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HOW ORGANIZATIONAL BOUNDARY CHOICES IMPACT CAPABILITY DEVELOPMENT

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ABSTRACT

As construction oriented public sector agencies have outsourced more and more of their construction related activities, they have often suffered from an inability to provide appropriate oversight due to degraded capabilities. This had led to calls for these agencies to rebuild capabilities across different technical areas. A firm's boundary choices – make, buy, ally and dual modes (make and buy simultaneously) – may impact the ability of a firm to maintain and even build new capabilities, and in this paper we seek to investigate the impact that boundary choices have upon rebuilding capabilities and the extent to which organizations may make sub-optimal choices economically to potentially create opportunities for learning and knowledge sharing. Using qualitative data from three project-based public sector organizations managing large construction projects, we observed that neither pure make nor buy decisions assisted significantly in capability building. Dual modes provided firms with some opportunities to build capabilities, but the most successful decisions seemed to occur in respect of using intermediate governance modes such as alliances. We also observed that the boundary choice was just one dimension of the capability building process and suggest organizations require a multi-pronged strategy to rebuild capabilities over time.

HOW ORGANIZATIONAL BOUNDARY CHOICES IMPACT CAPABILITY DEVELOPMENT

Research concerning firms' vertical boundaries has traditionally looked towards efficiency arguments in terms of whether it is more efficient to undertake an activity internally relative to the total cost of sourcing the product or service from the market.¹ Transaction cost economics (TCE) has dominated this research, highlighting the efficiency of markets in the absence of high transaction costs driven by factors such as asset specificity, high levels of uncertainty and small numbers bargaining (Williamson, 1975; 1985; Macher & Richman, 2008). However, an alternative perspective highlights that a firm's boundaries will be determined by its capabilities – that is, given firm heterogeneity, firms will specialize in those activities where they have a comparative advantage and attain 'gains from trade' by sourcing products or services from the market where they do not have a comparative advantage (Argyres, 1996; Jacobides, 2008).

Thus, while firm capabilities provide an explanation for determining the optimal location of a firm's boundaries, we suggest that this relationship between capabilities and firm boundaries is not unidirectional. That is, the choices a firm makes in terms of what it undertakes internally versus what is sourced from the market will, over time, fundamentally impact the development of its capabilities. At a basic level, producing a good or service internally (rather than using the market) provides an opportunity for firms to learn and build routines as a basis for new capabilities (Teece, 2007; Eisenhardt & Martin, 2000). And the use of concurrent sourcing or dual governance modes (where a firm buys from the market and simultaneously produces it in-house) along with

¹ Governance choices, firm boundaries, vertical scope and vertical architecture are all terms used within the literature but relate to the same broad concept – what activities take place within a firm versus what takes place external to the firm boundaries. While a number of authors (e.g. Poppo & Zenger, 2002) recognize contractual and relational governance approaches to organizing economic activities, our focus in this paper is upon the contractual governance approaches to determining firm boundaries.

hybrid or network forms of governance (such as alliances or joint ventures) provide opportunities for learning and capability building that are not stark ‘all or nothing’ choices in terms of internal production versus outsourcing.² It is the potential for firms to make boundary choice decisions that are less than optimal in respect of economic efficiency as a means to build new capabilities (Bridge & Tisdell, 2004) that provides an alternative approach to considering capabilities and firm boundaries. In this vein, we seek to investigate the choices firms make concerning their vertical boundaries (including the trade-offs they make), how these choices are operationalized in terms of their day to day activities and the impact these boundary choices have upon the actual development of new capabilities.

We present four possible vertical boundary choices – make, buy, intermediate governance modes and dual governance modes. Existing literature tends to focus upon the rationale for such choices rather than the impact that these choices will have upon subsequent capability development (Jacobides & Winter, 2005; Makadok & Coff, 2009; Parmigiani & Mitchell, 2009). In a strategic sense, we are primarily interested in how boundary choice decisions are made, along with the actual management of these firm boundaries over time, to build or rebuild capabilities that will directly impact firm efficiency and competitiveness.

In respect of our empirical setting, the emergence of New Public Management (Pollitt & Bouckaert 2000, English 2005) has seen government agencies pull back their corporate boundaries through outsourcing and divestment of core activities (Young, 2007). Agencies that have previously been tasked with construction activities as an example, no longer complete any construction and instead manage a plethora of contractors. In some cases, the outcome is a misalignment between an organisation’s capabilities and the agency’s mandate. At a practical level

² Makadok and Coff (2009) also distinguish intermediate modes from hybrids in that hybrids are market like in some dimensions (ownership, rewards and authority), but hierarchy like in others.

the result has been a number of failed projects and select agencies have been tasked with increasing their capabilities significantly. The need to (re)build organisational capabilities in the construction industry has been clearly identified (Hartmann, Davies & Frederiksen, 2010) whilst maintaining high levels of efficiency and thus this paper considers the specific issue of how organizational boundary choices has impacted the capability development process in select construction oriented public sector agencies.

FIRM BOUNDARIES, CAPABILITIES AND LEARNING

Building (or rebuilding) capabilities has been a popular topic of research within the capabilities and the learning literatures. The focus over time has seemingly become more micro with a stream of literature concerning the microfoundations of capabilities (e.g. Teece, 2007; Felin et al., 2012). Coupled with such studies is a focus on learning (e.g. Zollo & Winter, 2002; Styhre, Josephson & Knauseder, 2004) and the role of the individuals in the decision-making process (e.g. Corner & Wu, 2012; Dahlander, O'Mahony & Gann, 2016).

