Non-monetary collaborative alliances (NMCA): a field study of an Australian-Chinese alliance

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Non-Monetary Collaborative Alliances (NMCA): A Field Study of an Australian-Chinese Alliance

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Master of Philosophy in Accounting

2010

A thesis submitted in partial requirement for the Degree of Master of Philosophy (in Accounting) at the University of New South Wales.

Acknowledgements

I would like to express my sincere gratitude to my supervisors, Associate Professor Jane Baxter and Professor Wai Fong Chua, for their constructive comments, expert advice, and most of all, for their patient guidance throughout the course of writing this thesis.

I would like to extend my appreciation to the participants in MonFORMA 2009 for their comments and advice on my work.

I would also like to thank the field organization and those who participated in this study. Without their willingness and kindness to share their thoughts and feelings with me, this study would not have been possible. In particular, I would like to thank the manager who helped to facilitate my access to the field organization. I appreciate greatly his support and guidance.

Special thanks go to my parents for their love and support.

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List of Abbreviations

ANT	Actor Network Theory
APEC	the Asia-Pacific Economic Cooperation
APP	the Asia-Pacific Partnership on Clean Development and Climate
ARI	the Australian Research Institute (pseudonym)
CP	China Power (pseudonym)
CPC	the Communist Party of China
CO_2	Carbon Dioxide
CRI	the Chinese Research Institute (pseudonym)
GHGPI	the Greenhouse Gas Protocol Initiative
IND	Individualism (IND)
MA	Masculinity
MOST	the Ministry of Science and Technology
NDRC	the National Development and Reform Commission
NMCAs	Non-monetary Collaborative Alliances
NO_X	Nitrogen Oxides
PCC	Post Combustion Capture
PD	Power Distance
PIC	Policy and Implementation Committee
PPP	Private Public Partnership
SASAC	the State-owned Assets Supervision and Administration Commission
SOEs	State-owned Enterprises

SO$_X$ Sulphur Oxides

TCE   Transaction Cost Economics

UA   Uncertainty Avoidance

Thesis Abstract

This thesis is motivated by the growth in and significance of alliances involving transfers of intangible resources and the challenges that these alliances present to traditional management (accounting) planning and control practices. To this end, a field study was conducted in an Australian-Chinese alliance formed between two government research institutes working on a green gas project. This alliance involved the transfer of intangible knowledge-based resources between the Australian and Chinese partners. A field study examining this project considered two research questions: first, 'what networks of actors/actants informs partner selection in a non-monetary cross-national collaborative alliance?'; and, second, 'how are the management (accounting) planning and control practices implicated in the functioning of a non-monetary cross-national collaborative alliance?'. These questions were examined using Actor Network Theory. Data were collected via semi-structured interviewing and document study. It was found that partner selection was informed by individual social ties located in university alumni networks, time pressures and political influences. In terms of formal planning and control practices, the contract played an important role regulating this alliance because of its political and symbolic significance. Although there was no monetary exchange between the partners, accounting played a role in regulating the practices of the Australian alliance partner. Budgets were important to the financial justification and administration of the alliance. In relation to socio-ideological forms of control, actors struggled to achieve common understandings and shared values because of a lack of

face to face interaction and differences in communication practices. Nonetheless, this alliance was regarded as an example of successful collaboration at the inter-governmental level. The findings from this research have three main implications in terms of how we think about alliances. First, this thesis raises issues relating to the role of contracts in non-market based exchanges. Second, this research also questions the importance of shared values and beliefs to the operation of collaborative alliances. Third, and finally, this research also motivates future research seeking to address the governance of alliances in the absence of market disciplines and shared values informing collaboration.

CHAPTER ONE:
INTRODUCTION

'The Chinese will take a long time to Westernize and the West will take a long time to get used to the Chinese.'[Jim Wilson, consultant with the Confucius Institute of the University of Adelaide, cited in James (2009)].

1.0 Research Focus

This research aims to investigate management (accounting) planning and control in a cross-national collaborative alliance. To this end, a field study is conducted of an inter-governmental Australian-Chinese collaborative alliance. The alliance that is to be studied is focused on the development and commercialization of a green gas emission technology, which aims to reduce the amount of carbon dioxide (CO_2) emitted through coal-based electricity generation.

This alliance has two distinctive features. First, this alliance centres on a transfer of knowledge between alliance partners, that is, it involves primarily transfers of intangible forms of 'value in kind' (Burfitt et al., 2009) – rather than transfers of mainly tangible, financial resources (Grant, 2002). We know little about the functioning of collaborative alliances which involve the transfer of value in kind, especially intangible forms of value in kind. Second, this alliance also brings together two partners at the level of the state, with both partners having different

histories and political models.

Thus, it is the author's intention to contribute to our knowledge by conducting an exploratory field study of this distinctive form of alliance.

1.1 Motivations and Research Questions

Collaborative alliances are argued to be an important design choice for conducting business in the contemporary business environment (Doz and Hamel, 1998; Spekman et al., 2000), with rapidly changing technologies, stakeholder expectations and resource constraints. Correspondingly, there has been a significant growth in the number of collaborative alliances being formed in the last decade (Chua and Mahama, 2007).

Despite the variety in these alliances' form and functioning, collaborative alliances are argued to confer many advantages on participating organizations. These benefits include: gaining faster access to new markets; providing a capability to access or internalize new technologies and know-how developed beyond organizational boundaries; exploiting economies of scale and scope; sharing risk or uncertainty for activities that are beyond the scope or capability of a single organization; and gaining access to complementary skills (Kale et al., 2000; Mariti and Smiley, 1983; Powell, 1987).

However, the literature reports high failure rates amongst collaborative alliances

(Doz and Hamel, 1998; Spekman et al., 2000; Bamford et al., 2004). Correspondingly, it is argued that the ways in which collaborative alliances are managed and controlled is an important factor contributing to the success or failure of these inter-organizational alliances (Chua and Mahama, 2007). Thus, researchers are encouraged to pay increasing attention to how practices related to management (accounting) planning and control foster cooperation between alliance partners, contributing to the ongoing efficient and effective alliance operation.

There is little research addressing the functioning of alliances in the context of what have been described as non-monetary collaborative alliances (NMCA[s]) (Sundin, et al., 2009), alliances involving an exchange between alliance partners of value in kind. In many NMCAs, particularly those involving public sector partners (such as research institutes) and the not-for-profit sector, the primary outcomes sought from these alliances are social and environmental in nature, rather than purely financial in orientation (Burfitt et al., 2009; Sundin et al., 2009).

Traditional management control systems, which have been designed for implementation in profit-oriented contexts, focus on financially oriented performance indicators and reward the relevant parties mainly in terms of their financial performance. The different orientations of NMCAs, which focus on social and environmental performance, challenge conventional understandings of the role of the management (accounting) practices for planning and control which emphasize financial forms of efficiency and effectiveness.

The challenges involved in understanding management accounting planning and control practices in collaborative alliances, including NMCAs, are further heightened by the fact that many alliances are now formed at the international level. With the development of China's economic, political and strategic importance, China has become active in the formation and operation of these international collaborative alliances.

As the world's third largest economy and trading nation, China has achieved significant progress towards becoming a major global power (Shambaugh, 2009). According to the National Bureau of Statistics of China, China has witnessed a substantial rise in its involvement in international collaborative alliances during the last decade, both in terms of the volume as well as the value of these alliances. The number of international collaborative alliances involving China has increased from 2,233 in year 1987 to 37,871 in year 2007, while their value has increased from USD 2, 314 million to USD 3,787,100 million.[1]

Alliances with a Chinese partner are particularly interesting cases to study. China's political system is neither one of capitalism nor communism. It is characterized by a hybrid model of quasi-state capitalism (Shambaugh, 2009), or so-called socialism with Chinese characteristics. Further, a philosophy of Confucianism is argued to influence the ideologies and actions of Chinese alliance partners (Shambaugh, 2009).

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[1]

Source: http://www.stats.gov.cn/tjsj/ndsj/2008/html/R1716e.htm, http://www.stats.gov.cn/ndsj/information/nj98n/ Q131AC.htm (Last accessed 07 October 2009)

Understanding the impact of this Chinese context on alliance practices, again, is an under-explored area that deserves further research attention.

Given the distinctive informing context of this research, and a stated interest in examining management (accounting) planning and control practices in NMCAs, the following research questions are developed and investigated in the body of the thesis:

1. What networks of actors/actants inform partner selection in a non-monetary cross-national collaborative alliance involving governmental organizations?

2. How are the management (accounting) planning and control practices implicated in the functioning of a non-monetary collaborative alliance involving governmental organizations?

1.2 Research Methodology and Method

Actor Network Theory (ANT) is used as the theoretical framework to structure this research study. ANT constructs alliances as being made up of networks of humans and non-human actants (Ahrens, 2008). An understanding of the functioning of an alliance draws on the notion of the 'relationality' of action nets or the capacity of actors/actants being informed by their relations to other actors in a network of fluctuating stability and durability, changing whenever an actor and/or actant is enrolled or dis-enrolled from the network (Chua and Mahama, 2007; Law, 1999).

This methodology will be applied to a field study. A NMCA formed between

Australian and Chinese governmental organizations is the research site for this field study. The focal partners to this alliance are the Australian Research Institute (ARI) and China Power (CP), and its subsidiary, the Chinese Research Institute (CRI).[2]

1.3 Research Findings and Contributions

Based on the study of this alliance, it was found that inter-personal social ties were an important influence on partner selection, particularly given the surrounding time pressures and political influences that were present in this case study. It was also found that the contract as a formal control mechanism was more important symbolically rather than in terms of the day to day monitoring; it only acted as a symbolic tool to indicate an intention to collaborate between the alliance participants. Although the socio-ideological based controls were sought through building shared values and beliefs, this was difficult on a day to day basis because of communication difficulties and a lack of face to face interaction.

These findings from the study raise some interesting implications regarding our understanding of planning and control practices in alliances. What is the role of contracts where there is an exchange of an intangible nature without monetary payment? Also, how important is collaboration to alliance outcomes, especially when shared values are difficult to build on a day to day basis?

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[2] Pseudonyms are used for these three organizations.

1.4 Structure of Thesis

The remainder of this thesis is structured in the following way. The relevant literature is reviewed in Chapter Two. This is followed by an outline of the research methodology and method in Chapter Three. An overview of the field is presented in Chapter Four. Chapter Five contains the field account, based on documentary and interview data.   This is followed by a discussion of the field work and its theoretical implications in Chapter Six. The conclusions and limitations of the research are stated in Chapter Seven.

CHAPTER TWO:
LITERATURE REVIEW

2.0 Introduction

There has been substantial growth in the volume and significance of collaborative alliances. However, there is still much to be learned from research addressing the management (accounting) planning and control practices in alliances. It is the purpose of this chapter to outline research that is relevant to this thesis and the gaps in our knowledge that the thesis proposes to address in relation to NMCAs and their management planning and control.

Given this, the phenomenon of (non-monetary) collaborative alliances is introduced in section 2.1. This is followed by a discussion of management (accounting) practices in section 2.2. Relevant issues relating to trust, culture, and networks in relation to alliances are discussed in sections 2.3, 2.4, and 2.5 respectively. This is followed by a statement of the research questions in section 2.6.

2.1 Emergence of (Non-Monetary) Collaborative Alliances

The last decade has witnessed great growth in the number and importance of collaborative alliances (Chua and Mahama, 2007). There are several issues used to explain this trend, including globalization, increasing competition, the empowerment of customers, the need to strengthen core competences, and a requirement for

organization flexibility (Ezzamel et al., 2005; Powell, 1987; Smith et al., 2005; Van der Meer-Kooistra and Vosselman, 2006). Through collaborative alliances, focal organizations forming collaborative alliances may gain faster access to new markets, access to new technologies and know-how formed beyond an organization's legal boundaries, exploit economies of scale and scope, share risks and uncertainties associated with activities beyond the scope or capabilities of a single organization, and gain access to complementary skills (Kale et al., 2000; Mariti and Smiley, 1983; Powell, 1987).

There are many different types of collaborative alliances, however. These include horizontal alliances between competitors, vertical alliances between buyers and suppliers, and diagonal alliances between organizations in different industries (Langfield-Smith, 2008; Nooteboom, 1999). These collaborative alliances can take many forms, consisting of outsourcing, franchising, joint ventures, joint product development, joint research and development and joint marketing arrangements (Langfield-Smith, 2008).

However, it has been noticed that an increasing number of collaborative alliances are based on non-cash transactions or non-money exchange among participants (Adby 2002; Burfitt et al., 2009; Dolphin, 2003; Sundin et al., 2009). In comparison, these non-monetary collaborative alliances (NMCA) involve a transfer of 'value in kind' (Burfitt et al., 2009). Moreover, the desired outcomes of many NMCAs (such as charities, arts foundations, research institutes) are not primarily or solely financially

oriented (Sundin, et al., 2009) – there may be an express desire to contribute to social and environmental aims, for instance. The 'value in kind' that may be exchanged between alliance partners can either be a tangible product or an intangible form of knowledge and know-how. The existence of non-cash transactions and non-financially oriented targets creates challenges in relation to the application of traditional management (accounting) practices in these forms of alliances.

2.2 Contextualizing Alliance Management Planning and Control

Unlike traditional organizational forms, collaborative alliances blur organizational boundaries (McEvily et al., 2003) and are subject to management from at least two different enterprises (Jarillo, 1988). Thus, collaborative alliances face unique management planning and control issues, including accommodating conflicting perspectives from multiple stakeholders, establishing trust among participants, protecting participating organizations from opportunistic behavior, and potentially achieving coordination across dispersed geographical sites and different time zone (Das and Teng, 1998, 2001, 2002; Langfield-Smith and Smith, 2003; Mouritsen and Thrane, 2006). To address these issues, management (accounting) research has focused increasingly on how management (accounting) practices could foster collaboration among participants in relation to ongoing alliance functioning.

An important factor affecting emerging management planning and control practices

in alliances involves partner selection. Partner selection is demonstrated as being an important factor influencing cooperation, coordination and the mitigation of opportunism in the operating stage (Das and Teng, 1998, 2001, 2002) of a collaborative alliance (Dekker, 2008). This is particularly the case with NMCAs. For example, Sundin et al. (2009) examined the management practices in the Greenhouse Gas Protocol Initiative (GHGPI) Project, an example of a NMCA, from 1999 to 2005. In this GHGPI project, over 300 people from industry, academia, governments, scheme administrators, consultants, non-government and environmental agencies worked together to set up internationally acceptable greenhouse accounting standards. It was found that strong planning in the form of partner selection and negotiation contributed to the success of this NMCA.

2.2.1 Partner Selection

Management planning and control is paramount in the processes of partner selection and negotiation in collaborative alliances. This is evidenced in activities that make potential partners clear about with whom they will collaborate, the nature of the collaboration, and how responsibilities and authority will be allocated between the partners.

When selecting an alliance partner, there are at least two influences that focal organizations may take into consideration. These are, first, the capabilities and resources of potential partners and, second, whether there is a prior alliance

experience between the focal organization and the potential partners.

Firstly, capabilities and resources are a critical driver of partner selection, and ultimately the nature of management planning and control (Das and Teng, 2002; Garcia-Pont and Nohria, 2002; Koza and Lewin, 1998; Park et al., 2002; Park and Zhou, 2005; Silverman and Baum, 2002; Walker, 1998). These capabilities and resources are either knowledge-based or market-based. In NMCAs, these capabilities are mostly knowledge-based. Collaborative alliances represent one alternative for organizations to gain access to complementary capabilities, reap economies of scale, and shorten development time while spreading the risk and cost of new developments (Mariti and Smiley, 1983; Powell, 1990; Sampson, 2007).

Secondly, organizations generally prefer to ally with other organizations that they have had a successful relationship with in the past (Sampson, 2007). Prior alliance experience can generate trust between partner organizations (Gulati, 1995a), which in turn reduces the transaction costs and uncertainties involved in information sharing and resource transfers, thereby also reducing the potential for opportunism (Barney and Hansen, 1994; Beckman et al., 2004; Dyer and Chu, 2003; Gulati, 1995a; McEvily et al., 2003; Parkhe, 1993; Sabel, 1993). Prior alliance experience can also build up relationship-specific routines (Gulati, 1995b) and decrease the information asymmetry between partners (Li et al., 2008). This, in turn, reduces the causal ambiguity surrounding knowledge and technology transfer, facilitating the flows of knowledge and technology from one party to the other (Cohen and Levinthal, 1990;

Kale et al., 2000; Kogut and Zander, 1992; Li et al., 2008; Mowery et al., 1998; Szulanski, 1996; Von Hippel, 1994; Zahra and George, 2002).

Partner selection and negotiation helps to establish the development of shared values, beliefs and trusting behaviours between alliance partners (Langfield-Smith, 2008), providing a platform for participants to work collaboratively in the later stages of an alliance. Nevertheless, strong partner selection processes themselves do not lead to the success of collaborative alliances (Sundin, et al., 2009). The implementation of the alliance agreement during the operation stage (Das and Teng, 1998) and the role of management (accounting) planning and control in this stage is important also.

