CHALLENGING THE PROJECT MANAGEMENT PARADIGM

- Integrating Strategic Value with Project Development and Execution.

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ABSTRACT

This paper discusses, through the use of the VM approach, ways to: minimize budgeting, oper-rational corporate and stakeholder "surprises", meet the user's vision through early (and continuing) stakeholder consultation, identify strategic value beyond traditional evaluation criteria, define the different aspects and phases of project development, identify technical and administrative concerns.

INTRODUCTION

So often we hear of project proposals that, late in the day, have become too expensive to implement or have become the target for much criticism by a particular group of stakeholders. The Value Management (VM) approach encourages earlier than usual participation of all interested parties and agreement of values to be assigned to a range of project parameters. This ensures a higher degree of confidence that risk management goals are defined and achieved. In doing so, VM requires early identification, development, appraisal and testing of the least life-cycle cost, together with demonstrating related consequences at the project concept/feasibility stage. Such a concerted, focused approach leads to significant cost-savings and will, inevitably, challenge previous practices and "committed assumptions".

Background

There are many examples, particularly within the building and environmental fields, of stakeholder dissatisfaction with project results. Typically, the development of a project (from vision to hand-over) takes place over protracted time, through a number of technical and administrative personnel and for a diversity of stakeholders. These factors, combined with the complexity of project issues, create the potential for variability of approach in project development that can lead to delays, unnecessary expenditure (initial capital investment and lifetime operational costs) and stakeholder dissatisfaction. This can be particularly true for projects that have long been proposed and for which the original intent and performance criteria may have become somewhat "fuzzy". A particular problem encountered in project execution is that the budget no longer is sufficient to cover the proposed project scope. A not uncommon result is for some projects to be either cancelled or to be only partially completed under the original plan and modified subsequently at additional expense to the Owner.

Need

With all the experience and project management systems available, why do we so often hear of concerns with the completed product? The context of this question relates mainly to "one-off" type projects such as infrastructure and environmental improvements. So often we hear such project-related accusations of:

"over-budget", "schedule delays"

"unacceptable quality, difficult to operate, too sensitive, over-indulgent finishes"

"too big, too small, too many, too few..."

"why didn't they provide....?"

"wrong location, wrong solution"

"not needed, waste of money"

"why didn't they ask someone before deciding to ..., we could have saved them a lot of money and developed something much simpler and more useful!"

In addition to all of these criticisms, I have long held the view that many projects are developed in a somewhat "back-to-front" manner. That is to say some "hidden", relatively straight forward aspects, such as structural details, receive disproportionately high attention in the early stages, while perhaps some philosophical aspects of process and control remain incomplete. From the user's point of view, it would be more satisfactory if the items with which he will actually interface, such as instrumentation, computerized controls and miscellaneous mechanical equipment, were to receive more detailed consideration earlier in the project development stage.

Extending this thinking further, there are probably few people who have not heard of an example over-built/underused component of major infrastructure. Examples may be waterworks, wastewater plants and roadways that may never be subjected to the design loading intended. There are examples of the converse whereby some major infrastructure is overloaded or outdated virtually just after the opening ceremony. Then there are the massive underground tunnels that somehow are just not needed. All of these being examples of well-designed projects in terms of detailed design and construction standards; however the value and functional planning was unsuitable (or non-existent). Consequently, the emphasis of this paper is on the need for, and benefits of, conducting more up-front program/ project definition work than is usual.

VALUE MANAGEMENT APPROACH

SAVE describes the terms Value Management (VM), Value Analysis (VA) and Value Engineering (VE) as being synonymous. There is, however, an emerging alternative view that VM is the aegis under which the sequence of activities of both VA and VM (and, subsequently, project cost control) are coordinated. As such, VM has a direct relationship with sound project management practices by "closing the loop" with strategic planning, reliable first cost estimates, project execution and ensuring environmental sustainability/compliance.

Within the context of this discussion, the following descriptions apply:

* **Value Management** is the all encompassing "parent" methodology and focuses on (and aids confirmation of) those value characteristics deemed most important by the stakeholders.