Whether a firm should undertake an activity or outsource to the market has traditionally been determined by the presence of a comparative advantage in respect of a particular activity, thus linking firm boundaries and capabilities (Argyres, 1996; Araujo, Dubois & Gadde, 2003). However, the relationship is not unidirectional. The location of firm boundaries and the nature of these boundaries is a key determinant of whether a firm may engage in the learning and establishment of routines that form the basis of new capabilities (Bredillet, Tywoniak & Tootoonchy, 2018). It is this 'reverse' relationship (ie that boundary choices impact capability development) that we investigate.

Current explanations for the location of firm vertical boundaries have emerged from a variety of perspectives including seminal organizational theory models that focused on the coordination of tasks and activities (Katz & Kahn 1966; Lawrence & Lorsch 1967; Thompson 1967), to theories of economic organisation focused on property rights and transaction costs (Alchian & Demsetz 1972; Grossman & Hart 1986; Jensen & Meckling 1976; Williamson 1975), and strategic theories of resources, capabilities and knowledge (Barney 1995; Foss 2002; Teece, Pisano & Shuen 1997). There is also the potential to distinguish between contractual and relational governance in terms of where to establish a firm's vertical scope (Poppo & Zenger, 2002; Zheng, Roehrich & Lewis, 2008; Cao & Lumineau, 2015). Here we focus on contractual governance, though invariably in determining whether to engage in an exchange, relational governance would be considered.

Focussing on contractual governance explanations, contemporary research is dominated by two broad conversations. The first one is informed by TCE and is primarily concerned with the vertical scope of the firm: where to draw organizational boundaries in order to minimise costs at a given time point. Whenever the combined costs of internal production and coordination are less than the suppliers' cost of production plus the corresponding transaction costs, firms should perform activities in-house (Williamson, 1975, 1985). The second conversation is informed by theory concerning capabilities, knowledge and learning, and suggests that due to the heterogeneous distribution of capabilities across an industry, the presence of particular capabilities that create the basis for a comparative advantage determines firm boundaries. Some authors (e.g. Jacobides & Winter, 2005; Argyres & Zenger, 2012) have discussed how transaction costs and capabilities interact to determine a firm's vertical boundaries. In this section we present a review of the salient

elements of each of these two research traditions in respect of how boundary choices may directly or indirectly impact capability development.

These perspectives provide a theoretical rationale for a variety of boundary choices – make, buy, ally (intermediate governance modes) and concurrent sourcing (dual governance modes). However, each of these boundary choices will then impact the extent to which firms may build (or rebuild) capabilities. In the following section we discuss these four boundary choices in terms of their impact upon learning and thus the potential to use these in a strategic manner to build capabilities over time.

Buy

TCE suggests that when external suppliers have a comparative cost advantage, provided that there is no major threat of holdup, then the firm should buy in the goods or services considered, rather than attempt to perform the activity in-house (Williamson, 1975). However, firms that move various activities from internal production to external suppliers will see their capabilities in respect of these activities wither over time (Collis, 1994). The firm may retain an element of capability, but it will weaken significantly in due course as structures change, cultures adapt and critical employees leave (Grant, 1996a).

The potential for gains from trade is likely to limit the efforts a firm makes to build capabilities for non-core activities. However, a firm moving into an entirely new activity may still find opportunities for learning even if it uses a buy option. There may be some limited knowledge leakage (Hamel, 1991; Inkpen, 2005), and whilst its productive capabilities may not change, at a minimum, the firm should learn about existing industry standards, technology and appropriate pricing of the activity. The need to minimize the risk of cheating encourages firms to learn about

various dimensions of the market. Firms pursuing a 'buy' strategy will at best know enough to engage efficiently with the market, but will not build any significant capabilities.

Make

Conversely, firms should undertake in-house activities that are considered to be core business, where the firm has a comparative advantage, or the transaction costs involved in using the market exceed internal production costs (Williamson, 1975). Internal production will allow firms to entrench certain routines and develop capabilities over time. Thus the make option provides firms with classic learning opportunities akin to the experience curve (Henderson, 1984). Capabilities are continually developed within the firm: "know-how is held as trade secrets, and has been developed from longer experience than competitors in experimenting with the many combinations of parameters of the process" (Argyres, 1996:143). Firms may build new capabilities through exploration whereby they actively seek to learn (Brady & Davies, 2004). Hence, there are trade-off between gains from trade (contracting with a more efficient provider) and a purposeful 'make' strategy seeking to develop capabilities that are perceived to be desirable.

Intermediate Governance Modes

The intermediate governance mode or network enables a firm to use a combination of incentives to govern a particular transaction with a single economic actor (Makadok & Coff, 2009; Williamson, 1991). These modes refer to a single transaction where the product or service is produced via a strategic alliance, whilst dual modes see the options of make and buy applied to different transactions, but for the same activity. There is considerable literature concerning how alliances can lead to knowledge transfer and learning (Rice et al., 2012; Inkpen, 2005). Beyond

any planned knowledge sharing, there is always a degree of knowledge spillovers such that interconnected firms will generally experience greater erosion of rents owing to imitation (Lavie, 2006: 649) and as such, by forming alliances, interconnected firms can gain access to resources without paying full acquisition costs.

Strategic theories focused on knowledge and learning provide clear rationales for the existence of alliances as an economically efficient governance mode (Grant, 1996b). As there is never a perfect congruence between the activity boundaries of the firm and the knowledge boundaries of the firm, opportunities exist for alliances. The suggested implication is increasing cooperation with other organizations to engage in activities and access resources, including knowledge, outside their own boundaries (Grant & Baden-Fuller 2004). However, strategic theories of capabilities and knowledge do not address how the knowledge actually flows between organisations and implicitly treat knowledge like other tradeable assets without delving into the complexities of transferring knowledge between organisations (Grant & Baden-Fuller 2004).