2.2.2 Management Planning and Control

Traditionally, management (accounting) planning and control practices have been researched from an economic perspective. Applying transaction cost economics (TCE), asset specificity, transaction uncertainty, transaction frequency, and ex post information asymmetry are argued to determine the appropriate management (accounting) planning and control system (Spekle, 2001; Williamson, 1979, 1985, 1991, 1996).

Drawing on TCE, market-based patterns of management planning and control have been argued to be appropriate for collaborative alliances operating in the context of high to low levels of environmental uncertainty, low to moderate asset specificity, low levels of transaction frequency, and high task programmability and output

measurability. Bureaucratic/hierarchical patterns of management planning and control are argued to be appropriate to control collaborative alliances in an environment of medium uncertainty, moderate asset specificity, high task programmability and output measurability, low to medium frequency of transactions, when activities are closely complementary and similar, and there is asymmetry in bargaining power (Hakansson and Lind, 2004; Langfield-Smith and Smith, 2003; Sartorius and Kirsten, 2005; Spekle, 2001; Van der Meer-Kooistra and Vosselman, 2000).

However, a distinctive characteristic of collaborative alliances and their management planning and control practices is that partners have to deal not only with the uncertainty in their transactional environment, but also with the uncertainty arising from each other's behavior (Harrigan, 1985; Krishnan et al., 2006). Thus, focusing on economic theories of management control systems downplays the social and relational aspects of exchange in collaborative alliances (Carson et al., 2006). This is particularly the case with NMCAs, where the conception of 'market' has little or no relevance. For example, Sundin et al (2009) found that in a NMCA focusing on non-monetary objectives, socio-ideologically based management control systems focusing on the development of shared values and beliefs were more critical to ensure the success of an NMCA than market-based control mechanisms. However, there is still much to be understood about the nature and functioning of socio-ideological practices in the management planning and control of collaborative

alliances.

2.2.3 Socio-ideological Practices as Management Planning and Control

Socio-ideological practices are frequently labeled as constituting 'informal' planning and control practices. According to Alvesson and Karreman (2004), socio-ideological planning and control practices influence organizational participants to adopt certain values, norms and ideas about what is good and important with respect to organizational functioning.

Economic theories, in comparison, do not focus on this socially embedded nature of management planning and control (Vosselman and Van Sonsbeeck, 2008). Hence, the dichotomization of management into 'technical' and 'social' forms of planning and control, and the subsequent depiction of management accounting as a form of 'technical' control, can be misleading (Chua and Mahama, 2007). However, given that management (accounting) planning and control is often grounded in norms of 'fairness', 'transparency', and 'equitable right[s] to information' (Luft, 1997), management (accounting) planning and control practices may create a social context that fundamentally affects behaviors through developing certain values and norms (Berry et al., 2009).

For instance, Seal et al (1999) identify the social-ideological role of management accounting information in collaborative alliances by studying the role of accounting

in a partnership between a buyer and a supplier. According to Seal et al (2009), "technical solutions that merely demonstrate how the costs and benefits of a partnership are identified and measured are important but must also contribute towards the overriding issues of agreeing an equitable distribution of the costs and benefits of cooperation" (p. 320). Thus, accounting is identified as a constitutive element in the formation and management of trusting relationships, transcending the technical level and becoming more symbolic and socially constitutive in action (Caglio and Ditillo, 2008).

Accordingly, developing shared values and beliefs is a key to the success of collaborative alliances; this is particularly the case with NMCAs (Sundin, et al., 2009). And trust is argued to be centrally linked to this. Thus, the concept of trust becomes a particularly important topic.

2.3 Trust

The importance of trust has been highlighted in the literature on collaborative alliances (for example, Cooper and Slagmulder, 2004; Dekker, 2004; Hakansson and Lind, 2004; Nooteboom, 2004; Tomkins, 2001; Van der Meer-Kooistra and Vosselman, 2000; Van der Meer-Kooistra and Vosselman, 2006). The general view of the research is that trust has a beneficial effect on achieving alliance objectives. Trust helps to bring about good faith in the intent, reliability, and fairness of partner behavior (Sako, 1991; Zaheer et al., 1998), allowing for the constructive

interpretation of partner motives (Uzzi, 1997), reducing the potential for conflict (Zaheer et al., 1998), promoting the ease of information flow between partners (Sako, 1991; Zand, 1972), and mitigating uncertainty about partner behavior (Krishnan et al., 2006).

Extant research has argued that there are three types and levels of trust that contribute to the foundation of an alliance's formation and operation (Ganesan and Hess, 1997; Sako, 1992). The three types of trust are contractual trust, competence trust, and goodwill trust. The three levels of trust are interpersonal trust, organizational trust, and inter-organizational trust.

According to Sako (1992), contractual trust is based on moral standards of honesty and rests on the expectation that the other party will fully honour an agreement. Competence trust is based on the expectations that the counterparty has the necessary technical and management competences to implement the agreement. Goodwill trust is based on an expectation that the parties have an open commitment to each other, that is, a readiness to do more than what is formally expected. Each type of trust is created and maintained differently, although with some degree of interaction.

According to Ganesan and Hess (1997), interpersonal trust means that *individuals* in organization A trust individuals in organization B. Organizational trust connotes that individuals in organization A trust organization B as a whole. And inter-organizational trust involves members of organization A having collectively

held trust in organization B. However, inter-organizational trust has often been conceived as the agglomeration of interpersonal trust (Kale et al., 2000). As organizations work with each other, trust is built among individual members of the partnering organizations through close interaction and relationships developing at the personal level. Thus, it is argued that trust between individuals is critical for inter-organization cooperation, and is the key to the development of trust between organizations in alliance agreements (Das and Teng, 2001; Langfield-Smith, 2008; Ring and Van der Ven, 1994; Velez, et al., 2008).[3]

Further, it is argued that trust is constituted by and through processes of socially embedded communication/interpretation. This is even the case with contractual trust and competence trust, which are generally constructed via relatively objective items – for example, based on the written terms of a contract.   However, moral standards of honesty, the foundation of contractual and competence trust, are a product of power relations embedded in day to day social interactions (Giddens, 1976). Moreover, there are no guaranteed shared moral standards of honesty among participants, who are embedded in different networks of interests and power, without processes of communication, interpretation and adaptation.

The issue of building trust based on socially embedded communication/interpretation is particularly problematic in the context of NMCAs. In more market-based collaborative alliances, the performance and/or outcomes of the collaborative

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[3] For detailed discussion of how trust and distrust at an individual level could influence cooperation, see Labianca and Brass (2006).

alliance could be inscribed and measured in terms of performance measures, which are relatively objective. But when the main desired performance outcomes of a collaborative alliance are primarily qualitative in nature, the interpretation and communication of desired performance and partner contribution is particularly influenced by the social context in which the relevant alliance partners are embedded and functioning. For example, English and Baxter (forthcoming) have shown the importance of ongoing interaction and communication in achieving qualitative outcomes in the context of Private Public Partnership (PPP) prison agreements.

2.4. National Culture

It is generally regarded that culture also comprises an important part of the social context affecting organizational and inter-organizational functioning, affecting the operation of many alliances that operate trans-nationally (such as the alliance studied in this thesis). According to Flamholtz, et al (1985), culture is a set of values, beliefs and social norms that tend to be shared by actors and, in turn, influence the actors' thoughts and actions. This view of culture has been adopted in a range of management/accounting-related research (for example, Birnberg and Snodgrass, 1988; Dent, 1991; Pratt and Beaulieu, 1992).

As stated earlier, many NMCAs are formed at the regional or international level and bring together actors from different nations. It is argued that different nations have different cultural characteristics, which, in turn, lead to differences in management

(accounting) planning and control practices (Chenhall, 2003). The difference is claimed to be particularly obvious between Asian and Anglo-American nations. For example, by way of structured questionnaires and personal interviews with middle-level managers, Chow et al (1999) demonstrated that there is a difference in the information sharing practices between Chinese and Anglo-American organizations.

Given this, national culture is an important element of the social context in which cross-national collaborative alliances are embedded. However, extant cross-national management research has predominantly adopted a value-dimensional conception of culture as an explanatory variable. In particular, Hofstede's (1980, 2001) cultural consequences indices have been used extensively in this regard (for example, Chow et al., 1999; Harrison, 1993; O'Connor and Ekanayake, 1997).

Based on a survey of employees' attitudes in the worldwide subsidiaries of IBM, Hofstede (1980, 1991) identified five cultural dimensions that he labeled as power distance (PD), uncertainty avoidance (UA), individualism (IND), masculinity (MA), and, more recently, Confucian Dynamism (or Long-term versus Short-term Orientation in life). PD indicates whether an unequal distribution of power is accepted by actors in a nation. IND/collectivism specifies whether the actors place self-interest ahead of a group's needs. UA indicates whether an actor prefers to avoid uncertainty and rely on rules and structures. MA/femininity refers to whether actors pursue achievement, assertiveness and material success or modesty and quality of

life respectively. Confucian Dynamism emphasizes the relative importance of status, respect for tradition, and the protection of one's face.

However, Hofstede's characterization of culture is problematic and has been rejected by those who privilege the social construction and embeddedness of values and interests. From this alternative perspective, there are at least six reasons to reject Hofstede's typology as a universalistic approach to studying management planning and control practices in the context of cross-national collaborative alliances.

Firstly, many studies fail to consider the totality of a cultural domain, that is, researchers select one or some of the cultural dimensions available for use and ignore others (Chenhall, 2003; Harrison and McKinnon, 1999). For example, Birnbaum and Wong (1985) focused on UA only. Secondly, the differential intensity of cultural norms and values across nations is not explicitly considered (Chenhall, 2003; Harrison and McKinnon, 1999; Lachman et al., 1994). Thirdly, there is a tendency to assume that the empirical results associated with certain nations are applicable to other 'culturally similar' nations (Harrison and McKinnon, 1999). Fourthly, assumptions about the stability of these cultural differences are also doubtful (Baskerville, 2003; Chenhall, 2003) as Hofstede's work was published more than twenty years ago. Fifthly, his work fails to provide a detailed picture of the rituals, myths, narratives, metaphors, language and codes that constitute culture (Chenhall, 2003). Sixth and finally, Hofstede's work has been criticized for depicting national cultures as being homogeneous (Baskerville, 2003; Harrison and McKinnon;

Wildavsky, 1989).

Alternatively, non-positivist writers have argued that culture is constituted by and through a "logic of practice" (Bourdieu, 1977, p.19). That is, day to day practices, such as the practices which characterize the functioning of organizations and inter-organizational alliances, both produce and reproduce 'culture'. Cultural understanding is part of the practical knowledge that participants in allying organizations, for instance, have acquired through their working and social lives, informed by the particular socially-embedded situations or "habitats" (Bourdieu, 1977) in which they operate. Cultural practices are part of the 'rules of the game' in these particular situations. Individuals appropriate and embody these situated rules as part of their "habitus" (Baxter and Chua, 2008; Bourdieu, 1977) or predisposition to act in particular ways, thereby enacting and reenacting culture. Culture, therefore, does not have an externalized, objectified existence that can be measured as suggested by Hofstede and those who follow his approach. Instead culture needs to be understood by studying practices using fieldwork research methods (Ahrens and Chapman, 2007).

2.5 Alliances as Networks

In collaborative alliances, there are always many different and shifting networks of actors involved. Some actors may be more remote; they are not involved in the day to day practices of alliances directly but influence the outcome and performance of

an alliance through their power and relevant agency. Other actors are more actively involved in the immediate activities of collaborative alliances. Nevertheless, different and multiple actors bring different and sometimes conflicting perspectives and interests to the functioning of an alliance. Thus, managing potentially conflicting actors' interests and expectations is an important part of developing sufficiently shared and stabilized values and beliefs to enable planning and control in an alliance.

The importance of a range of actors' interests on alliance operation is highlighted by Chua and Mahama (2007). Chua and Mahama (2007) studied the management (accounting) processes in an alliance between OzCom and its suppliers A and B. OzCom is an Australian telecommunications carrier. Supplier A is a local subsidiary of a global European company, whereas supplier B is a wholly owned subsidiary of a North American company. However, as Chua and Mahama show, supplier selection processes were complicated by the involvement of an Australian government agency. Although this agency was not an official party to the contract between the buyer and seller, its influence on the practice of OzCom, Supplier A, and Supplier B was substantial. Chua and Mahama's work is also important and distinctive because it highlights our need to better understand the role of governmental agencies in collaborative alliances, both directly as partners and indirectly through networks of interests (see also Andon, Baxter and Chua, 2007).

Thus, Chua and Mahama (2007) highlight the fact that alliance management extends beyond the immediate dyadic relationship between the alliance partners, the buyer

and seller. In fact, alliance management is a result of interactions between different actors in larger networks, which include important external parties, such as government agencies. This leads to a conclusion that it is problematic to construct even the focal partners to an alliance in a simplistic way, ignoring the potentially complex network of layers of actors and interests which inform the practices of a partnering organization and their possible diversity.

This is highlighted by the work of Thrane and Hald (2006). In their work, they studied a large hearing aid manufacturing firm and its relationships with suppliers and customers. Rather than constructing the manufacturer as a single entity, Thrane and Hald focused on analyzing individually the purchasing, manufacturing, shipping, customer service and sales departments' relationships with component suppliers, the logistics provider and customers respectively.

By so doing, Thrane and Hald demonstrated that it is problematic to construct a focal organization embedded in an alliance as a single and undifferentiated entity. Their research shows that the interests and values of individual departments within a partnering organization can be sufficiently diverse to increase the complexity of alliance management planning and control practices. Take the shipping and customer service department as an example. On the one hand, the shipping department focused on running effective packaging and shipping operations. On the other hand, the customer service department focused on satisfying demands from customers. Thus, the shipping department valued predictability and stability, whereas the service

department did not. Although emphasizing predictability and stability produced loyalties between the shipping department and the logistical provider, this emphasis caused conflict between and split the shipping and customer service departments. If there are diverging values within an organization, their research suggests, focal organizations involved in an alliance need to be constructed as networks of different actors.

The research by Chua and Mahama (2007) and Thrane and Held (2006), discussed above, also highlights the importance of recognizing the agency and transformative effect on alliance networks and operations of artifacts, practices and inscription. The role of non-human actants, such as management planning and control practices, has been overlooked in research on collaborative alliances informed by traditional economic theories.

However, management (accounting) planning and control practices are part of the socio-ideological foundation of an organization, conveying and constituting norms and values informing resource management processes within and between organizations and alliances. Thus, management (accounting) planning and control practices have the potential to shape and re-shape network relationships by informing the values embedded in both strategic issues and more mundane day to day transactions and activities (Berry et al., 2009; Caglio and Ditillo, 2008; Callon, 1986; Latour, 1987; Law, 1992; Van der Meer-Kooistra and Vosselman, 2006) as a result of their implementation and operation (Lowe, 2001; Miller and O'Leary, 2007).

Whilst there has been some research on the agency of management planning and control practices in an alliance context (Chua and Mahama, 2007; Thrane and Held, 2006), this aspect requires further research in the context of NMCAs.

2.6 Research Questions

From the above literature review, it can be seen that there is much that remains to be known about management planning and control processes in non-monetary, cross-national collaborative alliances.   As a result, the following research questions are proposed:

1. What networks of actors/actants inform partner selection in a non-monetary cross-national collaborative alliance?

2. How are the management (accounting) planning and control practices implicated in the functioning of a non-monetary cross-national collaborative alliance?

CHAPTER THREE:
RESEARCH METHODOLOGY AND METHOD

3.0 Introduction

This chapter outlines the research methodology and method to be adopted in this thesis. The research methodology, which provides the theoretical framework informing this research, is presented in section 3.1. As such, this section provides a brief overview of ANT and the reasons for its adoption in this research. The research method– a field study – is outlined and discussed in section 3.2. This is followed by a brief overview of the research site in section 3.3. Issues relating to data collection and analysis are stated in sections 3.4 and 3.5 respectively.

3.1 Methodological Framework - ANT

3.1.1 What is ANT?

ANT is a methodological approach that characterizes the constitution of the world in terms of networks of human and non-human actants (Ahrens, 2008). The notion of a network, or a web of inter-connected actants, is important because the capacity of an actant is constrained and/or enabled by the actants' relations to other actants (Chua and Mahama, 2007; Law, 1999). Thus, ANT acknowledges that practices cannot be examined without studying the network through which the identities of actants are defined at the same time (Chua and Mahama, 2007). For example, Chua and

Mahama (2007) applied ANT to study management accounting in inter-organizational networks and found that management (accounting) practices had a temporary stabilizing effect on the network. But, to a large extent, the strength of this effect was dependent on how other actants in the network defined management (accounting).

In particular, ANT recognizes that strong or more influential actants may function as 'obligatory passage points' (Latour, 1987) in a network. That is, they occupy the central nodes of a network through which information must pass. Furthermore, these actants gain their identity as 'obligatory passage points' through processes of 'problematization', presenting the indispensability of their solutions for others' problems (Latour, 1987).

As such, ANT seeks to capture the interconnected nature of the collective action of many dispersed actants (individuals, organizations, technologies, artifacts, and so-on), which interact to produce particular outcomes (Czarniawska, 2004), such as the outcomes achieved by networks of partners in NMCAs.

