transformations is crucial for adapting project management practices to ensure successful outcomes in the Bangladeshi context. Table 3.1 shows the detailed impact for cultural dimensions based on our study.

Table 3.1: Cultural Dimensions Impacting Software Project Management in Bangladesh

Cultural Dimension	**Impact on Project Management**
Power Distance	Can hinder open collaboration and decision-making.
Uncertainty Avoidance	Resists agile methodologies that require adaptability.
Collectivism	May conflict with individual accountability in agile practices.
Time Orientation	Challenges iterative and long-term project planning.

Summary of analysis: A summary analysis of the issue reveals a profound impact on the topic of cultural transformation and project management within Bangladesh's software industry. The clash between traditional cultural values and modern project management practices creates a multi-dimensional challenge. High power distance in Bangladeshi culture can hinder open communication and collaboration essential for agile methodologies, impacting project efficiency and outcomes. Uncertainty avoidance tendencies can resist the adaptive nature of agile, stifling innovation and responsiveness.Collectivism might deter individual ownership and accountability, vital components of successful project execution. Additionally, the present-focused time orientation can

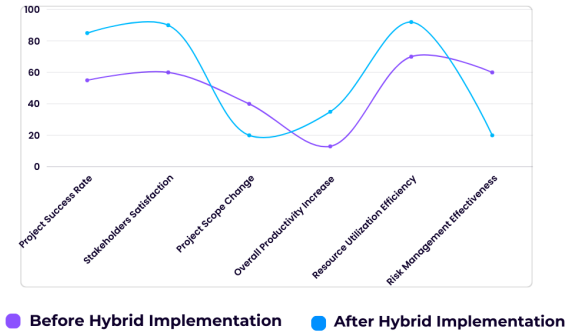


Figure 3.7: Organizational performance before and after hybrid Project Management

Table 3.2: Improvement of project metrics before and after hybrid implementation

Metric	Before Hybrid Implementation(%)	After Hybrid Implementation(%)	Improvement (%)
Project Success Rate	55	85	30%
Stakeholder Satisfaction	60	90	30%
Project Scope Change	40	20	20%
Overall Productivity	13	35	22%
Resource Utilization	72	85	13%
Risk Management	60	20	40%

impede iterative planning and reflection inherent to agile processes. These cultural influences collectively lead to resistance to change, inefficient teamwork, and compromised project quality. Addressing these impacts requires strategies that not only acknowledge cultural nuances but also find innovative ways to integrate them into project management practices to achieve the desired balance between tradition and modernity, ultimately driving successful project outcomes within the unique context of Bangladesh's software industry. Figure 3.7 and Table 3.2 shows the major changes and improvement before and after the implementation of hybrid project management in the Bangladesh software industry.

3.4 Proposed Solution

Bangladeshi software industry has experienced substantial growth but it grapples with challenges rooted in traditional project management practices, notably the widespread use of waterfall methodologies[74]. These conventional approaches often hinder adaptability in a rapidly evolving technological landscape. Cultural resistance within the industry makes it difficult to embrace hybrid project management—a methodology blending. Waterfall and Agile methods[75]. Resistance stems from hierarchical structures, risk aversion, and reluctance to deviate from established norms. Transitioning to hybrid methods requires more than procedural changes; it demands a profound cultural transformation[12]. The shift holds promise, including heightened adaptability, improved risk management,

and enriched collaboration. Overcoming cultural barriers necessitates leadership-driven cultural change, fostering a culture embracing change, encouraging experimentation, and facilitating cross-functional collaboration. In essence, reshaping the industry's cultural landscape is essential for competitive positioning, innovation, and sustainable growth[23].

3.4.1 Our Proposed Solutions

To navigate the cultural challenges impeding the adoption of hybrid project management in Bangladesh's software firms, several strategies are recommended based on the survey:

1.Leadership Advocacy: Industry leaders should endorse hybrid approaches, demonstrating commitment and setting the tone for change.

2.Tailored Training: Develop training programs that educate employees on hybrid principles and their benefits, adapting content to resonate with their experiences.

3.Cultural Workshops: Conduct workshops that address hierarchical barriers, risk aversion, and communication issues, fostering a culture of collaboration.

4.Collaboration Platforms: Implement tools to facilitate cross-functional interaction and idea exchange, nurturing teamwork.

5.Incremental Adoption: Gradually transition to hybrid methods via pilot projects, showcasing benefits while building confidence.

6.Continuous Improvement: Establish feedback loops for iterative enhancement, embracing a culture of learning.

7.Change Champions: Appoint advocates of change within the organization, aiding colleagues in the transition.

8.Measurement and Transparency: Define KPIs to quantify hybrid's impact, sharing results transparently.

9.Mentorship Programs: Facilitate knowledge transfer from hybrid-experienced individuals to accelerate learning

10.Long-Term Strategy: Develop a sustained plan for cultural transformation, regularly assessing progress.

Thus, finally these strategies collectively lay the groundwork for a cultural shift that enables Bangladesh's software industry to thrive with hybrid project management, ensuring improved project outcomes and global competitiveness. The Table 3.3 is the summary of final suggested strategies for successful hybrid project management implementation in Bangladesh to navigate the cultural transformation.

Table 3.3: Summary of strategies for successful hybrid project management implementation

Strategy	Action of Work
Clear Communication	Establish open communication channels to bridge cultural gaps.
Localized Training	Provide training tailored to the local context to enhance understanding and acceptance.
Gradual Implementation	Introduce hybrid methods slowly to ease the transition and reduce resistance.
Cross-Functional Teams	Create diverse teams to leverage collective skills and knowledge.
Leadership Advocacy	Encourage leadership support to drive cultural transformation and acceptance of new methodologies.

Approach to Mitigate the Issue: Mitigating the challenge of cultural transformation while implementing project management practices in Bangladesh's software industry requires a multifaceted approach. Embracing hybrid project management enables customization to cultural norms and balances traditional values with modern methodologies Comprehensive training equips teams to navigate challenges effectively. Cross-functional teams foster collaboration while accommodating collectivist tendencies. Open communication channels and gradual implementation promote transparency and ease transitions. This combined strategy enables software firms to harmonize culture and project management successfully, ensuring efficient project execution while respecting cultural heritage. Table 3.4 and Table 3.5 discusses the key benefits and their comparison of hybrid project management rather than the traditional one for cultural resistance.

Table 3.4: Key benefits of hybrid project management in terms of traditional

Benefit	Description
Improved Flexibility	Combines agile and traditional practices to adapt to changing requirements.
Enhanced Collaboration	Facilitates teamwork by aligning with cultural values.
Efficient Resource Use	Balances resource allocation between agility and structured approaches.
Increased Project Success	Supports cultural alignment, leading to higher project completion rates.

Table 3.5: Comparative analysis of traditional vs. hybrid project management approaches

Traditional Project Management	**Hybrid Project Management**
Sequential (Waterfall) approach with defined phases.	Combines elements of Waterfall and Agile, allowing flexibility and adaptability.
Low flexibility; changes are difficult to implement once the project is underway.	High flexibility; allows for iterative development and changes throughout the project.
Rigid time estimation; often leads to unrealistic timelines.	Adaptive time estimation with ongoing adjustments based on feedback.
Focus on risk identification and mitigation at the beginning of the project.	Continuous risk management and mitigation throughout the project lifecycle.
Limited stakeholder involvement after the initial planning phase.	Continuous stakeholder engagement and feedback are integral to the process.
Static resource allocation based on predefined phases.	Dynamic resource allocation allows for adjustments as project needs evolve.
Quality checks primarily conducted at the end of each phase.	Ongoing quality assurance and testing throughout the development process.
Formal and hierarchical communication structure.	Open and frequent communication, promoting collaboration among team members.
Fixed budget with limited room for adjustments.	Flexible budget management allowing for reallocations as needed.
Low adaptability to change; requires significant effort to alter project scope.	High adaptability, making it easier to pivot and adjust to new requirements.
Suitable for simple, well-defined projects with minimal changes.	Ideal for complex projects with evolving requirements and high uncertainty.
Limited collaboration; team roles are clearly defined but often siloed.	High collaboration, with cross-functional teams working together to achieve goals.

Chapter 4

Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Project Management

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In the rapidly evolving landscape of software development, timely delivery is a critical factor that determines the success and competitiveness of firms. This is particularly relevant in the context of hybrid software project management, which combines traditional and agile methodologies to leverage the benefits of both approaches[76]. In Bangladesh, a burgeoning software industry faces unique challenges and opportunities in managing on-time delivery of software projects. This paper aims to explore the various factors influencing on-time delivery within hybrid project management frameworks in Bangladeshi software firms.

Hybrid project management has gained traction due to its flexibility and adaptability, allowing teams to incorporate structured planning with iterative and incremental development processes[77]. However, the integration of these methodologies introduces complexity, requiring careful balancing to ensure project timelines are met[78]. In Bangladesh, software firms operate in a dynamic environment characterized by rapid technological advancements, a growing pool of skilled professionals, and increasing demand for high-quality software products both domestically and internationally. Despite the potential benefits, achieving on-time delivery in hybrid project management remains a significant challenge. Factors such as team collaboration, communication, resource allocation, and risk management play crucial roles[79]. Additionally, cultural, economic, and infrastruc-

tural aspects specific to Bangladesh further influence project outcomes. Understanding these factors is essential for improving project delivery performance and enhancing the overall efficiency and effectiveness of software development processes[80]

This study provides a comprehensive analysis of the factors affecting on-time delivery in hybrid software project management within the context of Bangladeshi software firms. By identifying key determinants and examining their impact, this research aims to offer insights and practical recommendations for project managers and stakeholders[81]. The findings are expected to contribute to the broader body of knowledge on hybrid project management and support the ongoing growth and development of the software industry in Bangladesh. The role of the project manager is another critical factor. Effective project managers who have substantial expertise and experience can significantly enhance the success of hybrid methodologies[82]. They are adept at managing project constraints, resources, and stakeholder interactions. Their ability to navigate the complexities of hybrid models by leveraging both traditional and agile practices is key to meeting project goals and ensuring timely delivery[83]. Finally, stakeholder engagement and communication are vital components. The involvement of multiple stakeholders often complicates communication, leading to potential delays. Maintaining robust communication channels and ensuring that all stakeholders are aligned with project goals are essential for on-time delivery[84]. Effective stakeholder engagement helps mitigate misunderstandings and ensures that any issues are promptly addressed, keeping the project on track[85]. The objectives and purpose of the study will be discussed by the 4 RQ's in section 4.2.1.

This chapter is structured as follows: Section 4.1 outlines the problem statement, while Section 4.2 describes the research methodology. Our analysis of the results is provided in Section 4.3. Lastly, Section 4.4 details the proposed solution

4.1 Problem Statement

The software industry in Bangladesh is at a pivotal crossroads, grappling with a range of challenges that impede its growth, operational efficiency, and global competitiveness. These challenges directly and indirectly impact the on-time delivery of projects, a critical metric for the industry's success[48]. While the adoption of hybrid project management methodologies offers a promising avenue for improvement, it also introduces a new layer of complexities[33]. The primary researchable issue to address is the effective integration of hybrid project management methodologies to ensure on-time delivery in small,medium to large software firms in Bangladesh. This involves understanding how various factors such as time estimation, volatility management, and stakeholder involvement impact the timely completion of projects.

4.2 Research Methodology

This section details the methodology employed in the research. The study aims to investigate the factors influencing on-time delivery in the Bangladesh software industry, focusing on the integration of traditional values with modern project management practices through hybrid project management methodologies. The methodology encompasses a mixed-method approach, combining both qualitative and quantitative data collection and analysis techniques. This section provides transparency into the research process, the strategies applied, and the criteria used to select the most relevant and effective methodological approaches.

4.2.1 Purpose of the Study

The purpose of this study is to investigate the critical factors affecting the on-time delivery of software projects within the context of hybrid project management in the Bangladesh software industry. As the industry increasingly adopts hybrid methodologies that blend traditional and agile approaches, it faces unique challenges that impact project timelines. These challenges include skill gaps, communication barriers, lifecycle inconsistencies, budget constraints, inadequate capacity planning, cultural resistance, and regulatory compliance issues. By identifying and analyzing these factors, the study aims to provide actionable insights and practical recommendations that can enhance the effectiveness of hybrid project management practices, ultimately improving the timeliness and success of software projects in Bangladesh. The findings of this research are intended to contribute to the broader understanding of hybrid project management in emerging markets and support the ongoing development and competitiveness of the Bangladesh software industry. Here we want to focus on 4 RQs which discussed below:

RQ1: *How do demographic factors such as age, marital status and work experience impact the hybrid project management effectiveness?*

This research question examines how demographic factors, such as age, marital status and work experience, influence professionals' perceptions of hybrid project management's effectiveness in Bangladesh's software firms as well as the on time delivery. It aims to understand whether younger employees or those with more experience in agile or traditional methods are more supportive of hybrid approaches. Analyzing these perceptions can provide valuable insights into tailoring training and implementation strategies to enhance acceptance and success across diverse demographic groups.

RQ2: *What are the key factors and challenges that influence on-time delivery in hybrid project management?*

This Reaseach Question identifies several factors influencing on-time delivery, such as communication barriers, resource allocation, and risk management. It also discusses how hybrid project management can address these factors by providing a balanced ap-

proach that combines structured planning with flexibility. This RQ seeks to delve deeper into understanding these specific factors, helping to identify what challenges need to be addressed for timely project completion in the below subsequent section.

RQ3: *How do company size, employee experience, and project methodologies impact on-time delivery in hybrid project management in Bangladesh?*

This research question focuses on understanding how organizational factors such as company size, employee experience, and the choice of project management methodology influence the timely delivery of projects in Bangladesh's software firms. It aims to explore how these variables affect project success, communication, flexibility, and resource management within hybrid project management frameworks. The insights from this analysis can help tailor project management strategies to improve on-time delivery across different types of organizations.

RQ4: *How can hybrid software project management methods improve on-time delivery in Bangladesh software Industry?*

Similarly, this research question emphasizes the benefits of hybrid project management in enhancing project efficiency and meeting delivery timelines. By integrating agile and traditional methods, hybrid approaches can better manage project complexities and stakeholder expectations. This RQ directly relates to evaluating how hybrid methods can be practically applied to improve the punctuality of project delivery, thus aligning with the report's goals of finding effective project management practices. The below section describes the more detailed answer of the question.

4.2.2 Data Collection

The data collection for this study was conducted using a blended research approach that integrates quantitative and qualitative methods to gain in-depth understanding of factors affecting timely delivery in hybrid project management Bangladesh software industry. Primary data was gathered with structured interviews with key stakeholders, including project managers, team leaders, and software engineers from various organizations within the industry. These interviews were designed to explore their experiences with on time delivery of project, their adoption of hybrid project management methodologies, and the specific challenges they encountered.

