

ISSN 1029-0982

VOL. 15 NO. 1, 2009

# THE VALUE MANAGER

The official publication of The Hong Kong Institute of Value Management



HONG KONG INSTITUTE OF VALUE MANAGEMENT

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## THE VALUE MANAGER

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## AIMS AND OBJECTIVES OF THE HKIVM

- To create an awareness in the community of the benefits to be derived from the application of Value Management in Hong Kong (HK).
- To encourage the use of the Value Management process by sponsors.
- To establish and maintain standards of Value Management practice in HK.
- To contribute to the dissemination of the knowledge and skills of Value Management.
- To establish an identity for the Institute within HK and overseas.
- To encourage research and development of Value Management with particular emphasis on developing new applications of the process.
- To encourage and assist in the education of individuals and organisations in Value Management.
- To establish and maintain a Code of Conduct for Value Management practitioners in HK.
- To attract membership of the Institute to support these objectives.

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## EDITORIAL

Welcome to the first issue of The Value Manager 2009. We are delighted to inform you that the 9th International VM Conference (IVMC08) organised by our Institute together with the Department of Building and Real Estate of The Hong Kong Polytechnic University concluded successfully. We will select and reprint some outstanding conference papers in the next issue.

The focus of this issue is on “Risk and Value Management” and three papers are presented. The first paper written by John Bushell from Australia introduces value/risk management (VRM) methodology, which helps to maximise the synergy generated by the integration of VM and RM. The second paper written by Colin Jesse, who is our council member, introduces commercial imperatives in managing value, risk and relationships. The last paper written by Henry John Gough from Australia takes the case of the destruction of the World Trade Centre in New York to highlight the risk/value relationship and consideration that should be given to value and risk in the planning and delivery of capital projects.

Lastly, we would like to share the joy of our conference with you and some memorable photos are selected.

*Jacky Chung*

Editor, The Value Manager

## MESSAGE FROM THE PRESIDENT

**Geoffrey Q.P. Shen**

President of HKIVM

This is the 13th year since HKIVM's formal establishment in 1995. This is also a busy year for the Institute, we have successfully organised the 9th International VM Conference in October. Linked to this conference, is an international symposium for speakers and participants from primarily the Greater China region including Hong Kong, China Mainland, and Taiwan to exchange views on the practices and advancement in different parts of the region.

To further promote VM in the community, we have organised several evening seminars on various issues related to VM to a large audience, and have given introductory presentations on VM to several professional institutions such as HKIS, HKIE throughout the year. We have also organised workshops/seminars under the PSDAS programme.

In addition to these activities, our Institute has successfully launched the Fellowship scheme, and we have 10 fellows as the first batch of fellows in the Institute. We have also revised and rationalised our membership fee structure, and attracted a number of new members.

Our research activities in the VM field remain to be strong. Our members have done well in obtaining funding from the Research Grants Council and other funding sources. Members have also participated in at least five ongoing research projects funded by RGC. In terms of dissemination of VM knowledge, our members have published around 20 papers in journals and/or international conferences.

While our economic tie with the Chinese mainland is increasingly closer, we have maintained a close link with VM/VE societies in the mainland. For example, we have participated in several events organised in Beijing and Guangzhou throughout the year. On the international front, we have maintained good working relationship with international VM societies, and we have signed an agreement with SAVE International this year to support each other in a variety of VM-related activities. We have also strengthened our link with the Miles Value Foundation, a charity organisation dedicated to promoting VM methodology.

Looking ahead, we need to have closer collaborations with our sister organisations in other countries to jointly promote VM at world level to benefit all. One of the initiatives is to jointly organise World Congress on Value Management regularly and hosted in different countries. We are in the process of discussing this initiative with our friends worldwide. We will continue to promote the use of VM in both public and private sectors, and enhance our links and influences on the use of VM in the industry through promotional activities and maintaining VMF list for the DB.

The HKIVM is of the member, by the members, and for the members. The Institute's survival and prosperity will rely on our members. We need your support to the Institute in all possible ways. Our Council members will be very happy to listen to your views and suggestions and to work with you to promote the Institute. Please feel free to contact our council members. Together, we can make a change and elevate our Institute to a new height!

Best regards,



President, HKIVM

(Extracted from the President Report presented in the HKIVM's 13th Annual General Meeting on 18 December 2008)

# DESIGNING OUT RISK

**John Bushell**

Australia

## NEED

Public and private sector and not-for-profit organisations worldwide face two fundamental demands:

- The need for effective and efficient use of scarce and increasingly expensive resources,
- The challenge of meeting a widening scope of liabilities and constraints on their operations; including: legislative, environmental, financial and social).

The widening scope of liabilities and constraints include the following areas in which risks may be present:

- Personal safety,
- Operational,
- Business,
- Legislative,
- Environmental, (including emission controls, energy conservation and global warming)
- Public perception.

The objective of Value Management (Value Engineering and Value Analysis) is the identification and removal of unnecessary cost in a project or program, Miles (1989).

The objective of Risk Management (RM) is to ensure that risks related to a project or program are as low as reasonably practicable, (Australian Standard HB 436:2004).

Leaving unnecessary risks in a project also means leaving unnecessary cost in it too, because:

- Risks will have to be managed,
- If risks eventuate and the project or program does not proceed as planned then efficient use of resources may not occur leading to an accident, financial or economic loss or all three,

- Similarly, if externally generated risks impinge on the project, losses may also be incurred within the project.

It is entirely consistent therefore to use the tools and techniques of value management to proactively remove risks from projects and programs. Indeed, Green (1997), has postulated that value and risk management should not be treated as separate entities but as different elements in the single process of resource management.

Additionally, organisations are under increasing legislative and social pressure to be public accountable for their acts and omissions.

The value / risk management (VRM) methodology proposed in this paper ensures that there are both a complying Risk Management Report and a Value Management Study Report leaving a transparent, auditable resource management trail.

## SCOPE OF PROJECTS

The VRM methodology can be used on a very wide variety of projects, products, processes and programs.

The process will however deliver the best return on investment on projects that have one or more of the following attributes:

- Are known to have high risks associated with them, such as, mining, heavy engineering, process engineering, high technology and information technology,
- Are large in scale and scope,
- Require the efforts of people and organisations from a wide variety of disciplines for their success,
- Have a multiplicity of users or stakeholders (e.g.: public transport systems, hospitals, shareholders, etc.).

## BASIS OF THIS PAPER

This paper is based on and references are generally to the Australian Standards for Value and Risk Management (respectively AS/NZS4183:1994, AS/NZS 4360:2004 and the related HB436:2004), (Standards Australia). The methodology is however applicable to any acceptable Value or Risk Management standards. Similarly, some organisations will have their own value and risk management standards that are applied in their industry context. In the process and heavy engineering industries the risk management study may be superseded or augmented by a “HAZOPS” (hazardous operations) study. What is crucial that the VRM approach is implemented within a value and risk / hazard management framework acceptable to the client (or to the community in the case of public sector projects)?

## METHODOLOGY OVERVIEW

Combination of VM and RM into a single VRM study provides a synergy which results in benefits to the client which are significantly greater than that provided by the two separate workshops. This is because VRM simultaneously optimises project functionality, reduces risk and ensures that the project cost accurately reflects the required functionality and risk profile. The VRM process provides a real opportunity to proactively “design out” or at the very least minimise the risks inherent in a project, Phillips, (2002).

The VRM target is that after the study the project will have no “Intolerable” risks and no practically avoidable “Tolerable” risks because they have been eliminated. The only risks to be managed should be those that are “Broadly Acceptable” or “Tolerable” that are low and cannot practically be reduced or eliminated. (See Key Tools below).

Key elements of VRM are:

- Project functions are identified (preferably by a small group prior to the VRM study itself) and documented by Functional Analysis Systems Technique (FAST) diagram, Function Listing, Function / Cost Matrix or Function Tree as appropriate.
- Once identified and classified, risks in the “Intolerable” and “Tolerable” categories (see Diagram 1 and Table 2 below) are

linked to the identified project functions, Moontanah et al (1998).

- In the Evaluation (Judgement) Phase of the VMS, weight is given to the contribution of ideas for elimination or reduction of risk, in addition to improving project value.
- In the Evaluation Phase there needs to be a strong focus on using the value management techniques to eliminate risk by “designing it out” wherever possible – even in removing the need to perform the “function” if this is achievable.
- Finalising the Risk Register and agreement on the method of treating risks in the Risk Management Plan should be delayed until the conclusion of the VMS section of the study.

The VRM Process can be achieved by separate value and risk management studies but is generally more effective if the studies are combined into a single study, usually of 2 or 3 days duration as the introduction stage will be common to both disciplines. These days do not necessarily have to be consecutive, a break of a week or so would be acceptable, best timed after the allocation of risks to project functions or the creative phase (phases 6 and 7 of the VRM process below). The risk management component may be conducted by a specialist in risk management or by the value management facilitator provided that that person is sufficiently experienced in the risk management process.

