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The Good, the Bad, and the Ugly of the Stage-Gate Project Management Process in the Oil and Gas Industry

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Abstract

Management teams across the globe have and will continue to bet on major capital projects to drive their companies' performance. Capital committed to these mega-projects has increased at a compounded average growth rate of over 12% over the last decade, and this trend is expected to continue over the next decade. To manage the shareholder value at risk in these projects, almost every major oil and gas company has invested heavily in a formal stage-gate project management process. Yet the performance of major projects has not appreciably improved, and significant project failures—both technical and economic—continue to occur.

We have investigated how the application of these state-of-the-art processes has gone astray in the oil and gas industry. We identify the key organizational and technical shortcomings that are diminishing project performance and suggest the top-ten actions management can take to gain significant competitive advantage.

Introduction

Mega-projects in the oil and gas industry are truly “mega.” Spending in excess of US\$2 billion over five years for a single project would raise no eyebrows. Most players have adopted a stage-gate project management process (PMP) to manage these projects. While cosmetic differences may exist, our experience has been that there is much more similarity than difference among different companies' PMPs. For this paper, we use the process and nomenclature shown in Figure 1. An overview of each phase in the PMP is presented below. (More detail on PMP can be found elsewhere.¹⁻³)

The authors have played many roles on projects with a formal PMP for different companies all over the world. Combined, we have worked on over 70 projects as team members, team leaders, management consultants, and decision review board members for more than 15 firms on projects in over 20 countries. While some primary and secondary data are used, conclusions are based principally on this real-world experience. The conclusions are the opinion of the authors and not necessarily of their current companies. The focus is on the first three phases of the PMP because they are most relevant to petroleum engineers.

PMP Overview

A PMP is meant to create greater shareholder value from major projects while simultaneously protecting people and the environment. Figure 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.

Most companies believe that management's greatest influence on value is early, during value identification (Figure 2). A company would rather have identified a great project, chosen a world-class way to develop it, and have had mediocre execution of the development plans than to have had a mediocre asset with a marginal development plan that was executed in a world-class manner.

The PMP that has evolved from companies' beliefs about shareholder value creation and management's ability to influence it is the five-stage-gate process (Figure 1). Three of the five PMP stages are focused on value identification, and frequently they collectively are referred to 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 a number of firms have delineation in Phase 1) and the end of Phase 3 is the final investment decision (FID). Thus, the first three phases may

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take significantly less time than Phase 4, Execution, when procurement and construction occur. Obviously, Phase 5 (Operations) will last for years and thus 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 impact 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 thus integral to a PMP. Most companies have recognized that the organizational and content complexity of the decisions associated with major projects make a formal dialogue decision process (DDP)⁴ critical (Figure 3). The DDP defines how the decision-makers—the decision review board (DRB)—interact with the project team to build quality in.

Phase 1 - Feasibility

The Feasibility phase, frequently called the Identify phase, is meant to answer some very basic questions. First, is a project feasible? Can it be done? The answer requires consideration of technical and non-technical issues. “Testing” alternatives may be necessary to answer the question, but very few firms would consider this testing sufficient to address the question of *how* it should be done, which is reserved for the second phase. Second, if it can be done, is the project aligned with the company’s strategic intents from a corporate and a regional perspective? Third, who are the other key stakeholders (broadly defined including competitors) and how would the project align with their strategic intents? An initial identification of full lifecycle 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 road map for how to move forward. This road map not only identifies key work activities and required resources, but also 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, “development plan” is very broadly defined. 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 trade-offs between compelling choices

Companies commonly conduct a number of “quality review” processes in this phase. Typically, experienced teams (e.g., reservoir management) external to the project team and the DRB will review data and/or evaluations for functional quality and report their findings to the DRB. These quality reviews

are outside the decision process and are meant to inform the DRB members, who are responsible for decision-making and own decision quality.

The Select phase concludes when the DRB decides which alternative is best and whether to continue to the next phase of PMP based on the project team’s evaluation of alternatives and an updated PMP road map.

Phase 3 – Definition

During the Selection phase, a development plan will have been chosen, but the plan detail is insufficient 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.

Most firms implement a number of value-improving processes (e.g., value engineering) to ensure that the fully defined plans allow for world-class execution and operations. In that sense, the Definition phase is the true transition point between value identification and value delivery in Figure 2.

At the conclusion 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 mega-projects, the Execution phase is straightforward. It means the tendering, procurement, and construction of the defined plan. Obviously, the simplicity of this definition is not intended to connote simplicity of work flow. 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 is very flexible and can be used for a variety of “projects” including those for which construction does not apply. An example is using the PMP to develop a new country entry strategy for a marketing organization. The Execution phase might then involve placing marketers in new offices locations.

