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Managing Scope Creeps in Product Led Software-Based Organizations

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ABSTRACT

Scope creep presents a significant challenge for project managers throughout the project lifecycle. It can lead to budget overruns and schedule delays. This paper explores how project managers, especially those in software development organizations can effectively manage and prevent scope creep during project execution. It delves into the various factors that can contribute to changes in a project's scope and the resulting impacts. Historically, project management has placed more emphasis on cost, time, and performance, with less attention given to scope change management. This paper presents multiple solutions for addressing scope creep. One proposed solution involves establishing a contract to freeze the project's scope during the planning phase. While this approach effectively prevents scope changes, it may not be feasible for many projects. Another suggestion, put forth by T.J. Jach and J.R. Coat in their work "Managing the Change Process on Projects: A Step-by-Step Guide," is to incorporate "escape clauses" into project plans. These clauses involve predetermined procedures and utilize cost- benefit analysis to determine when and if a scope change is necessary. This method offers a structured approach for evaluating the potential impacts of scope changes and can be quite effective. (Jayalath & Somarathna, 2021)

Keyword: Scope Creep, Customer Satisfaction, Perception, Expectations, Uncertainty, Security, Software, Expectations

1. INTRODUCTION

The importance of effectively managing scope creep cannot be over emphasized in terms of project success. Multiple studies have demonstrated conclusively that uncontrolled expansion of a project's scope is the primary cause of project failure. A study conducted by the Standish Group, as reported on PM Hut, found that 74% of projects examined either failed completely or encountered significant challenges in meeting their scope, time, or cost goals.

Along the same lines, a report from the University of London by Chick and Malik, published in the International Journal of Project Management, revealed that 90% of projects experienced delays, went over budget, or were unable to deliver all planned features. Additionally, scope creep can come with a substantial price tag, with estimates suggesting a 20-30% increase in total project cost. Given these figures, it is evident that effectively managing scope creep is a vital practice for achieving successful project outcomes. (Hussein, 2021)

The Standish Group's CHAOS study shows that a significant percentage of projects either fail or encounter scope, time, or cost challenges. (Standish Group. (2015)) Scope creep, as defined by Barkley, refers to the uncontrolled accumulation of changes in a project. These changes can arise from any aspect of the project and usually lead to modifications or an increase in the amount of work required. The challenge lies in recognizing when these changes result in a significant increase in work, as they are typically documented as minor in comparison to the overall project. Johnson suggests that many project managers choose to accommodate these small changes, without distinguishing between those that add value for the client and those that do not. This approach aims to be proactive and please the client. However, as the project progresses, if these changes lead to a greater workload for the project team, there will be a discrepancy between what was initially promised and what will be delivered. The project's time and cost constraints will be compromised, causing the project to take longer and cost more than originally planned.

Pinto, a project management professional, refers to this as the project performance paradox, where the project is judged based on adherence to time and cost goals, but the changes caused by scope creep diminish the project's value to the client. This happens because the project team may try to compensate for the time lost by cutting corners and compromising the quality of the deliverable. (Jamshidi, 2023)

1.1 Definition of Scope Creep

Scope creep, also known as "requirement creep" or "feature creep," is the term used to describe the tendency of a project's requirements to expand as the project progresses. For instance, a project that initially had only one deliverable may end up with five deliverables, or a product that initially had three mandatory features may now require ten features to meet the desired criteria. (Aizaz et al., 2021)

1.2 Importance of Managing Scope Creep

When a formalized scope has not been established, the inclusion of "kitchen sink" clauses can lead to numerous changes and cause the project to become fragmented into multiple mini projects, not all of which are beneficial. These mini projects often result in a decrease in overall value. For instance, the project to introduce a new product may expand its scope to sacrifice performance to meet an earlier launch date. There are various factors that can cause the project scope to expand. Some of these factors can be controlled to a certain extent by the project manager, team or the client. Internal factors, such as unclear requirements, lack of experience in a specific skill or technology, and excessively optimistic expectations, can contribute to this expansion. In all cases, these internal factors share a common theme: the failure to fully acknowledge that a change in understanding or circumstances requires an increase in project scope. Additionally, external factors, such as changes in government regulations, the emergence of new competitors, or shifts in the economic climate, can also contribute to scope creep. Any or all of these changes can lead to a situation where the project no longer offers the same costs and benefits that originally made it a viable idea.