Additionally, surveys were distributed to a broader audience within the industry to capture quantitative data on the prevalence and impact of factors such as skill gaps, communication barriers, lifecycle inconsistencies, budget constraints, and cultural resistance on project outcomes. The survey questions were carefully crafted to quantify these challenges and assess their influence on the effectiveness of hybrid project management practices.

Secondary data was also collected through an extensive review of existing literature,

including academic journals, case studies, and industry reports, to contextualize the findings and compare them with global trends in hybrid project management. This mixed-method approach allowed for triangulation, enhancing the reliability and validity of the study's results.

Together, these data collection methods provided a robust foundation for analyzing the factors impacting on-time delivery in hybrid project management, ensuring that the study's findings are both comprehensive and grounded in the real-world experiences of industry practitioners.

4.2.3 Data Analysis

The data analysis for this study was conducted using a systematic approach to ensure a thorough understanding of the factors influencing on-time delivery in hybrid project management within the Bangladesh software industry. The analysis integrated statistical techniques for quantitative data with thematic analysis for qualitative data, enabling a thorough investigation of the challenges encountered by software companies.

The quantitative data collected through surveys was analyzed using statistical software to identify key patterns and relationships among the variables. Descriptive statistics were employed to summarize the data, providing insights into the frequency and severity of challenges such as skill gaps, communication barriers, and lifecycle inconsistencies. Inferential statistical techniques, including correlation and regression analysis, were used to examine the relationships between these challenges and project delays. This analysis helped to pinpoint the most significant factors contributing to on-time delivery issues, offering a data-driven perspective on the critical areas requiring intervention.

The qualitative data obtained from interviews and focus group discussions was analyzed using thematic analysis. This process involved coding the transcripts to identify recurring themes related to project management challenges, cultural influences, and organizational behaviors. Themes such as the impact of communication barriers, resistance to change, and resource allocation issues were explored in-depth. The thematic analysis provided a contextual understanding of how these factors manifest in the day-to-day operations of software firms in Bangladesh and their influence on project timelines.

The final stage of the data analysis involved integrating the quantitative and qualitative findings to draw comprehensive conclusions. By triangulating the data, the study ensured that the quantitative results were supported by qualitative insights, leading to a more robust and nuanced understanding of the factors affecting on-time delivery in hybrid project management. This integrated analysis not only highlighted the key challenges but also provided a holistic view of the strategies that could be implemented to improve project outcomes in the Bangladesh software industry.

4.2.4 Research Method

This section outlines the research methodology employed in this study to investigate the factors impacting on-time delivery in hybrid project management within the Bangladesh software industry. The research methodology integrates both qualitative and quantitative approaches to provide a comprehensive analysis of the challenges and to develop practical solutions for improving project outcomes. The methodology in figure 4.1 represents the flow of research method that was developed in five stages: Background Study and scope findings, Research Design, Data Collection, Data Analysis and Final Result.

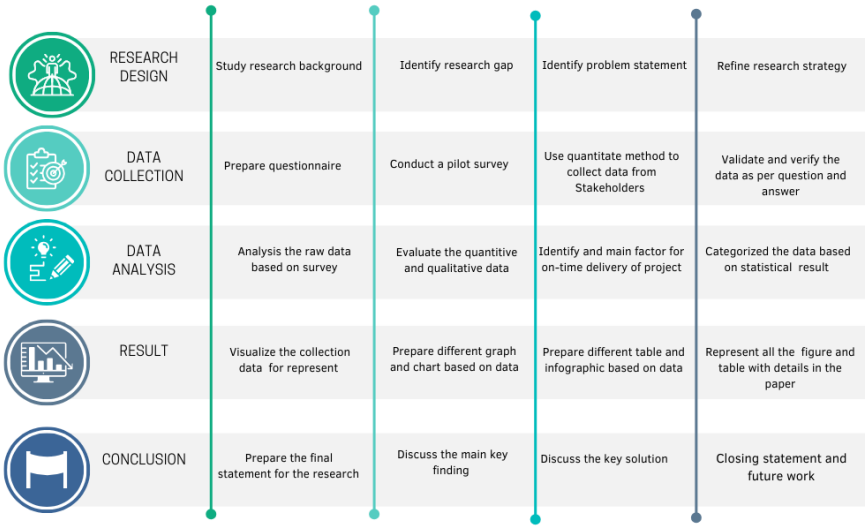


Figure 4.1: Research Framework

4.3 Result Analysis

The analysis of results reveals that key factors such as communication barriers, inadequate resource allocation, and insufficient project management training significantly hinder on-time project delivery. The study also highlights that integrating agile practices with traditional project management approaches can mitigate these challenges, leading to improved project timelines based on the survey on Bangladesh software companies.

4.3.1 Demographic Result

The below figure 4.2 provides demographic insights relevant to the research and it consists of two donut charts depicting age distribution and marital status of the study

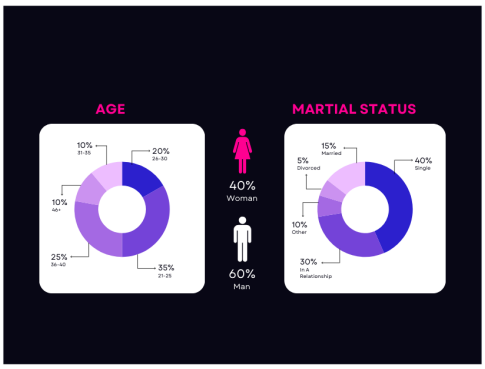


Figure 4.2: Demographic breakdown of survey participants

participants, along with gender proportions.These demographic insights are crucial in understanding the workforce dynamics within Bangladesh's software industry. They provide context on how factors like age and marital status might influence project management practices, team dynamics, and perspectives on achieving timely project delivery in a hybrid project management environment.

Age Distribution: The chart on the left shows in figure 4.2 that the largest age group among participants is 21-25 years, making up 35% of the sample. This is followed by the 36-40 age group at 25%, indicating a significant involvement of both younger professionals and those with more experience. Participants aged 26-30 comprise 20%, while those aged 31-35 and 46+ each make up 10%. This diverse age range suggests that the study captures perspectives across different career stages, from early-career individuals to more seasoned professionals.

Marital Status: The right chart indicates that 40% of participants are single, followed by 30% who are in a relationship, 15% married, 10% identified as 'Other,' and 5% divorced. The high percentage of single and in-relationship individuals could reflect a workforce focused on career growth and flexibility, which might impact their perspectives on project management and work-life balance in hybrid projects.

Gender Proportion: The image also mentions a gender breakdown with 60% male and 40% female participants. This distribution aligns with the common male dominance in the tech industry but also highlights a considerable female presence, indicating growing diversity.

Work Experience in Software Industry: Work experience in the software industry serves as crucial demographic information for our study. While software companies typically require their employees to adhere to a specific Software Development Life Cycle (SDLC) model during development, fresher, freelancers or self-taught developers may not follow a defined SDLC model. As illustrated in figure 4.3, the majority of participants in this study have between 3 to 5 years of industry experience, whereas the smallest group

of participants has more than 16 years of experience in the industry.

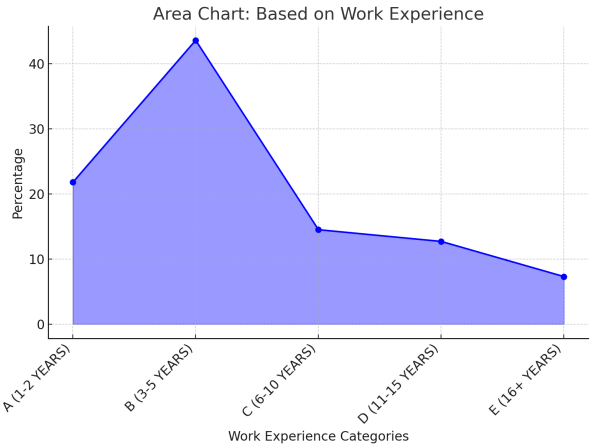


Figure 4.3: Survey respondents' work experience in the software industry

4.3.2 Exploratory Analysis

Firstly, this subsection delves into the preliminary findings gathered from the initial analysis, offering insights into emerging patterns and trends. Secondly, this phase serves as a foundation for deeper investigations, helping to shape hypotheses and guide subsequent research directions. The results are not conclusive but provide a valuable starting point for further exploration.

Researchable Issues: The primary researchable issue to address is the effective integration of hybrid project management methodologies to ensure on-time delivery in small, medium to large software firms in Bangladesh. This involves understanding how various factors such as time estimation, volatility management, and stakeholder involvement impact the timely completion of projects:

1. Time Estimation Accuracy: Initially, the accuracy is low, reflecting common challenges in predicting project timelines accurately. However, there is a noticeable improvement as hybrid methodologies are more rigorously applied, showcasing the importance of iterative and adaptive planning[86].

2. Volatility Management: Volatility, characterized by changes in project requirements, technology, and team composition, shows a trend of gradual stabilization. The graph indicates that effective volatility management practices lead to a reduction in project disruptions over time, facilitating smoother project execution[87].

3. Stakeholder Involvement: The level of stakeholder involvement fluctuates but shows an overall increasing trend. This suggests that consistent engagement and communication with stakeholders are becoming more integrated into the project management process, leading to better alignment of expectations and project goals[88].

4. Resource Allocation Efficiency: Initially, resource allocation efficiency is inconsis-

tent, with significant fluctuations. However, as more sophisticated resource management tools and techniques are adopted, the graph demonstrates a trend towards more efficient and balanced resource distribution across projects[89].

5. Regulatory Compliance: The trend for regulatory compliance starts low but shows steady improvement. This trend reflects the growing awareness and incorporation of regulatory requirements into the project management process, reducing delays and compliance-related issues over time[90].

Challenges faced by the companies: The software firms in Bangladesh encounter several challenges in achieving on-time delivery within hybrid project management frameworks [34]. One of the primary obstacles is balancing traditional hierarchical structures with the flexible, iterative nature of hybrid methodologies[36]. This often results in communication breakdowns, delayed decision-making, and resistance to adopting new approaches[37]. Moreover,The collectivist culture that emphasizes teamwork can conflict with the individual accountability required for agile practices, making it harder to meet deadlines[43]. Furthermore, a cultural preference for stability and risk aversion may hinder the adaptability needed for hybrid methods, which rely on continuous improvement and flexibility[44]. Based on the survey data the core issue lies in navigating these multifaceted challenges to ensure timely project completion. In the below Figure 4.4, the Radar Chart provides a visual representation of the impact of various factors on project performance, displayed on a circular grid. Each axis corresponds to a factor, with the plotted shape highlighting the relative strengths and weaknesses of each one . In this chart, the largest spikes correspond to Lack of Capacity Planning (37%) and Skill Gap (35%), highlighting their significant contribution to project challenges. On the other hand, Regulatory and Compliance Issues (10%) and Cultural and Organizational Inertia (15%) show the lowest impacts, forming the smaller points on the radar.

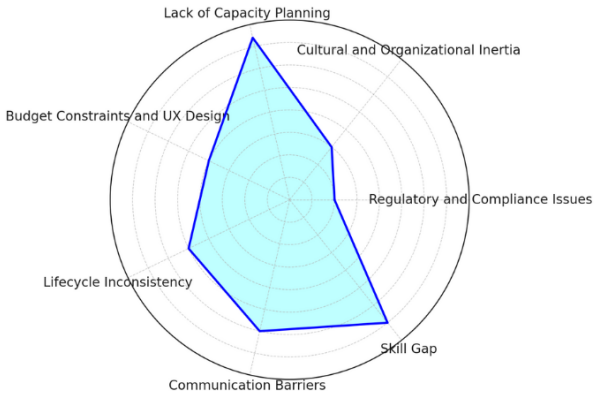


Figure 4.4: Challenge face by company for on time delivery in hybrid project

However, on the other hand follwing Table 4.1 represents the more detailed analysis of collected data for Factors Influencing On-Time Delivery in Hybrid Project Management.

Table 4.1: Factors Influencing on-time delivery in hybrid project management

Factor	**Severity (Scale 1-5)**	**Impact (%)**
Skill Gap	4.5	35%
Communication Barriers	4.0	30%
Lifecycle Inconsistency	3.5	25%
Budget Constraints and UX design	3.0	20%
Capacity Planning Issues	4.2	37%
Cultural and Organizational Inertia	3.0	15%
Regulatory and Compliance Issues	2.5	10%

Characteristics of software firms in Bangladesh: In the context of factors affecting on-time delivery, small software firms in Bangladesh exhibit several distinct characteristics.The subsequent line graphs illustrate in figure 4.5, 4.6 and 4.7 provided insights into how various factors impact on-time delivery in hybrid project management within the Bangladesh software industry, segmented by company size,employee experience levels and project management methodology. Each figure highlighted different perspectives on key elements such as communication, project management tools, planning, risk management, quality assurance, and team flexibility.

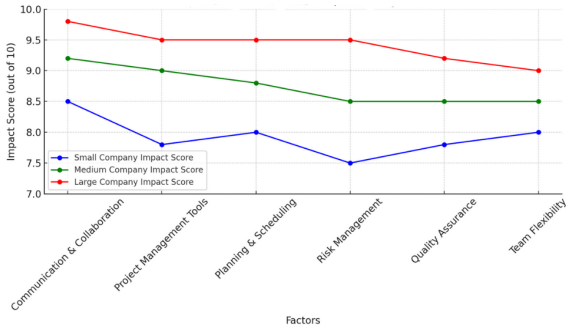


Figure 4.5: Factors for on-time delivery in hybrid project management(company size)

Company Size: The figure 4.5 showed above that large companies rated most factors significantly higher than medium and small companies. Large companies particularly valued communication and collaboration, with scores close to 10, indicating a strong emphasis on effective communication channels to manage complex projects. They also rated team flexibility and quality assurance highly, reflecting their capability to adapt to changes and maintain high standards. In contrast, small companies gave lower scores

across all factors, suggesting challenges in resource allocation and less structured processes. Medium-sized companies scored between the two extremes, balancing structured management with some level of flexibility.

