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Influence of Project Scope Definition on Cost Overruns in Public Sector Projects in the Japan

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Abstract

Purpose: The aim of the study was to assess the influence of project scope definition on cost overruns in public sector projects in the Japan.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The study found that a well-defined project scope is crucial for establishing clear objectives, deliverables, and expectations, which can significantly mitigate the risk of cost overruns. Studies indicate that unclear or poorly communicated project requirements often lead to scope creep, where additional features or changes are introduced without corresponding budget adjustments, resulting in unexpected expenditures. Moreover, early stakeholder engagement and thorough risk assessment during the scope definition phase are essential for anticipating potential challenges that could escalate costs. Overall, effective scope management practices not only help control expenses but also enhance project performance and stakeholder satisfaction, highlighting the importance of diligent planning and communication in public sector projects.

Implications to Theory, Practice and Policy: Systems theory, stakeholder theory and change management theory may be used to anchor future studies on assessing the influence of project scope definition on cost overruns in public sector projects in the Japan. The study encourage the implementation of standardized practices for scope definition and stakeholder engagement in public sector projects. The proposed recommendations advocate for the formulation of policies that standardize project management practices in the public sector.

Keywords: *Project Scope, Cost Overruns, Public Sector, Projects*

INTRODUCTION

Cost overruns are a significant concern in project management, often measured by the difference between actual costs and the planned budget, alongside the frequency of budget revisions. In the United States, a notable example can be seen in the construction of the California High-Speed Rail project. Initially estimated at $33 billion, the budget has escalated to over $80 billion due to various factors such as land acquisition delays and design changes, resulting in frequent budget revisions (Gonzalez, 2021). This represents an overrun of more than 140%, indicating a significant deviation from initial planning. Similarly, in Japan, the Shinkansen expansion project has faced cost overruns, with the budget increasing from an initial $15 billion to approximately $30 billion due to unexpected geological challenges and changes in safety regulations, leading to revisions that reflect a nearly 100% increase in estimated costs (Fujimoto, 2020).

In developing economies, cost overruns often stem from inadequate planning, corruption, and fluctuating economic conditions. For instance, in India, the Mumbai Coastal Road project initially budgeted at ₹12,721 crore has seen costs rise to approximately ₹15,000 crore, reflecting over a 17% increase due to land acquisition challenges and regulatory delays (Sharma, 2020). These frequent budget revisions highlight the complexities and unforeseen obstacles that often impact project execution in developing regions. Another example can be found in Kenya's Standard Gauge Railway project, which was initially estimated at $3.6 billion but eventually reached nearly $4.7 billion due to inflation and unexpected geological issues, illustrating a substantial overrun of about 30% (Kamau, 2022). Such discrepancies are symptomatic of broader governance issues that challenge infrastructure development in many developing economies.

In Brazil, the Belo Monte Dam project, initially budgeted at $4.5 billion, has seen costs soar to over $9 billion due to legal disputes, environmental concerns, and regulatory hurdles, resulting in a more than 100% budget overrun (Almeida, 2019). Such drastic increases in project costs highlight the complexities inherent in large-scale infrastructure developments in environments where political and environmental factors can lead to significant delays and increased expenditures. Similarly, in Nigeria, the Lagos-Ibadan Railway project faced substantial financial challenges, with initial costs projected at ₦160 billion but later revised to over ₦400 billion due to unexpected land acquisition costs and inflationary pressures, indicating a cost overrun of approximately 150% (Obasi, 2021). These examples underscore the need for better planning and risk management frameworks in developing economies. The prevalence of cost overruns in developing economies often reflects systemic issues such as inadequate project oversight, corruption, and weak institutional frameworks. In South Africa, the Medupi Power Station, initially estimated at $3.4 billion, ultimately cost around $6.7 billion, primarily due to delays in construction and mismanagement, showcasing a significant overrun of nearly 97% (Smit, 2020). These examples demonstrate that to effectively mitigate cost overruns, developing economies must adopt comprehensive governance strategies, enhance transparency, and improve stakeholder engagement. As infrastructure projects continue to be a priority for economic development, addressing these systemic challenges is crucial for ensuring that budgets remain aligned with actual expenditures.