Phase 5 – Operations

Operations are self-explanatory. The importance of this phase is that it is when much of the learning occurs in the PMP. World-class implementations of PMP recognize this and include formal “project reviews” to capture lessons learned to improve future projects (not to punish the guilty!).

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 respondents indicated that more than 25% of

their projects had “major problems.”⁵ Here, we discuss some of the most common behaviors we have observed that lead to PMP failures. 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 (Table 1). According to Kotter⁶, 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. Lowney⁷ describes this universal type of leadership well: Successful leaders

- Understand their personal strengths and weaknesses and their companies’ values and world views
- 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

Below are examples of how a lack of leadership in PMP has limited the value creation of major projects.

The DRB’s Lack of Decision Quality Ownership

Improving decision quality (DQ) is one of the reasons to use a PMP, but too often no one explicitly owns DQ. Details of what DQ is and how it can be managed are available.⁸⁻⁹ The DRB is, by definition, charged with ownership of DQ and its role is to align all stakeholders with DQ and motivate and inspire project teams to stay focused on DQ throughout the PMP. In this sense, the DRB’s lack of DQ ownership is a failure of leadership.

A couple of examples are instructive. During the Selection phase, a key dimension of DQ is the range (from “mild to wild”) of alternatives identified. Yet most DRBs are concerned more with project schedules and rarely encourage the creativity necessary to achieve quality alternatives. Many DRB members are not aware of what behaviors would in fact foster creativity. For example, leadership might include explicitly “protecting” the team from functional line management during the ideation and alternative generation steps. Functional line management rightly has high availability biases (“we can’t do that because we’ve never done that”) as part of its charter but they can bias the project team exactly

when biases should be minimized. In addition, since the vast majority of alternatives that are identified will ultimately be discarded; DRBs attuned to their leadership roles will appreciate the risks individuals take when promoting novel ideas and will celebrate novel ideas that ultimately are not chosen.

Another troubling aspect of DRBs failure to own DQ is in their interaction with quality review teams (QRT’s), especially during the Selection phase of the PMP. It is common for a DRB to abdicate its DQ role to the QRT rather than understand that the QRT is its agent. For example, on technology-driven projects a QRT may find that the level of uncertainty is significantly higher than is usually acceptable. This finding does not, in and of itself, constrain the DRB to rejecting a project team’s recommendation to move forward. Rather, it is the DRB’s responsibility to make the trade-off between risk and reward, by ensuring that the range of alternatives considered was robust, that the data used were unbiased and from the best sources, and that the evaluation process was logical and defensible. It may be quite appropriate to accept the higher level of uncertainty, especially if the project’s strategic alignment with corporate goals is to achieve a first-mover advantage.

Figure 4 presents examples of DRB behaviors that reflect DQ ownership and leadership. Clearly, high-functioning DRBs require substantial time commitment from their members. This challenges many companies’ practice of having individuals being members of DRBs for dozens of projects simultaneously. Further, the common practice of assigning individuals to DRBs without reducing other commitments is obviously a recipe for poor DQ and poor leadership.

Ownership of DQ is critical for true improvement in project performance, and leadership is needed whenever this type of change is desired. Companies need to invest in building the leadership capabilities of their current DRBs, as well as of those in the pipeline to be DRB members on future projects. It is self-evident that this improved capability must be matched with organizational and reward systems that are congruent with DRB ownership of DQ and the leadership role of the DRB.

One Size Does Not Fit All

As might be expected in a business that has so many JVs and other direct forms of interaction, the implementation of PMP has followed a very similar pattern in most companies. Strong leadership to achieve competitive advantage from PMP has been lacking. As Lowney⁷ suggests, leadership requires a sober assessment of true competitive strengths and weaknesses and consideration of the company’s own world view and values. These assessments appear to be lacking from most PMP implementations, with most firms assuming one size fits all. But this seems counterintuitive given the significant differences in asset base, capabilities, and decision culture of oil and gas companies. As a result, differentiated value growth due to a PMP has not occurred. Differentiated growth can occur only when the PMP is implemented and executed to fit a

company's individual characteristics.

Another example of the one size fits all failure mode is reverse-engineering another firm's PMP implementation. Again, the problem is that one company's implementation should be different from another's because the asset base and the decision culture are different. Consider an aggressive acquire-and-exploit superindependent and an international supermajor. The PMP should be tailored to the specific needs and abilities of these very different firms, but in practice they are likely to be the same. This is a failure of leadership to define and sustain the vision of PMP based on a sober assessment of individual strengths and weaknesses.

Another version of one size fits all leadership failure is in the flexibility of the PMP. It is common for a firm to be too inflexible on particular types of projects and too flexible on other types.