If there are to be separate studies then the RMS should be held before the VMS and the risks then linked to “functions” before the VMS commences. Alternatively, a better solution is to identify the “functions” before the RMS, as this can then be a valuable tool to assist in identifying risks.

Study participants can be expected to be the same for both the risk and value management sections and the study group should retain the same participants throughout the study to ensure commitment to and effective implementation of the study outcomes.

To ensure a proper balance of risks and functionality the VRM study should address the life of the project or program, not just the initial construction or manufacturing stage.

## THE VRM PROCESS

The VRM process, assuming a single study, is summarised below. The VM component is identified in regular type; the RM component is identified in italics.

Value Management / Risk Management,  
Combined VRM Process

1. Information Phase / Establish the Context
2. Function Analysis Phase
3. Identify Risks
4. Analyse Risks
5. Evaluate Risks
6. Allocate Very High and High Risks to the Project Functions
7. Creative Phase
8. Judgement Phase
9. Development Phase (including the Action Plan)
10. Treat Risks
11. Prepare Value Management Study Report / Prepare Risk Management Plan

12. Follow-up and implementation of the results of the study.

At the conclusion of the process it is important to check that in its enthusiasm, the study group has not introduced any new risks or increased any existing risk!

## KEY TOOLS

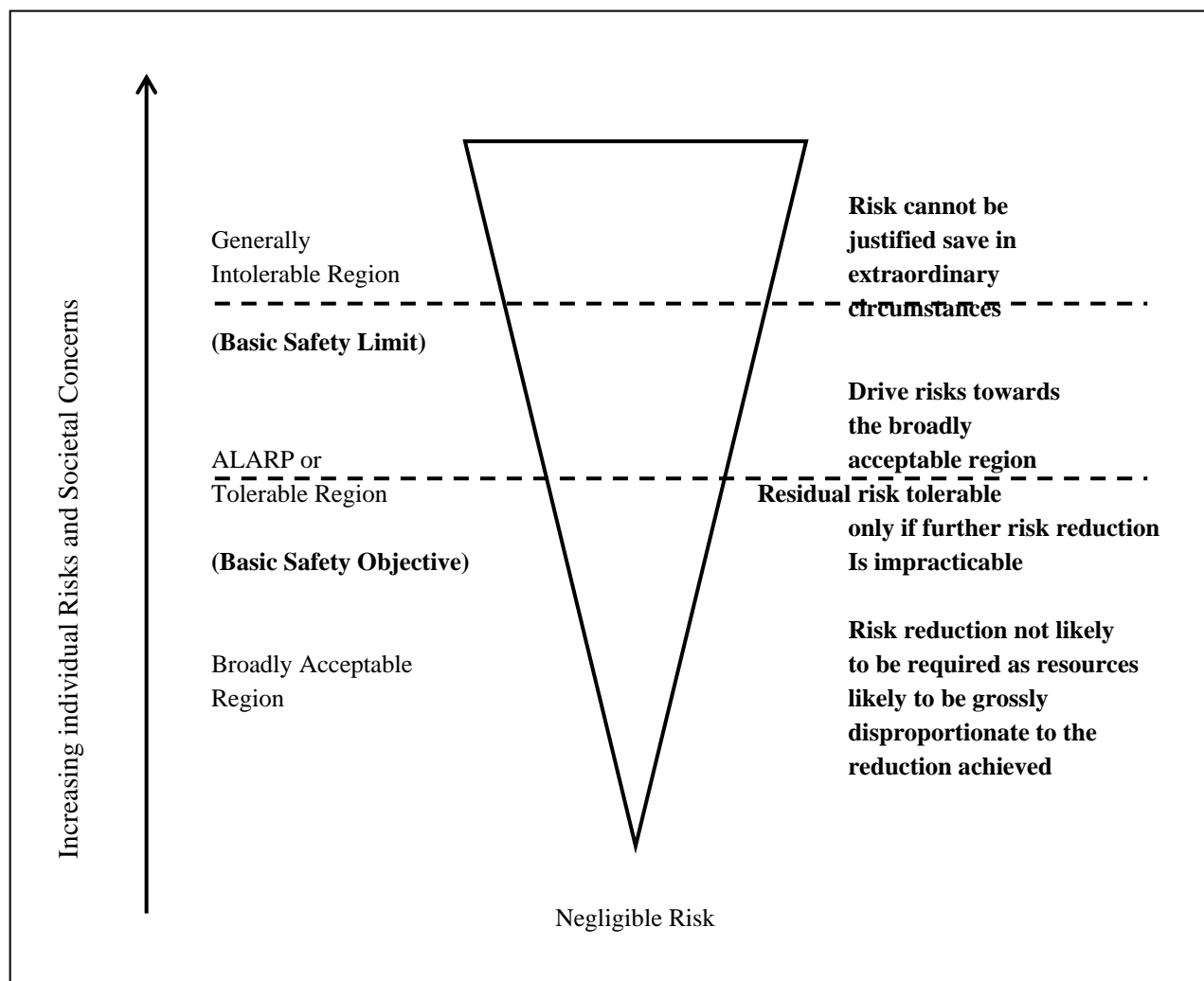
Key elements of the VRM Process are as follows:

- Function Analysis – FAST Diagram and other methods (VM)
- Classification of Functions (VM)
- The ALARP (As Low As Reasonably Practicable) Principle (RM)
- Classification of Risks (RM)

This paper will not canvas the methods of identifying and documenting functions as this has been adequately covered in a number of preceding papers including, Lenzer (2002). A review of the classification of functions and risks and the As Low As Reasonable Practicable (ALARP) principle is however appropriate as their use can focus the study team on the most effective use of its time.

**Table 1: Function Classification**

FUNCTION CLASSIFICATION	ACTION IN THE VRM STUDY
Basic Function	Reduce Life Cycle Cost Improve Value to the Customer
Required Secondary Function	Eliminate if possible Reduce Life Cycle Cost
Secondary Function	Eliminate if possible Reduce Life Cycle Cost
The generally preferred action is identified in bold.	

**Figure 1: ALARP Principle (Australian Standard, HB 436:2004)****Table 2: Risks Classification**

DESCRIPTION	RISK CATEGORY	ACTION IN THE VRM STUDY
Generally Intolerable Region	Very High, High	<b>Eliminate activity</b> Reduce frequency and consequences or risk
ALARP or Tolerable Region	Medium	Reduce frequency and consequence of risk <b>Do nothing</b> Eliminate activity
Broadly Acceptable Region	Low	Reduce frequency and consequences of risk <b>Manage in accordance with new protocols</b> Manage in accordance with existing protocols
The generally preferred action is identified in bold.		

The classifications in Tables 1 and 2 will greatly assist the study group to target appropriate actions for the functions and risks identified.

Those classifications also provide an excellent correlation between functions and risks. For example, if a Required Secondary functions (or functions) have a number of Very High or High risks then the in the Creative phase of the study serious consideration must be given to eliminating that function if possible, or alternatively performing the function in a manner in which risks will be eliminated or their consequences significantly reduced.

## COMPLEX PROJECTS

Roberts, (2001), recommends that for complex projects, particularly in the high technology, defence and aerospace industries, the cost and schedule impacts of all the risks in the highest category be identified and quantified before addressing possible risk mitigation. This quantification process will not only reveal further risks but provides a greater understanding of the project baseline prior to the Creative Phase of a VRM study.

This risk based decision support (RBDS) process has, through detailed quantification of risks, identified fundamental flaws in the structure of a number of aerospace projects in time for the defects to be rectified and the projects brought back on track. Without the application of the RBDS process the flaws would have eventually been discovered but far later in the project and with significant cost and time repercussions.

The quantification of risks in the RBDS process provides an excellent methodology to evaluate the trade-off of the life cycle cost, functionality and risk of competing VM generated risk mitigation measures.

## KEY BENEFITS OF VRM

Key benefits of the VRM study process can be summarised as follows:

- It is the most cost-effective use of the project team's time (effective use of this time if often overlooked on many projects);
- Classification of both risks and functions means that there is a clear hierarchy of

actions as to how they should be dealt with thus optimising both the study group's time and the use of resources within the project itself;

- The process is proactive in eliminating and reducing risk, rather than just managing it.
- The process is auditable thus ensuring transparency and quality control.
- It is more cost-effective of project team time and more efficient in respect of results achieved than unlinked RM and VM studies. VRM therefore delivers excellent return on investment.

## RESULTS

Results from the application of VRM have demonstrated a significant shift in the view of the project by its stakeholders. As a result project value has been greatly increased and risks to be managed substantially reduced as demonstrated by the following examples.