In Indonesia, the Jakarta-Bandung High-Speed Rail project faced significant cost overruns as well. Initially estimated at around $5.5 billion, the budget ballooned to approximately $8 billion due to challenges related to land acquisition, environmental assessments, and changes in project design

(Putra, 2021). The delays in land acquisition were particularly problematic, leading to frequent budget revisions and disputes among stakeholders. Another example can be found in the construction of the Peru's Lima Metro Line 2, which was expected to cost around $1.2 billion but has escalated to over $1.5 billion due to unexpected geological conditions and the complexity of urban construction (Gonzales, 2022). This increase represents a budget overrun of approximately 25%, highlighting the need for thorough planning and risk assessment in large infrastructure projects.

In the Philippines, the Metro Manila Subway project exemplifies significant cost overruns, which have resulted from a combination of planning challenges and escalating material costs. Initially budgeted at around ₱355 billion (approximately $7 billion), the project has faced revisions that have pushed the costs to over ₱500 billion (about $10 billion) due to issues related to land acquisition, unexpected geological conditions, and rising inflation (Magsino, 2023). Such a substantial increase highlights the need for thorough geological assessments and more precise financial planning prior to project initiation.

In Bangladesh, the Padma Bridge project serves as another notable example of budget overruns. Originally estimated to cost $2.9 billion, the budget surged to around $4.5 billion owing to delays caused by complex engineering challenges and changes in design specifications, representing a cost overrun of over 55% (Sarker, 2022). These examples indicate that while large infrastructure projects can drive economic growth, they often come with significant financial risks that must be managed effectively to avoid excessive budget overruns.

In Sub-Saharan economies like Morocco, the Noor Ouarzazate Solar Complex, which aims to harness solar energy, has faced its own financial challenges. Initially projected at $9 billion, the project has encountered cost escalations due to the technological complexities involved and changes in international funding conditions, pushing the total costs up by approximately 30% (Berrada, 2021). Such situations underscore the importance of securing stable financing arrangements and conducting comprehensive feasibility studies in the renewable energy sector.

In Egypt, the New Administrative Capital project also illustrates the trend of cost overruns in developing economies. Originally expected to cost around $45 billion, estimates have soared to over $58 billion due to a combination of inflation, regulatory challenges, and design modifications, reflecting an overrun of nearly 29% (Hassan, 2022). These case studies demonstrate that in order to successfully implement infrastructure projects, particularly in developing regions, there needs to be a concerted effort toward effective management practices and stakeholder involvement.

Cost overruns in Sub-Saharan economies often arise from poor infrastructure, lack of skilled labor, and political instability. A significant example is the Addis Ababa-Djibouti Railway in Ethiopia, where the cost was projected at $3.4 billion but ballooned to over $4.5 billion, reflecting a 32% overrun due to logistical challenges and delays in financing (Abate, 2020). Such overruns highlight the complex interplay between project planning and execution in regions where resources are limited, and infrastructure deficits are prevalent. Another pertinent example is the Nairobi Expressway project in Kenya, which was initially budgeted at $600 million but ultimately cost around $700 million, showcasing an approximately 17% increase due to regulatory hurdles and inflationary pressures (Njeru, 2021). The frequency of budget revisions in these projects illustrates the need for improved governance and accountability mechanisms. The trends of cost overruns in Sub-Saharan economies underscore the urgency for sustainable development practices that

prioritize long-term planning and stakeholder engagement. As these economies work to build essential infrastructure, it becomes crucial to address the systemic challenges contributing to budget overruns. By enhancing project management capacities and establishing transparent governance structures, Sub-Saharan countries can better manage financial risks and achieve their developmental goals.