Also important to ANT is the concept of an 'action net'. ANT recognizes that the dynamics of network relationships change whenever an actant is enrolled or dis-enrolled within a network. This dynamic has significant effects on the stability and durability of a network of relationships. Thus, the notion of action nets in ANT seeks to capture the ways in which certain actants become connected (disconnected)

to (from) one another (Chua and Mahama, 2007; Czarniawska, 2004). This process of connection and disconnection highlights the differing and shifting interests that each actant mobilises within a network (Callon, 1980; Chua and Mahama, 2007; Latour, 1987).

3.1.2 Why ANT has been Chosen

ANT has been chosen for several reasons. Firstly, by adopting ANT, a range of human and non-human factors can be recognized in this research. This is particularly the case with non-human actants, which significantly include management (accounting) planning and control practices. For example, a contract can be an actor as it prescribes and makes other actors behave in certain ways. By conceptualizing management (accounting) as an actor functioning within a network of relations, the capacity of management (accounting) to inform a set of relations can be examined within a larger set of connections among the constituent elements of a network (Mouritsen, et al., 2009). Further, a range of 'remote' human and non-human actors can be recognized as well, given their loose ties to a network.

Secondly, ANT is a desirable methodology when the concept of 'relationality' is important for understanding the phenomena under investigation. This is especially the case with respect to the functioning of NMCAs, where partnering is paramount. When a broader context of parties, policies, and practices are to be examined, adopting ANT enables a sense of understanding of the connectedness of networks

and the length and strength of ties, as well as their durability and fragility.

Thirdly, committed to advancing our understanding of life through a performative lens, ANT focuses on characterizing *'how'* society is constructed and understood within the frame of action nets (Mouritsen, et al., 2009). It provides researchers with the motivation to open 'black boxes', which, in this case, involves problematizing and examining the actual performance of NMCAs in action.

3.2 Field Study Research Method

A field study is defined as an empirical inquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between the phenomenon and its context are unclear, and where multiple sources of evidence are used (Brownell, 1995; Yin, 1989).

There are several reasons for adopting a field study as the research method to be used in this thesis. Foremost, field research allows an emphasis to be placed on the study of actual management (accounting) practices as they operate (Berry et al., 2009). There are considerable advantages of field studies in this regard: first, ensuring that the situation-specific factors that influence management practices are considered; second, allowing the monitoring of the changes in situated management practices as they occur over time (Berry et al., 2009), and third, grasping the complexity and dynamism of practices (Chenhall, 2003; Velez et al., 2008).

In addition, there is a limited understanding of the phenomena of the management (accounting) planning and control practices in NMCAs. Thus, for a study of an explorative nature, such as this, qualitative field research, which is grounded in actual (inter-)organizational practices, offers flexibility to respond to new insights from the field by developing, testing, and discarding or refining accounts (Ahrens and Chapman, 2006; Chenhall, 2003; Covaleski et al., 1996).

3.3 Research Site

A NMCA formed between ARI and CP, and its subsidiary CRI, provides the site of practice to be examined in this field study. Access to this alliance was organized and negotiated by the author.

ARI is Australia's national science agency and undertakes major research and development activities in relation to energy and the environment, amongst other areas. CP is a Chinese state-owned enterprise that engages mainly in power project investment, construction, operation and management. CRI, a subsidiary of CP, is a research organization which aims to reduce pollutants from fossil-fired power plants.

Firstly, the main reason for the choice of this alliance as the focal field site centres on the fact that this alliance involves an exchange of intangible 'value in kind'. The role of management planning and control practices in such NMCAs - involving two way transfers of know-how – is poorly understood.

Secondly, this NMCA is formed between Australian and Chinese entities. Practically, China is a major trading partner of Australia and a major economic force expected to dominate global markets in the next decade (Shambaugh, 2009). As such, it is important to study Australian-Chinese alliances in order to study the practices which facilitate and/or constrain their functioning.

Thirdly, ARI is a quasi government agency that reports to the Australian government. CP, and its subsidiary CRI, are state owned Chinese enterprises. Thus, the functioning of both ARI and CP/CRI is framed by government enrollment and state-based interests and practices. The complexity of the management (accounting) planning and control practices encountered in practice is accentuated by the potentially differing political ideologies and governmental agendas. A field study of this alliance provides an opportunity to become aware of the impact of such interests.

Last, but not least, the bilingual background of the author and the author's cultural experiences gained from living in both China and Australia provide resources to facilitate a study of this alliance between an Australian and a Chinese organization.

3.4 Data Collection

Following Chua and Mahama (2007), data collection is loosely structured but bound by the research questions outlined in Chapter Two. Data were collected via semi-structured interviewing (questioning organizational participants about alliance management [accounting] planning and control practices in their organizations) and

document study (examining public documents, such as press clippings, and proprietary documents, such as internal reports).

Six individuals from ARI were interviewed, with two individuals being interviewed more than once. The interviewees range from a senior manager located in the headquarters of ARI in Canberra, overseeing a range of collaborative alliances, to the scientist involved in specific knowledge transfers in the NMCA under investigation.

Table 1 (see over) contains a listing of the individuals interviewed and their job titles. [4]On average, each interview lasted for 56 minutes, with individual interviews ranging from 21 minutes to 84 minutes per interview.

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[4] Pseudonyms are used for these interviewees throughout this thesis.

Table 1: List of Individuals Interviewed

Name of Interviewee	Title of Interviewee	Location of Office	Language Used in Interview	Number of Interviews	Length of Interview
Dr Wong	Senior advisor of ARI international	Canberra	English and Chinese	1	52 minutes
Dr Brown	Deputy director of energy transformed national research flagship	Newcastle	English	1	60 minutes
Dr Green	CEO science leader of post-combustion CO_2 capture	Newcastle	English	2	1st interview - 84 minutes 2nd interview - 52 minutes
Dr Black	General manager – business development of energy transformed national research flagship	Sydney	English	4	1st interview - 60 minutes 2nd interview - 60 minutes 3rd interview - 21 minutes 4th interview - 34 minutes
Dr White	Principal research scientist of energy technology	Newcastle	English	1	60 minutes
Dr Zhang	Principal research scientist of energy and environment	Brisbane	Chinese	1	75 minutes
Total				10	558 minutes

Dr Wong is the senior manager located in Canberra. He was not involved in the daily management of this alliance but rather managed a portfolio of research projects, which included the alliance being studied in this research. Dr Brown, the head of the

division of coal based technology, and Dr Green, the head of the particular project scrutinized in the research, are both senior managers involved in day to day workings of this alliance. Dr Black is the manager responsible for relationship development, whilst Dr White is the scientist involved in person-to-person knowledge transfer in the project forming the basis of this alliance. Dr Zhang, a staff member from another division (the division of metal based technology), became connected to this alliance when he was asked to assist in understanding and resolving conflicts regarding Chinese style and culture.

Documentary sources of data employed in this research include internal archival material and public records. Key proprietary documents mobilized in this research include the co-operation agreement signed by ARI and CRI, the co-operation framework signed by ARI and CP, and documents related more broadly to the organizational functioning and history of ARI, CP and CRI. A wide variety of publicly-available documents related to official government policies, the policy framework, and relevant press releases were studied also (see Appendix 1 for detailed information regarding documentary data).

3.5 Data Analysis

The data gathered were maintained in an electronic data base in Nvivo 8, as well as in manual folders to facilitate analysis and interpretation. The Nvivo 8 program allows for 'in vivo' coding, which uses the language and categories encountered in

the fields.

As the dependability and confirmability of a field study relates to the quality of the integrated processes of data gathering, interpretation, and theory generation (Chua and Mahama, 2007; Lincoln and Guba, 1985), an audit trail and an analytical framework for linking data to theory are often recommended (Chua and Mahama, 2007). The approach adopted in this study, to ensure such dependability and confirmability (Chua and Mahama, 2007; Lincoln and Guba, 1985; Patton, 1985), focuses on the consistency between the Nvivo files and the manual folders – to ensure that the research findings are supported by the field data (Chua and Mahama, 2007). In addition, the credibility and trustworthiness of the interpretation of the data is further addressed by submitting written reports to key informants from the field to elicit their comments and feedback.

The following chapter provides further information about the research site used to generate the data analyzed in this investigation.

CHAPTER FOUR:
THE FOCAL NMCA AND ITS
RELATIONAL CONTEXT

4.0 Introduction

It is the aim of this chapter to contextualize the network of actants constituting the NMCA that forms the focus of this research. In section 4.1 the NMCA studied is described briefly. This is followed by an overview of the policy and regulatory frameworks informing the NMCA in sections 4.2 and 4.3 respectively. In section 4.4, the specific partners to this NMCA are described. The chapter concludes with an overview of the network of key actants informing the focal NMCA in section 4.5.

4.1 The Focal NMCA

This thesis focuses on a NMCA formed between ARI and CP, and its subsidiary, CRI. ARI, CP, and CRI therefore are key actants in the formation and operation of this NMCA. ARI is Australia's national science agency and one of the largest and most diverse scientific institutions in the world.[5] CP is a Chinese stated-owned enterprise that focuses on the development of power, although it also has a diversified business portfolio. CP's portfolio includes: the investment, construction, operation and management of power generation assets; the production and sale of power and heat; the investment, construction and operation of IT; transportation; renewable energy;

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[5] Source: http://www.ari.com.au/org/About-ARI.html (last accessed: 21 August 2009)

environment protection, trade and fuel; and investment and financing in domestic and international markets (see Appendix 2).[6] CRI, a subsidiary of CP, is a leading research organization in the field of thermal power engineering in China.[7]

The focal NMCA was formed in 2007. Its purpose is to enable ARI Energy Technology, CP, and CRI to cooperate on research in the areas of coal-based power generation and CO_2 capture and treatment. The espoused aim of this NMCA is to promote industrial applications of this area of research.

In terms of this NMCA, a pilot plant capturing 3,000 tonnes per year of CO_2 was planned to be built and launched in Beijing prior to the opening of the Beijing Olympics in 2008. This project was intended to contribute to the 'green' Olympics theme desired by the Chinese government.

This NMCA is also one of the 'Flagship Projects' of the Cleaner Fossil Energy Task Force, promoted by the Asia-Pacific Partnership on Clean Development and Climate (APP)[8]. Both Australia and China are members of the APP network. As a consequence, this NMCA was included as part of a cooperative agreement signed by the then Prime Minister of Australia, Mr John Howard, and the General Secretary of the Communist Party of China (CPC) Central Committee of China at the Asia-Pacific

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[6] Source: http://www.cp.com.cn/n16/n3250/n3274/index.html (last accessed: 24 September 2009)

[7] Source: http://www.cri.com.cn/eng/intro.htm (last accessed: 23 August 2009)

[8] Source: http://www.asiapacificpartnership.org/pdf/Projects/CFETF/PSU/CFE-06-06.pdf (last accessed: 20 August 2009)

Economic Cooperation (APEC) in 2007. Apart from receiving funding from governments through the APP framework (discussed below), this NMCA is of great symbolic and political significance to both nations. This NMCA is a symbol of scientific collaboration and political 'friendship'.

4.2 APP Policy Framework

The Asia-Pacific Partnership on Clean Development and Climate (APP) is a voluntary partnership that has been formed among seven Asia-Pacific countries - Australia, Canada, China, India, Japan, Korea, and the United States – to address the challenges of climate change, energy security and air pollution. Originally, Australia, China, India, Japan, Republic of Korea, and the United States were the key national actants that formally set up the APP at the January, 2006 inaugural Ministerial meeting in Sydney, Australia. In October, 2007, Canada was welcomed as the seventh partner.[9]

Within the structure of the APP, the member countries have agreed to explore opportunities by bringing together key experts to share knowledge and experiences on related matters, including national sustainable development and energy strategies[10].

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[9] Source: http://www.asiapacificpartnership.org/english/faq.aspx (last accessed 20 August 2009)

[10] Source: http://www.asiapacificpartnership.org/english/about.aspx (last accessed 20 August 2009)

The purposes of the partnership are to:

1. *Create a voluntary, non-legally binding framework for international cooperation to facilitate the development, diffusion, deployment, and transfer of existing, emerging and longer term cost-effective, cleaner, more efficient technologies and practices among the Partners through concrete and substantial cooperation so as to achieve practical results.*

2. *Promote and create enabling environments to assist in such efforts.*

3. *Facilitate attainment of our respective national pollution reduction, energy security and climate change objectives; and*

4. *Provide a forum for exploring the Partners' respective policy approaches relevant to addressing interlinked development, energy, environment, and climate change issues within the context of clean development goals, and for sharing experiences in developing and implementing respective national development and energy strategies.*[11]

The partnership is organized into three groups: Policy and Implementation Committee (PIC); Task Forces; and an Administrative Support Group (see Figure 1 below). The PIC, comprising of high-level government representatives from each of the Partner countries, oversees the Partnership as a whole, guides eight Task Forces and periodically reviews their work, and provides direction to the Administrative Support Group. The Administrative Support Group, currently hosted by the United

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[11] Source: http://www.asiapacificpartnership.org/english/about.aspx (last accessed 20 August 2009)

States, provides support to PIC and the partners more broadly, as well as coordinating APP's communications and activities.[12]
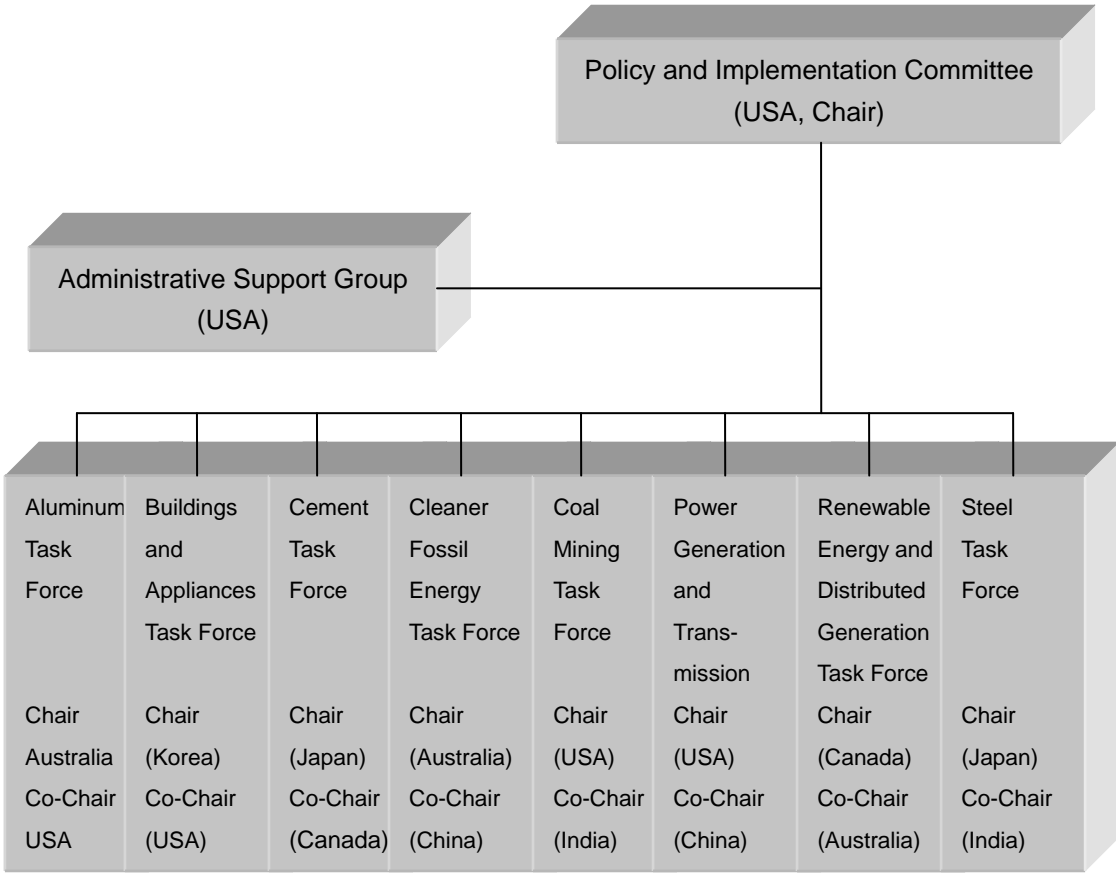

Figure 1: Organization of APP[13]

4.2.1 Task Forces

To develop and implement the APP framework, eight Task Forces have been established (refer to Figure 1 above).[14] The Cleaner Fossil Energy Task Force (the focal Task Force instituting the NMCA studied in this thesis), recognizes that a suite

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[12] Source: http://www.asiapacificpartnership.org/english/faq.aspx (last accessed 20 August 2009)

[13] Source: http://www.asiapacificpartnership.org/english/faq.aspx (last accessed 20 August 2009)

[14] Source: http://www.asiapacificpartnership.org/english/task_forces.aspx (last accessed 20 August 2009)

of technologies associated with CO_2 capture and storage, as well as complementary advanced power generation systems, has the potential to significantly reduce greenhouse gas emissions levels, air-borne pollutants and other environmental impacts. Since the cost of new technologies declines over time, this Task Force aims to accelerate the development and deployment of these technologies through collaborative research and on-going demonstration in order to reduce costs and facilitate the availability of a broad range of accessible and affordable low-emission technologies.[15]

4.2.2 Flagship Projects

Led by Chairs and Co-Chairs, the Task Forces identify flagship projects – projects that illustrate and demonstrate the vision and objectives of the Partnership.[16] With respect to the Cleaner Fossil Energy Task Force, Australia and China are the Chair and Co-Chair respectively.[17] The Cleaner Fossil Energy Task Force recognizes opportunities for integrating key technologies to achieve lower- or zero-emitting power production facilities, focusing on a suite of technologies associated with CO_2 capture and storage.[18] Accordingly, seventeen flagship projects have been implemented by this Task Force (see Table 2 below).