Dual Governance Modes

Since Harrigan's (1984) work on taper integration, it has been recognized that firms do in fact use dual governance modes whereby they simultaneously make and buy (concurrent sourcing) and make and sell (concurrent exploitation) the same product or service. These dual modes are independent and stable choices (as opposed to transitory phenomena) that enable a firm to utilize both the market and hierarchy simultaneously. The existence of dual modes cannot be explained using TCE principles and thus alternative explanations rely on alternative mechanisms, including learning and capability development (Jacobides & Billiniger, 2006; Krzeminska, Hoetker & Mellewigt, 2013; Parmigiani & Mitchell, 2009).

Dual modes provide firms with learning opportunities from both their own activities and suppliers/buyers. In addition to experience curve effects, the firm is able to build absorptive capacity thereby enhancing their capacity to assimilate new knowledge from suppliers (Lane & Lubatkin, 1998; Jansen, van den Bosch, & Volberda, 2005). Hence, firms will learn which activities provide the best opportunities for further gains from specialization. “Concurrent sourcing opens the firm to learning arising from the spillovers from related components and different production methods of the firm and its suppliers” (Parmigiani & Mitchell, 2009: 1067). Over time, changes in the capability distribution within the industry provide feedback regarding the appropriateness of their relationship with suppliers – “firms need to make in order to know ... [but] firms do not need to make all of their components to know enough to outsource” (Parmigiani & Mitchell, 2009: 1067).

Taken together, different governance modes have been linked to learning and/or capability development. This is most overtly seen in the strategic alliance literature where a body of work has evolved around ‘learning alliances’ (Khanna, Gulati & Nohria, 1998; Inkpen, 2005; Howard, Steensma & Lyles, 2016). Similarly, in considering the make option, there is considerable work concerning how firms learn through doing³. Kogut and Zander (1992) look specifically at how combinative capabilities may derive from both internal and external learning and the role that the make versus buy decision may have upon this learning. Finally, the dual-mode literature is the least expansive and the links between this mode and capability building is limited. Nevertheless, Parmigiani and Mitchell (2009) highlight the desire for learning within the firm and learning about the market (suppliers, standards and prices) to explain why firms may make and buy an input product or service simultaneously.

³ See Dodgson (1993) for a review of the early work on learning by doing.

Thus, the TCE and the capabilities literature provide a theoretical logic for different vertical boundary choices and their management over time. And literature concerning capability building and learning considers how this may occur – including issues relating to knowledge spillovers, learning by doing and absorptive capacity. This paper extends this line of thinking to explicitly consider the following research questions:

Research Question 1: How do organizations' boundary choices impact organizational efforts at (re-)building capabilities?

Research Question 2: What other organizational choices impacted efforts to (re-) build capabilities?

METHODS, DATA AND CONTEXT

This research involves three case studies of Australian government organizations. These organizations – the West Australian Department of Housing and Works (DHW), the Main Roads Department of Western Australia (MRWA) and the Queensland Department of Main Roads (QMR) – are all involved in the building and maintenance of major infrastructure projects such as roads, bridges and tunnels in the case of the roads specific departments, and hospitals, schools and major government buildings for the 'works' department. As outlined in each case study below, these organizations have witnessed a significant shift in the location of their boundaries and in two cases, major reports have recommended that they need to rebuild relevant capabilities following the review of a number of projects.

The advantages of using these three case studies was that they approximate to something akin to a natural experiment and their selection in the study was due to their similarity in respect of their activities and the fact that they made different boundary choices. The organizations are all

overseeing large scale construction projects and use many of the same contractors. But they also demonstrate different boundary choices in action. DHW is dominated by make or buy boundary choices; QMR often relied upon dual-modes; whilst MRWA used intermediate governance modes in the form of alliances. Faced with similar institutional environments, organizational structures (as government departments) and operating in very similar industries, these cases provided an opportunity to investigate the role of boundary choices and their impact upon building organizational capabilities.

Data was obtained via 34 interviews (minimum of ten per organization) of approximately one hour with key internal and external stakeholders (suppliers/contractors). We committed to undertake a minimum of 10 interviews per organization and data saturation was achieved within this number. Supplementary data came from secondary data sources including websites, annual reports and documentation of procedures. These were used as background information and assisted contextualizing the data. To ensure that we had not misinterpreted any of the material, we presented detailed reports concerning all of our analysis and our finding to each organization in draft form and made some minor adjustments on the basis of this feedback.

To ensure that we spoke to the most appropriate people, the project sponsors in each organization recommended various employees as well as recommending different contractors/suppliers. This purposive sampling of participants enabled us to gain a variety of perspectives on some of the most relevant processes and thus yield rich data for the development of the case studies (Cresswell, 2002). Following the initial interviews, we immediately started analyzing data and based decisions about what data to collect next on this analysis, thus providing valuable clues about missing data and shaping theoretical sampling (Miller, Dingwall & Murphy, 2004). We initially used open coding for preliminary categorizing and analyzing the data. This

identified key themes that existing across the data in respect of the central research questions. Rearranging the data into blocks according to the results of the initial coding process allowed us to develop further insights and thus it was through axial coding that additional connections between categories were identified. Constant comparative method underpinned the process (Dey, 2004) and finally selective coding was applied whereby we selecting the core concept and decided what was required to fill in gaps in categories that required further refinement. Once no further data was required to fill in gaps and the same issues continued to be presented, we recognized that we had reached saturation. Final key coding categories can be seen in Tables 1, 2 and 3⁴. NVivo™ was chosen as the preferred analysis software because of its ability to assist in the maintenance of large data sets. Coding was undertaken by one team member and then reviewed by another team member to ensure that they ‘made sense’ as a means of ensuring inter-rater reliability (Charmaz, 1990).

