

## **"21<sup>st</sup> CENTURY CUSTOMER VALUE – INTEGRATED TOOLSETS IN MAJOR CAPITAL INVESTMENT**

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Book : "Achieving Results: How to Create Value" go to link below, or Amazon.com  
<http://www.ttbooks.co.uk/achieving-results/index.asp>



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### **ABSTRACT**

We believe the demands of Project Teams in major capital investments in the 21<sup>st</sup> Century requires professionals supporting teams, and projects, to have a much broader skill set than those routinely expected of the "Traditional Project Team Facilitator / Practitioner." Furthermore these approaches should exhibit a consistent, repeatable process which is underpinned by both **proven theory** and record of **credible practice**.

This paper describes such a proven integrated decision process that we use to guide and to assist project teams in assessing and planning both their early asset assessment needs, & in achieving their project delivery objectives. Advanced Decision Analyses (DA), Value Management (VM), & Project Management (PM) professionals routinely use some of the tools described herein. We document a rigorous application of several traditionally diverse tools, which are now linked together in a new synchronized and rational order. Additionally we introduce some **new tools** which have proven their worth in 50 Major Capital Investment Workshops over the last 3 years.

During early project stages, this integrated DA and VM approach has led to a better understanding of the business (project) opportunity and allowed Project Teams to develop a viable and compelling project execution plan for Management consideration. At strategic points during the early project cycle, the concepts of Analyses of Function can be utilized to frame the functional (organizational) work requirements. This framing is necessary to deliver a rigorous "Investment Support File." Consequently, Management will be able to make informed choices about major capital investment, while having a better understanding the Quality of the Decision being made.

Some major concepts addressed in this paper are Tools and an Overall Business Process:

- How to Apply Phased Investment aligned with Corporate Strategy.
- How to Frame the Results to be delivered by the Opportunity / Project.
- Understand the Business and Social Priorities.
- Engage the Multidiscipline Project Team in Decisions to be made and Uncertainties to be addressed.
- How to select the Value Improving Practice (VIP) Tools appropriate to developing the Project towards funding.
- Plan the Project and define Roles / Accountabilities Interfaces, & Milestones.
- Assess the Quality of Decisions and Project Value Status and gain insights to the Value of additional information.

This methodology described here has been applied in over 50 major investment workshops within the last 3 years.

## **Introduction**

The story about the blindfolded wise men trying to describe an elephant is somewhat akin to modern project opportunities. Modern projects tend to have many parts (complex) and are often differentiated from past experience (uncertainty). Project teams are staffed with very skilled multi-discipline personnel who are expected to effectively take an (project) opportunity from a possibility to a reality. It is an imperative that some process is used to help the Project Team and Management (project decision makers) to clearly define the asset/project opportunity's value and risk, the resulting clarity ensures that the opportunity will achieve the level of success demanded by Management and earnestly sought by the Project Team.

In today's fast, dynamic, and volatile global market place, the pressures on corporate leadership to perform have become greater and greater. Corporations in general cannot afford significant strategic mistakes. Thus, having the broad visionary ability to work with a team of specialists to help firmly establish and guide corporate strategies, initiatives, and projects to success has become paramount in the 21<sup>st</sup> Century.

Furthermore, with the myriad of tools, methods, and techniques it is even of greater important that corporate leadership have a well established program in order to avoid overspending indirect and direct resources, intellectual capital, and financial resources where there may be little or no return on investment.

The bottom line should always be considered to ensure shareholders are receiving a good value return for their investment. Thus accountability and sensitivity to strategies, decisions, impacts, risks, cultural differences, market dynamics, contingencies, and expected outcomes must be fully understood and appreciated by corporate leaders when embarking on new endeavors while evaluating existing market and corporate performance to deliver customer quality and value products and/or services.

There is no one tool, one person, nor one methodology, to solve, manage, or service every challenge. That is why it is so vitally important to engage a team of skilled and accomplished specialist to assist corporations with their strategic challenges and endeavors.

This paper describes a scalable process that uses Value Management, Decision Analysis, Team Building, and Project Management Methodologies to guide Management & Project Teams to consistently deliver significant, measurable business results. We have evolved our process over a 10 year period, and it has been used innumerable times by project teams throughout the world, proving its worth.

As the Petroleum Industry has moved into increasingly difficult environments during the last decade to find oil and gas fields, opportunities are being found in ten thousand feet of water and in both unmercifully freezing, and in seemingly incinerating, climates. Today, project opportunities are less likely to be simple decisions and are likely to include cultural and political aspects. As such, it has become even more important to help Project Teams frame the business (project) opportunity such that a safe and robust project plan can be developed.

As the projects become more complex, better ways to characterize the project must be implemented. In efforts to improve opportunity/project understanding a focused approach must be undertaken so that project resources can be effectively utilized to achieve Management Objectives. Over several

years, this combination of Decision Analysis (DA), Value Methodologies (VM) together with Project Management Approaches have been developed and proven to improve investment opportunity discussions.

This scalable, systematic approach guides the project team in describing the opportunity in consistent Business Terms, clear functional terms, to evaluate the development options, and to characterize project risk & uncertainties. Project teams that implement similar front-end framing activities are better able to assess the opportunity, to effect management expectations and to establish a viable project execution plan. In essence, the opportunity is broken into “bite size” issues and considerations that can be evaluated by the Project Team and understood by Management.

DA and VM tools can be effectively combined to identify, and to rationalize, the value of a given opportunity. Tools such as the new “Augmented” Objective Hierarchy, Decision Hierarchies, Decision Set Tables, and Influence Diagrams can be integrated with Value Engineering and Project Management methodologies. The resulting combination significantly improves the way that a project team evaluates, comprehends, and develops a project.

