

Project Scope Management

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Abstract- Project scope management is a main function in project management process. Moreover, it is a critical function because any changes or modifications in scope will cause extra cost on the total project development expenses. In addition, scope management function ensures the successful management of other key project management areas, including time, cost, and quality. There are six main steps in scope management process namely; plan the scope, collect the requirements, define the scope, create work breakdown structure, validate scope and control the scope. These processes have been highlighted in different scale in project methods and standards. This paper highlighted the importance of the scope management, how it is viewed by project management different methods and what it is impact on the project outcomes. Moreover, it highlighted the issue of the variation orders in the Sultanate of Oman and suggested the concept study to examine this issue.

Keywords- Project management; Scope management; Variation orders

I. INTRODUCTION

1.1 What is scope?

The scope of a project can be defined in terms of the functionality which the project is intended to provide, attain, or span. A project scope statement defines, in writing, drawings and price figures, the intended span of work expected and to be provided for in plans for a new facility. The scope statement should also spell out expectations about any eventual extensions, and should include a contingency policy as well. The scope statement should be a clear communication of the extent and functionality of the facility, between the proposers, sponsors, designers, constructors and the users or purchasers.

In order to be explicit as to the meaning or extent of various systems, scope may be further described in terms of cost budget figures. Such budget figures need to be expressed in enough detail to provide the basis for a cost control system and for evaluating any subsequent changes to that scope.

1.2 The PMBOK® Project Scope Management Processes

As previously stated, the scope of the project is concerned with what exactly the project will deliver and the function of Project Scope Management is to define and control the work required producing these deliverables.

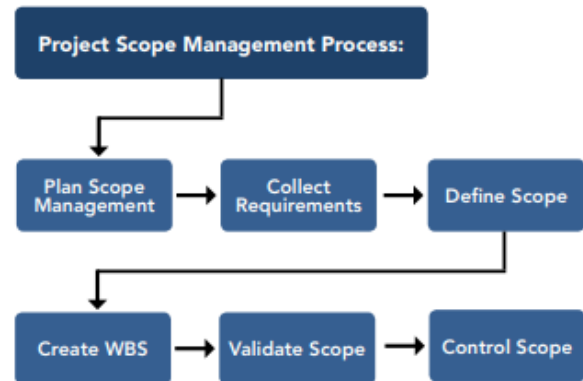


Fig 1. Project Management processes

There are six Project Scope Management processes:

- ✓ Plan Scope Management
- ✓ Collect Requirements
- ✓ Define Scope
- ✓ Create Work Breakdown Structure
- ✓ Validate Scope
- ✓ Control Scope

These are dealt with in detail in the following chapters of this eBook.

1.2.1 Plan Scope Management

This process involves creating a Scope Management Plan that describes how the scope of the project will be defined, validated and controlled so that it can be managed through out the life of the project.

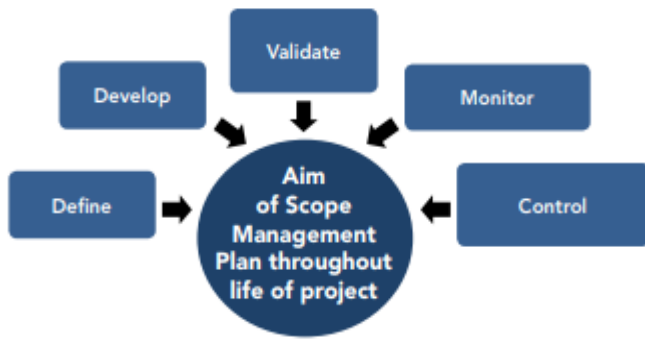


Fig 2. Plan scope management

The main input to this process is the project charter, and by using expert judgment in conjunction with project team meetings, the two main outputs are the Scope Management Plan itself and the Requirements Management Plan. The inputs, tools and techniques, and outputs of this process are summarized in the table below.

Inputs	Tools & Techniques	Outputs
Project Management Plan	Expert Judgment	Scope Management Plan
Project Charter	Meetings	Requirements Management Plan
Enterprise Environmental Factors		
Organizational Process Assets		

Table 1. Plan Scope Management: Inputs

1.2.1.1 Plan Scope Management: Inputs

This process requires the following inputs:

Project Management Plan

1. The project management plan is the document that describes how the project will be executed, monitored, and controlled. It integrates and consolidates all of the subsidiary plans and baselines from the planning processes.
2. Approved subsidiary plans of the project management plan are used to create the scope management plan and influence the approach taken for planning scope and managing project scope.

