

Understanding the Principles of Project Scope Changes

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Abstract: Projects, no matter the size, complexity, duration, or involved stakeholders, can evolve and change in numerous directions rapidly throughout their lifecycle. We are reminded by the fact that change is inevitable, it is a constant in every aspect of our lives, and change in the temporary, goal-driven endeavors we undertake, in other words, projects, is no exception to this rule. A fundamental element to any project is defining its scope and boundaries, which is referred to the totality of its goals, requirements, activities, deliverables, costs, resources and deadlines. There are many reasons why a project's scope might change after the initial stages of scope definition, and they can have serious consequences to a project's timeline, budget, and overall success. However, scope changes are a natural part of the project management process, and in many cases, these changes are not what hinders projects, but it is how we manage and control it that does. It is crucial that we learn, understand, and plan for these changes to minimize the rippling impacts and effects. This paper will break down the definition of scope changes and highlight the various types and leading causes that attribute to this phenomenon. In addition, the paper will shed light on the impact of scope changes and also provide recommendations and guidance on how to best handle these situations. Finally, real-life examples will be provided to further understand and comprehend how changes were introduced and handled.

Keywords: project's scope, goals, requirements, activities, deliverables, involved stakeholders.

1. INTRODUCTION TO DEFINING SCOPE CHANGES

In project management, it should never be assumed that the journey through project planning, execution and delivery will be smooth sailing and easy. Whether you are launching a new product, constructing an office building, or simply renovating your home, it is expected that you will face challenges associated with scope changes. Scope changes, in simple terms, is an alteration to the project's scope. They are deviations from what was originally agreed upon in terms of functionality, layout, quality, and responsibilities. This can include adding new features, changes in quality requirements, and even eliminating certain components and specifications. The further down the project lifecycle, the more difficult and impactful a change becomes to adapt. Think of it as laying the foundations of a building and building the first floor, it's very impractical to change the layout of the load-bearing structure. It may be possible to demolish some walls and build others, but completing this task will bear tremendous unfavorable cost and schedule impacts (Watts 2020).

A crucial aspect to understand is how to differentiate between scope changes and scope creeps. Scope changes are official decisions made to the project to change a feature, to expand or reduce its functionality and usually stem from initially unclear requirements or the emergence of new requirements. This generally involves adjusting the cost, budget, timeline, and other features. Scope creep, on the other hand, refers to the phenomenon where the project scope grows beyond what was originally defined in the statement of work and without conscious thought about the consequences. It lacks proper change control process, including planning, costing, and approval processes. Fundamentally, the crucial difference between scope change and scope creep is management and control; scope changes are inevitable and something to handle, whereas scope creeps are something to avoid (BQE 2023).

2. TYPES OF SCOPE CHANGES

There is a common belief that all scope changes are bad, however, that isn't the case. When projects progress, it only natural that along the way the project team learn more about their clients, audience, and customers, discover and understand more about certain aspects and features of the project, witness changes to the market, and/or have their priorities shifted (MacKay 2022). All this can ultimately trigger scope changes and are valid to adjust accordingly. Not all project shifts are the same, and it is important to understand each type to understand how to handle and address it. Scope changes can be classified per below:

- Data-Driven Changes

New information, data and insights may often reveal that the existing scope of work won't achieve the desire outcome and project objective. More information can become available and reveal that certain changes are necessary to be adapted for the success of the project.

- Budget-Driven Changes

There are cases where decisions regarding scope changes are influenced by how much fund is allocated or available. Sometimes a higher budget is required to achieve a certain goal, or a budget cut can cause a shift in time and resource investment. Project scopes are accordingly altered to adapt to these circumstances.

- Schedule-Driven Changes

Projects sometime require to be accelerated, for example launching a product early to beat a competitor to the market, or meeting project sponsor demands. In other cases, the duration is pushed further to shift attention to a higher priority project. A timeline adjustment may result in modification of project scope.

- Resource-Driven Changes

If resources change on the project, whether an increase or decrease in assigned people or equipment and material, this may enable or inhibit from delivering more or less scope.

- Quality-Driven Changes

Certain mandated quality standards can push for scope changes in order to comply with these requisites. Sometimes after delivery prototypes or proof of concepts, there may be realization that quality needs improving, thus adjusting the scope.