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[15] Source: http://www.asiapacificpartnership.org/english/tf_fossil_energy.aspx (last accessed 20 August 2009)

[16] Source: http://www.asiapacificpartnership.org/english/faq.aspx (last accessed 20 August 2009)

[17] Source: http://www.asiapacificpartnership.org/english/tf_fossil_energy.aspx (last accessed 20 August 2009)

[18] Source: http://www.asiapacificpartnership.org/english/tf_fossil_energy.aspx (last accessed 20 August 2009)

Table 2: Project Roster - Cleaner Fossil Energy Task Force[19]

Project 1	CO$_2$ Capture and Storage Program
Project 2	Ultra-Supercritical Pulverized Coal and Carbon Capture and Storage (USC PC/CCS) Near Zero Emissions Workshop and Design Guides for APP Countries - *(Completed)*
Project 3	Ultra Clean Coal Project
Project 4	Oxy-Fuel Combustion Program and Working Group
Project 5	Callide-A Oxy-Fuel Demonstration Project
Project 6	**Assessing Post-Combustion Capture Technologies for Emissions from Coal-Fired Power Stations**
Project 7	Integrated Gasification Combined Cycle with Carbon Capture and Storage Workshop, and Design Information for APP Country Coals - *(Completed)*
Project 8	Asia-Pacific Gas Market Growth
Project 9	Evaluating and Reducing Emissions in Producing, Processing and Transporting Natural Gas
Project 10	Information Exchange on LNG Public Education Campaigns - *(Completed)*
Project 11	Asia-Pacific Gas Hydrate Cooperation
Project 12	Costs and Diffusion Barriers to Deployment of Low Emissions Technologies for APP
Project 13	CO$_2$ Enhanced Coal Bed Methane (ARI-JCOAL–ECBM)

[19] Source: http://www.asiapacificpartnership.org/english/pr_fossil_energy.aspx (last accessed 20 August 2009)

Project 14	Development of Advanced Adsorption Process Technologies for Pre-Combustion Capture of CO_2 in Coal Gasification Processes (IGCC)
Project 15	Coal Gasification Performance Assessments for Low Emissions IGCC Systems
Project 16	Cooperative R&D on Cleaner Fossil Energy
Project 17	Guidelines for Safe and Effective Carbon Capture and Storage: Building Regulatory Capacity

The focal flagship project framing the NMCA studied in this research is project 6, which assesses post-combustion capture for emissions from coal-fired power stations. This project aims to progress the development of post combustion capture (PCC) as a technology, which can then be retrofitted to existing coal power stations to achieve major improvements in environmental performance by capturing sulphur oxides (SO_X), nitrogen oxides (NO_X) and CO_2 emissions.[20]

The program is aimed to reduce the costs of deploying PCC technology by improving the technologies associated with CO_2 capture, as well as by increasing engineering process knowledge and experience in using PCC technology.[21]

As participation in the APP/Task Force is voluntary, the APP serves as a framework only for supporting agile, constructive, and productive international cooperation and

[20]

Source: http://www.asiapacificpartnership.org/pdf/Projects/CFETF/CPD/CFE-06-06.pdf (last accessed 20 August 2009)
[21]

Source: http://www.asiapacificpartnership.org/pdf/Projects/CFETF/CPD/CFE-06-06.pdf (last accessed 20 August 2009)

relations. It does not create a legally binding contract or enforceable agreement. Each

partner, that is, the relevant national government, may, at its discretion, contribute

funds, personnel, and other resources to the partnership and supporting task forces.

4.3 Regulatory Framework

4.3.1 Australia's Regulatory Framework

Australia, also known as the Commonwealth of Australia, is a stable, culturally

diverse and democratic society.[22] The Commonwealth was formed in 1901 and the

rules of government are enshrined in the Australian Constitution. The Constitution

has created a 'federal' system of government. Thus, power is divided between the

Commonwealth Government and the six state governments in Australia. The

Commonwealth Government (also known as the Federal Government) passes laws,

which affect the whole country.   The six State Governments retain power to make

their own laws over matters not controlled by the Commonwealth. Local

governments take responsibility for a number of community services.[23]

4.3.2 China's Regulatory Framework

Although China's recent economic reform – in particular, privatization and the

opening of markets – has fundamentally changed the economic and regulatory

contexts in which Chinese state-owned enterprises (SOEs) operate (Child, 1994),

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[22] Source: http://www.dfat.gov.au/aib/overview.html (last accessed: 07 October 2009)

[23] Source: http://www.australia.gov.au/about-australia/our-government (last accessed: 07 October 2009)

organizational design (which includes management planning and control systems), is constrained by political conditions and hampered by active and consistent government involvement in management. Such government involvement is acknowledged as being an important feature of the Chinese business context (O'Connor et al., 2006; Qian, 1996). In particular, opaque, uncertain, and unpredictable regulatory frameworks may be formed by both central, regional, and local governments. These not only complicate but often also nullify strategic planning choices, including decisions of SOEs to form NMCAs (Lin et al., 1998).

Moreover, the differential tiers of government(s), that is, the presence of a central government and local governments, make the situation even more complex. This is especially the case with respect to NMCAs involving Chinese organizations. In China, organizations in different industries are subject to idiosyncratic treatment by governmental policies (Lin et al., 1998). Also local government bargaining power may be used to strengthen the monitoring and control of joint venture operations (Luo et al., 2001).

In China, governments influence enterprise decision-making in SOEs via the power of Communist Party officials (Hassard et al., 1999). Thus, understanding the interaction between the effective control by managers and the ultimate control by the Party and the government (via the power of Communist Party representatives) is the key to understanding management controls in Chinese SOEs (Qian, 1996).

Like all the other Chinese SOEs, CP/CRI is constrained in its management by government agency involvement and CPC representation. CP/CRI is governed by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). And, for this particular research project, CP/CRI is also under the supervision of the National Development and Reform Commission (NDRC). SASAC and NDRC are discussed further below.

SASAC

SASAC is an organization authorized by the State Council of China to perform its responsibilities as the investor of State-owned assets on behalf of the central government. In general, SASAC seeks to guide and direct the reform and restructuring of SOEs in order to: reinforce the management of the state-owned assets, promote the establishment of a modern enterprise system of SOEs, improve enterprises' corporate governance, and drive the strategic adjustment of state-owned economic structures. In particular, SASAC dispatches a supervisory board to some large enterprises on behalf of the state. These supervisory boards appoint, remove and evaluate the executives of enterprises, granting rewards and punishments according to their performance.[24]

NDRC

The NDRC consists of twenty-eight functional departments/bureaus/offices, including the Department of International Cooperation. The main functions of the

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[24] Source: http://www.sasac.gov.cn/n2963340/n2963393/2965120.html (last accessed 24 September 2009)

NDRC and the Department of International Cooperation are to arrange and coordinate dedicated plans that involve central government investment; to undertake comprehensive coordination of energy savings and emissions reduction; to organize and guide the bilateral and multilateral cooperation and exchanges among the NDRC and international organizations, foreign government agencies and foreign institutions.[25]

4.4 Partners Forming the Focal Alliance

4.4.1 ARI

ARI, the Australian Research Institute, is Australia's national science agency and one of the largest and most diverse scientific institutions in the world.[26] Established in 1926, ARI is the single largest employer of scientists in Australia, with more than 6,500 people conducting and assisting with scientific research at more than 50 sites through Australia and overseas.[27]

ARI is an Australian Federal Government statutory authority, constituted and operating under the provisions of the *Science and Industry Research Act 1949*. ARI is accountable to the Minister for Innovation, Industry, Science and Research and is

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[25] Source: http://www.sasac.gov.cn/n2963340/n2963393/2965120.html (last accessed 24 September 2009)

[26] Source: http://www.ari.com.au/org/About-ARI.html (last accessed 21 August 2009)

[27] Source: http://www.ari.com.au/org/About-ARI-overview.html (last accessed 21 August 2009)

part of the Innovation, Industry, Science and Research portfolio.[28]

How Does the ARI Work?

ARI has developed a strategy, set of policies and reporting procedures to ensure its success as a research enterprise with global reach.[29] Three major strategic elements are designed to maximise ARI's continuing contribution to the nation: first, addressing national challenges and opportunities, faster and better; second, focussing and strengthening core science capability and delivery; and third, strengthening enterprise governance and enhancing operational excellence.[30]

Enterprise governance provides direction, control and accountability to enable the ARI to achieve its objectives. However, the ARI recognizes that good governance cannot be measured in purely financial terms. As a public sector body, ARI's performance is measured primarily against broader non-monetary national, social and community objectives also.[31]As an independent statutory authority, ARI reports on its budget and operational performance, as requested by the Australian Government. In addition, since ARI's research is committed to achieving positive environmental outcomes on a regional and national scale, ARI also provides

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[28] Source: http://www.ari.com.au/org/Governance-Overview.html (last accessed 21 August 2009)

[29] Source: http://www.ari.com.au/ari/channel/_ca_dch31.html (last accessed 21 August 2009)

[30] Source: http://www.ari.com.au/resources/StratPlan07-11.html (last accessed 21 August 2009)

[31] Source: http://www.ari.com.au/org/Governance-Overview.html (last accessed 21 August 2009)

environmental reports to the Federal Government as well.[32]

To function as an efficient organisation, the ARI is structured into several different units. These are: the Board and Chief Executive; Executive Team; Executive Management Council; Research sectors; and Divisions. The Board is responsible to the Australian Federal Government for the overall governance, strategy and performance of the ARI. The Executive Team is responsible for the development and implementation of strategy. The Executive Management Council provides a forum for sharing and discussing issues relating to the management and future strategy of ARI.[33]

Although the ARI is structured into seven research sectors (Agribusiness, Energy and Transport, Health, Information, Communication and Services, Manufacturing, Mineral Resources, and Environment and Natural Resources)[34], ARI's research is largely performed by the 16 Divisions, which are the business units of ARI.[35] ARI Energy Technology, the division studied in this research, is one of the 16 Divisions.

The ARI adopts a matrix structure of management planning and control. This structure enables ARI to tackle industrial and environmental problems with a

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[32] Source: http://www.ari.com.au/org/How-ARI-works.html (last accessed 21 August 2009)

[33] Source: http://www.ari.com.au/org/ARI-Organisational-Structure.html (last accessed 21 August 2009)

[34] Source: http://www.ari.com.au/org/ARI-Organisational-Structure.html (last accessed 21 August 2009)

[35] Source: http://www.ari.com.au/org/What-We-Do.html (last accessed 21 August 2009)

multidisciplinary approach, assembling the best teams from across the ARI.[36]

What Does the ARI Do?

ARI's research aims to create innovative and competitive industries, ensure the growth of a technologically advanced society, and maintain healthy environments and lifestyles. ARI also works collaboratively with industry, businesses, individuals and small to medium enterprises to develop new and improved technologies and products, share expert knowledge and skills, and provide world-class research facilities.[37]

ARI recognizes that fundamental partnerships with agencies, institutions and governments are vital in achieving the highest impact solutions. Thus, ARI takes a 'whole-of-picture' approach, with innovative solutions being driven by the partnership of communities teamed with its highly experienced and qualified researchers.[38] Thus, alliance formation is an established way of working within the ARI.

ARI in China

ARI has been working in China since the 1970s, playing a significant role in the transition of this Asian superpower into a modern economy. Since 1980, ARI has undertaken more than 140 projects in China. More than AUD $24 million has been

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[36] Source: http://www.ari.com.au/org/ARI-Organisational-Structure.html (last accessed 21 August 2009)

[37] Source: http://www.ari.com.au/org/What-does-ARI-do.html (last accessed 21 August 2009)

[38] Source: http://www.ari.com.au/science/ps1by.html (last accessed 21 August 2009)

invested in joint research projects between ARI and more than 170 Chinese organizations. More than 50 per cent of these collaborations have focused on primary production issues and have spanned China's vast geography.[39]

Collaborations between ARI and China have covered the full spectrum of ARI's multi-disciplinary capabilities. Many of these projects were made possible through support from Australian government agencies, including AusAID, the Australian Federal Government's international aid agency, and the Australian Centre for International Agricultural Research.[40]

ARI Energy Technology

ARI Energy Technology, the focal business unit situating the NMCA studied in this research, plays an essential role in researching and developing technologies to achieve the objective of near zero emissions from the use of energy worldwide.[41] In terms of paving the way for cleaner power and competitive coal, by partnering with industry and governments, ARI Energy Technology is developing new clean coal technologies to dramatically reduce greenhouse gas emissions, in combination with techniques to clean carbon from emissions and store it safely.[42]

4.4.2 CP

CP, China Power, a power generator, is a Central-Government-administered

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[39] Source: http://www.ari.com.au/org/ARI-China.html (last accessed 21 August 2009)
[40] Source: http://www.ari.com.au/org/ARI-China.html (last accessed 21 August 2009)
[41] Source: http://www.ari.com.au/org/Divisions.html (last accessed 21 August 2009)
[42] Source: http://www.ari.com.au/org/ETOverview.html (last accessed 21 August 2009)

state-owned enterprise that has the approval of the State Council of the People's Republic of China.[43] Its head office is in Beijing. CP is the largest independent power generation group in China.[44] In addition, CP is also one of the world's top 500 enterprises. At June 2009, CP was responsible for 130 power plants in China and overseas (see Figure 2 below).

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[43] Source: http://www.cp.com.cn/n16/n3250/n3274/index.html (last accessed 24 September 2009)

[44] By year 2008, CP's total power generation has reached 36,454.2 billion Kwh and total installed capacity has reached 858,617 thousand Kw.
Source: http://www.cp.com.cn/n16/n110237/n110306/n110373/111026.html
http://www.cp.com.cn/n16/n110237/n110306/n110373/111013.html (last accessed 25 September 2009)

Figure 2: Distribution of CP's Power Plants[45]

CP is a state-authorized investment entity. Thus, in accordance with the mandate of the nation's power sector reform instituted by the State Council, CP conducts business independently and bears full responsibility for its profits and losses.[46] By year 2008, the operating income of CP reached 151,300 million RMB.[47]

CP adopts the 'President-responsibility' system. Thus, the President of CP is the primary person responsible for setting the direction, carrying out the strategic plans

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[45] Source: http://www.cp.com.cn/n16/n110237/n110306/n110321/index.html (last accessed 24 September 2009) (Note: 电厂分布 – Distribution of Power Plant)

[46] Source: http://www.cp.com.cn/n16/n2862/index.html (last accessed 08 October 2009)

[47] Source: http://www.cp.com.cn/n16/n110237/n110306/n110388/191962.html (last accessed 25 September 2009)

and policies, and overseeing the operations of the company (McNamara, 1997). However, as stated before, governments influence the enterprise decision-making of SOEs via the power of Communist Party officials (Hassard et al., 1999). Thus, the Secretary of CPC in China Power also plays an important role in enterprise decision-making.

In accordance with the national economic development plan, state industry policies, and market demand, CP has identified its development strategy and goals for the first 20 years of this century. CP plans to increase its generation capacity to 80 GW, around 10% of the national total installation. It also plans to increase its sales revenue to US$10 billion, so as to become one of the World Top 500 companies by the year of 2010. CP plans to further increase its installed capacity to 120 GW, that is, around 12% of the nation's total energy requirements, as well as increasing sales revenue to U$20 billion by the year of 2020.[48]

To become a large enterprise group with international competitiveness, CP has to constantly improve the development of its capabilities, competitiveness and risk-taking.[49] To achieve this, CP has set the following goals. Firstly, CP seeks to build a large enterprise group characterized by world-class management.[50]Secondly, CP has established two key priorities. One is development. The other is human

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[48] Source: http://www.cp.com.cn/n16/n2862/n28855/n28987/index.html (last accessed 22 August 2009)
[49] Source: http://www.cp.com.cn/n16/n2862/n28855/n28987/index.html (last accessed 22 August 2009)
[50] Source: http://www.cp.com.cn/n16/n2862/n28855/n28987/index.html (last accessed 22 August 2009)

resources.[51] Thirdly, CP seeks to pursue a 'going-abroad' strategy.[52] Thus, the

formation of alliances has become a means for CP's internationalization.

