PROJECT ALLIANCING AND INFORMATION TECHNOLOGY IN BUILDING CONSTRUCTION: THE NATIONAL MUSEUM OF AUSTRALIA

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The construction industry demands priority from all governments because it impacts economically and socially on all citizens. A number of recent studies have identified inefficiencies in the Australian construction industry by modelling the building process. A culture of reform supported by industry and government is now emerging in the industry – one in which alternate forms of project delivery are being trialed. The Australian Building and Construction Industry Action Agenda brought together industry and government to identify actions necessary to lift Australia's innovative and knowledge creating capacity at the sector level. A central activity under this Action Agenda was dissemination of information relating to industry best practice initiatives in innovation, project delivery and the use of information technology. Government and industry identified project alliance contracting and more advanced information technology as means to increase efficiency in construction as part of a new innovative procurement environment.
The Acton Peninsula Development in Canberra has provided an ideal opportunity to case study the use of project alliancing and information technology as key platforms in a more innovative project delivery environment. This paper describes the collaborative research project developed to identify, analyse and disseminate information relating to best practice of project alliancing and the implementation of more advanced information technology in constructing the National Museum of Australia on the Acton Peninsula.

Keywords: Project alliance, relationship contracting, procurement, information technology, National Museum of Australia

PROJECT ALLIANCING

Project alliancing can be defined in many ways, because of its inherent complexity, simplicity and chameleon nature. Since application of alliancing requires a flexible approach, there is some confusion as to what project alliancing really is and how it differs from other project delivery mechanisms. It is therefore important to define alliancing and clearly distinguish between the following three, often confused and misunderstood terms: Partnering, Strategic Alliances, and Project Alliances.

Partnering

In the United States, Charles Cowan, an officer with the US Army Corps of Engineers championed partnering which gained momentum in Australia in the 1980s. Cowan (1991:2) described *partnering* as:

> *About going back to the way people used to do business, and putting the handshake back into business. Partnering empowers those involved in the*

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> *project with, the freedom and authority to accept responsibility to do their jobs by encouraging decision making and problem solving at the lowest possible level of authority. It encourages everyone to take pride in their work and tells them its OK to get along with each other. Partnering provides a mechanism for co-operation between the participants to occur, so that energy-sapping disputation is removed, and productive working relationships are carefully and deliberately built, based on mutual respect, trust and integrity.*

Partnering itself is not a contract. A partnering charter is developed to run in parallel with a traditional construction contract to provide guidelines to the relationship between the organisations (CIIA, 1996:11). Parties agree to act reasonably and fairly and 'shake hands on it' (Thomson, 1998b:5). Partnering relies solely on the commitment of individuals as the partnering charter is not legally binding … and this can be its best or worst feature. The Construction Industry Institute (Australia) in 1994 conducted a comprehensive study of partnering in Australia. One of the interesting results was the necessity of workshops and external facilitation to enable individuals to operate in a partnering environment (See Table !).

Content covered in workshops	Projects perceived as a success	Projects perceived as a failure
Self-perception exercises	56%	43%
Training in team skills	39%	43%
Development of goals and objectives	96%	86%
Dispute resolution plan	89%	**43%**
Anticipated problems	78%	71%
Action plan to address problems	78%	**57%**
Development of a charter	100%	100%
Celebration	89%	**29%**

Table 1: Partnering Workshop Content (CIIA 1996:21)
Comments:
Significant differences between projects *(perceived as successful or a failure)*
Dealing with problems as they inevitably arise.
Commitment to training and development appears poorly cultivated

Strategic Alliances

Unlike partnering, a strategic alliance is an inter-organisational arrangement usually between two companies that extends beyond a specific project. Parties to a strategic alliance contract expect ongoing mutually beneficial business. Hampson and Kwok (1997) propose the attributes—trust, commitment, interdependence, cooperation, communication and joint problem solving—as key to successful business relationships and as measures of strategic alliances. Kwok (1998:ii) went on to analyse strategic alliances between head contractors and subcontractors in building construction and noted the following:

> *Strategic alliance relationships may result in a higher initial tender price than typically achieved using open competitive tendering amongst all contracting firms regardless of their relationship with subcontractors. However, in the long-term, a higher standard of on-site construction*

> *processes may provide better value for money in respect of the facility life cycle.*

The life-cycle approach to facility ownership is becoming a higher priority for governments and other clients procuring large infrastructure projects. For example, recent Australian projects involving water treatment and transport facilities have specifically highlighted the life-cycle costs over the first twenty or thirty years of operation. Value for money does not necessarily equate to the lowest tenderer. If strategic alliances formed between parties to the construction process can produce quality workmanship with better life-cycle qualities then value for money has been optimised.

