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BUILDING A SUSTAINABLE TECHNICAL PROGRAM MANAGEMENT
(A Framework for TPMs to Manage Large Technical Programs)

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Abstract

This paper explores prevalent inefficiencies and resource inefficiencies in modern technical program management practices across large enterprises. Through a mixed-methods approach integrating qualitative case studies, stakeholder interviews, and quantitative performance metrics analysis, it proposes a comprehensive framework for sustainable technical program management. Key findings highlight that adopting this framework can significantly improve resource utilization, foster cross team collaboration, and enhance overall program effectiveness. Moreover, organizations implementing this approach demonstrate increased agility in responding to market shifts and higher stakeholder satisfaction. These insights suggest a paradigm shift in how large organizations can achieve more agile and efficient operational structures. The study underscores the critical link between program management strategies and organizational success, offering actionable best practices applicable across industries. Broader implications include improved service delivery, optimized resource allocation, and better alignment of corporate goals with stakeholder needs, promoting a more resilient and adaptable business environment.

Index Terms – Technical Program Management, TPM, Agile, Scaled Agile, Program Management, TPM Framework

I. INTRODUCTION

In the evolving landscape of organizational dynamics, the management of technical programs has emerged as a pivotal area of focus, particularly within large organizations that face increasing pressures related to efficiency, sustainability, time to market and stakeholder accountability. Critical examination reveals that the complexity of coordinating diverse project portfolios amid emerging technical conditions emphasizes the necessity for a structured yet adaptable framework for technical program management. The current body of literature indicates that traditional program management practices often lead to substantial inefficiencies and resource misallocations. This study identifies a notable gap in the research, specifically concerning the application of sustainable frameworks capable of streamlining operations while simultaneously addressing technical dependencies and market needs. The research problem centers on the need to develop a comprehensive and sustainable program management framework tailored for large organizations, aimed at overcoming challenges related to resource scarcity, technological advancements, and changing business expectations. As large organizations increasingly strive to align their operational strategies between their globally distributed teams, it is crucial to cultivate a framework for Technical Program Management that delivers scalable and sustainable outcomes. The significance of this research is multifaceted; from an academic perspective, it contributes to the field of project management by enriching the discourse on sustainable practices and offering

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empirical evidence that illustrates their feasibility within large organizational contexts. Practically, this study provides actionable insights for decision-makers on how to implement programs that prioritize sustainable methodologies, thereby fostering long-term viability and competitive advantage. Furthermore, visual representations of frameworks from analogous projects not only serve to contextualize the discussion but also reinforce the importance of strategic integration across departments to achieve organizational objectives. By addressing these areas with a critical lens, this dissertation aims to offer a well-rounded contribution to both theory and practice, laying the groundwork for future research and application in technical program management.

II. LITERATURE REVIEW

In the rapidly evolving landscape of technology, organizations face relentless pressures to innovate while also managing complexity and scale. The intersection of technical prowess and effective management has given rise to the role of Technical Program Management (TPM), which sits at this crucial juncture of engineering and business strategy. Recognizing the Multifaceted nature of this role, recent literature emphasizes the integral position TPM plays in aligning technological initiatives with organizational goals, effectively bridging gaps between teams within large enterprises [1]. This synthesis of technological insight and strategic oversight is increasingly vital, as large organizations contend with growing competition and the demand for sustainable practices that transcend mere profitability to encompass social and environmental responsibilities
Research has delineated several predominant themes surrounding the concept of TPM, particularly the frameworks established to optimize operations, facilitate communication, and reinforce collaboration among diverse teams. Scholars have pointed to best practices in risk management, stakeholder engagement, and the importance of agile methodologies as critical components in building robust technical programs. Furthermore, the literature highlights the effectiveness of various project management processes that incorporate stakeholder feedback loops and iterative development cycles, allowing organizations to adapt swiftly in fast-paced environments.

Figure 1: Dimensions of the program management

The 7-Step Program Management Framework:
The following 7 step framework for Technical Program Managers helps organizations for sustainable and scalable practices in Technical Program Management.

Step 1: Clarify the Objective / Problem Statement
As a TPM, gathering all available context, considering past experiences, and asking relevant questions to formulate a clear goal/problem statement is crucial. This understanding is essential for reducing ambiguity, effectively addressing the issue, and ensuring stakeholder alignment.
Retrieve existing program documents, requirements, and past meeting notes to establish a deeper understanding of the problem to be solved. Review them thoroughly to formulate targeted questions and gather answers from stakeholders. Employ various tools and techniques, such as email, brainstorming sessions, focus groups, interviews, and surveys, to gather insights on the problem. These techniques serve multiple purposes: fostering ownership, gaining diverse perspectives, and creating a comprehensive document of the goal/problem.