It is an imperative for Project teams that aspire to move at the “speed of light” to use every appropriate tool available that causes Project Team and Management alignment very early during the project cycle. Project clarity leads to value understanding and project execution focus. ... which ensures they are delivering the “Right Project!”

Followers of the concepts presented will learn how to integrate rather than compete with the Decision Sciences. The tools presented guide practitioners in engaging project leadership and senior management early in the business life cycle ... rather than "waiting until there is an identified problem" ... for Project Improvement / Intervention practitioners to respond to and target.

Depending on the type of project and related interfacing business processes, other value improving tools can be applied to help establish greater visibility of quantified costs, value opportunities, and potential conflicts which need to be addressed early. In many institutions and projects, the early stages commonly overlook details which can create unexpected costs downstream during project execution and/or completion. Therefore, using the right Analyses tools is extremely important to manage uncertainty, expected outcomes, and other details which are pivotal for a successful project delivery or corporate investment endeavor.

Concepts addressed in this paper are Tools and an Overall Business Process:

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### Phased Investment of Capital Resources

Many clients have “Stage & Gate” type of business processes to enable some clarity of thought using “Thinking Methodologies” to improve their likelihood of achieving their goals. Figure 1 depicts one such process on the top line. We have developed, and fully tested the “Right Thinking,” Right Decisions,” Right Actions,” tools and methods shown below the example Stage Gate Process, on over 90 major projects.

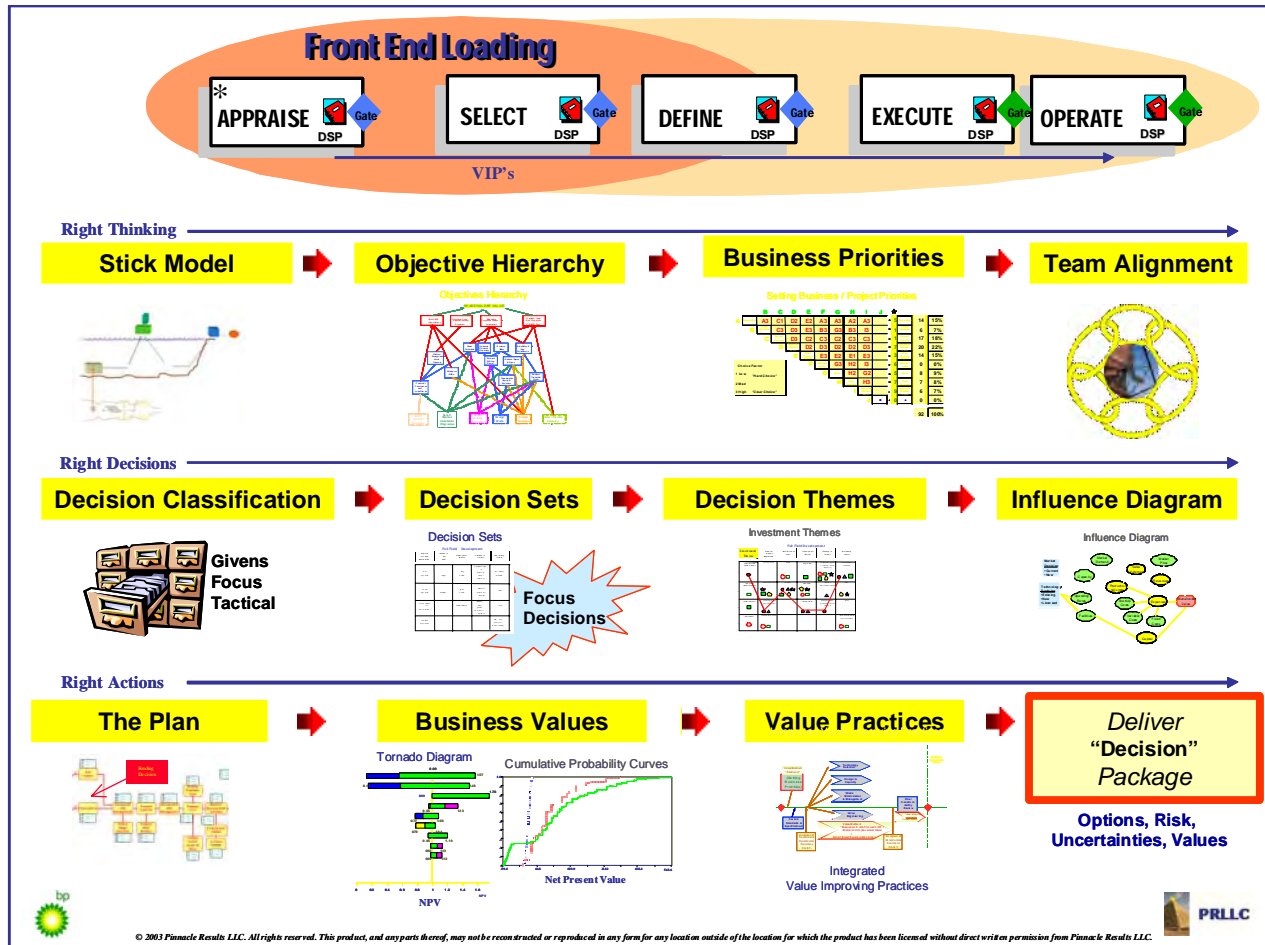


Figure 1 (Known as the “Blue Sheet.”)

