Re-Valuing construction through project delivery

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Abstract

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. This paper describes research into methodologies which encourage alignment of project partners towards achieving mutually beneficial goals. The research identifies nine variables 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.
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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. These resources will be focused on promoting the principles that underlie best practice project delivery rather than simply identifying an off-the-shelf procurement system. 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. All attempts to deliver projects more effectively – though without addressing the major structural issue of the industry that flow from its fragmentation, and uniqueness of product. Interestingly he 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 positioned in the arena of procurement, concerned with the efficiencies that can be gained by the optimum selection of project delivery methods, such as methodologies advocated by Skitmore & Marsden (1988), Kumaraswamy and Dissanayaka (1998, 2001) and the effectiveness that may be attained by a focus on the alignment of value to the various parties to the project. It is proposed that the examination, understanding and alignment of value, has a better chance of achieving successful project delivery. Rather than focused on identifying a particular delivery system the research develops a suite of value alignment actions, to guide project teams towards the best approach for a specific project. These actions will be focused on promoting the principles that underlie best practice project delivery. The need for such tools becomes more and more acute as the environment within which the construction industry operates becomes more and more complex, and as business and political imperatives shift to encompass or represent diverse stakeholder interests

Within an open market economy competitive advantage grows fundamentally out of the value a firm is able to create for its buyers that exceeds the firm's cost of creating it (Porter 1985). There are two basic types of competitive advantage: cost leadership (low cost or price competition) and differentiation. Firms may act competitively by either reducing cost to the client (cost leadership) or by differentiating itself from its competitors in the market (differentiation). Achievement of differentiation is most often achieved by the development of an innovation advantage, which, from a clients perspective could be translated as value. Procurement methods such as partnering, alliancing and relationship contracting, offer the prospect of achieving enhanced value through the close collaboration and positive client oriented nature of the method.

Gann and Whyte (2003) note that the construction sector has become more conversant with cost and time than with other parameters of concern to customers, end-users and society at large, including value and design quality. Clearly this is a function of the historical development of the industry with a focus on competitive price tendering. In order for the construction industry to become more customer focussed, it needs to provide customers with information about the industry's performance in terms of what represents value to the customer, rather than in terms of the industry's own internal measurements. A client is likely to be interested in the cost of designing and constructing a capital facility in terms of its unit of output. They may also be interested in capital costs, running and maintenance costs, time from the customer's decision to procure a new facility to moving in, or in the case of civil engineering projects, to the time it is open to traffic. Customers measure quality in terms of a range of performance standards, and in terms of the incidence and costs of remedying defects.

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

As construction firms recognise and track the movement of value in the construction industry (for example the emerging emphasis on energy efficiency and environmental sustainability) they need to ensure they can meet customers' requirements by providing core competencies, core processes, product and service offerings, innovations in strategies and so on. Value adding knowledge enables service providers to engage with the customer and become an extension of the customer's business. 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 1999a) 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 following organisational factors were found to have established the environment for success on these projects:

- Team environment was supportive and positive,
- Team members were empowered to get the job done,
- Team members were relieved of their normal organisational role,
- Strong commitment by owners to achieving a successful project,
- Experienced personnel were selected to carry out roles,
- Rules were allowed to be broken, changed, or removed,
- Process was allowed to be changed,
- Amnesty (team members were allowed to move "outside the square").

These factors required owners, managers and companies to change their business processes, and work processes by relinquishing some amount of control, and being dedicated to approaching the process in a lateral manner (CII, 1999), through aligning their objectives. Latham (1994) extolled the value of teamwork, based on the commitment and proactive attitudes of all project participants, in boosting performance levels.

The engagement of stakeholders and the importance of aligning their objectives is a recurring theme in management literature. Labovitz and Rosanksy (1997) found that the "alignment" concept enables organisations to establish a climate and culture that results in breakthrough levels of customer satisfaction, employee loyalty and financial return. They refer to alignment as both a state of being and a set of actions. This recognises that alignment refers to the integration of key systems and processes, and responses to changes in the external environment to maintain a state of alignment

Griffith and Gibson (1997) define alignment as it applies to construction projects as "the condition where appropriate project participants are working within acceptable tolerances to develop and meet a uniformly defined and understood set of project objectives." They go on, "alignment is the process of incorporating all of those distinct priorities and requirements into a uniform set of project objectives that meet the business needs of the facility".