Project Alliances

Project alliancing differs from strategic alliances, by the fact that parties are brought together for a specific project or outcome. Project alliances have a defined end – typically the practical completion date of a constructed facility. Abrahams and Cullen (1998:31) define project alliances as:

> *An agreement between entities which undertake to work cooperatively, on the basis of a sharing of project risk and reward, for the purpose of achieving agreed outcomes based on principles of good faith and trust and an open-book approach towards costs.*

The project alliancing 'agreement' is legally enforceable - but the intention is to establish and use 'drivers' that will stimulate parties to actively support and cooperate with one another - it is not just a *feel good* approach. To encourage co-operation in project alliancing, the hard contractual issues that affect the entities' bottom lines, such as risk allocation and remuneration are used. This is an obvious difference between project alliances and partnering, which is solely based on soft issues (Clayton Utz, 1998:7).

CASE STUDY: NATIONAL MUSEUM OF AUSTRALIA

Research Project

The objective of this research project is to identify and report on lessons learned on the construction of the National Museum on the Acton Peninsula in Canberra to promote best practice in the Australian construction industry. This report will take the form of a case study focussing on two main issues:

the application of the alliancing method of project delivery; and

the use of information technology in the design, construction and project management.

The lessons learned will be disseminated to the construction industry in order to achieve a high level of local, national and international professional and industry recognition.

Research Team

The research is conducted by a team of researchers from a national alliance between Queensland University of Technology (QUT) and CSIRO Building, Construction and Engineering – known as the *Construction Research Alliance (CRA)*, and Royal Melbourne Institute of Technology (RMIT).

Research Methodology
A rigorous literature review has been conducted to establish the theoretical framework for the analysis contained in the case study report. The CRA has conducted a critique of the relevant literature to develop an appropriate analysis framework upon which to base the case study. This has provided a suitably broad and internationally comparable framework for both the alliancing and information technology components of the case study.

On site data collection is being carried out through personal structured interviews and observations with the various participants in the Acton Peninsula Project. The data analysis will compare the results of the project alliance study to the 'business as usual' case and include a discussion of the theory, processes, costs, benefits and cultural change associated with the two components of the case study. The dissemination phase of the research is being delivered through a series of workshops facilitated by a partnership between the research team and major industry associations.

Outputs
This project will provide a number of deliverables:

a literature relating to Alliancing and the use of IT in Construction;

a measurement framework sourced from the literature and tested in the Acton Peninsula Development environment;

outcomes against the metrics developed for the Acton Peninsula Development Case Study measured against national and international benchmarks where possible;

frameworks or templates for future industry and academic use;

a summary of lessons learned in this process leading to a potential *Best Practice Guide* or draft guidelines for Alliancing or IT implementation for other building projects;

detailed case studies relating to Alliancing and Information Technology aspects of the Acton Peninsula Development; and a research case study including all of the above.

PRELIMINARY RESULTS

Results are considered under themes of Project Alliancing and Information Technology.

PROJECT ALLIANCING

A survey was conducted to establish if negotiation styles altered in a project alliance environment. This survey was implemented as part of the overall research program being undertaken on the Acton Peninsula Project Alliance. The following description relates to the negotiation style survey administered in January 2000.

Research Methodology
The initial negotiation survey was pilot tested on the Acton Peninsula Project Alliance team in September/October 1999 – approximately 9 months into a 24-month construction phase. The Acton Peninsula Project Alliance team is multi disciplinary and, with the exception of the Alliance Leadership Team (ALT), members are all site based and generally housed in one building. In response to the pilot test the survey instrument was refined and then distributed to the ALT, the project management team,

service consultants, architectural-exhibition designers and site foremen. There were 32 survey forms administered with 25 replies (78% response rate). This is a small sample group in itself, but represents a large proportion from a single project alliance.

Respondents were asked to compare their experience of negotiation on this project in the following three situations:

Average to Normal BAU (Business as Usual) – most common situation – usually high/constant conflict.

Best BAU (Business as Usual) – the occasional project where all parties to the project work exceptionally well together as a team.

Project Alliancing – the project delivery strategy used on the National Museum –to force collaboration as the means to achieve best project outcome and all teams involved.