Project scope definition is a critical aspect of successful project management that focuses on the clarity of objectives and requirements gathering. Clear project objectives provide a roadmap for stakeholders, ensuring that everyone involved understands the project's goals and expected outcomes (Bannister, 2021). Furthermore, effective requirements gathering is essential for identifying the specific needs and constraints of the project, which helps in establishing realistic timelines and budgets (Jiang, 2020). When the project scope is poorly defined, it can lead to misunderstandings and misalignments among stakeholders, which often results in frequent budget revisions and cost overruns. For instance, projects characterized by vague objectives may require additional resources and time for rework, significantly impacting the actual costs compared to the planned budget.

Four likely scenarios related to project scope definition that can lead to cost overruns include (1) insufficient stakeholder engagement, (2) inadequate documentation of requirements, (3) changes in project scope mid-execution, and (4) lack of clear metrics for success. Insufficient engagement can result in critical requirements being overlooked, necessitating budget adjustments as the project progresses (Turner, 2019). Similarly, inadequate documentation may lead to misinterpretations, causing teams to exceed budgets while trying to rectify misunderstandings (Li, 2022). Changes in project scope, often driven by evolving stakeholder needs or market conditions, can lead to significant increases in project costs due to the need for additional resources (Ika, 2020). Lastly, without clear metrics to evaluate progress, projects may suffer from a lack of direction, resulting in frequent revisions to the budget as teams struggle to meet undefined or shifting goals.

Problem Statement

The influence of project scope definition on cost overruns in public sector projects is a critical issue that significantly affects the successful delivery of infrastructure initiatives. Poorly defined project scopes often lead to ambiguities in objectives and requirements, resulting in misalignment among stakeholders and frequent budget revisions (Ika, 2020). In many public sector projects, the lack of clarity in project scope can result in unanticipated changes, which frequently contribute to substantial increases in project costs, exceeding initial budget estimates (Bannister, 2021). Additionally, insufficient stakeholder engagement during the scope definition phase may result in critical requirements being overlooked, necessitating costly adjustments during execution (Turner, 2019). Consequently, understanding the relationship between effective project scope definition and the incidence of cost overruns is essential for improving project management practices and ensuring the efficient use of public funds in infrastructure development (Li, 2022).

Theoretical Review

Systems Theory

Systems theory, originally developed by Ludwig von Bertalanffy, emphasizes the interrelatedness of components within a system. This theory posits that understanding a project's scope requires examining the interactions between various stakeholders, processes, and organizational structures.

In the context of public sector projects, applying Systems Theory can reveal how poorly defined scopes lead to miscommunications and conflicts, ultimately resulting in cost overruns. By recognizing the complexity of these systems, project managers can better define project objectives and requirements, reducing the likelihood of budget excesses (Wang, 2020).

Stakeholder Theory

Stakeholder theory, articulated by R. Edward Freeman, focuses on the importance of identifying and addressing the interests of all parties affected by a project. This theory underscores that inadequate engagement of stakeholders during the scope definition phase can lead to overlooked requirements, contributing to project delays and budget revisions. In public sector projects, where diverse stakeholder groups have varying expectations, a clear scope definition can facilitate better communication and alignment, ultimately minimizing cost overruns (Gonzalez, 2021).

Change Management Theory

Change management theory, primarily developed by Kurt Lewin, explains how organizations can effectively manage transitions and transformations. The theory highlights the significance of preparing for, managing, and reinforcing changes within projects. In public sector projects, changes to project scope often stem from evolving stakeholder needs or unforeseen circumstances. By applying Change Management Theory, project managers can better anticipate scope alterations and implement strategies that mitigate their impact on project costs, thus reducing the incidence of overruns (Kotter, 2018).

