

RE-VALUING CONSTRUCTION THROUGH PROJECT DELIVERY

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In moving from lowest cost adversarial based traditional procurement towards value driven methodologies the challenges range from re-engineering the process, to metrics and team alignment of project partners towards achieving mutually beneficial goals. Nine variables are identified which influence the achievement of successful projects delivering value. Results from case studies illustrate that not all parties can achieve value for themselves which directs attention to the balance between deliverables and the interests of team members. Re-valuing construction demands refocusing towards the delivery of operational assets and their place in the value system whilst recognising the need to manage the delivery process and the team to align the value to the parties. The objective of the project was to develop tools and recommendations for reform of project delivery in the building and construction industry to transform business-as-usual performance into exceptional performance. Benefits flow not only to the construction industry, but to the community as a whole because a more sophisticated industry can deliver more effective use of assets, financing, operating and maintenance of facilities to suit the community's needs.

Keywords: Value in Project Delivery, re-valuing construction, procurement case studies.

INTRODUCTION

The project *Value Alignment Process for Project Delivery* is one of a number of key projects funded by the Australian Co-operative Research Centre for Construction Innovation (CRC-CI) based at the Queensland University of Technology. The project consists of a study of best practice project delivery and the development of a suite of products, resources and services to guide project teams towards the best procurement approach for a specific project or group of projects. This project builds on earlier work by Sidwell, Kennedy and Chan (2002), on re-engineering the construction delivery process, which developed a procurement framework in the form of a Decision Matrix.

In his paper on structural change and the problems of construction Koskela (2003) discusses his Transformation – Flow – Value generation theory of production (TFV) in terms of production, management (of production) and the peculiarities of construction. In respect of project delivery he says that due to its peculiarities, construction is characterized by a high level of variability, and suggests that issues of project delivery have been addressed by models such as open building and attention to re-engineering the sequencing of the process. Other experiments have been with relational issues, such as partnering, and the mode of procurement – eg design build as against the traditional process. However these attempts to deliver projects more

effectively have not addressed the major structural issue of the industry that flow from its fragmentation, and uniqueness of product. Interestingly Koskela includes a statement that the role of managerial action at the level of operation and improvement is crucial in stemming the penalties and further propagation of variability. Early work by Ireland (1984) and Sidwell (1982) concluded that the reason why some delivery methods were more successful than others was not the sequencing per se, but the enabling influence the sequencing had on the efficacy of managerial actions. Thus successful delivery was as much a function of the relationships and the empowerment of management as anything else. The research discussed here is concerned with the efficiencies that can be gained by the optimum selection of project delivery methods and the effectiveness that may be attained by a focus on the alignment of value to the various parties to the project.

It is widely accepted that a successful product or service must meet both quality and cost criteria if it is to provide value (Sheehy, Bracey and Frazier, 1996). However, value is not influenced by cost. Value is a measure of outputs and cost is a measure of inputs. The ratio between value and cost is thus a measure of efficiency for organisations, or projects. Adding value and exceeding customer expectations will take preference over slashing costs (Sheehy et al, 1996). However in order to achieve this focus on delivering value, projects must provide construction firms with a fair profit. Customers who recognise the value which can be achieved by investing in an efficient and fair construction procurement process can take advantage of the value adding services provided by the construction industry. The CII research project "Exceptional Projects and Methods of Improving Project Performance" (CII 1999) looked at thirty projects in the USA which were executed with exceptional results in terms of time objectives, to determine what made them different from projects of the same scope and complexity which were procured by traditional methods. Commonly it was found that a united focus, a common goal, and an atmosphere which supported the need to get the project underway, existed on exceptional projects.

