

A Framework for Effectively Managing Scope on Service Contracts in the Mining Industry

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Abstract

In the mining industry, service contracts are essential for ensuring that outsourced operations run smoothly and efficiently. However, managing the scope of such contracts can be a significant challenge. Without proper scope management, service contracts can quickly become a financial burden and a source of conflict between mining companies and service providers. To address these issues, a framework to effectively manage the scope of service contracts is necessary. This framework should provide guidance on how to define the scope of a service contract, navigate changes in the scope, and ensure that both parties are satisfied with the services provided. This study investigated existing frameworks in the project management field and their potential application in service contracts. This study was conducted through a survey using quantitative analysis to examine the relationship between poor scope management and the occurrence of scope creep in services. The study concluded that there are similarities between managing the scope of projects and services; however, nuisances between projects and services would require separate frameworks. This study's outcome is a framework that can be used to assist contract owners and supervisors in effectively managing their service contracts, thereby reducing the risk of scope creep and its associated negative impacts.

Keywords

Scope Management Framework, Service Contracts, Scope Creep and Scope Change

1. Introduction

Effective scope management is a critical aspect of service contract management that ensures the successful delivery of services that meet the expectations of both the service provider and the client (Mirza et al. 2013). In today's business environment, where organisations increasingly rely on outsourcing services, it is essential to have a clear understanding of the best practices for managing the scope to avoid project delays, cost overruns, and quality issues (Mirza et al. 2013). Without proactively managing service contracts to ensure that the scope of services is executed correctly, rendered services may not meet the requirements set out in the contract agreement, thus impacting the client financially (Forth and Lock 2020). To address this challenge, a framework to effectively manage the scope of service contracts is necessary. This framework should provide guidance on how to define the scope of a service contract, navigate changes in the scope, and ensure that both parties are satisfied with the services provided. This study explores such a framework and its potential benefits for the mining industry.

1.1 Objectives

Scope management is a critical aspect of project and contract management that ensures that projects and services are delivered within defined boundaries. While the significance of scope management in project management is well known, there is limited research that focuses specifically on the challenges associated with scope management in service contracts. This study addresses three pertinent themes related to the poor scope management of service

contracts in the mining industry: (a) the importance of scope management, (b) the financial and non-financial impacts of scope creep, and (c) effective scope management techniques and scope creep prevention. Collectively, these themes aim to address the main question: **What are the key components and best practices that should be incorporated into a comprehensive scope management framework for services, and how can such a framework be effectively implemented to mitigate scope creep?** The research objective was to develop a framework that addresses the specific challenges and requirements related to scope management in service contracts within the mining industry.

2. Literature Review

Academic literature on scope management has been widely studied, predominantly within the project context. However, limited research has been done on managing scope on outsourced services in the mining industry. Outsourcing has become a strategic tool that forward-thinking companies use to optimise and elasticize their organisations' value chains (Gottfredson et al. 2005). South African mining companies have significantly increased their use of independent contractors to carry out core and non-core activities across their mining operations (Rupprecht 2014). Mines are commissioned on either an owner-operated or contractor-operated basis, with the main difference being on who has the most control over the primary mining operation (Suglo 2009). Core activities involve mining and processing, whereas non-core or secondary mining activities include plant and equipment maintenance, mineral beneficiation, material transport, security, office cleaning, and consultants (Rupprecht 2014). Using contractors to perform services can provide financial benefits and minimise the risk to mine owners by offering economies of scale and technical expertise for highly specialised work and labour for short-term or ad-hoc projects (Rupprecht 2014). However, it has been found that failures in service contracts are common when contract management is not maintained (Forth and Lock 2020).

Contractors may enter into formal agreements with mine owners to provide goods or services. Zhu et al. (2001) indicated outsourcing to be contract intensive in nature and that a successful outsourcing process relies upon a good contract. According to the Project Management Body of Knowledge (PMBOK), contract administration could be in the form of a contract, an agreement, a subcontract, a purchase order, or a memorandum of understanding (Enslin 2019). These agreements should specify a well-defined scope of work, as poor scope definition is a frequent cause of scope creep (Nabet et al. 2017). According to the Guide to the PMBOK (Project Management Institute 2017), project scope is defined as “the work that needs to be accomplished to deliver a product, service, or result with the specified features and functions”. The project scope includes project, business, and delivery requirements (Nabet et al. 2017), which should be well defined to manage the project. Some researchers have noted that a project's scope tends to expand as the project progresses through its lifecycle (Sharma 2016), emphasising the importance of proper scope management. Derenskaya (2018) describes scope management as a process that aims to identify, plan, and control the execution of the defined scope of work (Derenskaya 2018), and is considered to be one of the main reasons for project failure when managed poorly (Project Management Institute 2017). The project scope management process developed by the Project Management Institute (PMI), shown in Figure 1, is intended to ensure that all work involved in the project or service offered is captured during the scoping phases.