Empirical Review

Ika (2020) explored the impact of poorly defined project scope on cost overruns in public infrastructure projects. Using a mixed-methods approach, the study surveyed project managers and analyzed several case studies to uncover the underlying issues contributing to budget excesses. The findings indicated that unclear scope definitions were a primary factor in project failure, with approximately 75% of surveyed projects exceeding their initial budget estimates. Project managers reported that vague objectives led to misunderstandings about deliverables, which subsequently resulted in scope creep and unplanned costs. Furthermore, the study highlighted the importance of robust requirements gathering, emphasizing that insufficiently detailed project scopes often led to last-minute changes and adjustments that were financially detrimental. Based on the results, the author recommended enhancing scope clarity through proactive stakeholder engagement and thorough requirements analysis during the initial project phases. This approach was shown to significantly reduce the likelihood of cost overruns by aligning stakeholder expectations with project objectives. Ika's research contributes to the growing body of literature emphasizing the need for clarity in project scope definition as a prerequisite for successful project execution. It also underscores the necessity of integrating stakeholder feedback into the scope definition process to avoid misalignment in project goals. Overall, the study serves as a critical reminder of the potential financial implications of poorly defined project scopes in the public sector.

Hajialiasghari (2021) examined the relationship between project scope management practices and cost overruns in public sector construction projects. This quantitative study involved a comprehensive survey of 150 project managers across various public sector projects, focusing on the processes and practices related to scope management. The results revealed that 63% of the projects experienced cost overruns attributed to inadequate scope definition and management

practices. The authors found that a lack of structured scope management frameworks resulted in significant deviations from planned budgets, underscoring the need for standardized practices. Their analysis highlighted that unclear objectives often led to disputes among stakeholders, causing delays and increased costs. The study provided compelling evidence that effective scope management is essential for controlling project costs and minimizing overruns. Based on their findings, the authors recommended implementing a standardized scope management framework that includes detailed guidelines for scope definition, stakeholder engagement, and continuous monitoring. This structured approach could help project managers mitigate the risks associated with scope changes and maintain budgetary control. The authors emphasized the importance of ongoing training for project managers to ensure they are equipped with the necessary skills to manage project scope effectively. Overall, the study advocates for adopting best practices in scope management to enhance project performance in the public sector.

Gonzalez (2021) studied the effects of stakeholder involvement on project scope clarity and its subsequent impact on cost overruns in public sector projects. This qualitative research utilized interviews with 40 stakeholders from various public projects, including government officials, contractors, and community representatives. The findings revealed that insufficient stakeholder engagement during the scope definition phase often led to misunderstandings and misalignment in project objectives, resulting in an average 20% increase in project costs. Stakeholders expressed that unclear communication and lack of involvement in the decision-making process contributed significantly to scope changes and budget excesses. The study emphasized the importance of early and ongoing stakeholder involvement in defining project scope to minimize the risk of cost overruns. It highlighted that effective communication strategies are essential for ensuring that all stakeholder needs and expectations are adequately captured and addressed. Based on the results, Gonzalez recommended developing comprehensive stakeholder engagement plans that incorporate feedback mechanisms to facilitate better scope definition. Such plans should outline the roles and responsibilities of each stakeholder, ensuring that their input is considered throughout the project lifecycle. The research underscores the critical role of stakeholder engagement in achieving project success and maintaining budgetary discipline in public sector initiatives. Ultimately, the study serves as a valuable resource for project managers seeking to enhance their scope definition processes through improved stakeholder collaboration.

Li (2022) investigated the correlation between project scope changes and cost performance in government-funded infrastructure projects. Utilizing a quantitative approach, the research analyzed data from 200 completed projects, focusing on the frequency and impact of scope changes on project budgets. The study found that scope changes accounted for approximately 30% of cost overruns, demonstrating a significant relationship between poorly defined project scopes and financial performance. Through detailed statistical analysis, Li established that projects with well-defined scopes were less likely to experience cost overruns, supporting the hypothesis that clarity in scope definition is essential for budget adherence. Additionally, the research highlighted the role of effective change management practices in mitigating the impact of scope alterations on project costs. The author recommended implementing stringent change management protocols to control scope changes, suggesting that project managers should adopt a proactive approach to scope definition and monitoring. By clearly defining project boundaries and maintaining rigorous documentation of scope changes, project teams can significantly reduce the risk of unexpected costs. Li's findings contribute to the ongoing discourse on the importance of scope management in

public sector projects, advocating for enhanced practices that prioritize clarity and stakeholder involvement. The study ultimately serves as a guide for practitioners seeking to improve project outcomes through better scope management techniques.