An example of inflexibility is when companies require use of the PMP for all projects over a certain cost level (e.g., \$30 million) regardless of how many times the same decision may have already been made with no change in information or business environment. As a result, every well in a development program is required to go through every work step of the PMP when obvious simplifications are warranted. This rigid application destroys value, and it is a lack of leadership that allows this to occur.

Another common example of inflexibility is when management requires teams to pursue the same road map (work flow and decision process) for all projects. These road maps are based on the proven DDP,⁴ which is quite flexible (Figure 5) although this level of flexibility is rarely used. Consider a project with a JV that requires all parties to agree on a strategy before development (no opt out clause). It may then be very important to add an extra DRB meeting (assuming all JV partners are represented on the DRB) for the DRB to decide whether the information is of sufficient quality to proceed with evaluation.

At other times, we have observed firms being too flexible, deciding to change the PMP because a project was "too important" or "strategic" to be exposed to perceived delays caused by following the PMP. Some companies have made significant alterations of the process to "fast-track" projects. Interestingly, it is not uncommon for over 50% of projects to be fast-tracked. Speed can be very important, especially when a first-mover advantage is available; but that does not mean the process should be abandoned. It means that the DRB can accept higher risks for the chance of higher returns by limiting work flows designed to reduce uncertainty. The PMP is quite flexible in this regard. Yet leaders often do not understand how flexible the PMP is and eliminate whole portions of the process. It is common to eliminate or drastically reduce the exploration for and evaluation of competing development alternatives—this despite the fact that PMP was built on a belief that this is where management has the greatest impact on value (Figure 2). Another version of this PMP compression is putting Phase 2 activities (e.g., identification of

alternatives) into Phase 1 or putting Phase 3 activities in Phase 2 (e.g., detailed design). The frequent result is that this increases the duration of a PMP.

Breakdown of Project Governance

As companies move a project through the PMP, a subtle but important shift takes place: issues are resolved, a recognition of highest value path evolves, and the opportunity becomes more defined and ready for execution. Somewhere along the way, as the "opportunity" becomes a "project," many firms perceive proactive involvement of others and exploration of new ideas as burdens that will result in costly overruns. Quality governance is making sure that the roles and responsibilities of decision-makers, project managers, project team members, and wider stakeholders are appropriate.

A classic governance breakdown is when project teams or project team leaders overplay their role and develop an advocacy position, believing that they should make a recommendation to be approved by the DRB. While a project team may have a preferred alternative, and it is completely appropriate that they share that with the DRB, the team should not advocate that alternative. Nor, should the project team eliminate alternatives they deem inferior as they are not in a position to make the trade-offs that the DRB must make. This happens both internally within the operator and externally with partners and other stakeholders. When the project teams/leaders enter advocacy mode decision quality is diminished. The job of the project team/leader is not to filter the alternatives but to ensure the DRB, which owns DQ, has full clarity on the evaluation and can make clear trade-offs among the alternatives. Advocacy is a key failure mode that results in perspectives left unexplored and ultimately may lead to projects getting off track.

The tone for governance is established in the first phase (Feasibility), especially during framing when the collaboration of the many parties is established. DRB members in particular need to allocate significant time to this phase, as this is when they can have the highest value impact and when they can ensure that all levels are resourced for success. Too often, governance breaks down because DRBs do not dedicate the time to contribute to DQ.

Project team staffing is a critical decision that is too frequently not accorded the importance it should. Frequently, staffing can become more of an issue of who is available than who is best suited given the characteristics of the projects. Commonly we see teams significantly understaffed and then asked to "fast-track" the projects.

These problems with staffing, either at the DRB or team level, obviously create significant project risk; however, it is critical to also understand that when different levels of the governance structure are not staffed correctly, governance will be corrupted because of the organizational imperative to keep the project moving forward. Obviously, improper staffing will have other effects, but the negative impacts it can have on governance can be pronounced.

A final example of project governance breakdowns is how functional line management commonly participates in the PMP, especially in interacting with the project teams. Ideally, functional management ensures that project teams have access to functional experts to provide the best information; however, in practice, functional line management interjects itself into the decision process. This puts the project team members in a significant quandary, given that while their work product flows to the DRB, their evaluation and careers are managed along functional lines. What we have seen most commonly is that functional management will dictate more complexity and detail in all analysis than the DRB really needs to make the decision. This is usually done without the knowledge of the DRB (which is usually too busy to be dialoguing with the project team). This additional work can double the time for Phases 1 and 2 of the PMP. Further, since line managers are not part of the dialogue decision process, they do not understand the full value chain and express strong biases not to try new and different solutions. This is not to say the opinions of line management are not important; they are. However, to preserve a governance that will lead to DQ during FEL, and thus to higher value projects, this type of interaction must flow through the DRB and not the Project Team.