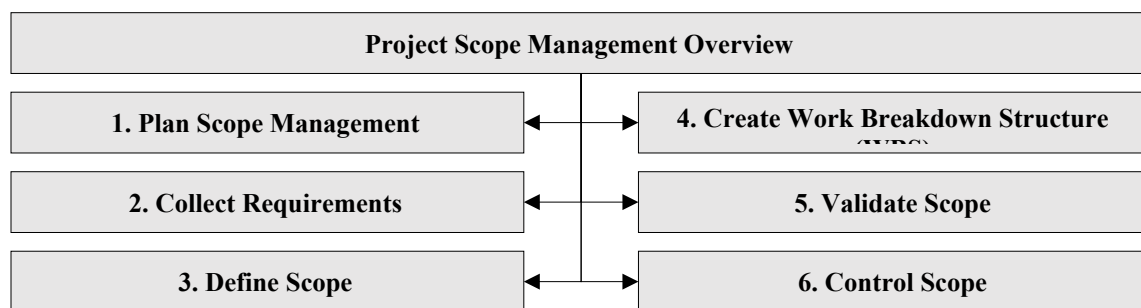


Figure 1. Scope management overview (Project Management Institute 2017)

The systematic approach developed by PMI consists of six steps (Project Management Institute 2017).

1. **Plan Scope Management** creates a plan that documents the definition, validation, and control of the project's scope. The plan outlines the processes, tools, and techniques to be used for scope management, and defines the roles and responsibilities of the project team and stakeholders.

2. **Collect Requirements** begins by identifying project stakeholders and eliciting their needs, expectations, and requirements for project deliverables. Requirement gathering techniques, such as interviews, workshops, surveys, and document analysis, are employed to ensure a comprehensive understanding of stakeholders' needs.
3. **Define Scope** refines information based on the collected requirements to create a Project Scope Statement. The Scope Statement includes a detailed description of the project's deliverables, boundaries, and objectives, providing a clear and unambiguous definition of what is or is not included in the project.
4. **Create Work Breakdown Structure** decomposes the project's scope into smaller manageable work packages, enabling better planning, execution, and control of the project.
5. **Validate Scope** involves formal acceptance of completed project deliverables by the client or relevant stakeholders. The completed work is reviewed against the acceptance criteria specified in the Scope Statement to ensure that it meets the required quality and aligns with the defined scope.
6. **Control Scope** is the ongoing process of monitoring a project's scope and managing changes, as necessary. Scope control ensures that the project remains within its defined boundaries, and that any scope changes are managed effectively

A comprehensive scope of work should define the task, budget, and completion dates without ambiguity (Sharma 2016). Project scope management provides the necessary tools to effectively control scope creep and scope change. This process is critical once a project has entered its operational phase, and should be managed effectively to prevent scope creep. Scope creep has been extensively studied and defined in many ways by researchers. Nabet et al. (2017) defined scope creep as “the gradual expansion of project work without formal acceptance or acknowledgement of their associated costs, schedule impacts or other effects” (Nabet et al. 2017). Scope creep is considered a major challenge in projects, and can lead to financial losses, reduced project quality, and disputes (Umuhoza et al. 2021). Scope creep has been noted as the leading cause of project failure globally, according to the 2010 Global Survey (Farok and Garcia 2016). Mirza et al. (2013) concluded that a major contributor to unsuccessful projects is poor scope definition and scope control. It was found that proper scope definition and effective scope management result in the successful delivery of projects that meet the agreed upon quality, cost, specified timelines, and stakeholders' needs (Mirza et al. 2013). While scope creep is commonly associated with projects, it should be noted that projects are temporary in nature with a defined beginning and end, typically resulting in the modification or creation of something new (Dinsmore and Cabanis-Brewin 2010). This study focuses primarily on services that differ from those of the projects. The Information Technology Infrastructure Library (ITIL) defines a service as an operational requirement that meets a client's needs without incurring specific ownership costs and risks (Cannon et al. 2013). Although projects and services differ, both have a scope of work which should be adhered to. It is evident from research that poor scope management, which typically results in scope creep, has undesirable effects on projects. Through inference, it can be deduced that scope creep in service contracts would have a similar effect, and therefore, the scope should be managed well.