- On a hazardous exit end of an existing steel plating mill the VRM approach resulted in the recommendation of a scheme that eliminated 86% of the risks for a 72% capital cost saving and 20% less plant downtime than the original proposal: a return on investment in the VRM study of 240:1.
- In the VRM study on a proposed \$70 million chemical manufacturing process plant the study group recommended initiatives to reduce or eliminate 37% of the identified risks. The study group also recommended that the capital cost of the plant could potentially be reduced by 14.3% (with a possible further 6% saving depending on the outcomes of trials). Subsequent bench tests and plant trials have verified that all saving and risk reduction identified will be realised in the new plant.
- 25 risks to staff were identified on high-level access platforms used for train maintenance. The VRM study resulted in the implementation of cost-effective, practical solutions that eliminated 23 "Extreme", "High" and "Moderate" risks, with the exception that 2 risks were reduced from "High" to "Moderate". Operations staff participated in identifying

the risks and developing physical and protocols solutions.

- The small rural settlement of Kings Plains in the state of New South Wales, Australia had a regional road running through it. This 5 km length of road had an accident rate four times that of the State average. The VRM process reduced of 11 out of 26 identified risks (2 risks downgraded to a lower risk category) and a marginal increase in one construction risk as a consequence of route selection on the proposed \$8 million roadworks project. Life-cycle safety of the functionally preferred option was critical to the client and the community.
- In suburban Sydney a steel-framed multi-story car park had been constructed on leased land over a railway line some 50 years ago. Subsequent rail infrastructure development had created a track junction and rail traffic had increased considerably resulting in a foreseeable risk of a derailed train hitting the structure and causing it to collapse on top of the train. Following the first section of the VM study, risk identification and evaluation the team developed a number of structure protection options and a demolition option. In the Development Phase of the study the team resolved that demolition of the car park would eliminate all the identified risks and recommended this action, Jain (2002).
- Results from the more detailed, quantified, risk identification and management process RBDS can be demonstrated in the case of two competing approaches for a robotic manipulator to be used in the assembly of International Space Station components. The consultants performed a cost, schedule and technical risk assessment for both the competing options. Investigation of management risks was specifically

excluded from the commission but the quantification of the three risk categories under investigation revealed significant under resourcing of program management and systems engineering functions. As a result of these discoveries the risk consultant and the project team developed Integrated Master Plans and Schedules for both projects. This permitted the difference between the existing and revised plans to be identified and the risks and related costs quantified. The result was the elimination of some \$20 million worth of at-risk cost from a project with a total value of \$50 million (Roberts, 2001).

## CONCLUSIONS

Return on the investment in VM preparation, workshop participation, and follow-up can be expected to be a minimum of 10:1. Individual workshops may deliver a significantly higher return, Adam, (1990).

When RM is incorporated into the VM process as described in this paper the returns are even greater because there is a strong focus on “designing out” risks from first principles thereby reducing ongoing risk management activities as well as opening up other functions for potential cost saving and value improvement

On appropriate projects, further investigation and quantification of the costs and schedule impacts of the most severe risks using the RBDS methodology can further reduce project costs and may in some cases save the project from disaster. Quantifying costs associated with risk provides the basis for evaluating competing methods of addressing risk that have been developed during the Creative Phase of the VM study.

What other activity of an organisation will deliver the level of return on investment that the VRM process can deliver?

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# THE COMMERCIAL IMPERATIVES MANAGING VALUE, RISK AND RELATIONSHIPS

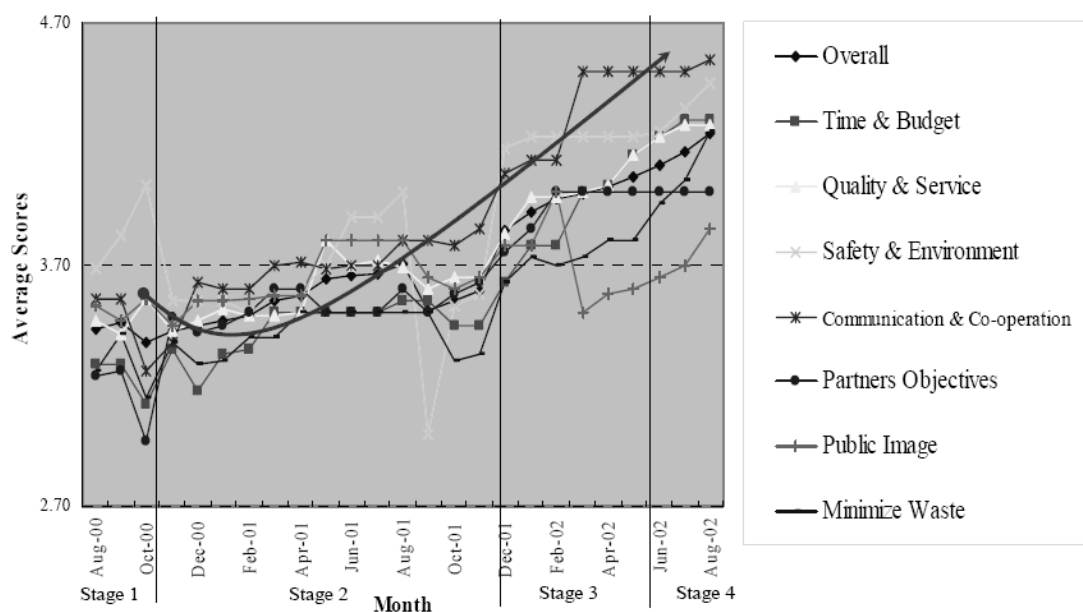
Colin Jesse

Hong Kong

Infrastructure development has traditionally been beset with overruns in time and cost due to a multitude of reasons and the inevitable blame culture. As a result of a number of initiatives Hong Kong has made several attempts to improve project delivery by using “relationship contracting”. This can take several forms for example, many large private developers in Hong Kong have successfully circumvented the issue altogether by running their own subsidiary construction companies or by procuring a significant shareholding in a listed contracting entity.

Project partnering in Hong Kong as a delivery mechanism illustrates how effective procurement, risk management and project delivery techniques enhance contractual outcomes. However current restrictions on the “purity” of partnering caused by onerous contracts, which generally rely on the spectre of punishment rather than the motivation of reward, reduce the effectiveness of a non binding “charter” superimposed on top of an adversarial legal relationship!

## Performance Monitoring

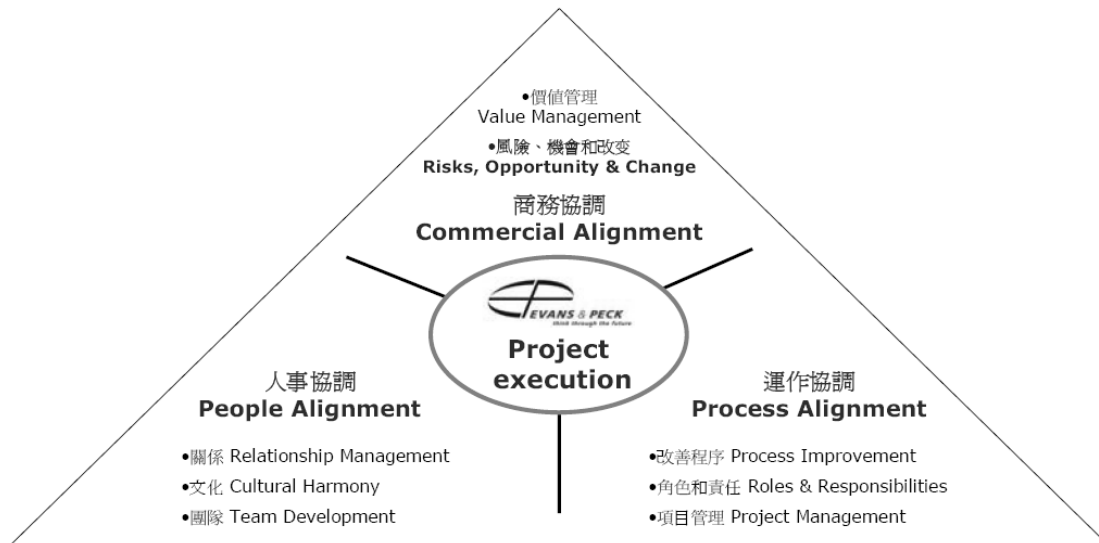


The “Performance Monitoring” chart above is an actual example of how a project team on a very competitive bid overcame the restrictions of low prices and difficult operating conditions to produce a remarkable result. The performance ratings are judged by the team itself illustrating genuine buy-in and commitment.

