

IT Project Management: The Role of Lean

By Howard Williams, PMP, and Judy Gerber

Scenario: A particular software development project is underway, but progress is slow, even with the required resources on board. Technical issues are compounded by changing requirements, and planning is complicated by development resources getting pulled into support work on existing products. Quality has been compromised.

The problem described above is an example of what we view as a *work process* issue. This is in contrast to what we have called, in a companion paper (“IT Project Management: The Role of Governance”), a *governance* issue. The interaction between governance and the domain of work is depicted in the model shown in Figure 1.

When we look at issues that may emerge within the domain of work, as suggested in our example above, they often pertain to issues of efficiency and quality—that is, how well the work is being done. Because work can usually be structured in some way, the processes and procedures that

enable this structure are important to identify, measure, and, quite often, improve upon. That is, without some deliberate attention to their improvement, there is no particular guarantee that they will operate efficiently, or that they will produce high-quality outcomes. The organization of project work around best practices provided within *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*—Fourth edition (Project Management Institute, 2008) serves as an example of one important way of fostering improvements that impact how well project work is done.

The Nature of Project Work

Projects are conventionally viewed as time-bounded processes with specific, unique objectives, and characterized by nonroutine activities. However, it is important to distinguish between the routine and nonroutine aspects of projects. Many project activities are quite repeatable—that is, they are performed exactly the same way in all projects.

When work is routine, highly repeatable, and sequential, it can be described as a *linear flow*. A project task that involves provisioning of servers might be an example of a linear flow activity. A linear flow typically consists of a limited set of activities and usually produces higher volumes of products or services of relatively low variety and minimal customization. The process steps of a linear flow can be standardized.

When work is organized so that it can respond in a more flexible way to the demands of individual customers and provide customized products or services, it can be described as a *jumbled flow*. Jumbled flows are likely to generate a wide variety of products and services and typically handle low-to-moderate volumes of production and involve fewer activities

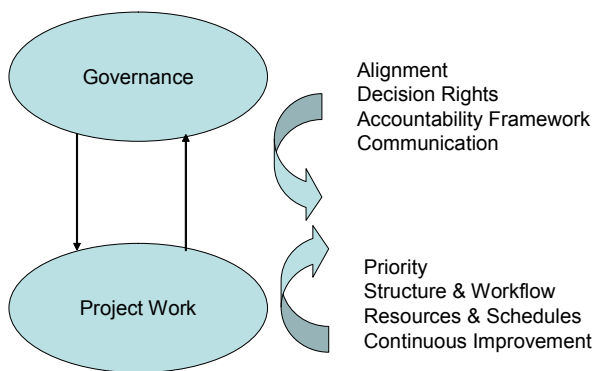


Figure 1: Issues related to governance and project work

that are routine, repeatable, and sequential, and are therefore less subject to standardization. A project task that involves the creation of a script to manage a unique job scheduling requirement would be an example of a jumbled flow.

Fundamental to the improvement of the processes and quality of project work is the ability to map the right process model to the work. To treat linear work as a jumbled flow, for example, will not allow one to leverage the benefits of standardization. One step toward the improvement of work is to identify work activities and organize work flows around these separate models. Further improvement can be achieved by adopting a methodology (or approach) that provides guidance on optimizing work within these flows. One of these approaches is Lean.

What is Lean?

Lean is historically associated with characteristics of the Toyota Production System (TPS). An outgrowth of quality initiatives, TPS emphasizes operational efficiency along with high-quality production. Some of the essential indicators of Lean include:

- Emphasis on customer value
- Optimization of activities through a defined value stream (flow)
- Customer pull through the value stream
- Elimination of waste
- Continuous improvement

Lean begins by specifying the customer's perception of value for any defined product or service. All operations (processes and activities) are then organized toward the delivery of customer value. Processes and activities typically fall into three categories: those that clearly create value; those that do not create value, but are nevertheless necessary; those that are neither value-creating nor necessary (the latter constitutes waste).

The concept of flow refers to the unimpeded progression of products or services through a *value stream*. In other words, products or services are created through the value stream without wasteful activities (e.g., unnecessary delays). "Pushing" products or services through the value stream is typically encountered in operations where products are processed in batches and wait in queues at stages of the production cycle ("batch-and-queue"). With Lean, the

product is "pulled"—that is, initiated by a customer signal of demand, with processing occurring only when needed by the next succeeding stage in the production cycle, and only in the required amounts. The concept of waste is identified in Lean by types of waste and is further described below. Finally, the quality foundation of Lean is underscored by its emphasis on continuous improvement, aspiring toward perfection.

With the Lean approach, there is a premium on efficiency in the flow of work. All impediments to speed and flow are analyzed, the root cause of each is determined, and fixes are implemented. These impediments might be experienced as backlogs, bottlenecks, or defects, to name three types of problems that are frequently encountered in IT project environments. To support analysis and improvement of problems, Lean uses a variety of tools, such as value stream mapping, 5S, Kaizen, A3

Reports, mistake proofing, and leveling. Each of these is described briefly below.

Lean Tools

Value stream mapping (VSM) is a tool for representing value streams and identifying which activities within the flows add value and which do not. A typical VSM exercise will often reveal many examples of waste.

