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## The characteristics of Australian infrastructure alliance projects

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### Abstract

The alliance contract method is a relatively new project delivery method that has started becoming popular in recent decades as an alternative to both traditional and other forms of relational contracts. The result of it being so new is that it is still unclear around the world as to when to utilise alliancing. The purpose of this research is to determine a list of project characteristics that identify when an alliance would be a suitable project delivery method. In addition, it identifies how alliancing addresses these characteristics and discusses a number of success factors and barriers.

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### 1. Introduction

The alliance contract method is a relatively new project delivery method (PDM) that has started becoming popular in recent decades as an alternative to both traditional and other forms of relational contracts. In recent years, alliancing has been receiving worldwide attention with more and more countries exploring its use. Having originated in the UK, it has become a booming success in Australia. The success in Australia has shown by example that there are alternative methods to delivering projects in order to move away from the often-adversarial, traditional project delivery methods. As projects become larger and more complicated, and the pressure from various stakeholders increases, alliancing is proving itself as being able to deal with these ambitious targets.

Jefferies, et al. [1] p466 have identified that “*there is a clear gap in Project Alliancing, particularly with regards to identifying factors for its successful implementation in the Australian construction industry*”. As countries and

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industries with no alliancing experience, and in particular, limited to no experience with relational contracting, begin adopting alliancing, they will no doubt face a number of challenges. To help overcome these challenges practitioners will need to be educated in the factors that make alliancing successful.

As the adoption of alliancing in the construction industry has started becoming more prevalent worldwide, knowledge of when alliancing is appropriate could be valuable to practitioners looking at implementing non-traditional forms of contracting. Many countries, particularly in Europe, have recently started adopting alliancing. In addition, Finland, who started using alliancing in 2007, has begun experimenting with the model by adopting lean ideology into their alliance projects [2]. A clear understanding of the current state of alliancing could potentially lead to the creation of improved project delivery models.

The body of knowledge is missing a clear summary of how a project's characteristics influence the choice to deliver the project using an alliance. The purpose of this research is firstly to determine a list of project characteristics that identify when an alliance would be a suitable project delivery method. Secondly, building on the first point, by identifying the way in which the elements of an alliance contribute to addressing the issues associated with the identified project characteristics. This combination will help to remove the ambiguity in this area and aid practitioners in determining whether an alliance could be an appropriate way to deliver their infrastructure projects. Thirdly, this research aims to determine the current success factors and barriers that exist for alliance contracting.

To supplement the body of knowledge, the following research questions have been identified:

What characteristics of a project make it suitable for alliancing?

How do alliance elements address these characteristics?

What are the key success factors and barriers when choosing alliancing?

By addressing these research questions, this study will provide a means for those less experienced with alliance to recognise projects that are suitable for the alliancing PDM. It will provide them with an understanding as to how the model addresses these projects, will give them an insight into how to ensure success, and offer some points of concern when considering whether to choose alliancing.

## 2. Research methods

The research questions were addressed by performing a literature and document study. The results from this study were compared with the results of a series of interviews with Australian practitioners.

A literature study, following the prescription of [3], was undertaken to develop the theoretical background for alliancing. A combination of both journal articles and conference papers was used to gain a broad perspective of the current views of the topic. A document study was performed on a number of key government and industry publications covering alliancing, for example The National Alliancing Contracting Guidelines [4] and Alliancing: A Participant's Guide [5]. This was undertaken in order to pick up the government and industry perspective on alliancing and to supplement the academic perspective. Thus, the two studies allow us to gain insight into both the theoretical and practical aspects of alliancing.

As part of a larger study on the experiences of Australian infrastructure alliances, twenty-seven semi-structured interviews were undertaken face-to-face with key industry professional in Australia. The interview questions were formulated in line with the three research questions. The interviews ran over a period of three weeks during March and April 2016. Interviewees were contacted based on their experience with alliances. Respondents were chosen among project managers and contract specialists, mostly from client side (government), as in the Australian infrastructure industry, it is the government organisations that own the projects. In addition, a number of respondents from contractors (8), consultants (3), and academia (1) were included to gain a full industry perspective on the current state of alliancing.