Successful project relationships clearly struggle to develop in an environment where strategic

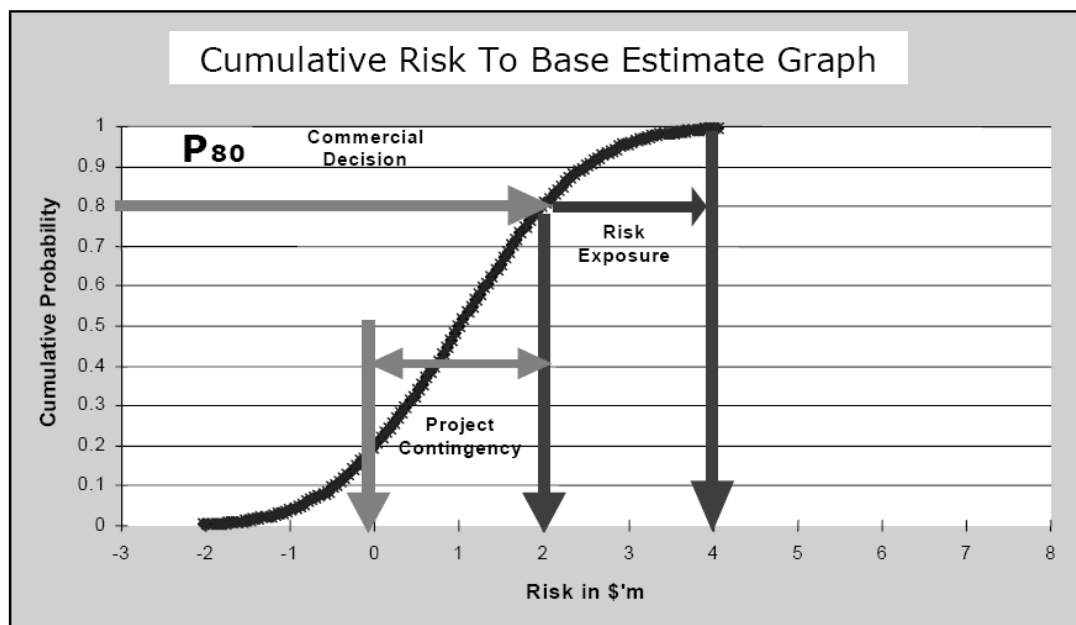
partnering is stunted by the cheapest price and “project by project” procurement.

Process and People” alignment (see chart below) can be developed as a base upon which ultimate commercial success depends. Project stakeholders to establish collaborative mechanisms for co-operation which directly lead to measurable increases in performance; drive greater trust; collaboration and value enhancement.



Key relationship management relies on a unified team using advanced management systems to confidently predict risk and increase value through incentivisation (i.e. key competencies). This has been proven by the careful analysis of “trust” which shows that genuine openness is only achieved after the parties have actually worked through some successful experiences together!

Risk management is a proven method of reducing uncertainty in predicting final project cost and delivery time. Rigorous risk modelling by using “risk” or other software and the ongoing management of a “calculated” project contingency achieves a number of desirable results ranging from a discernable ability to proactively mitigate project risk to the intelligent management of project stakeholder expectations!

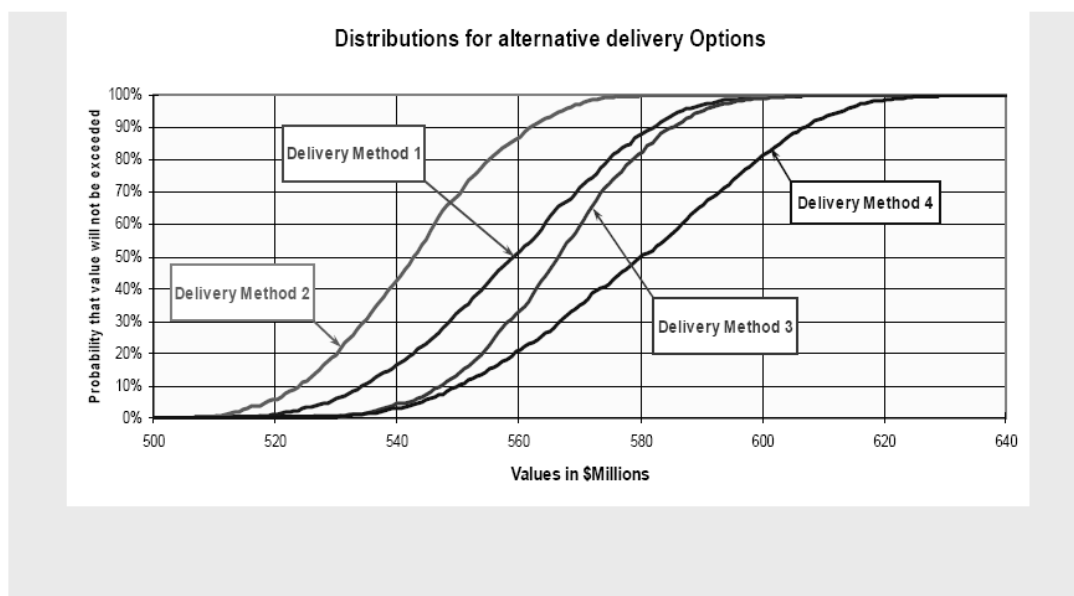


“0” represents “Base Estimate”

This graph shows that at “P80”; an 80% probability exists that the \$2 million contingency allowance will not be exceeded;

however the project is still exposed to a further \$2 million risk!

### Quantitative Comparison - Predictive Model Output

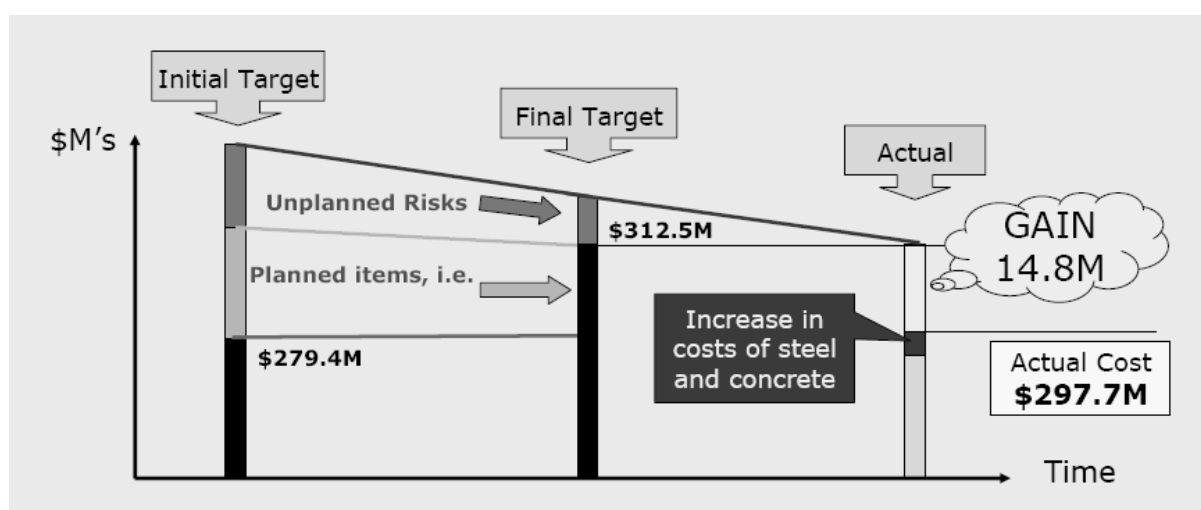


Risk modelling can be applied to a number of alternative delivery mechanism e.g. lump sum; design and build, target cost etc. to provide an accurate quantitative comparison of likely output costs as shown above. This rigorous methodology has significantly reduced the frequency and consequence of selecting a poor delivery option.

The Hong Kong Drainage Services Department is about to trial the New Engineering Contract

which will probably be based on a target estimate and a pain/gain share mechanism similar to the model which recently delivered a successful MTR station enhancement project.

Pain-Gain' share rewards desirable behaviour by providing "benefit" for achievement rather than punishment for under performance. This innovation in project procurement represents a significant breakthrough in maximising project stakeholder commercial outcomes e.g.:



The Target Cost Estimate (TCE) "gainshare/painshare" amounts do not

necessarily have to be determined by cost performance alone.

The base model for TCE Gainshare is a 50:50 share of any overrun (painshare) or underrun (gainshare). The overrun or underrun is determined by comparing the Actual Outturn Cost on completion of the Project against the TCE. In the example shown above the \$14.8 million gain is shared 50/50 between the contractor and the client.