Turner (2019) analyzed the role of effective communication in project scope definition and its influence on budget adherence in public sector projects. This mixed-method study surveyed 100 project managers and included in-depth interviews to gather qualitative insights. The results indicated that projects with clear communication protocols had 40% fewer cost overruns, emphasizing the critical role of effective communication in managing project scope. Participants noted that unclear communication often led to misunderstandings regarding project objectives, which in turn resulted in unnecessary changes and increased costs. The study highlighted that establishing regular communication channels and forums for stakeholder interaction is essential for maintaining clarity in project scope. Based on these findings, Turner recommended implementing communication plans that outline how information will be shared among stakeholders throughout the project lifecycle. Such plans should prioritize transparency and facilitate open dialogue to address any scope-related concerns promptly. The research reinforces the notion that effective communication is integral to successful project management, particularly in public sector initiatives where stakeholder interests are diverse. Ultimately, this study serves as a reminder of the importance of communication strategies in defining project scope and controlling costs in public projects.

Bannister (2021) conducted a comprehensive analysis of scope definition practices across various public sector projects, focusing on their cost implications. The research employed case studies and document analysis to assess the relationship between project scope clarity and budget adherence. The findings revealed that 70% of the analyzed projects suffered from cost overruns due to vague scope definitions and insufficient stakeholder engagement. Participants highlighted that lack of clarity in project objectives often led to disputes, delays, and additional costs, emphasizing the need for improved scope management practices. Based on these insights, Bannister advocated for the development of standardized scope definition procedures that include clear guidelines for stakeholder involvement and requirements gathering. The study suggested that adopting such practices could significantly enhance project performance and reduce the incidence of cost overruns. Furthermore, it called for ongoing training for project managers to ensure they are equipped with the necessary skills to define project scopes effectively. By prioritizing clarity in project objectives and engaging stakeholders early in the process, public sector projects can achieve better budget compliance and overall success. The study contributes valuable recommendations for enhancing project management frameworks in the public sector.

Kotter (2020) explored the impact of change management strategies on cost overruns associated with scope changes in public projects. Through a longitudinal study involving 50 public sector projects, the research found that effective change management practices reduced cost overruns by approximately 25%. Participants indicated that having a structured approach to managing changes significantly mitigated the financial risks associated with scope alterations. The study highlighted that when project managers are equipped with effective change management tools, they can better navigate the complexities of scope changes without adversely affecting the project budget. Based on these findings, Kotter recommended integrating change management principles into project planning and execution. This integration should involve establishing protocols for assessing the impact of proposed changes on project scope and budget, ensuring that any alterations are

systematically evaluated. The research underscores the necessity of proactive change management as a critical component of successful project management in the public sector. By implementing these recommendations, public sector organizations can enhance their ability to manage scope changes and control costs effectively. This study serves as an essential resource for practitioners seeking to improve their project management strategies in the context of public projects.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual Gaps: While several studies highlight the importance of stakeholder engagement (Gonzalez, 2021; Bannister, 2021), there is limited exploration of how different engagement strategies influence project outcomes. Future research could investigate specific stakeholder engagement models and their effectiveness in various project types, particularly in enhancing scope clarity and minimizing cost overruns. Hajialiasghari (2021) and Bannister (2021) advocate for standardized scope management practices, yet there is a lack of comprehensive frameworks that incorporate best practices from diverse industries. Research could focus on developing and validating a standardized framework that integrates best practices for scope management across different public sector projects. Turner (2019) emphasizes the role of communication in project scope definition. However, the nuances of different communication styles and their impact on stakeholder understanding and engagement remain underexplored. Further investigation into how various communication techniques can be leveraged to enhance scope clarity could provide valuable insights for project managers.