1.2.1.2 Project Charter

The project charter provides a preliminary definition of roles and responsibilities and the project objectives. It is usually a fairly short document that refers to more detailed documents.



Fig 3. Project charter

The purpose of the project charter is to document the reasons for undertaking the project:

- Objectives
- Constraints
- Main stakeholders
- In-scope items
- Out-of-scope items
- High-level Risk Management Plan
- Communication Plan
- Target Project Benefits
- High-level Budget
- Spending Authority

1.2.1.3 Enterprise Environmental Factors

These include the organization's culture, infrastructure, personnel administration, and marketplace conditions.

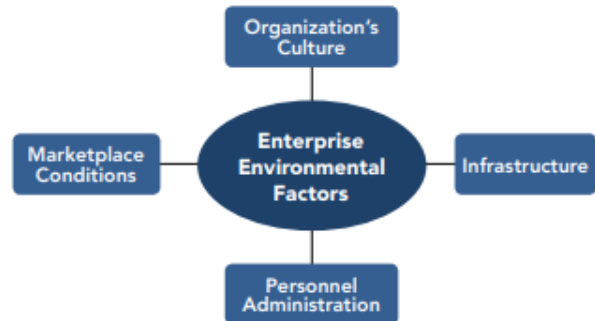


Fig 4. Enterprise Environmental Factors



Fig 5. Organizational Process Assets

There are two categories of these, the first being policies and procedures, and the second being historical information and the lessons learned database.

1.2.1.4 Plan Scope Management: Tools and Techniques

There are two interrelated techniques that can be used.

1.2.1.5 Expert Judgment

This can involve any member of the project management team with expertise in creating a Scope Management Plan.

1.2.1.6 Meetings

These involve people who are responsible for scope management including the project manager, the project sponsor, selected project team members, selected stakeholders, anyone with responsibility for any of the scope management processes, and others as needed.

1.2.1.7 Plan Scope Management: Outputs

This process will create the following outputs:

1.2.1.8 Scope Management Plan

This describes the contents of the other five scope management processes. That is, how the scope will be defined, developed, monitored, controlled, and verified.

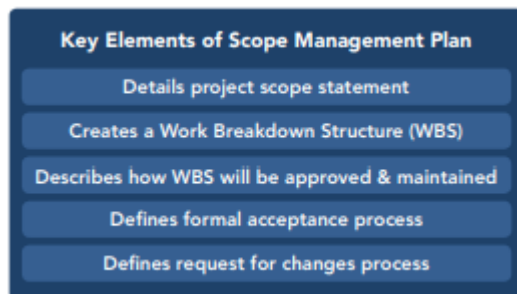


Fig 6. Key elements of Scope Management Plan

Key elements include processes that detail how

1. A detailed Project Scope Statement will be prepared
2. The WBS will be created from the detailed Project Scope Statement
3. How the WBS will be approved and then maintained
4. How formal acceptance will be obtained
5. How requests for changes to the Project Scope Statement will be accepted and handled

1.2.1.9 Requirements Management Plan

Requirements include quantified and documented needs and expectations of the sponsor, customer and other

stakeholders. This plan describes how requirement activities will be planned and tracked. Key elements include:

1. Methods to identify requirements
2. How to analyze, prioritize, manage, track changes to them
3. Configuration management activities
 - How changes will be initiated
 - How impacts are analyzed
 - Authority levels required to approve changes
4. Product metrics that will be used and the rationale for using them
5. Traceability structure to reflect which requirement attribute will be captured on the traceability matrix

1.3 Why project managers need scope management

- ✓ Effective scope management requires clear communication, to ensure that stakeholders and team members alike understand the scope of the project while agreeing on how the project goals will be met. Scope management helps avoid the challenges that a project might face with bloating scope and an unruly requirements list.
- ✓ Project scope clearly sets out what is or is not included in the project, and controls what gets added or removed as the project is executed. Scope management establishes control mechanisms to address factors that may result in changes during the project lifecycle.
- ✓ Without defining project scope, the cost or time that the project will take cannot be estimated. At times, due to a lack of communication, scope may need to change.
- ✓ This directly affects the cost and disturbs the schedule of the project, causing losses.
- ✓ Scope management is not difficult to implement; however, it does require effort, time, and patience. It's well worth the investment with proper scope management, you can specify a clear scope and deliver the project with minimal overruns.