3. CAUSES OF SCOPE CHANGES

Scope changes can affect several parameters set around a project, and hiccups in a project's progress are sometimes unavoidable, but that doesn't diminish the importance of recognizing key sources of scope changes. There are many ways and reasons that can trigger scope changes, and in order to better manage these changes and project risks, and further minimize the number of scope changes, it is pivotal that we understand the leading causes behind scope changes on a project (Martins 2023). The major contributors include the following:

- Lack of Clear and Detailed Scope

One of the primary reasons leading to scope changes is an unclear and ambiguous project scope. According to the "The Chaos Report" published by The Standish Group (1994), incomplete requirements, changing requirements, and unclear objectives were three (3) of the top ten (10) factors contributing to challenged projects. The AST Group (2001) lists incomplete project scope and a lack of formal project management methodologies as two of the top ten (10) reasons that projects fail. Additionally, Eric Rosenfeld (n.d.), with Adaptive Consulting Partners, LLC, states that vague, unstable requirements will reduce any project's reasonable chance for success.

A lack of clarity and depth to the project goals, objectives, and requirements can create misunderstanding among project stakeholders and lack of cohesiveness amongst the team, which can open the door for different interpretations of what needs to be accomplished. Thus, clarity is critical to the success of the project; without outlining and defining the scope at project initiation will cause major distributions later down the line.

- Poor Communication

We all know effective communication is key between project team members as it ensures that roles, responsibilities, and relationships are transparent and aligned towards a common goal. Additionally, at the beginning of every project, the defined

project scope needs to be distributed and shared and clearly understood by all involved parties, and feedback needs to be communicated and captured to avoid any misalignment. Getting stakeholder buy-in during project initiation and securing approvals will help shield you from any arising scope change requests (Eby 2018).

One of the important factors to keep in mind is ensuring a proper channel of communication is established between stakeholders. Team members should respect and adhere to the formal communication methods between the correct entities and avoid free haphazard reporting that could lead to unauthorized changes. Unmanaged contact between the customer and various team participants leads to unforeseen scope changes.

- Weak Management

Strong and effective leaders are critical in providing guidance, inspiration, and motivation to the team to work towards a successful project. They keep everyone and everything organized and under control. Having poor and disengaged leaders can fuel the introduction of scope changes, as showing weakness and inexperience can lead to being overwhelmed by unreasonable demands. One of the characteristics of being a strong leader is grasping priorities and understanding when it is appropriate to say “No”. Effectively communicating that certain requests are “whimsical” or “wishful” and are beyond the original approved project scope draws the line for accepting scope changes and bearing the consequences.

- Unforeseen Circumstances

Almost every project has an element of uncertainty, and it’s something that creeps on project teams unexpectedly and can be tricky to navigate as they don’t see it coming. This may include new imposed government regulations, changes in project site conditions, or even replacement of critical team members. Conducting a risk analysis during project planning and throughout the project phase can help provide proper mitigation and response plan to minimize the occurrences and impact. However, some events are beyond our control, and once they happen, they can force us to make scope adjustments.

- Unrealistic Project Objectives

Sometimes projects are planned with unrealistic expectations and ambitious targets, which can be something the team cannot achieve within the time frame and resources available. This can provide major challenges to the project, causing it to experience scope changes or inevitably fail. Thus, it is important that objectives and targets are thoroughly reviewed and even benchmarked with other similar successful projects to ensure that the project is delivered meeting the requirements and with no deviations.

- Client Un-Involvement

Projects have adapted and evolved to ensure the client or project sponsor is continuously involved and engaged during every phase of the project. Spending months doing the required work and keeping the client out of the picture will result in surprises for the project scope. Completed work may have to be redone entirely, causing delays and cost impacts. The project team needs to aim to collaborate closely with the client throughout each stage of the project, keep them updated on the work and its progress, iterate the status consistently, and proactively involve them in the entire process.

- Lack of Change Control

When a project doesn’t have systematic guidelines and procedures to manage changes or amendments, it can be problematic to the project team to make decisions and choices. Not having a clearly defined mechanism that allows changes to be made and feedback to be implemented are much more prone to scope changes than those that manage change efficiently and methodically. Therefore, it is crucial to have an established change management that all stakeholders adhere to.