The selection of multiple-case design was done in order to check for replication, as described by Yin [6]. Data from thirteen alliance projects was collected during the interview series. Fourteen of the twenty-two interviews were case specific and the remaining eight were general in nature. To ensure that we were gaining reliable information, we chose projects where the practitioners had played a significant role in the alliance. In addition, a limitation of a project value of greater than \$50M AUD was chosen to ensure that each project was considered a large infrastructure project. The case projects that were analysed varied in size from \$52M up to \$1B AUD.

Using a combination of a literature study and document study is an effective way to gain a theoretical insight into alliancing. With the theoretical background in place, interviews were performed to gain practical insight. The combination of theoretical and practical insight helped to verify that the findings from literature are representative of the current reality, and highlighted where the literature is lacking in capturing the current state of alliancing in Australia.

The results from the case projects represent the experiences of practitioners and are limited by their memories. They provided us answers to the best of their knowledge. Where possible, facts were cross-checked against project documentation. This discussion presents the authors' interpretation of the studied literature and interviews.

### 3. Theoretical framework

Alliancing has developed out of the need and want to improve on, and overcome, the adversarial nature and negative impacts associated with the more traditional forms of project delivery, namely design-bid-build (DBB) and design and construct (D&C) contracts [7, 8]. It often falls under the umbrella of relationship contracting [9, 10], however, now in recent years, it is beginning to be placed into its own unique category [11, 12].

Alliancing is a collaboration between the client, service providers and contractors where they share and manage the risks of the project together [11]. All parties' expectations and commercial arrangements are aligned with the project outcomes and the project is driven by a best-for-project mindset where all parties either win together, or lose together [10, 13]. The contract is designed around a non-adversarial legal and commercial framework with all disputes and conflicts resolved from within the alliance [9].

This type of project delivery can lead to improved project outcomes and value for money, in part due to the increased level of integration and cooperation between planners, design teams, contractors and operators [14].

The current most widely accepted definition of alliancing comes from the Department of Finance and Treasury Victoria [15 p9] who describe alliancing as:

*"... a method of procuring ... [where] All parties are required to work together in good faith, acting with integrity and making best-for-project decisions. Working as an integrated, collaborative team, they make unanimous decisions on all key project delivery issues. Alliance agreements are premised on joint management of risk for project delivery. All parties jointly manage that risk within the terms of an 'alliance agreement', and share the outcomes of the project".*

The majority of studied literature after 2010 has made reference to this definition when discussing alliancing and does not contribute anything of significance in addition to that mentioned above [8, 10, 12, 13].

#### 3.1. Project characteristics

Alliancing is not a form of project delivery method that is suitable for every infrastructure project [9]. Some projects however, have key characteristics that make them highly suitable for the alliance method.

A preliminary list of the characteristics of a project identified in the literature study as being suitable for an alliance is shown in Table 1. They have been arranged in order of the number of articles that have attributed these project characteristics to the selection of an alliance.

Most often, the characteristics of a project are taken into consideration with many other factors when determining the choice of delivery method for a project. However, in some cases, the decision to use an alliance is based purely on one or two project characteristics. For example, Jefferies, et al. [1 p477] highlights that *"The Queensland State Government, in the form of both their Public Works and Main Roads departments, use Alliance and Partnering arrangements as default contracts on projects with construction periods of over 12 months and/or with a dollar value of A\$10 million."*

Each project characteristic identified in Table 1 is described briefly below. It should be noted that a number of characteristics were identified in the literature as being suitable for alliancing however, the literature lacked explanations as to why. Where possible, explanations of why alliancing suits the particular characteristic is included.