Griffith and Gibson's report "Team Alignment During Pro-Project Planning of Capital Facilities" for the Construction Industry Institute (1997) demonstrated that the level of alignment of stakeholders during pre-project planning positively contributes to the ultimate success of the project. They established that in order to enhance alignment, "management" must ensure the following actions are carried out:

- Stakeholders are appropriately represented on the project team.

- Project leadership is defined, effective and accountable.
- The relative priorities amongst cost, schedule, safety, and required project features are clear.
- Communication within the team and with stakeholders is open and effective.
- Team meetings are timely and productive.
- The team culture fosters trust, honesty and shared values.
- The pre-project planning process includes sufficient funding, time and scope to meet the project objectives.
- The reward and recognition system promotes meeting or exceeding the project objectives.
- The teamwork and team building programs are effective.
- Planning tools (eg simulations, and work flow diagrams) are effectively utilised.

Griffith and Gibson (1997) stress that alignment of objectives must be in multiple dimensions simultaneously and must also be maintained longitudinally. Throughout the project life cycle, alignment with the project objectives and priorities should be

- Top-to-bottom within each stakeholder organisation, and cross-organisationally between functional groups within organisations.
- Between each of the organisations with a stake in the project.

The Value Alignment Actions

Sidwell, Kennedy and Chan (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 identify actions taken by the project teams to achieve improvements in performance. The characteristics of the case studies are illustrated in Table 1.

Commonalities	MTQ	BACL	NRB	RBH	QCC5	BPI	NBB	WG	PMP2	MOA
Clear client brief	✔	✔	Needs not able to be defined at outset	✔	Needs changed during const	✔	✔	✔	Construct only package	Needs not able to be defined at outset
Client part of Integrated project team	✔		✔	✔	✕			✔		✔
Team cohesion for total project delivery	✔	✔	✔	Mostly ✔				✔		
Innovations to improve design	✔	✔	✔			✔		✔	✔ Relation-	✔ Internet based data control and

and construction workflow									ship Man. Unit	exchange
Open book	✔		✔					✔		✔
Realistic fee levels for design consultant	✔	✔	✔	✔		✔		✔		✔ Direct costs reimbursed by Alliance
Key personnel	✔	✔	✔	✔		✔		✔		✔
Benchmarking			✔					✔		✔
Integrated process design construction operation	✔	✔	✔	✕ Operating costs Comprom-Ised by capital cost savings				✔		✔
Inadequate standard of documentation					✔				✔	
Re-engineered activities	✔		✔					✔		Streamlined decision-making process
Equitable risk sharing	✔	✔	✔	✔	✔	✔	?	✔	✕	✔

Table : Summary of characteristics of ten case studies

The research looked at fifty-six variables that influence project success identified by the case studies. Statistical analysis grouped the fifty-six variables into fifteen principal factors[1] 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

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 aim of the half-day workshop was to express these results in practical ideas for improving the industry's performance. 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] 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.

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.

The findings were used to construct a matrix of best practice project delivery strategies. These six actions, called best practice guidelines, form one axis of the Decision Matrix. The other axis is provided by a model of the construction project process using the following phases which are perceived as iterative rather than discrete phases:-

- Idea and feasibility
- Planning and design
- Construction
- Commissioning
- Operation and maintenance

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 has 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. The Value Alignment project seeks to leverage the progress made in developing the Decision Matrix to provide a best practice guide to project delivery. Also it is envisaged that the guide will be accompanied by a tool to provide assistance to clients and project teams when making decisions regarding project delivery directions, Kennedy et al (2003).