Although it is not always feasible to prevent changes in a project, it is essential to exercise control over them. Scope control involves closely monitoring the project and product scope, identifying scope changes, and managing their integration into other project aspects such as schedule, cost, quality, and risk. This process ensures that changes are agreed upon, and efforts are made to influence factors that may lead to scope changes (Shirazi et al. 2017). Although scope creep and scope change have similar impacts on projects, they are completely different. Sharma (2016) highlights the main difference between scope change and scope creep as controls for the change in scope. While minor changes in scope could prove to be beneficial to a project or service and provide a competitive advantage to the organisation, it should be done in a controlled manner (Sindi 2018). The costs should be well understood and managed with a trade-off between the cost and scope before accepting any changes to the scope.

Several studies have investigated the causes of scope creep and its impact on various projects. Table 1 lists the causes of scope creep in construction projects studied by various authors. It is evident from research on scope creep that common causes are prevalent across organisations. Poor scope definition, poor change control, and lack of stakeholder involvement have been highlighted as some of the main causes of scope creep. This further accentuates the need for proper scope management and organisational capabilities to define the scope of work for projects and service-related work.

It has been noted that the value of a project can be realised by managing its scope, quality, cost, and schedule (Rojas Albán 2021). Studies on scope creep in construction projects have found that this can be prevented. Sharma (2016) proposed that a scope creep management model and scope creep checklists should be used to reduce the risk of scope creep. Farok and Garcia (2016) posited that scope creep should be negligible or non-existent and is within a project managers control. Although scope creep mitigation is not always possible, it can be managed (Farok and Garcia 2016). The researchers recommend that support from project management professionals should be considered as they can reduce the impact of scope creep. Furthermore, project managers should plan for scope changes, and budgets should make provisions for minor changes, however, scope creep should be limited as much as possible, as the cost implications are far reaching (Farok and Garcia 2016).

Table 1 Summary of scope creep causes on projects (author)

Study Paper & Authors	Common Causes of Scope Creep
Managing Scope Creep in Construction Projects in Egypt (Nabet et al. 2017)	<ul style="list-style-type: none"> • Inexperienced contractors and clients. • Poor scope definition. • Change in client requirements. • Poor cost estimation prior to project commencement.
Scope Definition and Management of Scope Changes & Scope Creep in Large Infrastructure Projects in Construction Industry for Lump Sum Contracts (Sharma 2016)	<ul style="list-style-type: none"> • Poor change control. • Change in client requirements. • Insufficient data during scoping. • Stakeholder ignorance. • Misinterpretation of the original scope of work.
Scope Creep Monitors Level of Satisfaction, Cost of Business and Slippery Slope Relationships Among Stakeholders, Project Manager, Sponsor and PMO to Execute Project Completion Report (Farok and Garcia 2016)	<ul style="list-style-type: none"> • Stakeholder ignorance. • Poor communication between management and leadership. • Insufficient data and technology. • Poor internal decision-making. • Lack of involvement from stakeholders.
Investigating the Major Causes of Scope Creep in Real Estate Construction Projects in Ghana (Teye Amoatey and Anson 2017)	<ul style="list-style-type: none"> • Poorly defined scope which resulted in a misunderstanding of the project requirements. • Project managers seeking to improve the outcome of the project. • Acquiring new knowledge throughout the project requiring minor changes without a formal change in scope. • Inability or unwillingness to say no to the client.

3. Methods

The following research methodology was used to analyse the consequences of poor scope management, particularly scope creep, on services in the mining industry.

3.1 Research Design

A quantitative research methodology was selected for this study. Quantitative research is driven by the need to quantify data and therefore requires a numeric or statistical approach to the design (Williams 2007). To gain a sufficient understanding of the consequences of inadequate scope management of contracted services in the mining industry, a study was conducted using a survey approach on a single mining organisation. The study was limited to a single organisation due to time constraints and limited access to other mining organisations. The author intended to compare the data from the study with the theoretical understanding of scope management and scope creep through a literature review.

3.2 Sampling Technique and Sample Size

A total of 267 questionnaires were administered to personnel from a mining company in the Northern Cape. The personnel group comprised contract owners and supervisors across departments on the mine. The selected participants formed part of the organisation's supervisory and management structure and were responsible for managing or supporting the management of at least one service contract. The survey yielded a total of 21 responses (8% of the targeted participants) within a one-week timeframe for the data collection phase.