THE VALUE ALIGNMENT ACTIONS

The precursor to this project by Sidwell, et al (2002) undertook empirical research into opportunities for re-engineering the construction project delivery process based on detailed studies of ten projects selected to include building and civil projects, not all of which were successful, and to include a range of innovative delivery processes. The case studies identified fifty-six variables that influence project success, statistical analysis grouped the variables into fifteen principal factors¹ of which four are identified as critical in explaining project performance. They are:

- co-operative project teams
- client's competency and commitment
- continuity of key personnel
- equitable risk allocation

¹ Fifteen principal success factors identified through ten case studies:

co-operative project teams, client's competency and commitment, continuity of key personnel, equitable risk allocation, well-defined project brief, complexity, regular monitoring of key objectives, effective communication process, availability of suitable contractors, consultant selection criteria, mechanism for reward and penalty, clear reporting lines, client's preparedness to absorb risk, shared responsibility to project problems, selection of subcontractors.

A Delphi style process was adopted to consult with industry experts, culminating in a half-day workshop with twenty-six industry experts (Kennedy 2001). The industry workshop identified global issues that influence successful outcomes for the construction industry, regardless of contract type. The following list of actions required to achieve the four critical success factors are:-

1. Value to parties - *Seek high levels of value for all the project participants and stakeholders.*
2. Alignment of objectives - *Break the cycle of mistrust currently at work in the industry. Adopt relationship management techniques to eliminate manufactured, institutional or psychological causes of conflict.*
3. Holistic process-lifecycle - *Adopt a whole of life approach to project outcomes, including a long-term approach to shareholder value if applicable.*
4. Value driven selection - *Use a value driven selection process for all service providers rather than a purely price-driven process.*
5. Eliminate duplicated effort - *Eliminate ambiguity or confusion about roles or responsibilities, particularly about responsibility for the coordination of documentation.*
6. Process not contractual arrangement - *Achieve high standards in key performance measures by using fundamental processes rather than through existing contractual arrangements.*

This is consistent with the suggestions from Griffith and Gibson (1997) that alignment of value is a multi dimensional concept, requiring management actions, engagement of stakeholders in a cross organisational manner throughout the delivery process. Significantly, the elements of successful project delivery were viewed more in terms of alignment of objectives and agreement of value rather than the need to re-sequence the process. This principles-based decision matrix may have the potential to re-engineering the process possible by providing a tool to identify better ways to achieve optimum value for all stakeholders than using existing delivery methods.

Subsequent research extended the six actions to nine to include the additional elements of evaluation and benchmarking. As “evaluation” is described by the CIB (1997) as an action rather than a phase, there would seem to be merit in including it on the action axis of the Decision Matrix, particularly as the value of feedback to the robustness of a best practice data base is recognised. Importantly, including it as an action on the cross-axis recognises that feedback needs to be ongoing throughout all phases of projects and culminates in an action at the end of projects which brings together the lessons learned in the process. This action is also essential to produce feedback from project to project (Bennett and Jayes 1998). Success and failure can offer important lessons for the future. In the development of the Decision Matrix this action may be expressed as “*ensuring team members have feedback-driven control systems*”. (Bennett, 2003) The review and validation of the matrix follows:-

1. Value to Parties, and 2. Alignment of Objectives

These two guidelines are discussed together because they are integral to each other’s achievement. “Value to parties” refers to ensuring that outcomes achieve positive project objectives for all stakeholders. The “value” guideline equates with the concept of wealth creation which values the benefit that the constructed facility

provides over its entire lifetime. Clearly, achieving this “value” depends on a shared understanding of each party’s goals and values (SRD, 2002) which is described by the alignment of objectives guideline. The critical issue of alignment of objectives has been addressed by a number of recent studies conducted in the area of procurement (e.g. CIIA 1994, CII 1997, APP 1998, ACA 1999, Griffith and Gibson 2001,). The Business Council of Australia (BCA 1993) noted “early involvement of key participants and clear communication of purpose, objectives and needs”, in the initiating stage of a project is essential to its success.

Level of Team Commitment relative to Success									
Very	XA	OXA	XO	AOX		XO	O	X	AOX
		O							
Reasonable	AO	XA	A	A	XA	A	XA	XO	
				A					
Average		A		A			A	A	
Case study No	1	2	3	4	5	6	7	8	9
C = Client			X = Contractor			A = Consultant			

Table 1 – Case study results - Commitment

These case study results show that the strongest level of commitment was between the client and the contractor. This is likely to have been because many of the delivery methods involved the early contractor in the decision making process. When a project team is ‘out of alignment’ none of the outcomes of the project is entirely satisfactory, and the participants are in a constant struggle to maintain their viewpoints (Griffith and Gibson 2001). Alignment is the process of incorporating all of these distinct priorities and requirements into a uniform set of project objectives that meet the business needs for the proposed facility. The final stage of a successful alignment process is the acceptance and commitment of the entire team to those overall project objectives.