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, 2002a)

Benchmarks are needed in order to make sense of feedback. Bennett (2003) notes that benchmarks give attention to the search for better answers. Benchmarks will enable significant improvements to be made in the quality of decision-making pertaining to design and construction processes. However, the performance of many of the operations carried out by the construction industry is not currently consistently measured. The lack of comparative information and an acceptable system to measure it prevents professionals from assessing their performance, relative to their competitors (Love and Mohamed, 1995). Therefore a further action is required to be included in the Decision Matrix to ensure feedback is meaningful, that is *"agreeing how team performance is to be measured".*

Matrix Validation

We undertook a validation check of the Decision Matrix against contemporary research and other industry reports, particularly in the context of project delivery strategies which are based on collaborative approaches. These are generally known as relationship contracting, and reference is made particularly to project alliancing, and strategic partnering. These approaches seek a closer alignment of client and project team goals and a better understanding of risk sharing for win/win outcomes. In a significant departure from traditional project procurement practice, these approaches frequently advocate a 'no blame' approach. Success or failure is a joint responsibility of the parties involved. The contemporary sources were:-

- The report by the Business Council of Australia (BCA, 1993) *Fundamentals of Project Implementation for the Building and Construction Industry* which was a precursor to both the Latham (1995) and Egan (1997) reports from the UK.
- The Commonwealth Government through the National Building and Construction Committee (NatBACC) commissioned *Building for Growth* (1999) to identify those areas in which the industry needs to strengthen its capabilities.
- The Australian Constructors Association publication *Relationship Contracting - Optimising Project Outcomes* (ACA 1999) endorsed a flexible approach to procurement as the way forward and outlined proven practices and techniques to optimise project outcomes.

- The Queensland Government through the Construction Queensland Equitable Delivery Strategy Taskforce prepared *Wealth Creation through Equitable Asset Delivery* (CQ, 2001).
- Reference is also made to the unpublished Outputs Document prepared by the Queensland Department of Main Roads following *Achieving Outstanding Performance,* an industry workshop on relationship based contracting (SRD Consulting, 2002).

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. Furthermore, the correct identification and prioritisation of the Stakeholders and their needs is essential to enable effective decision-making throughout the project lifecycle (Kagioglou et. al. 1998). The "value" guideline equates with Construction Queensland's concept of wealth creation which values the benefit that the constructed facility provides over its entire lifetime. CQ (2001) notes that in the construction context, indicators of wealth creation can include return on investment, extra value achieved from capital outlay, extra services incorporated for end-users, supplier margins that are met or exceeded, improved quality of life for the community and stakeholders and improved morale of all those involved in a project. 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, Budiawan 2002) The Business Council of Australia 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. Relationship contracting as described by the Australian Constructors' Association requires that all parties to the contract agree to align their individual goals, thereby establishing common or aligned goals for the project. In the manifestation of relationship contracting which is project alliancing, parties to the contract include key members of the supply chain.

A typical project team is comprised of individuals representing a wide variety of functional groups with diverse priorities and requirements. As each team member enters the project process, they may have different priorities and expectations. Essentially, they all are working to juggle the elements of price, quality and time, within what is becoming an increasingly complex regulatory framework to meet environmental, social and economic objectives. Typically disparate objectives of various project team members may be:-

- the owner wants the best product for the least price in the least time;
- the design team wants a functional design that reflects their philosophies;
- the construction team wants a buildable product within reasonable risk limitations.