Table 1. Characteristics of a Project that Suit Alliancing Identified from the Literature

Project Characteristics	References
Tight Time Constraint/ Need for early start	[4, 9, 11, 13, 14, 16-19]
Multiple/ Complex Stakeholders	[1, 11, 13, 17-20]
High Risk	[4, 11, 13, 14, 16-19]
High Complexity	[9, 11, 13, 17-20]
Unclear/ Broad Scope/ Risk of Scope Change	[8, 13, 14, 17-20]
Complex External Threats	[11, 13, 17-19]
High Uncertainty	[4, 8, 13, 18]
Large Project/ High Cost	[1, 4, 14]
Need for Innovation	[9, 14, 21]
Tight Cost Control	[9, 13, 18]
Environmental Challenges	[1, 18]
Need for owner involvement	[17, 19]
Need for Flexibility	[21]
Special Requirements	[13]
Resource Shortages	[14]

**Time pressure** is a major reason for choosing alliancing [13]. Alliancing allows multiple processes to occur simultaneously, for example, investigation, design, land acquisition, approvals, materials sourcing, etc. [16], thus reducing the time to complete the project in addition to allowing the possibility for an early start. **Multiple/Complex stakeholder** issues is a project characteristic often recommended by government guidelines regarding when to use alliancing [17, 18]. **High-risk** projects are not well suited for traditional contract models as there is always the issue of who takes on the risk. The client is trying to pass the risk onto someone else and the contractors do not want to accept such high risk. Alliancing is ideal as the risk is shared amongst all participants and everyone is incentivised to work together to manage the risk [8]. Projects with **high complexity** are recommended as being suitable projects for alliances [13, 22]. **Unclear Scope/ Risk of Scope Change**. A large number of alliances have resulted from a project that has had an unclear or poorly defined scope [10, 14]. Alliancing is a suitable method to deal with such projects because all parties work together to define the scope and handle any changes that come about through the delivery of the project. **Complex external threats** has been recognised as a characteristic of a project that can be addressed by alliancing [11, 22]. The characteristic of **high uncertainty** is very similar to the characteristic of Unclear Scope because of the way an alliance addresses each characteristic. **Large Project/ High Cost**. Some government agencies, having recognised the benefits of alliancing, have made it a standard to use alliancing or partnering for large projects, for example, projects with durations over 12 months or values over A\$10M [1]. **Need for Innovation**. The nature of alliancing facilitates innovation making it a top choice on projects that require high innovation to be completed successfully [9, 13]. **Tight Cost Control**. Projects that require significant cost control often see alliancing as the preferred PDM [9]. **Environmental Challenges**. Alliancing is a method recommended for projects that exhibit significant environmental challenges [1, 16, 18]. **The need for owner involvement** is another project characteristic often recommended by government guidelines regarding when to use alliancing [17]. **Need for Flexibility**. This point relates very closely to the project characteristic of Unclear Scope based on the way an alliance addresses each characteristic. **Special Requirements**. This point was only mentioned by one article and a clear description of what was meant by special requirements was not stated. **Resource Shortages**. This point was only mentioned by one article and a clear description of what was meant by resources shortages was not stated.

### 3.2. Alliance elements

Determining the key elements of alliancing through the literature was an involved process. Almost all of the literature on alliancing, in the introduction, involved a small definition of alliancing. These were collected and common themes were elicited. To delve deeper, the literature was carefully analysed to identify defining elements that were thought to be key to an alliance.

Lahdenperä [12] identified a number of defining elements of alliancing, which are shown in Fig. 1.