Some leading companies have recognized the failures of leadership within the PMP and have begun to invest in improving it with the explicit intent of capturing competitive advantage. We believe that this will be very successful, especially if these companies leverage outside resources and focus not only on today's needs but also on creating a pipeline of leaders for tomorrow's projects.

Failures of Value Discipline

The Tyranny of Compliance

PMP is about creating maximum value from projects through better decision-making and improved execution. During FEL, the emphasis is on improved decision-making. However, the links between PMP, decision quality, and improved value creation have been severed at most companies. Most typically, the PMP is linked to compliance and assurance. Thus, it has morphed from a value-maximizing endeavor to a risk-mitigation process. While risk management is important, it is a poor proxy for value maximization.

Examples of this compliance/assurance mindset are plentiful, with the most common outcome being that most PMP implementations have become activity driven rather than decision driven. Companies "train" project leaders by requiring them to master the hundreds of reports that must be filled out as proof of PMP compliance. According to this mindset, if these reports are logged, then the PMP is working.

Likewise, it is common for the PMP to specify a level of complexity of technical work to be performed in a certain stage. In reality, the level of complexity of technical work that is appropriate varies from project to project. The question not

asked, if one has a compliance/activity-driven PMP rather than a decision-driven PMP, is what level of work is needed to make the decision appropriate to wherever the project is in the PMP. The project team needs to identify the key subsurface drivers and uncertainties for the decisions at hand. Often, focusing on details and complexity in reservoir models or other technical work to meet PMP requirements or other company standards can prevent the team from identifying the full range of uncertainties in the key drivers. The goal is not to eliminate uncertainty but to make decisions that are robust in the presence of uncertainty

The same is true when companies require that cost estimates fit a fixed distribution as a function of the PMP phase. For example, we have seen companies prohibit projects from leaving Phase 2 unless the uncertainty about all costs is within a $-10\%/+25\%$ range. How can such a requirement relate to the quality of information needed to differentiate alternatives (the goal of Phase 2)? The result is an activity-driven PMP that will search for alternatives for which this tolerance can be reached and that provides a strong bias against other more uncertain alternatives that could dominate the more certain cost alternatives from a value perspective. There is another very serious technical problem with requiring uncertainty to fit a given distribution regardless of the nature of the alternatives. It creates a potential for motivational bias that seriously jeopardizes information quality. Given the uncertainty in world steel markets or the construction costs in oil sands, for example, how would any project actually pass this type of hurdle, unless bias is affecting the assessments?

This compliance/assurance behavior is complex and multifaceted. Clearly, it is partially due to a risk-averse culture that believes, consciously or not, that compliance will drive risk out of projects. However, when teams become activity driven, it is clear they will then be exposed to biases and will work on what they know rather than what is decision relevant. Thus, compliance focus can actually increase risk.

The Sins of Omission

During the Execution and Operations phases of the PMP, when something goes wrong the impacts are obvious and the associated corporate pain is keenly felt. These "sins of commission" can affect value, safety, and the environment. During FEL, "sins of omission" are a much greater source of value destruction, but companies rarely feel this pain. Sins of omission occur when a company does not do something that it could to capture value, as opposed to doing something incorrectly. A recent survey⁵ of professionals confirms the significant value lost because companies miss opportunities they should have captured (Figure 6). In addition, the greatest identified source of value lost was as not considering a quality range of alternatives

The failures of governance and the culture of compliance discussed above are reasons companies lose value from errors of omission. However, a number of biases also drive this value destruction. For example, there is an extremely strong motivational bias for teams to focus on project approval, as

opposed to value maximization. Teams are rewarded for completion, usually the faster the better. Rarely do they even capture estimates of value “left on the table.” Another key bias that increases the losses due to sins of omission is a comfort zone bias. There is a strong natural bias toward the known over the unknown, so teams are strongly biased against considering alternatives that are outside their expertise or that have not been done before. Comfort zone bias also results in viewing uncertainty as an evil to be avoided, which eliminates the other side of uncertainty; namely, the source of opportunities and potential value creation.

While sins of omission occur for number of reasons, the result is always the same. Projects are developed in less valuable and more risky ways than if the companies had considered a richer strategic context (in Phase 1) and developed more innovative and creative alternatives (in Phase 2).

Consider the real case of a company that was concluding Phase 2 of the first deepwater project in a West Africa country that had extensive deepwater potential. After almost two years of PMP, the company was ready to choose a “development concept.” The team was happy to be moving the project forward, functional experts were happy that a known facility concept (FPSO) was chosen, and all seemed fine until newly installed management began to ask questions like, does the development concept support our corporate strategy to focus on this country as our newest core area? How will this project interact with our and competitors’ exploration prospects? Are we raising barriers to competitive entry or lowering them? How will the regional competitive landscape impact our plans given the need to gather gas and limitations on regional gas sales? Should we be considering partnering with in-country firms? Unfortunately, the team was in no position to answer these questions because it had narrowly defined the “project” as a facility selection decision only.

