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Interorganizational Cost Management in Australian Construction Alliance

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Abstract
Project alliancing/alliance is an alternative to traditional contracting methods in procuring infrastructure projects. Over the past decade, alliance has attracted wide research interest. However, previous research has less considered the interorganizational cost management (IOCM) practices in alliances. When looking at alliance as an interorganizational relationship in which both the owner and construction service providers play important roles, IOCM is highly relevant. In this study, IOCM in alliances is defined as contracting parties' coordinated efforts to reduce the shared costs. Through interviews with Australian alliance managers, this study investigated IOCM practices and techniques regarding how alliances develop the project proposal, set target costs, and make cost more effective during the delivery phase. A number of IOCM practices have been identified. As one of the only several studies regarding IOCM in the construction management discipline, this study is the first attempt to explore IOCM in construction alliances. The results indicated that many of the IOCM practices and techniques could also be used in construction transaction relationships.

Keywords
Interorganizational cost management, project alliance, Australian construction industry

1. Introduction

Nowdays, Australia has developed world class leadership in making project alliances in delivering infrastructure projects (AAA, 2008). Actually, alliance is a kind of interorganizational relationship in which the contracting parties commit their resources and knowledge into a joint team, work together in a collaborative and cooperative way to pursue common goals and realize respective benefits (Axelsson *et al.*, 2002, Crowley and Karim, 1995). Under alliance arrangements, the owner collaborates with one or more service providers (e.g. designer and contractor) to share the risks and responsibilities associated with the delivery of a project (DTF Victoria, 2010b). The organizational boundaries between parties become blurred in an alliance since alliance places all parties' activities and resources as objects for management and control. This often leads to the development of interorganizational cost management (IOCM) techniques that go across organizational boundaries (Cooper and Slagmulder, 2004), because the overall efficiency of an alliance relies on the way to manage activities and resources of all the contracting parties, instead of one party's own competence. Thus, the alliance relationship creates new demands on cost management to manage the transaction value creation process while simultaneously economizing transaction costs. However, the use of IOCM practices have been largely unexplored in construction alliance to date. Knowledge about how contracting parties direct their collaborative efforts towards the improvement of the interorganizational coordination and the entire efficiency of the value chain is limited. This unknown

area is worthy of exploration. This study intends to address the shortcomings and gaps in the existing literature, and therefore establishes its aims as exploring IOCM in alliances.

The remaining of the paper proceeds as follows. Section 2 provides a brief literature review on IOCM in other industries and IOCM studies in the construction industry. Research method is presented in section 3. The subsequent section presents the findings of the study. The paper closes with a concluding remark.

2. Literature Review

In recent decade, a number of cost management and management accounting techniques and methods used in interorganizational relationships have been identified as an important result of many empirical studies conducted in different industries (Håkansson *et al.*, 2006). In general, these cost management methods comprise a range of techniques, tools and practices, and can be defined as the customer and supplier's coordinated efforts to reduce shared costs (Agndal and Nilsson, 2009). They are usually termed as IOCM. Without purporting to be exhaustive, IOCM practices and techniques include target costing (Ansari *et al.*, 1997, Okano and Suzuki, 2006), trade-off techniques such as functionality-price-quality trade-offs, interorganizational cost investigations, and concurrent cost management (Cooper and Yoshikawa, 1994, Cooper and Slagmulder, 2004), open-book accounting (Kajüter and Kulmala, 2005, Anderson and Sedatole, 2003, Carr and Ng, 1995), total cost of ownership (Wouters *et al.*, 2005), value chain analysis (Dekker, 2003), and some other non-financial, qualitative and informal approaches such as cross-functional teams (Carr and Ng, 1995, Cooper and Slagmulder, 2004), regular measurement of quality and cost (van der Meer-Kooistra and Vosselman, 2000), joint task groups, joint alliance boards, drawing up plans and policies, and programs of innovation (Dekker, 2004). They are mainly used for controlling interorganizational operations and improving interorganizational efficiency and effectiveness (Håkansson *et al.*, 2006).

