DETERMINANTS OF KNOWLEDGE TRANSFER AND LEARNING IN HYBRID PUBLIC PRIVATE ALLIANCES

Janet Sutherland
(Corresponding author)
Graduate School of Business, Curtin University of Technology,
GPO Box U1987, Perth, Western Australia, 6845, Australia
Email: janet.sutherland@cbs.curtin.edu.au

Stephane Tywoniak
School of Management, Queensland University of Technology,
Level 9, Z Block, School of Management, Garden's Point Campus,
Queensland University of Technology, GPO Box 2434,
Brisbane, Queensland, 4001, Australia
Email: s.tywoniak@qut.edu.au

Peter Galvin
Graduate School of Business, Curtin University of Technology,
GPO Box U1987, Perth, Western Australia, 6845, Australia
Email: peter.galvin@gsb.curtin.edu.au

DETERMINANTS OF KNOWLEDGE TRANSFER AND LEARNING IN HYBRID PUBLIC PRIVATE ALLIANCES

ABSTRACT

This paper uses the case study of a hybrid public-private strategic alliance as data to complement and contrast with the traditional views on knowledge transfer and learning between alliance partners. In particular, the paper explores whether the concept of competitive collaboration conceptualized by Hamel (1991) in his seminal work holds true for all forms of strategic alliances. Conceptualizing the knowledge boundaries of organisations in alliances as a 'collaborative membrane', we focus attention on the permeability of these boundaries rather than the actual location of the boundaries. In this vein, we present a case study of a major public sector organization that illustrates how these principles have allowed it to start rebuilding its internal capabilities adopting a more collaborative stance and ensuring their knowledge boundaries are highly porous as they move more major projects into hybrid public private alliance contracts.

DETERMINANTS OF KNOWLEDGE TRANSFER AND LEARNING IN HYBRID PUBLIC PRIVATE ALLIANCES

Traditional perspectives on knowledge transfer and learning in alliances between private firms have suggested that partners will compete with each other for knowledge and resources. Our research into hybrid public-private alliances has found that partners do not compete but choose to cooperate in order to achieve a mutual knowledge sharing and learning agenda. This competition-cooperation dichotomy suggests that a review of the theory on inter-partner knowledge transfer and learning is necessary. Furthermore, the competition-cooperation dichotomy has implications for organizational structure and especially the conceptualization of the boundaries of the firm – at least in respect of the public sector organization.

With the emergence of New Public Management, government agencies (Pollitt and Bouckaert 2000, English 2005, English and Skellern 2005), have pulled back their corporate boundaries through outsourcing and divestment of core activities (Young 2007). As a result, they have increasingly cooperated with other organizations, mainly private enterprise, to engage in activities and access resources (Hood 1995, Lapsley 1999, Seal 1999), including knowledge, outside their own boundaries (Grant and Baden-Fuller 2004) to deliver according to their mandate. This mirrors trends in large industrial organizations where new organizational forms are emerging as firms roll back their boundaries through downsizing, divestment, refocussing and outsourcing (Grant and Baden-Fuller 1995). Essentially government is using contractual structures, such as

strategic alliances, to replicate the vertical integration which previously existed internally (Hart and Moore 1990, Williamson 1991b).

Using a case study of a hybrid public-private strategic alliance, this paper explores whether the concept of competitive collaboration (Prahalad and Hamel 1990, Hamel 1991) holds true for all forms of strategic alliances. Furthermore, we examine the premise that the nature of organizations boundaries is more important than simply the location of these boundaries. In particular we discuss the permeability of boundaries and how this affects the flow of knowledge and learning between partners.

CONCEPTUALIZATION OF KNOWLEDGE IN STRATEGIC MANAGEMENT

As the understanding of knowledge is our fundamental concern, we examine the key perspectives on knowledge in the strategic management literature. McGee, Thomas, and Wilson (2005) suggest there are four different perspectives of knowledge in strategic management theory. Firstly the resource-based view of knowledge (Wernerfelt 1984, Prahalad and Hamel 1990, Grant 1991, Hamel 1991, Grant 1996b) sees knowledge as an asset for gaining competitive advantage. The subsequent knowledge based theory of the firm (Grant 1996b, Spender 1996) shifts the focus from value appropriation to value creation (Berger and Luckmann 1966, Ghoshal and Moran 1996). Secondly the Schumpeterian (1934) view reflects knowledge as innovation. Thirdly, the evolutionary economics view (Alchian 1950, 1953, Nelson and Winter 1982) focuses on knowledge as being embedded in routines; and fourthly the dynamic capabilities view suggests that

knowledge is achieved through learning (Teece, Pisano, and Shuen 1997, Eisenhardt and Martin 2000). These perspectives are complementary and are all useful for analyzing the determinants of knowledge transfer and the resultant learning in strategic alliances.

Our starting point for analysis is the seminal study by Hamel (1991) of the extent to which, and the means through which, collaboration might lead to the reapportionment of skills between strategic alliances partners. As a result, Hamel outlines three key determinants for inter-partner learning, namely intent, transparency and receptivity. Furthermore, Hamel asserts that because of the asymmetries in the skills of firms, collaboration may provide one partner in an alliance with the opportunity to improve its competitive position, both within and without the alliance, by internalizing the skills of the other partner.

We have chosen Hamel's study as our starting point not only because he was the first scholar to look at knowledge management in alliances from a strategic perspective, but because of his conceptualization of an alliance as a "collaborative membrane". We see this conceptualization as significant because we suggest that the nature of the organizational boundary in terms of permeability matters as much – if not more – as compared to where it is drawn. Jacobides and Billinger (2006) introduce the notion of permeable organizational boundaries to explain how markets and hierarchies can be used simultaneously for the same activity as permeability allows for inputs and outputs, and most importantly knowledge, to move relatively freely into and out of the organization.

Building on the work of Hamel, and more recently Jacobides and Billinger (2006), we further develop the membrane metaphor by exploring related biological constructs such as permeability.

DETERMINANTS OF INTER-PARTNER KNOWLEDGE TRANSFER

Organizations with specialised or complementary knowledge can learn from each other by establishing collaborative partnerships, which can range from joint ventures, consortia and alliances to contractual agreements (Grant and Baden-Fuller 1995, 2004). The ideal is to benefit from a two-way flow of information, knowledge and resources. Key motives for partnerships are seen as transaction costs, competitive positioning and organizational learning (Davenport and Prusak 1998). From a transaction cost economic perspective, the governance of transactions, which involves contracting, control and incentive systems, is influences by three factors: bounded rationality, opportunistic behaviour and asset specificity (Williamson 1981, 1991a, 1991b). The degree to which organizations need specific assets to operate and the extent to which these assets have unique capabilities, interacts with the transaction costs of engaging in market transactions to shape the boundaries of the organization.

Understanding the motives and factors that encourage or impede knowledge transfer and learning place us in a better position to establish the best context and method for this to occur, e.g. closeness, cultural match (Badaracco 1991a, 1991b, Davenport and Prusak 1998). Hamel (1991) indicates that knowledge transfer is rare when an explicit and

clearly communicated learning motive is lacking. Others who support the idea that inter-partner learning must be by design, i.e. an explicit strategic intention, and not default include Inkpen and Crossan (1995), Davenport and Prusak (1998), Zack (1999) and Dixon (2000). In contrast, Helleloid and Simonin (1994) believe that learning can occur as an unintended consequence of inter firm collaboration. Gomes-Casseres, Hagedoorn and Jaffe (2006) suggest that while some knowledge flow across organizations or between units within an organization may be accidental or involuntary, intentional knowledge flows will be greater when they are in the interests of both parties. Hamel (1991) found that in the absence of a clearly articulated learning agenda individual businesses appeared unlikely to devote resource to the task of learning and that they could expect skills substitution or surrender. Thus, learning needs to be an explicit and measurable motive included in each contract with outsourcing partners. However, a contract is not enough and these need to be underpinned by sound relationships and skills, because the quality of learning is equal to the quality of the dialogue between people sharing tacit knowledge (Hamel 1991). Reflection, questioning and probing deliver a better quality of interaction and thus better knowledge and learning (Argyris and Schön 1978).

While previous authors may have suggested setting up appropriate structures for enhancing knowledge transfer and learning, Hamel in his seminal article (1991), is very specific in his description of the three specific determinants central to the internalisation of knowledge from inter-partner learning, namely intent, transparency and receptivity.