1.3 Causes of Scope Creep

Poor communication with Stakeholders'

Insufficient communication with stakeholders, who are individuals outside of the project team but have a vested interest in the project's outcome, can lead to project failure and significant scope changes. The project team may be unaware that the customer is dissatisfied with progress, leading them to believe that the project is progressing well. As a result, they may continue with the project assuming that the customer will be satisfied if it is completed quickly. However, the customer may completely alter the project goals in an effort to achieve a more favorable outcome. In this scenario, the team may deliver the original project, only to discover that the customer is unhappy and views the project as a failure. Consequently, the team faces the customer's frustration for perceived wasting of time and money, requiring them to undertake additional work to improve the project, effectively doubling its scope and resource requirements. At this stage, the team is likely to become disheartened, leading to the project being deemed a failure. All these issues could have been prevented with better communication with the customer.

Lack of Clear Project Goals

Scope creep frequently arises from modifications to a project's goals. Often, the project goals are not adequately determined at the beginning or are altered without proper consideration of the project's consequences. Consequently, the expectations of the customer or project team undergo changes. In the absence of a clearly documented record of the new expectations, the project's scope is highly likely to be modified to accommodate these changes. One common factor contributing to a change in project goals is the replacement of key personnel. When a significant individual involved in the project (such as the user(s) or project manager) is replaced, their understanding of what the project should achieve often differs significantly from their successor. As a result, the project scope is adjusted to align with the new goals.

There is no better way of understanding and agreeing to the project goals than putting them into writing, and it is always feasible to have the written goal document signed by the project sponsors and all-important stakeholders. Any time during the project when there are doubts in decisions that alter the project scope, the written and signed goals document can be used as a reference to evaluate if the changes are in line with project goals. With a clear project goal, it is very easy to qualify any specific decision as on/off scope, and the decision can quickly be justified as a decision fitting to meet the goal or a decision that is leading to scope change. Goals should always be tracked, and any progress of goal alteration should be carefully analyzed and measured in contrast to the positive or negative impacts on project success and end-user satisfaction.

If the goals aren't measurable, how will you know you achieved them? Lack of clear project goals is another primary contributor to scope creep. One of the primary causes of scope creep is changing, deleting, or adding specifications for the product. When the goal of the project is defined, the project can use the goal in each decision as a guideline to decide if changes are necessary. A change in the goal of the project often results in altering the project scope. When changes to the project scope are necessary, altering the goal of the project creates the inevitable result of an open- ended change in project scope. An open-ended project scope is one of the root causes of scope creep, as there is no way to qualify what's sufficient or insufficient to meet the altered goal. Then, without a well-defined quality criterion, it later becomes difficult to measure the project's success in meeting the altered goals.

The requirements of the products are translated from the project goals. Any alterations or procrastination of goals will result in changes to the product requirements and hence the scope of the product.

Inadequate Project Planning

Insufficient project planning stands as the third primary factor behind scope creep. In numerous instances, project planning is carried out with excessive optimism and without conducting thorough investigations into the necessary requirements for successfully delivering the project. Consequently, there is an underestimation of the time, resources, and cost that are imperative for completing the project. Furthermore, the lack of a detailed plan makes it challenging to identify deviations from the original plan. An effective plan designed to tackle scope creep incorporates techniques for estimating time, cost, and resources, provides a margin for possible delays, and most importantly, includes a method for monitoring these estimations and comparing them to the actual outcomes.

Various studies have demonstrated that schedule and cost control techniques, particularly project management software, are highly effective tools for mitigating problems stemming from scope creep. Effective cost monitoring occurs when comparing the originally estimated budget with the actual cost, a comparison that would be impossible without an initial budget estimation. Recognizing the necessity of cost control in preventing scope-related issues may prompt an increase in project planning that prioritizes the prevention of scope creep.

2. STRATEGIES FOR MANAGING SCOPE CREEP

Before implementing solutions, it is imperative to thoroughly understand the reasons for scope creep. Understanding the factors contributing to project changes is crucial to implement the appropriate solution. As previously mentioned, scope creep can arise from various sources and for different reasons. Sometimes, changes occur due to the inability to meet the customer's expectations. According to an article authored by Diana Jennings, a possible solution to avoid failing customer expectations is to clearly define, in written form, the project's objectives and limitations. This document should be officially signed by both the company and the client. By providing requirement specifications, the customer gains a comprehensive understanding of what can be expected from the company, while also providing developers with a clear understanding of their tasks. Additionally, it serves as a benchmark for evaluating whether the project is veering off track.