Preliminary Research Results

The following is a sample analysis of responses directly related to – *Do Negotiation Styles Alter in a Project Alliance Environment?*

Negotiation Styles

Please tick the boxes that best describes your negotiation style – not what you think your negotiation style should be.

Negotiation Styles *(adapted from Fisher and Ury, 1981, XII)*	Average to Normal BAU	Best BAU	Project Alliancing
Soft Negotiation: Involves avoidance of any personal conflict and the making of many concessions	8%	8%	9%
Hard Negotiation: Involves treating negotiation as a contest between stronger and weaker, where 'hanging tough' and 'holding out' are treated as virtues.	34%	4%	4%
Principled Negotiation: Involves deciding issues on their merits rather than through a 'haggling' process.	58%	88%	87%

Table 2: Negotiation Styles

Table 2 indicates respondents believed their negotiation styles were quite similar for Best BAU and Project Alliancing. There is however a significant difference between Average to Normal BAU responses and Best BAU and Project Alliancing. Graham Thomson (Solicitor for the Alliance) from Mallesons Stephen Jaques believes this response should not be surprising – since Project Alliancing is trying to create the same if not better collaborative team environment that occurs in the Best BAU situations. From an operational perspective there may be no difference between Best BAU and Project Alliancing. The problem is Best BAU only occurs occasionally and Average to Normal BAU is more common. Project Alliancing takes the *hit or miss* characteristic out of achieving the Best BAU situation.

If the assumptions above are correct then the percentages in Table 2 acknowledge a significant difference in negotiation style between Average to Normal BAU and Project Alliancing, with 29% more respondents using *Principled Negotiation* in Project Alliancing and 30% less respondents using *Hard Negotiation* in Project Alliancing.

Negotiation Outcomes

Please tick the boxes that best describe how you feel at the end of negotiations: not how you would like to feel

Negotiation Outcomes *(adapted from Fisher and Ury, 1981, XII)* At the end of negotiations do you feel:	Average to Normal BAU	Best BAU	Project Alliancing
You have been exploited and compromised	18%	11%	13%
You have damaged relationships	35%	6%	0%
You have dealt with issues harshly but people have been respected	47%	83%	87%

Table 3: Negotiation Outcomes

Table 3 is similar to Table 2 with a similar response rate for Best BAU and Project Alliancing. Therefore for similar assumptions that were made for Table 2 – a direct comparison between Average to Normal BAU is made with Project Alliancing. There are two interesting points to identify:

0% of respondents believed they had damaged relationships negotiating in the Project Alliance environment and

87% of respondents under Project Alliancing believed they focussed on issues and respected people, whereas only 47% in Average to Normal BAU believed this.

Direct Question Results

Do you feel being involved in a Project Alliance has encouraged you to revisit your negotiation style? Yes 40% No 60%

Do you believe the Project Alliancing has encouraged others in the team to revisit their negotiation styles? Yes 91% No 9%

Do you believe the style of negotiation developed under a Project Alliancing environment has reduced conflict? Yes 70% No 30%

Do you believe the style of negotiation developed under a Project Alliancing environment has reduced the impact of conflict? Yes 83% No 17%

Negotiating Tactics

Rate your responses for the appropriateness and the likelihood of your using the following negotiating tactics in the following situations:

		Average/Normal BAU		Best BAU		Project Alliancing	
Tactic #	Tactic Description	Appropriateness	Likelihood	Appropriateness	Likelihood	Appropriateness	Likelihood
4	Hide your real bottom line from your opponent	40%	41%	33%	34%	15%	16%
5	Make an opening demand that is far greater than what you really hope to settle for	34%	34%	26%	27%	14%	16%
10	Make an opening offer or demand so high (or low) that it seriously undermines your opponent's confidence in his/her ability to negotiate a satisfactory settlement.	12%	13%	9%	10%	7%	7%
13	Convey a false impression that you are in absolutely no hurry to come to a negotiated agreement, thereby putting more time pressure on your opponent to concede quickly	22%	23%	18%	19%	8%	8%

Table 4: Negotiating Tactics

Table 4 highlights how the construction team on the National Museum perceive their own negotiation tactics changing from average to normal BAU to Project Alliancing.

Summary

It is important to acknowledge the small survey size and the limited conclusions that can be made from such a survey. However if the survey is viewed as an indication of a potential trend, then it is clear that in relation to negotiation styles and outcomes, direct questions and negotiation tactics respondents indicated a difference between Average to Normal BAU negotiation and Project Alliance negotiation. Respondents also believed that this change in negotiation style had reduced conflict and the impact of conflict.