Project alliancing	
Department of Treasury and Finance (2010d)	Yeung et al. (2007)
<b>Key features</b> <ul style="list-style-type: none"> <li>● Risk and opportunity sharing</li> <li>● Commitment to 'no disputes'</li> <li>● 'Best for project' unanimous decision-making processes</li> <li>● 'No fault--no blame' culture</li> <li>● 'Good faith'</li> <li>● Transparency expressed as open book documentation and reporting</li> <li>● A joint management structure</li> </ul>	<b>Hard/contractual elements</b> <ul style="list-style-type: none"> <li>● Formal contract</li> <li>● Real gain-share/pain-share</li> </ul> <b>Soft/relationship-based elements</b> <ul style="list-style-type: none"> <li>● Trust</li> <li>● Long-term commitment</li> <li>● Cooperation and communication</li> </ul> <b>Other elements</b> <ul style="list-style-type: none"> <li>● Win-coin philosophy</li> <li>● Equity</li> <li>● Agreed problem resolution methods</li> <li>● Common goals and objectives</li> <li>● Continuous improvement</li> <li>● Alliancing workshops</li> <li>● Early selection of contractors</li> </ul>

Fig. 1. Example of defining elements of alliancing from the literature.

Beginning with the elements identified by Lahdenperä [12] we concluded on a number of key elements from the literature that were of interest to this study. The elements include open book, integrated project team, pain/gain-share, aligned client and commercial participants objectives, no-disputes clause, unanimous decision making and incentivised cost reimbursement.

**Open-Book Approach.** A key component of alliancing, but not unique to alliancing, is the open-book approach which equates to the disclosure of financial information among all participants [11, 21]. This approach helps to reinforce the *everyone is working on the same team* mindset and helps to provide accurate and real time information on the financial performance of the project.

This approach is a major benefit for clients who, through this method, get an insight into the real cost of construction [9]. As most clients outsource the majority of their work through traditional contracts, they often lose track of the actual cost of undertaking various construction activities.

An alliance team is an **integrated project team**, which means that people from all disciplines and parent companies are working together in the one team allowing for the sharing of expertise and resources [9]. In order to make the 'perfect' team, each member is selected on a best-for-project basis, regardless of the company he or she works for.

The integrated project team is part of the concept of the virtual organisation. An alliance operates as a virtual organisation in the sense that all individuals from all parent organisations are, for all intents and purposes over the duration of the contract, employees of the alliance and it is the alliance that delivers the project [11, 16].

The co-location of the project team is a mechanism for realising the full effects of an integrated project team. Although not a strict must-have, it is an element consistent with many successful alliance projects and is often identified in literature as a key success factor [7, 23]. It is implemented as a way of developing a single alliance culture and leads to effective communication and improved innovation in that members have close and immediate contact with each other. A condition often unavailable in traditional arrangements [10].

**Painshare and gainshare** are essential components of an alliance and this was the most cited element in the literature study. All participants share in the profits and losses of the project and ensure that no single participant is held accountable for financial performance [7]. This helps to reinforce the mindset of *we all win, or we all lose* [11]. The pain/gain forms part of the incentive arrangements and is a measure of how the project performs against the Target Outrun Cost (TOC)[10]. If the project is delivered under the target price, the Non-Owner Participants (NOP) share in the savings, whereas if the project is delivered above the target price, the participants lose a proportional amount of their overhead and profit [16]. This is detailed further under three-limbed contract.

In recent times, alliance contracts have been structured around the three-limbed approach, where [8, 22]:

- Limb 1 consists of all the directly reimbursable costs including project-specific overheads
- Limb 2 is made up of the corporate overheads and profit for each NOP, determined by an independent auditor. This is placed 'at-risk' according to the pain/gain arrangement
- Limb 3 consists of the incentivised cost-reimbursement where all participants share in the pain/gain associated with how the alliance performs against pre-arranged targets in cost and non-cost key result areas (KRAs).

Financially, the maximum risk, or most adverse situation, for the NOPs is that they receive compensation for Limb 1 only [11, 22].

Pain/gain-share is a result of the risk sharing arrangements in alliancing. In an alliance agreement, all parties share the risk and reward, which provides a strong motivation to work collaboratively and reinforces the *we're all in this together* mindset [11, 14]. Operating hand in hand with the no-blame culture, risk sharing ensures that all participants work together to overcome any challenges that may arise during the delivery of the project [9].

