White Paper 2013-13

Minimizing complexity – the core of complex projects preparation

Complexity creates uncertainty and unpredictability. A key practice for mastering large, complex projects is to minimize complexity. This needs to be done early during the project strategic preparation phase because it touches the very structure of project execution. Several commonly accepted organization practices actually relate to this complexity minimization. In this White Paper, we investigate what are those strategic complexity minimization practices for the project preparation phase and how they can help to execute reliably successful projects. This paper complements White Paper 2012-25 "Fundamental Insights on Minimizing Complex Project Risk for a Single Project" which deals with complexity reduction at the start-up and execution stages.

Dealing with systems complexity

Complexity is defined by the situation of a system with several contributors having a high level of inter-relations and not necessarily aligned as to their goals or interests. Complex systems are unpredictable and prone to large scale unexpected changes of state, also called 'black swans' in the complexity literature. This is prone to happen when the system's complexity increases up to a threshold of fragility.

Large, complex projects dwell in complex environments which make them difficult to handle properly. Of course, organizations would like to avoid as much as possible the unpredictability associated with complex systems. A great way is to diminish as much as possible the complexity of the system. The more structural this minimization will be, the higher the chances that it will fundamentally alter the success odds of the project.

> **The amusing paradox is of course that complex projects aim at creating very complicated objects, and the more the outcome is complicated with high expectations of reliability, the more complex is the project that will create it.**

Be clear on what you want to achieve

First and foremost, it is essential to be clear on what the organization expects that the project will achieve. Too often we observe that it has not been defined clearly, or at least that it has not been communicated properly from executive management to the project team. This creates a significant misalignment which might only become visible when it is too late (and added complexity by having senior management and the project team not pulling in the same direction).

That objective of the organization should be clear enough to be able to be stated simply and convey a vision that can be shared easily. The key question here is "*Why are we doing this project?*" Some work might be needed (often requiring external help to have an external challenging eye) to narrow down what is actually the objective of the project, beyond the communication ruffle and ego games surrounding these sorts of endeavours.

When the project starts, it is then essential to ensure that the objectives are reaffirmed and detailed for the project team – refer to the White Paper 2012-013 '*Define Clearly your Project Objectives! Why is this Key Project Step so Often Skipped?*'

Is your objective too complicated?

Complicated is not the same as complex. A system might be complicated and highly reliable and predictable (the classic example of complication is a mechanical watch). The amusing paradox is of course that complex projects aim at creating very complicated objects, and the more the outcome is complicated with high expectations of reliability, the more complex is the project that will create it.

Often, organizations are quite ambitious regarding the complication of the end product of the project. Effort and complexity tends to increase exponentially with complication, in particular in areas that are on the fringe either technologically or geographically.

Startup wisdom (startups are nothing but extremely unpredictable projects in a very complex and unknown environment) informs us that there are huge benefits of limiting one's ambition to a minimally functional product, and evolve from there, rather than going straight for the full product will all its bells and whistles (one reason is to let time for the market to feedback on the product before too much resources have been spent, possibly in vain).

A first question is thus whether it would be possible to reduce the complication of the project's product, at least for a first phase. Some functions might be required in all cases, and some other functions, more secondary, might be added only later. Maybe the production of a plant which process needs to be confirmed might be made smaller in a first phase, or produce only a lower value-added product, or some logistics optimization might not be needed in a first capability demonstration. It all revolves around the question - where does the value of the product actually really lie in the view of the sponsors and customers?

Such a simplification approach using phasing has also a great advantage in terms of decision making: keeping the maximum options open is a benefit which reinforces resilience to external events.

Package your project

Most projects can be packaged in chunks that have minimum inter-relation, or which interfaces can be

managed relatively easily. It all relates to the overall project graph. Packages that are smaller will be easier to manage; managing them separately will decrease the overall complexity of the system. Contributors will have an enhanced clarity as to what they need to achieve and it will be closer to their core capabilities.

Packaging the overall project will increase complexity at the level of the project management team, with package managers overseeing their package transversally to a number of disciplines. However, this complexity creation is easier to manage within an operating project team as it involves only a limited number of individuals, which can be regrouped geographically, compared to trying to manage complexity with project contributors all talking to each other.

A word of caution here however – some organizations try to minimize complexity by packaging their large projects without understanding that it involves additional investment in leadership and management at the project team level. This additional cost will be more than repaid by the diminution of complexity of the overall system.

> **Keeping internal complexity is a sure recipe for failure because managing it will swamp the project team in political games, blame contests, and distract it from the external challenges**

Minimize and align your contributors

The last lever to diminish complexity is to minimize the number of contributors, and make sure they all align with the project's purpose. This is related to supplier strategy and growing a lesser number of generalist suppliers that can cover larger expanses of the project. Specialist suppliers are always required and need to be firmly aligned with the project purpose. Techniques involve integration of representatives within the project team (usual in automotive and aerospace industries), contractual incentives and partnerships.

Get rid of internal interfaces

Finally, a word on minimizing internal complexity. It is amazing how organizations can create unneeded complexity for high stakes projects, adding layers of oversight. Minimizing internal complexity should be the easiest lever to minimize overall complexity. It is not an option for complex projects, it is a mandatory condition for success. The key is an integrated team with large decision-making capabilities, no departmental intrusion or committees, and a sound governance structure to the project sponsor (often at the top executive level for large projects).

The objective should be to remove as many internal interfaces as possible. It might take the form of an integrated Joint Venture with independent decision capability when partners are involved. In all cases avoid like hell any project management organization involving dual leadership or spread out decision-making capability. Avoid also intrusive oversight distracting the project leader. Keeping internal complexity is a sure recipe for failure because managing it will swamp the project team in political games, blame contests, and distract it from the external challenges, which are already sufficiently daunting.

Conclusion

Helping to minimize complexity is actually a key intervention topic for Project Value Delivery and a number of consultancies active in the field of project execution. It is arguably, when done early enough to enable thorough implementation, the intervention with the greatest value leverage for large, complex projects, both in terms of project value and reliability.

Examine the projects you are about to undertake, or that you are considering. What are the few decisions you could make to structure them so as to diminish drastically their complexity?

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