4.4.3 CRI

CRI (Chinese Research Institute) is a leading research organization in the field of

thermal power engineering in China. Although CRI is controlled by the five major

Chinese independent power generation groups, CP is its majority shareholder[53] (see

Figure 3 below). Its business ranges from R & D programs/projects to consultation

and technical services and from product development to engineering contracts.[54]
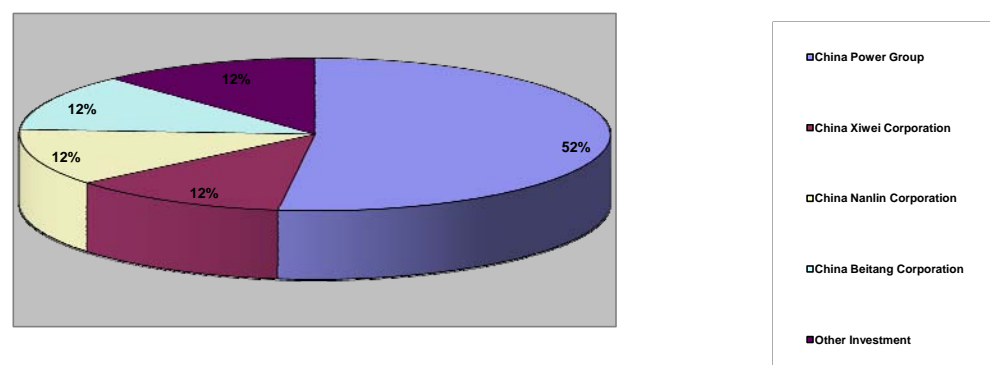
Figure 3: Shareholders of CRI[55]

CRI is actively involved in key R & D projects funded by Chinese government

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[51] Source: http://www.cp.com.cn/n16/n2862/n28855/n28987/index.html (last accessed 22 August 2009)

[52] Source: http://www.cp.com.cn/n16/n2862/n28855/n28987/index.html (last accessed 22 August 2009)

[53] Source: http://www.cri.com.cn/eng/intro.htm (last accessed 23 August 2009)

[54] Source: http://www.cri.com.cn/eng/graduate1.htm (last accessed 23 August 2009)

[55] Source: http://www.cri.com.cn/eng/graduate1.htm (last accessed 23 August 2009)
Pseudonyms are used for the various shareholders of CRI.

authorities, including the NDRC, and the Ministry of Science and Technology (MOST). CRI undertakes R & D mainly relating to thermal power generation technologies and equipment. CRI has capabilities to provide technical and economic solutions to power plant operation optimization, pollutant reduction and equipment life extension.[56]

Based on its extensive expertise, CRI has contributed to the improvement of overall efficiency, reliability and availability of fossil-fired power plants in China for over 50 years. CRI enjoys a high reputation for its qualified technical service and consultation, inscribing its footprint in almost all of China's power plants, as well as in power plants internationally.[57]

4.5 Concluding Comments

The above narrative enables a construction of the overall morphology of the network in which the NMCA to be studied is embedded. In short, the NMCA has been formed by three governmental organizations as part of an APP project. Figure 4 (see below) depicts the overall network of actants locating this alliance. The following chapter aims to examine a range of practices constituting the management planning and control of the NMCA between ARI, CP and CRI to work on the post CO_2 capture technology.

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[56] Source: http://www.cri.com.cn/eng/intro.htm (last accessed 23 August 2009)
[57] Source: http://www.cri.com.cn/eng/intro.htm (last accessed 23 August 2009)
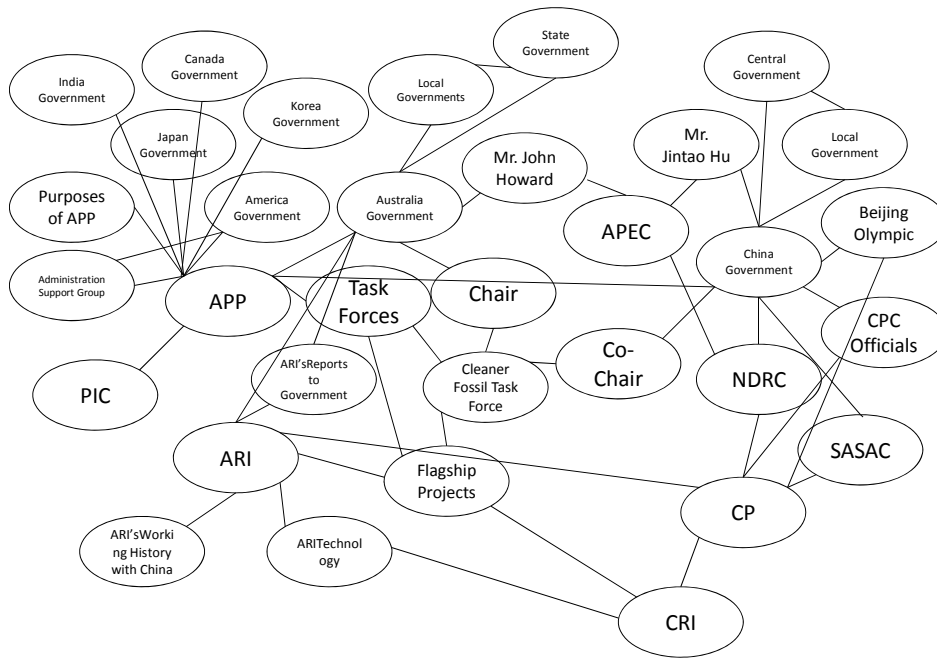
Figure 4: Overall Network of Actors and Actants Locating the Focal Alliance

CHAPTER FIVE:
EXPLORING AN
AUSTRALIAN – CHINESE NMCA

5.0 Introduction

In this chapter, the focal NMCA is characterized, exploring ARI's involvement in this NMCA. Sections 5.1 to 5.4 address issues relating to management planning and control practices relating to partner selection and negotiation. Sections 5.5 and 5.6 discuss other relevant management planning and control practices – the role of the contract, accounting controls and socio-ideological controls. The outcomes of the formation and operation of this NMCA are then discussed in sessions 5.7 to 5.9.

5.1 Partnering in China

In order to secure research funds from the Australian government as a result of its membership of APP, ARI considered partnering with organizations in other member nations to work on an environmental project encompassed by a relevant task force of APP. Given this, China was not the only choice of a potential partnering nation. As one interviewee stated:

> *"In fact, we could choose any other countries other than China, but we have equally strong partnerships in China and in India, in Japan, in Korea and so on." (Dr Wong, Senior Advisor of ARI International)*

That is, the ARI has a history of partnering and alliance formation, which is embedded in an established international network of alliance partners.

ARI decided to undertake this green gas related project with China for three main reasons. Firstly, since China is the largest polluter in the world, from a strategic point of view, involving China to develop this technology could make a real contribution to the problem of CO_2 emissions:

> *"Now with the growth in energy consumption globally and particularly in China, this technology has to be applied in China if you want to make real, large reduction[s] in CO_2 emission. ... If you're talking about combating climate change then China should be part of that global effort to reduce emissions. So there's a strategic reason to cooperate with China to make the Chinese aware of the availability of this technology." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

Secondly, ARI had already built a similar pilot plant in Australia. Thus, in terms of technology development, it was perceived as a good opportunity for ARI to learn about the technology in a similar but different context, translating its know-how to a different situation:

> *"Because Australian power stations in terms of the flue gases, so the gases which goes up the chimney after you've produced electricity, the quality of those is similar to the quality in Australia, so there's quite a bit of similarity there in terms of the CO_2 emissions and the other emissions from power generation. So for us it's a good way to learn in a different context about the technology as well." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

Thirdly, since coal is an important energy source for both Australia and China, cooperating with China on this coal related technology is seen to represent a natural interaction between Australia and China. As one interviewee stated:

> *"Australia, in terms of its energy sources ... coal is a predominant energy source, and in China, coal is very much a ... important part of their energy source. ... Both Australia and China are actively looking at technologies that can be applied to burning coal, to ... that can mitigate the amount of greenhouse gas emission that comes from burning coal." (Dr Black, General Manager of Energy Transformed National Research Flagship)*

Thus, according to Callon (1986), enrolling Chinese organizations into this NMCA is a natural result of the 'problematization' and 'interessessement'. With respect to problematization, ARI posited an indispensable 'solution', CO_2 capture technology, to China for its environmental 'problems'. With respect to 'interessessment', ARI aimed to align its interests with China to deal with China's environmental problems from an international perspective. Thus, using the notions of 'problematization' and 'interessessment', ARI attempted to enroll potential Chinese partners into an alliance agreement.

Also this CO_2 capture technology was positioned as an 'obligatory passage point' through which the Chinese organizations were to pass, learning about and adopting this technology to reduce CO_2 emission.   This would ensure the indispensability of the solution and the attraction of the potential alliance to a Chinese partnering organization.

5.2 Enrolling CRI as Prospective Partner

After deciding to partner with China, the task became the identification of a particular Chinese organization with which to work. At the time in 2007, Australia was in an election year. And the APP framework was very much attached to John Howard's Liberal government. As a result, the ARI was worried that a change of government may have negative ramifications on potential research funding in this area. Therefore, the ARI aimed to secure funding before the Federal Election. Thus, there were acute time pressures involved in the process of partner selection.

As a result, ARI did not undertake its normal procedure to identify potential partners, that is, do research across 20 provinces, among 20 potential partners, to choose a partner for this green gas project. Staff at ARI selected the first candidate of which they became aware that was suitable to partner in this field.

ARI chose CRI as potential partner for both economic and social reasons. From an economic perspective, first, there is a marked similarity between the functioning of CRI and ARI. Both CRI and ARI are research institutes. As one interviewee stated:

> *"Because CRI is a thermal power research institute, it's a research institute, and we are a research organization that's … so there's more synergy between CRI and ARI." (Dr Wong, Senior Advisor of ARI International)*

Secondly, both CRI and ARI are very internationally oriented organizations and have experience working with foreign organizations. ARI is involved in over 740

international research activities per year, working in more than 80 countries with leading scientific organizations[58], while CRI has also had many international research collaborations in Canada, Germany, Denmark, and Britain.[59]

Thirdly, the nature of the technologies CRI has developed also ensured that CRI became a candidate for ARI's partnering in this alliance. As one interviewee noted:

> *"CRI are actively involved in the research of a number of different types of technologies that maps quite closely what ARI was doing." (Dr Black, General Manager of Energy Transformed National Research Flagship)*

Indeed, the innovativeness of CRI's technologies was noted by ARI's senior management:

> *"They're quite important that ... been important in the past in actually implementing novel technologies in the power generation sector, so that makes for a very interesting partner for us as well." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

However, economic considerations are insufficient to explain the choice of CRI as the potential partner.

Pre-existing relationships that had been formed between personnel played a key role as well, especially in the context of the time pressure confronting ARI in partner selection. ARI became aware of CRI's capabilities from Chinese employees working

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[58] Source: http://www.ari.com.au/org/ARIInternational.html (last accessed 21 August 2009)
[59] Source: http://www.cri.com.cn/left_c/crigh.htm (last accessed 19 September 2009)

in ARI. These Chinese employees were educated in China and maintained their networks in China. They could go back to their network to find out who would be the best partners to enter a collaboration. As a result, Chinese employees put ARI in touch with CRI for discussions regarding a potential collaboration. As summed up by one interviewee:

> *"So a short timeframe, so you tend to go to the people you know even though you haven't really assessed them for being the best collaborator for this particular project, but you're trading more on the fact that you have a … some personal relationship to get the conversation started that gets the collaboration going quickly." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

This approach to partner selection by ARI is akin to an organizational 'garbage-can' approach (Cohen et al., 1972) in which problems and solutions intermingle in a fashion informed by extant network ties (Daft, 1982). In particular, through the long personal ties in the networks of Chinese university alumni, CRI came to the attention of ARI as a potential project partner. Nevertheless, trust in the institutional competence (Chenhall and Langfield-Smith, 2003) of CRI was also important in enrolling CRI into this NMCA with ARI.

5.3 Enrolling CP

Staff from ARI flew to China in 2007 to meet with the staff from CRI to discuss a potential collaboration. At the time of that visit, senior staff from CP were at CRI's offices. Managers from CRI commented that they would like to involve their parent,

CP, in this collaborative project. After consideration and on their return to Australia, ARI decided to enroll CP in this alliance as well, both for technical and political reasons.

From a technical perspective, as CRI does not have its own power station, the enrollment in the project of CP as a power generator was necessary. Moreover, as the largest energy group in China, CP is well connected to governments and political practices in China. CP has enormous insight into the way that China works. Thus, working with CP was seen as a politically astute choice of partner. As one interviewee stated:

> *"Working with someone … a company that's already established, is very important, is well connected in terms of its government, its politics, its … its technology. Working with the best … the biggest, often, is a good way of ensuring the work we do, hopefully, will come to the most benefit both for China and for Australia." (Dr Black, General Manager of Energy Transformed National Research Flagship)*

Here, again, CP was enrolled through an established network of contacts, that is, its ties with CRI, with competence trust playing an important role in the process of enrolment.

5.4 Forging the Agreement

During 2007, the official negotiation process started and a collaboration framework between the two countries was drafted. This broad collaboration framework was

signed at APEC in Sydney in September 2007. There was a formal signing ceremony involving Mr John Howard, Prime Minister of Australia, and of Mr Hu Jintao, the General Secretary of CPC Central Committee of China. The presence of these two leaders gave the collaboration between ARI and CP, which was included in this collaboration framework, the highest levels of political support.

Meanwhile, a collaboration agreement was then signed between ARI and CP. This agreement stated that ARI and CP would cooperate on research in the areas of coal-based power generation, CO_2 capture and treatment, and to promote industrial applications of scientific achievements in this area.

The agreement signed between the leaders of ARI and CP is described as a 'friendly agreement', which signaled that, in principle, these two organizations wanted to work together. The agreement is not a contract. It is not binding. It is, however, a sign of the presence of goodwill trust at the institutional and executive levels between ARI and CP. As the agreement is not binding, its implementation depends on the support of the executive and the realization of competence and goodwill trust.

Nevertheless, this agreement signaled that these two organizations would work towards a formal contract stage to elaborate the details of the specific project. However, it was the role of project personnel to work out the details of the contract and to agree on all the terms for its execution. As one interviewee stated:

> *"Presidents and CEOs, people like that, they don't want to get involved in the detail of the contract. What they want to do is to show that their organization wants to work with another organization, so they want some form of high-level agreement to work together, and then that is the sign then that you can enter into a formal contract stage to work out all of the details to enable you to operate up here. So when you have a photo opportunity at the APEC Conference in Sydney, that was to sign a one-page letter that said in principle we wish to work together with these partners to create this vision of the plant operating in Beijing. But then those people go away and it's left to the people who will now have to put the project together, work out the agreement, and agree all the terms. So it's … it's definitely a two-step process." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

As a result, the agreement that emerged in this situation was atypical of ARI's normal approach to alliance formation. The time pressures and potential political opportunities that were associated with the collaboration resulted in a relatively ambitious maiden project between ARI and CP:

> *"Now, what you do from there, you know, your first project might be a little one where you just test each other out by seeing whether you can work together, and then you slowly work your way up. Now, in the case of the … the China Power project, you know, the opportunity was big, the time pressures were … you know, were pretty short, so I … I think there was an effort to go almost from here up to here in one … you know, in the first contract, and that's a pretty big step. So, you know, I think what we're seeing is the stress of trying to go from, you know, well, we know these people all the way up to we can partner with these people in one go." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

The resultant co-operation contract that was eventually signed between ARI and CRI aimed to: first, build a post combustion capture pilot plant demonstration project in

China; second, launch a pilot plant in Beijing to capture 3,000 tons per year of CO_2; and, third, progress to a full scale system after a much larger demonstration phase.

As a result of the time pressure surrounding the formation of this alliance, there was not much detail specified in the contract between ARI and CRI, especially in relation to the tasks to be undertaken, the nature of the deliverables, the processes of information/knowledge sharing and the articulation of alliance goals. Interestingly, there was no Chinese translation of this contract, only an English language version.

In short, two major control devices were instituted during the formation of this NMCA: the 'friendly' agreement between ARI and CP and the contract between ARI and CRI. These relied heavily on perceptions of both goodwill and contractual trust between these partners, given the lack of detail contained in the agreements.

5.5 Resourcing the NMCA

The functioning of this NMCA was supported by two main forms of (inter) organizational resources. One key resource contributing to the functioning of this NMCA involved financial resources, including funding from the Australian government, funding from NDRC, and funding from CP. The other key resource is intangible and knowledge-based, informing an understanding of the CO_2 capture technology and the design of the pilot plant.

5.5.1 Financing

The contract between ARI and CRI made it clear that each party would account for their own costs. From ARI's perspective, this approach was favoured because each country had its own cost structure. As one interviewee stated:

> *"The ... well, the discussion around finance had been very much around each side would pay its own costs. That ... that's quite common in a lot of these collaborative-type projects because each country has a different cost structure, so you say, well, we're going to bring five people to the project and that might cost us $1,000,000, CRI might bring five people to the project and it might cost $500,000. So, you know, it's ... it's better to talk about, well, this is our work program and that's their work program, than it is to try and level the costs." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

In addition, it was argued that giving Australian taxpayers' money to China to assist with its environmental problems would not to be perceived favorably by Australian stakeholders. One interviewee stated:

> *"We have a lot of expectations from the Australian taxpayer, who pays our money, not to hand over money to China, which, for all intents and purposes, for most Australians, is a country that's quite wealthy. And particularly at the time we were doing this, the Chinese boom was very, very high. So, from a from a political point of view, being seen to give Australian taxpayers' money to China for China to help itself when it's a very large polluter probably would be not be seen as a good thing." (Dr Black, General Manager of Energy Transformed National Research Flagship)*

The interests of Australian taxpayers prevailed in ARI's decision-making and its sense of accountability in using its funds prudently. Thus, although ARI was

provided with AUD $4 million for this project from the Australian government for the purposes of partnering with China, the Chinese partner was responsible for resourcing the building of the pilot plant itself.