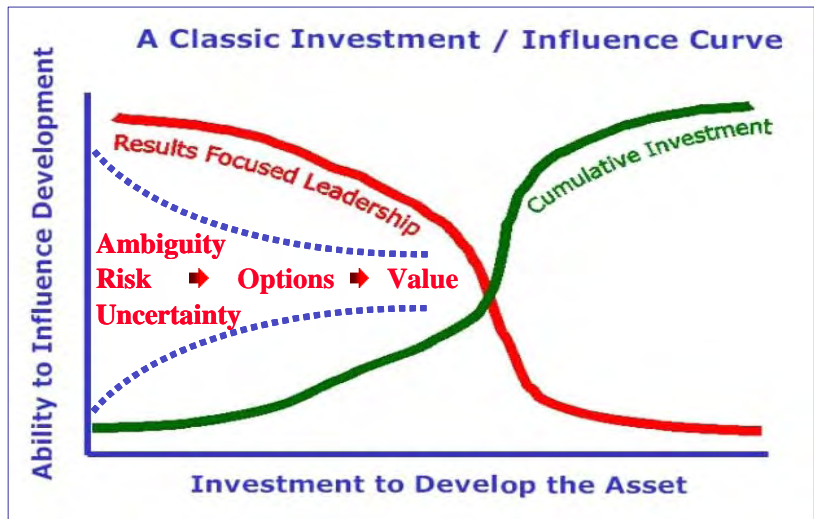
Some of these “Stage and Gate-like,” ... Project Decision making processes, essentially conform to a classic “5 – Stages,” (3 Front End Loading Stages “FEL 1, 2, & 3,” followed by “Project Implementation,” then “Operate.”)

In the example process, shown the company gradually invests resources in a series of Phases, supported by formal Funding Decisions. Closer to implementation, the Company’s teams use various Value Improving Practices ... including Traditional Value Engineering.

The rationale for such a progression, can be seen from the classical Influence vs. Expenditures curves shown in Figure 2.

Strategically managed companies, in the early phases, understand that value is delivered by Decision Quality rather than Project delivery. They apply “Results Focused Leadership” in the early phases supportive of careful analyses prior to funding the standard project development and management activities.

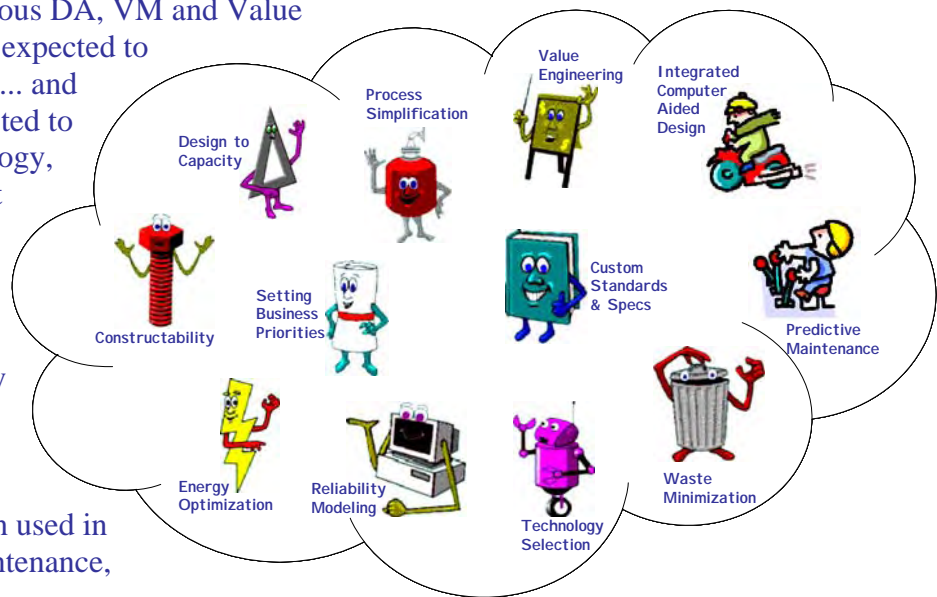
As we move further into investing in a capital project we lose the ability to influence / change direction of the project.



Some of the various Value Improving practices used in advancing a capital project are shown in **Figure 3**

In engaging & serving such companies, the “VE/DA/VIP Professional” today is expected to be familiar with all of the various DA, VM and Value Improving Practices and is expected to recommend as appropriate ... and in many instances, is expected to deliver a tailored methodology, selected to meet the project team’s specific needs.

The Value Improving Practices (VIPs) shown here are out-of-the ordinary practices used to improve cost, schedule, and / or reliability of capital construction projects. Often used in Business, Operations, Maintenance, Engineering, Projects.



From an aspect of assurance of quality in progression of a Capital Investment, strategically managed companies will focus on different value measures to improve as the potential asset / project is brought to fruition. In early Stages the primary focus should be on understand value, options & risk.



## Value, Options and Risk

Project opportunities are largely about business value, development options and project risk. Project Teams are responsible for converting raw project opportunities into safe, reliable and economic realities. Management is responsible for providing resources and for making value decisions. Using a rigorous methodology for framing the Project Team's actions expands the project team's Vision and clarifies Management expectations.

In many of the legacy companies, the old ways of doing business no longer works or operates effectively in today's business world. Thus, these organizations tend to struggle more with visibility of organizational dynamics and the efficiency or inefficiency of the corporate business machine. Applying the types of VM/DA/PM & integrated results focused toolsets, methods, and techniques helps to obtain a firm grasp on the known and unknown variables, uncertainties, risks, and managed expectations. Legacy companies have tremendous opportunities to improve corporate performance and shareholder returns. Modifying or designing the high performance corporation of the 21<sup>st</sup> century is taking on an entirely new realm of opportunities and challenges which must be met with highly effective strategies which are implementable and measurable.