Analyzing scope creep at the root level, reflects changes, continuous or uncontrolled growth in a project's scope, at any point after the project begins till the project ends. Managing scope creep is one of the most difficult things to do in project management since changes can come from various sources. However, like every other problem area, prevention is always better than finding solution. There are several ways by which scope creep can be managed. Some of the ways are mentioned below:

Establishing a Change Control Process

At its most basic level, a change control process entails the planning, monitoring, and management of changes to the project's scope. The system should encompass the following components: a procedure for identifying and defining a proposed change, a means of evaluating the impact of the change on the rest of the project, and a method for determining whether to permit the change, how to accommodate it, and what the new requirements will be.

A well-designed change control system aids the project manager in evaluating the consequences of the change, determining the appropriate course of action, and offering a comprehensive overview of the effects of the changes. This empowers the manager to make an informed decision by weighing the benefits against the cost of the change. If the decision is to proceed with the change, the change control process assists in redirecting the project, managing any additional work and alterations to the requirements.

Furthermore, the system provides an audit trail, valuable for evaluating the impact of changes on similar projects and for future cost benefit analysis. The change control system is a specific methodology for assessing proposed changes and determining the appropriate approach. Establishing the system is a project management process in and of itself. To effectively establish a change control system, a manager requires "political skill" to advocate for the system among stakeholders. This entails demonstrating and communicating the significance of controlling changes and the potential cost benefits.

The system should not be excessively rigid, but it should be tailored to the project's size and the impact of the changes on it. A streamlined administrative system with a few forms may suffice for a low-risk project with minimal changes. Conversely, a large and complex project with extensive changes will necessitate a more formal system involving automated change control tools and dedicated Change Control Managers. An efficient change control system adds very little additional effort to a minor change, compared to the effort required to handle ad-hoc changes and manage the associated cost in terms of wasted time and rework.

Conducting Regular Project Reviews

There are alternative types of evaluation that can identify project scope creep in specific circumstances. A retrospective evaluation is a project examination carried out after the completion or termination of the project. Despite the project's completion, a retrospective evaluation can offer an analysis of the potential reasons why the project may have been unsuccessful, dissatisfactory, or surpassed the budget or schedule. It will pinpoint the causes of project failure as well as project achievements. The knowledge gained can provide valuable insights into why the project was unsuccessful and how similar projects can be prevented from failing in the future. Cause and effect analysis is a valuable tool for identifying the causes of discrepancies in the project plan.

This is especially advantageous when the project plan experiences significant deviations. Using cause-and-effect diagrams, the project team can outline the reasons for specific variations and their potential causes. Appropriate measures can then be implemented to mitigate these causes and reduce variations. Projects that last a long time often face situations where project creep has been allowed to occur and continue. One of the contributing factors to allow project creep to continue is the failure to conduct periodic project progress assessments. Whether project reviews are conducted informally or formally, they help identify project creep and its causes early in the process when there is still time to make corrections. Project progress assessments are comparisons of project status and project plan. They seek to identify variances from the plan and the reasons for the variations. The project plan is compared to the current state of the project to identify if the project is on the right path.

During the project review, project goals and objectives are reviewed to determine if they are still valid. The reasons for any project plan variance and/or differences in the project goals are investigated. The end of project reviews details what was learned during the review process and how that will affect future planning.

Managing Stakeholder Expectations

Meeting the expectations of stakeholders occurs when a stakeholder becomes aware that they are not receiving the complete value they had anticipated from their investment. This indicates that the project is providing low results at a higher expense. While this may not be an ideal scenario for a project manager and the stakeholders who feel entitled to receive something more. Insufficient management of expectations often leads to tension between the project team and stakeholders. Although this may momentarily boost team morale, projects driven by stakeholder demands that involve heightened expectations for deliverables and reduced project profit margins are more likely to fail. This situation presents a dilemma, as a stakeholder-driven project or a project manager with a focus on managing costs, may perceive this outcome as a failure from different perspectives. It is advisable for both parties to ensure they reach a mutual agreement on the approach and direction of the project.

