EPiC Series in Built Environment

Volume 5, 2024, Pages 659–667

Proceedings of 60th Annual Associated Schools of Construction International Conference

Lessons Learned from Construction Projects to prevent Scope Creep

Mohamed E Abaza and Krishna P. Kisi, Ph.D.
Texas State University
San Marcos, Texas

This article delves into the pervasive issue of scope creep in construction projects, drawing insights from case studies and existing literature. It explores the challenges and conflicts arising in three construction projects from Bahrain as a direct consequence of scope creep. It elucidates how scope creep can lead to disputes among team members, resource overruns, missed deadlines, and compromised quality. Through insightful anecdotes and analysis, it examines each conflict scenario independently, discussing not only the negative outcomes but also recommend on the potential strategies to mitigate scope creep's impact. The recommendations focus on clear communication and collaboration to prevent scope creep. Training programs for project managers are identified as a critical need, specifically enhancing skills in scope management and change procedures. Project governance rules and codes and contractual immunity for project managers emerge as proactive measures to prevent issues in later project stages. Three case studies further exemplify the practical implications of these recommendations. The findings emphasize the universal applicability of these strategies in diverse construction project scenarios, offering a comprehensive framework for mitigating scope creep and ensuring successful project outcomes.

Key Words: Scope creep, Stakeholders' Management, Disputes, Project management.

Introduction

Scope creep presents a persistent challenge for project managers striving to control its expanse and impact (Ajmal et al., 2022). This phenomenon, characterized by the expansion of a project's scope or objectives beyond the initially agreed-upon parameters, often leads to delays, increased costs, and, in extreme cases, project failure. Factors contributing to scope creep include inadequate communication, deficient planning, poor management, and external changes like regulatory shifts or market conditions, making it an enduring issue despite ongoing efforts to curb it through improved planning and communication techniques (Amoatey et al., 2017; Mok et al., 2015). Notably, the construction industry is particularly susceptible to the effects of scope creep (Moneke et al., 2016).

Construction projects inherently face the risk of scope creep, a well-known challenge in the industry (Lee et al., 2006). Whether triggered by unforeseen events like extreme weather or supply shortages or rooted in stakeholder disagreements, scope creep consistently poses a significant threat to project success, resulting in increased costs, missed deadlines, and compromised work quality (Amoatey et al., 2017; Olander, 2007). Construction companies must prioritize robust communication and collaboration to counteract this pervasive issue. Establishing clear goals and expectations at the project's outset and regularly assessing progress against benchmarks are crucial steps toward mitigating the impact of scope creep. Defining the scope of a construction project holds paramount importance, establishing precise parameters and guidelines for the entire endeavor. By articulating what needs to be accomplished, at what costs, and within what timeframe, a well-defined scope ensures that all stakeholders are aligned from the project's inception, preventing misunderstandings that can lead to delays or costly errors (PMI, 2017). A comprehensive scope definition empowers project leaders to anticipate and address potential challenges early on, laying the groundwork for successful project execution that aligns with the expectations of all involved parties. Consequently, meticulous planning and communication during the project's initiation phase are pivotal in positioning teams for success and delivering high-quality work.

The construction industry is grappling with a significant and concerning trend: the rising costs attributed to scope creep, marked by unforeseen changes and additions during projects, leading to budget overruns—a substantial challenge for contractors and clients alike. In 2019, 35% of construction projects encountered scope creep, resulting in an average cost overrun of $10 million. This alarming figure is expected to increase by another 10% by 2022, with a projected cost impact of $14 million (Patel, 2017). Contributing factors, such as miscommunication and inaccurate initial planning, propel this upward trajectory. To address this pressing issue, the article introduces an innovative strategy outlining the causes of scope creep and providing a proactive approach to minimize its impact on construction projects. This strategy equips readers in the Middle East and North Africa region to address challenges head-on and reduce costs where feasible. Recent industry trends highlight the severity of the scope creep challenge, with global costs escalating due to this phenomenon (Xie et al., 2022). This trend underscores the urgent need for effective strategies globally to address and mitigate the impact of scope creep in construction projects.