Willingness for a Better Way									
Proactive	OXA	OXA	XA	O	X	X		X	AOX
		X							
Reasonable		OA	O	XOA		AO	XOA	XA	
				A					
Average	A			A	AO		A		
Case study No	1	2	3	4	5	6	7	8	9
C = Client			X = Contractor			A = Consultant			

Table 2 – Case Study results – Willingness for a better way

These results suggest that there is a strong interest on behalf of clients and contractors to find better ways to achieve project and stakeholders objectives, although there is again, a lower level of commitment from the consultants. The research team therefore decided a modification to the initial action of the Decision Matrix, to become:-
“agreeing project objectives taking account of the project stakeholders’ values and the need to improve over industry norms”

3. Holistic Process - Lifecycle

The key elements of this objective in the Decision Matrix are:

Front-end participation by a wide spectrum of expertise to predict and inform whole of life issues,

Value engineer the entire process including operations,

Consider impact on other parts of the virtual organisation when making decisions,

Identify non-conformities – can be rectified at the conceptual stage for a fraction of cost further downstream in the project's life; and

Simplify construction.

Sidwell et al identified two factors which hinder the adoption of holistic approaches to project delivery. Artificial time frames imposed on project teams have a negative impact when they leave little time to plan prior to commencement of construction. The separation of capital budgets and operational costs is also a hindrance - the emphasis on meeting tight project budgets means that a less than optimum product is constructed with higher operational and maintenance costs. A whole of project view is recommended by the Process Protocol (Kagioglou et al. 1998). There is growing acceptance of the need for a long-term approach regarding not only operational and maintenance costs of development and construction, but also environmental, and societal impacts that should be applied in taking actions concerned with both individual projects and the organisation of a series of projects.

However, taking a long-term view is not an action. So the action should be:- *“agreeing the design strategy to take account of (environmental, societal and economic) life cycle costs”* Furthermore an action of:- *“agreeing the construction strategy taking account of life cycle costs”* should also be included to ensure that whole of life decisions made in the design phase are not overshadowed by short-term issues which may arise during the implementation phase. These actions are able to be explicitly featured in an alliance agreement where participants are collectively responsible and accountable for all project outcomes.

4. Value-driven selection process

The elements of this objective of the Decision Matrix address several key points, which include:

- Selection based on non-price criteria.
- Matching the capability of the project teams with the project objectives.
- Appointing whole teams on the basis of previous performance in meeting benchmarks.

A value-driven selection process essentially suggests a move away from traditional price-focused decision-making in the project delivery process, from engaging consultants to awarding contracts, including sub-contracts and supply contracts. The ACA (1999) notes that the selection of parties to form an integrated project team in a relationship contracting situation is crucial to project success. The selection criteria for contractors and consultants must be based on the type, size and other specific requirements of the project. The selection of parties also needs to be based on criteria which include commercial and technical competence and their management systems, to meet the client's predetermined standards for the management and control of

project objectives. This objective is also concerned with the selection of people who can carry out their individual roles effectively. The BCA report *Fundamentals of Project Implementation* (1993) stated that having the right people for the job, and using and developing quality people in all aspects of project procurement is critical to project success, and advised that considerable attention be paid to selection processes to ensure this. The BCA found that the greater the experience or capability of the respective project staff of the client, contractor or consultants, the greater the likelihood of continuity of key personnel on projects, and achievement of project objectives. An important element of the implementation of this guideline is that the selection panel must include competent people in the evaluation process. This guideline from the Decision Matrix can now be expressed as:- “*Selecting team members on the basis of the value they add to the team*”

5. Eliminate duplicated effort

The elements of the ‘eliminate duplicated effort’ guideline in the Decision Matrix address several key points which include:

- Assemble the integrated design and construction team by matching expertise to objectives.
- Eliminate ambiguity and confusion about roles and responsibilities.
- Early selection of team and inclusion in decision-making process.
- Establish effective open communication between the parties.
- Encourage a co-operative multi-skilled approach.