Target costing, trade-off techniques and open-book accounting are the most popular among the identified IOCM practices. Target costing is a cost management technique with aims to minimizing new products' life-cycle costs while meeting consumer requirements through exploring all possible ideas at the early stage of new products research and development (Kato, 1993). Cooper and Yoshikawa (1994) investigated the IOCM techniques developed in the automobile industry in a Japanese supply chain, and concluded that these systems, which rely upon the customer-supplier cooperation, make the whole supply chain more cost-efficient. Ten years later, Cooper & Slagmulder (2004) observed three trade-off techniques (functionality-price-quality trade-offs, interorganizational cost investigations, and concurrent cost management) and argued that IOCM can help to overcome the information asymmetry and enable different parties to coordinate and cooperate effectively by investigating the IOCM systems in different relational context. Also, they pointed out that target costing lies at the centre of IOCM. In interorganizational settings, information exchange is indispensable. This is the primary function of open-book accounting. The cost information disclosure may be unidirectional (Carr and Ng, 1995), or bidirectional.

In comparison with other industries, only limited studies in relation to IOCM have been conducted to date in the construction industry. The action research conducted in the UK in 1997 was mainly to examine the applicability of target costing in two pilot projects (Nicolini *et al.*, 2000). Jacomit and Granja (2011) investigated into the applicability of target costing on Brazilian public social housing projects and critically examined the contextual characteristics that may influence its implementation in the product development process. Some scholars attempted to introduce and apply the concurrent engineering conception into the construction industry as means of improving the supply chain integration and project performance (Love *et al.*, 1998, Evbuomwan and Anumba, 1998). However, Nicolini *et al.* (2000) argue that the main barrier to the adoption of a fully-fledged version of target costing in construction derives from the extant commercial practices in the construction industry and the application of target costing was seriously jeopardized in this context. Jacomit and Granja (2011) also view the outsourcing of design and the bidding process as the obstacles for the implementation of target costing in the construction industry. Thus, it is unrealistic to apply these cost management

practices without the appropriate contractual, relational context and specific organizational arrangements. In addition, these studies focus on the determination of the target costs of construction projects in the design stage, and are less concerned with the IOCM practices in the construction stage. Consequently, the construction management literature as such does not offer any comprehensive models of processes involved in construction project-based transactions where IOCM might be relevant.

Compared with other types of contracting relationships in the construction industry, project alliance provides a platform in terms of contractual mechanism, relational context and organizational arrangement to apply IOCM. Actually, a few studies have been referred briefly to some IOCM practices that might be used in alliances but lack of further research, such as open-book accounting (Ross, 1999, DTF Victoria, 2010b), target costing (Langfield-Smith, 2008) and concurrent engineering (Halman and Braks, 1999). In addition, construction industry has its own distinctive features. Firstly, the nature of its project-based and organizational dynamics and the complexity of its supply chain relationships often lead to difficulty in controlling its environment compared to other industries (Barlow, 2000). Secondly, the large, discrete, and immobile nature of the final product is the most salient feature distinguishing construction projects from manufacturing operations (Masten *et al.*, 1991). Those identified IOCM practices fit quite well for other industries. However, it remains unknown whether those IOCM practices are suitable for construction industry.