Literature Review

Contemporary construction projects involve multiple stakeholders, including contractors, subcontractors, suppliers, architects, engineers, cost consultants, project management firms, and client representatives (Ajmal et al., 2022). While this collaborative approach can yield successful outcomes, it also introduces challenges, particularly in conflicting expectations among stakeholders. Each participating firm seeks to demonstrate its value to the client by advocating for cost-effective contributions, often leading to conflicting goals and expectations, resulting in delays and cost overruns (Amoatey et al., 2017). Disputes over expectations and demands regarding the scope of work and claims for reimbursement can emerge, necessitating legal intervention and imposing additional costs and risks on the general contractor (Nabet et al., 2017). A cohesive group effort is essential to navigate these challenges, emphasizing effective communication and collaboration to minimize hindrances in construction project management (Lee et al., 2006).

Preventing gold-plating from the start of a construction project is crucial for its life cycle, setting clear expectations for all stakeholders (Malhotra et al., 2012). The historical concept of gold-plating, used to impress clients with unnecessary features, has evolved, proving counterproductive and

leading to scope creep and budget overruns (Najjar et al., 2016). In modern methodologies like Agile and Scrum, gold-plating is discouraged, focusing on delivering only what the client requires to control costs and meet deadlines (Streule et al., 2016). This shift emphasizes efficiency and resource optimization, recognizing the pitfalls of unnecessary embellishments. Communication breakdowns about a project team's scope of work can significantly impact outcomes (Gamil et al., 2023). Without a well-communicated project scope, team members may operate in the dark, causing confusion, misunderstandings, and scope creep (Hussain et al., 2018). Awareness of project goals is crucial for avoiding disruptions to timelines and budgets. Training teams on proper scope management processes ensure a comprehensive understanding of project deliverables, preventing issues like budget overruns and scope creep (Ahadzie et al., 2009; Hilali et al., 2019). Investing in training demonstrates a commitment to project success, fostering transparency and teamwork, often through face-to-face meetings to discourage working in silos (Sakikhales, 2021).

The existence of silos in large construction companies can contribute to scope creep (Tett, 2015). Miscommunication and lack of understanding between estimation and project teams may lead to inaccurate estimates and unrealistic expectations, resulting in scope creep. The absence of Internal-Scope-Identification-Meetings (ISIMs) exacerbates this issue, hindering a clear understanding of the project scope (Kuritzkes et al., 2003). Companies need a unified approach to project management to guarantee smooth teamwork and continuous updates and to avoid scope-related issues such as change management conflicts (Motawa, 2007). The lack of proper change management processes in construction projects can have far-reaching consequences, including scope creep, budget overruns, missed deadlines, and a general lack of accountability (Sun et al., 2006). Inadequate documentation of changes during construction may lead to legal disputes between stakeholders, contractors, and managers over payment schedules and additional funding demands (Hao et al., 2008). Proper change management, enforced through regular communication, is crucial for maintaining project alignment with schedules and budgets, preventing unnecessary delays and disputes (Sun et al., 2009). A systematic approach to managing changes ensures project success and mitigates potential negative impacts on all parties involved.

Methodology

The study used case study analysis to find findings from three projects from Bahrain. The case studies were intentionally selected to offer a unique perspective, with one author actively engaged as a stakeholder throughout the projects. This deliberate choice ensures detailed and firsthand insights, comprehensively understanding each project's aspects, challenges, and outcomes. The direct involvement from start to finish allows for informed analysis and valuable insights not easily obtained through traditional research or secondary data sources alone. Examining three projects in the same country, built in collaboration with different stakeholders but facing similar issues, highlights potential systemic flaws in project management or cultural nuances. The analysis aims to identify common denominators contributing to recurring problems, particularly scope creep, and implement necessary measures for improved outcomes in future projects within this cultural context. The authors employ a rigorous and comprehensive analysis supported by compelling evidence, grounded in solid foundations through meticulous research from credible sources.

Case Study 1: Project A

Project overview: The "Construction of Family Entertainment Center in LIWAN mixed-use development at HAMALA" project, executed in the Kingdom of Bahrain from May 2021 to

December 2021, was completed in March 2022. Employing a Lump-Sum procurement type, the project held an estimated value of USD 2.36 million. Focused on enhancing the mixed-use compound in Hamala, the project encompassed a range of tasks, including demolishing existing slabs, excavating, and constructing new foundations tailored for the installation of rides. The comprehensive scope further entailed the incorporation of necessary infrastructure and landscaping elements.