* **Value (/Risk) Planning** precedes VA and VM and is aimed at developing, through early stakeholder consultation, corporate values for a range of parameters as applied to the activities and aspirations of the organization. These parameters mirror the potential risks which include aspects of ecology/ environment, health, safety, sustainability, community wellbeing, litigation liabilities and penalties for non-compliance. Additional risks may be: not meeting the in-service date (penalties & loss of production/decreased revenue); cost overruns; change in economic assumptions, scope (or route/ location); effects of technology changes.

* **Value Analysis** is conducted during the planning stage of a particular project and is specific to the process or service to be developed. VA is a mechanism to enhance project conceptualizing and definition, together with agreement of appropriate quality parameters. In this way, realistic forecasts of project scope/elements, costs and consequences/choices are established at the early stages of program and project development.

* **Value Engineering** is project specific and is

conducted at the project implementation stage (during the design stage). VE examines the functionality of proposed project elements to optimize design and ensure best value for money over the total project lifecycle.

PROGRAM/PROJECT PLANNING

The planning stage encompasses corporate strategic planning through stakeholder consensus development to confirmation of project definition. This includes agreement of key elements, quality/ performance parameters, overall operational/maintenance requirements & policies to realistic implementation budget and schedule. Value/Risk Planning and VA are used to develop a value-based consensus on project requirements.

Strategic Planning and Stakeholder Requirements

Stakeholders beyond the traditional owner/lender group are placing new pressures on business and the community generally. The attitudes and expectations of these stakeholders are shifting rapidly and project promoters will ignore such influences at their peril. There is now heavy pressure for improvement of projects particularly in regard to environmental and social aspects. Public participation is now an essential prerequisite for environmental management. Participation of stakeholders, from the early stages and on a continuing basis, provides a more comprehensive input and generally yields stakeholder understanding, support and acceptance of responsibility for continued facility operation (and improvement).

Traditionally, stakeholders have been investors, lenders, government policymakers and regulators. Project plans have been developed in isolation from narrowly focussed, internal procedures and financial processes. Over recent years the following additional stakeholder groups have come to the fore: employees (operations and maintenance end-users) trade unions, customers/consumers, professional and business associations, universities, community, environmental and special interest groups. Thus a wide variety of viewpoints exert differing pressures on the development of a project. The more open participatory approach is leading away from the traditional "megaproject" solution towards a blend of defined and managed risk with minimization of cost, environmental and social impacts. This being the case, the challenge is to understand the competing influences, prioritize requirements and decide on the most appropriate actions, while being cognizant of the budgetary and scheduling constraints.

There is unlikely to be a "one size fits all" solution. However, the VM approach applied from project inception to completion will provide stakeholders with confidence that the end-product will perform satisfactorily in terms of functionality, completeness, reliability, availability, legal /environmental compliance and cost-efficiency. The VM approach is a strategic thinking process and involves the systematic, formalized and objective assessment of particular aspects. The key to success is to develop a value based consensus on project requirements, which includes defining what value means to the stakeholder groups within a particular context or set of circumstances. At the strategic planning stage this typically requires a zero-based review approach to appraise the purpose, responsibilities, levels of service, constraints, assumptions, scope of work, policies, procedures and methods, resource requirements and cost in use.

Environmental Impact

At either end of the environmental assessment spectrum there are the following applications of the VM approach:

a) Cumulative Effects Assessment which comprehensively takes into account the compounding effects of other projects and activities, not just the project of immediate interest.

b) Building performance reviews and workshops which examine (for new construction and retrofit work), the following aspects:

- energy efficiency of the building and its subsystems
- environmental impact of the building's construction and operations
- health, comfort and productivity of the building's occupants
- operations and maintenance issues relating to building systems (including landscaping)
- functional performance of building systems
- adaptability of building designs and systems for future requirements
- economic viability considered on a life-cycle cost basis.