Outcome of Step 1
At the end of this step, you will have a high-quality program narrative, refined problem/goal statement, and data that supports a deeper understanding of the program. You will have become a subject matter expert and have created awareness of the program amongst stakeholders and partners.

Step 2: Enhance Engagement and Understanding
This step focuses on the importance of collaboration and communication in refining the goal/problem statement and using metrics to ensure a shared understanding among stakeholders, partners, and experts. By involving all relevant parties and utilizing formal program documents, you can align everyone's goals, criteria for success, scope, metrics, and risks, fostering a cohesive approach to delivering across multiple owners or organizations.
To achieve a shared understanding of the problem, stakeholders, partners, and domain experts must align on success metrics. Without clear links between the problem, supporting data, metrics, and the mechanisms for the solution, the approach will likely face challenges from stakeholders and partners. Examples of key metrics: Key Performance Indicators (KPI), Quantitative and Qualitative metrics and Baselines to compare

Outcome of Step 2
At the end of this step, using feedback and input from stakeholders, you will have refined the program narrative document that defines the goal/problem statement and established well-defined success criteria and metrics against which the program will be evaluated. The stakeholders and partners will have reviewed the document and other artifacts to gain a deep understanding of the program, impact, and ownership expectations. You will also have started building up the program document repository containing the risk register, records of stakeholder feedback sessions, and meeting notes.

Step3: Drive Alignment and Prioritization
At this stage, the TPM will be the subject matter expert on the goal/ problem, and your stakeholders will look to you to explain why they should invest time and resources toward a solution. Despite stakeholders' understanding of the program, competing priorities may affect the

scope or timeline. The TPM focuses on achieving alignment and prioritization to secure commitment for resources and high-level timelines.
Achieving alignment on the goal/problem statement and measurable success criteria is crucial for program success. Explicit agreement prevents misinterpretations and ensures focus on the right issues. Use data and metrics to support decision-making and prioritize tasks aligning with the program's goals. This provides a data-driven, transparent approach that everyone can understand.

Outcome of Step 3
At the end of this step, you will have refined the program document and finalized the problem/goal statement and success criteria that all stakeholders are aligned on. Stakeholders and partners will have committed to supporting the program deliverables and high-level timeline. The TPM has the green light to engage resources and firm up the execution plan. Step 3 and Step 4 are usually concurrent.

Step 4: Establish Ownership & Accountability
Managing large programs often brings new, complex issues and blockers requiring collaboration with multiple teams inside and outside your organization. The right program owner, often the Single Threaded Owner (STO) or program champion, is crucial for providing leadership, ensuring accountability, and driving the program to successful completion. This owner, who may or may not be the TPM, must have the authority to make critical decisions and resolve conflicts. The STO should be aligned with the program's goals, provide consistent decision-making, and have an aligned vision, regardless of their title. The STO model is being increasingly adopted across large organizations.
As a TPM, you need to identify and recommend candidates for STO to the leadership team. Solicit advice from stakeholders to ensure the right choice of STO based on teams that are the main contributors, which organizations the teams belong to, and alignment issues that have been encountered. If the TPM and STO are different individuals, the TPM supports the STO by keeping them updated on status and risks while escalating issues when necessary. In these situations, the TPM represents the STO in most program meetings and decisions unless escalation is needed. Multiple program owners should be avoided to maintain clear accountability and focus. If required, split the effort into separate programs with distinct goals and metrics.

Outcome of Step 4:
By the end of this step, the program will have a single-threaded owner to influence alignment and ensure the successful completion of the program across the larger organization. The TPM will have developed a detailed RACI (Responsible, Accountable, Consulted, Informed) matrix identifying all team Points of Contact (POCs), their roles, and responsibilities, including dependencies, problem resolution, and risk management. The selected POCs will have engaged their teams to kick off collaboration to develop the execution plan. The TPM will update the program document with these decisions.

Step 5: Develop the Execution Plan
Managing technical design, problem-solving, timelines, resourcing, and launch planning involves numerous concurrent discussions. The TPM is crucial in coordinating technical design, problem-solving, assessing timelines, resourcing, and launch planning, ensuring seamless collaboration and alignment with program goals. These activities are iterative and may occur concurrently. The

execution plan encompasses all the actions and activities required to complete the program and guides the day-to-day activities to ensure that tasks are carried out according to the program schedule and match objectives. It Includes tasks, timelines, responsibilities, and resources needed to execute the plan. The TPM will share the high-level execution plan, including expected timelines and milestones, with all contributing teams and POCs. Provide a deadline for finalizing estimates and scope.