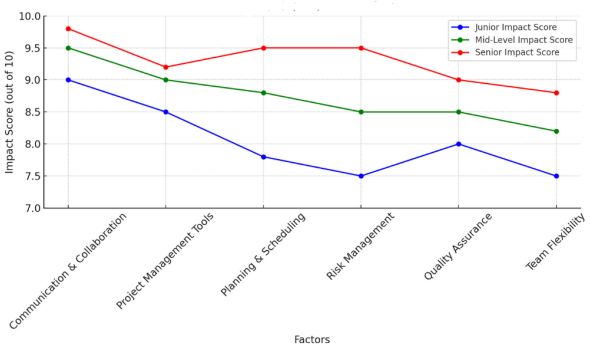


Figure 4.6: Factors for on-time delivery in hybrid project management(employee level)

Employee Experience Level: The figure 4.6 analyzed how employees at different experience levels; where junior, mid-level, and senior perceived the impact of various factors on on-time delivery. Senior employees consistently rated all factors higher, showing their recognition of the strategic importance of communication, planning, and risk management in ensuring successful project outcomes. They placed particular emphasis on communication and collaboration, scoring it near 10, underlining its critical role in managing complex projects. Mid-level employees also valued these factors but to a slightly lesser extent, focusing more on operational elements like project management tools. Junior employees rated all factors lower, suggesting their limited involvement in strategic planning and risk management, which are typically handled by more experienced team members.

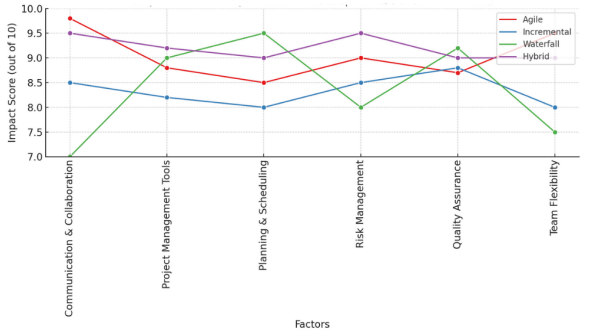


Figure 4.7: Factors for on-time delivery in hybrid project management(process model)

Project Management Methodology: The figure 4.7 compared the impact scores based on different project management methodologies: Agile, Incremental, Waterfall, and Hybrid. Hybrid methodologies received the highest scores across most factors, emphasizing their ability to integrate best practices from multiple approaches. Agile scored particularly high on communication and team flexibility, reinforcing its iterative and collaborative nature. Waterfall, however, showed lower scores, especially in flexibility and communication, reflecting its sequential, less adaptive approach. Incremental methodologies scored lower on project management tools and team flexibility, suggesting that while they are more structured than Agile, they may not fully leverage all tools and flexibility for optimal project management.

Overall, these analyses highlight that the importance of different project management factors varies significantly based on company size, chosen methodology, and the experience level of employees. Large companies and experienced professionals tend to prioritize communication, risk management, and flexibility more, while different methodologies dictate how tools and adaptability are utilized to achieve on-time delivery. This detailed breakdown underscores the complexity of project management in the software industry and the need for tailored approaches depending on organizational context and experience in Bangladesh.

Moreover, the bar chart on the other hand in the figure 4.8 illustrates the trends in the Bangladesh software industry's 3 key performance metrics like On-Time Delivery Rate, Project Success Rate, and Cost Efficiency from 2020 to 2023, highlighting the factors impacting on-time delivery in hybrid project management

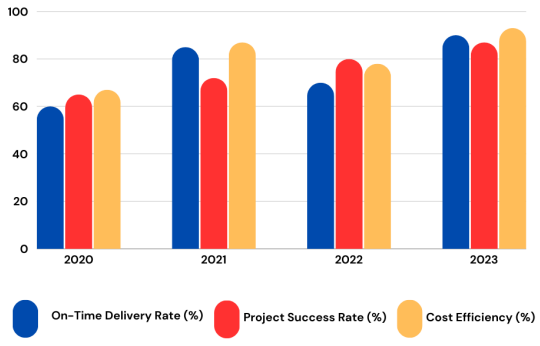


Figure 4.8: Three key metrics for on-time delivery of project for the last 4 Years

On-Time Delivery Rate (blue bars): This metric shows a steady increase over the years, starting from around 60% in 2020 and rising to approximately 90% by 2023. The consistent improvement suggests that companies are increasingly adopting effective strategies and practices for meeting project deadlines.

Project Success Rate (red bars): Similar to on-time delivery, project success rates also improved over the period, rising from about 60% in 2020 to nearly 85% in 2023. This indicates a correlation between successful project delivery and other quality factors being well-managed in hybrid project settings.

Cost Efficiency (yellow bars): Cost efficiency started around 70% in 2020 and has steadily increased to nearly 90% by 2023. This upward trend reflects improved budget management and resource optimization, possibly through better planning and risk management practices in hybrid projects.

However, the chart shows positive trends in all three metrics, indicating that the Bangladesh software industry has effectively leveraged hybrid project management practices to enhance on-time delivery, increase project success rates, and improve cost efficiency. These improvements likely stem from adopting flexible project management methodologies, enhanced collaboration, and better quality assurance processes.

Summary of analysis: A summary analysis of the issue reveals a significant impact on the factors influencing on-time delivery in hybrid project management within Bangladesh's software industry. The interplay between traditional cultural values and modern project management practices creates complex challenges. High power distance in Bangladeshi culture can limit open communication and collaboration, which are crucial for the effectiveness of hybrid methodologies, thereby affecting project efficiency and timelines. The tendency towards uncertainty avoidance can resist the flexible nature of hybrid approaches, reducing innovation and the ability to respond quickly to changes. Collectivist attitudes might limit individual ownership and accountability, which are essential for meeting project deadlines and maintaining quality. Additionally, a present-focused time orientation can obstruct the iterative planning and continuous improvement processes inherent in hybrid project management. Addressing these challenges requires strategies that achieve on time while integrating them into project management practices, achieving a balance between traditional approaches and modern hybrid methodologies.

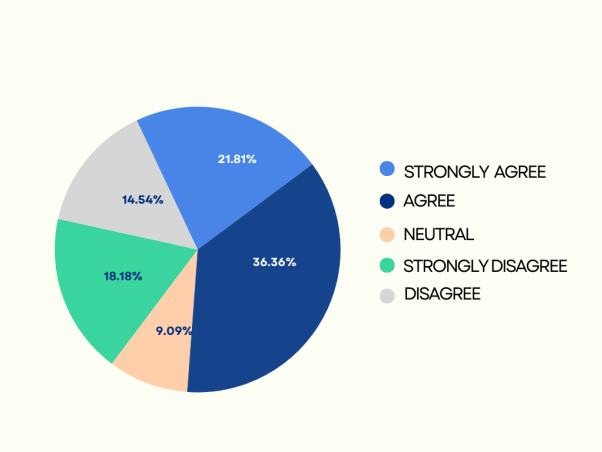


Figure 4.9: User perceptions on hybrid project practices in Bangladesh's software industry

Namely, the pie chart in figure 4.9 summarizes respondents' perceptions of a specific aspect of hybrid project management practices in Bangladesh's software industry. It shows that the majority of respondents have a positive view, with 36.36% agreeing and 21.81% strongly agreeing with the statement. Conversely, 18.18% of respondents strongly disagree, and 14.54% disagree, indicating some level of opposition. A smaller portion, 9.09%, remain neutral, showing no strong opinion either way. Overall, the chart highlights that while there is significant support for the statement, a notable portion of respondents also express disagreement, reflecting diverse perspectives within the industry.



Figure 4.10: Comparison before and after hybrid Project Management in the organization

Furthermore, the figure 4.10 shows that after implementing hybrid project management, organizations experienced significant improvements. Project success rate increased from 55% to 85%, and stakeholder satisfaction rose from 60% to 90%. Scope creep reduced from 40% to 20%, and productivity increased from 13% to 35%. The on-time delivery rate improved from 58% to 83%, resource utilization efficiency went up from 65% to 80%, and risk management effectiveness was enhanced from 55% to 85%. These changes highlight the positive impact of hybrid project management on project outcomes and efficiency.

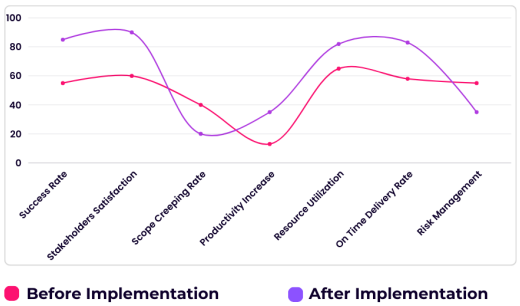


Figure 4.11: Line chart for before and after hybrid implementation in the company

In the same way, the line graph in 4.11 shows that after implementing hybrid project management, there were significant improvements across various performance metrics. Success rates and stakeholder satisfaction increased, while scope creep rates decreased, indicating better control and alignment. Productivity and resource utilization also saw marked improvements, reflecting enhanced efficiency. On-time delivery rates rose, and risk management effectiveness improved, demonstrating better project planning, execution, and risk mitigation. Overall, hybrid project management positively impacts project outcomes and operational efficiency.

4.4 Proposed Solution

The software industry in Bangladesh is at a critical juncture, facing numerous challenges that significantly hinder its ability to deliver projects on time[91]. One of the most pressing issues is the lack of a skilled labor force, which often results in the inability to handle complex projects effectively[92]. This is compounded by frequent communication gaps between clients and project managers or developers, leading to misunderstandings and misinterpretations of project requirements. Moreover, many companies in Bangladesh do not adhere to any particular project management lifecycle, making it difficult to manage the ever-changing requirements of clients[93]. This lack of structure is especially problematic in the context of hybrid software project management.

This section particularly presents the proposed solutions to address the challenges identified in ensuring on-time delivery within hybrid project management in the Bangladesh software industry. The solutions are designed to mitigate key issues such as skill gaps, communication barriers, lifecycle inconsistencies, and cultural resistance, which have been identified as significant contributors to project delays. By leveraging advanced project management techniques, enhanced communication strategies, and adaptive frameworks, these solutions aim to improve the efficiency and effectiveness of hybrid methodologies, ultimately leading to more consistent and timely project deliveries.

4.4.1 Our Proposed Solutions

We proposed a model which was developed to address the unique challenges faced by the software industry in Bangladesh, particularly in the realm of hybrid software project management. It combines the structured decision-making of the Stage-Gate model with the flexibility and adaptability of Agile methodologies [2],[45]. Additionally, Prototyping is integrated at each stage for iterative validation and user feedback. The following model aims to provide a comprehensive framework that can adapt to changes and complexities, thereby increasing the likelihood of on-time project delivery[94], [95].

Gate 0: Discovery

- Agile Framework: Lean Startup / Agile Project Chartering

- Prototyping: Low-fidelity prototype or MVP

- Example: Before initiating a project, a simple prototype or MVP is created to validate the business idea or to outline the project's scope, objectives, and stakeholders.

Gate 1: Scoping

- Agile Framework: Scrum

- Prototyping: Refine the prototype based on new requirements

- Example: The project team uses Scrum to create a backlog of requirements. The prototype is then updated to reflect these requirements, which are prioritized for the next development sprint.

Gate 2: Design Review

- Agile Framework: Design Thinking

- Prototyping: Update the prototype to reflect the finalized system design

- Example: Design Thinking workshops are conducted to empathize with users and understand their needs. The prototype is updated to reflect the final system design, incorporating user feedback.

Gate 3: Development Review

- Agile Framework: Extreme Programming (XP)

-Prototyping: Create a functional prototype for initial testing

-Example: Developers use XP practices like pair programming and test-driven development to build a functional prototype that undergoes initial testing for validation.

Gate 4: Testing Review

- Agile Framework: Behavior-Driven Development (BDD)

- Prototyping: Use the prototype for user acceptance testing

-Example: BDD scenarios are created to define the expected behavior of the system. The prototype is then used for user acceptance testing to ensure it meets these expectations.

Gate 5: Deployment

- Agile Framework: DevOps

-Prototyping: Finalize the prototype to reflect the production-ready system

-Example: DevOps practices like continuous integration and continuous deployment are used to automate the transition from development to production. The prototype is finalized to reflect the production-ready system.

Gate 6: Post-Implementation Review

- Agile Framework: Kanban

- Prototyping: Continuously update the prototype for future iterations

- Example: After deployment, Kanban is used to manage ongoing tasks like maintenance and optimization. The prototype is continuously updated to reflect any changes or future enhancements.

Table 4.2: Strategies for enhancing on-time delivery in hybrid project management

Strategy	**Impact on On-Time Delivery**
Advanced Time Estimation Techniques	Improved accuracy in project timelines, reducing delays.
Adaptive Project Management Frameworks	Better responsiveness to changes, leading to timely delivery.
Enhanced Stakeholder Management	Reduced misunderstandings, resulting in fewer delays.
Improved Resource Management Software	Optimal resource utilization, reducing bottlenecks and delays.
Cultural Training and Workshops	Enhanced team collaboration, resulting in more efficient execution.
Iterative Prototyping and Feedback	Early identification of issues, minimizing rework and delays.
Risk Management and Mitigation Plans	Increased ability to foresee and mitigate risks, reducing disruptions.
Regulatory Compliance Automation	Faster adherence to compliance requirements, preventing delays.
Cross-Functional Team Collaboration	Better problem-solving and innovation, enhancing delivery speed.
Incremental Adoption of Hybrid Methodologies	Smoother implementation of changes, leading to consistent progress.

Subsequently, the above Table 4.2 also presents the proposed strategy from the stakeholder's survey for improving on-time delivery of project and its management efficiency within Bangladesh's software industry. Each solution is tailored to address specific challenges identified, such as communication barriers, cultural resistance, and resource management, aiming to enhance overall project outcomes and stakeholder satisfaction.

Approach to mitigate the issue: To address the challenges of integrating hybrid project management methodologies for on-time delivery, several approaches can be considered based on our literature review:

1.Improved Time Estimation: Utilize advanced estimation techniques, possibly incorporating machine learning algorithms or fuzzy logic, to provide more accurate time estimates[96].

2.Adaptive Frameworks: Implement frameworks that allow for quick adaptation to changes in project requirements, technology, or team composition. This could involve creating a 'change buffer' in project timelines[97].

3.Stakeholder Management Tools: Use advanced stakeholder management tools to keep all parties informed and aligned, reducing the chances of misunderstandings that could lead to delays[98].

4.Resource Management Software:Employ resource management software that can allocate resources dynamically across multiple projects, helping to identify and alleviate bottlenecks before they cause delays[99].

5.Change Management Programs: Initiate organizational change management programs to reduce resistance to the adoption of hybrid methodologies[100].

6.Regulatory Compliance Checklists: Develop comprehensive checklists and automated tools to ensure that all regulatory requirements are met in a timely manner, reducing the risk of delays due to compliance issues[101].

7.Regular Reviews and Audits: Conduct frequent project reviews and audits to iden-

tify potential issues early on, allowing for corrective actions to be taken before they impact the project timeline[102].

So, undoubtedly by implementing these approaches, the issue of effectively integrating hybrid project management methodologies for on-time delivery can be significantly mitigated, leading to improved project outcomes, client satisfaction, and organizational reputation which summarize in Table 4.3 by suggesting solutions against the major challenges in the software industry in Bangladesh for ontime delivery.