This may include review and development of:

- site ecosystem protection plan
- local air quality protection plan

- ozone layer protection plan
- water use plan
- construction and demolition waste management plan
- building emissions plan
- plan to deal with solid wastes created by building and occupant operations
- payback periods for innovative and conserving/preserving installations.

The use of Value Management and attention to these sorts of details will facilitate adherence to the requirements of sustainable development.

Risk Identification

At the early needs analysis and concept/feasibility stages there are the two particular contrasting issues of:

1. quantifying the cost of "over design" for "operational comfort";
   vs,
2. sufficiency of applied safety margins, redundancy of processes/units and diversity in design.

An implication of "excessive" expenditure on protection against one risk may be acceptance of less protection elsewhere. Risks and values may relate to health, safety, time, cost, ecological, social, litigation or other parameters.

At the VA stage, the overriding considerations are those of risk and reliability, together with realistic definition of scope and budget such that "project creep" does not occur during the subsequent stages of development. Specific process questions may be:

* is the cost of being safe in compliance higher than necessary?

* how far can processes be pushed both individually and in combination?

These questions and others will naturally create some discomfort for those persons charged with the responsibility of making facilities perform under the wide range of constantly changing conditions. There is the need to identify, evaluate and quantify on a comparative basis the risks, consequences and associated costs. An interesting observation relates to building appurtenances for large public infrastructure facilities such as water supply projects. Looking back over the last century there would appear to have been high value placed on aesthetics. Today the trend for such structures tends generally to be quite utilitarian. Nowadays, depending on the locale, timing and stakeholder attitudes, there may or may not be a revival of the more substantial buildings and their more expensive architectural finishes. Value planning elicits these sorts of requirements at the appropriate stages of the decision-making process.

Significant uncertainties are likely to be encountered in estimating scheme benefits and costs. To address this, quantitative Uncertainty Analysis (UA) may be used to compare relative benefits and costs. UA techniques range from parametric analysis of critical assumptions to probabilistic techniques such as Monte Carlo Analysis. This uncertainty treatment is particularly important as there can be considerable extra or unexpected costs associated with a decision that is based upon an analysis that would otherewise have significant levels of (inherent) uncertainty.

These potential costs would arise from adopting a course of action that results in unforeseen risks and/or financial burdens, misplaced or irreversible commitments of resources, or policies which are difficult to alter later when new information becomes available. Analysis of uncertainties, together with the application of sensitivity analysis to a range of possibilities, assist the development of a risk management strategy. This in turn aids response to uncertain or changing conditions and can provide a higher, quantifiable degree of confidence that the risk management goals will be achieved. A number of other, related tools, such as Decision Analysis, Decision Modelling System and Risk, Availability and Maintainability of Processes packages are utilized as appropriate.

In essence, the VA methodology is used to appraise and test the least life-cycle costs and identify associated consequences at the project concept stage, together with developing a consensus on priorities for action. It is worth differentiating between risk assessment and risk management. The former asks the question "how bad is the problem?" while the latter asks what is realistic to do to acceptably contain the risk within the organization's constraints?". Value/Risk Management is a comparative, decision-making process in which the ranked results from a particular risk assessment study can be integrated with economic, environmental, political, technical and social considerations.

In addition to process type of performance risks, there is a range of other (implementation) risks that

relate to project execution and need to be recognized and aggregated. Examples are:

Scope Changes
* Lengthening of route on long pipeline or transportation project
* Incorporation of revised safety requirements and technology changes
* Change of "heart"

Scheduling
* Length of approval process
* Start date/finish date
* "Weather window" effect

Costs
* Delays (labour strikes, material shortages, construction difficulties, commissioning problems)
* Inflation, interest rates, cash flow and exchange rates
* Market forces - a) supplies, b) labour.

Project Definition

Early design decisions of process, form, building systems and the like, impact very heavily and irrevocably on the final cost of the project. The opportunity of saving costs diminishes very rapidly during the concept and outline design stages. With the close relationship of design decisions to investment decisions and social/environmental consequences, there is a need for the explicit "frame of reference" that VM provides to Owner organizations for evaluation of the best course of action. Relative values - in terms of lifetime costs, environmental and social impacts - should be evaluated concurrently before proceeding past the major "go/no go decision point to the implementation stage.