We now discuss the importance of each of these constructs for knowledge transfer and learning, as well as the impact of collaboration as competition on the ability of organizations to acquire knowledge or learn from a partner.

Hamel found that whether or not an organization possessed an explicit internalisation intent or desire seems to be a product of whether it viewed the collaboration being entered into as a more or less permanent collaboration or as a temporary vehicle for improving it competitiveness in relation to the partner (Hamel 1991). Other factors impacting intent are the resources of the organization in relation to the partner and other players in the industry, the calculation of the pay-off of the learning and the preference for balance versus asymmetric dependence within the alliance (Hamel 1991).

The factors that determine transparency in a relationship between two partners include the degree to which one partner can penetrate the social context which surrounds the other partner and the organizations attitude towards outsiders (Hamel 1991). It is in this social context characterised by organizational routines, processes, practices, and norms, rather than documents and repositories, that much of the most powerful, embedded, tacit knowledge resides (Davenport and Prusak 1998, Tywoniak 2007a). This tacit knowledge is highly personal, embedded in experience and laden with emotion, values and ideals which are difficult to formalise and share with others, particularly between organizations (Badaracco 1991a, 1991b, Nonaka 1991, Nonaka and Takeuchi 1995, Nonaka and Konno 1998). When acquiring knowledge from another organization, it is not just the technical

knowledge which is required but also access to and understanding of stories, myths, language and culture of the other organization (Nonaka and Takeuchi 1995). This is a way to comprehend the embedded knowledge that characterise routine (Nelson and Winter 1982).

Receptivity is the crux of the knowledge transfer and process, because there is a fundamental difference between having knowledge and understanding what to do with it (von Krogh and Roos 1996), i.e. being able to transform knowledge inputs into outputs (Grant and Baden-Fuller 1995, Rifkin and Fulop 1997). Inkpen and Crossan (1995) observed firms that had explicit learning objectives going into a joint venture, but which were unable to internally mobilise the appropriate mechanisms and systems to transfer knowledge (Love, Irani, and Edwards 2003) from the joint venture into the parent. Grant and Baden-Fuller (1995) identify the efficiency of the integration mechanisms and the extent of capacity of utilisation of knowledge, i.e. the degree to which the new knowledge matches the organization's product domain, as the two factors critical to knowledge integration.

Receptivity or absorptive capacity is dependent on the diligence and persistence with which people approach the task of learning (Hamel 1991). Absorptive capacity is a firm's ability to recognise the value of new information, assimilate it and apply it (Cohen and Levinthal 1990). In essence even if you acquire the best knowledge, unless you have the ability to internalise it, the knowledge is useless to you. Absorptive capacity is linked to

an organization's prior related knowledge (Cohen and Levinthal 1990). Potentially, organizations with greater prior knowledge have a greater capacity to learn and absorb new knowledge.

Critical to receptivity is the ongoing commitment of senior management to learning, i.e. an explicit learning agenda (Hamel 1991). A learning orientation may make an organization more skilled at creating, acquiring and transferring knowledge, as well as giving it the capacity to change organizational behaviours (Garvin 1993), thus enhancing its ability to learn (Burpitt 2004). The ability to recognise, acquire and utilise new knowledge is itself a valuable resource (Grant 1996a). Organizations which have a rigid set of managerial beliefs which result in the inability or unwillingness to abandon or unlearn past practices will severely limit the effectiveness of organizational learning (Inkpen and Crossan 1995).

While the external relationships allows the organization access to the knowledge of alliance partners, these relationships have only limited relevance to the diffusion of the knowledge within the organization (Walter, Lechner, and Kellermanns 2007). Thus successful knowledge transfer is determined by effective external, as well as internal, linkages (Adler and Kwon 2002). Hamel (1991) says that partners with the greatest need to learn often have the highest barriers to receptivity. If the knowledge gap is substantial, knowledge transfer may be almost impossible. This may result in an inability to understand what the partner is doing, as well as not being able to understand the process

leading to the partner's knowledge development (Hamel 1991). Other key factors impacting receptivity are the personal skills of the individuals involved in the learning and the ability to match the pace of absorption to pace of partners innovation (Hamel 1991, Brown and Duguid 2002).

Hamel (1991) highlights the need to first unlearn as a precondition for receptivity. Knowledge 'makes you wise in some ways, but it can make you a blindfolded fool in others' (Davies 1975 in Hargadon 2004, 13). Hamel (1991) says that there will be more to unlearn if an organization has been in the industry for a long time and has become a laggard. Unlearning is about changing cognition and behaviour and employees need to alter perceptual maps and drive out old behaviour with new behaviour (Nystrom and Starbuck 1984, Hamel 1991, Inkpen and Crossan 1995, de Holan, Phillips, and Lawrence 2004, Navarro and Moya 2005).

The concept of collaboration as competition is founded on the premise that there are two basic processes in any alliance: value creation (putting in) and value appropriation (taking out) (Hamel 1991). Essentially what you take out – economic, competitive advantage, skills, competencies, gives you greater bargaining power in the partnership and in the market and in forming other partnerships (Hamel 1991). However, this heightens the risk of opportunistic behaviour and self-interest which could negate the benefits of collaboration. Badaracco (1991a; 1991b) sees managing knowledge transfer as a key managerial responsibility and managers must protect core knowledge competencies,

assess and attempt to access the knowledge of partners (Badaracco 1991b). Hamel (1991) talks of the "collaborative membrane" through which skills and competencies flow between partners. The degree to which this membrane is permeable, and the directions in which it is permeable, determines relative learning (Hamel 1991). This membrane analogy suggests an ongoing process of collaboration exchange. Badaracco (1991b) believes that effective transfer of knowledge requires closeness but not necessarily openness. However, closeness is particularly important for accessing the highly complex knowledge embedded in social relations (Helleloid and Simonin 1994), which may result in causal ambiguity (Lippman and Rumelt 1982, Reed and DeFillippi 1990). The more multidimensional an organization's competitive advantage and the more each dimension of competitive advantage is based on a complex bundle of organizational capabilities rather than individual resources, the more difficult it is for a competitor or outsider to understand the determinants of that organization's success (Lippman and Rumelt 1982, Reed and DeFillippi 1990, Grant 2005). This ambiguity creates a barrier to others imitating the knowledge and/or resources which resulted in the success. Also, knowledge acquisition may be impacted by asymmetric information (Akerlof 1970), which puts the party without the knowledge at a distinct disadvantage in the knowledge transfer. Inkpen and Crossan (1995) see the differences or discrepancies between partners' competency areas as potential motivators for learning to take place, but it is whether or not these discrepancies are not identified and resolved that impacts on whether learning takes places.

THE PERMEABILITY METAPHOR

As membranes and permeability are central concepts for us in terms of better understanding the way that organizational boundaries are configured relative to operational boundaries and the necessary subsequent transfer of knowledge, we build on existing concepts in management as well as referring to biology – the original source of such concepts. To begin with, to explain how knowledge is transferred between (and within) organizations, we build on the 'collaborative membrane' metaphor used by Hamel (1991) – and borrowed from biology. The membrane metaphor is particularly pertinent to transfer of knowledge between organisations when you consider the five related yet distinct roles of biological membranes (Becker, Kleinsmith, and Hardin 2003). While membranes define the boundaries and serve as permeability barriers of the cell, they also serve as loci of specific functions and control the movement of substances in and out of the cell. However, most importantly, membranes contain the receptors required for the detection of external signals and provide the mechanisms for cell-to-cell communication.

This framework allows us to make the 'semantic leap' (Cornelissen 2005) by articulating knowledge boundaries and processes through incorporating the other associated biologically-related concepts of permeability, and related terminology such as absorption, diffusion and solubility.

The use of metaphor by organizational researchers as a means of understanding organizations, and being able to probe more deeply and generate emergent meaning or make the unfamiliar familiar, plays a crucial role in mainstream practice, particularly in qualitative research (Inns 2002, Cornelissen 2005, Cornelissen, Kafouros, and Lock 2005). In particular, the concept of organizational boundaries has been viewed through mechanical and organic metaphorical lenses since the 1950s (Heracleous 2004).

In essence, metaphors work in much the same way as models to assist in bridging the gap between theory and practice (Von Ghyczy 2003). Furthermore, the use of new metaphors revitalises theoretical concepts that have become hackneyed and have lost their former metaphorical underpinnings (Cornelissen, Kafouros, and Lock 2005). Tsoukas (1991, 1993) suggests that metaphors can be used creatively to reveal 'literal' structural similarities between concepts that were not evident before and which can provide new insights into organizations.