This ‘eliminate duplicated effort’ objective essentially suggests a move from the conventional systems (e.g. traditional, design and build) in which project participants tend to spend considerable human resource and time in non-value-added activities such as contract administration, duplicated inspection procedures and so on, because all of the conventional systems legally bind participants through contractual terms. Role ambiguity is found to be caused by discrepancies in information available to an individual and that required for the expected performance of their role. On construction projects this occurs when integration fails between organisations, work is duplicated and omissions are made (Gray and Suchocki 1996). Defining clear roles and responsibilities of the members of the team is essential to achieve cooperative effort of the team toward meeting a collective goal (Mendelsohn 1998). CQ’s (2001) review of various reports on the performance of the construction industry found that up to 40% of the cost of management of projects adds no value to the end-user and therefore is wasted effort that reduces the investment value of the built asset to the government/taxpayers and companies/shareholders.

Bennett and Jaye’s (1998) action of continuous improvement through “project processes” essentially describes the same action “eliminate duplicated effort”. The main aim of strategic partnering is to improve performance. When people continue to work in the traditional way there are very real limits to the savings that can be achieved. Improved performance requires that processes are examined and then made more efficient. That means each activity in the processes is questioned to identify any that do not add value for the client. Non-value adding activity is regarded as waste. Thus there is considerable support for the guideline ‘eliminate duplicated effort’ in developing the Decision Matrix this action can now be expressed as:- “*aligning team members’ interests, using project processes*”

6. Process not contractual arrangement

The elements of this objective address several key points, which include:

- Front end participation by a wide spectrum of expertise to predict, inform, and design out problems which might be encountered at the later stages of the project process.
- Ensuring coordination role lies with appropriate parties.
- Integrated supply chain.
- Investigating new approaches to improve construction output “learning” project teams.
- Team participation and empowerment.
- Accurate, open data communication ensuring decisions are based on up-to-date information.

Collectively, these points are in essence about integrated processes involving key parties very early in the project’s life which are structured around effective coordination, teamwork, improved communication, degree of empowerment given to team members and aimed directly at meeting the client’s overall requirements. Research by Mitropoulos and Tatum (2000) has indicated similar findings to Sidwell et al.’s ‘process not contractual arrangement’ in that integration is needed during all project phases. For example, at the planning stage, integration with designers, contractor, and suppliers is needed to ensure that the owner’s expectations are realistic and can be achieved with the available means. Lack of certainty during project planning may result in scope uncertainty, ambiguity, unclear priorities, and unidentified needs and constraints, which in turn cause changes, rework, and delays. During the construction phase, integration increases responsiveness of the project organisation. The uncertainty surrounding construction projects, namely uncertainty of the physical and the business environments, requires a responsive organisation able to make fast and effective midcourse corrections.

Conflict Resolution Rating									
Collaborative	X	OXA	X	AO		X	XA		AOX
		O							
Reasonable	AO	XA	A	XO	X	AO	O	O	
				A					
Average	A		O	A	O		A	A	
Case study No	1	2	3	4	5	6	7	8	9
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Table 3 Case study results – Conflict Resolution

Interestingly many of the case studies involved project teams where the main contractor played a significant role, and in this respect felt comfortable with the process of conflict resolution, whereas others, particularly consultants felt less empowered. Essentially, ‘process not contractual arrangement’ emphasises the importance of integration that goes beyond contractual integration through efforts similar to partnering. Furthermore, it also implicitly highlights the need for technological integration as indicated by the element ‘Accurate open data

communication to ensure decisions are based on up-to-date information'. This objective reinforces previous research studies by Puddicombe (1997) and Mitropoulos and Tatum (2000), which addressed the need for a combination of organisational and technological integration to overcome a major stumbling block to increased performance, that is, the required change in the roles and expectations of the project participants.