Scenario: The project involved the modification of a recently completed building within the Liwan-Mixed-Use-Development, previously delivered by the same contractor to the same client. The modification aimed to transform the building into an indoor family entertainment center. Tasks included cutting existing concrete slabs, constructing an outdoor generator room, installing two rolling shutters (involving cutting existing walls), building a steel platform, and two staircases. The contractor completed all tasks ahead of schedule, except for the installation of the rolling door shutters.

Challenges arose when the client, without specifying a firm date, requested the contractor to postpone the installation until the rides, essential for the entertainment center, were delivered and installed. The size of the space provided post-installation of rolling shutters would not accommodate the rides' parts or the necessary plants for installation. The client faced a predicament as the rides were delivered three months behind the targeted handover date. The contractor, maintaining resources on-site during this period with no reimbursements, faced significant financial implications due to the unexpected delay and lack of clear communication regarding the modified project requirements.

Findings: The project encountered difficulties as it grappled with additional requirements that continuously expanded beyond the initial scope. What began as a seemingly straightforward assignment transformed into a complex challenge, resulting in missed deadlines and heightened tensions. Issues arose when the client introduced additional requirements not explicitly outlined in the contract, such as delays associated with rolling shutter installations. The client's request to delay the installation until all rides were delivered and installed caused a three-month delay in the project. This delay was critical as it impacted the overall progress and completion timeline.

Case Study 2: Project B

Project overview: The project, titled "Construction of LIWAN mixed-use development in Hamala, Kingdom of Bahrain," was executed from April 2020 to April 2021, with the actual completion date achieved in June 2021. Valued at USD 132.7 million, the procurement type employed for this project was Remeasure. The undertaking involved the construction of a comprehensive mixed-use compound in Hamala, encompassing 11 blocks with diverse functionalities, including residential units, a hypermarket, cinemas, family entertainment areas, and additional residential apartments. SEEF properties served as the client for this extensive project, which also included the implementation of all necessary infrastructure and landscaping components. The successful completion of this multifaceted development underscores its significance in contributing to the evolving urban landscape of Hamala, Bahrain.

Scenario: The project entailed the construction of 17 buildings accommodating 136 shops, 117 buildings, a cinema, two drive-thru buildings, and a large gym. Specifically, the scope for the 136

shops was shell and core, requiring the contractor to handle concrete framing, block walls, steel doors at the back, and aluminium doors at the front. The flats were situated on the upper floors of the same buildings as the shops. During the painting works for the apartments and building fascia, the client verbally instructed the contractor's team to paint the shop fronts' fascia, claiming it was industry custom and a moral obligation within the contractor's scope. Without consulting the assigned project manager, the contractor's team, consisting of young engineers, complied with the client's demands. This decision resulted in project delays and increased costs.

Findings: The project experienced a delay of two months and three days, a significant concern that required immediate attention. The contract for this project was Cost-Plus, necessitating early engagement with stakeholders to provide clear direction on expectations, priorities, and timelines. However, in contrast, the project was managed as a lump-sum contract. The consultant consistently delayed approvals, including papers and shop drawings, and added incapacitating comments. This ongoing issue, compounded by the delayed return of documents to the contractor and resistance to approval, contributed to the project's setbacks. The project manager's failure to effectively manage risks associated with the undefined scope resulted in the inability to ensure timely project completion, impacting the overall success of the outcomes.

Case Study 3: Project C

Project overview: The NBR (Non-Branded Residential Buildings) MARASSI AL-Bahrain project, situated in the Kingdom of Bahrain and spanning from February 2017 to September 2018, achieved its actual completion in January 2019. With a contract value of USD 35.28 million and a Lump-Sum procurement type, this project played a pivotal role in shaping Marsai Al Bahrain as one of the premier shopping destinations. Covering a vast site area of 38,500 square meters, Marsai Residences comprises a total of 258 high-end residential units, including one-bedroom apartments, two-bedroom apartments, and three-bedroom apartments. This development represents a significant contribution to the landscape of Marsai Al Bahrain, providing an array of luxurious residential options within a thriving and dynamic environment.