During the early project deliberations, there are numerous opinions and expectations that must be melded in to a single project vision. These early team engagements benefit significantly from skilled workshop facilitation, using a consistent and repeatable toolset. Early project activities are focused on understanding the following:

- Project (business) values,
- Viable options that could move the project into reality.
- Characterizing the project risk and uncertainties.

As the value, options and risk issues are understood, the project team can assemble a viable, robust and compelling business case(s) for Management consideration.

A pragmatic process utilizing DA and VM methodologies can be utilized to provide sufficient opportunity characterization and visualization which the Project Team and Management can agree on a project execution plan. The basic process is aligned with the Business Process described above and has multiple steps using DA, VM & Project Management tools:

1. In simplest visual terms, what does the opportunity look like with respect to alignment with Corporate Strategy?
2. How can we characterize the potential Project as a contributing Idea?
3. What are the Project (opportunity) objectives and drivers?
4. What are the tangible, prioritized goals to be achieved?
5. What are the options available? I.e. Viable, Doable Decisions which are Compelling to analyze.
6. What is uncertain that influences our ability to achieve the project goals?
7. What is required at Each "Funding Decision" to continue to the next Project Phase?
8. What are the functional work activities required to deliver an "End-Stage Analyses" to justify further capital investment to meet the objectives?

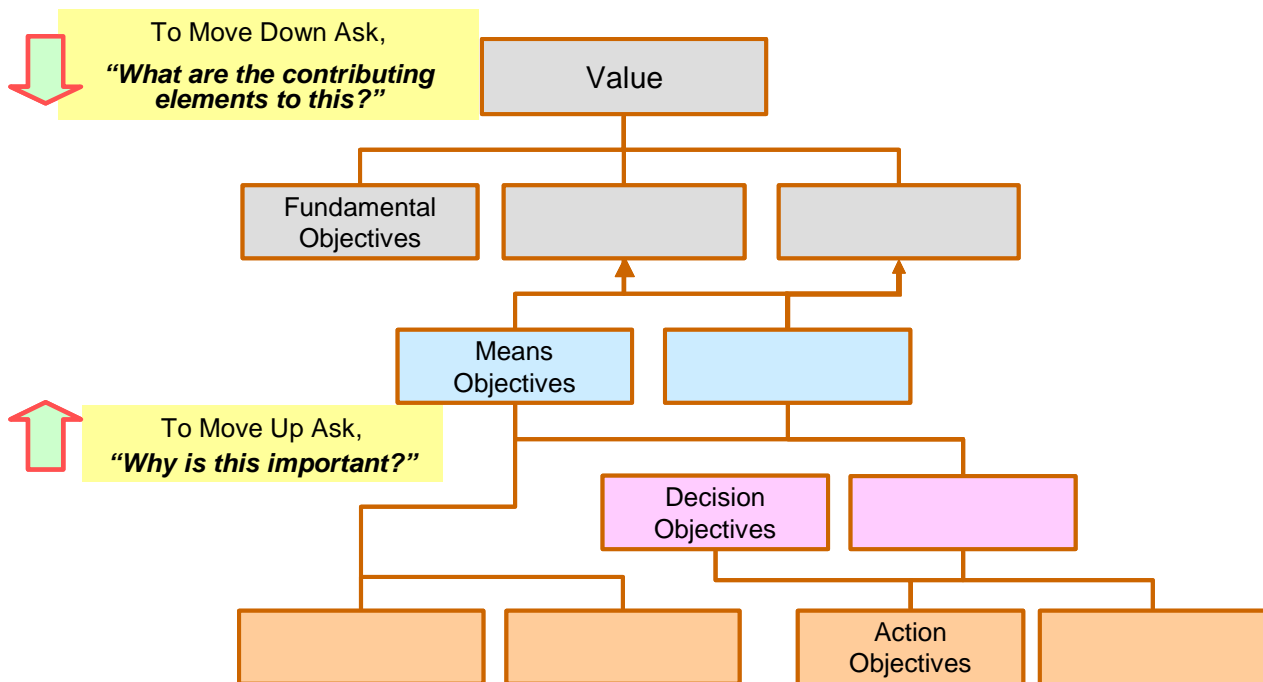
As with all "project processes", the project team must be able to scale the process to satisfy monetary and resource constraints while retaining the capability to yield a value added deliverable.



## 2) “Augmented” Objectives Hierarchy”

While the Objectives Hierarchy appears simple to apply is powerful in clearly depicting Business and Project Decisions from “Project Objectives.” Thence the graphic is used to relate those Project Targets to Corporate Objectives and to Shareholder Value.

Objectives are illusive if the Project Team and Management have not agreed on the project objectives during the very early project stages. Value and risk trade-offs cannot be evaluated unless the project objectives are clearly stated and agreed. In simple terms, some project drivers are important and some are not. The Project Team and Management must have a common understanding about project objectives will be used to characterize project success. An objectives hierarchy is simply a graphical means to characterize what is important for the team to management. The objective hierarchy is also a visual contract with Management that defines expectations and defines project success.



The Augmented Objective Hierarchy primarily helps the project team to prepare for discussions on trade-offs such as accelerating spending to improve schedule or enhance facility operability.

For example, if major project capital is scarce, schedule may not be a fundamental project objective. However, if sufficient value can be realized by accelerating the project schedule, management may make capital available.

The objective hierarchy provides a dynamic negotiation tool for discussing project value, options, and risk. Note: Often Project teams have difficult to clearly articulate “Fundamental Objectives.” And additionally they tend to have trouble separating “Means Objectives” from “Decisions” and “Actions.”