Table 4.3: Challenges and proposed solution for the software company of bangladesh for the hybrid project management.

Challenges	**Proposed Solutions**
Lack of skilled labor leading to project delays	Implementing training programs and hiring skilled professionals
Misunderstandings between clients and project teams resulting in rework and delays	Enhancing communication channels and using collaborative tools
Absence of a standardized project lifecycle causing inefficiencies and missed deadlines	Adopting standardized project lifecycle frameworks
Skipping essential steps due to budget limitations leading to late-stage changes	Effective budget planning and allocation
Inadequate planning causing resource allocation issues and bottlenecks	Implementing robust capacity planning and resource management tools
Resistance to adopting new methodologies slowing down project execution	Change management programs and fostering a culture of adaptability
Legal complexities introducing unforeseen delays	Developing comprehensive compliance checklists and automated tools

Chapter 5

Conclusion

The study "Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management" investigates the profound challenges faced by software firms in Bangladesh as they attempt to blend traditional cultural values with modern project management practices. In a country where cultural dimensions such as high power distance, collectivism, and uncertainty avoidance are prevalent, integrating agile methodologies that emphasize flexibility, individual accountability, and adaptability poses significant challenges. The study finds that hybrid project management, which combines the structured approach of traditional methodologies with the flexibility of agile practices, provides an effective strategy to overcome these cultural barriers.

Key findings from the study highlight the necessity of clear communication, localized training, and a gradual implementation strategy to mitigate resistance to change and navigate hierarchical structures. By tailoring project management practices to align with cultural norms, firms can enhance collaboration, reduce conflicts, and improve overall project outcomes. This approach not only respects the cultural heritage of Bangladesh but also fosters a more adaptable and innovative software development environment. The study underscores the importance of a balanced approach that leverages both traditional and modern methodologies to drive industry growth and project success.

The second research study, "Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Projects Management," provides a comprehensive analysis of the factors that influence the timely delivery of software projects within hybrid management frameworks. The study identifies critical challenges such as skill gaps, communication barriers, inconsistent project lifecycles, budget constraints, and cultural resistance. These challenges often result in project delays, increased costs, and diminished quality, highlighting the need for more effective management strategies.

To address these issues, the study proposes several solutions, including advanced time estimation techniques, adaptive project management frameworks, enhanced stakeholder management tools, and improved resource management software. By focusing on these areas, the research suggests that software firms can significantly improve their project

delivery performance. The study emphasizes that hybrid project management is not only about combining methodologies but also about adapting these approaches to the specific context and challenges of Bangladesh's software industry.

Moreover, the study points out that small software firms, due to their agility and adaptability, can more readily implement hybrid methodologies, albeit with challenges related to resource constraints and expertise. The research advocates for a tailored approach that considers the unique characteristics and needs of each firm, fostering an environment where hybrid methodologies can thrive.

These two research studies collectively emphasize the critical role of adaptive project management in navigating the unique challenges faced by the Bangladeshi software industry. By integrating hybrid methodologies that respect cultural values and address practical challenges, these studies highlight the potential for improved project delivery and enhanced competitiveness in a rapidly evolving global market. The results offer important insights for software companies aiming to enhance their project management strategies, supporting the industry's sustainable growth and success in Bangladesh

5.1 Sustainability

Sustainability of **"Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management"** and **"Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Projects Management":** The proposed solutions for both of the study are aimed at ensuring long-term sustainability for Bangladeshi software firms across environmental and social dimensions

All of the proposed solutions for Bangladeshi companies depend on several factors specific to each organization, such as technology used, organizational size, organizational culture, and available resources. While the principles of sustainability analysis like environmental and social are universally applicable, their implementation may require adaptation to the unique context of each company in Bangladesh[103]. The following are the sustainable discussions based on our proposed solution for the Bangladeshi software industry.

5.1.1 Environmental Sustainability

Using **automated compliance** tools and **cloud-based collaboration platforms** reduces reliance on paper and lowers energy consumption. According to our survey, companies like 'BJIT' and 'Kaz Software' can enhance environmental sustainability by adopting cloud infrastructure and minimizing manual processes.

The **Chief Technology Officer** of these large tech firm places a strong emphasis

on environmental sustainability, marking it as **Very Important**. The company actively implements practices to reduce its carbon footprint, achieving impressive outcomes:

- They utilize **efficient energy usage**, encourage **remote working**, and focus on **minimizing resource usage**.
- A significant portion of the company's projects (61-80%) actively incorporates sustainability measures, and they have achieved a **31-40% reduction** in physical resource usage.
- Their focus on energy efficiency has resulted in a **31-40% improvement** in energy savings.

This firm demonstrates a **high focus** on sustainability in project management, with effective resource-saving methods that are making a **significant impact** on energy efficiency. Their consistent efforts are supported by hybrid project management techniques, highlighting their leadership in sustainability efforts within the tech industry.

Aditionally, implementation of **automated compliance tools** and **cloud-based DevOps** practices helps companies minimize their environmental footprint by reducing reliance on paper-based processes and decreasing energy usage[104]. For example, organizations such as 'BJIT' and 'Kaz Software' can utilize these approaches to adhere to regulatory requirements while simultaneously lowering their carbon emissions. Shifting to cloud-based infrastructure not only enhances energy efficiency but also offers scalability, contributing to long-term environmental sustainability[103].

In contrast, the **Project Manager** at a mid-sized software company acknowledges environmental sustainability as **Important** but the company's efforts are less robust compared to the larger firm:

- Their practices to reduce the carbon footprint are applied only **Sometimes**, and they rely primarily on **remote working options** and **recycling**.
- Fewer projects (21-40%) incorporate sustainability, and the company has achieved a **11-20% reduction** in physical resource usage.
- Their energy efficiency has seen a **11-20% improvement**, which, while beneficial, is less impactful than the larger firm's achievements.

This mid-sized company displays a **moderate focus** on sustainability. While their efforts are noteworthy, they are limited by fewer resources, likely a result of the company's size and perhaps a lower priority placed on sustainability by leadership. Their approach is still evolving, and while they have made gains, these gains are moderate compared to the larger tech firm.

5.1.2 Social Sustainability

Leadership advocacy, **cultural training**, and **change champions** help foster inclusivity and collaboration, ensuring smoother transitions to hybrid models. Companies like 'Kaz Software' can enhance team dynamics and social cohesion through these strategies, promoting a socially sustainable work environment.

From a social sustainability perspective, the company is equally committed to ensuring the well-being of its employees, with a **Strongly Agree** stance on improving work-life balance(See Appendix). This indicates that the company is not only focused on environmental practices but also considers the broader impact on employee health, engagement, and work-life harmony. By promoting remote working, they also contribute to reducing employee stress and creating a flexible work environment.

In the same way, introduction of **cultural training** and **stakeholder management** promotes inclusivity and improves communication in diverse teams. For example, 'Technobd Web Solutions' can enhance collaboration between local and international teams by addressing cultural differences, while 'Dream71 Bangladesh' can use cross-functional collaboration tools to improve teamwork. This creates a socially sustainable work environment, where employees are engaged, and clients feel involved, leading to higher retention rates and long-term business relationships.

In terms of social sustainability, the company **Agrees** that improving work-life balance is important, but their actions in this area are less intensive than the large tech firm's(See Appendix). As they are a smaller company, their approach is focused on addressing work-life balance through flexible work arrangements, but it lacks the same comprehensive measures seen in larger organizations.

So finally we can say that the **large software firm** has a highly structured and impactful sustainability program, achieving significant reductions in resource use and energy consumption through hybrid project management. The **small mid-sized software company**, while committed, has seen more moderate results, focusing primarily on remote work and recycling with smaller improvements in efficiency.The **large firm** excels in both environmental and social sustainability, strongly promoting work-life balance for employees. The **small mid-sized firm** also values social sustainability but offers fewer comprehensive initiatives due to resource constraints. The **large software firm** benefits from its scale and resources but must continue innovating to maintain leadership in sustainability and **small mid-sized firms** face resource limitations but have potential for growth and improved sustainability practices with more structured initiatives.

5.2 Feasibility

Feasibility of **"Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management"** and **"Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Projects Management":** The proposed strategies for adopting hybrid project management in Bangladesh's software firms are feasible when evaluated across economic, technical, and operational dimensions. The proposed hybrid project management model combines the Stage-Gate framework with Agile methodologies, incorporating prototyping at each stage to address the unique challenges of the Bangladeshi software industry[94]. This approach aims to improve on-time delivery by balancing structure with flexibility. Below is a feasibility study based on economic, technical, and operational aspects.

5.2.1 Economic Feasibility

By implementing **tailored training programs** and **incremental adoption** through pilot projects is cost-effective, as shown by 'Southtech Limited' which used internal resources and small-scale trials to minimize financial risks. Affordable **collaboration platforms** like Trello and Microsoft Teams, as used by 'Technobd Web Solutions', further support economic viability without significant investment.Agile Framework Integration can adopt Agile frameworks like Scrum, XP, and DevOps which require investment in training and tools but offer long-term economic benefits[104]. The iterative nature of Agile reduces project risks and potential cost overruns by enabling early issue detection and continuous improvement.

As per our survey, the COO at this large software company finds implementing hybrid project management to be **very feasible** in terms of cost, supported by the company's established budget allocation for new initiatives. The financial stability of this larger organization enables it to absorb the costs associated with new project management tools and necessary infrastructure upgrades. This commitment to funding innovation has allowed them to deliver a high success rate (61-80%) for projects completed on time. In contrast, the Software Project Manager at this mid-sized startup finds economic feasibility **somewhat difficult**. With a limited budget, the company faces financial constraints that impact its ability to fully implement hybrid project management. As a result, the feasibility is rated as only **moderately feasible**, and the company's financial limitations constrain project execution, which impacts overall project success and on-time delivery rates (41-60%).

5.2.2 Technical Feasibility

Stage-Gate and Agile Integration is the integrating Stage-Gate and Agile methodologies is practical, as many firms already incorporate aspects of both frameworks[95]. The challenge lies in effectively integrating them. Companies like 'BJIT Limited' have shown that with proper training and tool integration (e.g., JIRA for Agile and MS Project for Stage-Gate), this model can be successfully implemented. The use of **Prototyping and Testing** at each stage ensures technical validation and user feedback, making it feasible to iterate and refine the product based on real-world requirements.'Technobd Web Solutions', for instance, has utilized prototyping and user testing effectively to align development with client expectations.

From a technical perspective, the COO also rates the feasibility of adopting new project management tools as **high**. The company's extensive resources allow for quick integration of new technology and alignment with existing systems. This technical advantage contributes to a **31-40% increase** in project success rate, showcasing the substantial improvements that technical readiness can provide in a well-resourced organization.

The startup's technical feasibility is also **moderate**, reflecting its partial readiness for new tools and technologies. With a limited budget for advanced project management tools and partial infrastructure in place, the company has achieved only **moderate improvements** in project outcomes. This is indicative of the challenges startups often face in accessing the technology and resources needed for a robust hybrid project management system.

5.2.3 Operational Feasibility

Leadership advocacy and **incremental adoption** are operationally feasible with strong leadership support and careful planning, as seen in "DataSoft Systems". A **long-term strategy** for cultural transformation, as developed by "Bangla Puzzle', aligns well with overall business goals, making it operationally sustainable

Moreover, The hybrid **Adaptability of the Model** to different project requirements is operationally feasible. It allows for flexible response to changes, a necessity in the dynamic software industry[105].The integration of **Resource and Team Management** frameworks like Scrum and Kanban facilitates efficient resource allocation and task management, making the model operationally sustainable[106]. Companies like 'Brain Station 23' have leveraged these methodologies to manage teams effectively across multiple projects, ensuring alignment with project goals and timelines.

As per our survey, the operational feasibility is mostly favorable, with the large company fully resourced in terms of personnel and infrastructure. However, **resistance to change** and occasional **infrastructure limitations** present ongoing challenges. Despite these hurdles, operational improvements remain significant, with **41-60% of projects**

showing enhancements in workflow and resource allocation. Overall, the firm experiences a **significant improvement** in project outcomes, driven by a well-supported hybrid project management approach.

Operationally, the startup struggles more than the large firm. With limited **trained personnel** and **budget constraints**, the company can only partially meet the requirements for hybrid project management. This results in only **21-40% of projects** showing improvement in operational feasibility, impacting project workflows and delivery. Consequently, the project success rate has only increased by **11-20%**, showcasing the operational hurdles faced by smaller companies in adopting complex management frameworks like hybrid project management.

So finally, we can say that the **large software company** finds economic feasibility much more favorable due to its financial resources, enabling effective budget allocation for hybrid project management. The mid-sized **startup**, on the other hand, faces cost constraints, making full implementation challenging. The **large company** benefits from high technical feasibility, with strong infrastructure and technology support, leading to substantial improvements in project success. The **startup**, however, experiences moderate technical feasibility due to limited access to advanced tools, affecting its overall project performance. Operationally, the **large company** fares better, with significant improvements in workflow and resource allocation. The **startup** faces operational challenges, including a lack of trained personnel and infrastructure limitations, which restricts its ability to improve project processes effectively. The **large company** reports a **significant increase** in project success rate due to well-supported economic, technical, and operational feasibility, whereas the **startup** shows only **moderate improvement** in project outcomes, primarily due to its limited resources and partial implementation capabilities.

5.3 Social and Environmental Impact

Social and Environmental Impact of **"Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management"** and **"Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Projects Management"**: The recommended strategies for overcoming cultural challenges in adopting hybrid project management in Bangladesh's software firms have significant social and environmental implications. The proposed solutions for On time project delivery of hybrid project management in Bangladesh software companies have positive implications for both social and environmental impact.

5.3.1 Enhanced Employee Engagement and Collaboration

Cultural Workshops addressing hierarchical barriers and communication issues help foster a culture of inclusivity and collaboration. This creates a more cohesive work environment, breaking down silos and promoting equal participation across teams. **Collaboration Platforms** facilitate cross-functional interactions, enabling employees from diverse backgrounds to share ideas and work together more effectively. Compnay like "BrainStation 23' use it which not only enhances teamwork but also nurtures innovation by leveraging diverse perspectives within the organization. **Mentorship Programs** and **Change Champions** contribute to a socially sustainable environment by empowering employees through knowledge sharing and peer support. These initiatives reduce the anxiety associated with transitioning to hybrid models and help build a more confident, adaptable workforce. As per our survey, the Head of HR at this large corporation reports strong leadership advocacy, which has **greatly influenced employee engagement** and on-time project delivery. The use of **collaboration platforms** is maximized, with 75-100% of cross-functional interactions facilitated by these tools, which help maintain project timelines and minimize physical meetings. Tailored training programs and mentorships are seen as **very effective** in enhancing employee adaptability to hybrid models, resulting in high levels of engagement across projects.