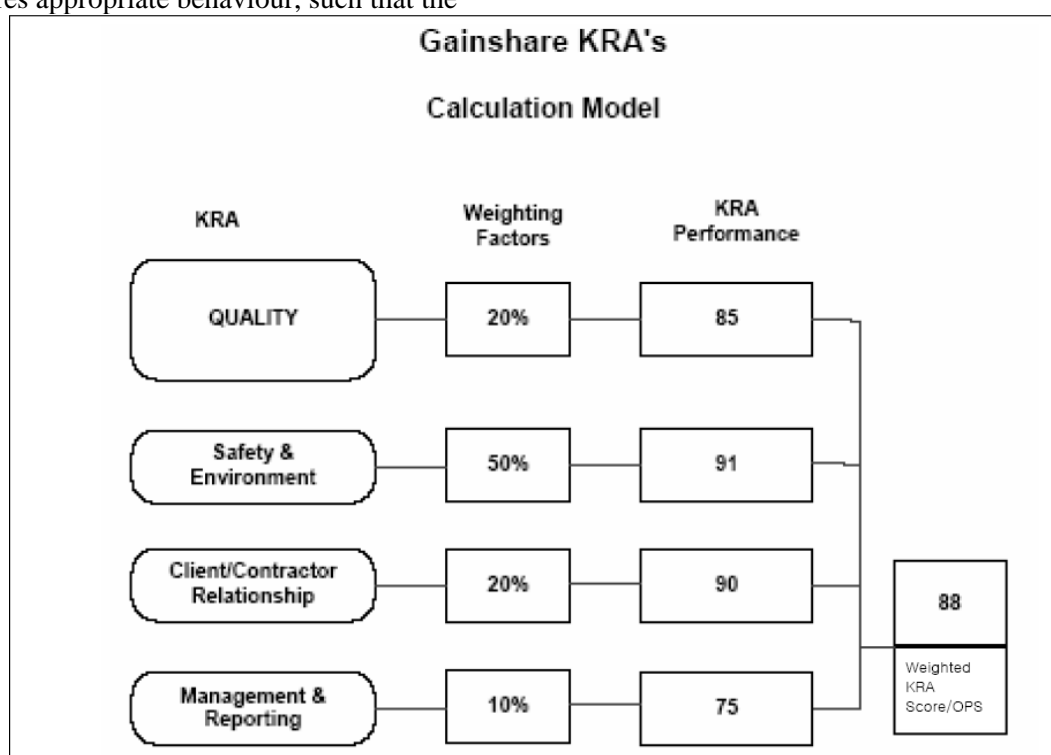
The value available to/from the Contractor can be pro-rata to the actual performance measured against non cost Key Result Areas (KRA). This will be applicable to both cost underruns and cost overruns.

This arrangement is attractive to Clients as it ensures appropriate behaviour, such that the

focus is not simply on cost performance to the detriment of satisfying other non cost areas important to the Client.

KRAs relevant to TCE Gainshare may include, for example:-

- (a) Quality; at 20% of total gainshare,
- (b) Safety and Environment; at 50% of total gainshare;
- (c) Management and reporting, at 10% of total gainshare
- (d) CLIENT/Contractor relationship, at 20% of total gainshare



The Overall Performance Score (OPS) will be used as a Fee Modifier to adjust the 50:50 sharing of cost underrun or overrun as generally indicated below. This table is an example of the

limits which could be applied to the range of the OPS and how the score would affect the sharing of the cost underrun or overrun.

Overalls Performance Score	Share of Underrun		Share of Overrun	
	Contractor	CLIENT	Contractor	CLIENT
OPS = 100	75%	25%	25%	75%
OPS = 50	50%	50%	50%	50%
OPS = or <25	25%	75%	75%	25%

Working experience illustrates that careful selection of a project procurement strategy; deliberate evaluation of a rigorous risk profile;

proactive team development and the critical, ongoing monitoring of all the above does generate superior project performance.

# VALUE AND RISK – TWIN POWERS

Henry John Gough

Australia

## INTRODUCTION: VALUE AND RISK; WHAT IS THE RELATIONSHIP?

The market place understanding of value is straight forward, i.e. “getting all wanted functionality from a service or product, at a price that is satisfactory”. To assess what is “good value” we must consider not only the relationship between function and cost but also the worth of functional outcomes.

Consequently, an increase in value may be achieved by providing all necessary functions at less cost or, increasing functionality for the same or some additional cost.

Value management (VM) is used to add value to functional outcomes of any project, process or thing by bringing into focus the difference between wants and needs and using “groupthink” to consider alternative ways of achieving required outcomes (functions) with less input of resources.

Risk management (RM) on the other hand seeks to manage “things” that have the capacity to detrimentally influence the achievement of outcomes, the cost of outcomes, the maintaining of outcomes - and hence the value of outcomes. Identification and assessment of risk is challenging because risks change throughout the life of a project and perhaps for this reason value and risk are often considered separately. However, participants who have taken part in a VM workshop will know that risk complicates the task of judgement because a new idea may introduce risks that had not previously been identified. Participants find themselves struggling to balance an increase in functional value against risk and so it follows that understanding the relationship between value and risk is extremely important if the effectiveness of a VM workshop is not to be compromised.

Some practitioners argue that value management is a subset of risk management; rather than the other way round. Others feel that risk is just another value consideration and that a formal integration of risk assessment into value management assists participants in understanding how the value of outcomes can

depend upon adequate assessment and management of risks.

Some progressive Australian government agencies have recognised the relationship between value and risk and combine value and risk workshops at all phases of project initiation, including concept and delivery phases.

This paper uses aspects of the destruction of the World Trade Centre in New York to highlight the risk/value relationship generally and more specifically the consideration that should be given to value and risk in the birth and delivery of capital projects. The intention is to demonstrate that formal identification, evaluation and ongoing management of risks is essential if predictable, high-value outcomes are to be achieved and maintained and that these tasks sit comfortably within the method of value management.

## WHAT IS RISK?

In the author’s opinion a risk may be seen as: “something that may or may not happen in the life of a project, process or thing that has the capacity to cause loss of one form or another”.

Some risks have implications for value if something happens; such as delays in design/construction or accidents. Others may reduce the value of outcomes if something doesn’t happen – such as expected service demand or customer acceptance not being achieved.

The losses associated with risks can include: financial, time, functional, relationship, human, intellectual property, reputation, political and market position losses. If losses due to risk occur then the anticipated value of outcomes for stakeholders and/or shareholders is reduced.

## RISK MANAGEMENT

Risk assessment and management is generally covered by some form of regulation or standard. In Australia it is the Australian/New Zealand standard (AS/NZS4360: 2004). Although there are variations in how risk is dealt with, the

following elements are generally part of the process:

- Identify the risks;
- Categorise risks (relate to business case if possible);
- Assess the likelihood and consequence of risks;
- Compare risks for importance (risk factor);
- Determine what risks should be managed;
- Establish a management plan as appropriate; and
- Prepare a contingency plan as appropriate

## VALUE MANAGEMENT

Value management in Australia is covered by the Australian/New Zealand standard AS/NZS 4183:1994 (in review) that recommends a 5 stage job plan, expressed generally as:

1. Inform all participants about the subject and establish objectives;
2. Analyse available information including required functions;
3. Innovatively speculate on how to provide functions in a better value way;
4. Critically assess speculative ideas for worth; and
5. Develop and consolidate value adding opportunities for decision makers.

## WHAT ARE THE SIMILARITIES AND DIFFERENCES?

Value management and risk management both require strong commitment from senior management in order to deliver worthwhile outcomes and both rely on the knowledge of participants and their ability to speculate - in the case of VM to identify opportunities for adding value and for RM to reveal all the risks that may impact on outcomes.

Both RM and VM need to be undertaken by a group of key stakeholders who have an ability to think laterally and who very well know the project, process or thing under analysis and the system within which it exists.

The expression “what if” is extremely relevant to both VM and RM but in slightly different

contexts. In the case of VM to elicit innovative ideas for better value and in the case of RM to ensure all risks that matter are brought out.

Both VM and RM use prioritisation techniques; in the case of VM to develop a focus on needs rather than wants and filter out ideas that have no added value. For RM they are used to quickly eliminate risks that don't matter and shift the focus to those that do.

Both VM and RM should take a system view – i.e. to get the best overall outcome for the “system” it may be necessary to make value and/or risk compromises in “parts” of the system.

A key process difference between VM and RM is that VM requires participants to think innovatively for the purpose of identifying alternative, better value ways of carrying out functions. Getting a group prepared to do this takes time and the requirement for innovation sets VM apart from RM and other cost reducing or loss mitigating methods that utilise groups of stakeholders.

Although it may be argued the outcomes are different; participant makeup, skills and the tools required for the identification, assessment and management of risks are similar to those required for a VM workshop.

## THE CHANGING NATURE OF RISK

The opportunity for loss due to risk is inherent in all phases of planning and delivery of a capital project and may relate to: basic assumptions, project definition, estimates and costs, timelines, project features, client and community relations, procurement procedures, construction (including safety and workforce liaison) and subsequent operation. It follows that if a risk has the capacity to cause financial, functional, relationship, time, human and other losses, then it needs to be considered in the overall context of the value of outcomes.

The first opportunity to add value or allow possible risk losses to creep into a new resource is at its birth - the “inspiration” for a new capital asset. To ensure a new resource is the right business and service solution, other processes should have already taken place namely; Strategic Service Planning (SSP) and Strategic Resource Planning (SRP). These processes are

critical in justifying a new resource and in deciding what functions it must deliver.