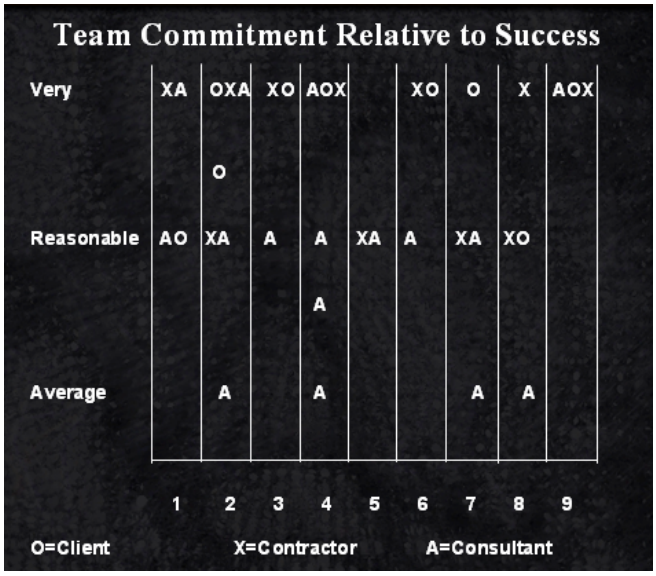

Figure 1 – Case study results

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. Clearly, if not properly coordinated, divergent internal team goals and objectives are likely to emerge. This will adversely affect the effectiveness of teamwork. 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. The CII (1997) developed the following definition of alignment:- "The conditions where project participants are working within acceptable tolerances to develop and meet a uniformly defined and understood set of project objectives."

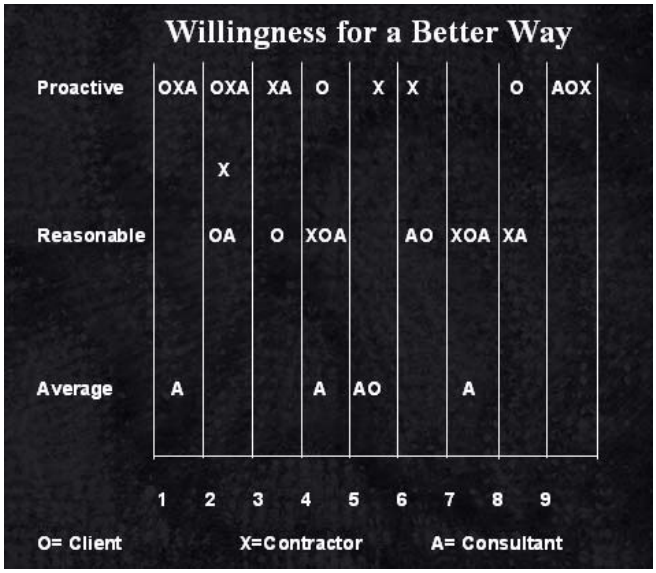

Figure 2 – Case Study results

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.

Obviously, the objective is to take a holistic approach from recognition of a need, to the design, production and operation and maintenance of a constructed facility, with regard for ecological sustainability. This also suggests that a multi-disciplinary approach is brought together at the outset of the project to determine how downstream environmental, societal or economic issues may be affected by early decisions. 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.

There is no obvious equivalent in the literature on relationship contracting generally for this best practice guideline, though taking a whole project view is recommended by the Process Protocol (Kagioglou et al. 1998). However it implies that a whole project view is to be adopted on individual projects. 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. Sidwell et al.'s intention is that a long-term view is taken in making project planning and design decisions. 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. Indeed, there has been an indication that government clients of the Australian construction industry are moving away from price-focused decision making in awarding contracts and instead the trend is toward selection on the basis of prequalification and performance in the execution of work. Further, in valuing the relative merits of one proposal against another, clients will increasingly measure whole-of-life costs rather than capital costs to arrive at a decision as to who should be awarded a contract (Australian Procurement and Construction Council, 1997).

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. A criterion recommended by the BCA (1993) is the need for tenderers to demonstrate that their management systems, and staff with the skills to implement them, meet the client's predetermined standards for the management and control of project objectives. Clearly, this objective is explicitly included in strategic partnering as "Membership" which deals with the choice of firms to be involved in a partnering arrangement. In alliancing, this action is called "participant selection". The selection of firms must be conducted thoroughly so that only those capable of putting the overall strategy into effect are selected.

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. Project Alliance teams take this approach by selecting individuals from across the alliance on a "best for project" basis. (Hampson et. al. 2001). An important element of the implementation of this guideline is that the selection panel must include competent people in the evaluation process. Construction Queensland (2001) notes that non-price selection criteria must also be measurable.