On the contrary, the HR & Admin Manger in this startup indicates that leadership advocacy has a **moderate influence** on engagement and on-time project delivery. Collaboration platforms facilitate **50-74% of team interactions**, enabling better communication but not to the same extent as in larger corporations. Mentorship programs and change champions are used **occasionally** to support employee adaptability, showing that the organization values engagement, albeit with some limitations due to resources.

5.3.2 Skill Development and Continuous Learning

Tailored Training programs and **Continuous Improvement** strategies establish a culture of continuous learning and professional development. By providing employees with the necessary skills and knowledge to adapt to hybrid project management, companies like 'Data soft' contribute to their personal and professional growth, leading to higher job satisfaction and retention. **Mentorship Programs** ensure that less experienced employees receive guidance and support from seasoned professionals, fostering a culture of learning and development[107]. This not only helps individuals grow but also strengthens the organization as a whole by building internal expertise.

As per our survey, tailored training programs and cultural workshops are rated as **very effective** for overcoming resistance to hybrid project management by the Head of HR of this company. This proactive approach helps employees continually develop skills and adapt to changing project needs, with a strong emphasis on using change champions

and mentorship programs to support ongoing learning.

The startup finds tailored training and cultural workshops **moderately effective** in reducing delays. However, the approach to training is likely less formalized, focusing on addressing immediate project needs rather than ongoing skill development. While effective, this training structure may be less consistent compared to the structured programs in larger firms.

5.3.3 Improved Work-Life Balance and Employee Well-being

Incremental Adoption of hybrid methods allows employees to gradually adapt to new practices, reducing stress and avoiding overwhelming changes. This considerate approach to change management supports mental well-being and helps maintain a healthy work-life balance.

According to our survey, the incremental adoption of hybrid project management, along with flexible work options, has been **very effective** in reducing stress and turnover. This organization promotes work-life balance by providing employees with time to adjust, leading to increased well-being and productivity. The frequent use of flexible work arrangements and collaboration platforms has further contributed to on-time delivery by enhancing employee satisfaction.

However, the HR and admin manager of small company confirm us to adopts a **moderately effective** incremental approach to hybrid project management, which helps reduce employee stress by allowing time for adjustment. However, flexible work options are only used **occasionally** to enhance employee well-being and reduce turnover, suggesting that the startup faces challenges in fully supporting work-life balance. Limited flexibility may lead to delays and impact project timelines, especially under tight deadlines.

5.3.4 Reduction in Physical Resource Use:

Implementing **Collaboration Platforms** reduces the need for physical meetings, paperwork, and travel, thereby lowering the company's environmental footprint. Digital tools of 'Southtech' enable efficient communication and documentation, reducing the reliance on paper-based processes and physical infrastructure. **Tailored Training** and **Cultural Workshops** conducted online or through digital platforms further reduce the need for travel and physical resources, contributing to a more sustainable business model. As per our survey, with a commitment to environmental impact, the Head of HR of this large company fully uses **cost-effective cloud solutions** and **energy-efficient remote tools**, achieving a **high impact** on energy use reduction. These measures also enable on-time project delivery by reducing dependency on physical office spaces and minimizing travel needs, thereby supporting the organization's sustainability goals.

Whereas the HR and Admin Manager of a small company reports a **moderate impact** from cloud solutions on reducing energy use and resource dependency, reflecting its partial adoption of cloud-based tools. While the organization utilizes cost-effective tools like Kanban, the startup's limited investment in advanced cloud solutions may restrict further gains in energy efficiency, reflecting the challenges smaller companies face in implementing sustainability measures.

5.3.5 Energy Efficiency and Reduced Carbon Footprint

Incremental Adoption and **Collaboration Platforms** support remote and hybrid working models, which can significantly reduce energy consumption associated with commuting and maintaining large office spaces. Compnay like 'brainstation 23' do this by enabling flexible work arrangements, companies can decrease their carbon footprint and contribute to environmental sustainability. **Continuous Improvement** in digital project management practices, such as optimizing cloud resource usage and minimizing unnecessary data storage, further enhances energy efficiency. As companies refine their hybrid models, they can adopt more sustainable practices that reduce their overall environmental impact.

According to our survey, the large company's extensive use of **cloud-based solutions** and virtual collaboration tools significantly reduces its environmental impact. The organization has integrated energy-efficient practices across the board, with the Head of HR reporting **great improvements** in project timelines due to reduced physical resource requirements. This commitment to reducing their carbon footprint aligns with the company's broader environmental responsibility goals.

On the other hand, startup's use of **energy-efficient remote collaboration tools** is moderately effective in reducing delays and travel needs, helping to lower the carbon footprint to some extent. Although committed to environmental impact, the startup lacks the same level of resources as the larger corporation to invest in comprehensive energy-efficient solutions.

So finally we can say that the **large corporation** excels in using collaboration platforms to maintain high levels of engagement, while the **startup** uses these tools more sparingly. This reflects the larger company's stronger emphasis on employee engagement as a strategic advantage in hybrid project management. The **large firm** prioritizes continuous learning through structured training programs and cultural workshops, which are very effective in reducing project delays. In contrast, the **startup** offers moderate support for skill development, focusing on short-term needs over long-term training, which may limit adaptability and engagement. Work-life balance initiatives are **very effective** in large companies, where flexible work policies are frequently used. The **startup** provides these benefits only occasionally, limiting its impact on employee well-being and possibly

affecting retention and project timelines. The **large corporation** shows a high commitment to sustainability, using energy-efficient remote collaboration and cloud solutions to significantly reduce physical resource dependency. The **startup** adopts these practices moderately, which provides some benefits but reflects a more limited capacity to prioritize sustainability fully. Both companies strive for environmental impact, but the **large firm** achieves greater success through extensive cloud usage and energy-efficient practices. The **startup** makes some progress in reducing its carbon footprint, but its scope is limited compared to the large corporation due to fewer resources for comprehensive environmental initiatives.

5.4 Ethics

Ethical Considerations in **"Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management"** and **"Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Projects Management":** The proposed strategies for adopting hybrid project management in Bangladesh's software firms emphasize ethical considerations that are essential for fostering a responsible and fair workplace culture. These strategies ensure that the transition to hybrid methodologies aligns with the ethical values of transparency, respect and inclusively[108].

5.4.1 Transparency and Accountability

The use of **Measurement and Transparency** practices, such as defining KPIs and openly sharing results, promotes an ethical culture of transparency and accountability. By keeping employees informed about the goals, progress, and impact of hybrid models, companies build trust and ensure that all stakeholders are aware of the organization's direction and performance. This openness prevents misinformation and aligns with ethical business practices.

As per our survey, the COO at the large software firm ensures that **transparency and accountability** are prioritized. They report a high level of adherence to ethical standards, with **transparency ensured at all times** and **more than a 40% improvement** in accountability since adopting hybrid practices. This strong commitment to transparency reflects the firm's focus on ethical responsibility and regulatory compliance, typical of companies in the financial sector.

The Project Coordinator at the small startup reports that **transparency and accountability** are maintained only **sometimes**, with a modest 11-20% improvement in transparency after adopting hybrid management practices. Limited resources and a smaller operational structure may contribute to these challenges, as startups often have

fewer resources to enforce strict accountability across projects

On the other hand, ethical business practices require transparency and accountability in all operations. By maintaining **clear documentation** and openly communicating project goals, progress, and challenges, companies create a transparent work environment that values honesty and integrity. This openness allows for constructive feedback and collaboration, ensuring that all stakeholders are informed and can trust the process[109].

5.4.2 Ethical Leadership and Advocacy

Leadership Advocacy for hybrid project management sets an ethical standard for the organization. When leaders endorse and model ethical behaviors, such as open communication, respect for employee input, and commitment to continuous improvement, they set a positive example for the entire organization. Ethical leadership inspires employees to adopt similar values and behaviors, fostering a culture of integrity and responsibility[110].

As per our survey, the large company **actively promotes ethical leadership**, with a high proportion of its leadership (61-80%) advocating for responsible software development. This proactive approach highlights the company's dedication to ethical advocacy, indicating that the firm values ethical practices not only as compliance but as a core component of its organizational culture.

In contrast to the larger firm, the startup's approach to **ethical leadership** is less formalized as per the Project Coordinator. Ethical advocacy is not actively promoted at all leadership levels, and only **21-40% of leadership** is reported to advocate for ethical practices. This limited advocacy could be due to a leaner organizational structure where the focus might be more on growth and survival rather than formalized ethical practices.

Adhering to local labor laws and creating a safe and supportive work environment are core ethical responsibilities for any organization. Through **standard NDAs** and clear employment agreements, companies protect the rights and contributions of their employees. Ensuring compliance with fair labor practices and providing necessary training to uphold these standards reflects a company's dedication to ethical treatment of its workforce, fostering a positive and respectful organizational culture[111].

5.4.3 Fair and Ethical Use of IP

Implementing **Collaboration Platforms** and **automated tools** must be done with a focus on ethical considerations, such as data privacy and security. Organizations must ensure that these tools are utilized in a manner that safeguards employee privacy and adheres to data protection laws . Ethical use of technology involves safeguarding sensitive information and being transparent about how data is collected, used, and stored.

According to the survey, the COO of a large firm demonstrates strict adherence to **legal frameworks for IP** management, which aligns with industry expectations for fair and ethical use of IP in project management. The company's commitment to IP rights shows an understanding of the importance of IP as a valuable corporate asset, maintained through stringent ethical guidelines.

The startup and small firm, on the other hand has a less stringent approach to IP, **occasionally following legal frameworks**. This may be due to fewer resources dedicated to legal compliance, a common issue in early-stage companies. While they demonstrate awareness of IP importance, adherence to strict frameworks is likely secondary to the company's immediate goals of growth and product development.

Respecting IP rights is crucial for fostering a fair and just industry. The use of **affordable IP compliance tools** ensures that companies do not inadvertently infringe on third-party IP rights and that their own innovations are protected. By actively managing IP compliance, companies set an ethical standard for respecting the intellectual property of others, promoting a culture of innovation and creativity within the software industry.

5.4.4 Data Privacy and Security

Ensuring the protection of client and user data is a fundamental ethical obligation. Implementing **basic data protection measures** and **automated compliance tools** helps companies uphold the principles of data privacy and security. By anonymizing user data, obtaining proper consent, and securing sensitive information, companies demonstrate a commitment to ethical data handling practices[112].

According to our survey, given the financial nature of the firm, **strict policies for data privacy** are in place, ensuring that **81-100% of projects** adhere to security protocols. This focus on privacy reflects a robust, security-driven culture within the organization, where data protection is integral to its operations. Overall, the COO responses of ' KAZ Software' indicate a very high standard for ethical practices, driven by both industry regulation and company values.

Data privacy is another area where the startup falls short compared to the large firm, with **only a few policies in place** as discussed by the Project Coordinator. Consequently, only **21-40% of projects** adhere to strict privacy protocols, suggesting a need for stronger data governance. This gap in security could be due to limited funding and infrastructure, which restricts the startup's ability to enforce comprehensive security measures across projects.

Maintaining ethical relationships with clients and stakeholders is essential for long-term success. Companies that utilize **clear documentation** and **transparent communication** foster trust and reliability[113]. Adhering to ethical standards in project management and delivery ensures that clients receive value and that their expectations

are met ethically and professionally.

So finally we can say that, these case study highlights the differences in ethical practices between a large software firm and a small software startup. The large firm's commitment to transparency, ethical leadership, IP protection, and data privacy is supported by its robust resources and regulatory requirements. In contrast, the small startup, limited by resources and prioritizing growth, displays more relaxed adherence to these practices. This comparison illustrates how company size, industry, and available resources enforcement of ethical practices in project management, with larger firms better equipped to adopt comprehensive ethics policies than smaller startups.

5.5 Project Summary

The primary objective of this graduate project report is to investigate key areas within modern software project management and delivery, focus a hybrid approach that incorporates elements of both traditional and agile methodologies . In the context of software development in Bangladesh, the research on cultural transformation and hybrid project management examines how cultural dimensions and project management practices influence on-time delivery in software projects. Concurrently, the exploration of factors impacting on-time delivery in hybrid projects management aims to identify critical challenges and propose solutions for improving project outcomes. Additionally, from a cultural and business perspective, the emphasis is on understanding how the integration of traditional values with modern methodologies can enhance project delivery and industry growth.

The key findings from these studies are highlighted as follows: The study on cultural transformation in Bangladeshi software firms identified significant challenges such as power distance, uncertainty avoidance, and resistance to change, which impact the adoption of agile methodologies. It revealed that a hybrid project management approach, combining traditional and agile practices, can effectively navigate these cultural barriers, improve communication, and enhance project outcomes. The research emphasizes the importance of clear communication, localized training, and a gradual implementation strategy for successful integration.

Furthermore, the investigation into factors impacting on-time delivery in hybrid projects management uncovered critical issues such as skill gaps, communication barriers, and inconsistent project lifecycles. The study highlighted the need for advanced time estimation techniques, adaptive project management frameworks, and enhanced stakeholder management tools to address these challenges. It also stressed the importance of understanding the unique characteristics of small software firms and their agility in adopting hybrid methodologies despite resource constraints.

This integrated graduate project report provides a comprehensive understanding of

Table 5.1: Integrated summary of navigating cultural transformation by on-time delivery

Impact/Outcome	**Related Strategies**
Enhances team collaboration, acceptance of new methodologies.	Conduct cultural training workshops, foster open communication, and promote adaptability.
Reduces project delays and improves deliverable quality by equipping teams with necessary skills.	Implement training programs and partnerships with educational institutions.
Reduces misunderstandings and scope changes, promoting on-time delivery and project success.	Utilize collaborative tools and establish clear communication protocols.
Allows for iterative development, better risk management, and adaptability to change.	Implement hybrid methodologies tailored to project needs and organizational context.
Improves project predictability and efficiency, reducing lifecycle inconsistencies.	Adopt frameworks like Agile, Waterfall, or a custom hybrid model.
Minimizes bottlenecks and improves overall project performance and timelines.	Employ resource management software and agile resource planning strategies.
Prevents delays due to regulatory issues, maintaining project timelines and client trust.	Automate compliance processes and develop comprehensive compliance checklists.
Enhances satisfaction and project success by aligning outcomes with expectations.	Conduct regular feedback sessions and maintain open communication channels.
Improves deliverable quality and reduces project risks, contributing to on-time delivery.	Implement iterative testing and risk mitigation strategies throughout the project.
Enhances competitiveness and client satisfaction by reducing time-to-market and meeting deadlines.	Use advanced time estimation techniques and adaptive project planning.

how cultural influences and hybrid project management practices impact software development in Bangladesh. It offers valuable insights into addressing cultural challenges, optimizing project management techniques, and improving on-time delivery performance. These findings serve as a valuable resource for practitioners, policymakers, and researchers seeking to enhance project management practices and support the growth of the software industry in Bangladesh. By bridging the gap between traditional values and modern methodologies, this report contributes to the broader discourse on adaptive project management in culturally diverse contexts, positioning Bangladesh's software industry for competitive growth and innovation.