3. Research Method

This study aims to explore the IOCM practices used for developing the project proposal, setting target costs, and making cost more effective during the delivery phase in project alliances. The data collection was accomplised by means of interviews. The interview approach was selected because it can help to capture in-depth information around the research topic, and is considered particularly useful for getting the story behind a participant's experiences (McNamara, 1999). Since the research studies the IOCM in project alliances, the interview therefore focuses purely on cost management practices that cover alliance relationships and all alliance participants' joint activities, and ignore those which are used for dealing with individual alliance participants' internal activities. In total, sixteen in-depth interviews were conducted over a two-month period. All interviewees have served as alliance managers in Australia. In the interviews, alliance managers were chosen because they are responsible for the delivery of alliancing projects, heading the Alliance Management Team, and are usually highly experienced project managers (DTF Victoria, 2010b). Further, alliance managers would have greatest understanding of the cost management issues in project alliances. Thus, the interviewees are considered to be particularly knowledgeable about the subject under study. The interviews were conducted at the offices of interviewees. Each interview varied in length from 45 to 120 minutes. Upon consent of interviewees, interviews were digitally recorded for data analysis purposes.

The collected data was analysed concurrently with interviews. The data analysis process comprised three main steps intended to produce meaningful findings from raw information collected in interviews. The concurrent and iterative data collection and analysis process used in this research allow for emerging understanding about research questions to be developed, and help to identify new categories or themes (DiCicco-Bloom and Crabtree, 2006). First, the interviews were transcribed verbatim to allow for capturing the common perspectives and nuances on a particular topic. Second, the interview data was organized and compiled. The information collected through the interviews was grouped into different categories according to the topics investigated. After grouping, the information was manually and systematically searched. Different tables were created with each table focusing on one category. The relevant information concerning the purposes of costing and what IOCM techniques were used were entered into corresponding tables along with data source. Third, comparisons between interviewees' statements were made based on the extensive tables. Through the comparisons, interviewees' common perspectives and different viewpoints on a particular topic were identified. At the later stage of the interviews, some additional questions were asked with a view to validate and verify the statements made by previous interviewees.

4. Findings and Discussion

4.1 Joint project proposal development

Normally, the objective of project proposal development in alliances is to work out project solutions including project design and construction methods, the estimate and determination of target cost and other performance targets of the alliance such as time, quality and safety, and finalisation of commercial arrangements (DTF Victoria, 2010a). Actually, project proposal development in project alliances is not a simple activity, but rather a joint effort of the contrating parties to find project solutions and set cost and non-cost goals of alliances, especially when extremely complex projects are involved that require collaboration, cooperation and interaction between parties. This study investigated the IOCM practices employed by alliances in the project proposal development stage.

Design focused. In the project proposal, project solution is the primary driver for target cost, and target cost is the quantitative representation of the other elements of the project proposal. Thus, project design lies at the centre of project proposal development. As is frequently stressed in both construction management and management accounting literature, design is crucial to cost savings because a large proportion of costs is committed in the design stage (e.g. Nicolini *et al.*, 2000, DTF Victoria, 2010a, Ansari *et al.*, 2006, Kato *et al.*, 1995). In most cases, the project design process consists of such activities as concept design, design alternative options, assessment and comparison of options, and selection of the preferred option. Concurrently, risk analysis and assessment is undertaken, construction methods and associated procurement strategies are developed, and related costs are estimated along with each design activity in the design process. This makes the project proposal development an iterative and interactive process rather than a linear activity. By brainstorming and identifying as many innovative solutions as possible, alliances design cost out before construction, and work out more cost-effective project proposals. Interviewees suggested that value management/engineering is also widely used for identifying, assessing and selecting alternative options and innovative solutions based on the best balance between cost and functionality.

Involvement and collaboration of alliance participants. Project proposal is developed by alliance participants in collaboration and interaction with the owner. The continuous interaction and collaboration enables the functional specifications, owner's requirements, objectives, experience and knowledge of the project are simultaneously incorporated in the project design and target cost. All major parties in the alliance are involved in this process.