Scenario: The project comprised two 11-story buildings housing a total of 258 flats. A critical issue arose concerning the paint color for all facades, which were initially designated for a specialist contractor, while the main contractor provided the scaffolding. The project specifications mandated Engineer approval for all facade paint colors, leading to a prolonged approval process due to the involvement of numerous stakeholders. This delay in approval doubled the time the scaffolding was erected on the facades, resulting in scope creep and additional time and cost burdens on the contractor. Proper involvement of all stakeholders and timely implementation of change requests could have averted this issue, emphasizing the importance of effective collaboration in construction projects.

Findings: The project encountered a substantial setback with a four-month delay attributed to the failure to document change requests, impacting the team and stakeholders. The unrecorded changes led to scope creep, resulting in escalated costs, missed deadlines, and a consequential decline in team morale, ultimately jeopardizing the delivery of the final product. Notably, the client's representative requested additional work without specifying the exact requirements, contributing to the project's challenges.

Results and Discussion

The three case studies shed light on distinct challenges and outcomes in construction projects, emphasizing the importance of effective project management and communication.
Project A faced complications due to expanding requirements beyond the initial scope, resulting in missed deadlines and heightened tensions. The client introduced additional demands, such as delaying rolling shutter installations, leading to a critical three-month project delay. This highlighted the significance of explicit contract specifications and the detrimental impact of unanticipated modifications on project timelines and progress.

Project B, a multifaceted mixed-use development, experienced a two-month and three-day delay and increased costs due to the misalignment between the project management approach and contractual obligations. Despite its Cost-Plus nature, the project managed as a lump-sum contract suffered from delayed approvals and resistance, negatively impacting its overall success. This underscores the vital role of effective project management and risk mitigation in achieving timely and successful project outcomes.

Project C, focusing on Non-Branded Residential Buildings, encountered a four-month delay due to the failure to document change requests and scope creep. The absence of proper change management processes resulted in escalated costs, missed deadlines, and compromised team morale. The client's representative's vague additional work request added to the challenges, emphasizing the need for clear communication and documentation to prevent unexpected scope changes.

All three case studies underscore the pervasive impact of scope changes, inadequate communication, and mismanagement on project outcomes. Clear contract specifications, effective project management practices, and proactive risk mitigation strategies are crucial to avoiding scope creep, ensuring timely project completion, and safeguarding stakeholder interests.

The case studies and existing literature underscore the multifaceted nature of scope creep, revealing its occurrence due to various factors. However, the primary root cause is inadequate project management knowledge and communication breakdowns internally (among tendering, estimating, and operation teams) and externally with stakeholders and team members. Effective project planning involves identifying and clearly defining parameters for scope, goals, and objectives. Failure to communicate these parameters thoroughly introduces ambiguity about team members' responsibilities, fostering misunderstandings and leading to the addition of new features or unforeseen demands on resources. This, in turn, causes delays, cost overruns, and adverse impacts on project outcomes. Mitigating scope creep requires robust communication channels, necessitating continuous engagement between project teams and stakeholders to ensure a shared understanding of project goals and deliverables.

Establishing well-defined scopes from the outset outlining all requirements and priorities within the project schedule enables practical evaluation of any changes against these predetermined parameters. Additionally, maintaining transparency with stakeholders by setting expectations early contributes to more realistic costs and end products, ultimately satisfying completion dates and the product's final shape. This emphasizes the imperative for organizations and project managers to institute proactive measures for controlling scope creep, highlighting the critical role of effective communication and well-defined project scopes in project success.

Lessons learned

1. Proper Project Closure: Improper project closure in the construction industry can have far-reaching consequences, impacting financial stability, reputational standing, and relationships among stakeholders. The failure to close a project correctly often leads to significant financial losses, disputes, and scope creep. This, in turn, introduces uncertainties in project costs, quality control, and timelines, making it challenging to manage future projects effectively. Poor hand-over practices contribute to sub-standard maintenance, causing increased costs and potential accidents. Effective project completion requires thorough scope identification, regular review meetings, and robust control processes. Proper project closure safeguards stakeholders' investments, fosters long-term partnerships, and becomes a cornerstone for sustained success in this dynamic industry.