Given that cooperation between ARI and CP/CRI was highlighted in the statement of Mr Hu Jintao at APEC 2007, granting this project the highest political support, pressure was placed on the National Development and Reform Commission (NDRC) of China to financially support the alliance. Consequently, NDRC injected funding[60] into this project. Because of this injection of funds from the NDRC, this agency was also enrolled into this project.

When viewed from this context, this project is no longer a collaborative project between two organizations only – ARI and CRI. Rather, this project enrolled important third parties as well. As one interviewee stated:

> *"What happened just went further away from the plan because as new people got involved they had a different agenda and a different timetable, so the project moved towards serving a lot of internal purposes within China rather than a collaborative project between the two organizations that had undertaken to do it." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

These other interests were acknowledged to possess the capacity to potentially destabilize the network.

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[60] Because of the limits of data access, there is no information regarding the exact figure of the funding from NDRC.

5.5.2 Intangible Knowledge

Although ARI did not inject funds directly into this project, ARI contributed to this alliance by providing its reputation and specific scientific knowledge. In terms of specific scientific knowledge, ARI agreed to provide a research design as a starting point for the design of the pilot power plant to be built in China. In addition, ARI agreed to provide training for CRI staff connected to the project. However, as ARI failed to deliver the design on time, CRI/CP chose a design from another third party. In terms of knowledge sharing via the facilitation of training, CRI sent five staff to ARI's offices to learn the relevant technological know-how. This involved a one day workshop and two-weeks first hand study of the pilot plant in Australia. The pilot plant in Australia, the training site, was still in the phase of being commissioned when staff in CRI took part in this training exercise.

From ARI's management perspective, it was a great learning exercise for both parties. As one interviewee stated:

> *"They have worked with our power plant which at that point was just in the phase of being commissioned and started up, and that was a good ... from our point of view a good opportunity to have them here because the problems you get when you commission things, that's a very important learning exercise, things will go wrong. If you start off something new then things will go wrong and you need to resolve it so that was a ... a very good learning exercise in ... in that respect." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

However, the Chinese staff in ARI stated that CRI staff did not perceive this two

weeks first hand study as a training program. Rather, they thought it was them who had 'helped' ARI to test the data and adjust the design.

Thus, there was no common interpretation on ARI's contribution to this project between ARI and CRI/CP. From ARI's perspective, they provided the know-how that underscored this project. But from CRI/CP's perspective, there were doubts about ARI's contribution to the project. CP/CRI thought that ARI probably had not provided anything; this project was CP/CRI's independent work. On subsequent reflection, staff from ARI acknowledged that this lack of common interpretation on ARI's contribution led to distrust and an unproductive relationship in the later stages of the alliance.

5.6 Controlling the NMCA

Management (accounting) control systems have been argued to be an important actant in the functioning of an alliance (Chua and Mahama, 2007). In the focal NMCA, the primary formal control mechanism is the contract itself. However, as the contract is unable to address all future uncertainties and, in this particular case, lacked much detail, social-ideological based management practices had an important part to play in the functioning of this NMCA as well.

5.6.1 Contractual Control

Although the contract is a primary formal control mechanism in this alliance, the

ability of the contract to realize its function of controlling the alliance, was seen to

depend on the commitment behind the words in the agreement:

> *"The written document can capture a set of words but it can't capture the commitment behind those words that each document … that each organization brings to the … to the project. … It doesn't mean that they're as enthusiastic just because they've signed the same piece of paper." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

It was also recognized that the issue of commitment was influenced by different

interpretations of the alliance agreement:

> *"What people write down and then sign is different depending on … you know, it might be the same words but if it means different things to both sides, particularly for, you know, a foreign … You know, that people can learn a language but it doesn't mean that you've absorbed all of the cultural and social differences to know, you know, how to … how to … how to make sure that you're working towards a … a … a contract that people want to adhere to, or a contract that they're signing but really they're not committed to." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

The problems of commitment that derived from cultural differences in interpretation

were particularly obvious with respect to the word 'collaboration'. Collaboration is a

very ambiguous word and there are various levels of collaboration. Differences of

interpretation in this regard led to differences in expectations regarding commitment:

> *"You know, a lot of the misunderstanding around collaboration, as a word, is that, you know, some people are thinking … you know, they're thinking here … or one party's thinking here and another one is thinking here. So … so there's a set of mismatched expectations between what did you want when you said you were*

collaborating?" (Dr Brown, Deputy Director of Energy
Transformed National Research Flagship)

5.6.2 Accounting Control

In this NMCA, ARI and CP/CRI maintained their own discrete accounting systems.

They do not interfere with each other. In this regard, there is no 'open book'

accounting. In addition, each party works out their respective potential expenses

based on their respective activity plan. Although ARI tries to budget as realistically

as possible, ARI builds in contingencies to make sure they can tackle any additional

expenses that they may incur.

ARI uses a standard SAP system for management accounting control. By using SAP,

all the man hours that are spent on the project are then translated into monetary costs.

Also all the outgoings, such as travel expenses and consumables, are charged directly

to the specific project. Thus, by the end of any month, ARI has a fairly good idea as

to what has been spent on this particular project. Although ARI is quite flexible in its

resourcing of project needs, ARI does have to be sensible about budgeting because

this research organization cannot spend money which it does not have.

Usually, ARI reviews each project every year. This review encompasses not just

scientific progress but also financial progress. If there are large deviations from plan,

staff from the finance department will highlight this and seek further explanations

from the project leader. Although it is not the case with this NMCA, an accounting

firm may be called in to audit the accounts of a particular project to attest to the use

of government funds.

In this NMCA, it is the project leader who is the main person accountable for the financial control of the project. And doing the project within the budget is a very important goal for the project leader to achieve. As commented by one interviewee:

> *"… if it happens very often to a particular project leader he will probably not be given that authority anymore because he's not managing his expenses, and that's very important for a project leader to not just check whether the project has a hole but the science is on track and the customer is satisfied. But they also need to do that within the available budget, that's the goal. … if you as a project leader, your track record is that you can't manage these expenses, then … then you really … you'll probably lose your delegation as a project leader if it happens all the time, that can happen." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

Since this NMCA is financed by the Australian government, this NMCA is a project with clearly identified milestones and associated budgets. Although the primary aims of this NMCA are not financial in orientation, the aim of knowledge transfer and application has to be achieved with 'sensible' financial management and 'sound' budgeting practices.

5.6.3 Socio-ideological Control

The importance of developing a shared understanding of goals and commitments was highlighted previously in the discussion of the functioning of the collaboration frameworks and contracts establishing this project. These issues are discussed

further below.

Communication and Collaboration

Communication has been argued to be an important means of achieving collaboration in terms of developing shared values and beliefs, exchanging information and knowledge, developing shared understanding of tasks, progress, and so on (Langfield-Smith, 2008).

During the formation and operation of this alliance, there were different methods of communication adopted to facilitate the emergence of shared understanding of tasks and aims, including email messages, face to face encounters, and telephone conversations. Almost all those interviewed commented that face to face contact is the most effective method for facilitating knowledge of technology transfer, especially in the context where there are language and cultural differences, such as in this NMCA. Neither email messages nor telephone conversations were considered "good enough" to build shared understandings and collaboration:

> *"We can only get things done if we actually go there and talk to them. … So how do you manage the relationship, basically by face to face meetings. Email is … is not good enough. It's ... in general email even if it's between two English speaking ... English speaking people, they might be ... there might be misunderstandings. … I … I've seen this ... I've seen the project leader there face to face, I know that if I talk to him how much effort I need to do to make things clear to him, and I can make things clear to him by repeating things and to look to see ... look at his reaction to see if he's understanding it, I can't do that via phone. You can do it via video conference, that would be perhaps an alternative. But I feel it's the … the best ... the best thing to ... best way to manage this is*

to actually go there, sit down at the table and discuss things." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)

Another interviewee made a similar comment:

"I think in person being the main one, because you gather … not just in person, but in person, working together on the equipment. I think that's the way you get the best technology transfer, working together in the context of what you're doing. … I think in person, because a ... because it's all about a technology, so working with the technology is the most effective way, plus, also, we have some Chinese speakers in ARI, but not many, so to overcome some of the language and cultural issues, I think in person, hopefully, you can minimize the effect of that, whereas with phone calls and particular with email, it's very hard to understand nuances and ensure that you don't give the wrong message unintentionally" (Dr Black, General Manager of Energy Transformed National Research Flagship)

Cultural Barriers to Collaboration

It was perceived by the Australian scientists that the socially embedded practices in China had a negative effect on communication and collaboration, especially in relation to the diffusion of negative information. The routines experienced, in the main, in the Chinese research institute placed a high value on protecting not only one's own but also the counterparties' faces. Thus, being afraid to lose face, the Chinese scientists are argued to pretend that they understand the counterparty, which was probably not always the case.   As noted by one interviewee:

"You can explain things but you're not sure if it's understood, or if the message has been received… You ... you can't ask very direct questions in my opinion because you don't get the proper answer and it's always a risk of the chief engineer losing face for his juniors, to his juniors so we were not able to penetrate that." (Dr

Further, it was perceived by ARI staff that their Chinese counterparties were less likely to raise the negative issues in front of the others in a formal atmosphere. The Chinese partners were more likely to disclose negative information through informal mechanisms and were inclined to wait to do so:

> *"That's very disappointing that people won't, you know … won't bring these issues up, you know, early on and say, look, we're a bit worried about this, talk to us about it. You know, they've let it get to the stage where it could be a barrier to future work. … It could … it could get back to some of those cultural issues around, you know, the management of face. You know, that I suppose Australians are fairly direct, you know, if something's going wrong they'll say something. Perhaps there … you know, there just wasn't the right mechanism, perhaps there weren't enough informal meetings to enable informal messages …" (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

However, one staff member of CRI, who had overseas working experience, was more willing to express himself frankly – even at the risk of losing his face. As one interviewee commented:

> *"I mean there ... there's a guy who's been six ... six or seven months in the UK and you ... you feel that you can ... he understands what you're saying, and he's also ... he asks when he doesn't understand, not everybody ... not every Chinese does that." (Dr Green, CEO Science Leader of Post-combustion CO$_2$ Capture)*

Thus, it is problematic to equate culture with nations (Baskerville, 2003; Harrison and McKinnon, 1999) and countries. Different people with different backgrounds and experiences within one country can hold different values and beliefs and perform

behaviors differently.

5.7 Outcomes of the NMCA

Despite some of the difficulties alluded to above, the pilot plant was launched on time before the Beijing Olympics (as desired) and within the ARI's budget. Mr Kevin Rudd, the Prime Minister of Australia who was elected after the defeat of the Howard government, visited the pilot plant during his visit to China in April, 2008. This political and symbolic event demonstrated that there was bipartisan support from Australian parliament towards this alliance. As one interviewee stated:

> *"I think because there's equal support from the current prime minister and he's visited the power plant even before it was built ... was ready. So that's on the Australian side there is bipartisan support for this technology I think, as they call it so both parties ... both main parties in parliament support this initiative, there's no doubt about that." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

After the pilot plant was launched, ARI drafted a media release to publicize this milestone. In the media release, it was stated that ARI helped CP/CRI launch the pilot plant in Beijing and that ARI received 4 million dollars for this project from the Australian government. Before ARI made its media release public, a copy was sent to CRI/CP for comment. At that time, ARI did not hear any disagreement regarding the contents of the media release from CRI/CP.

Despite the ostensible success of this collaborative agreement, the relationship

between ARI and CRI became "unproductive" in July 2008. This made it hard for ARI to collect post-implementation testing data from CRI to assess the performance of the post combustion technology under Chinese conditions.

5.7.1 Shifting Interests and Ties

ARI suspects that one reason for its difficulty in collecting data from CRI hinges on the departure of the previous president of CP, Mr Ma Ming [61]. Ma Ming is a close relative of Li Peng, who was the Premier of the State Council, that is, the Central People's Government, from 1988 to 1998.

Because Mr Ma Ming, president of CP, made a public statement that the plant would be built and operating by July of 2008, CP took over the management and control of this research project, sourcing a design and building and operating the plant, to show that the president could deliver on his word and to display the competencies of the Chinese to the world at a time that the country was under heavy international scrutiny because of the Olympic Games. Thus, CP was strongly motivated to take responsibility for the project and to do a lot more of the project than was anticipated initially by ARI or even CRI. This made it difficult to collect data because of limited access to the plant. As one interviewee stated:

> *"What happened in practice was essentially that we had a relationship with CRI, CRI had a relationship with China Power, but China Power took over the management and control of building and operating the plant. So CRI … a little bit on … on the outer*

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[61] A pseudonym is used to de-identify the individual concerned.

> *compared to the original project. ... What's happened is the plant's been built, it's been operated by China Power, but even CRI has limited access to the plant. So the ability to share technology data and to improve the operation of the plant has been broken because the ... the link between CRI and China Power isn't very strong either." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

This change in personnel, and the corresponding decline in the stability and strength of the network of ties surrounding the project, was brought about by the State-owned Assets Supervision and Administration Commission (SASAC). The SASAC planned to consolidate 150 SOEs into around 100 SOEs, including the consolidation of the five biggest electricity SOEs into three. As part of this proposal, senior executives were transferred to different roles to strengthen communication and knowledge transfer among coal and electricity enterprises. As a result of this senior executive exchange, CP witnessed a big change in its senior personnel during the course of this research.

Mr Ma Ming, previous president and secretary of CPC Committee of CP was appointed as vice governor of ShanXi province. Mr Zhao Yong[62], previous vice president of CP became the Secretary of CPC China Power Committee. Mr Yang Chao[63], previous president and secretary of CPC Committee of Huadian, one of the biggest five energy companies, was appointed as the new president of CP, replacing Mr Ma Ming.

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[62] A pseudonym is used to de-identify the individual concerned.
[63] A pseudonym is used to de-identify the individual concerned.

After the key patron, Mr Ma Ming left CP for his new position, support for this project diminished within CP. The hands-on involvement of Mr Ma Ming was one of the great strengths of the alliance because this was his 'pet project'. The new president did not have the same sense of individual or institutional commitment to the alliance with ARI. As one interviewee stated:

> *"The previous president..., he was the main driver of this project. Yeah, and since he's gone we've seen yes, a change. ... It's still friendly, very friendly, but not productive. ... Those key persons ... people are away, then their support for the project, if it's not ... if they're not people you know that will also support the project it's going to ... it's going to be very doubtful.. This project has lost importance because of the departure of [the previous president]."* (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)

5.7.2 Changing Interests

This change at the institutional level was accompanied by changes in the goals of this project. It changed from being a project with environmental and scientific objectives to one with profit making objectives – at least from CP/CRI's perspective. As one interviewee stated:

> *"I just think the emphasis might have been a bit different, and that when we were working with the former president, I think his interest was very much about showing that the Chinese industry was committed to doing things for the benefit of the environment, whereas I think the new president's looking at that, but also perhaps more at a financial justification for it, rather than just an environmental one. So, the goals and emphasis of the project have changed since he's come about."* (Dr Black, General Manager of Energy Transformed National Research Flagship)

Thus, the disenrollment of Mr Ma Ming led to the differences in emerging interests. The 'problem' for CP/CRI was to make money. And CP/CRI did not perceive ARI's green gas technology as their 'solution'.

However, quite interestingly, the interviewee who has a Chinese background formed a different opinion of the role and position of Mr Ma Ming in this network. He did not see Li Xiaopeng's departure as being important. Instead he highlighted the importance of Mr Hu Jintao, the General Secretary of the CPC Central Committee of China who signed the cooperative agreement between Australia Government and China Government at APEC 2007, as being important. As he stated:

> *"The resignation of Mr Ma Ming did not play a decisive effect on the change of the relationship. The CP's commitment to the project came from support from Mr Hu Jintao rather than Mr Ma Ming."*
> *(Dr Zhang, Principal Research Scientist of Energy and Environment)*

Nevertheless, irrespective of whether the disenrollment of Mr Ma Ming to the network led to the change of CP/CRI's interest in this research project, it was agreed that CP was happy to have 'just' a power plant. CP just wanted to capture CO_2 and sell it. CP did not look upon the power plant as a research facility. Because the pilot plant became an end in itself, CP was not committed to the original research objectives of the agreement. As one interviewee stated:

> *"In the tension and excitement of getting the plant in place then everybody was working to the same objective, but once the plant was in operation then China Power no longer had the same*

> *political imperative to be seen to be delivering the project. So ...*
> *and that's where, you know, some of the things we didn't know when*
> *we started the project have started to surface. So after July of 2008,*
> *so after the successful public launch, and everybody saved face..."*
> *(Dr Brown, Deputy Director of Energy Transformed National*
> *Research Flagship)*

Thus, because CP/CRI shifted its interests from 'planet' to 'profit', the network constituting this collaboration became increasing fragile. This fragility led to an increasing unproductive relationship between CP/CRI and ARI.