### 3) Setting Business Priorities

SBP is used to clarify the team focus as they progress the project to the next Stage Decision Point. It draws upon the concepts of the well known Value Engineering “Pre-Event.” However it requires some facilitator skill when teasing out the Attributes of a Quality Decision within the early stages in the project.

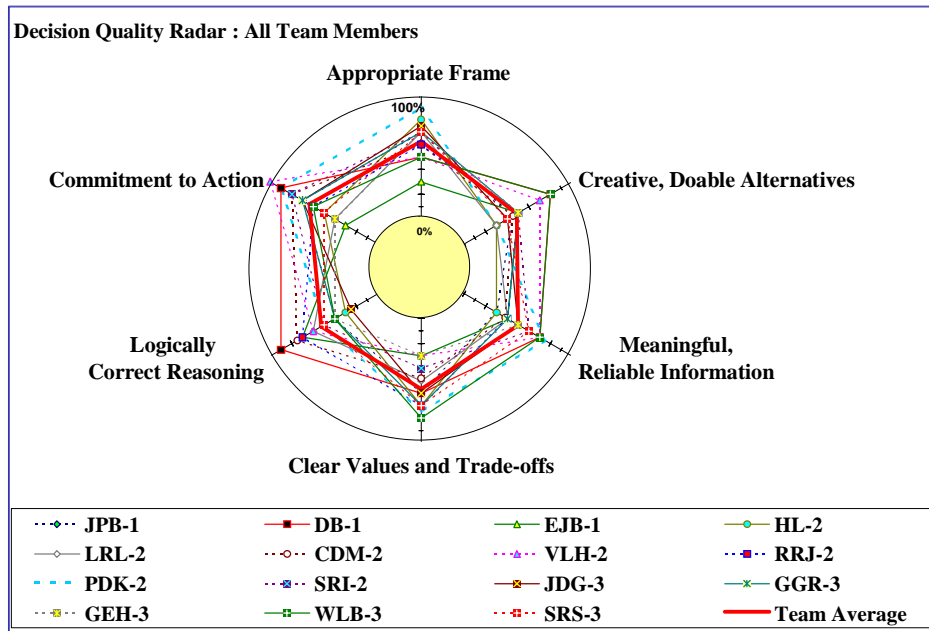
SBP is normally engaged in 4 sections

- 1) Clear Project vision: as developed by discussing & answering a short set of questions
- 2) Developing the Attributes of Value, or Key Results Areas, to be delivered and discussing the range of acceptability to management.
- 3) Developing Consensus on the current “Snapshot” of the Project and / or Project plan.
- 4) Prioritizing the teams’ effort to improve the Project and / or Project plan.

### 4) Decision Radar

A quick team response tool which gives team members an appreciation of how they currently think differently about various aspects of a Quality Decision, and how close the team is to making a recommendation.

Using the Decision Radar tool, The Project Team shares individual perceptions of how much more the team must do ... to deliver a Quality Decision Support Package.



They individually assess where we are today if we had to make the decision to build the Plant today.

The attached example graphic shows how the team members can view the “current potential of Decision Quality” and can exhibit differences in individual perceptions.

The Project team reflects upon the graphic developed, with a goal to examine the reasons for the differences in individual perceptions, and pursue resolution of any apparent conflicts uncovered.

## **5) Decision Classification**

At each defined “Phase of the Investment” Project decisions are discussed, and it is very useful to take the time to “classify” these decisions. Specifically those that are to be analyzed to deliver recommendations to Management at the next “Funding Request Gate,” must be uncovered and clearly described. The classification is as follows:

- Established project Policy (Classification: Given),
- To be considered by the Project team now (Classification: Team Focus for analyses in the **current** Project Stage so as to make a continued Investment Recommendation)
- Should be left until later when the appropriate Funding has been agreed (Classification : Tactical for the Project Team)

Using this “Decision Classification” provides a medium for discussing policy and strategic decisions between Management and the Project Team. This early project discussion between Management and the Project Team is used to prioritize the decisions that need to be considered immediately from the decisions that can wait. In short, what decisions must be made and how can resources be used to clarify the decision values, options and risks.

**“Given” decisions** are :

- (1) Made by “Management” and are generally integrated into the corporate culture. Safety and reputation issues are often characterized in policy decisions.
- (2) Have been analyzed in a previous Asset/Project Investment Phase, agreed to in the Funding Decision Review and should not be revisited by the Project Team.

In certain instances, corporate cultures have very specific approaches and/or specifications to achieve company objectives and may never wish to alter the approach. Project teams are not allowed to make policy. However, the Project Team can use the Classification to test Management policies and to evaluate the impact that stated policy will have on project objectives. It is routine for the decision Classification debate to reveal some Management latitude regarding policy if the alternatives are reasonable and do not relegate safety and reputation.

Any outstanding Policy/Strategy decisions must be made in the imminent future or the project objectives will be impacted. The Project Team is generally responsible to make recommendations on Decisions within the boundaries set by Management, or to propose viable alternatives for a Management decision.

**Team Focus Decisions** are those which are compelling to analyze so as to be able to recommend a course of action to pursue which warrants further investment in the Capital Project.

**Tactical decisions** can be deferred and will not impact the project objectives. For examples, during the early project stages, the paint manufacturer is usually not important and can be deferred until later. Tactical decisions should be captured as issues to be resolved and should be entered into an “issues register” for future handling.

## 6) Decision Sets Table

The Decision Classification discussion will be used to generate a Decision Set Table. The Decision Set table is simply a matrix that lists the potential Investment decisions and the alternatives (options) about the decision.