Finally, the summary encapsulates the core objectives and findings of the studies, aligning with the specified format and highlighting their contributions to understanding and improving project management practices in Bangladesh. Table 5.1 presents the clear picture of Integrated summary of Cultural Transformation by On-Time Delivery on Hybrid Project Management followed by impact or outcome and related strategies in terms of Bangladesh software industry.

5.6 Future Work

Future work for the study titled "**Cultural Transformation for Software Firms in Bangladesh: Overcoming Challenges with Hybrid Project Management**" could focus on expanding the research to include a broader range of emerging markets that experience similar cultural challenges in adopting modern project management methodologies. This expansion could involve conducting comparative studies across various

regions such as South Asia, Southeast Asia, and Africa, where cultural dimensions like power distance, collectivism, and uncertainty avoidance are prevalent. Understanding these dynamics could provide deeper insights into how cultural factors influence the effectiveness of hybrid project management globally. Future research could investigate the role of cultural change agents within organizations and how they can facilitate the transition to hybrid methodologies. Developing tailored training programs and workshops that specifically address cultural barriers, such as hierarchical communication and resistance to change, would also be beneficial in facilitating smoother transitions and increasing the acceptance of hybrid project management.

Moreover, investigating the integration of digital tools and platforms that support cultural transformation and hybrid project management practices could provide additional insights. Tools that enhance communication, collaboration, and stakeholder engagement may help bridge cultural gaps and improve project outcomes.

Future research for the second study titled "**Bangladesh Software Industry: Factors Impacting On-Time Delivery in Hybrid Projects Management**" could delve into the role of technological advancements, such as artificial intelligence (AI), machine learning (ML), and data analytics, improving on-time project delivery. Investigating how these technologies can be integrated into hybrid project management frameworks to automate and optimize processes like time estimation, resource allocation, and risk management could provide significant benefits. Conducting longitudinal studies to track the evolving impact of these factors on project outcomes over extended periods would yield insights into the sustainability and long-term effectiveness of hybrid methodologies. Such studies could examine changes in team dynamics, project efficiency, and stakeholder satisfaction as technological integration becomes more prevalent. Furthermore, research could explore the development of industry-specific best practices for hybrid project management in Bangladesh, drawing on global experiences and lessons learned from other successful implementations. Analyzing the interplay between local cultural factors and international project management standards could offer insights into tailoring hybrid methodologies to fit the unique needs of the Bangladeshi software industry.

Another promising area for future work could involve exploring the impact of government regulations and incentives on the adoption and success of hybrid project management. Understanding how regulatory frameworks influence project management practices could help identify areas where policy adjustments or support mechanisms are needed to foster industry growth.

Finally, examining the potential for cross-industry collaboration and knowledge sharing could enhance the effectiveness of hybrid project management. By fostering partnerships between software firms, academia, and government agencies, the industry could benefit from shared resources, expertise, and innovations, ultimately improving project delivery and competitiveness on a global scale.

Bibliography

[1] F. P. Zasa, A. Patrucco, and E. Pellizzoni, "Managing the hybrid organization: How can agile and traditional project management coexist?," *Research-Technology Management*, vol. 64, no. 1, pp. 54–63, 2020.

[2] R. G. Cooper and A. F. Sommer, "The agile–stage-gate hybrid model: a promising new approach and a new research opportunity," *Journal of Product Innovation Management*, vol. 33, no. 5, pp. 513–526, 2016.

[3] E. G. Ochieng and A. D. Price, "Managing cross-cultural communication in multicultural construction project teams: The case of kenya and uk," *International Journal of Project Management*, vol. 28, no. 5, pp. 449–460, 2010.

[4] G. Fotiadis, "Agile project management approach applied in non-it industry. a manual to start adopting.," 2021.

[5] A. M. C. Barbosa and M. C. P. Saisse, "Hybrid project management for sociotechnical digital transformation context," *Brazilian Journal of Operations & Production Management*, vol. 16, no. 2, pp. 316–332, 2019.

[6] B. Boehm and R. Turner, "Management challenges to implementing agile processes in traditional development organizations," *IEEE software*, vol. 22, no. 5, pp. 30–39, 2005.

[7] R. Hansenne and A. Hibner, "Overcoming organisational challenges related to agile project management adoption," 2011.

[8] J. Cho, "A hybrid software development method for large-scale projects: rational unified process with scrum," *Issues in Information Systems*, vol. 10, no. 2, pp. 340–348, 2009.

[9] A. Gemino, B. Horner Reich, and P. M. Serrador, "Agile, traditional, and hybrid approaches to project success: is hybrid a poor second choice?," *Project management journal*, vol. 52, no. 2, pp. 161–175, 2021.

[10] S. C. Sistare, *Overcoming resistance through organizational change models and leadership strategies*. Charleston Southern University, 2022.

[11] R. Siriram, "A hybrid (soft and hard) systems approach to project management," *SSRG International Journal of Industrial Engineering*, vol. 4, no. 6, pp. 1–16, 2017.

[12] M. Kuhrmann, P. Diebold, J. Münch, P. Tell, V. Garousi, M. Felderer, K. Trektere, F. McCaffery, O. Linssen, E. Hanser, *et al.*, "Hybrid software and system development in practice: waterfall, scrum, and beyond," in *Proceedings of the 2017 international conference on software and system process*, pp. 30–39, 2017.

[13] M. Ciesielska, *Hybrid Organisations: A study of the Open Source–business setting*. Samfundslitteratur, 2010.

[14] J. Mcgrath and J. Kostalova, "Project management trends and new challenges 2020+," 2020.

[15] D. M. Raffo, "Software project management using prompt: A hybrid metrics, modeling and utility framework," *Information and Software Technology*, vol. 47, no. 15, pp. 1009–1017, 2005.

[16] J. Hopkins and A. Bardoel, "The future is hybrid: how organisations are designing and supporting sustainable hybrid work models in post-pandemic australia," *Sustainability*, vol. 15, no. 4, p. 3086, 2023.

[17] F. Copola Azenha, D. Aparecida Reis, and A. Leme Fleury, "The role and characteristics of hybrid approaches to project management in the development of technology-based products and services," *Project Management Journal*, vol. 52, no. 1, pp. 90–110, 2021.

[18] W. W. Powell, "Hybrid organizational arrangements: new form or transitional development?," *California management review*, vol. 30, no. 1, pp. 67–87, 1987.

[19] M. C. Dewey, "How does hybrid project management contribute to managing change in a volatile and uncertain context in the financial services industry: An interpretive multiple case study," 2023.

[20] M. Neumann, K. Schmid, and L. Baumann, "Characterizing the impact of culture on agile methods: The moca model," in *2023 IEEE/ACM International Conference on Software and System Processes (ICSSP)*, pp. 81–85, IEEE, 2023.

[21] M. Al-Tarawneh, "Cultural factors: The key factors in software development," *Culture*, vol. 4, no. 19, 2012.

[22] Z. T. Kosztyán and I. Szalkai, "Hybrid time-quality-cost trade-off problems," *Operations Research Perspectives*, vol. 5, pp. 306–318, 2018.

[23] C. Karrenbauer and F. Wedel, "Literature review–hybrid project manage-ment,"

[24] M. Gupta, J. F. George, and W. Xia, "Relationships between it department culture and agile software development practices: An empirical investigation," *International Journal of Information Management*, vol. 44, pp. 13–24, 2019.

[25] C. Baham, "The impact of organizational culture and structure on the routinization of agile software development methodologies," 2016.

[26] T. Anning-Dorson, I. O. Christian, and M. B. Nyamekye, "Organisational culture and customer service delivery," in *Customer Service Management in Africa*, pp. 207–215, Productivity Press, 2020.

[27] N. Koceska and S. Koceski, "Hybrid project management as a new form of project management," *Journal of Applied Economics and Business*, vol. 10, no. 4, pp. 16–23, 2022.

[28] F. Almasi and B. Malmir, "Analyzing and estimating the project success with a hybrid method based on fuzzy theory and decision making analysis," in *2015 International conference on industrial engineering and operations management (IEOM)*, pp. 1–9, IEEE, 2015.

[29] J. Reiff and D. Schlegel, "Hybrid project management–a systematic literature review," *International journal of information systems and project management*, vol. 10, no. 2, pp. 45–63, 2022.

[30] C. Bhavsar, "Hybrid project management approach for software modernization," 2016.

[31] V. Lalsing, S. Kishnah, and S. Pudaruth, "People factors in agile software development and project management," *International Journal of Software Engineering & Applications*, vol. 3, no. 1, p. 117, 2012.

[32] M. Rahmanian, "A comparative study on hybrid it project management," *International Journal of Computer and Information Technology*, vol. 3, no. 05, pp. 1096–1099, 2014.

[33] M. A. Jabar, S. Abdullah, Y. Y. Jusoh, S. Mohanarajah, and N. M. Ali, "Adaptive and dynamic characteristics in hybrid agile management model for software development project success," in *2019 6th International Conference on Research and Innovation in Information Systems (ICRIIS)*, pp. 1–5, IEEE, 2019.

[34] E. Hartl, "A characterization of culture change in the context of digital transformation.," in *AMCIS*, 2019.

[35] M. Monterrey and D. de la Fuente, "Hybrid management model combining process management and project management in local administration," in *2008 IEEE International Conference on Industrial Engineering and Engineering Management*, pp. 1779–1782, IEEE, 2008.

[36] O. Adelakun, R. Garcia, T. Tabaka, and R. Ismail, "Hybrid project management: Agile with discipline," 2017.

[37] A. Baird and F. J. Riggins, "Planning and sprinting: Use of a hybrid project management methodology within a cis capstone course," *Journal of Information Systems Education*, vol. 23, no. 3, p. 243, 2012.

[38] H.-L. Yang and C.-S. Wang, "Recommendation system for it software project planning: a hybrid mining approach for the revised cbr algorithm," in *2008 International Conference on Service Systems and Service Management*, pp. 1–5, IEEE, 2008.

[39] S. Costantini, J. G. Hall, and L. Rapanotti, "Using complexity and volatility characteristics to guide hybrid project management," *International Journal of Managing Projects in Business*, vol. 14, no. 5, pp. 1135–1162, 2021.

[40] A. Lalmi, G. Fernandes, and S. B. Souad, "A conceptual hybrid project management model for construction projects," *Procedia Computer Science*, vol. 181, pp. 921–930, 2021.

[41] G. Fernandes, S. Moreira, M. Araújo, E. B. Pinto, and R. J. Machado, "Project management practices for collaborative university-industry r&d: a hybrid approach," *Procedia computer science*, vol. 138, pp. 805–814, 2018.

[42] E. Papadakis and L. Tsironis, "Towards a hybrid project management framework: A systematic literature review on traditional, agile and hybrid techniques," *The Journal of Modern Project Management*, vol. 8, no. 2, 2020.

[43] M. J. Bianchi and D. C. Amaral, "A systematic review of association rules in project management: opportunities for hybrid models," *Product: Management and Development*, vol. 18, no. 2, pp. 136–144, 2020.

[44] E. Papadakis and L. Tsironis, "Hybrid methods and practices associated with agile methods, method tailoring and delivery of projects in a non-software context," *Procedia computer science*, vol. 138, pp. 739–746, 2018.

[45] X. Liu, Y. Yang, J. Chen, Q. Wang, and M. Li, "Achieving on-time delivery: a two-stage probabilistic scheduling strategy for software projects," in *Trustworthy Software Development Processes: International Conference on Software Process, ICSP 2009 Vancouver, Canada, May 16-17, 2009 Proceedings*, pp. 317–329, Springer, 2009.

[46] N. Jamous, G. Garttan, D. Staegemann, and M. Volk, "Hybrid project management methods efficiency in it projects.," in *AMCIS*, 2021.

[47] L. Luo, L. Zhang, X. Zheng, and G. Wu, "A hybrid approach for investigating impacts of leadership dynamics on project performance," *Engineering, Construction and Architectural Management*, vol. 29, no. 5, pp. 1965–1990, 2022.

[48] A. O. DÜNDAR and R. ÖZTÜRK, "The effect of on-time delivery on customer satisfaction and loyalty in channel integration," *Business & Management Studies: An International Journal*, vol. 8, no. 3, pp. 2675–2693, 2020.

[49] A. Lalmi, G. Fernandes, and S. S. Boudemagh, "A hybrid project management model for construction projects: A mixed research approach," in *Mixed Methods Research Design for the Built Environment*, pp. 57–70, Routledge, 2023.

[50] H. Zhao, "Hybrid approach to project management: Still have a long way to go," *Journal of Education, Humanities and Social Sciences*, vol. 3, pp. 165–171, 2022.

[51] R. Jaziri, O. El-Mahjoub, and A. Boussaffa, "Proposition of a hybrid methodology of project management," *Am. J. Eng. Res. AJER*, vol. 7, pp. 113–127, 2018.

[52] M. Mirzaei, V. Mabin, and O. Zwikael, "Customising hybrid project management methodologies," *Production Planning & Control*, pp. 1–18, 2024.

[53] A. Sattar, A. Mahmud, and S. R. H. Noori, "Appliance of agile methodology at software industry in developing countries: Perspective in bangladesh," in *Proceedings of International Joint Conference on Computational Intelligence: IJCCI 2018*, pp. 571–581, Springer, 2020.

[54] M. Islam, D. Karmaker, M. A. Imran, M. S. U. Miah, and A. Bhowmik, "Determining the best agile sdlc for bangladesh's software industry," 2015.

[55] B. Bose, N. T. Khan, S. Ashreen, F. A. Shuvo, M. Mazid-Ul-Haque, and A. Bhowmik, "Hybrid scrum-xp: A proposed model based on effectiveness of agile model on varieties of software companies in bangladesh," *AIUB Journal of Science and Engineering (AJSE)*, vol. 22, no. 1, pp. 35–44, 2023.

[56] M. Syeed, R. H. Khan, and J. Miah, "Agile fitness of software companies in bangladesh: an empirical investigation," *International Journal of Advanced Computer Science and Applications*, vol. 12, no. 2, 2021.

[57] T. Chow and D.-B. Cao, "A survey study of critical success factors in agile software projects," *Journal of systems and software*, vol. 81, no. 6, pp. 961–971, 2008.

