

Stage-Gate Project-Management Process in the Oil and Gas Industry

Management teams speculate on major capital projects to drive company performance. Capital committed to megaprojects has increased at a compounded average growth rate of more than 12% during the last decade, and this trend is expected to continue over the next decade. To manage the shareholder value that is at risk in these projects, most companies have invested heavily in a formal stage-gate project-management process (PMP). Yet the performance of major projects has not improved appreciably, and significant project failures—both technical and economic—continue to occur. Key organizational and technical shortcomings that diminish project performance are identified, and actions that management can take to gain significant competitive advantage are suggested.

Introduction

Spending in excess of U.S. \$2 billion over a 5-year period for a single project is accepted. Most companies have adopted a stage-gate PMP to manage these projects. While differences exist, there is much similarity among the different PMPs. For this paper, the process and nomenclature shown in **Fig. 1** are used. The focus is on the first three phases of the PMP because they are most relevant to petroleum engineers.

This article, written by Technology Editor Dennis Denney, contains highlights of paper SPE 102926, "The Good, the Bad, and the Ugly of the Stage-Gate Project-Management Process in the Oil and Gas Industry," by G.W. Walkup Jr., SPE, SDG, and J.R. Ligon, SPE, Consultant, prepared for the 2006 SPE Annual Technical Conference and Exhibition, San Antonio, Texas, 24–27 September.

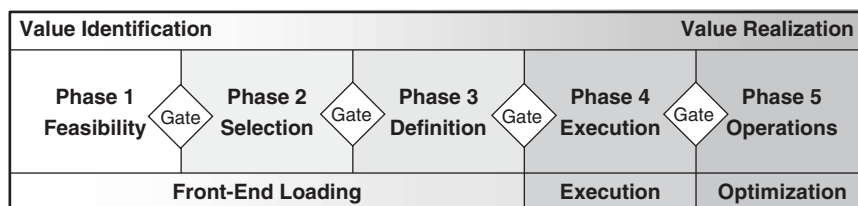


Fig. 1—Stage-gate PMP outline.

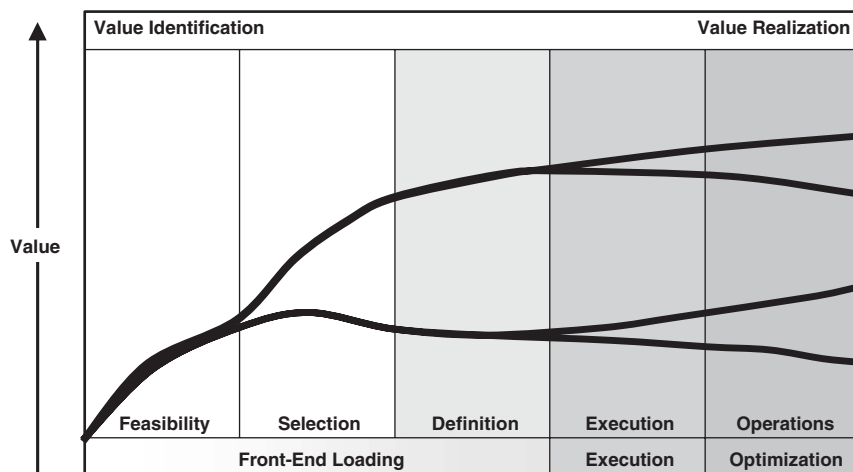


Fig. 2—Value creation in a PMP.

PMP Overview

A PMP should create greater shareholder value from major projects while simultaneously protecting people and the environment. **Fig. 2** is a model of how shareholder value is created, beginning with value identification and ending with value delivery. The role of a PMP in this value-creation cycle is to improve value identification through improved decision quality and to improve value delivery through improved project execution.

The five-phase stage-gate process in **Fig. 1** is the PMP that has evolved from companies' beliefs about shareholder-value creation and management's ability

to influence it. Three of the five PMP phases are focused on value identification, and frequently they are referred to collectively as front-end loading (FEL). Each phase has a specific goal and ends with a decision to move the project to the next phase, redo the current or prior phase, or drop the project altogether. The exception is that the final phase, Operations, has no terminal stage-gate decision.

In most implementations of PMP, Phase 1 starts after exploration and delineation (although several firms have delineation in Phase 1) and the end of Phase 3 is the final-investment decision (FID). Thus, the first three phases may

take significantly less time than Phase 4, Execution, when procurement and construction occur. Phase 5, Operations, will last for several years, much longer than the other phases combined. The emphasis on FEL is not because of the number of activities undertaken, which is more a function of time, but rather because of beliefs on how best to affect value creation.

The discipline of the stage-gate process allows the right decisions to be made at the right time by the right people. A disciplined decision process is integral to a PMP. Most companies have recognized that the organizational and content complexity of the decisions associated with major projects makes a formal-dialogue decision process critical. The PMP defines how the decision makers—the decision review board (DRB)—interact with the project team to build quality into the project.

Phase 1—Feasibility. The feasibility phase should answer very basic questions. First, is the project feasible? The answer requires consideration of technical and nontechnical issues. Testing alternatives may be necessary to answer the question, but very few firms would consider this testing sufficient to address whether the project should be done, which is reserved for the second phase. Second, if the project can be done, is it aligned with the company's strategic intents from corporate and regional perspectives? Third, who are the other key stakeholders (broadly defined to include competitors), and how would the project align with their strategic intents? An initial identification of full-life-cycle risk factors is done to inform future planning and staffing. The project team then recommends whether the project should proceed to the next phase and, if so, prepares a plan for moving forward. This plan identifies key work activities and required resources and clarifies future decision processes. The phase ends with the DRB deciding whether to proceed and how.