The most common elements of real choice ignored by project teams are a regional strategic perspective (see below), broadly defined stakeholder issues, competitive positioning, and full commercial life-cycle planning (e.g., future managerial flexibility). In contrast, most teams are much too focused on facility selection and conducting familiar technical analyses (as discussed above in the Tyranny of Compliance).

The Heartbreak of Valuation

The heartbreak of valuation is that even when companies break through all the barriers and create truly innovative and creative alternatives that are conditioned by a compelling strategic context they ultimately choose suboptimal alternatives, not because they use bad data to define the alternatives, but because they use overly simplistic valuation methods that distort the relative value of the alternatives. For most firms, valuation begins and ends with a calculation of NPV from a set of calculated cashflows. To get these cashflows, companies invest significant resources estimating (probabilistically in most cases) costs, schedules, and production rates. A significant fraction of companies put considerable thought into how fiscal and regulatory terms may

evolve. The last step is defining prices, which almost always are provided to project teams from some corporate group. To assess value from these cashflows, project teams use a simple risk-adjusted discount factor that is again almost always provided to them.

In theory, this status quo process could work but in practice it does not for a number of well-known but almost universally ignored set of reasons. First, for most firms, the price curves used are not actually expected prices; rather, companies decide to control expenditures by using “conservative” prices. In fact, many companies have boasted of their conservativeness in this regard. The expressed logic is that by using conservative price forecasts, they can be sure the projects are robust and that only the best projects will be funded. This second reason requires an assumption that the company is capital constrained to be even internally consistent, much less to be correct. The fact that the price curves are not expected prices but are risked is critical to valuation, both to the absolute valuation and the relative valuation of the alternatives. Thus, firms mix expected costs with risked revenues to generate a set of cashflows that are neither explicitly risked nor expected. Further mudding the waters is the common process used to discount these cashflows. Most commonly, companies will use their corporate weighted cost of capital (WACC), which they fully understand does not reflect the nature of risk for any particular project but expect that it will be right “on average” and provide the best ranking of projects to fund. Again, this requires the assumption of being capital constrained to be internally consistent. Another more hidden assumption, but one that can distort relative valuation of alternatives, is that the nature of risk is the same for all time as only a single discount rate is used. Even worse, some companies knowingly use a discount rate well above their corporate WACC. This would tend to over discount the future, which can lead to undervaluing a project or suboptimal operating leverage tradeoffs which can destroy value.

These points are not new but companies use this process for the following reasons that we address individually. First, we have heard a number of companies state that price curves are irrelevant to project decisions because the same project development decisions would be made no matter what price curve were used. This is demonstrably not the case. Figure 6, for example, demonstrates that key development decisions for a real deepwater project are a function of beliefs about prices. Further, if a company’s alternatives are rich (e.g., consider more than facilities), it is easy to show that price beliefs will drastically change project decisions.

A second argument made is that it is more important to be consistent than to attempt to be accurate because the real decision is whether or not to fund a project. Thus, while the valuation may be inaccurate, consistency will produce a ranking that allows a company to know which are the best projects to fund. This would be a compelling argument if two conditions were true. First, the relative valuations of alternatives within a project are not distorted by the valuation approach so the “best” alternative is being used in the corporate ranking. Second, the nature of “error” in the

valuation approach must not allow the ranking of individual projects to be changed or that all projects get the same “haircut.” Unfortunately, neither of these conditions are true, which negates the entire argument. A further condition that challenges the status quo approach is that the whole idea of ranking is based on companies being capital constrained. While that may have been the case a decade ago, it is a rare condition in today’s world where most companies are either opportunity constrained or resource (other than capital) constrained. If a company is opportunity constrained, any ranking arguments do not make sense. If a company is constrained by resources other than capital, ranking may be needed but it should not use NPV or capital efficiency (e.g., NPV/capex) to perform the ranking.