Every major decision should be captured in the Decision Set Table. If the table begins to be unwieldy, the Decision Sets should be divided into “high level,” and “low level,” decisions or some similar approach that makes the matrix and ensuing analyses manageable.

Full Field Development

Reservoir Pressure Maintenance	Number of Drill Sites	Development Options	Flexibility to Process	Host Facility Option
Gas injection	Single	Dry Trees	Tightly design to capacity (Fit for Purpose)	TLP / SPAR / IPG3300
Water Injection	Multiple	Wet Trees	Build for Expansion (Equity)	FPSO
Combination of Gas & Water		Combination	Build for future growth (Reservoir Upside)	Semi
Natural Depletion				Sub-Sea tie back to Host Facility

Once the Decision Set Table is built, the Project Team can devise various project Investment Themes or “future state outcomes.” Investment Themes should be characterized using **Simple Titles** such as:

- “Aggressive market share growth target”,
- “Maximum production rates”,
- “Minimum capital cost exposure”
- “Wait and see”.

The number and nature of the potential investment themes are only limited by the imagination of the Project Team. However, generally 4 to 6 encompasses the rational field of clearly different investment themes. After sufficient themes are created, and explanations of the specific differences in the themes documented, each of the decisions columns are examined and the appropriate option is selected that would allow the theme to best succeed.

For each investment theme, only one option can be selected for each decision. The resulting “String of Decisions” should make the “Investment Theme Aligned -Decision Set” both viable & compelling to analyze. We refer to this approach in alignment of options of rational Decision Sets as **“Threading the Investment Themes.”**

## **7) Decision Modeling**

As the Decision Set Table is populated with decision areas, options, and investment themes, some options will be selected repeatedly for several Investment Themes. The Project Team should pay particular attention to those options. There is a high likelihood that the viable, robust and compelling solutions will contain those options as part of the decisions made. As such, the Project Team should determine if the option really requires additional evaluation and if so, what resources are needed.

In many cases, various themes will compete and will represent different values and risk. In these circumstances, formal decision analysis software, and modeling, should be used to model the theme(s) to assess how the project objectives are impacted by the perceived risk and uncertainty.

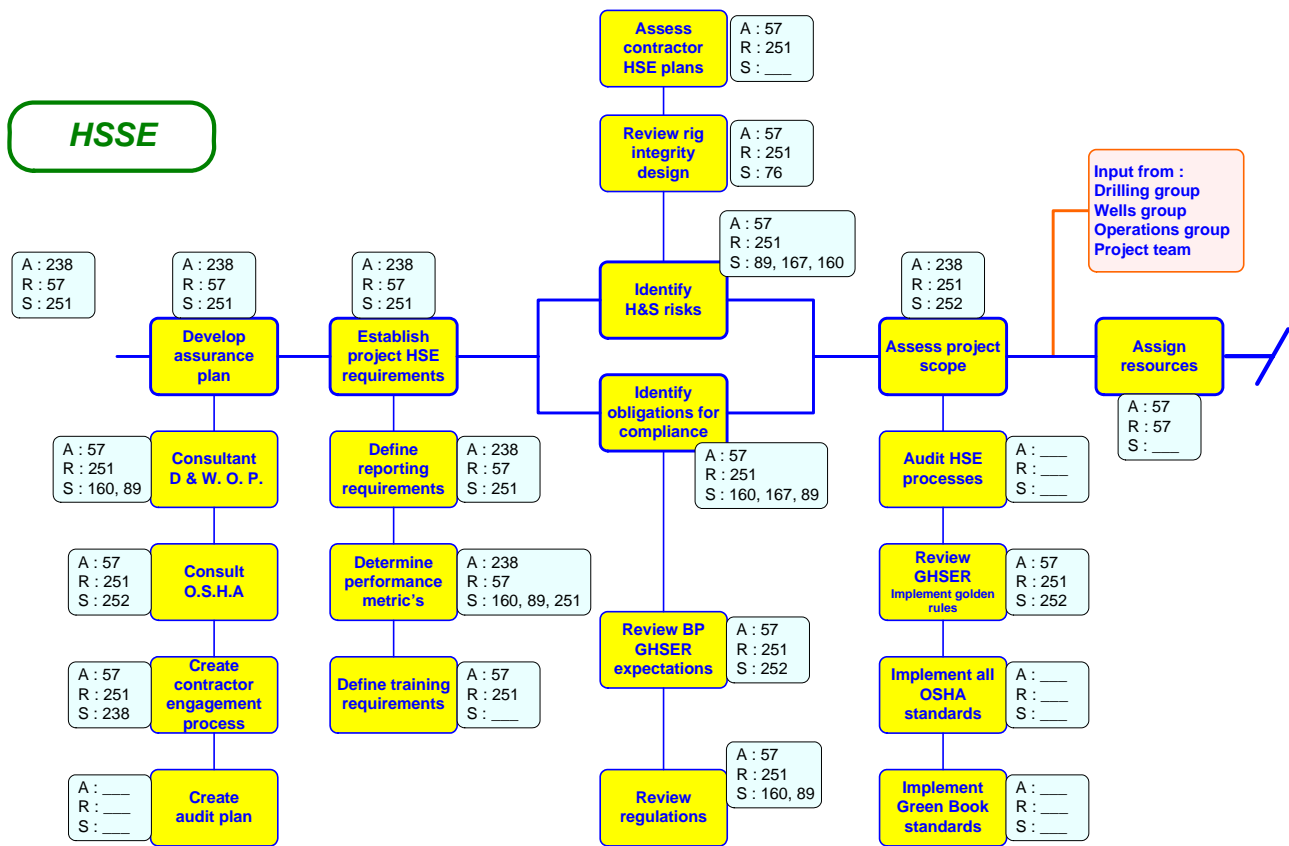
Typical DA tools available include deterministic models (spread sheets), decision trees, influence diagrams, and tornado / cumulative probability charts giving insights as to potential spectra of Return on the Capital Investment. Usually projects have significant uncertainty and ambiguity and probabilistic modeling is used to provide valuable insight about the range of decision outcomes. The DA models help to prioritize the decisions and risks that have the greatest impact the project objectives.