[58] S. A. K. Ghayyur, S. Ahmed, M. Ali, A. Razzaq, N. Ahmed, and A. Naseem, "A systematic literature review of success factors and barriers of agile software development," *International Journal of Advanced Computer Science and Applications*, vol. 9, no. 3, pp. 278–291, 2018.

[59] R. Marques, G. Costa, M. M. da Silva, and P. Gonçalves, "A survey of failures in the software development process.," in *ECIS*, p. 155, 2017.

[60] H. Edison, X. Wang, and K. Conboy, "Comparing methods for large-scale agile software development: A systematic literature review," *IEEE Transactions on Software Engineering*, vol. 48, no. 8, pp. 2709–2731, 2021.

[61] E. Kula, E. Greuter, A. Van Deursen, and G. Gousios, "Factors affecting on-time delivery in large-scale agile software development," *IEEE Transactions on Software Engineering*, vol. 48, no. 9, pp. 3573–3592, 2021.

[62] S. A. Butt and T. Jamal, "Frequent change request from user to handle cost on project in agile model," *Proc. of Asia Pacific Journal of Multidisciplinary Research*, vol. 5, no. 2, pp. 26–42, 2017.

[63] U. Indumini and S. Vasanthapriyan, "Knowledge management in agile software development-a literature review," in *2018 National Information Technology Conference (NITC)*, pp. 1–7, IEEE, 2018.

[64] T. Kamal, Q. Zhang, M. A. Akbar, M. Shafiq, A. Gumaei, and A. Alsanad, "Identification and prioritization of agile requirements change management success factors in the domain of global software development," *IEEE Access*, vol. 8, pp. 44714–44726, 2020.

[65] M. Islam, F. Khan, M. Hasan, F. Sadia, and M. Hasan, "Impact of covid-19 on the factors influencing on-time software project delivery: An empirical study.," in *ENASE*, pp. 554–561, 2023.

[66] T. B. Chiyangwa and E. Mnkandla, "Modelling the critical success factors of agile software development projects in south africa," *South African Journal of Information Management*, vol. 19, no. 1, pp. 1–8, 2017.

[67] A. Aldahmash, A. M. Gravell, and Y. Howard, "Using factor analysis to study the critical success factors of agile software development.," *J. Softw.*, vol. 12, no. 12, pp. 957–963, 2017.

[68] N. B. Moe, T. Dingsøyr, and T. Dybå, "Overcoming barriers to self-management in software teams," *IEEE software*, vol. 26, no. 6, pp. 20–26, 2009.

[69] F. Hujainah, R. B. A. Bakar, M. A. Abdulgabber, and K. Z. Zamli, "Software requirements prioritisation: a systematic literature review on significance, stakeholders, techniques and challenges," *IEEE Access*, vol. 6, pp. 71497–71523, 2018.

[70] S. Hussain, Z. Fangwei, A. F. Siddiqi, Z. Ali, and M. S. Shabbir, "Structural equation model for evaluating factors affecting quality of social infrastructure projects," *Sustainability*, vol. 10, no. 5, p. 1415, 2018.

[71] P. Ram, P. Rodriguez, M. Oivo, and S. Martínez-Fernández, "Success factors for effective process metrics operationalization in agile software development: A multiple case study," in *2019 IEEE/ACM International Conference on Software and System Processes (ICSSP)*, pp. 14–23, IEEE, 2019.

[72] S. A. Lesum, S. R. Akthar, M. R. Islam, F. Sadia, and M. Hasan, "Project governance to improve the performance of software projects by mitigating the software risk factors: The moderating role of project leadership," *Procedia Computer Science*, vol. 239, pp. 1863–1870, 2024.

[73] M. Uzzafer, "A risk classification scheme for software projects," *Int. J. Softw. Eng. its Appl*, vol. 7, no. 1, pp. 57–68, 2013.

[74] M. Keil, P. E. Cule, K. Lyytinen, and R. C. Schmidt, "A framework for identifying software project risks," *Communications of the ACM*, vol. 41, no. 11, pp. 76–83, 1998.

[75] M. Asif and J. Ahmed, "A novel case base reasoning and frequent pattern based decision support system for mitigating software risk factors," *Ieee Access*, vol. 8, pp. 102278–102291, 2020.

[76] P. Patanakul and A. J. Shenhar, "What project strategy really is: The fundamental building block in strategic project management," *Project Management Journal*, vol. 43, no. 1, pp. 4–20, 2012.

[77] P. A. C. Miguel, "Implementação da gestão de portfólio de novos produtos: um estudo de caso," *Production*, vol. 18, pp. 388–404, 2008.

[78] S. Meskendahl, "The influence of business strategy on project portfolio management and its success—a conceptual framework," *International Journal of Project Management*, vol. 28, no. 8, pp. 807–817, 2010.

[79] L. Crawford, T. Cooke-Davies, B. Hobbs, L. Labuschagne, K. Remington, and P. Chen, "Governance and support in the sponsoring of projects and programs," *Project Management Journal*, vol. 39, no. S1, pp. S43–S55, 2008.

[80] M. S. Chaudhry, M. N. Kalyar, A. Rehman, and W. Kouassi, "The impact of leadership on project performance," *Industrial Engineering Letters*, vol. 2, no. 2, pp. 18–32, 2012.

[81] M. N. Theophanus, "A study on the influence of project leadership on project management and performance," 2020.

[82] A. Elzamly, B. Hussin, S. S. A. Naser, and M. Doheir, "Classification of software risks with discriminant analysis techniques in software planning development process," *International Journal of Advanced Science and Technology*, vol. 81, pp. 35–48, 2015.

[83] J. Pollack, J. Helm, and D. Adler, "What is the iron triangle, and how has it changed?," *International journal of managing projects in business*, vol. 11, no. 2, pp. 527–547, 2018.

[84] A. Khan, M. Waris, S. Panigrahi, M. R. Sajid, and F. Rana, "Improving the performance of public sector infrastructure projects: Role of project governance and stakeholder management," *Journal of Management in Engineering*, vol. 37, no. 2, p. 04020112, 2021.

[85] V. S. Anantatmula, "Strategies for enhancing project performance," *Journal of Management in Engineering*, vol. 31, no. 6, p. 04015013, 2015.

[86] T. Cooke-Davies, "The "real" success factors on projects," *International journal of project management*, vol. 20, no. 3, pp. 185–190, 2002.

[87] P. Tyrväinen and J. Selin, "How to sell saas: a model for main factors of marketing and selling software-as-a-service," in *Software Business: Second International Conference, ICSOB 2011, Brussels, Belgium, June 8-10, 2011. Proceedings 2*, pp. 2–16, Springer, 2011.

[88] L. Hill and K. Fielden, "Marketing innovative software: A new zealand case study," *PACIS 2007 Proceedings*, p. 17, 2007.

[89] M. Luisa, F. Mariangela, and N. I. Pierluigi, "Market research for requirements analysis using linguistic tools," *Requirements Engineering*, vol. 9, pp. 40–56, 2004.

[90] L. Bass, C. Buhman, S. Comella-Dorda, F. Long, J. Robert, R. Seacord, and K. Wallnau, "Volume i: Market assessment of component-based software engineering," *Software Engineering Institute, Technical Note CMU/SEI-2001-TN-007*, 2001.

[91] A. Ahamed, T. A. Khan, N. Sadman, M. I. Hannan, N. Nahar, and M. Hasan, "The rise of remote project management-a new norm?: A survey on it organizations in bangladesh.," in *ICSOFT*, pp. 518–525, 2023.

[92] T. Özsoy and K. Sezgili, "Exploring the current practices and future directions in project management education and training," *SAGE Open*, vol. 14, no. 1, p. 21582440241236053, 2024.

[93] Z. Saduakassova, "The use of project management in the professionalization of management personnel," 2023.

[94] A. F. Sommer, C. Hedegaard, I. Dukovska-Popovska, and K. Steger-Jensen, "Improved product development performance through agile/stage-gate hybrids: The next-generation stage-gate process?," *Research-Technology Management*, vol. 58, no. 1, pp. 34–45, 2015.

[95] A. Rehder, J. V. Souza, R. Marx, and M. S. Salerno, "Emerging field or passing fashion? a case study of agile-stage-gate model in innovation processes," *Revista de Gestão*, vol. 30, no. 4, pp. 362–386, 2023.

[96] A. Naderi, *Project Management and Business Intelligence: A Bibliometric Analysis*. PhD thesis, Politecnico di Torino, 2024.

[97] P. Ågren, E. Knoph, and R. Berntsson Svensson, "Agile software development one year into the covid-19 pandemic," *Empirical Software Engineering*, vol. 27, no. 6, p. 121, 2022.

[98] M. M. I. Shamim, "The effects of covid-19 on project management processes and practices," *Central Asian Journal of Theoretical & Applied Sciences*, vol. 3, no. 7, pp. 221–227, 2022.

[99] B. Abwanzo, "How negotiation techniques might support the project manager in the delivery of projects," *Available at SSRN 2233087*, 2013.

[100] E. Eshtehardian and F. Saeedi, "Developing improvement planning phase in project management maturity models," *Modern Applied Science*, vol. 10, no. 9, pp. 1–13, 2016.

[101] A. Stare, "Agile project management–a future approach to the management of projects," *Dynamic Relationships Management Journal*, vol. 2, no. 1, pp. 43–53, 2013.

[102] D. S. A. SURESH and A. Sivakumar, "An empirical study, analysis and investigation about impact of schedule management plan in project management effectiveness using structural equation modeling," *Int J Adv Eng Manag*, 2021.

[103] J. Leong, K. May Yee, O. Baitsegi, L. Palanisamy, and R. K. Ramasamy, "Hybrid project management between traditional software development lifecycle and agile based product development for future sustainability," *Sustainability*, vol. 15, no. 2, p. 1121, 2023.

[104] M. Senapathi, J. Buchan, and H. Osman, "Devops capabilities, practices, and challenges: Insights from a case study," in *Proceedings of the 22nd International Conference on Evaluation and Assessment in Software Engineering 2018*, pp. 57–67, 2018.

[105] S. Santos, T. Pimentel, F. G. Rocha, and M. S. Soares, "Using behavior-driven development (bdd) for non-functional requirements," *Software*, vol. 3, no. 3, pp. 271–283, 2024.

[106] M. O. Ahmad, J. Markkula, and M. Oivo, "Kanban in software development: A systematic literature review," in *2013 39th Euromicro conference on software engineering and advanced applications*, pp. 9–16, IEEE, 2013.

[107] S. Raihan, B. H. Khondker, E. Sharmin, O. R. Chowdhury, and F. Islam, "Labour market study under skills for employment investment program (seip)," 2022.

[108] M. J. Littman and E. S. Littman, "Six ethical leadership strategies for project management success," *PM World Journal*, vol. 8, no. 10, pp. 1–9, 2019.

[109] W. A. Moylan and L. Walker, "Ethics in project management: Research on valuesbased leadership in project driven arenas," *PM World Journal*, vol. 1, no. 3, pp. 1–29, 2012.

[110] B. D. Fischer and L. Charef, "Leadership in an agile project management environment," *Journal of Leadership, Accountability and Ethics*, vol. 18, no. 4, 2021.

[111] P. Mishra, G. Dangayach, and M. Mittal, "An ethical approach towards sustainable project success," *Procedia-social and behavioral sciences*, vol. 25, pp. 338–344, 2011.

[112] Z. C. Yeten, "Project management and intellectual property rights: Strategic approaches," *Orclever Proceedings of Research and Development*, vol. 4, no. 1, pp. 43–51, 2024.

[113] O. G. HAMMED, A. Adewolu, and A. A. BAKARE, "Relationship between project management ethics and project success: A case of total quality engineering service limited nigeria.,"

Appendix A

Survey Questionnaire

Section 1: Sustainability

1. **How important is environmental sustainability in your software development projects?**

   A. Very Important

   B. Important

   C. Neutral

   D. Less Important

   E. Not Important

2. **Does your company implement practices to reduce its carbon footprint during software development?**

   A. Yes

   B. No

   C. Sometimes

   D. Not Applicable

3. **What measures does your company take to promote environmental sustainability? (Select all that apply)**

   A. Efficient energy usage

   B. Remote working options

   C. Minimizing resource usage

   D. Recycling and waste reduction

   E. None

4. **How does your company ensure social sustainability, such as improving work-life balance for employees?**

   A. Strongly Agree

   B. Agree

   C. Neutral

   D. Disagree

   E. Strongly Disagree

5. **What percentage of your projects actively incorporate environmental sustainability practices (e.g., reduced energy consumption, resource optimization)?**

   A. 0-20%

   B. 21-40%

   C. 41-60%

   D. 61-80%

   E. 81-100%

6. **How much reduction (%) in physical resource use have you achieved after adopting hybrid project management?**

   A. 0-10%

   B. 11-20%

   C. 21-30%

   D. 31-40%

   E. 41-50%

7. **What is the percentage increase in energy efficiency after implementing hybrid project management practices?**

   A. 0-10%

   B. 11-20%

   C. 21-30%

   D. 31-40%

   E. More than 40%

8. **How would you rate your company's focus on environmental sustainability in project management?**

A. Very Low

B. Low

C. Moderate

D. High

E. Very High

9. **How effective are your company's efforts to reduce physical resource usage during project execution?**

   A. Not Effective

   B. Slightly Effective

   C. Moderately Effective

   D. Effective

   E. Very Effective

10. **What impact has hybrid project management had on your company's overall energy efficiency?**

    A. No Impact

    B. Slight Impact

    C. Moderate Impact

    D. Significant Impact

    E. Major Impact

Section 2: Feasibility

1. **How feasible is it for your company to implement hybrid project management approaches in terms of cost?**

   A. Very Feasible

   B. Feasible

   C. Neutral

   D. Somewhat Difficult

   E. Not Feasible

2. **How would you rate the technical feasibility of adopting new project management tools in your company?**

   A. Very High

B. High

C. Moderate

D. Low

E. Very Low

3. **Does your organization have the necessary resources (personnel, infrastructure) to execute hybrid project management?**

   A. Yes

   B. No

   C. Partially

   D. Unsure

4. **What are the main challenges your company faces in the operational feasibility of hybrid project management? (Select all that apply)**

   A. Lack of trained personnel

   B. Resistance to change

   C. Insufficient budget

   D. Poor infrastructure

   E. Other (Please specify)

5. **What is the success rate (%) of projects delivered on time since adopting hybrid project management?**

   A. 0-20%

   B. 21-40%

   C. 41-60%

   D. 61-80%

   E. 81-100%

6. **What percentage of your company's projects have improved in terms of operational feasibility (e.g., workflow, resource allocation) after adopting hybrid management?**

   A. 0-20%

   B. 21-40%

   C. 41-60%

   D. 61-80%

   E. 81-100%

7. **How much (%) has the project success rate increased in your company after adopting hybrid project management?**