The resulting cases provide the rich data (Siggelkow, 2007; Burton & Galvin, 2018) required to understand the second order complexity of knowledge processes which are contextualised in social and cultural experiences (Tywoniak 2007). The choice of three comparable, rich case studies gives us interesting insights into the experiences of those in organizations that are seeking to rebuild their capabilities through purposeful boundary choices.

CASE STUDIES

Department of Housing and Works (WA)

Of the three organizations that formed part of this research, DHW had undergone the most significant changes. It had evolved from the original Department of Works in Western Australia

⁴ The codes shown in the tables are the sub-set that relate to this research paper and a much larger set of codes was used across the entire project to meet the needs of the organizations.

having been responsible for building much of the major government infrastructure for the better part of two centuries. Starting in the 1980s, there was a shift towards greater outsourcing. Different parts of the organisation were shifted to other agencies and an increasing number of activities were outsourced.

At present, the DHW primarily manages contracts. Other government departments form the client base. For example, when the Department of Education needs a new school or the Health Department has funding to build a new hospital, they use DHW to manage the entire process. DHW then outsources the vast majority of the activities associated with the design, project management and building of the required infrastructure.

Following some notable problems in some high profile buildings and a change in government, DHW implemented a 'Review and Rebuild' strategy in 2008. It was recognized that the organization was losing a significant portion of its corporate knowledge each year as highly skilled long-serving employees retired. Often these employees had come from a technical background, the fact that they might have initially entered the organization as an architect or an engineer meant that they had a capacity to work with contractors and sort out issues before they became problems.

There are a number of strands to the 'Review and Rebuild' strategy. Significant efforts have been made to work with other public sector agencies such as the Department of Planning and Infrastructure and MRWA. This includes formal processes such as the creation of a central Office of Strategic Projects to assist with major projects (such as a new teaching hospital) and more informal processes such as networking events for relevant project managers.

There has been little in the way of changing the boundaries of the organization with the vast majority of activities directly relating to designing and building completed by contractors.

There are some limited efforts to bring some of the preliminary or complementary work back in-house. For example, in respect of meeting certain sustainability targets, DHW is doing a small amount of the work and using consultants on more specialized projects. This is also being tried in other preliminary design related activities – *“Sustainability is one area we are putting in some effort, but there’s many other facets of design that we’re not able to put the same effort of resources in and so there are large gaps. Heritage has been variable, but it’s less well resourced, also it’s a specialised area. Then there’s everything, remediation, pollution, are all related to sites and ... there is no expertise”*.

There have been significant attempts to learn from contractors as part of the ‘Review and Rebuild’ strategy such as the introduction of much more detailed project reviews. These however, have been fairly unsuccessful at helping to build organizational knowledge. First, little real effort was put into the reviews with people customising them as they see fit – *“Because you allow that customisation, I guess you then get different firms, and different project managers, who have a different perspective on what they want, and what they expect”*. Secondly, the pace of work is such that there is little time for reflection and subsequent action – *“People don’t do a job and then start the next one... they’ve always got six, or eight, or ten on the run at once”*. In addition, employees tend to work individually on projects so they have little opportunity to learn from other projects unless a formal evaluation review is shared amongst a larger group – *“each project manager is basically his own little island and his or her team”*.

The other key reason why so little knowledge is assimilated by DHW from their various contracting efforts is the actual nature of the contracts used. The principal determinant for selecting a contractor is the price – *“So there’s a lot of pressure on us, generally speaking, to bottom trawl, to have the cheapest price”*. Contractors submit tenders that include virtually no margin and work

on the (commonly correct) assumption that there will be some change in scope or specifications for which they will be able to invoice separately and this is where they will make their margin. The result is that there is simply no organizational slack such that contractors can spend time working with DHW in a way that will help them rebuild some capabilities.

The boundary choices of outsourcing much of the work and trying to learn from some contractors has not been successful in the main. And even when activities are undertaken internally, they tend to not result in organization-wide capability development as the learning tends to stop at the individual involved. Key findings can be seen below in Table 1.

< < - - - Insert Table 1 around here - - > >

Queensland Department of Main Roads (QMR)

Of all the states in Australia, Queensland has been the least aggressive in pursuing out-sourcing amongst its various government agencies. They have been slow to follow this global trend and as a result are envied by agencies across many other states due to their ability to still take a lead role in a variety of standards or process related discussions with industry bodies.

Nevertheless, there has been a significant shift in the design of the organization with the construction component being corporatized (ie they were structured to operate in a manner similar to a commercial firm and to pay a dividend to the government). This shift started in the 1980's when QMR began to initiate a change in their structure to split the department into two sections: Main Roads (QMR) and RoadTek. QMR was responsible for much of the design and recording of standards and specifications which they maintain through a comprehensive set of manuals.

RoadTek was responsible for the physical building of the projects and contract themselves back to QMR. Employees were allocated a division in which to work.

Even with this arrangement, over the last two decades more and more work has been outsourced to private contractors. Respondents indicated that it used to be the case that 80 percent of project work was done through RoakTek and 20 percent outsourced. The situation is now reversed with 80 percent of work being outsourced.