## EMERGENCE OF A CAPITAL PROJECT

The need for a new capital project should only come out of an effective strategic planning process. Having an established series of processes that first relates resources to business strategies and vice-versa and then “shepherds” a new resource into existence are pivotal in ensuring that value and risk considerations are built into the delivery of capital projects.

Service and business strategies driven by customer needs, demand, technology, the availability of resources and others are often the subject of frequent change. To ensure services remain relevant and the necessary resources are available when needed, a cyclic process of Strategic Resource Planning (SRP) should be carried out in conjunction with Strategic Service and Business planning (SSP). Linking resources to services in a planned, structured way provides opportunities for adding value and reduces the likelihood of losses due to unforeseen risks.

Both SSP and SRP require planners to take a stakeholder perspective (including that of customers) and to clearly understand why the organisation exists and where it is likely to be heading. Questions that should be asked include in this order:

- why do we exist and what is our business?
- where are we at in terms of business outcomes and services?
- what are the drivers of change?
- what direction should we be taking? and
- what resources do we need to ensure services are relevant and efficiently delivered into the future?

Service and business planning and resource planning have a mutual dependence on each

other and should always be considered concurrently. The diagram below illustrates the relationship and is relevant for all enabling resources including: human, information, assets and financial resources.

As the diagram suggests, SSP may result in different practises being adopted, identify a change in demand and suggest opportunities for new and lost services. Such outcomes are likely have an impact on resources and must be fed into the SRP process so that changes to enabling resources can be proactively initiated.

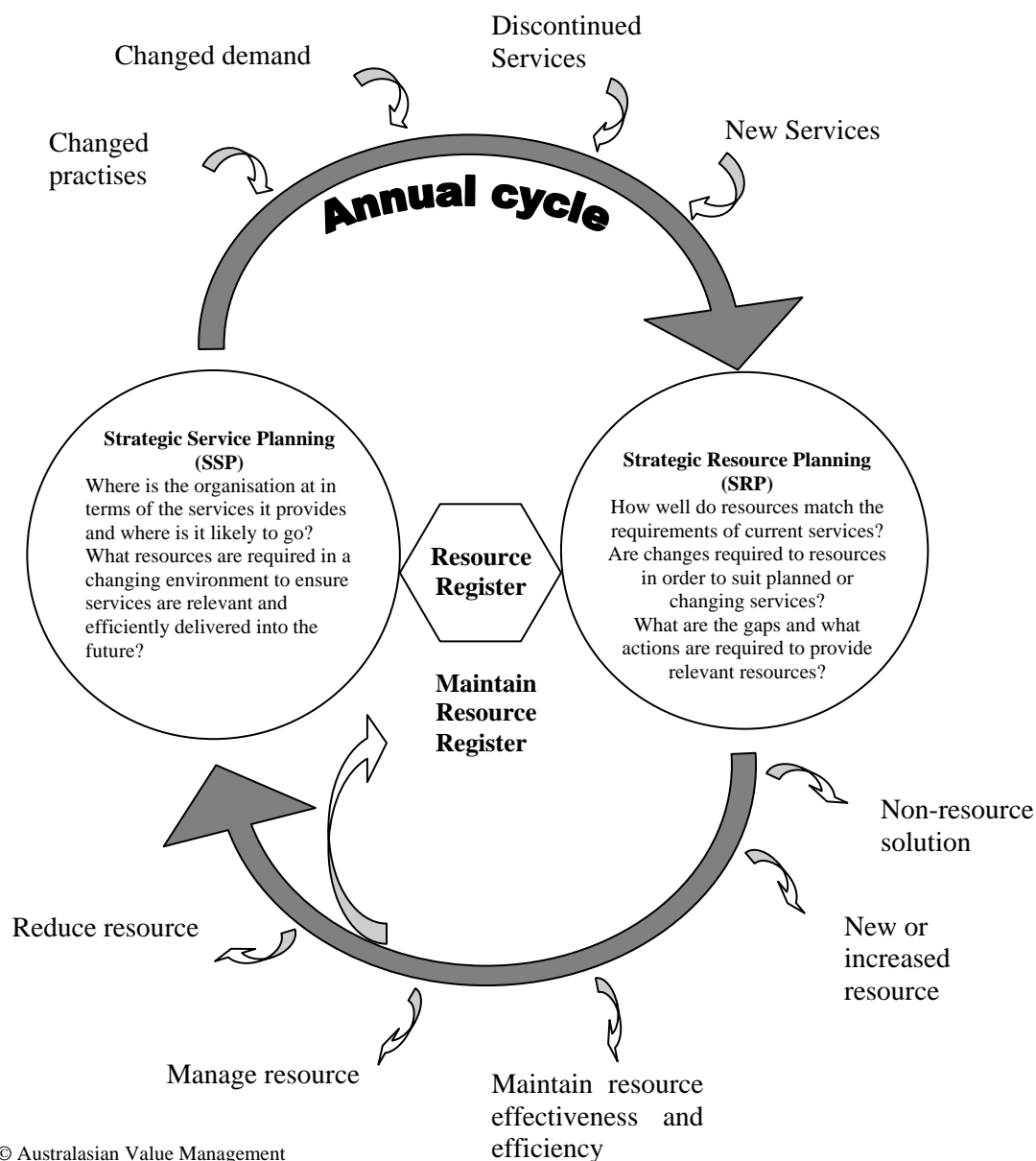
Some outcomes of SRP include strategies for managing, maintaining, reducing and increasing resources to meet service requirements. A strategy to increase resources may include a new capital resource such as that being discussed here.

It should be noted that SRP outcomes that are fed back into the SSP process may cause a rethink of business strategies. For instance, it may not be possible to increase resources to satisfy new demand; for one reason or another. This is likely to impact on planned business and service outcomes and is why it is essential the two processes are linked in a never ending cycle.

If VM and RM can be employed to find innovative ways to increase, change, or develop services without increasing resources, then a better value outcome has been found; this is often referred to as a “non-resource” solution and is shown on the diagram as a valid outcome of SRP.

If the processes outlined above are part of an organisation’s culture and the benefits of effective VM and RM are employed, then service changes will be more predictable and the right resources will be available when needed. Lack of, or inadequate SSP and SRP commonly results in last minute responses to a resource need and increases the risk of the wrong resource being procured.

## Periodic Cycle of Strategic Planning linking Resources to Services



### SELECTING A BEST VALUE SOLUTION TO AN IDENTIFIED NEED

If a new resource is justified then VM and RM techniques can reduce losses by assisting stakeholders to select the right resource by:

- Confirming why – the reason for doing it;
- Confirming necessary functions and their relative importance to stakeholders;
- Confirming what other functions stakeholders are prepared to pay for;
- Developing viable options for delivering the functions;
- Considering the value of options from a functional perspective;
- Considering risks associated with the options and their possible effect on value;
- Selecting the best value option; and
- Managing risks for the life of the project as appropriate.

It is often the case that several viable alternatives are presented that will satisfy resource needs and to decide which is best, all stakeholders must agree on service criteria that will define a successful outcome - they must also agree the relative importance of each criterion.

VM and RM can be used to develop and prioritise rational decision-making criteria and apply them to the options. It is important that all relevant criteria are considered and it is convenient to group them into two main groups. One relating to output (or service) functions and the other to risk or other, possibly non-negotiable, issues. The first set, if correctly identified, will allow participants to rank alternatives from best to worst in terms of how well a solution meets functional needs; the second set and other “filters” may require a change in the preferred order.

### ***Service criteria***

In the case of a capital project we pay for functions like “accommodate”, provide transport”, “provide icon”, “provide access”, “provide storage”, etc.

Experience suggests that all service (functional) criteria can be sorted into 4 groups:

1. Supports required output functions;
2. Assists in meeting service demand;
3. Supports long-term business strategies; and
4. Improves operating efficiency and effectiveness

For example, Supports required output functions may include: “be a civic icon”, “provide administration space”, “provide storage space”, “provide access” etc. Each criterion has to be mutually exclusive and at the correct level in the function hierarchy because it is not possible to compare say “reduced operating costs” with “improved efficiency” or “accommodates a cyclist lane” with “supports required service functions”.

### ***Risk criteria***

Finding the best value solution also requires a consideration of risk and other “filters” which may affect the outcome of an alternative - even if it is functionally “perfect”.

Risks that need to be considered at the developmental stages of a project are generally different in character to those that come later. These early risks can be thought of as development risks and may vary from enterprise to enterprise. Recurring risks of this type include:

1. Does not support long-term government/board policy;
2. Loss of stakeholder/shareholder/political confidence;
3. Impacts on design/construction/operation/safety;
4. Consistency of (cost/benefit/needs) analysis;
5. New but unproved business opportunity/investment strategy; and
6. Risk to continued service (failure or interruption of existing facilities).