   A. 0-10%

   B. 11-20%

   C. 21-30%

   D. 31-40%

   E. 41-50%

8. **How feasible has the adoption of hybrid project management been in terms of cost?**

   A. Not Feasible

   B. Slightly Feasible

   C. Moderately Feasible

   D. Feasible

   E. Highly Feasible

9. **Rate the technical feasibility of implementing hybrid project management in your company.**

   A. Very Low

   B. Low

   C. Moderate

   D. High

   E. Very High

10. **How much has the adoption of hybrid project management improved project success rates in your company?**

    A. No Improvement

    B. Slight Improvement

    C. Moderate Improvement

    D. Significant Improvement

    E. Major Improvement

Section 3: Social and Environmental Impact

1. **To what extent has leadership advocacy influenced on-time project delivery by encouraging employee engagement with hybrid project management?**

   A) Greatly

   B) Moderately

   C) Slightly

   D) Not at all

2. **How effective are tailored training programs and cultural workshops in reducing delays associated with resistance to hybrid project management?**

   A) Very effective

   B) Moderately effective

   C) Minimally effective

   D) Not effective

3. **How often do mentorship programs and change champions help maintain project timelines by supporting employee adaptability to hybrid models?**

   A) Always

   B) Often

   C) Occasionally

   D) Rarely or never

4. **To what extent do collaboration platforms contribute to on-time delivery by facilitating cross-functional team interactions?**

   A) 75-100%

   B) 50-74%

   C) 25-49%

   D) Not at all

5. **How effective is the use of collaboration platforms in reducing project delays by minimizing physical meetings and paperwork?**

   A) Very effective

   B) Moderately effective

C) Minimally effective

D) Not effective

6. **What impact does adopting cloud-based solutions have on reducing energy use and enabling on-time delivery?**

   A) High impact

   B) Moderate impact

   C) Low impact

   D) No impact

7. **Does your organization use cost-effective cloud solutions to manage digital resources, minimizing environmental impact and supporting on-time delivery?**

   A) Yes, fully

   B) Mostly

   C) Occasionally

   D) Rarely or never

8. **How often do cost-effective tools like free Kanban and data protection measures improve timelines by fostering a secure work environment?**

   A) 75-100%

   B) 50-74%

   C) Sometimes

   D) Rarely or never

9. **How effective is incremental adoption of hybrid project management in supporting work-life balance and reducing delays due to employee stress?**

   A) Very effective

   B) Moderately effective

   C) Minimally effective

   D) Not effective

10. **How often does flexible work through collaboration platforms improve on-time delivery by enhancing well-being and reducing turnover?**

    A) Frequently

    B) Occasionally

C) Rarely

D) Never

11. **How does clear documentation and standardized NDAs help meet client expectations and support on-time delivery?**

    A) Very effective

    B) Moderately effective

    C) Slightly effective

    D) Not effective

12. **To what extent does adherence to labor laws and data protection standards improve on-time delivery by building trust and reducing risks?**

    A) Greatly

    B) Moderately

    C) Slightly

    D) Not at all

13. **How effective are data compliance tools in enhancing on-time delivery by ensuring secure data handling and reducing disruptions?**

    A) 75-100%

    B) 50-74%

    C) 25-49%

    D) Not effective

14. **To what extent does implementing energy-efficient remote collaboration tools reduce delays from physical limitations or travel?**

    A) Greatly

    B) Moderately

    C) Slightly

    D) No impact

15. **How often does adopting a gradual, hybrid approach to project management prevent delays by allowing employees time to adjust?**

    A) Always

    B) Often

    C) Sometimes

    D) Rarely or never

Section 4: Ethics

1. **How does your company ensure transparency and accountability in project management?**

   A. Always

   B. Frequently

   C. Sometimes

   D. Rarely

   E. Never

2. **Does your company actively promote ethical leadership and advocate for responsible software development practices?**

   A. Yes

   B. No

   C. Not Sure

3. **How is data privacy and security ensured in your project management processes?**

   A. Strict policies in place

   B. Some policies but need improvement

   C. Few policies exist

   D. No policies

4. **How does your company handle the fair and ethical use of intellectual property during projects?**

   A. Always follows legal frameworks

   B. Occasionally follows

   C. Does not focus much

   D. No clear framework in place

5. **How ethical is your company's approach to hybrid project management in balancing profitability with fairness?**

   A. Very Ethical

   B. Ethical

   C. Neutral

   D. Unethical

   E. Very Unethical

6. **What percentage of projects in your company adhere to strict data privacy and security protocols?**

   A. 0-20%

   B. 21-40%

   C. 41-60%

   D. 61-80%

   E. 81-100%

7. **What proportion (%) of leadership in your organization actively advocates for ethical practices in project management?**

   A. 0-20%

   B. 21-40%

   C. 41-60%

   D. 61-80%

   E. 81-100%

8. **How much (%) has transparency and accountability in project management improved since adopting hybrid practices?**

   A. 0-10%

   B. 11-20%

   C. 21-30%

   D. 31-40%

   E. More than 40

Appendix B

Survey question response by the participants

Table B.1: Survey Response-1 for Sustainability with CTO at a Large Software Firm

Question	**Response**
1. How important is environmental sustainability in your software development projects?	Very Important (A)
2. Does your company implement practices to reduce its carbon footprint during software development?	Yes (A)
3. What measures does your company take to promote environmental sustainability?	Efficient energy usage, Remote working options, Minimizing resource usage (A, B, C)
4. How does your company ensure social sustainability, such as improving work-life balance for employees?	Strongly Agree (A)
5. What percentage of your projects actively incorporate environmental sustainability practices?	61-80% (D)
6. How much reduction (%) in physical resource use have you achieved after adopting hybrid project management?	31-40% (D)
7. What is the percentage increase in energy efficiency after implementing hybrid project management practices?	31-40% (D)
8. How would you rate your company's focus on environmental sustainability in project management?	Very High (E)
9. How effective are your company's efforts to reduce physical resource usage during project execution?	Very Effective (E)
10. What impact has hybrid project management had on your company's overall energy efficiency?	Significant Impact (D)

Table B.2: Survey Response-2 for Sustainability with Project Manager at a Mid Sized Firm

Question	**Response**
1. How important is environmental sustainability in your software development projects?	Important (B)
2. Does your company implement practices to reduce its carbon footprint during software development?	Sometimes (C)
3. What measures does your company take to promote environmental sustainability?	Remote working options, Recycling and waste reduction (B, D)
4. How does your company ensure social sustainability, such as improving work-life balance for employees?	Agree (B)
5. What percentage of your projects actively incorporate environmental sustainability practices?	21-40% (B)
6. How much reduction (%) in physical resource use have you achieved after adopting hybrid project management?	11-20% (B)
7. What is the percentage increase in energy efficiency after implementing hybrid project management practices?	11-20% (B)
8. How would you rate your company's focus on environmental sustainability in project management?	Moderate (C)
9. How effective are your company's efforts to reduce physical resource usage during project execution?	Moderately Effective (C)
10. What impact has hybrid project management had on your company's overall energy efficiency?	Moderate Impact (C)

Table B.3: Survey Response-1 for Feasibility with CFO of a Large Software Company

Question	**Response**
1. How feasible is it for your company to implement hybrid project management approaches in terms of cost?	Very Feasible (A)
2. How would you rate the technical feasibility of adopting new project management tools in your company?	High (B)
3. Does your organization have the necessary resources (personnel, infrastructure) to execute hybrid project management?	Yes (A)
4. What are the main challenges your company faces in the operational feasibility of hybrid project management?	Resistance to change, Poor infrastructure (B, D)
5. What is the success rate (%) of projects delivered on time since adopting hybrid project management?	61-80% (D)
6. What percentage of your company's projects have improved in terms of operational feasibility after adopting hybrid management?	41-60% (C)
7. How much (%) has the project success rate increased in your company after adopting hybrid project management?	31-40% (D)
8. How feasible has the adoption of hybrid project management been in terms of cost?	Feasible (B)
9. Rate the technical feasibility of implementing hybrid project management in your company.	High (D)
10. How much has the adoption of hybrid project management improved project success rates in your company?	Significant Improvement (D)

Table B.4: Survey Response-2 for Feasibility with Project Manager at a Mid-Sized Startup

Question	**Response**
1. How feasible is it for your company to implement hybrid project management approaches in terms of cost?	Somewhat Difficult (D)
2. How would you rate the technical feasibility of adopting new project management tools in your company?	Moderate (C)
3. Does your organization have the necessary resources (personnel, infrastructure) to execute hybrid project management?	Partially (C)
4. What are the main challenges your company faces in the operational feasibility of hybrid project management?	Lack of trained personnel, Insufficient budget (A, C)
5. What is the success rate (%) of projects delivered on time since adopting hybrid project management?	41-60% (C)
6. What percentage of your company's projects have improved in terms of operational feasibility after adopting hybrid management?	21-40% (B)
7. How much (%) has the project success rate increased in your company after adopting hybrid project management?	11-20% (B)
8. How feasible has the adoption of hybrid project management been in terms of cost?	Moderately Feasible (C)
9. Rate the technical feasibility of implementing hybrid project management in your company.	Moderate (C)
10. How much has the adoption of hybrid project management improved project success rates in your company?	Moderate Improvement (C)

Table B.5: Response-1 for Social and Environmental Impact with Head of HR at a Large firm

Question	**Response**
1. To what extent has leadership advocacy influenced on-time project delivery by encouraging employee engagement with hybrid project management?	Greatly (A)
2. How effective are tailored training programs and cultural workshops in reducing delays associated with resistance to hybrid project management?	Very effective (A)
3. How often do mentorship programs and change champions help maintain project timelines by supporting employee adaptability to hybrid models?	Often (B)
4. To what extent do collaboration platforms contribute to on-time delivery by facilitating cross-functional team interactions?	75-100% (A)
5. How effective is the use of collaboration platforms in reducing project delays by minimizing physical meetings and paperwork?	Very effective (A)
6. What impact does adopting cloud-based solutions have on reducing energy use and enabling on-time delivery?	High impact (A)
7. Does your organization use cost-effective cloud solutions to manage digital resources, minimizing environmental impact and supporting on-time delivery?	Yes, fully (A)
8. How often do cost-effective tools like free Kanban and data protection measures improve timelines by fostering a secure work environment?	75-100% (A)
9. How effective is incremental adoption of hybrid project management in supporting work-life balance and reducing delays due to employee stress?	Very effective (A)
10. How often does flexible work through collaboration platforms improve on-time delivery by enhancing well-being and reducing turnover?	Frequently (A)
11. How does clear documentation and standardized NDAs help meet client expectations and support on-time delivery?	Very effective (A)
12. To what extent does adherence to labor laws and data protection standards improve on-time delivery by building trust and reducing risks?	Greatly (A)
13. How effective are data compliance tools in enhancing on-time delivery by ensuring secure data handling and reducing disruptions?	75-100% (A)
14. To what extent does implementing energy-efficient remote collaboration tools reduce delays from physical limitations or travel?	Greatly (A)
15. How often does adopting a gradual, hybrid approach to project management prevent delays by allowing employees time to adjust?	Always (A)

Table B.6: Response-2 for Social and Environmental Impact with HR Manager at a Small firm

Question	**Response**
1. To what extent has leadership advocacy influenced on-time project delivery by encouraging employee engagement with hybrid project management?	Moderately (B)
2. How effective are tailored training programs and cultural workshops in reducing delays associated with resistance to hybrid project management?	Moderately effective (B)
3. How often do mentorship programs and change champions help maintain project timelines by supporting employee adaptability to hybrid models?	Occasionally (C)
4. To what extent do collaboration platforms contribute to on-time delivery by facilitating cross-functional team interactions?	50-74% (B)
5. How effective is the use of collaboration platforms in reducing project delays by minimizing physical meetings and paperwork?	Moderately effective (B)
6. What impact does adopting cloud-based solutions have on reducing energy use and enabling on-time delivery?	Moderate impact (B)
7. Does your organization use cost-effective cloud solutions to manage digital resources, minimizing environmental impact and supporting on-time delivery?	Mostly (B)
8. How often do cost-effective tools like free Kanban and data protection measures improve timelines by fostering a secure work environment?	50-74% (B)
9. How effective is incremental adoption of hybrid project management in supporting work-life balance and reducing delays due to employee stress?	Moderately effective (B)
10. How often does flexible work through collaboration platforms improve on-time delivery by enhancing well-being and reducing turnover?	Occasionally (B)
11. How does clear documentation and standardized NDAs help meet client expectations and support on-time delivery?	Moderately effective (B)
12. To what extent does adherence to labor laws and data protection standards improve on-time delivery by building trust and reducing risks?	Moderately (B)
13. How effective are data compliance tools in enhancing on-time delivery by ensuring secure data handling and reducing disruptions?	50-74% (B)
14. To what extent does implementing energy-efficient remote collaboration tools reduce delays from physical limitations or travel?	Moderately (B)
15. How often does adopting a gradual, hybrid approach to project management prevent delays by allowing employees time to adjust?	Often (B)

Table B.7: Survey Response-1 for Ethics with COO at a Large Software Firm

Question	**Response**
1. How does your company ensure transparency and accountability in project management?	Always (A)
2. Does your company actively promote ethical leadership and advocate for responsible software development practices?	Yes (A)
3. How is data privacy and security ensured in your project management processes?	Strict policies in place (A)
4. How does your company handle the fair and ethical use of intellectual property during projects?	Always follows legal frameworks (A)
5. How ethical is your company's approach to hybrid project management in balancing profitability with fairness?	Very Ethical (A)
6. What percentage of projects in your company adhere to strict data privacy and security protocols?	81-100% (E)
7. What proportion (%) of leadership in your organization actively advocates for ethical practices in project management?	61-80% (D)
8. How much (%) has transparency and accountability in project management improved since adopting hybrid practices?	More than 40% (E)

Table B.8: Survey Response-2 for Ethics with Project Coordinator at a Small-Sized Startup

Question	**Response**
1. How does your company ensure transparency and accountability in project management?	Sometimes (C)
2. Does your company actively promote ethical leadership and advocate for responsible software development practices?	Not Sure (C)
3. How is data privacy and security ensured in your project management processes?	Few policies exist (C)
4. How does your company handle the fair and ethical use of intellectual property during projects?	Occasionally follows (B)
5. How ethical is your company's approach to hybrid project management in balancing profitability with fairness?	Neutral (C)
6. What percentage of projects in your company adhere to strict data privacy and security protocols?	21-40% (B)
7. What proportion (%) of leadership in your organization actively advocates for ethical practices in project management?	21-40% (B)
8. How much (%) has transparency and accountability in project management improved since adopting hybrid practices?	11-20% (B)