5.7.3 Attempting to Strengthen the Network

Staff from ARI flew to China again in March, 2009 to ascertain whether it was possible for ARI to collect data from CRI. ARI did not want to force CP/CRI to deliver on the contract at the risk of damaging the relationship even more. As stated by one interviewee:

> *"It was built on trust and mutual benefit, so if one side decides not*
> *to fulfill its obligations, there's probably not much incentive being*
> *very hard on them because, I mean, you might win that, but you've*
> *damaged the relationship even more." (Dr Black, General*
> *Manager of Energy Transformed National Research Flagship)*

During this visit, there was a meeting among personnel from ARI, CP, CRI, and NDRC. As a result of this meeting, ARI came to understand that NDRC was unhappy with this project, which, in turn, put pressure on CP not to collaborate with ARI.

NDRC was dissatisfied with the alliance for two main reasons. Firstly, NDRC questioned why it funded the building of the pilot plant for the project. Personnel in

NDRC questioned the remoteness of the benefits of being a member of APP. NDRC questioned why the Australian government did not pay for the project. As one interviewee stated:

> *"The [Chinese] government put money into that project, again, because of high-level political interest and they felt coerced to fund it and they've been a bit resentful that … that the project was pushed upon them. They had to … they had to put money into it because of the political influence, but they feel a bit … they feel a bit cheated as a result of that. So that's why questions around why didn't Australia pay for it? Why did China have to pay for it?" (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)*

Another interviewee made similar comments:

> *"I think that they probably had felt some obligation to do that because it was a project that was discussed at a very high government level at APEC between the former Prime Minister John Howard and Hu Jintao as a project that was demonstrating the co-operation between Australia and China, so I think there was a sense of obligation on them to do that, and I'm not sure how comfortable they were having that sense of obligation, and to pay for the project. … There was a bit of a sense of that … bit of a sense of, perhaps from their point of view, unfairness, that we'd received this money from the Australian government to help ARI pay for its costs in helping out, and I think there might have been an expectation that some of the money that we received from the government would go to the project." (Dr Black, General Manager of Energy Transformed National Research Flagship)*

Also, the non-monetary basis of this alliance between Australia and China was quite different to China's previous experiences with the European Union:

> *"I know from the European projects in which I was involved that the European Union pays for these projects, they pay the Chinese*

> *to do these projects in China and we as Australia are not doing that. We provide them with our hours and our internal resources and help them as much as we can, but there's no cash going to China and I think that's a major issue." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

Secondly, the Chinese counterparties were unhappy about the extent of credit that ARI claimed in the media release. In the media release, ARI mentioned that it 'supported' CP/CRI to launch the pilot plant. However, as commented by one interviewee, the word 'assist' probably better captures the reality:

> *"The way it's been picked up is that this is [an] ARI technology and ARI is doing this in China. And I ... I disagree with that, because I don't think ... we were supporting them, we're assisting them, but the Chinese have built the plant themselves. And it's their technology, not ... not ours, because we ... we've provided the designs and assisted but not more than that. And that I think that has irritated them as well that's ... ARI seems to be ... they're giving this technology to ... to China, it's not like that. It's ... it's really the Chinese developing their own technology. I'm not sure whether that's also been a bad influence on the relationship." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

Another interviewee emphasized the importance that China placed on taking its 'rightful' place in the world based on its competence and excellence that was equal to others:

> *"The Chinese side probably needed less help than they thought in terms of achieving the project outcomes, and they demonstrated a very high level of competence in terms of the engineering they brought, and I think once they realised that, they probably felt it was important to distance themselves a bit from Australia, to demonstrate how independent and how good they were already, as opposed to relying on us to help them out. So I think there was ... my personal feeling is there was a bit of pride that came about as*

a ... you know how successful China was at hosting the 2008 Beijing Olympics, and I think there was, wound up in that ... was a sense of, we're, you know, we're very good, we don't need help from people, we can do it ourselves, and I think we certainly felt a little bit of that from an Australian point of view." (Dr Black, General Manager of Energy Transformed National Research Flagship)

Consequently, at the end of the project, there were a number of actors with expectations that had not been met. Because of these mismatched expectations or misunderstandings of expectations, blame started to "get shared around". As one interviewee stated:

"I'm just saying that I don't think things went the way they hoped it would either, and so they just couldn't deliver on what the project was. But, you know, because ... because the project wasn't what was agreed then, you know, where do ... where do people want to put the blame for that? Well, there's ... you know, that's where the blame starts to get shared around." (Dr Brown, Deputy Director of Energy Transformed National Research Flagship)

5.8 Assessing Performance – Success or Not?

Both partner selection and the operation of management planning and control systems have been argued to influence the performance of alliance (Dekker, 2008). In terms of the performance of this alliance, it was not perceived as being a very successful project from the 'ground' in ARI because of the difficulty in achieving cooperation regarding data collection to test the technology under Chinese conditions.

However, from an inter-governmental perspective, this project was regarded

favourably because the pilot power plant was commissioned on time and within budget. It was seen as being a very good collaboration between CP/CRI and ARI. As such, it was a great success from the Governments' point of view, with success being perceived differently within the network.

Nonetheless, ARI still would like to cooperate with CP, and especially CRI, on future research projects. In part, this stems from a desire of ARI to further test its technologies in China and to get more out of its existing collaborations. As one interviewee remarked:

> *"China Power is still a large power company, they are still a good partner to work with, and it's more difficult to start up a new collaboration in China in my ... in my view. So it's ... it's better to see and get the most out of the existing collaboration." (Dr Green, CEO Science Leader of Post-combustion CO$_2$ Capture)*

To this end, ARI staff flew to China in August, 2009 to accompany members of the Australian government to discuss the development of a full scale post combustion capture plant, a project which will involve Australian government, Chinese government, CP, and World Bank. During this visit, ARI staff were surprised that the pilot plant was pointed to by the Chinese government as an excellent example of collaboration between the two countries:

> *"The interesting thing was, that you know how there was a bit of a ... a negative sense for a time, every place we went to, to two different departments of the Chinese government, plus China Power, plus a number of people, all point towards the fact that the Gaobeijian [pilot plant] was an excellent example of collaboration*

between two countries, so they all are holding in our present example of cooperation, which is quite funny because at the time it didn't feel like it was a good example, but now later on it is. So as you can imagine it's ... you know you don't know the whole story, I mean that ... that's what I've learned, there is no whole story..." (Dr Black, General Manager of Energy Transformed National Research Flagship)*

This visit helped ARI to understand more about the alliance and to better understand the nature of these projects.   Firstly, it was admitted that when partnering with China, developed countries should change their attitude towards China's expertise. Rather than thinking of supporting or helping China, developed nations should think of these projects as a process of mutual learning and development. As commented by one interviewee:

"Australia always thought itself as developed country, China as developing country. There are technologies that Australia could help China. However, China has witnessed fast change and development in the last decade. For example, information system, infrastructure. Do not treat China as the one twenty years ago. There is lots of stuff that Australia should learn from China." (Dr Zhang, Principal Research Scientist of Energy and Environment)

Another interviewee made similar comments:

"I think to be honest, I mean can we talk about it a bit more ... I think to be honest, a lot of international companies make the mistake of going to China, thinking they're going to teach the Chinese companies about stuff whereas you know, China has so much expertise and so much experience and skill itself it doesn't need it, whereas I think if the approach is much more of a partnership or doing something to learn from each other, which is the truth, it's much more acceptable than some silly company from outside saying to China oh we'll tell you what to do or we'll teach you what to do." (Dr Black, General Manager of Energy

Secondly, ARI also began to appreciate the importance of different government interests to the functioning and outcomes of collaborations with Chinese organizations. To succeed in partnering with Chinese organizations, it is very important to enroll the interests of appropriate Chinese government agencies and to understand the established networks within which Chinese government(s) function.

5.9 Post-script

Although ARI had problems gaining access to data from CRI regarding the performance of the pilot plant, the relationship is now perceived to have worked sufficiently well. In fact, a more productive relationship has emerged since CRI has provided ARI with scientific papers concerning the performance of the pilot plant. CRI has also initiated contact with ARI to discuss the possibility of launching a second power plant in China.

Ironically, the Chinese partners have realized that knowledge transfer and research is the key to improving the commercialization of this power plant technology. Both CRI and the Chinese government recognize that there is a need to learn about the technology in order to improve it. Although this technology can bring about improved environmental performance, this environmental performance comes at the price of electricity generation efficiency. By capturing CO_2, the electricity generation efficiency drops from 40% of the energy to below 30%, which is not acceptable in

China, one of the largest energy consuming nations. [64] As one interviewee commented:

> *"Well that's an issue which is very important in China, because that means that you need to put more coal in to get the same amount of electricity out, and the ... China is very ... well it's resource constrained so it's not something that comes natural, I mean it's ... it's ... something that they see as a big hurdle, so yes we can reduce emissions and yes we can build such plants, but if it comes at an expense of 30% extra coal, because that's what it is, we're not going to do that, so it ... that's one of the main issues why we ... we need to improve the technology." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

The only way to improve the technology is to undertake more research. CRI now understands this:

> *"They're also now realize something that we told them a year ago but they now ... it's now they realize that, that they need to have a second pilot plant as a research tool, and that's ... those ... that's how things often go that, we're one step ahead and if you are too far ahead to convince them to ... to join in, and they've reached that now so ..." (Dr Green, CEO Science Leader of Post-combustion CO_2 Capture)*

Thus, the problem for CRI is to capture CO_2 emissions without the loss of power generation efficiency. And the indispensable solution to this problem is further research. As ARI's continuing collaboration could provide a solution, there is a growing alignment of interests between ARI and CRI.

Subsequently, staff from ARI have flown to China to discuss the feasibility of

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[64] Source: http://news.163.com/09/1111/02/5NQAB5V90001124J.html (last accessed 11 November 2009)

developing a second pilot plant with CRI.

Figure 5 (see below) depicts all the relevant actors and actants enrolled in the focal alliance. For the purpose of presentation, the actors and actants enrolling in APP framework are represented as APP sub-network.

Figure 5: Network of Actors and Actants Enrolling in the Focal Alliance

CHAPTER SIX:
DISCUSSION

6.0 Introduction

In this chapter, the main findings of the research are restated and elaborated, considering their similarity and difference to previous research. The research context is stated briefly in section 6.1. This is followed by an outline of the main findings in section 6.2, relating to issues of partner selection, formal control, socio-ideological control, and alliance outcomes.

6.1 Research Context

This investigation provides a distinctive contribution to the study of inter-organizational alliances.

Firstly, this study focuses on non-monetary alliances, which are based on intangible knowledge transfers between the two partnering organizations. As a NMCA, there was no monetary exchange between the focal organizations studied in this research. ARI agreed to contribute knowledge regarding CO_2 capture during coal-based power generation, whilst CRI signed agreements to provide test data from the application of this knowledge to Chinese conditions. As such, the agreed collaborative outcomes were to share test data with a view to furthering research about green gas capture. There is little management (accounting) research examining such an alliance context

(Burfitt, et al., 2009; Sundin, et al., 2009).

Secondly, the focal partners to this inter-organizational alliance are government entities. This provides a further point of interest and distinction in relation to extant accounting research investigating alliances. As can be seen from this study, governmental partners introduce a range of political interests that impact on alliance practices and the symbolism attached to them. This distinctive context entitles further understanding of management practices in alliances involving important government powers (Chua and Mahama, 2007).

Thirdly, this study addresses alliance partnering and planning and control practices in a Chinese context. China has become a more and more important economic and political power in the global business world (Shambaugh, 2009). However, there is little accounting research that gives us insight into the practices of Chinese organizations, especially in relation to alliance formation and operation.

6.2 Main Findings

As stated in Chapter Two, this research has been informed by two research questions. The first research question focused on the partner selection process and the second research question focused on the planning and control practices informing the alliance studied. The issues raised by each of these questions will be discussed in turn below.

6.2.1 Partner Selection

In terms of partner selection, ARI's selection of CRI to work on a green gas project under the APP framework was limited in terms of its scope because of the time pressure of the forthcoming Federal election and a possible change of government. The political events and opportunities that were present at that time led to a 'garbage-ban' (Cohen et al., 1972) style of selection process. Because of the limited search effort and time pressure, CRI was ultimately selected to partner ARI on this project, primarily based on the personal ties of ARI Chinese staff, which had been formed via their educational alumni network and the institutionalized practices of academic action nets. ARI was satisfied with the choice of CRI because it was also a research institute in terms of its functioning.

This finding lends some support to extant research that indicates that although similarity in function (Sampson, 2007) between partners is not the main reason for the final selection of an alliance partner, it is, nonetheless, an important filter in partner selection. Thus, this research demonstrates empirically that the capabilities and resources of a prospective partner are a necessary but not a sufficient condition for the selection of alliance partners, at least in this focal field of practice.

This finding also augments and develops our understanding of the importance of 'previous alliance experience', which is cited as an important influence on alliance partner selection (Sampson, 2007). As can be seen from this research, the concept of

'previous experience' is not limited to previous alliance experience at the inter-organizational level but also includes individuals' previous experiences at the personal level. Thus, previous experience at the inter-organizational, organizational and personal levels were important considerations for partner selection (Barden and Mitchell, 2007).

6.2.2 Formal Alliance Control

As the focal alliance was formed under time pressure because of the scheduling of important political and symbolic events – the APEC forum and the Beijing Olympics - the parent of CRI, CP, was enrolled in this focal network as well because of its connections to the Chinese government and CPC officials. However, as the process of negotiations between the key parties was brief because of the time pressures outlined above, there were few opportunities for these parties to communicate/interpret their respective interests and build up common understandings of the desired alliance outcomes and each party's respective contributions to these outcomes. It may be argued that this had a significant impact on the emerging practices of alliance planning and control.

As the result of the process of alliance formation, there are two main formal planning and control mechanisms informing the functioning of the alliance. The two formal written agreements are integral in regulating the behavior of the collaborating organizations. First, the non-binding friendly agreement between ARI and CP

outlines the intention of these two organizations to collaborate on a green gas project. Second, the binding contract between ARI and CRI states the shared intention to build a pilot test power plant for the purpose of data collection. Nevertheless, the agreement and contract were drafted quickly and are particularly brief and therefore very incomplete (Williamson, 1979; 1996), providing little insight into the desired performance outcomes of the partners.

Within this context, the friendly agreement and project contract are also interesting examples of formal controls. As knowledge-based rather than market-based economic transactions connect the alliance partners, this raises interesting questions as to the role of these two forms of contractual control. Rather than imposing a market-based discipline on alliance planning and control, these agreements regulate the alliance because of their political and symbolic importance – they signal an intention to act collaboratively. Being seen to be able to collaborate at a national and project level is an important part of the functioning of this alliance.

Within the ARI, however, the day to day formal control of alliance activities was achieved via budgeting. Budgeting was used to ensure, first and foremost, that government funds received for this project were expended within Australia in line with stakeholder expectations – that is funds were spent "prudently". Budgeting practices also provided an element of financial justification for a project that had primarily policy and social aims. Secondly, budgeting was also the key to managing the project and personnel overall, ensuring that the project was delivered

on cost and on time. Thirdly, budgetary control also became a way of assigning a stable form of administrative control for the project to a defined member of managerial staff, as research staff with different forms of expertise and interests moved in and out of the project.

6.2.3 Socio-ideological Control

Given the brevity of the agreements governing the alliance between ARI and CP/CRI and the importance placed on a need to be seen to collaborate, the development of socio-ideological (Sundin, et al., 2009) forms of alliance control were very important in this alliance context. However, the development of shared values and trust were hampered by the brevity of the planning and negotiation processes. This was seen to lead to problems in alliance functioning later on, illustrating Langfield-Smith's (2008) argument that the duration and strength of the partner selection and planning processes provide opportunities for partners to work together closely to enhance goodwill trust and establish a collaborative alliance perspective (Langfield-Smith, 2008).

Collaboration and Collective Action

As this thesis highlights, collaboration must stem from the collective action of different actors and actants; a result of interplay of the values and interests of human actors (such as research scientists and government officials) and non-human actants (such as contractual agreements and pilot plant results) (Chua and Mahama, 2007).

And collaboration emerges from collective action embedded in a network of 'relational' ties (Chua and Mahama, 2007; Law, 1999).

The actors and actants informing collaboration include remote actors and actants, who enact their roles through loose ties within a network. For example, the Australian tax payers, who were not physically involved in this alliance, influenced the ARI's philosophy of how it spent government funds, which in turn negatively influenced the relationship between ARI and NDRC because of the issue of a lack of financial contributions to the establishment and operation of the pilot plant in China. Similarly, European counterparties were not physically enrolled in this alliance, however, previous alliance experience between European and Chinese research organizations led to the expectations of the NDRC that the ARI would provide a financial contribution.

Non-human actants are also influential in shaping an alliance through their interplay with human actors (Chua and Mahama, 2007; Mouritsen and Thrane, 2006). The primary non-human actants in this alliance are the friendly agreement and formal contract. In this NMCA, the contract required interplay with human actors for its functioning. And language was an important transformative element linking the human and non-human actants through practices of communication/interpretation. In particular, in this focal NMCA, inconsistent communications/interpretations of human actors regarding two key words – 'collaboration' and 'knowledge' – contributed to perceptions of mistrust and a non-productive relationship amongst

staff working on the project.