The knowledge that is created through projects and specific research undertaken internally is shared and eventually forms the basis for enhanced capabilities through a number of mechanisms. There are formal communities of practice which have been very successful, smaller technical forums and an annual technology transfer forum held in Brisbane annually for participants from all the regions. There are also structures and systems in place such as always trying to put pairs of people or groups of three on a project, structured mentoring programs and the creation of a culture where people are very happy to share information.

There is less success with building capabilities in respect of outsourced work. With respect to big projects there are formal systems in place – “... *there are formal meetings with the representatives; it's all documented in minutes*”. The problem is that this tends not to be internalized – “...*here's the explicit knowledge, and here's the tacit knowledge and then how do we bring it into, so it becomes tacit knowledge, you know, for others and passing it on. So we've got to be thinking about how do we pass on information, not plonking it somewhere, and that's what we do – we put it somewhere and then expect people to go and find it for themselves*”.

There are some exceptions to this where due to the relationships in place there are meaningful learnings emerging out of the work done by the private contractors – “*I was at a learnings workshop a couple of weeks ago for a very large project and all of the presenters, or*

bar one or two, were private industry people, and they had an attitude of sharing that even with their competitors. They're not sharing financial commercial in confidence information ... it [could] be just a simple technical construction issue or a design issue or it can be something much broader".

The choice to make and buy certain activities simultaneously has had limited success in terms of building capabilities. There were select examples where QMR sought to explicitly learn from contractors and incorporate this knowledge into their own similar activities. However, in the main, using outside contractors was undertaken to achieve economic efficiencies and the continuance of internal operations whilst the majority of the activity occurred externally was more likely to see QMR assume the position of an 'informed buyer'. The key findings for QMR are shown below in Table 2.

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Main Roads Western Australia (MRWA)

Up until the 1980s MRWA had total control over the design and construction of roads. Over time more work was outsourced such that by the 1990s as much as 60 percent of work was handled by contractors. A further push to outsourcing work was made under the State Government's economic rationalist reform agenda – resulting in significant staff reductions. In 2001 a Ministerial report recognized that this has severely compromised MRWA's capacity to operate and recommended that 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. This paved the way for a move towards relationship contracting and particularly alliancing. A new Commissioner was hired who brought

with him a wealth of contracting experience and knowledge about relationship contracting and in a little under three years from the influential report, MRWA entered its first (rather prescriptive) alliance contract.

Before covering the alliance contracts used, it is worth noting that the majority of work done by MRWA is still smaller scale projects that are either completed in-house in respect of establishing standards or are outsourced and a project manager oversees them from the perspective of MRWA. Similar to the previous two cases, the extent to which there is any learning from the contractor very much depends upon the relationship that exists.

In comparison, alliance contracts – which apply to the largest of contracts – seem to be considerably more successful. The awarding of alliance contracts are based on multiple criteria including the reputation of the alliance partners rather than being based entirely upon cost. Even the final cost is often not determined until after the contract has been signed and preliminary design work is completed (though there is always an accepted formula or system for determining the eventual cost that is agreed to in advance). In essence, a key driver for MRWA is to build the best possible roads for the community and they seek alliance partners who can bring innovation to each project (Edmonds, 2007). While alliances 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 capacity building potential for all individuals and organizations involved – something that is not inherent in conventional contracting arrangements.

At the start of each project, an independent alliance facilitator works with the alliance management team to determine goals, including a commitment that everyone will exit the alliance with enhanced knowledge and skills. This process involves establishing explicit non-cost key

performance indicators (such as training), which are measured and rewarded by the client as part of the contract. Thus there is a clearly articulated learning agenda.

Alliance partners agree that the biggest challenge in establishing an alliance partnership is bringing people from different organisations together to think as one. Another key issue is that alliance contractors may require the use of key personal for many years and employees are not replaced in MRWA while they are working away from the department on the alliance contract. However, involvement in an alliance contract is an invaluable source of knowledge for the employee and the department – *“The learning has been huge... and importantly we are documenting everything we do and feeding that back into Main Roads”*.

When alliance members return to the parent organisation they take with them invaluable knowledge not only about the practice of constructing a particular road, but also about the way that alliance partners think and the collaborative, problem solving processes involved to achieve the outcome. Documenting the alliance experience embellishes knowledge which flows back to the organisation through other conduits like formal reporting, designs and the Technical Advisory Group. People entering new alliances have described the knowledge gleaned from the documented processes of previous alliances as invaluable. Many 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 effective because feedback loops are being developed and this new knowledge challenges existing, traditional thinking within the parent organization. Employees involved with developing and implementing design standards see great benefits flowing back to their team.

MRWA employees have a 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 said *“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 key findings for MRWA are shown below in Table 3.

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DISCUSSION

In considering whether organizations make strategic vertical boundary choices to rebuild capabilities and whether these vertical boundary choices involve trading-off short-term efficiencies for learning opportunities we considered four boundary choices. The three case studies discussed do not present pure and discrete cases of different boundary choices, however, many of the decisions were unique and provide a very useful starting point for better understanding the choices organizations make in respect of their boundaries, how they operationalize these choices and the impact they have upon the organization. A summary of these choices and their impact upon capability building is shown in Table 4.