1.4 Steps involved in project scope management

1.4.1 Define project needs

- ✓ Defining the needs of the project is the first step toward the establishment of a project timeline, allocation of project resources and setting project goals.

1.4.1.1 Understand the project objectives

- ✓ To define the project scope, it is important to first establish the objectives of the project, which may include a new product, creating a new service within the organization, or developing a new piece of software.

1.4.1.2 Steps for defining the scope of a project

1. Project objectives
2. Goals
3. Sub-phases
4. Tasks
5. Resources
6. Budget
7. Schedule

1.5 Objective

- ✓ To identify the scope of residential and commercial building by referring PMBOK
- ✓ To study factors affecting the project scope management.
- ✓ To implement WBS for satisfying the project scope.
- ✓ To develop WBS programme using tool MSP
- ✓ To check effectiveness of MSP programme for satisfying the project scope using questionnaires survey

1.6 Advantages of project scope management

- ✓ Help to understand what is in-scope of the project.
- ✓ Help to understand the deliverables of the project.
- ✓ help to make informed decision making during the project.
- ✓ helps to identify risks and plans steps to mitigate.
- ✓ helps in setting the right expectations to the stakeholders.

II. LITERATURE REVIEW

2.1 Qais Hashil Salim Al-Rubaieia (2016)

In this paper the Project scope management is a main function in project management process. Moreover, it is a critical function because any changes or modifications in scope will cause extra cost on the total project development expenses. In addition, scope management ensures the successful management of other key project management areas, including time, cost, and quality. There are six main steps in scope management process namely; plan the scope, collect the requirements, define the scope, create work breakdown structure (WBS), validate scope and control the scope. These

processes been highlighted in different scale in project methods and standards.

2.2 Maha Alkhaffaf (2020)

This work provides a valuable contribution for professionals in the field, both in terms of researchers and practitioners, and further highlights the different ways in which project managers can arrange and modify Project Scope Management Processes in pursuit of their efforts to enhance the mediation of Successful Project Scope Management through User Involvement. Although Project Scope Management Processes have a tendency to centre on various factors pertaining to the collecting criteria, defining scope and verifying scope, controlling scope is viewed as being fundamental to the management process as a whole. Furthermore, Success in Project Scope Management in the modern-day competitive business setting is recognised as resting on efficient and effective processes applied across Project Scope Management.

2.3 Faizatul Akmar Abdul Nifa(2020)

The study aims to examine the relationship between the stakeholder's involvement, project manager skills, top management strategy and project scope management in the funded government project in the Sultanate of Oman. A mapping of this relationship has been issued in previous paper to highlight the importance of these variables and effect on the scope management. A statistical tool which is SPSS was used to analyze the data collected. The findings indicated that there are positive and significant relationship between the stakeholder's involvement, project manager skills, top management strategy and project scope management. Moreover, these variables can be further tested to evaluate their effect on government projects. The findings also confirmed that stakeholder's involvement, project manager skills, top management strategy has positive effect on the project scope management. Finally, the study suggested numbers of others influencing factors for future study on the project management practices of government projects.

2.4 Igor Luiz Lampa (2017)

In this sense, the objective of this work is to propose the integration of the scope management with the requirements engineering, in order to better identify the requirements of a project and to understand what needs to be done, contributing to the success of projects. For the evaluation of the results obtained, a requirements engineering module was developed and integrated with a previously developed computational tool for project management and

it aims to assist the application of the project management following the guidelines and good practices proposed on PMBoK. Scope management is an area of project management defined by PMBoK, which has processes to register and control everything that belongs to the project boundaries. Although the relevance of this area to the success of projects, its application is still a challenge, which is potentialized by the lack of computational tools to support project management that integrate the scope management totality. In addition, the lack of understanding of project requirements is another factor that hinders the execution of this area, because often the stakeholders do not have full knowledge of their needs at the beginning of the project, resulting in changes throughout the project lifecycle, which increases the costs and deadlines.