Taking account of lifecycle costs. In project alliances, the proposal development considers the construction costs as well as the maintenance and operation costs. Interviewees indicated that lifecycle costs were considered and addressed in project alliances by using formal or informal mechanisms. For example, the owner often has very good knowledge of its expectation and requirements, but may have less experience with construction. Interviewees suggested that owner's information and knowledge plays a very important role in minimizing maintenance and operation costs. Alliances have usually used information from the owner's organization and used people with them to help change the designs to minimize the maintenance and operation costs. Further, alliance participants can consult or work with facility operators and maintainers to identify new solutions to reduce maintenance and operation costs. More importantly, to work out optimal solutions to reduce the lifecycle costs and balance various performance requirements, alliances adopted a collaborative approach. All the relevant parties such as the owner, designer, constructor and operator are involved in proposal development and the decision-making process. Interviewees suggested that it is worthwhile to spend time and effort to develop proposals in such a way because the developed proposal not only leads to cost savings in the delivery phase but also reduces the operational risks of the project and makes the lifecycle costs more efficient. Other strategies to address lifecycle costs in the project proposal development stage include quantifying lifecycle costs to help the selection of the most desirable project solutions, and linking the operational performance of project with alliance participants' commercial benefits.

Information and knowledge sharing. Alliance participants share information on basic costing elements, information and knowledge, helping to identify cost reduction solutions and ensuring transparency between parties. Interviewees indicated that information and knowledge sharing supports the whole project proposal development process.

The target cost is value-driven. Interviewees suggested that the strategies used for setting target costs in project alliances are different with those used in manufacturing environments where competitive market price can be easily obtained for most products. In project alliances, target cost is driven by the owner's functional and performance requirements, and project objectives. Target cost is established by considering, measuring and balancing various functional and performance requirements, and quantifying the project solutions. The owner's value proposition (i.e. functional specifications and performance requirements, instead of market price) is the major determinant for, and main consideration in setting target cost. The target cost is fixed once it is established. It can only change when the owner changes the project scope (i.e. the scope or size, and/or functional requirements of project. Interviewees mentioned the change in legislation is the other issue that can lead to adjustment to target cost. However, the change in legislation is beyond the control of project alliance, and thus is not considered in this study).

Multi-disciplinary team. Project proposal development is undertaken by a multi-disciplinary team, which is typically made up of a designer, construction engineer, operator, maintainer, procurer and estimator.

4.2 Joint delivery of the project

Although it is a consensus that project costs are largely determined at the design stage, there is still room for cost savings or functional improvement (Nicolini *et al.*, 2000), and the achievement of the target cost in the delivery stage is as important as the determination of target cost. Further, Ansari *et al.* (1997, p. 86) argue that "an optimized supply chain is one of the most critical elements in attaining the target cost." As opposed to other IOCM research that often focuses on product design and process development in manufacturing environments, this study highlights IOCM practices during the project delivery phase. Actually, a formal alliance relationship is established only when alliance participants have reached agreements on the project proposal and alliance agreement. This is followed by project delivery. Therefore, the alliancing project delivery phase can be viewed as a process in which the established target cost and non-cost performance requirements are achieved. Furthermore, alliance participants strive to realize the owner's project objectives as well as their respective commercial benefits in this process. Thus, the question of how project alliances conduct cost management during the project delivery phase becomes relevant. By interviewing alliance managers, a number of IOCM practices and techniques were identified. Some of these are not used only for cost management purposes, although they are still presented as powerful tools for cost management in the context of alliance.

Collaboration. Interviewees reiterated that collaboration among alliance participants covers every corner of cost management in project alliances. Actually, collaboration is the primary way of work in project alliances. Alliance participants create a seamless interface in the management of costs during the project delivery phase. Additional opportunities for cost reduction arise through collaborative efforts of alliance participants.

Continuous improvement. Interviewees indicated that cost management is a continuous process with improvements being made throughout the whole lifecycle of project alliances. The costing methodology of project alliances can be likened to the Kaizen costing approach that is sometimes used in manufacturing environments to reduce costs on a continual basis during the production process (Monden and Hamada, 1991). Interviewees also emphasized that project alliances proactively manage risks and associated costs, and do their best to prevent costs from overrun during project delivery phase. Alliances employ a number of techniques to make continuous improvement and to manage risks proactively such as setting stretch targets, regular meeting, performance checking, Deming cycle, balanced scorecard, value engineering and reporting.