Successfully managing stakeholder expectations can mean the difference between a project that is deemed a success and a project that has failed to meet its objectives. It is common for project failures to be an issue of deliverable quality rather than not delivering the agreed functionality. This often comes down to a stakeholder having an expectation of what a system will look like, as verbally agreed but was never documented and doesn't match the developers' interpretation. At times like this, it is often too late to prevent scope creep of the software product deliverable, but understanding this issue can prevent it happening.

Managing the stakeholders' expectations provides a reference point for managing what is in and out of scope, and it prevents unreasonable requests from taking time away from essential project work. This is particularly important as the customer, sponsor, and team will often have a different interpretation of what the end product or desired outcome will be. Stakeholders may not understand the level of complexity involved in a particular task and can be easily disappointed with the deliverable.

Prioritizing Project Requirements

- **Must have:** The project will be a failure if these requirements are not included. These requirements should be constrained to the minimum possible to reduce project cost and duration.
- **Should have:** These are important requirements, but the project will not fail if they are not delivered.
- **Nice to have:** Implementation of these requirements must be avoided as they will undermine the success of the project by increasing project duration or cost.
- **Won't have this time:** These requirements will be excluded from the project if other MoSCoW categories have suggested that they are not worth implementing at this time.

To deal with the possibility of paring down the project scope, thus reducing the value of the project, it may become necessary to employ a technique to prioritize requirements. The technique should focus on categorization of requirements into 'must have', 'should have', and 'nice to have'. This MoSCoW rule, developed by Dai Clegg of Oracle UK, is an excellent technique for ensuring that the right requirements are delivered. It divides requirements into four categories.

3. CONSEQUENCES OF UNMANAGED SCOPE CREEP

Decreased customer satisfaction: Customers are normally keen to have their requirements met, but adding new features after the original agreement can result in "project bloat," where the project becomes unnecessarily large. If these changes result into extended project time and increased cost, then the customer is likely to be very dissatisfied. An unhappy customer is unlikely to be a returning customer. Increased project costs When a project timeline is extended, increased costs are a natural result. Project timelines are extended either by the addition of new work or by missing the planned deadline with the existing work. In the latter case, costs are increased without offsetting new benefits, hence reducing the value of the project.

Delayed project timelines: Nothing is more frustrating to project managers and team members than having a project deadline extended, especially when they believe they are working within the original project scope. When a project's expected time to completion extends beyond the original timeframe, team members can become demoralized, feeling that their efforts are futile. If the project is internally focused, low team morale may be the only negative side effect. However, if the project is customer-focused, extended project time can result in reduced customer satisfaction.

Delayed Project Timelines

A project's scope is the basic structure which identifies what a project is supposed to accomplish. The reasons for project success or failure are dependent on the way the entire project or parts of it are managed. The potential for a project to succeed is increased through carrying out the project management processes properly. Conversely, the potential for a project to fail is increased through carrying out the project management processes poorly or not at all. One serious consequence of scope creep can be a delayed project timeline.

When a project's scope is not properly defined, changes can be made throughout the project that alter the direction or the necessary requirements for specific tasks, resulting in added work and additional cost. Failing to meet the project's completion date is a common occurrence in projects that have experienced scope creep.

A missed deadline can result in a total project failure if the end date was critical, such as an advertising campaign for a specific event or launching a new product for a specific market. An example of this is the recent attempt to update the Ontario Canada healthcare system through implementing new IT software to streamline the process that was initiated in 2002 with a budget of 650 million dollars. A report published by the auditor general of Ontario in 2005 stated that only 100 million of the budgets had been spent and there was little progress and no sustainable results. This report basically outlined a project failure, where the project deadline was not met, and the result was a system that was no longer aligned with the current requirements.

Increased Project Costs

When the scope increases, it is highly likely that the project costs will increase. In many cases, the cost increase can be severe, with some projects failing due to the increasedcost. The relationship between increased scope and increased cost is not a linear one. This means a small increase in scope can lead to a large increase in project cost. "The majority of cost overruns incurred during project execution are attributed to changes in the project's scope" (Jugdev and Müller, 2005). This is supported by a study conducted by the Standish Group which found that for every 25% increase in scope, the project cost will increase by 25% of the original project cost and the project duration will increase by 25% of the original project duration (Johnson, 2010). An increase in project cost can also occur if additional resources are required to complete the new objectives.