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. Participants work separately and this encourages bureaucratic, non-value-added activities and prevents participants from concentrating on processes.

According to Mendelsohn (1998), the single human factor that affects productivity most in any enterprise, particularly in the labour-intensive construction industry, is cooperative effort of a group of individuals toward meeting a collective goal. This is achieved by defining roles and responsibilities of the members of the team and then providing a climate that promotes the efficient operation of those roles and responsibilities. By cooperation, coordination and cordiality, the team can produce more than the individual efforts taken alone. Team members are motivated to go beyond the letter of the contract and work in a spirit of cooperation. This is also an immediate benefit of one integrated team under alliancing's "team and leadership structure" in which team members are selected on a best person for the job basis (Walker, et al 2001).

It is obvious that the importance of correctly defining roles should not be neglected. 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). Boudjabeur (1996) found that the consequences of role ambiguity on the contractor's performance are very damaging and far reaching, leading to poor job performance and eventually resulting in considerable loss of time, inflated cost and poor quality work. 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.

The BCA (1993) emphasises the importance of proper allocation of responsibility and accountability to project success. The broad conclusion from case studies was that the more successful projects tended to have a single guiding authority and the shortest practical lines of responsibility. The BCA notes that an organisation process to secure and retain the commitment of those involved in the project is essential and should create a climate where as far as possible, those working on a project should relate strongly to it and feel responsible for its success. This requires a cooperative and transparent approach to management of projects. Efficient and clear allocation of tasks avoid confusion, duplication and conflict.

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.

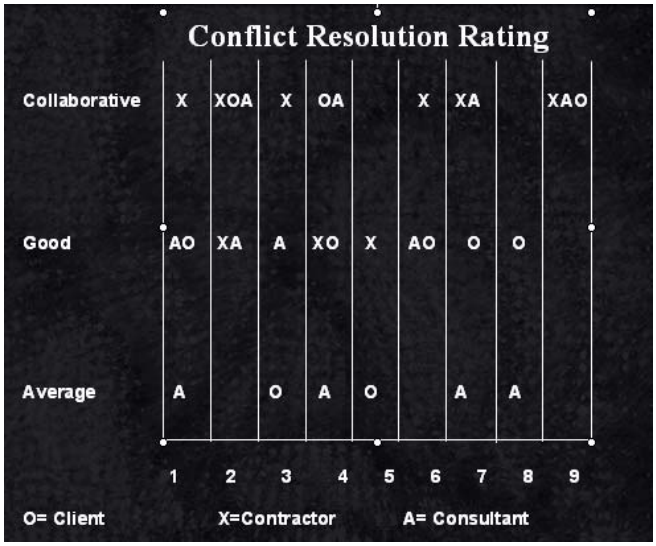

Figure 3 Case study results

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 literature[2]. 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.

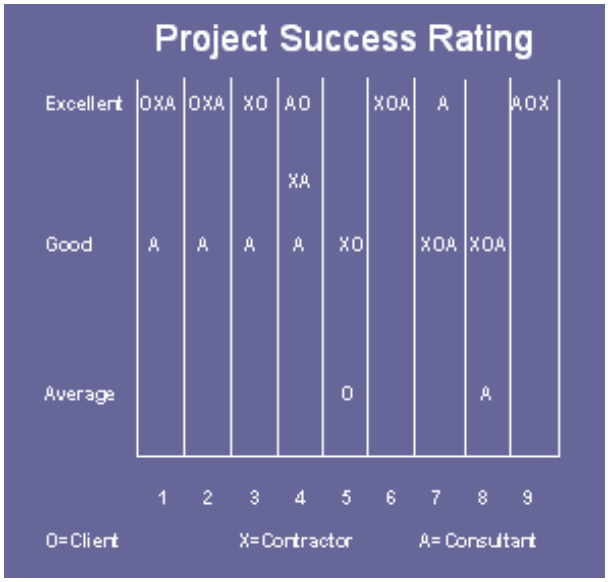

Figure 4 – Case study results

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.

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

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

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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