Consideration of such risks when evaluating a set of alternatives may reveal that some options should be eliminated. For example, an alternative may not be acceptable if it requires cutting an essential or important service for an unacceptable period of time.

### ***Other decision making criteria***

This paper focuses on value and risk relationships but they are not the only criteria for deciding which option to progress along the project initiation path, others include:

**Statutory requirements:** If an option can not be made to comply with statutory requirements then it should not be considered a viable alternative. However, there are examples of projects that do meet minimum standards and yet losses due to unforeseen or underestimated risks still occur.

**Cost:** Cost should not be a criterion for choosing the most suitable alternative but instead looked upon as a “filter” to help decide how much desired functionality and how much risk management (or risk avoidance) can be afforded.

Cost comparisons should be based on life cycle costs (LCC), inclusive of capital, operating and disposal costs. Getting most function for the least cost and within acceptable risk limitations for the life of a project is one way of defining

best value. At the end of the day, proposals that are unaffordable tend to stay on unfunded forward works programs until they are superseded by a later, functionally acceptable alternative that is affordable.

### VM/VE AND RM IN THE PROJECT INITIATION PROCESS

SRP and SSP utilising VM and RM assist in identifying the right resource but depending on a project's complexity it could take several years to come on stream. Without a structured process of development and approvals, the benefits gained in using VM and RM to find the best value option can be lost in design rework, construction problems and cost overruns.

A lot has been written in recent years as to how best to ensure a project stays on track for

delivery within cost and time constraints. Most large organisations utilise a Project Initiation Process (PIP) involving several distinct phases and to progress from one phase to the next, several outcomes and an approval are required.

The table below summarises a typical PIP process and where, in the opinion of the writer, value management and risk management and their derivatives can be used to assist in delivering safe and stakeholder "friendly" assets that are worth the money and other resources that go into them.

It will be noted that as a project moves through the PIP process the nature of risk changes from high level (risks to services, funders, other stakeholders and the like) to that of the more familiar risks associated with development, design, construction and operation of the project.

RID – Risk Identification    RM – Risk Management    VM/VE – Value Management/Engineering

PIP Phase	VM	VE	RM
Pre-PIP Strategic service and resource planning	To assist stakeholders to make best value strategic business and resource decisions.		(RID) focuses on risks to political/business/service outcomes (see list above).
<i>Concept</i>	To assist stakeholders to develop innovative, best value options to meet a resource need and establish an evaluation brief.		(RID) focuses on identifying high-level risks to the funder, stakeholders and services
<i>Evaluation</i>	To assist stakeholders to evaluate and choose a best value option that will deliver required outcomes.		(RID) still focuses on high-level risk but risks associated with design and delivery emerge.
<i>Definition</i>	To assist stakeholders to develop a delivery brief based on agreed functional requirements.	<i>To assist stakeholders to look for innovative ways to add value to designs and ensure all functional needs have been met.</i>	(RID)/(RM) reviews and updates project risk identification and management.
<i>Delivery</i>	To assist stakeholders to choose best value procurement methods, develop contracts and deliver partnering agreements.	<i>To assist stakeholders develop innovative, value adding ways of achieving construction programs and project outcomes.</i>	(RM) reviews and updates project risk identification and management for the project and its operation.
<i>Review</i>	To assist stakeholders to learn functional and contracting lessons from post occupancy and post construction studies.		(RID) reviews and compiles risks encountered in project delivery and operation.

## IDENTIFYING AND ASSESSING RISKS

Risk management requires the identification, assessment and management of risks and it is convenient to think of it as a two part process: “identify and assess” and “manage”. This approach has advantages if undertaken in a VM style workshop environment.

There are two key factors in risk assessment: the likelihood of a risk occurring and the consequences for the project if it does. For the purposes of comparing the impact of risks these factors are each given a score and a risk factor is calculated (product of likelihood and consequence scores).

Different organisations may have their own approach to RM but after a review of available literature and listening to the views of well-informed workshop participants, the following suggestions are made for assigning likelihood and consequence scores. Likelihood scores are linear ranging from 1 (rare) to 5 (almost certain) as shown but in the case of consequence, a non-linear score better reflects the need for management of high consequence risks. For this purpose, consequence scores fall generally on a parabolic curve and range from 1 (insignificant) to 20 (catastrophic).

## LIKELIHOOD SCORES

Level	Likelihood	Score
Rare event	Only occur in exceptional circumstances	1
Unlikely	Unlikely to occur but could	2
Possible	Might occur at sometime	3
Likely	Likely to occur in some circumstances	4
Almost certain	Very likely to occur in most circumstances	5

## CONSEQUENCE SCORES

Level	Consequence	Weighted score
Insignificant	Very low effect on project objectives	1
Minor	Some easily managed effects	3
Moderate	Moderate effect requiring management effort	5
Major	Major effects on project objectives requiring significant management effort	10
Catastrophic	Unacceptable effect preventing project objectives being met and/or resulting in unacceptable human or material losses	20

The highest possible risk rating based on the above tables is 100 but it is recommended a dedicated management approach be applied to risks with a rating of 20 or more. A score of 20 or more includes any risk deemed likely to happen and requiring management but it would also include a risk thought to be a rare event but which would have catastrophic consequences;

such risks should be seriously addressed in the planning, design and construction of a project.

It is also useful to group risks by category to indicate where a risk impacts on the business plan and where in the process of planning, project initiation and delivery, a risk is likely to occur; suggested categories are:

Category	Examples
Cost	budget, adequacy, funds, source of funds, ETC accuracy
Time	program, schedule, milestones
Project definition	justification for project, scope, how well defined, required outcomes
Client and community	experience of client, relationship, community interest, approvals
Procurement	complexity, consultants, tender, contractor (availability/competency)
Project features	uniqueness, location, site, occupation, hazards, security

## MANAGING RISKS

Risk identification and assessment is just the beginning – risks that have the capacity to reduce the value of outcomes need to be managed until they become irrelevant or are appropriately dealt with. To be effective, risk management should be incorporated in all phases of project management and project delivery. The key elements of a risk management plan are:

- Identify the risk, its risk factor and the category the risk fits;
- List the action required to manage the risk;
- List the person responsible for carrying out the actions;
- List the date by which the action should be carried out;
- List the status of the risk (dealt with/not dealt with)
- List the outcomes of the actions; and
- As appropriate list contingency plans.

Risk management plans need to be revisited throughout the life of the project so that risks needing management are regularly reviewed. For this purpose, IT methods can be effectively utilised at workshops to produce automated reports that provide a “living” risk management plan thus eliminating the need for many paper reports and saving time and effort for project managers.

## THE WORLD TRADE CENTRE – VALUE AND RISK REFLECTIONS

The title of this paper is a play on words to illustrate that possibly unrecognised or underestimated risks can result in catastrophic events that greatly influence the value of outcomes – at some time. The debate on the failure of the twin towers still prevails but it is likely the buildings would still be standing and many of their occupants still alive today, if they had not been deliberately impacted by large, fully fuelled, commercial jet aircraft. It is always easier in hindsight to be wise but we can learn from this disaster and better understand the influence that risk can have on the value of outcomes.

No doubt a factor in the design of the twin towers was the need to make the best and highest use of one of the most valuable building sites in the World. To this end the designers and builders created two enormous, almost monumental, towers that provided an appropriate iconic presence in the financial district of New York.

Height, structural limitations and (internal) transportation issues called for an innovative design that resulted in a very efficient structural system that permitted high floor areas and building volumes compared with other methods of construction. Although lightweight, the structures were strong and designed to resist all expected floor, earthquake, wind and other loadings. It is likely the finished product represented very good functional value for the owners and other key stakeholders.

And yet, these great 110 storey structures, after suffering the aircraft impact and fires at high level, each collapsed in seconds to a pile of rubble a few storeys high and killing around 3,000 people in the process. After collapsing, the great iconic structures were not worth much

more than the value of the site and it is reasonable to ask “could the destruction of the buildings and many of the deaths have been avoided by better understanding the risk/value equation”?

The designers no doubt considered all reasonable risks to the buildings, including the possibility of bombings and even an aircraft hitting them “by accident” but the idea of someone deliberately crashing fully laden aircraft into both buildings with the purpose of destroying them may have been so preposterous that these questions may not have been asked:

“What if”...

- a large jet aircraft was intentionally flown into the building;
- the aircraft had full fuel tanks;
- fire protection systems were damaged/disrupted; and
- fire protection systems could not prevent the structure being affected by heat?

Before 911, if the above questions were considered, the likelihood of it happening would probably be assessed as “rare and only likely to occur in exceptional circumstances” and depending on the assessment of damage, it would likely be concluded that the consequences could be either “major” or “catastrophic”. A maximum risk factor score of 20 (according to the scoring system suggested earlier in this paper) would result, which is borderline in indicating whether the risk needed to be managed.