**Alignment of Client and Commercial Participants' Objectives.** The structure of the alliance and a number of the elements mentioned previously create a situation where the client and commercial participants' objectives are aligned [1, 21]. That is, that the business goals of each party is aligned with the alliance and the outcomes of the project [9].

**No Dispute Clause.** The alliance agreement is structured so that everyone is working on the same team. A key component of this is the development of a no blame culture often backed up by a no dispute clause in the alliance agreement [11]. The commercial drivers and the integrity of the participants, combined with the requirement of consensus decision making, ensures that all disputes are handled internally within the alliance. This eliminates the expensive and lengthy court battles often associated with traditional contracting methods [8, 22]. With the exception of wilful default and insolvency, all issues and conflict are kept within the alliance and resolved on a unanimous basis with no recourse to litigation or arbitration [9, 11].

**Unanimous Decision Making.** Within an alliance, each party gets an equal say in the decision process and all decisions must be made unanimously [9, 11, 22]. Collaborative problem solving and decision-making is a key characteristic of alliancing [10]. This emphasises that all parties work together to overcome problems that arise.

**Incentivized Cost-Reimbursement.** In addition to pain/gain share, alliances include other forms of incentivized cost reimbursement. These can include incentives for non-cost factors such as innovation, quality, delivery time etc. and are factors that are important to the owner [10, 16].

### 3.3. Success factors and barriers

Success factors and barriers give insight into what factors one must consider when selecting alliancing as the PDM or when choosing to enter into an alliance agreement.

By reviewing six papers, Jefferies, et al. [1] has identified 17 success factors from literature, and by analysing a case study, they identified five additional success factors. The full list of twenty-two success factors is shown in Table 2:

Table 2. Success Factors as identified by the literature

Strong commitment by client and senior management	Trust between parties
Sound relationship	Equity
Mutual goals and objectives	Joint process evaluation
Dispute resolution process	Cooperative spirit
Flexibility and adaptability	Tight alliance outline
Alliance structure	Best people for project
Facilitation	Commercial incentives
Open communication	Shared knowledge
Stretch targets	Integrated Alliance office
Staging of project and stretch targets	Establishing project specific KPIs
Facilitating on-going workshops that include site personnel	Integration of a web-based management programme

The list by Jefferies, et al. [1] is quite extensive. Our literature search did not uncover any new unique success factors. However, the search did highlight some success factors that were emphasised the most. The selection of the right people and having a good leader seems to be a crucial success factor according to the literature [24, 25].

Rowlinson and Cheung [25], through their study of success factors (which did not form part of the work by Jefferies, et al. [1]) identified the following factors for successful alliances: creativity, trust, commitment, interdependence, cooperation, open communication, goal alignment and joint problem solving. Despite being performed independently, their results of factors necessary to ensure the success of an alliance are in alignment. The explanation behind why each success factor is important is well documented and thus will not be covered in this paper.

During the research, it became clear that alliancing is not the best-fitted PDM for all projects and a number of considerations should be taken into account when deciding whether to proceed with an alliance. These considerations can be seen as a barrier to introducing alliancing into a new country, industry or organisation. The literature study identified six factors that should be considered when selecting an alliance as the preferred PDM. The factors shown in Table 3 are sorted by the number of times they appeared in the studied literature.

Table 3. Factors to Consider when Choosing an Alliance

Factors to Consider when Choosing an Alliance	References
Cost to Establish	[4, 8, 10, 13, 14, 18, 19]
Maturity and Competence of the Industry	[7, 8, 10, 13, 18, 19, 26]
Resource Availability of Project Participants	[4, 10, 13, 19]

As an extensive study of the barriers to alliancing has not been undertaken, a brief explanation of each factors follows.