An example will demonstrate that the common valuation approach distorts the relative valuation of alternatives within a project and also significantly alters the relative valuation among different projects. Consider a large resource that could be developed in two very different ways. A big expensive facility could be built that would have very high initial rates and high decline rates. The costs of this facility are dominated by steel costs and are thus very uncertain, and this uncertainty is highly correlated to the overall economy. The second alternative involves debottlenecking a nearby hub and committing a fairly certain stream of capital to extend the life of that facility over time. Incremental rates would be small initially, but the planned ullage after 10 years would be substantial. For purposes here, we assume the reserves of both alternatives are the same. The common valuation approach has a very predictable bias. Because of the risked price forecast and the relatively high and time-constant discount rate, the valuation will predictably significantly undervalue long-term revenues relative to near-term revenues. Less obvious is that the relatively high and importantly time-independent discount rates will tend to underestimate the impact of costs, especially highly uncertain and highly correlated costs. Thus, the first alternative will be biased high relative to the second option. Whether the bias is sufficient to switch optimal plans depends on the specifics of the case and the alternative valuation approaches used. Figure 7 is a simplified case study similar to the above hypothetical one. In this case, a company had a three-year deep water lease with delineation requirements to hold the lease. A simplified version of their choice considers that in each of the first three years they can exit, delineate (first two years only), or commit to building a small, medium, or large facility. As shown in Figure 7, the economic modeling treated delineation results influence on ultimate performance dynamically. Prices were also handled dynamically. Other uncertainties were considered statically. It is clear that both the value and the optimal strategy from the standard valuation are significantly different from that determined from a market-based valuation approach that doesn’t share the limitations of the standard approach.

The known biases of the conventional valuation approach should create predictable portfolio impacts. Specifically, large basins will likely be overcapitalized and exploration will be under-funded. The risks to sustainable competitive advantage are clear.

It is beyond the scope of this paper to describe the richness of other valuation approaches, but the key point is that other methods do exist that are more accurate under a wide-range of conditions.¹⁰⁻¹² No one approach is best for all conditions. In our experience, the most important features to capture are how the value of price exposure is determined and how the nature of risk actually changes with time. A number of no-arbitrage or market-based valuation approaches that are mechanically similar to existing approaches exist and for which a high level of corporate control can be exerted.

Lots of Trees but No Forest

Over the past decade, most companies have become very decentralized to ensure optimal execution of plans, keep costs down, and ensure accountability. Distinct benefits have been seen, but this “atomization” of the business has created difficulty for major projects: Project teams have difficulty gaining clarity on how their project fits within a regional or corporate strategy. Most commonly, a tight ring-fence is drawn around a project, and project decisions are made based on that frame. For many projects, this is simply not the best way to make decisions. Consider early projects into new plays, regions, or countries, such as many companies’ current activities in Russia or the oil sands.

Most PMPs simply assume that a strategic business context exists. Others make a small attempt to define this context in the Feasibility stage. In practice, neither approach has yielded impressive results. Rather, the result is a poor set of alternatives and a value that is not reflective of the investment.

Some companies are successfully meeting this challenge in different ways. The common feature is that companies are empowering project teams to conduct a “Phase 0” type of effort to define the business context of the project before completing Phase 1. The most valuable of these efforts has enforced an “outside-in” perspective to ensure a broad range of competitive and stakeholder issues are identified. This business context then creates a frame from which individual projects can be hung.

Failures of Stakeholder Engagement

The majority of major projects are conducted within some form of partnership. Yet recent evidence suggests that these partnerships are not very effective.¹³ From operators, it is common for “partner drag” to be a main source of schedule delays. In a recent survey, 46% of non-operator partners indicated that their most recent experience with an operator was “negative or painful” versus only 15% who indicated a “positive” experience.¹³ This same survey of both operators and non-operator partners identified the “decision making process” as the biggest problem. Thus, many perceive that PMP is not helping and is in fact hurting the relationship between the operator and the other partners.

As discussed, the efficacy of the PMP is based on improving decision quality by implementing a dialogue decision process. Other decision processes, especially an advocacy process, are ineffective. However, in practice the PMP has been implemented in such a way as to exclude non-op partners from the strategic dialogue, thus setting up an advocacy process between the operator and the partners. When viewed this way, it is not surprising the PMP is viewed as part of the problem.

A number of companies have attacked this problem head on with impressive results. Van Driel¹³ presents a practical approach to marry the PMP with an operator/non-operator decision dialogue process. An important first step is forcing the discipline to segment decisions between those that are strategic, for which all partners need to be involved, from those that are tactical, for which the operator can follow a more traditional communication style. For strategic issues, a disciplined dialogue decision process is recommended where operators more effectively use the expertise of the non-operator partners, especially during the Selection phase. In addition, the recommended approach yields fewer delays for extended review by non-operator partners.

Conclusions

All the failure modes discussed above are common, but each has been successfully eliminated by some high-performing project teams and companies. The “top 10” corrective actions summarized below are based on observations of success and are recommended as the steps to take 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 is the greatest single lever that companies have to create additional value from existing projects. Leveraging expertise outside the company to build this capability is a best practice.
- Begin, in earnest, to build a sustainable project leadership pipeline at the DRB and project Team Leader positions to meet the future needs of companies.
- Ensure sustainability in project leadership capability by establishing a “project leadership” community. Particular emphasis on attracting and retaining individuals with subsurface expertise into this community of project leaders will be critical.
- Develop the means to hold DRBs responsible for decision quality not process compliance (e.g., DQ scorecard).
- Ensure that within Phase 1 (Feasibility) the complete governance model is defined and that this 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 alternative selection.