## **8) Early Stage Project Mapping**

Just as the wise men had difficulty to describe the elephant, diverse project areas are just as apt to communicate poorly. In general, the various project disciplines do not appreciate the inextricable relationships and symbiotic needs within the Project Team. Reservoir engineers often do not appreciate how reservoir flow rates and fluid properties impact the facility design. Usually all of the “hardware project personnel” do not understand how the economist and marketing personnel impact the project objectives. These diverse Interfaces, Roles, Accountabilities, & Milestones are difficult to discuss unless a “project map” is created. In general, the project map is initiated concurrently with the planning & building of the DA model.

The Project Map somewhat resembles a classical Value Management FAST diagram. The project map basically creates a visual relationship between the various technical and non-technical disciplines and places those relationships into a logical sequence. The basic FAST diagram methodology is used to create the map, which follows the “how”, “why” and “when” conventions. The basic difference between a VM FAST and a project map is that the project map is generally not used to evaluate value improvement opportunities. (... Although we have used such an Organization Function Map to interrogate for ideas to improve Project Schedule.)

An important difference is that the Completed Project Map has a “life after the workshop” since the teams members place it on their wall and refer to it during the project progression. Most teams find this more useful than a standard printout from a traditional Project Scheduling program to support interfaces, obligations and dependences.



On certain projects, the map was used to identify and to characterize value improving opportunities. In all circumstances, the project map can be used as a basis to initiate Value Improving Practices.

In some ways, the Map can be considered similar to a project schedule or to a work breakdown structure. However, as in a FAST diagram, the project map does not initially target a time (or schedule) element and does not include CTR (cost, time, resource) information. The map is intended to capture pure functional project relationships and establishes a depiction of project interdependencies.

In general, the project map can be used to characterize the “magnitude” required workload, and to gain insights as to potential resource needs. But generally stops short of in-depth analyses of such as cost, manpower and time but the map does not provide a way to schedule or manage the attributes. For instance, when the project map is dimensioned with time, the resulting “schedule,” without significant re-work, can often be so daunting that any project manager worth his salt may be tempted to run away.

The project map can be an excellent way to ensure all the necessary Organizational tasks / dependencies are captured. For schedule considerations a proper “project schedule” is developed. For example, the information from the Project Organization Map can be migrated into such tools as Microsoft Project or Primavera to do the “Heavy lifting” of Project scheduling and management. ... and to optimize the project activity relationships and durations

The project map provides a means to relate disparate project groups and gives a superior level of project clarity. The various project sub-teams are given a clear understanding of the “natural order” needed to achieve the project objectives.



The project map also provides a means to discuss resources with Management. Often Management does not appreciate how many “trees” it takes to create a “forest”. The project map provides a rich appropriately detailed view for the Project Team and Management to discuss alternatives and compromises that would impact the project (strategic) decisions. It is not unusual for either the Project Team or Management to elect to defer certain activities (functions) or to decide that certain data will not be collected. The project map provides a valuable method to assess the potential impact of those decisions. Depending on the nature of the decision, Management, or the Project Team, can understand the impact on the project objectives and can gain insight into the project value impact.

The general approach to assess the business value, to establish viable and compelling options and to assess the risk and uncertainties are applicable across all businesses and enterprises. Successful FEL activities always lead to better decision-making ... that yields better a project value.

### **9) Value Improving Practices**

Value Improving Practices, (VIPs,) when applied ought to return measurably improved project outcomes (e.g., cost, operability, schedule, reliability, safety, etc.). A VIP does not improve one outcome at the expense of another. **Further the collective application of the VIPs should add positive impact on FULL CYCLE RETURN ON INVESTMENT ...** rather than “Checking a Box” in a list of Project Management behaviors ... as does occur in many cases.