In project alliancing, this guideline is similar to “alliance principles” which are applied to evaluate and validate each decision taken by the participants in delivering a project (Hutchinson & Gallagher, 2003). It is also similar to strategic partnering’s “integration” pillar which deals with agreeing how decisions are made. The integration pillar deals with systematically developing over time more effective ways for teams to work together (Bennett and Jayes 1998). This approach, which attempts to integrate project members through partnering, is classified as organisational integration (Puddicombe 1997, Mitropoulos and Tatum 2000). Unlike the partnering approach however, the alliance principles, along with the project objectives, are a contractual requirement and prominent part of the alliance agreement. The integrated project team approach is also strongly advocated by the ACA. The action described by this guideline can be expressed as:- *“agreeing the processes to be used, including how decisions will be made and how the team will be integrated”*

EQUITABLE RISK AND REWARD

The issue of equity or reward for each of the parties to the process is widely discussed in the literature². The ACA notes that the parties to an agreement should be aligned not only through common goals, but also through shared business interests in the project’s success, linking profitability to performance throughout the supply chain.

Project Success Rating									
Excellent	OXA	OXA	XO	AO		XOA	A		AOX
				XA					
Good	A	A	A	A	XO		XOA	XOA	
				A					
Average					O			A	
Case study No	1	2	3	4	5	6	7	8	9
	C = Client			X = Contractor		A = Consultant			

Table 4 – Case study results – Project Success Rating

The results from the case studies illustrate that although there was general agreement about the levels of success amongst the project team, there was a tendency for consultants to be less satisfied with the financial rewards from the project. This reflects a current trend in Australia for consultant fees to be driven down to almost unsustainable levels, reductions in fee levels have detrimentally affected documentation completeness, certainty, co-ordination and final checking. Two of the case studies confirmed that inadequate documentation prepared by consultants translates into delays and cost increases in the construction phase. However the results suggest that the clients and contractors views of success of were largely unfazed by the difficulties experienced by the consultants.

² (eg. CIIA, 1994, Ireland 1994, ACA 1999, Bennett and Jayes 1998, CQ 2001, Hutchinson and Gallagher 2003)

Bennett and Jayes (1998) note that a key to giving everyone the confidence to concentrate on joint interests and mutual objectives is to make sure that they are rewarded fairly for work well done. The “equity” pillar of strategic partnering uses the client’s business case as the basis for a firm budget, guaranteeing all the firms involved fair; predetermined profits and paying all their costs using open book methods. This requires rigorous cost control backed by rigorous audit. Moving to a full open book approach takes time in building up confidence in the financial systems and trust in the people involved. Establishment of a commercial framework is a key feature in the project alliance. A gainshare/painshare mechanism is structured so that the parties will either win or lose together. The notion of equity in project delivery describes actions aimed at ensuring that the financial arrangements agreed amongst client and project team members do not impede team-working. Therefore a further guideline should be added:- *“ensuring the financial arrangements support team-working”*

CONCLUSION

The ongoing research and validation process suggests a modified Decision Matrix for individual projects comprising one axis formed of a fundamental construction process expressed in terms familiar to construction practitioners:

- Ideas and feasibility
- Planning and design
- Construction
- Commissioning
- Operation (including maintenance)

The axis which describes generic actions which need to be taken to achieve project success is modified and expanded to include the following:

- Agreeing the project objectives taking account of the project stakeholders’ values and the need to improve over industry norms.
- Selecting team members on the basis of the value they add to the team.
- Aligning team member’s interests.
- Ensuring the financial arrangements support teamworking.
- Agreeing the processes to be used including how decisions will be made and how the team will be integrated.
- Agreeing how team performance is to be measured.
- Ensuring team members have feedback driven control systems.
- Agreeing the design strategy to take account of life cycle costs.
- Agreeing the construction strategy to take account of life cycle costs.

This provides a robust foundation for the development of a best practice guide to project delivery, and a decision support tool to assist the decision-making process for project delivery. The next phase of the Value alignment project is the finalisation of a software based Decision Support Tool which uses the generic Value Alignment actions as a key dimension of the decision tool to capture project data and provide the

mechanism for accessing a data base of case studies to provide advice to project participants.

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