In biology, permeability refers to the rate at which a penetrant – liquid or gas – diffuses through a boundary (Massey 2003). Permeability is dependent on solubility, which refers to the penetrant and the structural characteristics of the barrier. There are few substances (only gases such as oxygen, nitrogen and carbon dioxide), which enjoy the ability of free or simple diffusion, i.e. the ability to move spontaneously across a barrier (Bolsover et al. 2004). In other cases the rate of passage of substances through a membrane are determined by temperature, concentration and pressure. Just as these factors are required

to push molecules through a membrane, so the rate of knowledge flow between organizations is determined by factors such as criticality, and the key determinants identified by Hamel (1991) - strategic intent, transparency and receptivity or absorptive capacity – which have been discussed in detail above.

Criticality refers to how urgent the task is, how core is it to the business and how much will it affect the bottom line. Furthermore, it is not enough to create knowledge, there must be an intent to use and share it, i.e. it must be translated into action before it is of worth (Macklup 1980, Dixon 2000, Inkpen 2005). As in biology, where few substances can freely diffuse, organizations do not spontaneously create knowledge out of experience – it takes intention for this to happen (Dixon 2000). The factors that determine transparency in a relationship between two partners include the degree to which one partner can penetrate the social context which surrounds the other partner and the organizations attitude towards outsiders (Hamel 1991). Critical to transparency and closeness between partners in knowledge transfer are relationships (Inkpen 2005) based on trust and value congruency, whether at an individual and organizational level (Aadne, von Krogh, and Roos 1996).

In knowledge transfer terms the solubility analogy reflects how the complexity of the knowledge, i.e. the degree of explicitness or codification versus tacitness or embeddedness impacts its ability to move between organizations. While highly explicit

knowledge may move freely across boundaries, tacit knowledge takes considerable time and effort to transfer, if it is able to be transferred at all.

Extra-organizational, as well as intra-organizational, boundaries can be conceptualised as semi- or selectively permeable membranes in the way that biological membranes are not equally permeable for all substances, but are selectively permeable, i.e. membranes can be permeated by a substance A but not by a substance B. For example, the GORE-TEX® membrane contains over 9 billion microscopic pores per square inch. These pores are 20,000 times smaller than a water droplet, but 700 times larger than a water vapour molecule, which makes the GORE-TEX® membrane completely waterproof from the outside, while allowing perspiration to escape from the inside (W. L. Gore & Associates 2007).

Using the GORE-TEX® example we are able to conceptualise why it easier for small amounts of simple or explicit knowledge which are easily understood by both partners to permeate through the boundary. However, if you try and push something major through like a new system or something foreign and unknown, it becomes harder to understand, accept and assimilate. This situation can potential destabilise the whole system and the knowledge will either be rejected completely or if the boundary is permeable enough to take it there will have to be adaptation on the receiving end. In this way, organizations and their need to absorb new knowledge may be likened to cells which depend on balancing water uptake and loss and can burst if they take on too much water and

collapse if they lose too much (Bell 2007). The GORE-TEX® example also explains how knowledge can be asymmetrically permeable. For example if one organization values tacit knowledge and the partner in knowledge transfer values explicit knowledge and the membrane is designed to only allow for the flow of explicit knowledge then the knowledge flow with be asymmetrical. This raises the issue of compatibility when forming strategic alliances, as evidenced in the early years of General Motors' NUMMI alliance with Toyota. While NUMMI was outperforming comparable GM plants, early attempts to transfer knowledge from NUMMI to GM were unsuccessful because GM advisors did not have the capacity to absorb the knowledge (Inkpen 2005).

THE RATIONALE FOR HYBRID PUBLIC-PRIVATE ALLIANCES

As the knowledge boundaries of the firm and the activity boundaries often fail to align, opportunities exist for alliances or other forms of intermediate organizational structures. From a transaction cost perspective, inter firm collaboration, both in its bilateral and network forms, has been viewed as an intermediate organizational form (Grant and Baden-Fuller 1995). Under certain circumstances these hybrid modes can be superior to either market transactions or internal governance (Williamson 1991b, Grant and Baden-Fuller 1995, 2004). Williamson (1991a, 269) sees these hybrid forms as being a broad middle ground between these two extreme 'polar forms' or ideal types of markets and hierarchies. Hybrid structures are not a new phenomenon and have operated largely to support resources projects since the start of the 20th century (Harrigan 1986 in Mowery, Oxley, and Silverman 1996). The sense that hybrids are a new phenomenon may be

garnered from a rise in popularity since the 1970s, as well as a shift in motives for their establishment, which may include higher levels of knowledge exchange and technology transfer between partners (Kogut 1988, Inkpen and Crossan 1995, Mowery, Oxley, and Silverman 1996) and the adoption of new ways of structuring boundaries and internal organization (Foss 2002).

Another perspective on this issue is that the 'polar forms' of markets and hierarchies are pure archetypes and work as theoretical constructs to help us make sense of reality. Heracleous (2004, 96) argues that using economic constructs such as transaction costs to theorize about boundaries is "parsimonious to the point of reductionism, caricaturing complex phenomena in terms of propositions that are clear but perhaps not always enlightening on actual boundary decisions taken by managers". So, while thinking in ideal types can be a powerful sorting schema, in reality the boundaries of the firm have always been problematic (Heracleous 2004). Boundaries were never as discrete as we theorised that they were, because organizational structure is contingent on and adaptive to economic and environmental variable such as complexity, uncertainty and technology (Pugh 1973, Child 1975, Quinn 1978, Granovetter 1985). Even early theorists, including Coase (1937) recognised that these distinctions were artificial. Thus the firm boundaries are not necessarily clearly drawn (Weick 1979) and interlocked behaviours extend beyond firm boundaries to encompass its supply chain partners, allies and stakeholders in strategic networks (Gulati, Nohria, and Zaheer 2000). This reflects Haracleous' (2004) contention that boundaries should be conceptualized as relational processes, the

formation, properties and consequences of which are the result of complex, shifting, socially constructed and negotiated entities. Thus, we begin to move from a functionalist view of organizational boundaries as the position which differentiates the internal organization from an external environment to a perspective which privileges the nature of the boundary, i.e. its permeability over the location of the boundary.

INSERT FIGURE HERE

Hybrids provide an efficient governance structure when transaction costs are higher than that which would make 'spot' cost efficient, but not high enough to justify the vertical integration typified by hierarchies. Based on the idea that the value chain might be dispersed across different owners but that they are controlled in economic terms through the operation of core competencies (McGee, Thomas, and Wilson 2005), McGee (2003) develops the notion of the knowledge web which replaces the activity sets of the value chain with knowledge concepts. At the centre is what McGee (2003) refers to as the corporate glue, which is the organizationally embedded tacit knowledge (Badaracco 1991a) or what Spender (1996) calls the collective knowledge. This corporate glue supports and is supported by core competencies, which in turn are buttressed by closely held partnerships (McGee, Thomas, and Wilson 2005). The corporate glue equates to corporate paradigm or culture (Fiol 1991), which has a profound bearing on how organizations perceive and engage with the environment (Daft and Weick 1984, Weick 1988) – internally and externally.

Building on the knowledge web, Figure 1 reflects the existence of extraorganizational boundaries, as well as intraorganizational boundaries, to knowledge transfer. The nature of the organizational culture is critical to the permeability of the relationship between the organization and its external partners and ultimately to the organisations ability to transfer and absorb knowledge across internal boundaries. While the shared causal maps and values might be sources of efficiency for managing socially complex organizations, their wholly tacit nature can make them a double-edge sword as they might generate causal ambiguity for outside observers (Tywoniak 2007b) and because they are difficult to change they may be a source of strategic rigidities (Leonard-Barton 1992). Subcontracting relationships for which market contracting in sufficient are more remotely managed (McGee, Thomas, and Wilson 2005). This blurring of the boundaries between markets and hierarchies indicates that boundaries are more permeable than suggested by the economics of organization (Foss 2002). As previously mentioned, Hamel (1991) proffers the useful analogy of a "collaborative membrane" to describe the permeability of this boundary. The extent to which the membrane is permeable and the direction/s in which it is permeable determine the capacity of knowledge flow and thus relative learning (Hamel 1991). At the heart of this permeability is the fluid nature of knowledge, rather than issues of structure – legal, governance or task (Hamel 1991). Conceiving of an alliance as a collaborative membrane suggests that access to people, facilities, documents and other forms of knowledge is traded or shared between partners in an ongoing process of collaborative exchange (Hamel 1991).