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Boundary Choices and Capability Building

In respect of Research Question 1 – how organizations’ boundary choices impact efforts to (re-)build capabilities, it was clear that the four different boundary choices presented very different outcomes. Not unexpectedly, the option to buy a product or service did not provide an opportunity

to learn from contractors. As the knowledge on the part of the contractor was embedded in the organization, being largely tacit in nature and entrenched within a dominant culture, it was inevitably difficult to transfer without a comprehensive appreciation of the context of the knowledge (Soo et al., 2002). And on the recipient side of the equation, the lack of relevant internal knowledge (Davies & Brady, 2016) limited absorptive capacity (Lane & Lubatkin, 1998) or receptivity (Hamel, 1991) led to an inability to understand what the other party was doing, as well as not being able to understand the process leading to the other party's knowledge development. Thus without existing knowledge and routines relating to a specific activity, it was challenging to acquire knowledge and build new capabilities – as was seen very clearly in the case of DHW.

In comparison, the make strategy did provide opportunities for the development of capabilities through learning by doing whereby explicit knowledge becomes internalised by staff and adds to their tacit knowledge (Nonaka & Takeuchi, 1995). DHW attempted to bring additional activities in-house such as sustainability, heritage and environmental reporting. However, without an existing knowledge base or relationships with contractors in these areas, there were limited opportunities to learn other than through trial and error. In essence, expanding the firm boundaries and bringing an activity into the organization does not suddenly (or even slowly) guarantee new capabilities (Wohlgemuth & Wenzel, 2016). Instead, we observed inefficiencies (relative to what was achieved when the activity was outsourced) and slow progress in respect of capability building.

It was not obvious as to why QMR followed a dual mode strategy in respect of their boundary management. The most likely explanations from the earlier discussion center on information asymmetries (Heide, 2003), performance uncertainty given the complex nature of the

products or services (Novak & Eppinger, 2001), and opportunities to learn (Parmigiani & Mitchell, 2009).

Where dual-modes were employed, the decision to buy seemed to be based on efficiency and budget constraints, whilst the decision to simultaneously make provided a deep understanding, of the activity as a basis for managing the outsourcing contracts efficiently. However, there were also clear examples of QMR choosing to undertake an activity internally so that they could learn and build this learning into their operations when more and more of this particular activity was being outsourced. Thus the logic concerning why an organization might take a potentially economic inefficient position by utilizing a make and buy choice for the same product or service in terms of learning and building absorptive capacity (Jansen et al., 2005; Parmigiani & Mitchell, 2009) did hold in this case.

Intermediate governance modes were most obvious in the form of alliance contracting as seen primarily in the case of MRWA. These were used for the largest projects and could be understood in terms of managing risk. By providing incentives for a range of outcomes that varied between the hard-to-motivate and the easy-to-motivate tasks, they limited opportunism through quasi-hierarchical authority and simultaneously delivered a degree of autonomy beyond that experienced with a hierarchy (Dyer & Singh, 2008; Oxley & Sampson, 2004).

These alliance contracts came at significant cost in that they were never established purely on the basis of efficiency and they purposefully incorporated a range of key performance indicators around knowledge transfer and learning. Some employees physically moved out of MRWA facilities for extended periods and the financial uncertainty associated with these projects was significant. Yet the results in terms of (re-)building capabilities were very positive. The physical co-location and joint activities provided a platform for tacit and explicit knowledge transfer

(Nonaka, 1994). Undertaking activities jointly presented the contextualization for effective learning that was not available through other boundary choices.

Organization Operations Choices and Capability Building

In respect of the second research question – what other organizational choices impacted efforts to (re-)build capabilities – a range of management initiatives enhanced or restricted the effectiveness of capability building efforts. Management support for developing capabilities was seen in the creation of structures, processes and support systems for learning. Such commitment manifested itself in a variety of ways including, the establishment of mentoring programs, internal training and development programs, communities of practice and informal knowledge transfer networks (Grigoriou & Rothaermel, 2017). One distinguishing factor between QMR's and DHW's attempt to rebuild capabilities was the desire and clarity around the strategy for rebuilding. Hamel (1991) suggests that knowledge acquisition requires intent on the part of management in the form of a learning agenda and support by senior management. "Without clear corporate goals for competence building, and a deep appreciation for the critical contribution of core competence leadership to long-term competitiveness, individual businesses appeared unlikely to devote resource to the task of learning" (Hamel 1991: 92). QMR's extensive communities of practice, informal systems to bring people together and formalized communications both within the organization as well as with suppliers emphasizes their intent.

In addition, social processes, like trust, were critical as contractual governance is unable to sufficiently safeguard against exchange hazards associated with information exchange to get people to commit to fully engaging in capability development activities (Zheng et al., 2008; Geneste & Galvin, 2015). As a number of respondents indicated, knowledge is power and thus,

you do not willingly give it up if you do not trust how you will be valued in the future: the contractual governance processes tried to create boundaries for relational governance such as formalizing the expectations around learning and collaboration.

Considering those factors that restricted capability building, the lack of slack resources that allow for staff to engage in learning and work with other parties was critical. Thus in the case of DHW, the focus on price meant that contactors did not have the capacity to work with the project manager from the government agency. It also created an adversarial relationship that went against the need to create trust in the relationship to allow for knowledge transfer. Finally, as previously alluded to, absorptive capacity and co-location were critical. If organizations “need to make in order to know” (Parmigiani & Mitchell, 2009: 1067) then simply using the market to provide certain products and services will never provide the basis for this absorptive capacity, or the socialization opportunities for inter-organizational knowledge sharing and learning. This was a key reason why the MRWA alliance contracts were so successful in helping to rebuild capabilities.

CONCLUDING REMARKS

This paper investigates the impact of organizational boundary choices on the capability development process in organizations. Our findings and discussion reveal two contributions: first, we build on existing literature to show how boundary choices impact the capability development (RQ1); second, our research identifies various management activities and decisions that enhance or restrict the relationship between boundary choices and capability development (RQ2).