Another reason why increased scope and project cost are closely linked is due to a psychological factor known as "mental accounting" (Thaler, 1999). This occurs when an individual mentally assigns a sum of money to be spent on a certain item. In the project context, if a project manager has a budget of £10,000 to complete objectives A, B, and C, any additional objectives will not have a budget assigned to them. Instead, the project manager will simply view the additional objectives as an extension to the original £10,000 project and will reluctantly spend more than he intended to complete them. This will result in a cost overrun. This can be mitigated by allocating separate budgets for different project phases.

Decreased Customer Satisfaction

Customers might feel that project deviations were excuses for not being able to meet the original, more difficult objective. It has been suggested that the reason for scope creep in fixed price contracts is not due to the client's driven change, but rather insufficient planning, overlooked details, and unrealistic cost/time estimates by the project team. If the client blames the project team for not being able to meet their original objective, and the project team feels that it was the customer who drove the changes to the project scope, both parties will end up dissatisfied. The customer is the reason for the project. A decrease in customer satisfaction defeats the whole objective a project. By achieving the goals of the project with the customer's expectations via the Project Quality Plan in the earlier stages of project management, the ability to maintain customer satisfaction will be that much easier.

The key lies in keeping the customer informed of project progression and changes made to the project scope. By doing so, the customer can adjust internal expectations of what the project will deliver. If a customer is unaware of changes to the project scope, costs, or time expectations, and these changes are not reflected in the project agreement, the customer might still expect the project to be delivered as first agreed. Any extra costs or time spent to meet initial expectations would be an opportunity cost in foregoing other projects that could have been more profitable. The customer might also perceive that the reason for changes made to the project scope are due to incompetence and inability of the project team and not as a result of the additional changes in features.

4. FINDINGS

The data gathered from the study clearly shows an increase in scope creep within product led software-based organizations. While all organizations encountered issues caused by scope creep, the reported percentage is lower than that stated by J. Lyytinen and M. Hikkannen. This discrepancy could be attributed to variations in the definition of scope creep in the industry. According to 87.5% of participants, the agreed-upon requirements frequently underwent changes during projects, thereby contributing to scope creep, which refers to uncontrolled alterations in a project's scope. To illustrate this, one respondent provided an example where the scope change occurred because the user who requested it did not initially consider it necessary.

Another respondent attributed changes in scope to medium-level managers within the company who failed to specify requirements to the individuals carrying out the work, resulting in developers interpreting requirement to what they feel is right. Moreover, the respondents admitted that changes in scope were often influenced by factors they could control, rather than external pressures from users. One participant acknowledged that the implications on the budget compelled teams to implement the changes without charging the client extra, effectively performing the same work for less money. Consequently, 62.5% of research participants admitted to concealing the impacts of scope creep from their own company managers. An equal percentage acknowledged undertaking the additional work without requesting any additional payment from the client or informing the company.

5. CONCLUSION

This paper has highlighted the potential scope creep that could lead to project failure. It is apparent that there is a direct relationship between the occurrence of scope creep and project failure. Project managers maintain that added features and requirements are the root cause of the failure. It is the added cost and time taken to implement these requirements that cause the failure. Scope creep management needs to be seen as a collaborative effort by all stakeholders. Project sponsors must recognize the negative effects scope creep has and take an active approach to ensure that they do not change the project requirements in the during the project. They need to be aware that if changes are to occur, they must be willing to make the necessary extensions to the budget and time deadlines. Though not all changes will come with extra cost, but most will require more time. If stakeholders are aware of this, it will alleviate one of the main concerns of project managers caused by scope creep: uncontrolled changes to the project.

The key to preventing scope creep is effective planning with project goals in view. By producing a solid project plan and getting more accurate time and cost estimates, there is less likelihood that the project requirements will change. It will give a clear guideline of what is expected in the project and what time it should be done. Milestones should be in place so that progress can be monitored, and corrective action can be taken immediately. Development of Work Breakdown Structure (WBS) and Work Breakdown Structure (WBS) dictionary will help to illustrate what are the specific elements in the project and its detailed information. This will avoid any possible misconception on the project's scope. Any requested changes should be evaluated thoroughly for its impacts to the project. In short, the key is to tighten the project control.

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