The resultant hybrid public-private strategic alliances formed between the West Australian State Government and private enterprise, as a contingency response to New Public Management, reflect Teece's (1992, 19) definition of strategic alliances as 'agreements characterized by the commitment of two or more firms to reach a common goal entailing the pooling of their resources and activities'. This sense of commitment to common goals and the equitable sharing of resources such as knowledge, contrasts with Hamel's view of alliances as a competition for resources. Hamel (1991) found that the power vested in an organization through the alliance contract will almost certainly erode if its alliance partners are more adept at internalising knowledge or building new competencies. In contrast, Broadbent, Gill and Laughlin (2003) found that public-private partnership contracts engender the development of goodwill trust which facilitates the management of future uncertainty. Campbell and Harris (1993) suggest that in the context of long-term contracts individual self-interest as a measure of economic rationality should be replaced by common interest. Thus the adequate form of self-interest in these contracts becomes cooperation (Campbell and Harris 1993).

Trust and value congruency is critical to any knowledge transfer between partners, whether at an individual and organizational level (Aadne, von Krogh, and Roos 1996). The coevolution of cooperation, communication and trust are critical factors for managers to assess the outcome of any interorganizational activity (Anderson and Narus 1990; Inkpen and Birkenshaw 1994 in Aadne, von Krogh, and Roos 1996). Aadne et al. (1996) suggest that partners in knowledge transfer seek to reduce equivocality (ambiguity,

multiple and conflicting interpretations) and create shared meaning. Key to the issue of trust is that only individuals can establish relationships so firm-to-firm abstraction does not exist (Aadne, von Krogh, and Roos 1996). The importance of trust for knowledge transfer and creation is indicative of knowledge creation as a quintessentially human process, i.e. trust is a complex, intensely emotional and human process (Walker 2004). Trust is more likely to occur where there is an open and honest communication style. The importance of trust and relationships for the functioning of long-term hybrid partnerships (Langfield-Smith and Smith 2003) is born out by empirical evidence presented by Campbell and Harris (1993) which suggests that partners will work to preserve hybrid relationships despite issues which may arise with adherence to contractual obligations.

Achieving effective knowledge transfer and learning in public-private alliances, in the current public sector environment, requires a shift in thinking which recognises the need to share a culture that goes beyond the organizational boundaries (Rowlinson and Cheung 2002). It also requires a move away from the adversarial nature of contracting relationships which use dispute resolution mechanisms as a fall back position. The benefit in creating these partnerships is that they enable the organization to benefit from integration and specialisation in a manner that is most likely more difficult to replicate than if the knowledge was simply held internally. While a partner may be disadvantaged in the macro-bargain, i.e. through the form and structure of the contract, they may make gains in micro-bargains, i.e. through collaborative exchange and relationships because of their capacity to learn (Rowlinson and Cheung 2002).

These collaborative relationships are a central tenant of the knowledge based view of the firm, which offers advantages over the traditional transaction cost perspective in that it provides an understanding the drivers of collaboration (Grant 1996b, Spender 1996). Certainly, the flow of knowledge, enabled by information and communication technology, is changing the way individuals and organizations interact and work, both within organizations and with those outside the boundaries of the organization such as suppliers, consultants and contractors (Dixon 2000, Galbreath 2002). In many instances new organizational forms have seen the boundaries of the firm radically transformed, not only by increasing moves to outsourcing and other forms of relational contracting and networks, but because of the implications of the fluid nature of knowledge capital versus the relatively static nature of physical capital (Foss 2002, Galbreath 2002, Foss 2007). Galbreath (2002, 9) speaks of 'extended enterprises' and suggests that knowledge in the form of intangible 'relationship assets' may come to represent an organization's most strategic asset, ushering in what he terms the relationship age.

METHODOLOGY

Using the Hamel's (1991) propositions as a theoretical underpinning (Yin 1994), a case study of a hybrid public-private strategic alliance was built. Thus the case study is both a process of enquiry and a product of that enquiry (Stake 2005). The individual case study is a specific, unique, bounded system which concentrates on experiential knowledge and pays close attention to the influence of its social, political and other contexts (Stake 2005). This methodology is invaluable for reflecting on the complexity of organizations

because it allows us to explore the interplay of resources and competences within firms, and sheds light on the influence of corporate ideologies, beliefs, routines and how and when the firm sub-units are loosely- or tightly-coupled (Weick 1995). While the boundedness is a counterbalance to complexity on a large scale, the uniqueness is a challenge to generalisability (Stake 2005).

The case provides the rich data (Siggelkow 2007, Weick 2007) required to understand the second order complexity of knowledge processes which are contextualised in social and cultural experiences (Tywoniak 2007a). Knowledge of second-order complexity is not validated through direct successful experience but rather through social processes of intersubjectivity (Passeron 1996). Thus the use of unstructured, qualitative interviews, which are seen to achieve Habermas' (1984) 'ideal speech situation', is a sound methodological choice for eliciting data for case study development. This was supplemented with secondary data sources. For Habermas (1984) this social "communicative action" is an act of communicative rationality, where two subjects engage in an intersubjective relationship to achieve shared understanding. The choice of a single, rich case study gives us interesting insights into the experiences of those in an organization which has only recently started using strategic alliances as a means of achieving its objectives. While the methodological intention is to capture the richness of the single case study, Yin (1994) suggests that the description and analysis of a single case study has the ability to convey information about a more general phenomenon by calling attention to issues and by highlighting discrepancies between theory and practice.

CASE STUDY: MAIN ROADS WESTERN AUSTRALIA-PRIVATE SECTOR

Established in 1926, Main Roads Western Australia (henceforth Main Roads) is Western Australia's statutory road authority. It is the longest serving public sector organization in the State and is responsible for highways and main roads with a replacement value of $21.4 billion (about 30 percent of the State's total assets) (Main Roads Western Australia 2006). The organization's net assets are worth $22.5 billion and its responsibility extends to total asset management of the classified road network, project delivery associated with network expansion and maintenance and traffic and road user management (Main Roads Western Australia 2006). Operations cover 2.5 million square kilometres, with dramatic diversity of climate and road conditions, making Main Roads one of the largest geographically spread road agencies in the world. Western Australia has 174,008 kilometres of roads, of which declared Highways and Main Roads comprise 17,706 kilometres or about 10 percent. Main Roads also contributes funding to assist in the maintenance of 125,968 kilometres of local roads and 30,334 kilometres of roads through national parks and forests.

Contracting guiding principles

Three clear guiding principles govern its contracting decision making process. These specify that contracts should be commercially viable; they should transfer appropriate decision making and risk to industry; while Main Roads retains responsibility for standards and compliance audits (Main Roads Western Australia 2007). Cascading from these principles, projects are classified into three categories. Category 1 projects are

discrete major projects, with significant scope that cost more than $20 million. They are either delivered by Design and Construct contracts or Alliance contracts. Category 2 projects generally cost between $1.5 million and $20 million and are competitively tendered either as Design and Construct contracts or as a mixture of separate design and separate construct. Category 3 projects are maintenance and rehabilitation projects, including capital works up to $1.5 million and are delivered through the Term Network Contracts and Term Asset Contracts.

History of alliancing

Up until 1980s Main Roads had total control over the design and construction of roads. Even thought as much as 60 percent of this work was handles by contractors, the organization continued to employed a huge internal day labour work force and employees felt that the organization had a very strong sense of control over its own destiny. In 1996, Main Roads began a metamorphosis from maker and maintainer of roads to owner and manager, which would have major significance for the organization (Edmonds 1997). Change was driven by the State Government economic rationalist reform agenda and lead to a rapid refocusing of Main Roads staff on outsourcing work to the private sector resulting in severe staff reductions (Edmonds 2007 in press).

A 2001 report commissioned by the Minister into the effects on Main Roads of contracting out virtually all services, including design, found that the 'full on' contracting out approach had severely impacted Main Roads knowledge base (Edmonds 2007 in

press). The report recommended that within three years, Main Roads rebuild about 25 percent of its in-house design capacity, so that it was not just an 'informed buyer', but a partner in the State road industry.