Value Discipline

- Complete, no later than the Feasibility DSP, a regional strategic framework from which to hang individual projects that ensures competitiveness and provides an “outside/in” business context (Phase 0).
- To create the real choice critical to project success, develop state-of-the-art approaches that draw from other industries (design industry, innovation, war-gaming, etc.) 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 (if needed!) is done correctly.

Stakeholder Engagement

- Develop an operator/non-operator dialogue process that is congruent with the PMP to ensure better decisions are made by bringing more expertise to the table and that execution is optimized by eliminating value-destroying delays.

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Comparing Leadership and Management		
	Leadership	Managing (execution)
Agenda	Establishing Direction - developing a vision of the future, and strategies for producing the changes needed to achieve that vision	Planning & Budgeting – Establishing detailed steps and timetables, allocating the resources necessary to make that happen
Communication	Aligning People - communicating the direction by words and deeds to all those whose cooperation may be needed, to influence the creation of teams and coalitions that are needed to make the vision a reality	Organizing and Staffing - establishing structure for accomplishing plan, staffing that structure, delegating responsibility carrying out plan, creating methods or systems to monitor implementation
Execution	Motivating and Inspiring - energizing people to overcome major barriers to change by satisfying very basic, but often unfulfilled, human needs	Controlling and Problem Solving - monitoring results vs. plan, identifying deviations, planning and organizing to solve these deviations
Outcomes	Change often to a dramatic degree, and has the potential of producing extremely useful change	Predictability and order of results, and has the potential of consistently producing key results expected by various stakeholders

Table 1 – How do leadership and management differ?

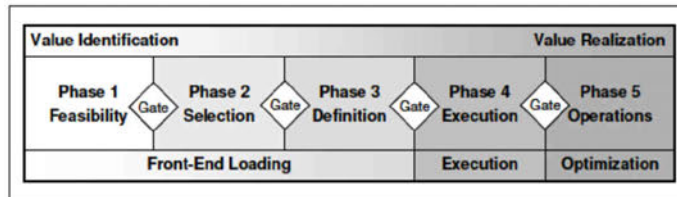


Figure 1 – Stage-gate Project Management Process (PMP)

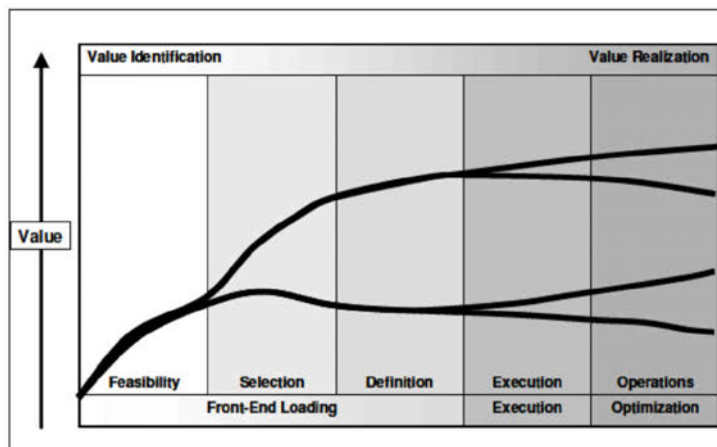


Figure 2 – Value Creation in PMP

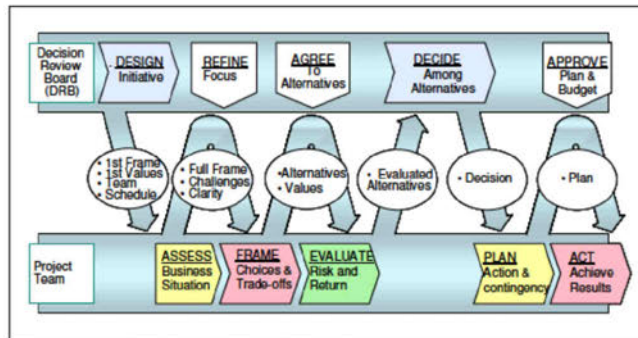


Figure 3 – Dialogue Decision Process

	Gate	Phase 1 Feasibility	Gate	Phase 2 Selection	Gate	Phase 3 Definition	Gate
Key DRB focus		<ul style="list-style-type: none"> Strategic perspective Talent management Stakeholder engagement 		<ul style="list-style-type: none"> Nurturing creativity Avoiding biases Value discipline 		<ul style="list-style-type: none"> Value assurance Organizational alignment Operational excellence 	
Reinforcing Behaviors		Proactively deep-dive on external business environment; actively participate in defining team composition; Create vision and communicate it broadly; Define governance with clarity w/ roles for all key stakeholders, including partners		Broadcast expectations of creativity, engage "customers" as creativity partners, engage team on personal level; protect team from distractions; celebrate heroic failures; Actively search for biases & external value benchmarks, discuss linkage to other portfolios		Empower quality review teams (QRTs) as agents and decide which risks for them to focus on; Establish dialogue with operational management if not represented; engage in decisions around team composition to ensure continuity and value focus	
		Front-End Loading					