3.3 Questionnaire Structure

The survey questions were derived from a literature survey and designed to address the challenges faced due to scope creep resulting from poor scope management. The survey results were analysed, and a framework was developed through research from the literature review. The survey questionnaire was grouped into three categories: (1) Career and work information, (2) Concept of scope creep and, (3) Causes and mitigation of scope creep.

1. The first category focused on the respondent's professional profile and job-specific information without requiring any identifiable information about the respondent or their contractor.
2. The second category tested the respondent's understanding of scope creep
3. The third category identified the causes of scope creep from the respondents' perspectives and their views on how scope creep could be mitigated.

The survey was deliberately designed to elicit respondents' understanding and perceptions of the causes and impact of scope creep to compare with case studies on project scope management. The purpose was to test for similarities between scope management of services and projects, while gaining insight into the causes of scope creep in service contracts. The response format was a combination of multiple-choice questions and a Likert perception scale (i.e. never, rarely, sometimes, usually, and always). Open-ended questions were limited to effectively analyse the data quantitatively.

4. Data Collection

4.1 Survey Data Collection

The survey questionnaire was created using Google Forms. A link to the survey was shared with 267 respondents via emails. Owing to time constraints, only an online questionnaire was made available to the participants. To increase coverage and potentially increase the response rate, a hard copy could be made available to participants with limited or no access to an electronic device. Responses to the survey were received in real time. The survey was open for one week, and the results were analysed once the survey was closed. The data was available from Google Forms in Excel format.

4.2 Data Analysis Method

The data extracted from the online survey was structured, analysed, and presented based on the outcomes of this research. The questions were grouped by category and the data was analysed per category. Data collected through the survey was analysed in Excel and the information was presented graphically, using a combination of graphs and tables to best represent the findings.

4.3 Ethical Considerations

The selection of respondents was limited to contract owners and supervisors at a bulk commodity mine in the Northern Cape. The mining company and respondents could not be disclosed because of the sensitive nature of this study and its potential impact on their contractor's reputation. The respondents and company in this study remained anonymous. The survey responses did not include or request any personal information about the participants, which would have allowed them to be identified. This ensured that the participants were not prejudiced and that their responses reflected the truth. The author of this study issued an anonymous online survey to the company, and participants could not be identified by the researcher or the public. The organisation that agreed to participate in the anonymous survey was known to the author of this research.

4.4 Strengths and Limitations

This study required gathering feedback from individuals in the form of questionnaires. Gnambs and Kaspar (2014) posited that the quality of data generated by conducting research using surveys is dependent on the respondents' willingness to disclose information that contrasts with prevalent social norms or sensitive information which could impact them. Given that this study required respondents to disclose information pertaining to the management of service contracts, it is plausible that they misreported protecting their reputation in the company. Gnambs and Kaspar (2014) suggested that this problem could be counteracted using computerised surveys to elicit more truthful responses. The survey conducted in this study was computerised and anonymous to improve the chances of receiving truthful answers. While online surveys can be an effective and efficient method of collecting data, Wu et al. (2022) found that online surveys produce an 11-12% lower response rate than other types of surveys, such as mail, telephone and in-person. The factors which contributed to the low response rate in this study include the survey duration, access to

internet and willingness to participate in the study. Wu et al. (2022) concluded that sending an online survey to a larger population does not result in a high response rate. This is a limitation of the study which could be overcome by clearly defining the target population, extending the time period and providing alternative survey types. A targeted approach with fewer participants may result in a higher response rate, reducing the margin of error.

5. Results and Discussion

The results from the survey were analysed, and the findings were compared to existing research on scope management and scope creep challenges faced in projects. The frameworks covered in the case studies focus on the construction industry and apply to projects, whereas the survey intended to determine whether there are commonalities with outsourced services in the mining sector.

5.1 Numerical Results

Respondents were asked four questions pertaining to their qualifications, work experience, and area of responsibility on the mine. Table 2 summarises the respondents' educational background and project management qualifications.

Table 2. Summary of respondent's educational background and project management qualifications

Highest Qualification		Project management qualification
	Number	Yes=1/ No=0
High school	2	0
Bachelor's degree	7	0
Master's degree	2	1
Other	10	1
Grand Total	21	2

The data shows that over 40% of the respondents held a bachelor's degree or higher. Only 2 of the 21 respondents held project management qualifications. While 47% of the respondents fell into the "other" category, it can be inferred that they hold trade qualifications or an equivalent qualification, given the nature of the work and responsibilities of a contract owner or supervisor in the mining industry. To ascertain whether there was a link between the respondents' work experience and scope creep, the respondents' work experience was grouped into three categories based on their years of experience: junior-to-mid (1-5 years), mid (6-10 years), and senior (11+ years). The majority (81%) of respondents had more than 11 years of postgraduate work experience, and 14% had between 6 and 10 years of work experience, which suggests that the group of contract owners and supervisors comprised experienced individuals.