Phase 2—Selection. The goal of the selection phase is to identify the best development plan. In this context, determination of “best” requires the DRB to be explicit in how to trade off multiple value drivers. Additionally, the term “development plan” is defined very broadly. The selection

phase includes a disciplined innovation process to identify a wide range of development and commercialization concepts, as well as an evaluation process that captures the best available information. This evaluation process is targeted at shareholder value, while allowing the DRB to make explicit tradeoffs between compelling choices.

The selection phase concludes when the DRB decides which alternative is best and whether to continue to the next phase of the PMP on the basis of the project team's evaluation of alternatives and an updated PMP plan.

Phase 3—Definition. The plan from the selection phase contains insufficient detail for the DRB to make the FID and to begin procurement and construction. Achieving that level of definition detail is the goal of the definition phase.

At the end of the definition phase, the DRB makes the FID. Typically, its signing authority is insufficient for the FID, so the DRB acts as proxy for those with signing authority. The responsibility for the quality of the FID rests with the DRB regardless of the specifics of signing authority.

Phase 4—Execution. For megaprojects, the execution phase is straightforward. It means the tendering, procurement, and construction of the defined plan. The simplicity of this definition is not intended to mean simplicity of workflow. Execution involves hundreds of company staff and most likely thousands of contractors. The project-management skills involved have long been recognized as special and needed.

The PMP can be used for a variety of projects including those for which construction does not apply. An example is development of a new-country-entry strategy for a marketing organization. The execution phase then might involve placing marketers in new office locations.

Phase 5—Operations. The importance of this phase is that this is when much of the learning occurs in the PMP. World-class implementations of PMPs include formal project reviews to capture lessons learned to improve future projects.

PMP Failures

In practice, a significant gap exists between the ideals of the PMP and

reality. In a recent survey of project professionals, two-thirds of the respondents indicated that more than 25% of their projects had “major problems.” The most common behaviors observed that lead to PMP failures were studied. The major-failure modes and areas for quickest improvement can be grouped into three categories: leadership, value discipline, and stakeholder engagement.

Failures of Leadership. Leadership differs from management. Leaders do four things.

- Establish direction.
- Align people.
- Motivate and inspire.
- Create change.

Frequently, leadership is interpreted as the purview of those “in charge”: presidents, business-unit managers, or decision executives. Yet this top-down, command-and-control type of leadership may, in fact, be part of the problem in that everyone is expecting someone else to lead. Rather, everyone involved in a PMP has a leadership role. Successful leaders do the following.

- Understand their personal strengths and weaknesses and their companies' values and worldviews.
- Confidently innovate and adapt to embrace an uncertain and dynamic world.
- Engage others with a positive and caring attitude.
- Energize themselves and others through heroic ambitions.

Examples of how a lack of leadership in a PMP has limited the value creation of major projects include the following and are detailed in the full-length paper.

- DRB's lack of decision-quality ownership.
- Assuming that a single plan fits all applications.
- Breakdown of project governance.

Failures of Value Discipline. These failures include the following.

- Tyranny of compliance.
- Information omission.
- Oversimplistic valuation.
- Failure to fit regional or corporate strategy.

Failures of Stakeholder Engagement.

Most major projects are conducted within some form of partnership. Yet recent evidence suggests that these partnerships may not be effective. A survey

of both operators and nonoperator partners identified the “decision-making process” as the biggest problem. Many perceive that a PMP is not helping and is hurting the relationship between the operator and the other partners. The effectiveness of the PMP is based on improving decision quality by implementing a dialogue decision process.

Conclusions

Each of the failure modes has been successfully eliminated by high-performing project teams, and companies have eliminated these failure modes. The following “top 10” corrective actions are based on observations of success and are recommended as the steps to achieve differentiated value growth from major projects.

Leadership.

- Invest in building the leadership capabilities of existing DRBs by developing an active DRB-coaching and -mentoring program. This step is the greatest single action that companies can take to create additional value from existing projects.

- Begin, in earnest, to build a sustainable project-leadership pipeline at the DRB and project-team-leader positions to meet the future needs of the company.

- Ensure sustainability in project-leadership capability by establishing a project-leadership community. Emphasize attracting individuals with subsurface expertise to this community and retaining them in it.

- Develop the means to hold DRBs responsible for decision quality, not process compliance.

- Ensure that within Phase 1, Feasibility, the complete governance model is defined and that it includes roles for key players outside the decision process (e.g., functional line management), clarity between expenditure authorization and decision-quality ownership, and the project team’s role (or lack thereof) in selecting alternatives.

Value Discipline.

- Complete, no later than the Feasibility decision point, a regional strategic framework on which to

establish individual projects that ensures competitiveness and provides an “outside-in” business context (i.e., Phase 0).

- Create a real choice that is critical to project success by developing state-of-the-art approaches that draw from other industries, and hold project teams and DRBs responsible for the quality of the range of alternatives identified.

- Develop the ability to evaluate a project team’s performance in maintaining a decision-driven PMP throughout FEL, and charge the DRB with the responsibility for this evaluation.

- Invest in improving valuation capabilities to ensure that optimal alternatives are identified within a project and that any ranking of projects is done correctly.

Stakeholder Engagement.

- Develop an operator/nonoperator dialogue process that is congruent with the PMP to ensure that better decisions are made by bringing more expertise into the decision process and that project execution is optimized by eliminating value-destroying delays. **JPT**