2. Proper Scope Identification: The importance of proper scope identification in construction projects cannot be overstated. Taking the time to accurately define the scope of work sets the stage for project success, ensuring smooth progression at every stage. This meticulous approach saves time, money, and resources by eliminating unnecessary work and preventing costly mistakes. Clear goals and objectives established through proper scope identification facilitate transparent communication among stakeholders, minimizing misunderstandings and conflicts. Investing a little extra time upfront in identifying the scope of work pays substantial dividends throughout the construction project, fostering efficiency and harmony among team members.

3. Upgrade the Control-Scope Process: The urgent need to upgrade the control-scope process in construction projects is a progressive step towards embracing industry evolution. Staying ahead of trends and adopting the latest technologies is crucial in the dynamic construction landscape. An upgraded control-scope process streamlines communication, reduces errors, sets clear expectations, and enhances efficiency across the project lifecycle. This modernization and emerging software solutions ensure more accurate plans, quicker turnaround times, and superior end-products for clients. Embracing cutting-edge technology positions the construction industry at the forefront of innovation, promising a bright future shaped by enhanced practices and methodologies.

4. Integration of VDC in Construction Projects: The paramount importance of integrating Virtual Design and Construction (VDC) into construction projects cannot be overstated, especially in eliminating scope creep. VDC streamlines the entire construction process and significantly reduces costs by minimizing errors and maximizing efficiency. The simulation and real-time testing capabilities of VDC prevent potential mistakes, saving on material costs and shortening timelines. The detailed accuracy of VDC promotes optimal communication among all stakeholders, reducing misunderstandings and miscommunications that lead to costly delays. Ultimately, incorporating VDC technology in construction ensures lower costs without compromising quality, guaranteeing that projects are completed to perfection within budget constraints.

Conclusion and Recommendations

In light of the comprehensive discussion, it is evident that preventing scope creep in construction projects demands a multifaceted approach, focusing on effective communication, proactive training, and robust project governance. The three case studies examined underscore the critical nature of these strategies.

Communication and Collaboration: Clear communication and collaboration among all project stakeholders are pivotal elements for preventing scope creep. Regular meetings and early identification of potential conflicts through ceremonies like Internal-scope-identification-meetings (ISIM's), and project-scope-path meetings (PSPM) ensure a shared understanding of goals, expectations, and changes throughout the project lifecycle.

Training and Skill Enhancement: Companies should invest in improving project management skills through targeted training programs. Enhanced awareness of scope management, coupled with a well-defined change management procedure, is crucial. The three case studies emphasize the significance of project managers being well-versed in these skills, as demonstrated by the consequences of improper project closure and inadequate control-scope processes.

Project Governance and Immunity: Establishing project governance rules and codes at the project's outset, communicated through face-to-face meetings, is a proactive measure. Granting contractual immunity to project managers empowers them to implement proposed methods effectively. These recommendations align with the case study, highlighting the importance of project governance in preventing scope creep due to unanticipated changes in stakeholders.

Gold-Plating and Clear Procedures: A focus on delivering only what is required by the client and adherence to proper change request procedures under the exclusive authority of the project manager guards against gold-plating. This recommendation correlates with the case study showcasing the consequences of gold-plating and the importance of meticulous change management.

Continuous Improvement: Continuous improvement through documented modifications during the execution phase and lessons learned from each project contribute to shared goals and expectations. This resonates with the case studies illustrating the impact of poor project closure and the need for ongoing collaboration and communication to prevent scope creep.

In summary, an integrated approach that incorporates effective communication, targeted training, robust project governance, adherence to procedures, and a commitment to continuous improvement is essential for preventing scope creep. The recommendations derived from the three case studies reinforce the importance of these strategies in diverse project scenarios, emphasizing their universal applicability in construction project management.

References

Ahadzie, D. K., Proverbs, D. G., Olomolaiye, P. O., & Ankrah, N. (2009). Towards developing competency-based measures for project managers in mass house building projects in developing countries. Construction Management and Economics, 27(1), 89-102.

Ajmal, M. M., Khan, M., Gunasekaran, A., & Helo, P. T. (2022). Managing project scope creep in construction industry. *Engineering, Construction and Architectural Management*, *29*(7), 2786-2809.

Amoatey, C. T., & Anson, B. A. (2017). Investigating the major causes of scope creep in real estate construction projects in Ghana. *Journal of Facilities Management*, *15*(4), 393-408.

