

Piecing Together the Project Puzzle



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Common definitions of “project” focus our attention on the task(s) or the endeavor to be completed. And as engineers and project managers, we tend to be comfortable with that focus. The team however, is the most important aspect of any project. Although a topic of its own for a later time (either here or in my new blog), a project is, more than anything else, a temporary organization created for a specific purpose, i.e. a social system. I have been thinking of projects as social systems and applying a systems thinking approach to them for over fifteen years and have been involved in dozens of projects across a range of industries. A systems approach provides a framework for understanding why projects succeed or fail. Through this lens, while looking at the puzzle of what makes a project successful, I identified what I think are the six most important pieces. Projects fail without these pieces:

1. Alignment of Purpose
2. Coordinated Effort
3. Open, honest, effective communication

4. Detailed planning
5. Rapid execution
6. Learning and adaptation

Each of these could take up a book or a significant paper in and of itself. This manifesto only serves as an introduction to get you thinking about these ideas

1. Alignment of Purpose

Alignment of purpose is arguably the single most important piece of the project puzzle. A project divided against itself will fail just as surely as a house divided against itself will fall. Alignment essentially means that each component of the project social system - whether individual or organization, owner or contractor, engineer or vendor, not only has a purpose but shares the same purpose. A project that can fail for the owner and still be successful for the contractor or the engineer will almost always fail. Shared purpose does not have to be soft and “touchy-feely”. Shared purpose shows itself in many “real” aspects of the project including:

- Incentives including obvious ones such as shared savings as well as a lack of disincentives such as a pricing scheme that encourages behavior contrary to overall project success
- Contracting strategy and language (at all levels)
- Early involvement of key players
- Participative team selection process
- Innovative project structures and organizational designs

Misalignment also shows itself in many different ways. Think of the traditional design - bid - build style of approach to contracting. Often, this approach violates the principle of alignment in almost every way. The contractor can succeed by providing lower quality and by getting off the project as quickly as possible to meet the bid estimate. The engineer gets paid a percentage and can actually make more money if the project costs more. Players critical to the success of the project are not brought into the team until such a point in the project that it is too late to make best use of their insights. The owner wants the best quality possible for its budget. And

yet, this approach incentivizes each party to act contrary to the interests of the others. While this is an egregious example, many projects contain both subtle, and not so subtle, examples of misalignments in purposes between the parties. To prevent this, the project team must design alignment into its contracting approach, organizational design, and systems. Likewise, it must root out misalignment at every opportunity.

2. Coordinated Effort

Coordinated effort between the team members can ensure minimal overlapping efforts (with resulting cost duplication) while at the same time covering project risks to prevent significant gaps (with resulting delays and overruns). Coordinated efforts rest on the three-legged stool of:

- Risk allocation based upon best ability to manage specific categories of risk

- Well-designed procedures with clearly designated responsibilities
- Balanced and appropriate experience/ expertise between the parties

Project owners sometimes try to push off all project risk onto other parties. The entire project then revolves around those other parties pushing back and trying to divest themselves of their responsibilities. On the other hand, projects in which no one has risk except for the owner tend toward significant budget overruns and delays. The time to design procedures is early in the project, once all the key team members are in place (and in alignment). Well-crafted procedures help to clarify responsibilities and reinforce the overall sharing of project risk and coordination of the work effort. Finally, a project in which the owners or other key stakeholders are ignorant as to the overall necessities of project management or the risks at stake might seem like a bonanza to the contractor but seldom ends well for anyone. While it might seem obvious that “coordinated effort” is essential to project

success, the courts are full of projects where this principle was not followed.

3. Open, Honest, and Effective Communication

Open, honest, and effective communication seems like another truism for project management. And yet, how often is communication meant to be open, honest, and effective rather than provoking, hiding, manipulative, risk-transferring, or an exercise in covering one’s backside? Communication should build on the following principles:

- Trust among team members
- Well-designed formal lines of communication
- Open, informal lines of communication

Each aspect of an effectively built and honestly executed communications plan builds on every other aspect. Distrust only breeds further distrust. But open, honest, and effective communication builds on itself as well and can lead to early

problem detection and resolution and overall more effective implementation of the project with resulting success.