This paper presents different boundary choices (make, buy, intermediate governance modes and dual governance modes) and considers how such choices may potentially impact the (re-)building of firm capabilities. Outside of the make option, all other governance modes provide

particular pathways to capability development and we sought to investigate how these were used and their effectiveness across three construction oriented public sector organizations. For managers, what was perhaps most revealing were the results for the intermediate governance modes and the dual modes. In the case of dual modes, the decision to use the market for some production of a service or activity has been proffered as potential source of learning. “When a firm concurrently sources, learning will be enhanced, since it gains both the deep tacit knowledge of internal production and the broader, more diverse understanding from external supply relationships” (Parmigiani, 2007: 292). For the purposes of building capabilities it seemed that the ‘deep tacit knowledge’ was key and the use of the market was done more for efficiency reasons and resource limitations (ie government dictated staff limitations) than for any logic concerning learning. In comparison, the choice of intermediate governance modes was undertaken specifically for the purposes of learning and the manner by which opportunism was limited through alliance contracts was something of a by-product of pursuing explicit learning goals. It was only through intermediate governance choices that new capabilities were able to be developed that were not generated internally. Nevertheless, the strategic use of these specific boundary choices were only a partial solution to rebuilding capabilities. Therefore we show how different strategic boundary choices impact capability building, providing an answer to RQ1.

While boundary decisions were shown to be important determinants in the capability building process, this was only half of the story. From a management perspective it is this other half of the process concerning how the boundaries were actually managed that represents opportunities to make significant changes within firms. Considering dimensions such as intent, embeddedness, receptivity and internalization, it was clear that the same boundary choices may have different outcomes in-line with variations across these dimensions. Interestingly, the

boundary choice decisions are made by senior managers. However, the boundary management processes are actioned largely at middle management levels. Examples of communities of practice were seen in two organizations, yet these were not initially supported by top management and in one case, they survived their first years by their champions pursuing their agenda under a quality banner. Overall, firms make trade-offs in respect of economically efficient boundary choices and choices that may provide opportunities for capability development. The success of firms following these sub-optimal boundary choices were, however, significantly tempered by the boundary management processes utilized by the organizations (thereby addressing RQ2).

This research suffers from the obvious limitations of single case studies for the different boundary choices, a unique setting in time in terms of the desire by all of the selected organizations to rebuild their capabilities that may have tempered the extent to which boundary choices may be used strategically. And the cases themselves were not as similar to each other as initially hoped, given our preference to create a natural experiment. However, we would suggest that future research efforts should not focus upon overcoming these limitations, but rather look more deeply at contextual factors and the micro-processes concerning how firms build capabilities through specific boundary choices over time. For example, how do firms move away from pure make or buy boundary choices in terms of the types of activities (core versus peripheral; product versus service, simple versus complex) that use dual or hybrid governance modes? How do these initial changes create trajectories in terms of subsequent changes in respect of boundary choices? And are these dual and hybrid governance modes temporary aberrations that may be utilized to rebuild capabilities before either bring the product or service back entirely in-house, or now that they are an informed buyer, go back to using the market? Strategically varying an organization's boundary

choices may be part of the process for rebuilding firm capabilities, but delving deeper in when, where and how would be a useful extension to this research agenda.

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Theme	Meaning	Textual Data
Learning (individual)	People work very independently which limits learning	<p>"So for a lot of people ... what they know is through their own experiences and they tend to keep it to themselves today because the project management environment doesn't promote that sort of informal interaction".</p> <p>"People worked on the basis that knowledge is power to I'll keep the knowledge to myself".</p>
Learning (organization)	Learning is often restricted to individual initiatives and not systematic organizational efforts	<p>"... there's no interchange of knowledge [from contractors]... they're selected, they basically do the work, we basically pay the bills and we generally only pay lip service to [enhance] capacity, to have any professional knowledge of what's going on".</p>
Boundary choices	Lack of clarity about the scope of activities to be undertaken by the organization versus what should be outsourced.	<p>"We haven't found the appropriate managerial control of a Public Works agency ... Where is the border line? ... I've advocated for a greater degree of expertise centrally".</p> <p>"[It's challenging], rebuilding capacity in an environment where essentially lip service is paid to rebuilding a public service entity".</p>
Outsourcing/internal operations	There is some attempt to learn via outsourcing	<p>"... we're having to build an understanding of sustainability ... so we send them over this checklist, you've got to check that the work is sustainable and as we up the ante we'll have to understand more about various sustainability tolls and evaluation techniques. We are struggling with that".</p>
Conflicting interests	Generally engaging the lowest priced contractor limits both quality and future learning.	<p>"With the builders, it tends to be adversarial. We try not to make it that way, but it tends to be ...</p> <p>"Here's a very detailed set of documents, down to the last bolt". This is for a fixed price and we've got a very tight contractor we manage you with".</p>
Relationships with contractors	Contractors engage with DHW in an adversarial manner.	<p>"These firms have got a culture of, we are always right, we are the professionals, we can't be wrong ... It's never, ever their fault".</p>
Review processes	There are no effective systems and processes to learn when contractors are used.	<p>"So post-contract form of analysis? Very rarely happens. Very, very rarely happens".</p> <p>"I've got a file ...every email with a change, I've stuck in there, but the changes are often verbal. Once it's sorted, I'll either write it down or I'll stick a copy of the email into a file. It's not very methodical".</p>