2.5 Nolan Scott (2021)

This research encompasses a review of previous literature, an analysis of structured project progression, and semi-structured interviews in order to investigate the evolution of scope management and needs identification in agile methodologies. Identifying stakeholders, identifying metrics, and analyzing specific aspects of agile development. This has led to a variety of questions around scope management such as "How do scope changes impact the velocity throughout the course of a project?", "What factors help determine the overall viability of adopting different scope measures?", and "What are the roles of project owners and managers in facilitating scope changes in project cycles?"

2.6 Farshad Shirazia (2017)

In this paper, we discuss scope change and managing scope and fuzzy analytical hierarchy process is used in selecting the best strategy to manage scope change in projects. It is very important to manage and control projects with the consideration of the triple constraints; namely time, cost and scope. It is also extremely important to manage the scope and all the procurements needed to complete any project. During the project's lifecycle many changes take place, either positively or negatively, which should be controlled. If the changes are not controlled we may have scope creep that has negative effect on the project. It is commonly considered a negative incident, and thus, should be kept away from the project. By considering this concept.

2.7 Denys Gobova (2021)

This paper is intended to analyze the current practice of elicitation techniques application in the software development projects, define factors influencing technique selection based on the two classification Machine Learning

model, and predict the usage of a particular elicitation technique depending on the project attributes and business analyst background. We conducted a survey study involving 328 specialists from Ukrainian IT companies. Gathered data was used to build and evaluate the prediction models. Project Scope Management is one of the ten knowledge areas described in PMBOK. It refers to the set of processes that ensures a project's scope is accurately defined and mapped. Elicitation is a critical part of the "Collect Requirements" process of the Scope Management that helps to derive and extract information from stakeholders or other sources. The results of elicitation are used as inputs for requirement analysis and management activities. Multiple elicitation techniques may be applied alternatively or in conjunction with other techniques to accomplish the elicitation. Business analysts can modify existing techniques or create new ones to adjust the project context. The selection of the best-suited techniques influences the business analysis approach, which is an important part of the scope management plan.

2.8 Sakariye Mahamed Abdilahi (2020)

This paper attempts to review the overall picture of the applications of project scope management in the telecommunication industry with the aim of exploring the approaches, impacts, constraints and practices of project scope management in telecommunication projects in Somaliland. The current paper is quite important to impending project managers that might want to practice in the telecommunication industry in Somaliland and elsewhere, as it provides new insights and novel strategies that are essential for the timely delivery of telecommunication projects. Moreover, this paper offers young academic researchers in project management field a better underlying understanding of the applications of project management knowledge areas, particularly, the use of project scope management in the telecommunication industry.

2.9 Arupjyoti Nath (2014)

This paper presents the importance of Scope Management in relation to the overall success of a project. It also talks about the whole scope management process and all the phases involved in it: initiation, planning, scope definition, verification and then control. An efficacious scope management of a project certifies the successful management of other strategic project management capacities including time, cost and quality. Its main focus is on the methodologies and techniques applied for a successful management of the project's scope. It came out to be that the features and methodologies employed in a project are the project's scope and their deliverance on time ensures the project's success.

2.10 Team FME (2014)

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III. METHODOLOGY

3.1 Research Methods

Research Methods In this segment, the scientist indicated the exploration process connected in this examination concentrate to answer the expressed goals. Research methods refer as to accomplish a research objective a researcher employs various method and procedure. A research method defines and provides detailed procedures of how to start, implement, and complete a research task. Under research methods experimental techniques/designs, data collection methods/designs, statistical techniques for the analysis of data, and evaluation of research results come. Experimental techniques, designs, data collection methods, statistical techniques for the analysis of data, and evaluation of research results come under the broad purview of research methods.

3.1.1 Planning

The planning process is when an attempt is made to capture and define the work that needs to be done.

3.1.2 Controlling

The controlling and monitoring processes focus on documenting tracking, scope creep, tracking, and disapproving/approving project changes.

3.1.3 Closing

The final process, closing includes an audit of the project deliverables and an assessment of the outcomes against the original plan.

IV. CONCLUSION

Clear communication between the project team and stakeholders is the key of an effective Project Scope Management. Both parties understand and agree on the project scope and how the project goals will be achieved. The project scope helps with the understanding of the requirements on what should be done

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