**Cost to Establish.** The experience in the literature is that alliances are only worthwhile for large projects [26]. This is due in part to the fact they have high establishment costs [8]. A client must be aware of this and decide whether the benefits of using an alliance outweighs the high investment cost.

**Maturity and Competence of the Industry.** Alliancing is an advanced form of relational contracting and thus requires competent organisations with particular knowledge, skills and attributes [8, 22]. If an industry has had little experience with relational contracting then it can create difficulties for clients to find suitable alliance partners [22].

A culture shift is required in order for the traditional mindset to transition into a mindset suitable for alliancing. This includes everything from client-contractor relationships to working methods [7, 22]. It can also be the case that organisations who are used to having all the power over a project, such as construction managers, can feel that they lose a certain level of control [26].

**Resource Availability of Project Participants.** As noted as a success factor, alliances require the commitment of senior staff from all involved parties [13]. This commitment needs to be supported by senior management [22]. Both clients and non-owner participants need to consider this when deciding whether to enter into an alliance agreement. This forms a barrier to the alliance method if an organisation does not have capacity to commit senior resources.

The client must consider that there is a high degree of hands-on involvement required of them due to the nature of the integrated project team [10].

#### 4. Findings and discussion

This section will identify the findings from the interviews and discuss them in relation to the findings from the literature study and case studies.

##### 4.1. Characteristics of a Project That Make it Suitable for Alliancing

Often, the nature of the project will dictate the choice of PDM. For example, a project may have a very tight timeframe that can only be achieved if all parties are involved from the very beginning. Such a situation lends itself to alliancing as certain aspects of planning, design and execution can happen concurrently. That being said, alliancing is not a form of project delivery method that is suitable for every infrastructure project [9]. Some projects however, have key characteristics that make them highly suitable for the alliance method.

Table 4. Project characteristics suitable for alliance as identified by thirteen Australian alliance projects

Characteristic	Number of Projects Influenced*
Tight Time Constraint/ Need for early start	9
Multiple/ Complex Stakeholders	7
High Risk	8
High Complexity	6
Unclear/ Broad Scope/ Risk of Scope Change	10
Complex External Threats	1
Large Project/ High Cost	4
Need for Innovation	4
Tight Cost Control	4
Environmental Challenges	3
Need for owner involvement	9
Multiple Interfaces	7
Market Situation	
Client Organisation	2
Other: Reputation	1
Other: Political Commitment	1

\*Where a characteristic was identified by the practitioner as partly contributing to the selection we have counted it in the number of mentions.

A review of the characteristics identified by both the literature and the interviews was undertaken. Each characteristic was analysed for uniqueness; where similarities were identified between characteristics, they were



combined. In addition, the characteristics were judged by the weight placed on them in the literature and interviews, and the number of times they were cited by different sources.

A number of the characteristics can be combined based on their similarity. For example, if a project has the Need for Flexibility or has High Uncertainty, when it applies to how alliancing addresses this issue, it is very similar to the project having an under-defined scope or having a Risk of Scope Change. In all these cases, every participant works together to solve the issues as they arise and they do this by maintaining a high degree of flexibility in the process. Special Requirements and Resource Shortages were mentioned briefly by just one source each, so with limited information on each characteristic, they are not considered as being relevant to this study.

The interviews identified a number of different drivers that have influenced the selection of alliancing in Australia. Alliances have been the preferred PDM when the project has one or more characteristics from the list in Table 4. This is quite consistent with the results from the literature review in that eleven of the sixteen characteristics identified by the interviews appear in Table 1.

#### *4.2. How do Alliance Elements Address the Identified Characteristics*

The structure of alliances lends themselves very well to addressing the issues created by the identified project characteristics. The shared risk and pain/gain arrangements combined with the alignment of client and commercial participants' objectives creates an entity that is very adept to dealing with projects that are high risk or have high levels of uncertainty. When problems arise, it is in the best interest of all the parties to find the best-for-project outcome, and find it quickly. In addition, these elements work together to enable the alliance to deal effectively with complex external events.