Gamil, Y., & Abd Rahman, I. (2023). Studying the relationship between causes and effects of poor communication in construction projects using PLS-SEM approach. *Journal of Facilities Management*, *21*(1), 102-148.

Hao, Q., Shen, W., Neelamkavil, J., & Thomas, R. (2008, July). Change management in construction projects. In *the Proceedings of International Conference on Information Technology in Construction CIBW78* (pp. 15-17).

Hilali, A., Charoenngam, C., & Barman, A. (2019). Barriers in contractual scope management of international development projects in Afghanistan. *Engineering, Construction and Architectural Management*, *26*(8), 1574-1592.

Hussain, A. M. A., Othman, A. A., Gabr, H. S., & Aziz, T. A. (2018, December). Causes and impacts of poor communication in the construction industry. In *2nd International Conference on Sustainable Construction and Project Management–Sustainable Infrastructure and Transportation for future Cities* (pp. 16-18).

Kuritzkes, A., Schuermann, T., & Weiner, S. M. (2003). Risk measurement, risk management, and capital adequacy in financial conglomerates. *Brookings-Wharton Papers on Financial Services*, *2003*(1), 141-193.

Lee, S., Peña-Mora, F., & Park, M. (2006). Web-enabled system dynamics model for error and change management on concurrent design and construction projects. *Journal of Computing in Civil Engineering*, *20*(4), 290-300.

Malhotra, N., Bhardwaj, M., & Kaur, R. (2012). Estimating the effects of gold plating using fuzzy cognitive maps. *International Journal of Computer Science and Information Technologies*, *3*(4), 4806-4808.

Mok, K. Y., Shen, G. Q., & Yang, J. (2015). Stakeholder management studies in mega construction projects: A review and future directions. *International journal of project management*, *33*(2), 446-457.

Moneke, U. U. & Echeme, I. I. (2016). Causes and effects of scope creep on large-scale public sector construction projects. *Int. J. Envineering Tech. Res.*, *5*(2), 165-172.

Motawa, I. A., Anumba, C. J., Lee, S., & Peña-Mora, F. (2007). An integrated system for change management in construction. Automation in construction, 16(3), 368-377.

Nabet, A. A., El-Dash, K. M., ElMohr, M. K., & Mohamed, M. A. (2017). Managing scope creep in construction projects in Egypt. *Egypt: Benha University*.

.Najjar, N. M., & Jarbi, N. (2016). Gold Plating of the Project Scope Identification and Solution. Journal of Multidisciplinary Engineering Science and Technology, 3(9), 5028-5032

Olander, S. (2007). Stakeholder impact analysis in construction project management. *Construction management and economics*, *25*(3), 277-287.

Patel, A. (2017, March). Managing Project Scope and Scope Creep, Project Management Works. Accessed on November 10, 2023 < https://www.projectmanagementworks.co.uk/managing-project-scope-scope-creep/>

Project Management Institute. (2017). A Guide to the Project Management Body of Knowledge (PMBOK Guide). 6th ed. Newton Square, PA: Project Management Institute.

Sakikhales, M. (2021). Nonlinear Project Management: Agile, Scrum and Kanban for the Construction Industry. In *Industry 4.0 for the Built Environment: Methodologies, Technologies and Skills* (pp. 227-246). Cham: Springer International Publishing.

Streule, T., Miserini, N., Bartlomé, O., Klippel, M., & De Soto, B. G. (2016). Implementation of scrum in the construction industry. *Procedia engineering*, *164*, 269-276.

Sun, M., Fleming, A., Senaratne, S., Motawa, I., & Yeoh, M. L. (2006). A change management toolkit for construction projects. *Architectural Engineering and Design Management*, *2*(4), 261-271.

Sun, M., Vidalakis, C., & Oza, T. (2009, September). A change management maturity model for construction projects. In *Proceedings 25th Annual ARCOM Conference* (pp. 7-9).

Tett, G. (2015). *The silo effect: The peril of expertise and the promise of breaking down barriers*. Simon and Schuster.

Xie, W., Deng, B., Yin, Y., Lv, X., & Deng, Z. (2022). Critical factors influencing cost overrun in construction projects: A fuzzy synthetic evaluation. *Buildings*, *12*(11), 2028.