INFORMATION TECHNOLOGY

Background

Previous research into application of IT in construction has mainly focused on IT at the organisational level - offering limited insight into IT use on a construction project as invariably, there will be many companies involved in various aspects of the project. The development of a framework has been primarily based on the IT tools to be used in the Acton Peninsula Project and their associated benefits. The framework examines IT implementation from seven different but inter-connected perspectives as shown in Figure 1.

An analysis framework that can be used to systematically evaluate the impact of IT implementation on a construction project was synthesised from first principles due to a lack of existing measures applicable at the project level. The developed framework makes use of performance measures and objective indices (throughout the project) as well as subjective performance indices (near to start and completion of the project).

Examples of performance measures and objective indices have been identified to give an indication of how individual activities or outputs are performing to assess the impact of IT over a period of time, against either the baseline; i.e. business as usual (pre- IT implementation) or since the project commenced. The subjective performance indices, on the other hand, provide an overall measurement of the effectiveness of IT implementation that helps establish user-standard benchmarks for IT performance on future projects of a similar nature. A questionnaire has been administered to assess the current state of the subjective issues in the use of IT (results shown in Figure 2).

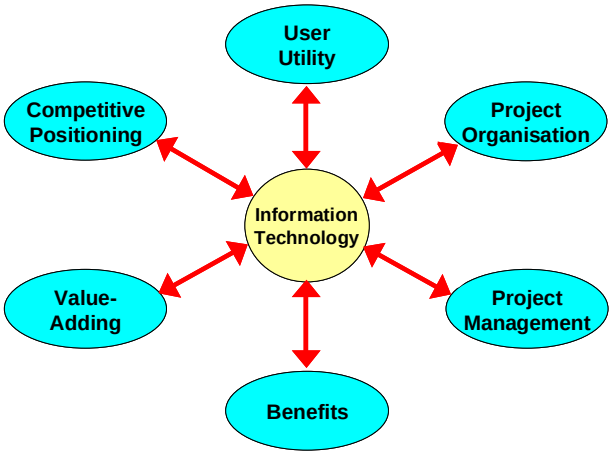

Figure 1: IT analysis framework

Preliminary Research Results

The Acton Peninsula Project is performing exceedingly well at the half way stage with project team members rating organisation impacts (speed of responses and support of the alliance) particularly highly. Direct benefits (such as cost and time savings) were rated lowest of all categories but at a very respectable 68%.

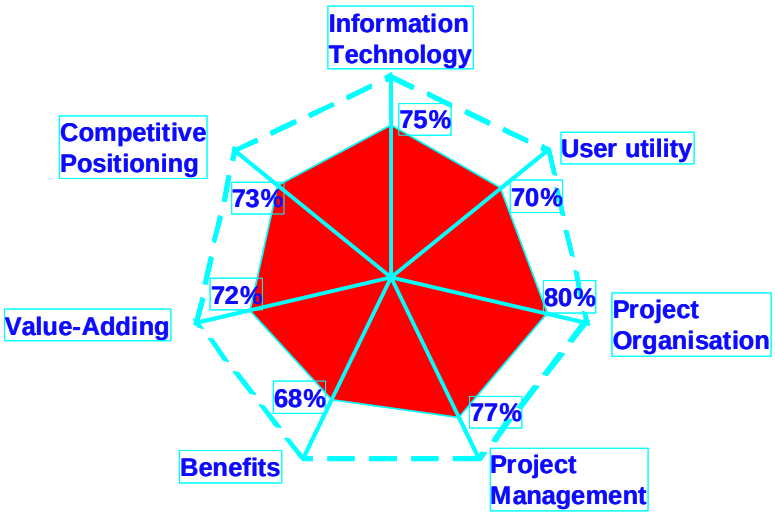

Figure 2: Current state of IT in the Acton Peninsula Project

A quantitative assessment of the use of IT in construction is being investigated by analysing data from this case study project. All parties in this project are encouraged to make use of the "ProjectWeb" system, designed and maintained by the constructor entity in the construction alliance. ProjectWeb is used via the Internet combining all common forms of business communication (other than voice) into a single managed system. ProjectWeb can be used for email, requests for information, electronic document transfer/transmittal, electronic document library management, site instructions, calendar events, project directory and document version control. All of these communications can be logged and archived for future reference. Users can access relevant information about the project at any time and communicate with others in a secure environment.

One early result of examining the communications data is shown in Figure 3. This shows initial enthusiasm and subsequent growth in senders of email and later stabilisation with broadcasting to recipients declining, maybe as users of the

information became more focussed, or as the project progressed and information needs became more well defined. Further analysis is continuing in this area.