Another critical step in becoming a partner in the road industry was the move towards relationship contracting and particularly alliancing. In December 2002 a new Commissioner took the helm at Main Roads and he brought with him a wealth of contracting experience and knowledge from another government agency, including relationship contracting (Edmonds 2007 in press). The organization also placed relationships on the strategic agenda by making 'building better relationships with key stakeholders by working together on aligning goals' a focus of its strategic plan: 2003-2007 (Main Roads Western Australia 2003b). Key benefits of this approach are minimising conflict inherent in adversarial style contracts, encouraging cooperation and reconnecting Main Roads staff directly with work to build capacity (Main Roads Western Australia 2003a, 2005, Edmonds 2007 in press). Those involve in alliances say that the biggest advantage is that they do away with the focus on dollar value, thus negating the conflict which is inherent in traditional contractual 'relationships'. In alliances the focus is on problem-solving, innovation and flexibility. In November 2003, Main Roads entered into its first public-private alliance to build Stage 7 of the Roe Highway (Edmonds 2007 in press). This initial alliance contract was still fairly prescriptive, but was a significant step in an evolutionary process toward relinquishing control to an alliance entity. Four years later alliances operate as autonomous decision making bodies.

An explicit innovation, knowledge transfer and learning agenda

Alliance contracts are awarded based on the integrity and reputation of the alliance partners rather than on the basis of cost, with the cost of the project not determined until after the contract had been signed and preliminary design work is completed (approximately six months into the contract). The key driver for Main Roads is to build the best possible roads for the community and so they seek alliance partners who can bring innovation to each project (Edmonds 2007 in press). While alliances with private consultants and contractors across a range of services are primarily risk/reward-sharing arrangements, they afford the opportunity for both public and private partners to engage in projects larger than any one entity would be able to undertake on their own. Thus alliances provide a capacity building potential for all individuals and organizations involved that is not inherent in conventional contracting arrangements.

At the start of each project, an independent alliance facilitator works with the newly combined alliance management team to determine goals, including a commitment that everyone in the alliance will enhance their knowledge and skills. Part of this process involves establishing explicit non-cost key performance indicators, which are measured and rewarded by the client as part of the contract. These include training (including individual training plans), indigenous employment, occupational health and safety, stakeholder relationships and environmental issues. Thus there is a clearly articulated learning agenda. Project director and construction industry alliance member says: "The sharing of knowledge is a two way street and no one is bleeding off anyone else. While I

have enhanced my knowledge of design and geotechnical issues, I know that the Main Roads guys have a better understanding of contracting issues. Although there is a contract in place, things are very different from a conventional contracting situation in that we negotiate better outcomes and there is a different mindset."

Transparency

Alliance partners agree that the biggest challenge in establishing an alliance partnership is bring people from different organizations together to think as one. The alliance facilitator facilitates much of the team development process and the establishment of common values. "Team development [of the management group] happened during the design phase and it is essential for future success. Because of the different cultures it has been a battle from day one to build a team and we have had to constantly work on our team culture and development. We have tried to get people out of their huddles and focused on creating a new team with a unique identity," said a Main Roads alliance member. An industry partner comment reflects the assertion that complex cultural differences distinguish firms, including those in the same city (Badaracco 1991b): "No one way is right or wrong, but different organizations have a different culture, behaviours, work ethics and time management and we have had to work from identifying individual goals to formulating common goals."

Building on this platform, people feel that they operate in an environment where it is safe to speak openly. Thus, the alliance is simultaneously a common space, for alliance

members to share knowledge, learn and problem solve, and a "collaborative membrane" (Hamel 1991) between the alliance members and their parent organizations. The social context of a common space is integral to organizational learning which is essentially a social and cognitive process (Weick and Roberts 1993). This safe environment where experimentation is encouraged becomes the quintessential learning environment (Garvin 1993), while the "collaborative membrane" fulfils the function of allowing learning to be effectively disseminated form one part of the organization to others within it (Starbuck 1992). Main Roads staff seconded to alliances indicate that the interface with Main Roads is fluid, but never intrusive. However, from the Main Roads perspective the alliance interface is made complex by the multiple roles which Main Roads plays in the alliance, namely alliance partner, client (head office), stakeholder (regional office) and advisor (Technical Advisory Group). Tension arises because those who are integrally part of the process appreciate the flexible and innovative practices employed inside the alliance, while those on the outside may work to maintain the status quo and reinforce standards. These tensions may raise potential issues for receptivity and absorptive capacity within Main Roads, despite the multiple conduits for knowledge transfer and learning into the organization.

Receptivity

When alliance members return to the parent organization they take with them invaluable knowledge not only about the practice of constructing a particular road, but also about the collaborative, problem solving processes involved to achieve the outcome . The non-

routinized actions and attempts to make sense of the unfamiliar inherent in problem solving are a critical source of radical learning (March, Sproull, and Tamuz 1991, Nonaka 1994, Miner and Mezias 1996, Adler, Goldoftas, and Levine 1999). Main Roads alliance members indicate that they closely document the contracting award process, all other processes and lessons learnt at each critical milestone. Specific interventions throughout the project are also documented and all this detail is fed back into Main Roads. The internal experience embellishes knowledge which flows back to the organization through other conduits like formal reporting, designs and the Technical Advisory Group.

Main Roads people entering new alliances as team members have described the knowledge gleaned from the documented processes of previous alliance experiences as invaluable. Many Main Roads employees see the exchange of ideas, the flexibility to resolve differences of opinion and innovate in the open environment of the alliance as a very healthy way of building knowledge. This is particularly because effective feedback loops are being developed and this new knowledge challenges existing, traditional thinking within the parent organization. However, some employees are still skeptical about whether these feedback loops are effective fearing that much of the knowledge is still in people's heads and not captured in systems. They suggest the need for conversations which capture not only the lessons learnt, but also the stories that go to make up experience. Certainly the lessons learnt from each alliance are supporting the development of future alliances. Skepticism at the efficacy of these measures must be

seen in the context of poor feedback loops in traditional project environments within the organization. This is characteristic of the construction industry as a whole, where few organizations have systems in place to acquire, capture or convert their lessons learned into knowledge to support future projects (Love, Irani, and Edwards 2003). Central to this issue is the challenge to project-to-project learning because of the unique and temporary nature of projects (Prencipe and Tell 2001).

Employees involved with developing and implementing design standards see great benefits flowing back to their team. Involvement in large projects builds capacity because designers are involved in large complex projects, but they also benefit from the alliance office environment which breaks down silos between disciplines and allows for the close proximity of key players like the designer, constructor and the environmentalist. In this environment the constructor can work with the designer as the design unfolds. This scenario equates to Nonaka and Takeuchi's (1995) socialisation process or the explorer/L-shaped learning landscape proposed by Prencipe and Tell (2001) where learning is socially driven and the emphasis is on creating and sharing implicit and experience-based knowledge through joint participation in work activities (Prencipe et al. 2005). Nonaka (1994) see this socialization process as vital to building trust between partners. Thus, this close, social multidisciplinary experience enhances the design capacity of the alliance member, but also equips them to review and update standards more effectively. Furthermore, those returning from alliances bring with them enhanced design software skills, which they are able to share with others in their team. However,

this process is often frustrated by the fact that within the organization, designers are using earlier versions of the design software and those returning from alliances often have the benefit of new knowledge and skills curtailed by this.

Attitudes to allocating personnel to alliances

Main Roads employees have a broad range of opinions about the effectiveness of alliancing and views differ depending on whether or not people have been involved in an alliance. One Main Roads alliance member admits that before going into an alliance he was skeptical when people spoke of the potential for knowledge transfer. "I didn't think that the knowledge and skills transfer would work the way people told me it would, but I have learnt a huge amount about how contractors work and I have taught the contractors about how Main Roads works and there has been an enormous transfer of knowledge," the respondent said. This attitude reflects some of the anxiety over asymmetric learning expressed by managers in Hamel's (1991) study, as well as Weick's (1979, 135) notion that 'believing is seeing', i.e. our mental models stand in the way of organizational learning.

There is an element of frustration with alliances because they are so resource hungry and they take away some of the best people for extended periods of time. With limited resources this is potentially leading to a loss of opportunity in other areas. However, this is balanced against the fact that knowledge is flowing back into the organization. This reflects classic tensions between the rigidity and complexity of traditional organizational

structures and the flexibility of alliance project team highlighted by Nonaka and Takeuchi (1995). They ascertain that organizations need to develop new organizational structures in order to effectively and continuously create knowledge. The hypertext organization proposes interlacing flexible task forces (project layer) with hierarchical formal structures (business layer) to allow for knowledge to move dynamically between the two structural layers to create the organizations knowledge base (Nonaka and Takeuchi 1995). The organizational structure and culture needs to be oriented towards allowing the best people to move between these structures for the duration of projects, in the best interests of building the knowledge base.