Post 911 the likelihood of it happening would probably score at least “possible” (because we now know it is possible) and the consequences almost certainly regarded as “catastrophic” thus resulting in a minimum risk factor score of 60, putting it into a range that demands a dedicated management approach.

Could the disaster have been avoided if the risk in question had been managed throughout the planning, design and construction process? Were there measures (maybe requiring only minor design changes) that may have given occupants more time to get out and allow time for effective fire control to get to the heart of the fires? Could the buildings have incorporated some functional and or cost

compromises that would have allowed them to remain standing after the impacts and fires?

The purpose of this paper is not to suggest ways of counteracting or managing risks but to show that the value of outcomes for capital projects also depends on risks. The paper seeks to demonstrate that undiscovered or underestimated risks have the capacity to cause losses that reduce or even totally destroy resources that on the face of it provide excellent functional value for money.

## COMBINED VM AND RM STUDIES

In Australia the two-day VM workshop has been a standard for more than 10 years and takes into consideration the requirements of busy executives but 2-days is considered by some to be too long.

If proper function analysis is undertaken at a VM workshop, and reasonable time is allowed for developing and considering each new speculative idea in terms of value and cost there is generally little time available to consider risks and develop a management plan. However, to decide whether a new, perhaps innovative idea represent better value, it must also be assessed for risk.

There is an efficiency advantage in combining value and risk in a single workshop but an allowance of up to 3 days needs to be made for a combined VM/RM workshop, with risk dealt with in detail on the third day. However, if participants are well prepared and technology can be used to advantage, then depending on the stage of the project it is possible to incorporate RM into a two day VM workshop (allowing about ½ day for dedicated risk management). In theory, consideration of risk should be easier to integrate with VM at the earlier PIP stages where value and risk deal mainly with project outcomes rather than project detail.

The following set of minimum requirements for integrating RM into the VM/VE job plan is presented for readers to consider (note: only risk outcomes are shown in the table as it is assumed all requirements of VM/VE will be achieved at each stage and note also that combining VM and RM necessitates the last stage of the workshop becoming the Value/Risk Development phase.):

VM/VE Stage	Integration of RID/RM
Information	Distribute workshop risk aids and risk prompts. Outline risk identification and assessment method. Knowledge transfer among participants as per VM
Analysis	Identify risks associated with functions as appropriate.
Speculation	Risk <i>speculation</i> follows 5-stage VM plan .
Judgement	Tag value adding ideas <i>deemed worthy of development</i> with risk implications as appropriate.
Value/Risk Development	Risk ID (speculation) and assessment (calculate risk factor) Determine if risks need to be managed. Notate risks associated with speculative ideas. Develop a risk management plan to be incorporated in VM report.

## IN CLOSING

In the process of developing and delivering a capital project, risk and value should not be considered as separate issues; they are twin powers. This paper suggests that functional innovations, which may offer increased service value can, in an overall system sense, introduce susceptibility to risks that have the capacity to

cause loss of life and/or property. It is important that such risks are identified, assessed for impact and managed as appropriate, within the framework of value management; otherwise there exists an opportunity for the expected value of outcomes to be compromised sometime in the life of the project.

## REFERENCES

Timothy Wilkinson, World Trade Centre – New York – Some Engineering Aspects” (October 25, 2001 and January 14, 2006), University of Sydney, Department of Civil Engineering; [www.usyd.edu.au/wtc.htm](http://www.usyd.edu.au/wtc.htm).

# THE 9TH INTERNATIONAL VM CONFERENCE

**Jacky K.H. Chung**  
HKIVM

On behalf of the Conference Organizing Committee, I am honoured to extend our warm welcome to our VIP guests, speakers, overseas visitors, friends and colleagues to the 9th International Value Management Conference (IVMC08).

We are delighted to have the full support of the Department of Building and Real Estate of The Hong Kong Polytechnic University as our co-organizer and the generous contribution from our sponsors including Henderson Land Development Company Limited, Evans & Peck (Hong Kong) Co Ltd, Hong Kong Housing Society as well as our supporting organizations to make this event a success in bringing innovative ideas and techniques to promote the application of Value Management (VM) application in Hong Kong.

The conference theme "Achieving Sustainable Values through Collaboration" provides a framework introducing how VM methodology can be applied to improve the collaboration between business partners so as to achieve sustainable values in long term working relationship. The conference programme includes keynote presentations, speaker presentations, VM workshop, panel discussion and technical site visit, through which the delegates can learn how to apply VM methodology and experience the strength of it. The event provides a platform for senior executives, professionals, facilitators, researchers and students coming from all over the world to share and exchange their professional knowledge and valuable experience in VM.

Lastly, I wish to thank the countless hours and immeasurable effort of the organizing committee members and advisors, secretarial office members and volunteers who have been relentless in their devotion to bringing you their best.

Please feel free to visit our website at [http://www.hkivm.org/conference/9th\\_conference/index.html](http://www.hkivm.org/conference/9th_conference/index.html) for further information and photos.

*Jacky Chung*

Chairman, Organizing Committee of IVMC08







## HKIVM NEWS AND EVENTS

- A CPD seminar on "Value management in Construction" was jointly organised by the HKIVM and the Young Surveyor Group of the Hong Kong Institute of Surveyors (HKIS) in the HKIS Centre on 31<sup>st</sup> March 2009. Our President, Prof. Geoffrey Shen, introduced the definitions, historical development, components, methodology and job plan of VM as well as its applications with real life examples. This seminar was received and attended by over 100 construction professionals.



### About the speakers

Prof. Geoffrey Shen is an active researcher in collaborative working in construction, supported by information technology. He has managed a large number of research and high-level consultancy projects with total funding over HK\$15 million, and has published extensively in both academic and professional journals and international conferences. He teaches in these fields mainly at the postgraduate level, and has successfully supervised a large number of PhD, MPhil, MSc, and BSc students. Professionally, he is the President of the Hong Kong Institute of Value Management (HKIVM) and member of the Institute of Value Management (IVM) in the UK. As a Certified Value Specialist (CVS) and Value Management Facilitator (VMF) recognised by the Hong Kong SAR Government, he has professionally facilitated a large number of value management and partnering workshops for a variety of large client organisations in both the public and private sectors.

# Construction Value Management

## CD Pack II



With the funding support of the Commerce and Economic Development Bureau of the Government of the Hong Kong Special Administrative Region, the *Hong Kong Institute of Value Management* has successfully co-organized with the *City University of Hong Kong* for a project entitled "**Improving Value Management (VM) Practice via International VM Study Process and Qualification System**" as an extension of the previous project named "Enhancement of Construction Value Management Professionalism for the New Generation" co-organized by the *City University of Hong Kong* and the *Hong Kong Institute of Surveyors* in 2003-05.

The current project aims to improve VM practice, including both study process and qualification system, for construction professionals in HK, so as to enhance the competitiveness of the construction professionals in a regional context. Through the project, a **series of VM seminars and workshops**, and a study to review the **local and international study processes and qualification systems of VM practice** were successfully conducted. To disseminate the fruitful results of the project, a **VM website** (<http://bcm.cityu.edu.hk/newevents/newevent.php>) and a "Construction VM CD Pack II" containing the information about all VM activities held has been produced.

Please search the website via <http://bcm.cityu.edu.hk/> or contact Ms Isabelle CHAN, City University of Hong Kong, by email: [isabelle@student.cityu.edu.hk](mailto:isabelle@student.cityu.edu.hk) for further information and details of coming VM courses or events.



"Any opinions, findings, conclusions or recommendations expressed in this material / any event organized under this Project do not reflect the views of the Government of the Hong Kong Special Administrative Region or the Vetting Committee for the Professional Services Development Assistance Scheme."

Co-Organizers:



Funding Organization



<http://bcm.cityu.edu.hk/>

## **THE VALUE MANAGER** **CALL FOR ARTICLES**

THE VALUE MANAGER is the official publication of the Hong Kong Institute of Value Management. It intends to provide a lively forum and means of communications for HKIVM members and those who are interested in VM. To achieve this objective, we need your support by sharing with us your articles or comments. The following are the notes to contributors:

1. Articles submitted to the journal should fall in one of the following categories: New VA/VE/VM techniques or methodologies, Review of conference VM papers, VM case studies, VM research trends and directions, Reports of innovative practice.
2. Papers or letters should be submitted on a CD / DVD and A4 hard copy. Discs will be returned to authors after editing. Figures, if any, should be sent separately, in their original and preferred sizes. The length of each paper should be around 1000-1500 words.
3. The preferred software for processing your article is Microsoft Word, other packages are also acceptable. If the above word processing package is not available, please find a computer with scanning capabilities; the typewritten copy can be transferred to a file as specified.
4. All articles and correspondences should be sent directly to the Editor:

**Mr. Jacky K.H. CHUNG**

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