The elements mentioned above, combined with unanimous decision-making, no dispute clause and open book help to ensure the win-win principle of alliancing necessary to deal effectively with the issues that arise.

The fact that all parties become involved in the project from the very beginning creates an environment where innovation can thrive. All options can be considered and explored for their merits. Many different perspectives all working together in the early phase can lead to very innovative solutions. This was recognised by many of the interview practitioners as being a key benefit to the alliancing method.

This arrangement of concurrent engineering creates an environment where normally successive stages can run in parallel. For example, the contractor can begin with the early works while the designers are finalising the design and the client is working on planning permissions and community consultation. This reduces the duration of the project significantly and allows for an early start. Many interviewees stated this as a reason for their project being delivered ahead of time.

In some cases, alliances were chosen for a project due to the tight cost control needed. For example, some projects were given the problem, and a budget, and told to find the best solution that addresses the problem and fits the budget. Alliances have a certain freedom to vary solutions on the go, as they are not locked into a pre-design. Combine this with the fact that it is in the best interest of all parties to find the best solution, meet the incentivised KRA's, and reduce the project cost in order for them to make money, makes alliancing well suited to dealing with tight cost control.

The integrated project team is crucial for allowing alliances to deal with complex stakeholder issues. Having the most suitable person for the job in each position means that you can manage the issues very effectively. For example, as identified by one of the practitioners, often the client has well established community consultation systems and networks. Often contractors do not have such systems and networks in place. Thus, it makes sense to have key client personal in the relevant position within the alliance. The integrated project team becomes very useful when there is a need for owner involvement, as the client is imbedded in the team for the entire duration of the project and can maintain a level of influence over the project outcomes.

#### *4.3. Success Factors and Barriers to Alliancing*

The series of interviews proved to be a great way to identify both the success factors and barriers to alliancing, and to check to ensure the literature is relevant to the current experiences.

The success factors mentioned by the majority of practitioners during the interview series were ensuring that alliance is chosen for the right reasons, and that the right people are chosen to work within the alliance. It was of the

opinion of most of the interviewees that if you have these two aspects in place, then you will achieve success. A number of times it was mentioned that one of the reasons why particular alliances were unsuccessful is that alliancing was selected for the wrong reason and that the project was not suited to an alliance.

Jefferies, et al. [1] and Rowlinson and Cheung [25] both identify a number of success factors that seem to be standard practice for the alliance model. They are essentially woven into the fabric of the Australian alliance model. Because of this, we believe that some of the success factors mentioned by Jefferies, et al. [1] and Rowlinson and Cheung [25] should no longer be identified as success factors. Yes, it is true that if they are not present then the success of the project is jeopardised, but if they are not present, then the strategy could not identify itself as an alliance, at least not by the Australia model standards. For example, every alliance project that we discussed during the interview series had mutual goals and objectives, an alliance structure, had a best for project selection process for staff, used an alliance facilitator, had commercial incentives, used an integrated project team with co-location, had established project specific KPI's, and facilitated workshops throughout the entire length of the project. That makes seven out of the twenty-two success factors identified by Jefferies, et al. [1] as being well-established norms. In fact, each of these points could be considered among the elements that make an alliance what it is today.

Another point to note is, of all the projects discussed, not one had a formal dispute resolution process. Each alliance had a no-dispute clause and the requirement that all disputes be handled internally within the alliance.