5.2 Graphical Results

Using the Likert scale to test the respondents' understanding of scope creep, a fair understanding would be the median which is three out of five. Figure 2 shows that 47% of the respondents believed that they had a better-than-average understanding of scope creep, while 29% had a below-average understanding. The remaining 24% rated their understanding of scope creep as average. To test their understanding, the question "How would you differentiate between scope creep and scope change" was posed with three possible answers. While the majority of respondents rated their understanding of scope creep as average or above average, the responses to the question, "How would you differentiate between scope creep and scope change", suggest that their perception and understanding of scope creep and scope change is different. Of the 21 responses to the above question, 12 (57%) selected the correct answer, while 9 (43%) selected one of the two incorrect answers. As suggested by Sharma (2016), scope creep is uncontrolled, whereas scope change is within the owner's control. This may be one of the causes of scope creep, as a significant number of respondents believed that scope creep leads to a scope change.

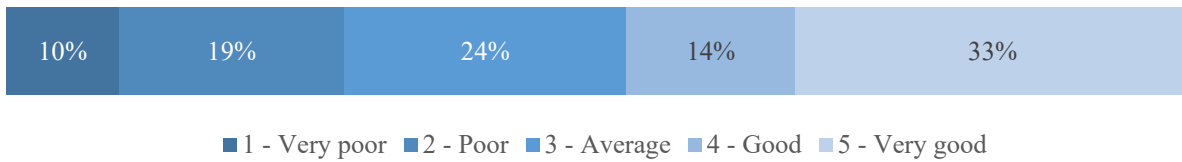


Figure 2. The respondents rating of their understanding of scope creep

Of the respondents, 62% experienced scope creep in their contract. Further, 29% of the respondents suspected that they had scope creep in their contracts. Such scope creep predominantly impacted contract performance negatively in terms of cost and time overruns, as well as safety (see Figure 3 and Figure 4). The results indicate that the respondents experienced more than one factor, which further indicates the need to better manage contract scope with the aim of preventing or minimising scope creep. This clearly indicates that contract scope management must be improved. The reasons for the scope creep recorded by the respondents (refer to Figure 5) are fully aligned with the outcomes reported by Nabet et al. (2017).

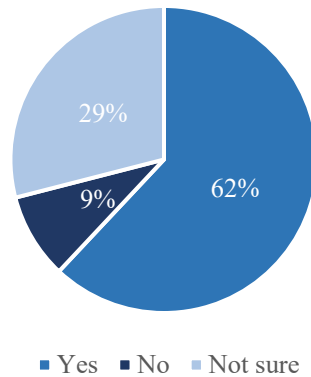


Figure 3. Respondents which have experienced scope creep on their service contract

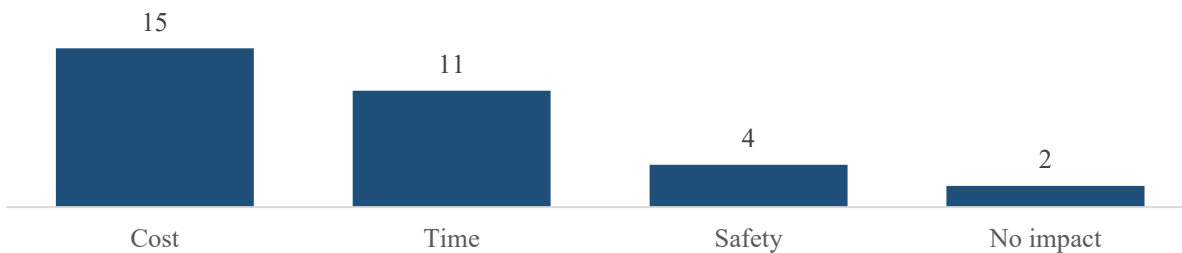


Figure 4. Respondents view on how scope creep has affected their contract

Category three focused on the causes of scope creep from the respondent’s perspective and experience in managing service contracts. Most of the respondents identified more than one cause of scope creep in their contracts. The most frequent cause reported by the respondents was “inexperienced contractors and clients” followed by “poor scope definition”. The remaining three causes received an equal number of responses and were relatively close to the most frequent cause, “inexperienced contractors and clients”.