Figure 4 – Examples of DRB Leadership Behaviors

Examples of DDP Flexibility

Example 1 – Adding an additional "Agreement" meeting when there is high organizational complexity focused on the data, allows the DRB to accept data quality before impact on value is revealed. This reduces biases and aids buy-in.

Example 2 – For very long projects, or when DRB's have limited availability a Steering Committee can help by being the proxy for the DRB. However, the DRB still owns Decision Quality!

Figure 5– Examples of DRB Leadership Behaviors

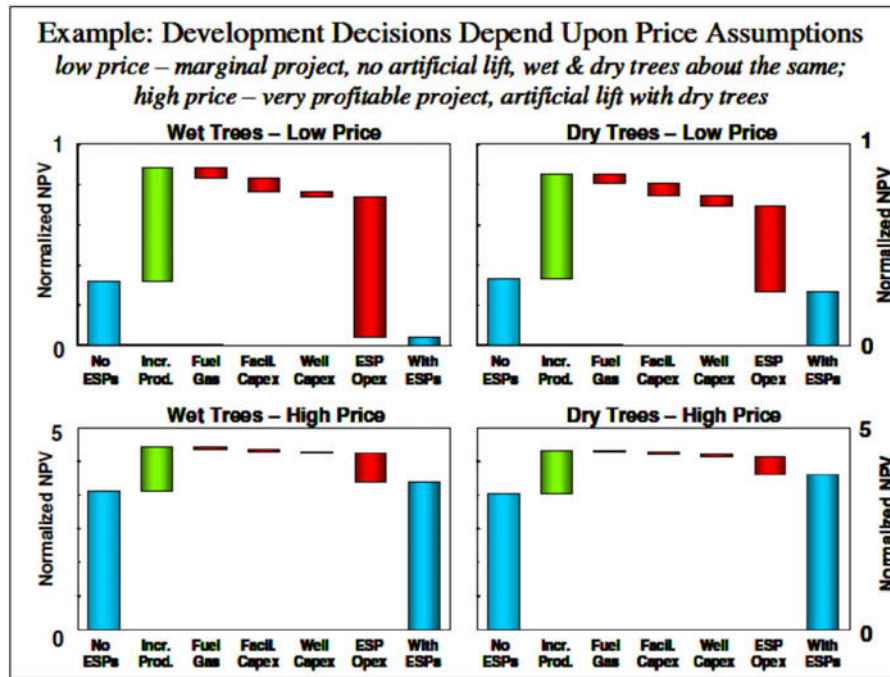


Figure 6 – Project Decisions are a function of prices expectations

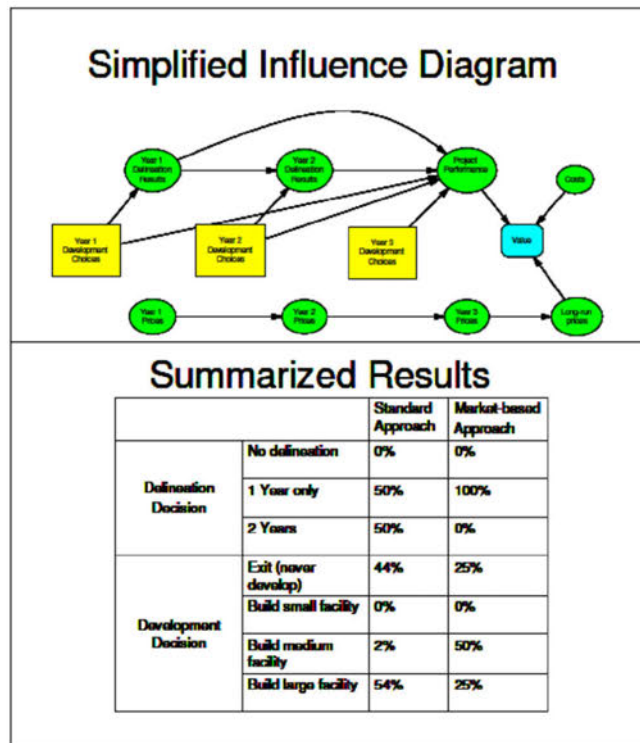


Figure 7 – Valuation Methods can greatly impact project decisions