4. Detailed Planning

Detailed planning includes organizational design (team membership, roles and responsibilities, project controls, etc.), contracting strategy, risk management, procurement planning, integrated project execution documents, early technical design and engineering, and the clarification of critical assumptions. Planning costs little compared to execution. A qualified team could spend a year on planning a project without significantly impacting the overall budget. Too many project stakeholders want to rush to get shovels in the ground before they know where they are going overall. This contributes to costly change orders, work interferences, and costly misalignments between budgets, expectations, and reality.

Various tools and methods can be useful during the detailed planning stage including:

- Backwards planning - beginning with the objective in mind and working backwards to the present
- Idealized design - a method for designing organizations focused on systemic alignment and overall project effectiveness
- Design visualization tools such as models, 3D, and computer simulations allowing stakeholders to visualize the impact of various early design decisions on the overall project.

Detailed planning costs little compared to execution. Failure to plan properly can cost a lot more. Detailed planning also sets the stage for the next piece of the puzzle: Rapid Execution.

5. Rapid Execution

Most of us have probably seen the TV show, Extreme Home Makeover, in which a crew takes a family from their home and sends them on a week-long vacation. Meanwhile, the crew demolishes the home and builds a new one, along with donated assistance from contractors and volunteers. The

well-known charity, Habitat for Humanity, celebrates teams that can build a spec house in the least time with the world record being around 4 hours from start to finish. Finally, housing contractors can compete in a competition show who can build the fastest house. They typically plan for months and build in hours. Each of these provides an example of rapid execution in residential construction. Each also relies heavily on the sort of detailed planning described in the previous section.

The simple fact is that rapid execution of the project typically costs less and benefits the project owner more than extended or even “paced” progress. Rapid execution does not necessarily imply an earlier start date. This is not a call to get “shovels in the ground” as quickly as possible. Instead, rapid execution is an attempt to minimize the duration of the execution period of the project. A seven-day house construction might take three months to plan but will still be more cost effective than the same project performed in such a

way that it takes only a month to plan but three months to construct. Likewise a factory that can be built in twelve months costs more if built in eighteen.

The keys to rapid execution often include the following:

- Upfront focus on detailed planning
- Well done engineering and a well-understood scope of work
- Early involvement of stakeholders critical to execution
- Modularization and off-site fabrication where possible
- Minimization of cushions built into the project schedule and proactive float management at the project level
- Procurement of long-lead items and careful integration of procurement, materials management, and equipment staging.

6. Learning and Adaptation

No plan, however detailed, can be perfect. In warfare, there is a relevant quote that says that “No plan survives first contact with the enemy”. This is true of any planning. No one can perfectly predict what will happen during the course of the project. In order to overcome this fact, the project team should be designed to be a learning organization. This does not mean that the detailed planning described under section 4 is not essential. Instead, it means that as the project team performs detailed planning, it should incorporate the ability to learn and adapt into the core of the project. In this approach, properly designed project controls become early warning signals that key project assumptions require modification. The team records decisions (along with the assumptions and reasons for the decision) so that they might be modified later if conditions are found to be different than expected. And lessons learned from similar projects are incorporated wherever relevant.

As mentioned in the introduction, each of the six “pieces” of the puzzle could be the topic of significant writing in and of itself. I hope that, for now, you do not just brush aside these principles as “obvious” and “simple” but take the time to think about your own projects and where these principles are, and are not, being successfully applied. It should also be clear that the six pieces do not stand alone. They fit together and in some cases rely upon each other. Missing just one of them might cause the puzzle to fail.

About the Author:



Mr. Steele is an experienced engineer and consultant based out of the Philadelphia area with twenty-seven years of experience in engineering, construction, and management across a range of industries including power and utilities, public sector, infrastructure, life sciences, and manufacturing. He has worked closely with senior executives to evaluate project status and risk, assess contract and process compliance, develop recovery plans, negotiate contracts, and create effective project management processes and organizations.

Mr. Steele also has extensive litigation experience related to the analysis and preparation of or defense against construction claims related to schedule delays, cost overruns, productivity losses, and design errors and omissions for both public and private sector projects. Mr. Steele is a graduate of West Point and a combat veteran of the US Army. In addition he is a licensed Professional Engineer, a Certified Cost Professional, and holds a Masters from Villanova University.

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