Collaboration is also a very ambiguous word. There are different levels of commitment informing collaboration. And different actors in this alliance network interpreted the commitments behind the word 'collaboration' differently. For example, as stated in the contract, ARI is to contribute its knowledge to the project in two ways, that is, the design of pilot plant and through the provision of training. However, the different training practices between ARI and CRI led to inconsistencies in the communication/interpretation of the 'knowledge' that ARI contributed to the alliance.

In relation to training, ARI is relatively process oriented whilst CRI is relatively results oriented. To ARI, experience is part of training. Thus, the process of testing data is 'training'. But this was not the case with CRI. CRI did not think they gained knowledge from ARI through this so-called training. Rather, CRI perceived that it helped ARI to run the test. This inconsistent interpretation regarding 'training' and 'knowledge' led to distrust surrounding ARI's competence and commitment from CRI. This impeded the development of shared values that could act as informal modes of socio-ideological control of the alliance. Also ARI did not provide direct funding for the outcome – the pilot plant.

Communication Practices

The functioning of the alliance and the development of shared values and

understandings was also influenced by the communication practices mediating the network of ties shaping the joint project between ARI and CP/CRI. All the interviewees in this research stated that face-to-face communication is the best communication method. By looking at the expression of the counterparties' face, rather than just listening to the counterparties' voices, individuals were more confident that information was both received and understood.

However, face-to-face communication methods are still influenced by distinct logics of practice. For example, the Chinese actors in the focal alliance were perceived to be reluctant to disclose negative information in a formal atmosphere, such as a project meeting. Managers from ARI attributed this to the effect of what are referred to as the situated practices of the Chinese, which emphasize the preservation of one's and others' 'face' in interaction.

As a result, Chinese participants aimed to protect their own 'face' by not admitting a lack of understanding. They also protected others' 'face' by not disclosing negative information, at least in front of others or not at all in the hope that issues would be resolved eventually. However, 'face' resulted in Australia claiming credit for the project and failing to treat China as an equally knowledgeable partner.

However, this research also illustrates that this may be an over-generalization. Not all the Chinese people act as if they are influenced by practices enacted to perpetuate so-called 'face'. The project member from CRI who had overseas study and working

experience was prepared to disclose negative information in a frank way and in a way that was not consistent with the concept of 'face'. He did not feel uncomfortable questioning the Australian counterparties if he did not understand a point. This is empirically consistent with the argument that 'culture' is not equivalent to a nation; rather there are a range of behaviors and values that may be exhibited by the 'Chinese' (Baskerville, 2003; Harrison and McKinnon, 1999).

6.2.4 Problematising the Alliance Outcome

Despite these differences in commitment, communication and practices, the pilot plant was built in China on time and within budget. However, different actors held different interpretations regarding the 'success' and 'outcome' of this alliance. This alliance is considered as a 'successful' example of collaboration between Australian and Chinese organizations from the perspective of the relevant governmental actors. This alliance is regarded as a 'success' at the institutional level – but was regarded as 'unsuccessful' at the project level by personnel involved in the day to day functioning of the alliance.

This finding supports empirically the argument that success/failure is not a function of the presence or absence of a list of factors affecting change (Briers and Chua, 2001). Success and failure are social accomplishments achieved in various ways by many different human and non-human actors (Latour, 1987; Alcouffe, et al., 2008), and potentially viewed quite differently from different positions within a network.

Consequently, the concepts of success/failure should be more carefully contextualised within a network context (Alcouffe, et al., 2008)

The following chapter, Chapter Seven, will discuss the contributions and implications of this field work.

CHAPTER SEVEN:
CONCLUSION

7.0 Introduction

This chapter concludes the thesis. Section 7.1 outlines the main findings of the thesis. Section 7.2 outlines the implications of this work. Future research opportunities are outlined in section 7.3.

7.1 Main Findings

Drawing on ANT, a knowledge-transfer-based alliance between Australian and Chinese government entities was examined to answer two research questions. These questions were:

What networks of actors/actants informs partner selection in a non-monetary cross-national collaborative alliance?

How are the management (accounting) planning and control practices implicated in the functioning of a non-monetary cross-national collaborative alliance?

Regarding the first research question, here partner selection was informed primarily through individual social ties (Barden and Mitchell, 2007); Chinese staff in ARI, who were still enrolled in Chinese university alumni networks, were key. This style of partner selection was partly because of the time pressure and political influences that

stemmed from the APP and the Australian Federal Election. Thus, relevant governmental actors played an important role in partner selection (Chua and Mahama, 2007). Nevertheless, economic and functional considerations, such as similarity in functioning (Sampson, 2007), were still important actors.

In terms of the second research question, the formal control mechanism, that is, the contract, was very incomplete. But the agreement and contract still regulated the alliance through their political and symbolic importance – due to the support of these agreements at governmental levels.

Although there was no money exchange among actors and the primary desired outcomes are not financially oriented, accounting still impacted on the alliance through the need for financial justification and for administrative purposes through the use of budgets.

Actors in the alliance struggled to achieve common understanding regarding desired outcomes and respective contributions through socio-ideological based management practice in the hope such effort could bring about collaboration (Sundin, et al., 2009). But the effort was hampered by culturally-aware forms of communication and the lack of face-to-face communication.

However, the findings from this distinctive case study raise some interesting questions regarding our understanding of management practices in alliances.

7.2 Implications

This thesis has three key implications in terms of the ways in which we think about strategic alliances and future research. First, what is the role of contracts in non-market based exchanges? Second, how important are 'shared values and beliefs' to 'collaborative alliances'? Third, how might we understand the governance/management of alliances in the absence of market disciplines and collaboration?

7.2.1. The Role of Contracts in Knowledge Transfers

Although complete contracts can never be drafted to cover all potential uncertainties, contracts are regarded as important control mechanisms in alliances to help manage appropriation problems and the coordination of tasks (Dekker, 2004). But in the focal alliance there was no monetary exchange, with the primary desired outcomes being social rather than financial. Also the contract was drafted quickly because of the impending APEC meeting and only acted as a symbolic tool in this context.

As such, can contracts provide a form of market discipline in a NMCA because of the nature of the transactions among alliance participants, that is, a non-monetary exchange? Does such an alliance only require a symbolic mechanism of mediation, including the parties' intentions to collaborate? Is this because of the political importance of such alliances, with such political importance only necessitating a statement to show this commitment to ally with others? Or was this the case

because of the time pressures surrounding this alliance's formation and the fact that the knowledge being transferred was only 'know-how' rather than intellectual property? Would a more detailed contract lead to a better relationship and alliance performance, or conversely even harm the subtle relationships that emerge between partners? All these questions require further research to augment our understanding of 'contracts' in action, particularly in the context of intangible and non-monetary transactions.

7.2.2 The Importance of Shared Values and Beliefs

Developing shared values and beliefs among collaborative participants is argued to be especially important for achieving alliance objectives in a NMCA context (Sundin et al., 2009). This was the case with the focal alliance in its early phase. There was an espoused commitment to collaboration at that time, partly because both parties shared the same desire to undertake a joint project under the APP framework that demonstrated a commitment to environmental sustainability and development.

However, accomplishing day to day collaborative practices was difficult. Collaboration was impeded by difficulties in realizing communication between the partners because of differences in socially embedded practices and the difficulty in achieving face to face interactions. More generally, collaboration was also difficult to achieve because of shifting interests. For example, CP/CRI shifted their values from 'planet' to 'profit' and a desire to commercialize the technology as the project

unfolded.

Despite a lack of collaboration between the partners on a day to day basis, one of the key alliance objectives – that is, building a pilot plant – was still achieved on time and within budget. Consequently, at a governmental level, the project was viewed as a successful example of collaboration because this outcome had been achieved.

Thus, this research leads us to question the presumed role of shared values and beliefs in alliances. Are shared values and beliefs really important for achieving alliance objectives? If there are no shared values and beliefs informing the day to day work of an alliance, how can the alliance still be successful in terms of achieving its objectives? Is that because the values of participants are not inconsistent or is it because the participants share the same means to achieve their respective values? Likewise, these questions require further research to enhance our understanding of the importance of 'shared values and beliefs' in alliance formation and operation.

7.2.3 Governing NMCAs

Both formal controls and shared values in the form of trust are argued to be important elements to govern alliances (Caglio and Ditillo, 2008). However, in this NMCA, the contract that was drafted was so incomplete and lacking in detail that it did not perform any day to day role in terms of performance monitoring and task coordination (Dekker, 2004; 2008). Also there was a lack of goodwill and competence trust at the 'coal face' in this focal alliance. But, the alliance was still

successful in terms of achieving its overall objectives.

If there are weak formal control mechanisms and little or no trust, how are alliances managed and governed?   What contributes to their success or failure? What are the other important means of governance?   Further research is required to address these questions.

7.3 Limitations

Whilst this research has examined alliances in a distinctive context and has raised important questions concerning their collaborative basis and management planning and control, this research has limitations as well. Firstly, because of the sensitivities surrounding the performance of the alliance, the researcher could not gain access to the Chinese counterparties during the research study. Thus, this research has only adopted one organization's point of view in describing the phenomena of NMCAs. This one-sided perspective provides partial insights into issues regarding partner selection and management planning and control (Coad and Cullen, 2006). Secondly, the research was limited to interview and document study. The author was unable to conduct participant observation during the research study. Thus, there was no first hand access to processual data to assist in understanding the functioning of the alliance studied.

7.4 Conclusion

This research has focused on management planning and control practices in the distinctive context of an Australian-Chinese NMCA focusing on a green gas technology project. Field work was conducted to characterize the formation and operation of the alliance in terms of a network of diverse actants, ranging from governmental interests to individual scientists, and the mediating effect of contracting, budgeting, and situated local practices. As a result, this thesis has raised important questions regarding the roles of contracts in non-market settings, the importance of shared values and beliefs in enabling collaboration, and the possibilities for governance to achieve alliances objectives. Many opportunities are presented to further our understanding of how NMCAs work in practice.

APPENDIX 1:

List of Documents Used in the Study

<u>APP</u>

1. About the Asia-Pacific Partnership on Clean Development & Climate

Source: http://www.asiapacificpartnership.org/english/about.aspx

2. APP Public-Private Sector Task Forces

Source: http://www.asiapacificpartnership.org/english/task_forces.aspx

3. CFE-06-06: Assessing Post-Combustion Capture Technologies for Emissions

   From Coal-Fired Power Stations

Source: http://www.asiapacificpartnership.org/pdf/Projects/CFETF/CPD/CFE-06-06.

pdf

4. Cleaner Fossil Energy Task Force

Source: http://www.asiapacificpartnership.org/english/tf_fossil_energy.aspx>

5. Frequently Asked Questions

Source: http://www.asiapacificpartnership.org/english/faq.aspx

6. Project Roster - Cleaner Fossil Energy Task Force

Source: http://www.asiapacificpartnership.org/english/pr_fossil_energy.aspx

7. Project Status Report Form.

Source: http://www.asiapacificpartnership.org/pdf/Projects/CFETF/PSU/CFE-06-06.

pdf

ARI

1. About ARI

Source: http://www.ari.com.au/org/About-ARI.html

2. Collaboration Framework of Technology Research in Clean Coal Power Generation and CO_2 Capture and Treatment between China Power and the Australian Research Institute of Australia

Source: Internal document

3. Cooperation Agreement – Australian Research Institute (ARI) and Xi'An Chinese Research Institute Co Ltd (CRI)

Source: Internal document

4. ARI Energy Technology

Source: http://www.ari.com.au/org/ETOverview.html

5. ARI in China

Source: http://www.ari.com.au/org/ARI-China.html

6. ARI role in global development

Source: http://www.ari.com.au/science/ps1by.html

7. ARI's organisational structure

Source: http://www.ari.com.au/org/ARI-Organisational-Structure.html

8. ARI strategic plan 2007-11

Source: http://www.ari.com.au/resources/StratPlan07-11.html

9. How does ARI work?

Source: http://www.ari.com.au/org/How-ARI-works.html

10. How we work.

Source: http://www.ari.com.au/ari/channel/_ca_dch31.html

11. Our Divisions

Source: http://www.ari.com.au/org/Divisions.html

12. Overview – About ARI

Source: http://www.ari.com.au/org/About-ARI-overview.html

13. Overview – International Activities

Source: http://www.ari.com.au/org/ARIInternational.html

14. The governance of ARI

Source: http://www.ari.com.au/org/Governance-Overview.html

15. What does ARI do?

Source: http://www.ari.com.au/org/What-does-ARI-do.html

16. What we do.

Source: http://www.ari.com.au/org/What-We-Do.html

Australian Government

1. Australia - an overview

Source: http://www.dfat.gov.au/aib/overview.html

2. Our government

Source: http://www.australia.gov.au/about-australia/our-government

3. People's Republic of China Country Brief - Overview of Australia-China

Relations

Source: http://www.dfat.gov.au/geo/china/china_brief.html

CP

1. About CP

Source: http://www.cp.com.cn/n16/n2862/index.html

2. Development Strategy

Source: http://www.cp.com.cn/n16/n2862/n28855/n28987/index.html

3. Distribution of Power Plant

Source: http://www.cp.com.cn/n16/n110237/n110306/n110321/index.html

4. Industrial Structure

Source: http://www.cp.com.cn/n16/n110237/n110306/n110336/index.html

5. Operating Income

Source: http://www.cp.com.cn/n16/n110237/n110306/n110388/191962.html

6. Overview of CP

Source: http://www.cp.com.cn/n16/n3250/n3274/index.html

7. Total Installed Capacity

Source: http://www.cp.com.cn/n16/n110237/n110306/n110373/111013.html

8. Total Power Generation

Source: http://www.cp.com.cn/n16/n110237/n110306/n110373/111026.html

CRI

1. Brief Introduction

Source: http://www.cri.com.cn/eng/intro.htm

2. International Collaborations

Source: http://www.cri.com.cn/left_c/crigh.htm

3. Shareholders/R&D Fields/Business Scope/Technical

Services/Certification/Qualification/Organizations Hosted/Departments and

Employees

Source: http://www.cri.com.cn/eng/graduate1.htm

National Bureau of Statistics of China

1. Amount of Foreign Investment by Form

Source: http://www.stats.gov.cn/tjsj/ndsj/2008/html/R1716e.htm

2. Overview of Foreign Capitals Utilization

Source: http://www.stats.gov.cn/ndsj/information/nj98n/Q131AC.htm

News Centre of 163.com

1. American President will visit four Asian countries tomorrow.
Source: http://news.163.com/09/1111/02/5NQAB5V90001124J.html

SASAC

1. Main Functions and Responsibilities of SASAC

Source: http://www.sasac.gov.cn/n2963340/n2963393/2965120.html

APPENDIX 2:

Industrial Structure of CP
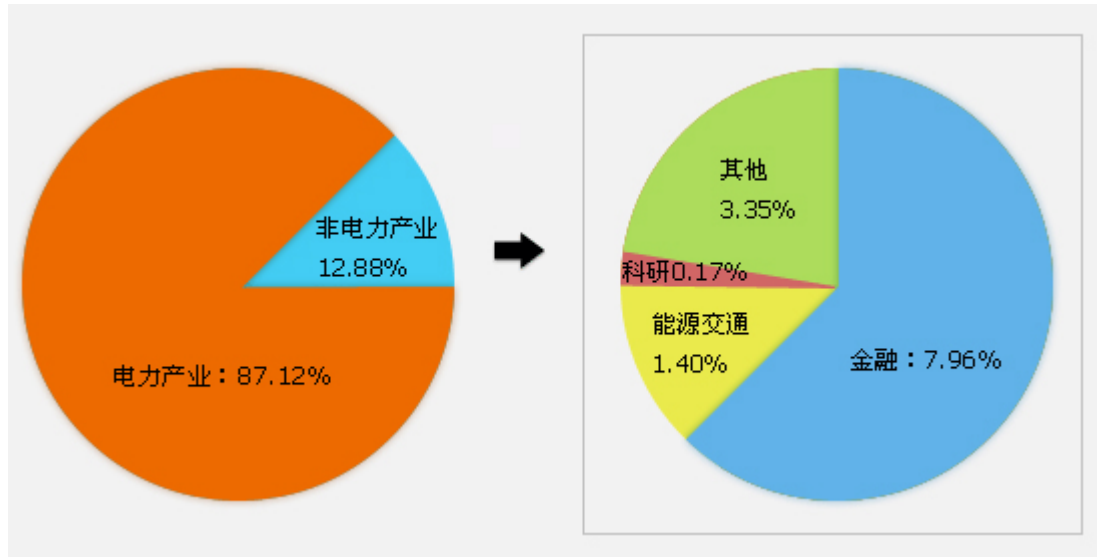
Source: http://www.cp.com.cn/n16/n110237/n110306/n110336/index.html (last accessed: 24 September 2009)

Note: 电力产业 – Power Generation, 非电力产业 – Non-Power Generation,

金融 – Investment and Financing, 能源交通 – Transportation and Renewable Energy, 科研-Research and Development, 其他 – Others

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APP. (date unknown). CFE-06-06: Assessing Post-Combustion Capture Technologies for Emissions From Coal-Fired Power Stations.
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Coal Power Generation and CO_2 Capture and Treatment between China Power and the
Australian Research Institute of Australia.
Source: Internal document.

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Source: Internal document.

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