DISCUSSION

Hamel (1991) presents a very context specific view of alliancing. In the case study, the creation of the hybrid public-private strategic alliance is driven firstly by the need for vertical integration rather than knowledge acquisition. Other factors driving the macro bargain are achieving the best outcome for the community and building construction industry capacity, including within government agencies, i.e. building social capital. Broadly speaking, social capital is the benefits that the stakeholders derive from their social relationships (Bourdieu 1986, Coleman 1988, 1990) and these can accrue to individuals, organizations and industries or communities (Walter, Lechner, and Kellermanns 2007).

In an environment where it is government policy to de-integrate, the competition for knowledge between alliance partners does not exist as Hamel describes it. Rather than an alliance between competitors we see an alliance between an elite public organization and several specialised private suppliers. Here the elite public organization equates to Quinn's (1992) idea of the 'central firm' which collects together partners to contribute to the whole system and whose roles are clearly defined in a positive and creative way. Thus the context and intent of the partnership in this case is very different to that described by Hamel, where the alliance provide a pre-determined territory, i.e. getting the best road possible for the community and developing industry capacity in the state, as well as common space in which to collaborate to achieve this.

The collaborative nature of this public-private alliance with its strong orientation towards team building, shared learning and relationships, as opposed to competing with partners for knowledge, results in the dual nature of the alliance as both a collaborative membrane and a common space. This intersubjective space is where the easy transfer of explicit knowledge occurs and as relationships develop the efficacy of the transfer of tacit knowledge increases. Here knowledge can be seen as neither the representation of reality nor the result of an application of ultimate rational criteria, but instead a competence to engage successfully in practice (Habermas 2003), which is at the heart of tacit knowledge or 'know how' (Ryle 1949, Polanyi 1966, Nonaka and Takeuchi 1995). The intersubjective social context and the processes they embody represent knowledge of second-order complexity as explicit and tacit knowledge are combined to create common

knowledge which is able to pass from one community to another (Tywoniak 2007a). This intersubjective or common space can be compared with Nonaka's concept of "ba" (Nonaka 1994, Nonaka and Takeuchi 1995, Nonaka and Konno 1998, von Krogh, Ichijo, and Nonaka 2000, Nonaka, Toyama, and Konno 2001), which is a shared space for knowledge creation and transfer. This differs from the concept of "environment" in that it is both physical, virtual and mental and individuals operating in "ba" are indivisible from it (Cohen 1998, Nonaka and Konno 1998).

From a western perspective, Nonaka's "ba", like his previous conceptualisation of "common cognitive ground" (Nonaka 1991), can be likened to Habermas' (1984) intersubjective social context. In western organizational terms this could be seen as the enmeshing of the physical work environment and the organizational culture. In this context there is less emphasis on knowledge transactions and greater emphasis on personal connections and commitment to shared outcomes (Cohen 1998). Tacit to tacit knowledge is shared between individuals in processes characterised by "indwelling", i.e. looking with others at what they do rather than looking at what others are doing (Polanyi 1966, Cohen 1998, von Krogh, Ichijo, and Nonaka 2000).

IMPLICATIONS

These findings, especially that cooperation as competition does not hold for all alliances, have implications not only for management theory as outlined in the previous section, but for managers in organizations especially in the public sector. The case study of Main

Roads illustrates how the organization has rebuilt some of its capabilities via a reconceptualization of the structure of the boundaries of their organization such that they are more permeable and focused specifically on both parties to any alliance benefiting from the learning that is possible. What is clearly evident from this case study is that organizational structure, especially the location of boundaries (i.e. what was undertaken by each partner) and the nature of the organizational boundary (which was designed to be as permeable as possible) fundamentally affected the learning and subsequent knowledge of Main Roads. Main Roads changed the boundaries of what they did such that their alliance partners worked with them on the preliminary stages (land resumption, heritage considerations etc.) and at the same time, employees were actively engaged in parts of both the design and the construct phases of the project. Strict delineation of firm boundaries became far more difficult as both parties to the alliance were involved in many stages. This in itself laid the foundations for knowledge transfer, but what also became central to the attempt by Main Roads to rebuild their capabilities was the design of organizational boundaries that were permeable and in fact the creation of systems to enhance the movement of knowledge between alliance partners.

For government agencies involved in hybrid partnerships with private enterprises, this case demonstrates the need for senior management to consider where they position their operational boundaries (be they highly restricted through the use of outsourcing or far wider in scope) as these boundaries are critical determinants of a firm's knowledge stocks both now and into the future. Restricting the operational boundaries does not necessarily

mean limiting a firm's knowledge and its subsequent capabilities. The purposeful creation of permeable boundaries is likely to be even more important than where the firm boundaries were originally set. In fact, coupled with cooperative contracts such as those found in alliance contracts as opposed to taking a more adversarial tack with contractors could allow a firm to develop its knowledge (and capabilities) to be a systems integrator (as per Brusoni, Prencipe, and Pavitt 2001) as opposed to a contracts manager. Finally, at its most fundamental level, this case clearly demonstrates that knowledge management (and subsequent competitive advantage) cannot be disconnected from organisational structural issues as the two are inextricably linked.

In respect of the limitation of this case study, we suggest a cautionary note, for while our methodology does not seek generalizability, nevertheless, our case study explores a very specific context. The fact that Main Roads was tasked with rebuilding its internal capabilities meant that the organization sought to develop structure and systems that would allow for this to occur rather than focus exclusively on efficiency principles. This approach led to a level of top management support for a cooperative attitude, which may not otherwise have been apparent.

The different context and intent articulated in the case study require different processes and result in different outcomes than those which take place between competitors who collaborate (Hamel 1991). The intent of public-private alliance described is to leverage knowledge across organizational boundaries not to out-compete their alliance partner, but

to get more out of their own fixed resources, e.g. caps on employee numbers. Furthermore, given that these alliances allow for private sector partners to engage in larger projects, previously outside of their scope, both partners might be seeking efficiency gains, but not competitive advantage. Furthermore, it is likely that knowledge embedded in the powerful relationships fostered by these public-private alliances may come to represent the most strategic capital outcomes of the risk/reward-sharing arrangements (Galbreath 2002).

While Hamel provides a good framework for understanding the determinants of knowledge transfer and learning, it is clear that the rise in public-private alliances with a social capacity agenda require a review of the theory on inter-partner knowledge transfer and learning.

REFERENCES

Aadne, J. H., G. von Krogh, and J. Roos. 1996. Representationism: The traditional approach to cooperative strategies. In *Managing knowledge: Perspectives on cooperation and competition*, ed. G. von Krogh and J. Roos, 9-31. Sage: London.

Adler, P. S., B. Goldoftas, and D. I. Levine. 1999. Flexibility versus efficiency? A case study of model changeovers in the Toyota production system. *Organization Science* 10 (1): 43-68.

Adler, P. S., and S.-W. Kwon. 2002. Social capital: Prospects for a new concept. *Academy of Management Review* 27 (1): 17-40.

Akerlof, G. A. 1970. The market for 'lemons': Quality uncertainty and the market mechanism. *Quarterly Journal of Economics* 84 (3): 488-500.

Alchian, A. A. 1950. Uncertainty, devolution and economic theory. *Journal of Political Economy* 58 (3): 211-221.

———. 1953. Biological analogies in the theory of the firm: Comment. *The American Economic Review* 43 (4): 600-603.

Argyris, C., and D. Schön. 1978. *Organizational learning: a theory of action perspective*. Reading, MA: Addison-Wesley.

Badaracco, J. 1991a. *The knowledge link: How firms compete through strategic alliances*. Boston, Mass.: Harvard Business School Press.

Badaracco, J. L. 1991b. Alliances speed knowledge transfer. *Planning Review* 19 (2): 10-16.

Becker, W. M., L. J. Kleinsmith, and J. Hardin. 2003. *The world of the cell*. 5th ed. San Francisco: Benjamin/Cummings

Bell, K. N. I. 2007. *Osmosis and diffusion*. www.mun.ca/biology/Help_centre/1001_2_tutorialpages/OSMOSIS.html (accessed September 25, 2007).