Commercial incentive. Due to the lock-in effect of target cost, alliance participants will still seek further cost reduction during the project delivery phase. Interviewees revealed that project alliances have made more efforts to reduce costs even though the actual cost was still lower than the target cost during the project delivery phase. The most important driver for cost reduction comes from the commercial incentives. In the context of project alliance, the commercial incentives are usually expressed as 'pain-share and gain-share' which means that all the alliance participants will lose or benefit from the actual performance against the target cost and non-cost targets (DTF Victoria, 2010b). The potential win or loss incentivises alliance participants to commit to cost reduction activities. More importantly, it is also suggested that alliance participants' willingness to reduce cost is matched with how much benefit they can get from the cost savings.

Information sharing. Information sharing is a widely used cost management technique in interorganizational relationships. From a management accounting perspective, it not only enables organizations in the relationship to jointly learn new skills and identify cost reduction opportunities (Coad and Cullen, 2006), but also facilitates more effective collaboration between organizations (Cooper and Slagmulder, 2004). Similar merits of information sharing can also be found in project alliances. Furthermore, the interviews identified two forms of information sharing that are widely used in project alliances. One is the face-to-face communication of skill, knowledge and real-time project information that can be used to identify risks and problems in delivering alliancing projects, and find cost reduction solutions to make continuous improvement, especially when specific information and knowledge was possessed by other parties. Interviewees believed that innovation could overcome risks and problems, which in turn reduce costs. The other form of information sharing is more formal and related to sharing detailed cost information. This form of information sharing is usually known as open-book accounting. The openness and transparency of cost information can support alliance participants' collaboration on cost management. Moreover, transparency of cost information is considered to be essential to identify cost reduction opportunities (Kajüter and Kulmala, 2005).

Value augmentation. One may suspect that alliance participants might be obsessed with cost reduction because of the potential commercial benefits, and the cost reduction efforts made by alliance participants might be detrimental to other non-cost performance and functionality. However, the interviews found that this is not the case in project alliances. Interviewees believed that cost management in project alliances not only led to cost reduction but also added more value to the owner. First, the improved functionality and non-cost performance is achieved without increasing costs. Second, the costs are reduced without compromising the functionality or performance requirements of projects. Actually, it is almost impossible to reduce costs at the expense of compromising the performance requirements and functionality, even though project alliances are faced with cost overrun problems. To deal with cost overrun problems, alliance participants can redesign part of the project or find innovative solutions to save costs without affecting its functionality and performance requirements. However, not all cost overrun problems can be resolved with redesigning and innovation. In such a situation, alliance participants have to share the "pain" from the cost overrun.

5. Conclusion

Through interviews with alliance managers, this study investigated IOCM practices and techniques regarding how alliances develop the project proposal, set target costs, and make cost more effective during the delivery phase. It should be noted that the investigation focused purely on cost management practices that cover alliance relationships and all participants' joint activities, and ignored those used for dealing with individual alliance participants' internal activities. The study has identified a number of IOCM practices and techniques used in alliances. The results also provide some interesting insights into the nature and application of IOCM in the context of project alliances. The intent of IOCM in project alliances is not only to deliver the project according to the owner's functional and performance requirements in a more cost-effective manner but also to improve the

efficiency and effectiveness of alliances. In alliances, the IOCM process is twofold. First, it is a project planning and designing activity to establish cost and non-cost objectives through the use of collaboration approach. Essentially, setting target cost in alliance is a value-based target costing process in which the owner's functional and performance requirements are fully considered and reflected in project proposal. Second, IOCM in project alliance involves collaboration, continuous improvement and the implementation of project-specific incentives to incentivise alliance participants to achieve the established cost and non-cost objectives.

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