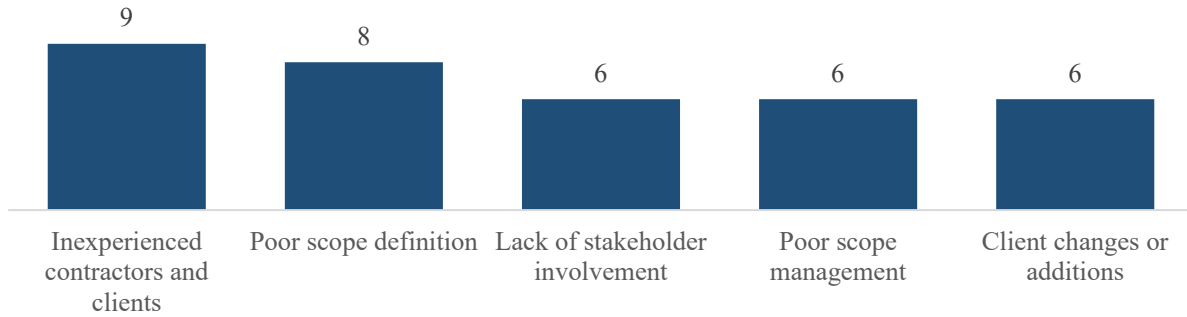


Figure 5. Respondents reasons for scope creep on their contracts

The primary reason for scope creep recorded was, “Inexperienced contractors and clients” (refer to Figure 5). This finding confirms the need to address contractor selection prior to contracting. The contractor selection model by Lutchman and Akula (2020), can be introduced in the mine’s contract lifecycle management processes to ensure that contractors with the required skills and management systems are selected for mine projects and service contracts. “Inexperienced clients”, in managing contracts, may be attributed to the recorded data that only 2 out of 21 respondents had project management qualifications. Although 47% of respondents indicated that they had an ‘above average’ understanding of what contract scope creep is (refer to Figure 2), it became clear from further responses that they accepted that uncontrolled scope creep automatically leads to scope change. This finding indicates that formal training in contract/project management is essential for officials tasked with contractor-contract management.

Mine management elucidated the importance of ensuring that all contractors have a formal contractual agreement in place. Based on the results, 90% of the respondents had contracts with their contractors. This is crucial because it allows the contract owner and supervisors to manage their contractors and assess their performance against the agreed performance indicators. The survey findings showed that 67% of the respondents provided inputs into the scope definition phase. Literature on the contracting process suggests that subject matter experts, such as contract owners, should be involved in the scope definition process to ensure that the scope is well-defined (Lutchman and Akula 2020). In instances where there are changes in scope, a change-request process should be followed. The survey found that the majority of respondents followed a change request process, whereas 14% did not.

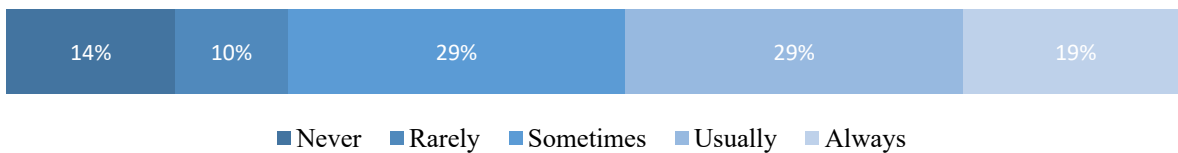


Figure 6. Frequency of how often the respondents follow a change request process

While 62% of the respondents had experienced scope creep (refer to Figure 3) and 81% did not always follow a change request process for changes to scope (see Figure 6), 62% believed that scope creep could have been prevented, while 29% believed that there may be a possibility; however, they were unsure. Only 9% of participants believed that scope creep could not be prevented. Among the respondents who believed that there was a possibility or it could have been prevented, most reported that monitoring the contract was the best way to prevent scope creep, followed by a clear understanding of the scope of work and alignment between the contractor and client. While the respondents’ responses to this question were subjective, the insights generated were based on their personal experiences of working with their respective contractors.

Furthermore, the analysis did not reveal any correlation between the respondents' qualifications and experience levels with their perceptions and experiences of scope creep. This outcome may be attributed to the demographic composition of the survey sample, where a significant majority of the respondents were senior professionals (11+ years of experience). These findings contribute to defining the most effective framework to manage the scope of service contractors.