The interview series confirmed the barriers identified by the literature study and identified a number of additional barriers and points of concern. A key barrier identified by respondents is the increased pressure from Government for clients to demonstrate value for money when selecting the alliance form of procurement. It has been the case that, the majority of alliances in Australia were delivered as "pure" alliances, whereby the non-owner participants were selected on merit and not on a cost basis. This lack of a price competitive tender process, it seems, is part of the cause for concern for the Government and treasury in Australia as to whether alliances deliver value for money. Perhaps there is little cause for concern though, as another key point of the findings was the answer to the question "*Could the same level of success have been achieved if this project was delivered by another form of PDM?*". In all cases the respondents answered either "no, not at all", or "no, not to the same extent". Among the reasons why not were "*the project would have ended in dispute and we'd still be in the courts*", "*the project would have most likely been delivered one year late instead of one year early*", and "*we [the client] would have been hit with a number of large variations*". It seems the value for money is there but it is difficult to demonstrate.

To expand on the barrier of Resource Availability of Project Participants, one of the interview respondents raised the following regarding the commitment to the alliance from the client. He makes this point while referring to the success of an alliance from which he performed a number of roles including being the senior representative of the client:

*"This alliance had unqualified commitment from the highest levels of the Client. Many others received commitment in words only. When critical decisions were needed, the Client was too busy. This is a breach of faith. Alliances are really successful when they are done right – I mean REALLY successful, but they are really hard to make them run right. They cannot be run by half-hearted or incompetent clients. The things that make Alliance run well are clearly documented and well known, so there is no excuse for having an unsuccessful one."*

## 5. Conclusion

This paper supplements the existing body of knowledge by answering the questions: what characteristics of a project make it suitable for alliancing? how do alliance elements address these characteristics? and finally, what are the key success factors and barriers when choosing alliancing? Due to its relatively new breakthrough into the world of large infrastructure delivery, alliancing is still finding its place amongst the more established project delivery methods. This development has been increasing rapidly since alliancing's birth in the 80's. Based on the literature studied, and the results from the interview series, we can conclude that alliancing is a very effective PDM, which is suitable for projects with particular characteristics, provided it is selected for the right reasons.

This research has identified twelve characteristics of a project that make it suitable for alliancing. Table 5 contains the final list of project characteristics based on the results of the methods contained within this report.

Table 5. Project Characteristics Suitable for Alliancing

Project Characteristics	
Tight Time Constraint/ Need for early start	Large Project/ High Cost
Multiple/ Complex Stakeholders	Need for Innovation
High Risk	Tight Cost Control
High Complexity	Environmental Challenges
Unclear/ Broad Scope/ Risk of Scope Change	Need for owner involvement
Complex External Threats	Multiple Interfaces

Where a project identifies one or more characteristics shown in Table 5, an alliance can be highly considered during the selection process for the project's delivery method. By looking closely at the elements of an alliance, we show how they address the identified project characteristics. For example, the integrated project team drives innovation and gives the owner more control within the project. The win-win culture created by the combination of a number of alliance elements enables the alliance to handle complex or high-risk projects and projects with great uncertainty.

By comparing the success factors identified in the literature with the case projects, we have concluded that a number of success factors seem to be now outdated. The bar has been raised so that these factors are now engrained into the model. However, the established research into success factors is still very important as it helps show industries new to alliancing why each element has its place in the model. It also provides a launching platform for how the model could be improved.

The research has lead us to conclude that the number one factor to having a successful alliance is choosing alliancing for the right projects and the right reasons. This makes it so crucial to have an understanding of the characteristics of projects that indicate an alliance might be the best option.

The conclusions are based largely on the Australian experience, but we believe that the lessons learned are transferable to other countries. Having an understanding of the success factors and barriers to alliancing, combined with knowing when to select alliancing, will enable practitioners to make better informed decisions regarding the adoption of alliancing into new industries and countries.

Limited work has been performed in the area of barriers to alliancing. Our preliminary research has identified a number of key barriers they may inhibit the choice of an alliance as the preferred project delivery method. The body of knowledge could benefit from further research in this area. The industry could benefit from more work within the area of success barriers to identify new "stretch" success factors that are a step above current standard practice. In addition, work should be done to identify success factors specifically for implementing alliancing in a new, immature industry.

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