Berger, P. L., and T. Luckmann. 1966. *The social construction of reality: A treatise in the sociology of knowledge*. Harmondsworth: Penguin.

Bolsover, S. R., J. S. Hyams, E. A. Shepard, H. A. White, and C. G. Wiedenmann. 2004. *Cell biology: A short course*. 2nd ed. Hoboken, NJ: Wiley-Liss.

Bourdieu, P. 1986. The forms of capital. In *Handbook of theory and research for the sociology of education* ed. J. G. Richardson, 241-258. New York: Greenwood.

Broadbent, J., J. Gill, and R. Laughlin. 2003. The development of contracting in the context of infrastructure investment in the UK: The case of the private finance initiative in the National Health Service. *International Public Management Journal* 6 (2): 173-197.

Brown, J. S., and P. Duguid. 2002. *The social life of information*. Boston: Harvard Business School Press.

Brusoni, S., A. Prencipe, and K. Pavitt. 2001. Knowledge specialization, organization coupling, and the boundaries of the firm: Why do firms know more than they make? *Administrative Science Quarterly* 46 (4): 597-621.

Burpitt, W. 2004. Knowledge based resources and organizational capabilities: A study of new entry. *Journal of Applied Management and Entrepreneurship* 9 (2): 67-81.

Campbell, D., and D. Harris. 1993. Flexibility in long-term contractual relationships: The role of co-operation. *Journal of Law and Society* 20 (2): 166-191.

Child, J. 1975. Managerial and organizational factors associated with company performance: Part II. A contingency analysis. *Journal of Management Studies* 12 (1): 12-27.

Coase, R. H. 1937. The nature of the firm. In *The nature of the firm*, ed. O. E. Williamson and S. G. Winter, 18-33. New York: Oxford University Press.

Cohen, D. 1998. Toward a knowledge context: Report on the first annual U.C. Berkeley forum on knowledge and the firm. *California Management Review* 40 (3): 22-39.

Cohen, W. M., and D. A. Levinthal. 1990. Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly* 35 (1): 128-152.

Coleman, J. S. 1988. Social capital in the creation of human capital. *The American Journal of Sociology* 94 (Special issue): 95-120.

———. 1990. *Foundations of social theory*. Cambridge, Mass.: Belknap Press of Harvard University Press.

Cornelissen, J. P. 2005. Beyond compare: Metaphor in organizational theory. *Academy of Management Review* 30 (4): 751-764.

Cornelissen, J. P., M. Kafouros, and A. R. Lock. 2005. Metaphorical images of organization: How organizational researchers develop and select organizational metaphors. *Human Relations* 58 (12): 1545-1578.

Daft, R. L., and K. E. Weick. 1984. Toward a model of organizations as interpretation systems. *Academy of Management Review* 9 (2): 284-295.

Davenport, T. H., and L. Prusak. 1998. *Working knowledge: How organizations manage what they know*. Harvard Business School Press (accessed February 6, 2007).

de Holan, P. M., N. Phillips, and T. B. Lawrence. 2004. Managing organizational forgetting. *MIT Sloan Management Review* 45 (2): 45-51.

Dixon, N. M. 2000. *Common knowledge: How companies thrive by sharing what they know*. Boston: Harvard Business School Press.

Edmonds, L. 1997. *The vital link: A history of Main Roads Western Australia 1926-1996*. Perth: University of Western Australia Press.

———. 2007 in press. The vital link: The transition years - Main Roads Western Australia 1996-2006. Perth. Main Roads Western Australia.

Eisenhardt, K. M., and J. A. Martin. 2000. Dynamic capabilities: What are they? *Strategic Management Journal* 21 (10/11): 1105-1121.

English, L. M. 2005. Using public-private partnerships to achieve value for money in the delivery of healthcare in Australia. *International Journal of Public Policy* 1 (1/2): 91-121.

English, L. M., and M. Skellern. 2005. Public private partnerships and public sector management reform: A comparative perspective. *International Journal of Public Policy* 1 (1/2): 1-21.

Fiol, C. M. 1991. Managing culture as a competitive resource: An identity-based view of sustainable competitive advantage. *Journal of Management* 17 (1): 191-211.

Foss, N. J. 2002. New organizational forms: Critical perspectives. *International Journal of the Economics of Business* 9 (1): 1-8.

———. 2007. The emerging knowledge governance approach: Challenges and characteristics. *Organization* 14 (1): 29-52.

Galbreath, J. 2002. Success in the relationship age: Building quality relationship assets for market value creation. *The TQM Magazine* 14 (1): 8-24.

Garvin, D. A. 1993. Building a learning organization. *Harvard Business Review* 74 (4): 78-91.

Ghoshal, S., and P. Moran. 1996. Bad for practice: A critique of the transaction cost theory. *Academy of Management Review* 21 (1): 13-47.

Gomes-Casseres, B., J. Hagedoorn, and A. B. Jaffe. 2006. Do alliances promote knowledge flows? *Journal of Financial Economics* 80 (1): 5-33.

Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *The American Journal of Sociology* 91 (3): 481-510.

Grant, R. M. 1991. The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review* 33 (3): 114-135.

———. 1996a. Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science* 7 (4): 375-387.

———. 1996b. Towards a knowledge-based theory of the firm. *Strategic Management Journal* 17 (Winter Special): 109-122.

———. 2005. *Contemporary strategic analysis*. 5th ed. Oxford: Blackwell.

Grant, R. M., and C. Baden-Fuller. 1995. A knowledge-based theory of inter-firm collaboration. *Academy of Management Journal* Best Papers Proceedings 1995 17-21.

———. 2004. A knowledge assessing theory of strategic alliances. *The Journal of Management Studies* 41 (1): 61-84.

Gulati, R., N. Nohria, and A. Zaheer. 2000. Strategic networks. *Strategic Management Journal* 21 (3): 203-215.

Habermas, J. 1984. *The theory of communicative action: Reason and the rationalization of society*. Cambridge: Polity Press.

———. 2003. *Truth and justification*. Cambridge, MA: MIT Press.

Hamel, G. 1991. Competition for competence and inter partner learning within international strategic alliances. *Strategic Management Journal* 12 (Special issue): 83-103.

Hargadon, A. 2004. *Bridging old worlds and building new ones: Towards a microsociology of creativity (unpublished manuscript)*. Davis, CA: University of California, Davis.

Hart, O., and J. Moore. 1990. Property rights and the nature of the firm. *The Journal of Political Economy* 98 (6): 1119-1158.

Heracleous, L. 2004. Boundaries in the study of organization. *Human Relations* 57 (1): 95-103.

Hood, C. C. 1995. The 'new public management' in the 1980s: Variations on a theme *Accounting, Organizations and Society* 20 (2/3): 93-109.

Inkpen, A. C. 2005. Learning through alliances: General Motors and NUMMI. *California Management Review* 47 (4): 114-136.

Inkpen, A. C., and M. M. Crossan. 1995. Believing is seeing: Joint ventures and organization learning. *The Journal of Management Studies* 32 (5): 595-618.

Inns, D. 2002. Metaphor in the literature of organizational analysis: A preliminary taxonomy and a glimpse at a humanities-based perspective. *Organization* 9 (2): 305-330.

Jacobides, M. G., and S. Billinger. 2006. Designing the boundaries of the firm: From "make, buy, or ally" to the dynamic benefits of vertical architecture. *Organization Science* 17 (2): 249-261.

Kogut, B. 1988. Joint ventures: Theoretical and empirical perspectives. *Strategic Management Journal* 9 (4): 319-322.

Langfield-Smith, K., and D. Smith. 2003. Management control systems and trust in outsourcing relationships. *Management Accounting Research* 14 (3): 281-307.

Lapsley, I. 1999. Accounting and the new public management: Instruments of substantive efficiency or rationalising modernity. *Financial Accountability & Management* 15 (3/4): 201-207.

Leonard-Barton, D. 1992. Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal* 13 (Special Issue): 111-125.

Lippman, S. A., and R. P. Rumelt. 1982. Uncertain imitability: An analysis of interfirm differences in efficiency under competition. *The Bell Journal of Economics* 13 (2): 418-438.

Love, P. E. D., Z. Irani, and D. J. Edwards. 2003. Learning to reduce rework in projects: Analysis of firm's organizational learning and quality practices. *Project Management Journal* 34 (3): 13-25.