5.3 Proposed Improvements

As this study aims to mitigate or limit scope creep using a scope management framework, mechanisms should be introduced to ensure compliance with the mine's contract change request process. The scope management framework must also address the factors identified to prevent scope creep in contracts, monitor contract performance, enhance a clear understanding of the scope of work, and promote alignment between the contractor and the client, as presented in Figure 7.

While this framework does not cover the contracting phase of the contract lifecycle, careful consideration should be given to contracting models, as it directly impacts the scope management process. Alternative contracting models during the contract negotiation phase ensure the best outcomes for both the contractor and client.

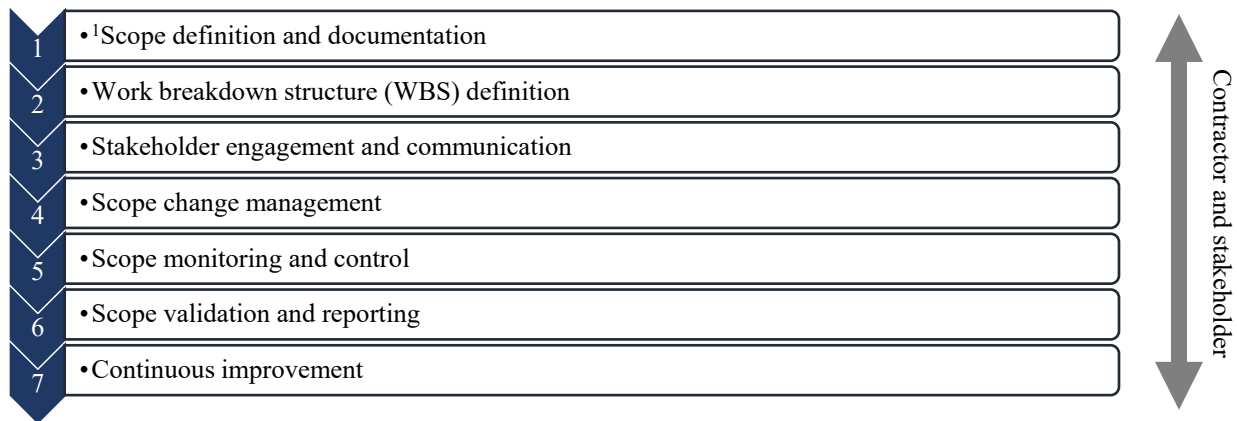


Figure 7. Overview of Scope Management Framework on Service Contracts in the Mining sector (author)

Note: ¹Scope definition and documentation are applicable only to new service contracts and renewals. For existing service contracts, steps two to six are applicable.

1. Scope definition and documentation

The scope management framework employs the contract life cycle approach for the scope definition and documentation phase which emphasises the importance of creating a well-defined and documented scope of services. Furthermore, the scope management process outlines activities that should be performed during the scope definition phase.

Some of the key activities typically performed during the scope definition and documentation phase include the following:

- Clearly define the scope of services to be provided under the contract with inputs from relevant stakeholders and subject matter experts. This includes outlining the specific deliverables, tasks, and objectives that the service provider is responsible for.
- Establish boundaries and limitations of the scope and identify any exclusions or items not explicitly included in the contract.
- Prepare the scope statement and document the process in the scope management plan

The scope of services can change over time depending on the service requirements; therefore, it is important to have a process in place to manage scope changes.

2. Work Breakdown Structure (WBS) definition

Although the traditional concept of a WBS is often associated with project management, it can also be adapted and applied to managing ongoing services, especially when those services involve multiple components, tasks, and deliverables. A WBS should be created with the contractor and structured to allow for effective management and control of the scope of work by managing the components of the services provided.

3. Stakeholder engagement and communication

This framework uses the stakeholder engagement framework developed by Freeman and Sybilleesachs (2017) to maximise value for both stakeholders and the mining company based on stakeholder theory. The four steps in the framework are as follows.

- I. Understand the state of the organisations relationship with stakeholders to ascertain where and how value can be created for both.
- II. Ensure clear, transparent, and continuous communication between the organisation and stakeholders to avoid ambiguity and strengthen alignment.
- III. Be open to learning from stakeholders and incorporating feedback into decision making to enhance value creation
- IV. Integrate the stakeholders and organisation by bringing together the above three steps.

The main purpose of this step is to improve shareholder and business values while creating a collaborative, consultative, and innovative environment.