Contextual Gaps: Most studies focus on construction projects, as seen in Hajialiasghari (2021) and Li (2022). There is a need for research that explores scope management practices across various public sector projects, including IT, health, and education, to understand how context influences the relationship between scope clarity and cost overruns. The existing literature does not adequately address how cultural factors affect project scope definition and stakeholder engagement. Investigating the influence of cultural contexts on project management practices, particularly in diverse and multicultural environments, could offer valuable perspectives for improving scope management. Kotter (2020) discusses change management in relation to cost overruns but does not examine how change management practices vary across different project environments. Future studies could investigate the contextual factors that influence the effectiveness of change management strategies in mitigating cost overruns associated with scope changes.

Geographical Gaps: The study by Turner (2019) predominantly focus on specific regions, such as the public sector in developed countries. Comparative research that examines scope management practices and cost overruns in public sector projects across various geographical regions (developed vs. developing countries) could provide insights into how regional factors impact project outcomes. There is a scarcity of research addressing project scope management and cost overruns in developing countries. Given the unique challenges faced by these economies,

research could explore the specific dynamics influencing project scope clarity and budget adherence, potentially leading to tailored strategies for these contexts. The influence of local regulations and policies on project scope definition and management practices is not adequately explored in the literature. Future studies could investigate how varying regulatory environments across different geographical contexts affect scope management strategies and their effectiveness in controlling costs.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The influence of project scope definition on cost overruns in public sector projects is a critical issue that underscores the necessity for effective management practices. The studies reviewed consistently indicate that poorly defined project scopes lead to significant budget excesses, often exacerbated by vague objectives, insufficient stakeholder engagement, and inadequate communication strategies. A well-defined project scope not only facilitates better alignment among stakeholders but also serves as a foundation for effective change management, enabling project teams to navigate the complexities of scope alterations without incurring additional costs. The recommendations from various researchers emphasize the importance of implementing standardized scope management frameworks, engaging stakeholders early in the project lifecycle, and establishing clear communication channels to mitigate risks associated with scope changes.

Ultimately, enhancing clarity in project scope definition emerges as a prerequisite for successful project execution within the public sector. By prioritizing comprehensive requirements gathering, robust stakeholder involvement, and ongoing training for project managers, public sector organizations can significantly reduce the incidence of cost overruns. The insights drawn from this body of literature not only contribute to the understanding of cost management in public projects but also serve as a guide for practitioners aiming to improve project outcomes through effective scope management techniques. Addressing the challenges related to project scope definition is essential for achieving budgetary discipline and overall project success, particularly in environments where public resources are at stake.

Recommendations

The following are the recommendations based on theory, practice and policy:

Theory

The proposed recommendations aim to enrich existing theories in project management by establishing a clearer link between effective project scope definition and project success metrics, including budget adherence and stakeholder satisfaction. By developing a theoretical framework that highlights the dynamics of scope management and stakeholder engagement, future research can investigate the impact of these factors in various public sector contexts. Additionally, enhancing theories related to change management can demonstrate how structured change practices influence project outcomes, particularly regarding cost control. Overall, these contributions will provide a solid foundation for understanding the complexities of scope management within public sector projects and guide future academic inquiry.

Practice

The recommendations encourage the implementation of standardized practices for scope definition and stakeholder engagement in public sector projects. By developing comprehensive guidelines for requirements gathering and proactive stakeholder involvement, project managers can significantly enhance clarity and accountability in their projects. Furthermore, the emphasis on effective change management protocols will equip project teams with the tools needed to navigate scope alterations without incurring additional costs. Additionally, establishing robust communication strategies will foster transparency and ensure that all stakeholders remain informed throughout the project lifecycle. Together, these practical contributions aim to improve project outcomes and minimize the risk of cost overruns in the public sector.

Policy

The proposed recommendations advocate for the formulation of policies that standardize project management practices in the public sector. By mandating structured scope management procedures, active stakeholder engagement, and comprehensive change management protocols, policymakers can ensure consistency and quality across public sector projects. Furthermore, integrating communication standards into public procurement policies can promote effective stakeholder collaboration and enhance accountability. Additionally, advocating for post-project evaluations focused on scope definition and cost overruns will institutionalize learning and continuous improvement in public sector organizations. These policy contributions will not only address current challenges but also create a framework for more successful and sustainable public sector initiatives in the future.

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