4. IMPACTS OF SCOPE CHANGES

According to Project Management Institute (PMI) research, thirty-seven (37%) of project failures are due to a lack of ‘clearly defined objectives and milestones to measure progress’, making this the single biggest cause of project failure. The same research found that forty-nine (49%) of completed projects ‘experience scope changes or uncontrolled changes to the project’s scope.’ Projects, whether small, large, simple, or complex all fall victim of scope changes, and when they do, the project and team can face serious consequences. Some of the major impacts of scope changes include the following:

- Project Rework

Introducing scope changes to a project, especially at later stages, can cause major project rework, as some scope changes require deliverables to be updated, new requirements to be executed, and additional cycles of review and feedback. The

rework can be as simple as revising a code to a software program, or as major such as demolishing and reconstructing parts of a building, but whatever the case, it will ultimately slow down the project and bear additional time and cost.

- Damaged Stakeholder Relationship

When scope changes become a topic of discussion between stakeholders, it is only natural that tension and opposing opinions arise between the team; different members look at the situation subjectively and often neglect what is beneficial and favorable for the project's success as a whole. This is why the project leader needs to know when to accept and decline scope changes, and that a clear set of criteria that justifies the change is followed. Getting this balance wrong will ultimately lead to strained stakeholder relationship which will only make it difficult to complete the project successfully.

- Demoralized Project Team

A synchronized motivated project team is what drives a project towards achieving its goals, however, when too many scope changes are forced into a project, the team can feel frustrated, discouraged, and lack the momentum to complete the project requirements. Scope changes can cause disruption and uncertainty. Ultimately, it is difficult for an organization to operate effectively and efficiently when the goalpost keeps changing.

- Additional Risks

Every project is susceptible to potential risks, but when projects experience scope changes and are poorly managed and handled inadequately, they are prone to even greater risks. Projects that decide to take another direction or add requirements become vulnerable and open the door for more uncertainty, so it is important when scope changes arise they are immediately contained and properly controlled to mitigate the risks.

- Reduced Benefits

If not thoroughly reviewed and challenged, unnecessary scope changes can defeat the project objective and add more burden to the project team, with little to no value added. The team end up having to do more work than what was initially planned, which inevitably leads to a shift in priorities, and the items that get dragged to the end of that priority list tend to suffer in quality. Scope changes should only be agreed upon if they add additional benefits or if they lessen the risk of benefits being lost.

- Schedule & Cost Impacts

Sometimes projects are initially planned with little to no flexibility in timeline and budget, the milestones and scheduled payments are set, and the project team organizes themselves accordingly within those boundaries. Thus, altering the scope when the project is underway throws the workflow off-balance and results in schedule and cost impacts. Therefore, it is important to make sure projects embed some flexibility from the start to account for some changes.

5. HOW TO HANDLE SCOPE CHANGES

Although scope changes can disrupt a project, it does not have to be detrimental to a project development and success. The way the project team goes about managing and handling the change is what ultimately affects the project, not the change itself. When looking at the project as a whole, change can be actually beneficial to a project when leveraged in the right way. The objective of any project should to always deliver the best outcome, product, and service, and if that requires changes in parameters every now and then, the project team needs to lead in the right way for adapting to that (Stefanka 2023). The below must be kept in mind to handle scope changes correctly:

- Put the Project Success First

The number one priority should always be to make a decision in the best interest of the project's ultimate goal; a project is successful when its objectives and purpose are achieved. When evaluating the validity of any scope change, the aforementioned should always be kept in mind. Rejecting valuable scope changes and proceeding with the initial inadequate scope will deem pointless if it is not delivering what it is supposed to do.

- Understand the Change

The first step when it comes to managing scope changes is identify the exact change that has occurred. This involves engaging with the stakeholder to get a clear understanding of the new requirements and changes that are needed. The project team must also analyze the change and understand the reasons behind it. Knowing the rationale for the change will also

allow the team to determine whether it is essential or should be ignored. In addition, gaining a thorough understanding of the changes will allow better and more effective communication regarding the specifics and details of the scope changes.

- Evaluate the Change Impact

Scope changes tend to alter the project's timeline and budget. For example, if a construction company was asked to build a school and a new requirement was introduced to construct an additional auditorium hall, there is no doubt that will entail an increase in the budget and maybe more time to execute the additional scope. It could also require more resources, further material to be procured, and supplementary deliverables and requirements. All these resulting impacts must be captured and agreed by project stakeholders to ensure a smooth execution of the change.