Table 1: Key findings – Department of Housing and Works

Theme	Meaning	Textual Data
Learning (individual)	Learning occurs when faced with new situations and is reinforced through repetition	"sometimes you have to experience a few problems to actually learn and improve ... it's an individual thing"
Learning (organization)	Sharing knowledge and codifying this knowledge is highly challenging	"Our design people created a code of practice ... we'd pass onto every consultant [we worked with]. There might be certain things that don't work, certain materials that do work in certain situations ... and it needs a lot of effort to receive the information on how to do things better and actually change the system quickly and efficiently".
Boundary choices	Learning from contractors was a high priority	"With contractors it is a little bit different ... But the Department has a strong emphasis on partnering and relationship management". "We're trying to do a little bit more of getting input and involvement ... from users than what we have in the past".
Outsourcing/internal operations	Learning from contractors is possible when the same activity is undertaken internally.	"... but we don't do it [design] routinely and the amount of work we've been doing has been decreasing and so the idea ... is to get some hands on experience on the application of the standards [to design] so that we can feed that back into our standards".
Conflicting interests	Sharing knowledge with other parties varies according to the activity.	"... that construction arm is commercial guys, so they're less willing to share ... They play those games and so that's actually hindering people".
Relationships with contractors	Learning from the activities of organizations with whom you outsource requires long-term investment	"We're trying to work more cooperatively with them [contractors] ... they became very antagonistic. ... They're finally realizing that they're in it for the long haul".
Review processes	Active engagement throughout the process is critical to build capabilities	"We hire consultants and contractors ... Our motivations were that we could learn ... Knowledge is fed back into standards and specifications manuals".

Table 2: Key findings – Queensland Main Roads

Theme	Meaning	Textual Data
Learning (individual)	Building knowledge across Main Roads and external organizations is important.	"I have organized an annual [training course] which we run for project managers within Main Roads ... This year we will open it up to allow local government".
Learning (organization)	A key focus of the alliance partnerships is knowledge building and sharing.	"Knowledge enhancement/ generation is a key part of the alliance. During the workshops we developed a strategic framework which included a commitment that everyone would come out of the alliance with enhanced skills".
Boundary choice	Alliances are used for large projects and co-location is a critical part of the alliance.	"The best part of the alliance is the proximity of the constructor and [Main Roads employees] ... so they can bounce ideas off each other and the constructor is actually part of the design team as it unfolds".
Outsourcing/internal operations	Working with partner organizations builds knowledge and networks.	"The sharing of knowledge is a two way street and no one is bleeding off anyone else. I have enhanced my knowledge of design and geotechnical issues, I know that the Main Roads guys have a better understanding of contracting issues".
Conflicting interests	Consultative processes in the alliance limited conflict.	"Different organizations have a different culture, behaviors, work ethic and time management ... "[with problems] we would discuss them on the spot and in the vast majority of cases, the problem didn't come back again – we had a solution to it".
Relationship with contractors	Relationships were collaborative, but different cultures created challenges	"Because of different cultures it has been a battle from day one to build a team and have had to constantly work on our team culture and development. We have tried to get people out of their huddles and focussed on creating a new team with a unique identity".
Review processes	The process of learning is not just from the alliance, but also concerns how well the alliance performs.	"We are documenting everything we do ... We are documenting the contracting award process, all other processes and lessons learnt at each critical milestone, ie once we finalized the alliances agreement, preliminary design ... There is a very fluid interface between the alliance and Main Roads WA – but not intrusive.

Table 3: Key findings – Main Roads WA

	Dept Housing & Works	Dept Housing & Works	Queensland Main Roads	Main Roads W.A.
<i>Boundary Choice</i>	Buy	Make	Dual-modes	Alliance
<i>Formal effort to build capabilities</i>	Introduced the 'Review and Rebuild' strategy.	Introduced the 'Review and Rebuild' strategy.	The internal party – Road Tek – continued to undertake activities even though most work was outsourced.	Staff (including CEO) were brought in on the basis of their experience with alliance contracting.
<i>Logic for boundary choice</i>	Efficiency. DHW lacked internal capabilities in areas where it used markets.	Efficiency across limited areas of core business. There was some effort to learn by bringing activities 'in-house'.	The bulk of the work (80%) was outsourced for efficiency reasons, but internal production occurred to allow for learning.	Need to build new capabilities – even at the expense of efficiency.
<i>Boundary choice changes</i>	Each year more activities have consistently been outsourced as staff retired and capabilities were lost.	Some work was brought in-house in the areas of sustainability etc. This did not prove to be successful.	Internal production went from 80% to 20% across relevant activities. Efforts were made to work with contractors and learn from them.	Large projects were undertaken using alliance contracting. Staff moved between MRWA and the contractor.
<i>Factors restricting capability rebuilding</i>	Contracts were awarded on the basis of lowest cost and thus contractors did not have the margin to work with DHW to assist the capability building process. Internal knowledge (absorptive capacity) was limited.	Internal knowledge in new areas was limited and without this absorptive capacity, it was difficult to build capabilities.	Many 'hands-on activities' were entirely outsourced limiting opportunities for new staff to work on-site.	Staff involved in the alliance benefited, but embedding this knowledge as a basis for new capabilities was challenging.
<i>Success in boundary choice assisting to rebuild capabilities</i>	Virtually no learning occurred. Learning was extremely limited in these arms' length transactions.	There was some limited learning. It was more around retaining rather rebuilding capabilities.	Learning did occur and allowed the organization to be an 'informed buyer and to work with suppliers.	Significant learning occurred and MRWA became a contributor to knowledge across the industry.

Table 4: Key findings for each organization