Outcome of Step 5

At the end of this step, all teams who need to contribute to a solution will have committed to a timeline and will have negotiated with any dependent or impacted teams to ensure they can meet the schedule as planned. The TPM will have a comprehensive execution plan with key milestones and a realistic timeline for achieving each stage of the program.

Step 6: Execute and Manage Implementation

Effective program execution requires constant monitoring, strong communication, proactive updates, and handling escalations. Be prepared to adjust plans due to unexpected delays, new data, or changing environments. TPMs bring order, drive progress, and ensure the seamless execution of complex technical programs.

As early as possible, establish mechanisms for monitoring progress and adjusting as necessary to keep the program on track. Try to automate the baseline and KPI metrics to ensure tracking towards the KPI is available early to validate success. Continuously track the program's progress against the established timelines, milestones, and deliverables. The TPM needs to identify and escalate issues promptly, facilitating quick resolutions and minimizing disruptions to the program timeline.

Outcome of Step 6

At the end of this step, the plan's execution will be complete, success criteria will be met, and the program goal will be achieved, with the solution deployed to production in a stable state.

Step 7: Measure, Improve and Handoff

Post-release, the ongoing ownership, operational readiness, support, and improvement will transition to a permanent owner. The TPM will deliver a comprehensive report summarizing the program, highlighting the observed benefits and changes, including feedback, lessons learned, and future recommendations.

To ensure the established KPIs for success are met and maintained, TPMs ensure that the appropriate monitoring and logging are in place to make sure any regression is identified and will also serve as a new baseline for further improvements. Implementing metrics automation and dashboards for real-time tracking and bug-tracking systems to manage and resolve issues are best practices.

Outcome of Step 7

At the end of this step, a new owner will be established, and mechanisms will be in place to track the solution's performance and drive future improvements. The TPM will then move on to other assignments. For their records, TPMs should note the program impact, timeline, and critical contribution to include in their annual performance summary and to keep their resume updated.

III. FUTURE SCOPE

This section outlines the potential directions in which the 7-step framework for technical program management can evolve. It explores how future advancements in technology and industry practices could enhance the framework's effectiveness, scalability, and applicability across diverse environments.

1. Integration of AI and Machine Learning: The future of program management could be enriched by leveraging AI and machine learning to automate decision-making, predict risks, and optimize resources, ensuring more efficient management of technical programs.
2. Expansion into Agile Environments: The framework may evolve to incorporate agile methodologies, enabling more flexible and iterative approaches to program management, which can be particularly beneficial for fast-paced, technology-driven projects.
3. Automation and Tools: Automating manual processes with advanced tools can significantly enhance the efficiency and consistency of the framework. This will also reduce human error and allow program managers to focus on strategic decisions.
4. Scalability and Global Application: As organizations grow, the framework could be adapted to handle larger-scale programs. Additionally, it could be customized to address challenges across different cultural, organizational, and regulatory contexts globally.

IV. LIMITATIONS AND CHALLENGES

This section discusses the current limitations and challenges of implementing and using the 7-step framework for technical program management. It highlights potential obstacles organizations might face in the adoption and execution of the framework and offers insights into how these challenges could be addressed.

1. Complexity in Implementation: Implementing the framework across diverse organizational environments presents challenges in terms of alignment with existing structures, processes, and cultural norms, requiring careful customization.
2. Resource Constraints: Effective application of the framework requires sufficient resources, including skilled personnel, funding, and technology. In resource-limited environments, these requirements may be difficult to meet.
3. Resistance to Change: The adoption of new methodologies often faces resistance, especially from teams and stakeholders used to conventional approaches. Overcoming this resistance is crucial to ensure smooth implementation and long-term success.
4. Adaptability to Rapidly Changing Environments: The pace of technological advancements and market shifts may pose challenges to the framework's relevance over time. Continuous adaptation and updates will be necessary to keep up with the evolving landscape.

V. CONCLUSION

The findings of this dissertation Showcase the importance of 7 step framework which highlights the immense coordination, decisive action, and oversight essential for successful program execution. TPMs are the linchpins of complex programs, blending technical expertise with strategic oversight to turn ambitious goals into successful realities.

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