At this point, there will have been developed a Statement of Needs, a Project Requirements Definition, performance and quality standards, realistic target budget/whole life costing and implementation schedule. The emphasis should be on the "what" rather than the "how" so as to avoid unnecessary constraints on designs and methods of construction. This should result in definition of the following:

- constraints, planning assumptions and phasing
- main functions to be covered by each of the facilities being developed under the project
- criteria to be met for each function, e.g., the minimum capacity, level of performance, quality standards and reliability to be achieved.
- review procedures and basis for acceptance of deliverables
- specific features, processes or major items of plant to be incorporated.

PROJECT IMPLEMENTATION

Project implementation advances the project development process from the "what" to the "how". VE reviews are conducted to maintain functionality while eliminating unnecessary costs. Through the VE process, there is a concerted search for unnecessary costs.

The focus of VE at this stage is to ensure satisfactory attention to some or all of the following:

- best project value for money
- confirmation of performance aims and standards,
- engineering practices acceptable to the end-users
- project delivery within target budget and schedule
- adequacy of QC/QA procedures and acceptance criteria
- verification of systems performance capability to ensure smooth start-up and hand-over
- minimum interference with existing facility operations, other ongoing projects and nearby parties.

VE reinforces the philosophy of a single point of responsibility, accountability and integrative control

throughout the project period. VE conducted just prior to awarding the construction/ installation contract provides an opportunity to confirm stakeholder expectations and modify plans and specifications accordingly. Changes made in the plan of execution after this time become particularly expensive.

The scope of the project implementation stage is broadly as follows:

- Pre-design and detailed design
- Contract documents
- Construction and installation
- Monitoring and verification
- Commissioning, training, start-up and handover
- Records & manuals preparation; document turnover
- Facility fine-tuning
- Preventive maintenance program
- Performance/compliance monitoring
- Post project reporting
- Operational optimization

Much has been written elsewhere about these activities. Suffice it to say that in general there is a relatively good routine and performance record in these areas. Hence the emphasis of this paper on developing the prerequisites essential to straightforward project implementation and stakeholder consensus.

CONCLUSION

VM provides a system of documented reviews and audits conducted by seasoned industry professionals to facilitate the accomplishment of the desired program/project areas, such that nothing is left to chance. The process adds confidence to project financiers and other stakeholders that the end-product will perform satisfactorily in terms of functionality and completeness; this includes constructability, availability, reliability, appropriateness, cost/ease of operation, maintainability and cost-efficiency.

VA workshops conducted at the program planning, initial concept and feasibility stages yield the following:

* confirmed project requirements definition (through value consensus building)
* established design and operational performance criteria
* qualitative and semi-quantitative, comparative risk assessments
* derivation of realistic target project budget
* determination of best project value for money (least whole life cost)

The VA process improves the clarity of the project objectives, options and related consequences, for a better briefing before project implementation. VE workshops applied later to the same scheme design and detailed design stages yield the following outputs:

* elimination and/or modification of non-essential project items
* optimization and enhancement of design proposals
* verification of proposed system(s) performance capability

The VE process advances the functional effectiveness and cost efficiency of key project improvements within the frame of reference developed during the process.

Quite often, where VA/VE has not been used early in the project development process, a significant cost reduction exercise is the only option remaining, (other than deferral/cancellation), to "force-fit" project elements within the budget ceiling.

Selective application of VA and VE leads to better estimation of project scope and costs, together with more efficient use of design and environmental resources. Rationalised and explicit expectations,

performance standards and consequences are established much earlier than has traditionally been the norm for commonly accepted project management practice. In essence, the VM approach (i) guides program development; (ii) establishes project priorities within the program confines; (iii) ensures delivery of the most cost-effective, quality solutions at known risk; (iv) provides a greater degree of cost certainty of the completed project.