- Formalize the Change

Effective scope control management requires the project team to document the scope changes properly. This means that the changes are clearly spelled out and formally approved by all stakeholders, and corresponding project documents are updated including the project execution plan. This is a crucial step in order to get the endorsement of stakeholders and avoid any misunderstandings and ambiguities in later stages.

6. EXAMPLES

Analyzing and reviewing past major projects is a valuable way to extract lesson learned and share knowledge that everyone can benefit from. Understanding what went wrong and what could have been differently can be very beneficial in helping project teams from making similar mistakes. Below illustrates some real-life examples of how scope changes occurred in major projects around the world that will hopefully shed some light on what went wrong and what could have been differently.

Denver International Airport

The Denver International Airport was a project executed around the mid-1990s with the aim to come with a brand-new automated system for handling luggage travel and transfers. Its objective was to replace the standard reliance on manual labor with a fully automated baggage system and reduce aircraft turn-around to as little as thirty (30) minutes for faster service to travelers. However, what the project ended up doing was only a fraction of the automation plan it was envisioned to do, and completed almost sixteen (16) months behind schedule and 250% over budget, with expenditure to maintain the empty airport and interest changes on construction loads cost the city of Denver \$1.1M per day throughout the delay (Coolman 2021).

The system was the most complex baggage system ever attempted, and one of the many missteps that have contributed to project failure was a major change in the strategy. At the beginning of the project, the team assumed that the individual airlines would make their own baggage handling arrangements, however it wasn't until later stages that it was realized that if an integrated system was to be built, the scope had to include taking responsibility from the individual airlines and include that as part of the project. The change was valid and crucial because an integrated system meant centralized control by the project team, however the timing of the decision was extremely detrimental.

Overall, during the project's duration, over 2,100 design changes were made to the baggage handling system. However, at the beginning of the project, the team made it a condition that no changes are to be made or accepted, however immense pressure to meet stakeholder needs proved to be way too strong and the team were forced to accept them. Some of the changes made required significant redesign of portions of work already completed.

The Sydney Opera House

The Sydney Opera House is one of the most iconic buildings ever constructed around the world a global symbol of Australia. An architecture competition carried out by the New South Wales government was won by Danish architect Jørn Utzon to design the new building in 1957. The project was originally scheduled for four (4) years, with a budget of \$7 Million AU (Australian Dollar). It ended up taking fourteen (14) years to complete and costed \$102 Million AU (Beyond Software 2017).

At the start, the architect presented some but not all of the elements of the overall projects such as designs, consultant reports, and varied plans, however, it was far from a complete and comprehensive working document for strategizing the construction of the building. Utzon stated that he didn't finish the entire structural plan, but the client immediately insisted on beginning the work on the project, and that's when things started tumbling down.

Because the project launched with no finalized plan, project scope kept changing along the way, including floor plan changes from two (2) theaters to four (4). In addition, the initial estimation was drawn on incomplete design and drawings and site surveys, so expectedly along the way the costs kept rising above the expected budget, and as more payments kept being made with little progress, Utzon was forced to resign as he felt his creative freedom was being restricted. When the architect left, he did not leave any designs or sketches to work with, which led to the need to create new ones based on the current structure of the Opera House and many unforeseen complications were found. Ultimately, after many redesigns, major cost overruns, and extensive schedule delays, in 1973, the Opera House was inaugurated.

7. CONCLUSION

Project scope changes are unfairly characterized as being purely evil and a surefire road to project failure, and as we've detailed above, in many cases it can be very detrimental to the project and can take a huge toll on the project team and stakeholders. However, being in a profession that is dynamic, agile and full of uncertainty, the only thing we can truly guarantee throughout the project lifecycle is that something will ultimately change. Looking at it from a positive perspective, project scope changes can actually be necessary because it allows projects to be correctly tailored towards meeting its goals and objectives. But in order to succeed, project teams need to be properly prepared on how to deal with these scope changes, as the best project teams implement a robust scope change process built on a consistent reliable process, thorough evaluation, and careful change integration. Ultimately, remember to always gain agreement on the business objective of your projects, correctly and accurately document the scope of work required to realize the benefits of the project, and control the scope of your projects so that your projects do not control you.

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