4. Scope change management

In this framework, it is recommended that the scope change control process defined by the Association for Project Management Body of Knowledge (AMPBOK) be followed once the change has been identified (Haward and Kidston 2015). The key steps of the process are as follows:

- Conduct a comprehensive impact assessment for each proposed scope change, considering factors such as feasibility, resource requirements, cost implications, and potential risks.
- Define the key stakeholders in the scope change control plan using the responsibility assignment matrix (RACI – Responsible, Accountable, Consulted and Informed), to evaluate and approve scope changes based on predefined criteria and guidelines.
- Document and communicate approved scope changes to the relevant stakeholders, ensuring that they are integrated into the contract documentation and the revised scope of work.

It should be noted that the implications of such a change should be well understood before accepting any changes in its scope.

5. Scope monitoring and control

This step leverages Sharma's (2016) scope creep-management framework, developed to track uncontrolled changes before they occur. The model, designed specifically for construction projects, has been adapted for the service contracts discussed in the context of the scope management framework.

- Using the responsibility assignment matrix defined in the scope change control plan ensures that scope change protocols are followed.
- Ensure effective communication and alignment between client supervision and contractor teams on a regular basis.
- Monitor and evaluate services rendered against the scope of work defined in the contract on a monthly or quarterly basis depending on the type of service.
- Record mistakes made during execution which may have led to scope creep to improve future performance on new or existing contracts.

6. Scope validation and reporting

Scope validation involves formal acceptance of the work completed as per the service-level agreement in the service contract. During the scope validation step, the contract owner must review the work performed against the criteria specified in the scope of the work to ensure that it meets the required quality. This process should be formalised by documenting the findings and reporting to the relevant stakeholders. Should there be any deviation from the original scope, follow the procedure outlined in the contract to ensure that the service meets the criteria and that the impact of scope creep is mitigated.

7. Continuous improvement

Once a contract has expired, the contract lifecycle process repeats, and the contract is either renewed or the client enters into a contract with a new contractor. Prior to entering into a new or renewed contract, the following steps should be followed (adapted from Sharma's (2016) scope creep management model):

- I. A post-service contract evaluation should be conducted to identify the lessons learned, best practices, and areas of improvement in scope management.

- II. Share the lessons learned and best practices with relevant stakeholders to enhance their understanding and effectiveness in managing the scope of mining service contracts.
 - III. Continuously review and enhance scope management processes based on feedback, performance metrics, and industry developments.
8. Contractor and stakeholder management

Throughout the process, contractor and stakeholder management is crucial to developing and maintaining the relationship between the contractor and mining company to ensure successful delivery of the service. Governance mechanisms should be defined during the contracting phase to ensure that the risk of misunderstandings or disputes between mining companies and contractors is limited. The most effective governance mechanism for improving performance is contractual governance, in which a contractor's working relationship is primarily managed through formal contracts. Given that service contracts may continue for extended periods of time, relational governance should be adopted, where less emphasis is placed on legal mechanisms and there is a degree of trust between the contractor and the mining company. Both mechanisms are crucial for managing relationships with contractors and hybrid mechanisms can be considered for service contracts.

5.4 Validation

Scope creep is considered a major challenge in projects, and can lead to financial losses, reduced project quality, and disputes (Umuhoza et al.2021). Mirza et al. (2013) concluded that a major contributor to unsuccessful projects is poor scope definition and scope control. It was found that proper scope definition and effective scope management result in the successful delivery of projects that meet the agreed upon quality, cost, specified timelines, and stakeholders' needs (Mirza et al. 2013).

While many studies have investigated the occurrence and negative impacts of scope creep on projects, these impacts may be prevalent in service contracts. Forth and Lock (2020) found that failures in service contracts are common when contract management is not maintained. Without proactively managing service contracts to ensure that the scope of services is executed correctly, rendered services may not meet the requirements set out in the contract agreement, thus impacting the client financially (Forth and Lock 2020). To address this challenge, a framework to effectively manage the scope of service contracts is necessary. Frameworks provide a structured approach to managing project scope, which is essential for delivering projects on time, within budget, and meeting stakeholders' expectations.

6. Conclusion

A scope management framework is an invaluable tool for effectively managing the scope of service contracts and preventing or limiting scope creep. The nuances between project and service contracts emphasise the need for a dedicated framework for managing the scope of service contracts. Services are continuous, repetitive activities that meet operational needs, whereas projects are temporary endeavours with specific goals and deliverables. Both have a scope of work which defines the activities that should be executed during the contractual period. Similarities between services and projects allow existing scope management frameworks to be leveraged, whereas key differences require the frameworks to be adapted for their intended application. The main causes of scope creep and its impacts on service contracts were identified, and a framework was developed to manage the scope and prevent the identified scope creep causes.

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