Summary

The IT analysis framework developed for the Acton Project is intended as a generic measurement framework that can be used to benchmark the performance of IT on a variety of project types. Early results in its use on the National Museum project are encouraging and has allowed the refinement of a number of the initially developed measures. Further application of this framework in the detail on this project and others will allow the research team to more rigorously analyse the performance of IT on construction at the project level.

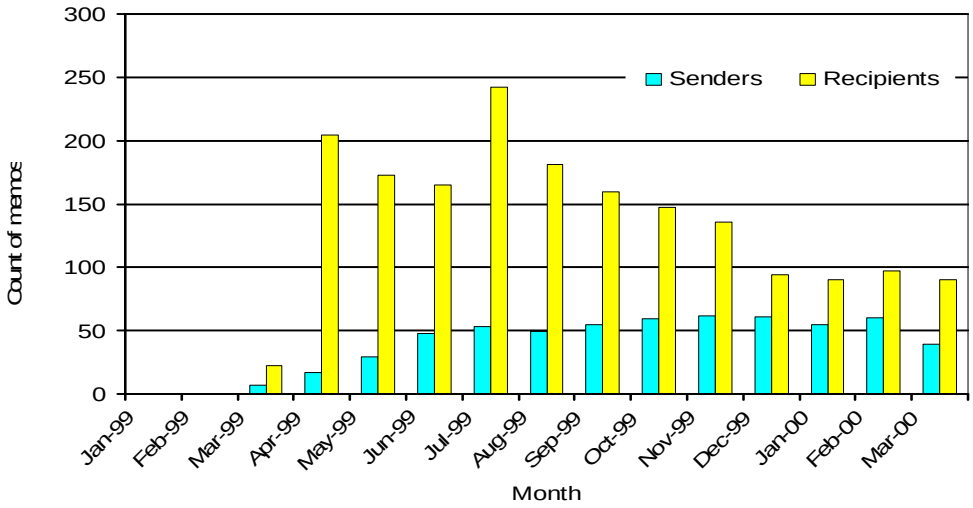

Figure 3: Use of email over time

CONCLUSIONS

A central activity under the Australian Building and Construction Industry Action Agenda is dissemination of information relating to industry best practice initiatives in innovation, project delivery and use of information technology. The Acton Peninsula Development in Canberra, Australia provides an ideal opportunity to case study the use of project alliancing and information technology as key platforms in a more innovative project delivery environment. In this way it is hoped that this line of research will contribute to the cultural change required to further advance the Australian construction industry.

REFERENCES

Abrahams, A and Cullen, C (1998) "Project Alliances In The Construction Industry", *Australian Construction Law Newsletter*, Issue #62, Oct/Nov, pp31-36

Australian Constructors Associations (1999) *Relationship Contracting: Optimising Project Outcomes*, Sydney: ACA

CIIA - Lenard, D, Bowen-James, A, Thompson, M, Anderson, L (1996*) Partnering – Models for Success*, Australia, Construction Industry Institute Australia (CIIA).

Clayton Utz (1998) "Alliance Contracts: A Glimpse of the Future", *Australian Construction Law Newsletter*, Issue #61, Aug/Sep pp7-8

Cowan, C (1991), Compilation of Partnering Documents by Arizona Department of Transport

Hampson, K D and Kwok, T (1997) Strategic Alliances in Building Construction: A Tender Evaluation Tool for the Public Sector. *Journal of Construction Procurement,* **2**(1): June

Kwok, T (1998) *Strategic Alliances in Construction: A Study of Contracting Relationships and Competitive Advantage in Public Sector Building Works*. Unpublished PhD Thesis, Brisbane: Queensland University of Technology.

Lendrum, T (1998) *The Strategic Partnering Handbook.* Australia: Mc Graw Hill

NSW Department of Public Works and Services (1998) *Project Alliances in the Construction Industry.* Sydney: in house document

Thomson, G. (1998a) Alliance Partnering as a Tool for Project Delivery. *Building for Growth Innovation Forum, Sydney 4-5 May*

Thomson, G. (1998b) *'Project Alliances', Acton Peninsula Development Industry Briefing.* Canberra 22 May

Tucker, S N; Mohamed, S; Ambrose, M D; Hampson, K D and Peters, R J, (1999) *Information Technology Analysis Framework for Acton Peninsula Project.* Internal document for Department of Industry, Science and Resources, September