5S is a method often used to help create a lean production environment. It is based on team participation and includes attention to the following:

- Sort—organize and separate what is necessary for work, and what is not
- Straighten—arrange work materials for ease of use
- Shine—keep everything clean
- Standardize—create a systematic way of maintaining and monitoring the environment
- Sustain—create mechanisms that provide motivation and discipline

Kaizen is a method for accelerating process improvement by deep-diving into identified problem areas. It is conducted by a team ("Kaizen team") and is a resource-intensive, time-bounded activity ("Kaizen event"). Kaizen events are well-structured, short-duration activities (e.g., 3 to 5 days), with expected outcomes that include immediate implementation of results.

“ The concept of flow refers to the unimpeded progression of products or services through a value stream. ”

A3 Reports are one-page reports used for problem analysis and identification of solutions. They typically condense a tremendous amount of information within the one page, placing a premium on good analysis, including root cause diagnosis, implementation plan, and expected results.

Mistake proofing techniques are used both to stop mistakes before they occur and to eliminate the possibility of mistakes being passed to the next step of a process. This is essentially a diagnostic and design activity, emphasizing root cause analysis of defects and design of controls that will ensure either prevention or detection prior to any impact that the defect might have on production activities. An example of a mistake-proofing tool is a checklist.

Leveling is a technique for scheduling work so that work can flow through the value stream in an orderly, uninterrupted manner, without bottlenecks or other symptoms of unorganized activity. By addressing possible causes of schedule or flow disruption, variations in workflow are smoothed. Applying leveling techniques can range from the simple (reduce the number of projects) to the sophisticated (use of scheduling tools that account for resource utilization, lead time, or task priority).

Elimination of Waste

Lean has a typology of waste that includes the following:

- Overprocessing—unnecessary data capture, data entry, or data analysis
- Transportation—excessive handoffs during task execution
- Motion—inefficient task routing or task switching
- Inventory—unmanaged or unnecessary work-in-progress
- Waiting—delays of any sort (including, for example, waiting for approvals)
- Defects—defects of any sort (as judged by the customer)
- Overproduction—unnecessary features not specified as having value to the customer

There is an often-cited “8th waste,” the waste of human potential that one might associate with the frequent declines in quality that characterize many service operations, including IT, and are frequently attributed to poor morale, lack of training, inefficient resource allocation, and so forth.

Elimination of waste is a good touchpoint for IT project managers, since it is not uncommon to observe wasteful activities within IT projects. The conventional Lean way of dealing with waste is to identify it, understand its root cause, and using the Lean tools, eliminate it.

Lean Project Management

The concept of *lean* projects might be thought of, quite simply, as the application of the Lean approach (its principles and tools) to project work. In addition, there are characteristics within variants of Agile or Critical Chain project management that can be viewed as consistent with the Lean approach.

One can argue that projects by their nature are based on customer pull, since some initial customer request serves as the initial signal to commence work. However, in practice, project work typically becomes bogged down in scope and resource complexities, and any connection to the initial pull signal becomes distorted over time. Incomplete requirements, changing scope, resource conflicts, and discontinuous scheduling become the norm for many projects. There is, in addition, a huge “inventory” burden in many projects, where work-in-progress becomes stalled for lack of resources (of any sort, including time and attention). All this becomes the area of central interest in adopting the Lean approach.

The general approach to addressing these problems is to identify the corresponding value stream map for the project work flow, identify areas of waste or other trouble spots (bottlenecks, delays, backlogs) and do in-depth analysis to determine the root cause of these problems. With the current (as-is) value stream understood, a future (to-be) state can then be designed. Implementation may be done in such a way that new practices are put into place rather quickly, and adjustments are made in real time to get it right. The goal is to gain greater efficiency and/or quality outcomes, so putting in place measurement systems that can determine progress toward desired objectives is also essential. The overarching aim is to see tangible improvements to work.

There are a few simplifying techniques that can assist in penetrating the maze of typical projects. One approach is to simplify the management and team structure, so that lines of responsibility are clear and intra-team communication is facilitated. Another approach is to reduce the scope of the project, and focus on quick implementation of project deliverables, with frequent customer checks to validate requirements or value received. For larger projects, phases and deliverables can be defined in such a way that there are fewer resource complexities within each phase. Flow and pull of small work deliverables can be organized in such a way. One of the purposes of generating short-term deliverables is to validate deliverables on an ongoing basis. In so doing, a Lean project might possibly identify milestones in hours or days, rather than weeks or months (milestones become “inch pebbles”).

The Role of Governance

This brief description of how Lean may be applied to project work brings us full circle. As project work is improved, many issues will surface that require robust governance mechanisms to address them. These may involve project alignment for business value, project/portfolio mix, resource organization and assignment, and so forth. Above all, Lean approaches do not work without committed management support, and this is most importantly the concern of governance. We address issues of governance in a companion paper, titled “IT Project Management: The Role of Governance.”

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Judy Gerber and Howard Williams, PMP, together have over 40 years' experience in the IT industry. Judy has worked as an IT manager with several large corporations, and also as a governance and PMO manager, most recently within Hewlett-Packard's services organization. She has post-degree training in Governance, Project Management, and ITIL. Howard is an ITIL process consultant for Hewlett-Packard, with career experience in both governance and project management. Howard is a Project Management Professional (PMP) and an ITIL® Service Manager.