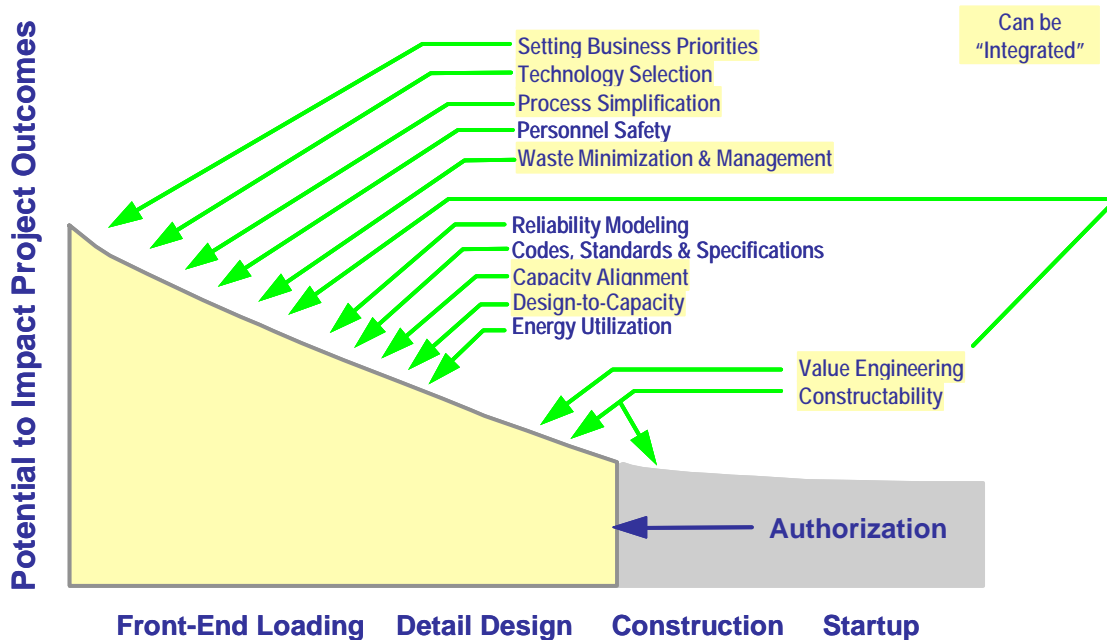
A key attribute associated with this description is that the practices be applied in a systematic approach with a methodology that allows them to be repeatable and consistent from project to project when they are applied.

Herein lies the opportunity for the Value Methodology (Augmented by Decision Analyses tools) to deliver a consistent, proven and repeatable process to implement the VIPs in a fashion that delivers measurable results!

To best use its resources, the company refines its list of VIPs as those that will generate the greatest return on the portfolio of work. In doing this, a company should determine what practices they believe add value within their system and determine how best to adapt them to their culture and get the optimum results from applying them.

For example, the Value Engineering Pre-Event is an excellent methodology for implementing the VIP of “Setting Business Priorities” for a Project team. This is addressed in the “Understanding Clients’ Needs Section”

## Potential Influence of Value Practices on Project Outcomes



### Example VIPs

Each company tends to have their own view of the exact interpretation of VIPs. Some companies have “extra” VIPs in addition to those normally tracked in the benchmarking data sets across industry. The following examples include some of the VIPs most used and several of those that can benefit from application of the Value Methodology and from toolsets often used in VE.

VIPs that we have found particularly suitable to Value Methodology use have been noted by **(VMO)** for “Value Methodology Opportunity!” (To avoid confusion we noted **(VMO)** alongside “Traditional Value Engineering” below.)

**Setting Business Priorities (VMO):** A communication process that identifies the decision maker’s & stakeholders’ requirements and the expectations associated with a business opportunity and translate them into measurable project objectives, ranked according to their relative importance to the business strategy. It puts the decision makers & stakeholders of the business opportunity in synchronization with the project team who are charged with delivering the business results.

**Customized Standards & Specifications:** A method for selecting the codes, standards and specifications most applicable to the selected project, making necessary modifications to meet project goals and objectives, and ensuring that the selection does not exceed actual project specific requirements.

**Waste Minimization and Management (VMO):** A formal and disciplined process-stream-by-process-stream analysis of ways to eliminate the production of waste products or non-useful streams from a process, as well as the methodology for managing any remaining waste streams.

**Design to Capacity (VMO):** A structured methodology to address design capacity against business needs and to eliminate “hidden capacity.” It focuses on the precise alignment of units, systems,

equipment and bulk within a range of capacity performance. The outcome of the Design to Capacity Value Improving Practice should provide the base case process design for your detailed design.

**Technology Selection (VMO):** A systematic search both inside and outside the company for manufacturing/processing technology that may be superior to that currently employed on projects to ensure that the technology used is the most competitive available technology aligned with the Projects Business Objectives.

**Traditional Value Engineering (VMO):** A facilitated, structured workshop to identify and achieve the needed functionality of a selected work process, facilities design, or equipment design at the lowest life cycle cost.

**Process Simplification (VMO):** A facilitated, structured workshop focused on simplifying development, facility, processing, or equipment requirements while satisfying needed functionality to deliver business outcomes.

**Constructability (VMO):** A systematic method that enables a project team to optimize the use of construction knowledge and experience in planning, engineering, design, procurement, fabrication and installation to achieve overall project and safety objectives.

**Energy Optimization:** This practice is an analytical study (utilizing “pinch technology”) in order to focus on energy options. The intent of energy optimization is to identify the optimal energy types and energy usages within a process and/or site by considering economic trade-offs and overall operability.

**Facility Systems Performance:** This practice provides a form of computer modeling used in forecasting performance to balance sales, operation and maintenance needs at the best cost. It provides a project team a more effective means of assessing, in advance, the cost/benefit impact of changes in design, operations, spares, training and/or maintenance of a facility.

**Predictive Maintenance:** An approach to maintenance whereby all maintenance techniques (breakdown, preventative, predictive, etc.) are integrated to achieve project objectives and maximize business value. Maintenance Excellence enhances business value through increasing uptime, product quality, yield, and capital productivity.

**Life Cycle Engineering Information Management** (more than 3D Computer Aided Design) The management of engineering information (including drawings, documents and data) using computer systems so that it can be of value throughout the life cycle of the asset, including the project phases, operations and maintenance and final decommissioning and demolition.

## **Conclusion**

Successful delivery of major investment projects is most likely when project teams and management commit resources to utilizing best-in-class toolsets, linked together in a consistent, repeatable fashion. There are suits of proven tools available and Project Teams & Management can become effective in these approaches in reasonable time, and after initial training, improving their competence in a in a “learn-by doing” environment with a knowledgeable professional guide.

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Achieving Results: How to Create Value" go to link below, or Amazon.com  
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