Macklup, F. 1980. *Knowledge: Its creation, distribution and economic significance.* Vol. 1. Princeton: Princeton University Press.

Main Roads Western Australia. 2003a. *Annual Report 2003.* Perth: Main Roads Western Australia.

———. 2003b. *Strategic Plan 2003-2007.* Perth: Main Roads Western Australia.

———. 2005. *Annual Report 2005.* Perth: Main Roads Western Australia.

———. 2006. *Annual Report 2006.* Perth: Main Roads Western Australia.

———. 2007. *Contracting strategy.* www.mainroads.wa.gov.au (accessed

March, J. G., L. S. Sproull, and M. Tamuz. 1991. Learning from samples of one or fewer *Organization Science* 2 (1-13): 58.

Massey, L. K. 2003. *Permeability properties of plastics and elastomers: A guide to packaging and barrier materials.* Norwich, NY: William Andrew Publishing.

McGee, J. 2003. Strategy as orchestrating knowledge. In *Images of strategy*, ed. D. Wilson and S. Cummings, 136-163. Oxford: Basil Blackwell.

McGee, J., H. Thomas, and D. Wilson. 2005. *Strategy: Analysis and practice.* 1st ed. Maidenhead, Berkshire: McGraw-Hill.

Miner, A. S., and S. J. Mezias. 1996. Ugly duckling no more: Pasts and futures of organizational learning research. *Organization Science* 7 (1): 88-99.

Mowery, D. C., J. E. Oxley, and B. S. Silverman. 1996. Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal* 17: 77-91.

Navarro, J. G. C., and B. R. Moya. 2005. Business performance management and unlearning process. *Knowledge and Process Management* 12 (3): 161.

Nelson, R. R., and S. G. Winter. 1982. *The evolutionary theory of economic change.* Cambridge, MA: Harvard University Press.

Nonaka, I. 1991. The knowledge-creating company. *Harvard Business Review* 69 (6): 96-104.

———. 1994. A dynamic theory of organizational knowledge creation. *Organization Science* 5 (1): 14-37.

Nonaka, I., and N. Konno. 1998. The concept of "ba": Building a foundation for knowledge creation. *California Management Review* 40 (3): 40-54.

Nonaka, I., and H. Takeuchi. 1995. *The knowledge-creating company: How Japanese companies create the dynamics of innovation, Harvard Business Review.* New York: Oxford University Press.

Nonaka, I., R. Toyama, and N. Konno. 2001. SECI, Ba and leadership: A unified model of dynamic knowledge creation. In *Managing industrial knowledge: Creation, transfer and utilization*, ed. I. Nonaka and D. J. Teece, 13-43. London: Sage.

Nystrom, P. C., and W. H. Starbuck. 1984. To avoid organizational crises, unlearn. *Organizational Dynamics* 12 (4): 53-65.

Passeron, J.-C. 1996. La Constitution des sciences sociales. *Le Débat* 90: 93-112.

Polanyi, M. 1966. *The tacit dimension.* Garden City, NY: Doubleday.

Pollitt, C., and G. Bouckaert. 2000. *Public management reform: A comparative analysis.* New York: Oxford University Press.

Prahalad, C. K., and G. Hamel. 1990. The core competence of the corporation. *Harvard Business Review* 68 (3): 79-91.

Prencipe, A., T. Brady, N. Marshall, and F. Tell. 2005. Making sense of learning landscapes in project-based organizations. In *Management of knowledge in project environments*, ed. P. E. D. Love, P. S. W. Fong and Z. Irani, 197-217. Burlington, MA: Elsevier Butterworth-Heinemann.

Prencipe, A., and F. Tell. 2001. Inter-project learning: Processes and outcomes of knowledge codification in project-based firms. *Research Policy* 30 (9): 1373-1394.

Pugh, D. S. 1973. The measurement of organization structures. *Organizational Dynamics* 1 (4): 19-34.

Quinn, J. B. 1978. Strategic change: "Logical incrementalism". *Sloan Management Review* 20 (1): 7-21.

———. 1992. *Intelligent enterprise: A knowledge and service based paradigm for industry*. New York: Free Press.

Reed, R., and R. J. DeFillippi. 1990. Casual ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management. The Academy of Management Review* 15 (1): 88-102.

Rifkin, W., and L. Fulop. 1997. A review and case study on learning organizations. *The Learning Organization* 4 (4): 135-148.

Rowlinson, S., and F. Cheung. 2002. *A review of the concepts and definitions of the various forms of relational contracting*. Brisbane: Cooperative Research Centre for Construction Innovation.

Ryle, G. 1949. *The concept of mind*. London: Hutchinson.

Schumpeter, J. A. 1934. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, MA: Harvard University Press.

Seal, W. 1999. Accounting and competitive tendering in UK local government: An institutionalist interpretation of the new public management. *Financial Accountability & Management* 15 (3/4): 309-327.

Siggelkow, N. 2007. Persuasion with case studies. *Academy of Management Journal* 50 (1): 20-24.

Spender, J. C. 1996. Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal* 17: 45-62.

Stake, R. E. 2005. Qualitative case studies. In *Handbook of qualitative research*, ed. N. K. Denzin and Y. S. Lincoln, 443-466. Thousand Oaks, California: Sage Publications.

Starbuck, W. H. 1992. Learning by knowledge-intensive firms. *Journal of Management Studies* 29 (6): 713-740.

Teece, D. J. 1992. Competition, cooperation, and innovation: Organizational arrangements for regimes of rapid technological progress. *Journal of Economic Behavior & Organization* 18 (1): 1-25.

Teece, D. J., G. Pisano, and A. Shuen. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal (1986-1998)* 18 (7): 509-533.

Tsoukas, H. 1991. The missing link: A transformational view of metaphors in organizational science. *Academy of Management Review* 16 (3): 566-585.

———. 1993. Analogical reasoning and knowledge generation in organization theory. *Organization Studies* 14 (3): 323-346.

Tywoniak, S. A. 2007a. Knowledge in four deformation dimensions. *Organization* 14 (1): 53-76.

———. 2007b. *Academy of Management Conference, Making sense of the resource-based view?* Philadelphia:

Von Ghyczy, T. 2003. The fruitful flaws of strategy metaphors. *Harvard Business Review* 81 (9): 86-94.

von Krogh, G., K. Ichijo, and I. Nonaka. 2000. *Enabling knowledge creation: How to unlock the mystery of tacit knowledge and release the power of innovation*. Oxford University Press: New York.

von Krogh, G., and J. Roos. 1996. Imitation of knowledge: A sociology of knowledge perspective. In *Managing knowledge: Perspectives on cooperation and competition*, ed. G. von Krogh and J. Roos, 32-54. Sage: London.

W. L. Gore & Associates. 2007. *What is GORE-TEX® fabric?* www.gore-tex.com (accessed September 28, 2007).

Walker, D. H. T., ed. 2004. *The knowledge advantage (K-Adv): Unleashing creativity and innovation (unpublished manuscript).* Brisbane: CRC Innovation in Construction

Walter, J., C. Lechner, and F. W. Kellermanns. 2007. Knowledge transfer between and within alliance partners: Private versus collective benefits of social capital. *Journal of Business Research* 60 (7): 698-710.

Weick, K. E. 1979. *The social psychology of organizing.* 2d ed. New York: Random House.

———. 1988. Enacted sensemaking in crisis situations. *Journal of Management Studies* 25 (4): 305-317.

———. 1995. *Sensemaking in organizations*, *Foundations for organizational science*. Thousand Oaks: Sage Publications.

———. 2007. The generative properties of richness. *Academy of Management Journal* 50 (1): 14-19.

Weick, K. E., and K. H. Roberts. 1993. Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly* 38 (3): 357-381.

Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal* 5 (2): 171-180.

Williamson, O. E. 1981. The economics of organization: The transaction cost approach. *The American Journal of Sociology* 87 (3): 548-577.

———. 1991a. Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quarterly* 36 (2): 269-296.

———. 1991b. The logic of economic organisation. In *The nature of the firm: Origins, evolution, and development*, ed. O. E. Williamson and S. G. Winter, 90-116. New York Oxford University Press.

Yin, R. K. 1994. *Case study research: Design and methods.* Thousand Oaks, California: Sage Publications.

Young, S. 2007. Outsourcing: Uncovering the complexity of the decision. *International Public Management Journal* 10 (3): 307-325.

Zack, M. H. 1999. Developing a knowledge strategy. *California Management Review* 41 (3): 125-145.