OWNER PROJECT CAPABILITIES IN INFRASTRUCTURE PROJECTS: UNPACKING COMMERCIAL CAPABILITIES

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This paper investigates how the public sector organisations charged with the definition and delivery of large infrastructure projects are structured and resourced, and how they undertake the definition and delivery of the projects they promote. The paper locates its contribution in the theoretical literature on dynamic capabilities and its roots in the resource-based view of the firm. We take as our point of departure the emerging literature on client side project capabilities for infrastructure development - termed as owner project capabilities, referring to the dynamic capabilities that are required by public sector clients to develop infrastructure assets and deliver public services. More specifically, based on an extensive literature review, we focus on the owner project capabilities needed to develop and maintain commercial interfaces with the project-based firms which supply the human and material resources - which we dub commercial capabilities. Examples of such capabilities include, but are not restricted to, packaging capabilities, contracting capabilities, and relational capabilities. The conclusions lay bare the importance of rejecting the notion of project management as a best practice toolkit, which is always applicable and useful, to instead direct attention to which sets of capabilities should be deployed.

Keywords: public sector client, owner project capabilities, commercial capabilities

INTRODUCTION

Many countries are presently facing the need for massive investments in social and economic infrastructure development - the so called 'infrastructure gap'. It is reported that an estimated value of US $5 trillion per year in global infrastructure investment will be needed to support a future global population of 9 billion people by 2030, with an annual financing gap of about $1 trillion (World Economic Forum, 2015). The economic role of social and economic infrastructure in modern societies is well understood (Stevens *et al*., 2006); and the many contemporary pressures put on the scarce resources available, such as citizens' rising expectations, ageing infrastructure, urbanisation, and sustainability are well rehearsed. Cost and time overruns on major infrastructure projects are, however, prevalent. For example, research has shown that close to 90% of these large projects are subjected to cost escalation, and cost overruns of up to 50% are relatively common (Flyvbjerg, 2014).

To achieve satisfying project outcomes, three types of organisations take principle responsibilities in the project delivery process, the temporary project or programme organisation, owners and operators who invest in the project, and the project-based

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firms who supply human and material resources to the project (Winch, 2014). The project supplier's main job is to implement a project as required achieving goals of schedule, cost, and quality, while the project owner is responsible for choosing the right project and ensure its successful delivery (Merrow, 2011). All construction projects begin with an owner, who is responsible for instigating the project. For the infrastructure project, the owner is often a government or public sector organisation. Around the world these public sector clients are increasingly being questioned regarding their ability to achieve value for money in the projects they deliver and services they provide, and face the grinding pressures of improving infrastructure project delivery while cutting administrative costs. Rather ironically they are being asked to do more for less, i.e. produce more public value with fewer resources.

Concomitantly, the 'New Public Management' agenda (cf. Hood, 1995) promoting decentralization, disaggregation, outsourcing and downsizing has persuaded many that public sector clients do not really need to be able to engage in the project implementation process (Haque, 2007). There is, however, an increasing body of evidence that the process of capability outsourcing has gone too far, and that many owners now have too little capability to manage the projects they promote (cf. Hui *et al*., 2008; Winch and Leiringer, 2016). For example, recent research in Hong Kong (Rowlinson, 2014) shows that most of the factors that have driven cost escalation in the Hong Kong construction sector resides firmly within the remit of the public sector clients. Therefore, this paper takes as its point of departure that public sector clients need the capability to manage the projects that they promote and invest. In other words, they need the competences and capabilities to define, manage and deliver the infrastructure projects efficiently and effectively. Given that most public sector clients will also have a stake in the operation of the built infrastructure asset, albeit that it might not be the same part of the organisation, we dub such capabilities 'owner project capabilities' (see Winch and Leiringer, 2016).

To acquire owner project capabilities, public sector clients need to develop and maintain in-house skills, competencies, and abilities to engage with the supply chain. Our particular focus lies in the commercial relationship between project owners and their suppliers or project-based firms. This is a topic that has received much research interest over an extended period (e.g. Pryke, 2004, Winch, 2010), in particular from a supply side perspective. For project suppliers, it is critical to have client-specific capabilities (Ethiraj *et al*., 2005, Wethyavivorn *et al*., 2009), which are built on repeated interaction with the owners over time and across various projects. Here we argue that, as the investors and operators of infrastructure assets, public sector clients also have continued interaction with suppliers; procuring services and products from them for the design, construction, and maintenance of infrastructure facilities. Hence, they in similar fashion need to develop supplier-specific capabilities. The importance of developing such commercial skills and competences when delivering complex projects has been widely acknowledged (e.g. Morse, 2009, Caldwell and Howard, 2010). These skills and competences needed to deal with the commercial relationship with project suppliers are here labelled as commercial capabilities.

This paper mainly focuses on the important role of developing 'owner project capabilities' for infrastructure development, with particular attention on commercial capabilities. We argue that public sector clients need owner project capabilities, especially commercial capabilities, to manage and deliver infrastructure projects. We take as our point of departure the concept of project capabilities (Davies and Brady, 2000, Brady and Davies, 2004, Davies and Brady, 2016) which is rooted in the

resource-based view and organisational capability view of organising. We then introduce the term 'owner project capabilities', and argue for how these can be understood as a set of dynamic capabilities. We then move on to the sub-sets of commercial capabilities and put forward an argument for the importance of developing, managing and maintaining commercial relationships with the project suppliers. We divide these commercial capabilities into three high-level sub-sets, packaging, contracting, and relational capabilities. We conclude by highlighting the importance of owner project capabilities, particularly commercial capabilities in ensuring project delivery. In doing so we reject the notion of a generic project management or management of projects toolkit. Instead we point towards the need to think about how different capability sets can be configured in different contexts.

PROJECT CAPABILITIES

In the domain of strategy management, the essence of the resource-based view of the firm is that a firm's competitive advantage originates from its tangible and intangible resources and capabilities (Barney, 1991). To be capable of something is to have a generally reliable capacity to bring that thing about as a result of intended actions. Organisational capabilities are commonly referred to as the particular combination of skills, knowledge, competences, resources, routines, and behaviours, which enable effective organisational performance and competitive advantages of firms (Zollo and Winter, 2002). These capabilities are usually divided into two types: 'operational capabilities' which capture the day-to-day, month-by-month ability of the organisation to deliver on its mission and make a living; and 'dynamic capabilities' which capture the ability of the organisation to change and develop in order to meet new challenges (Zollo and Winter, 2002, Winter, 2003, Helfat *et al*., 2007).

A sub-set of the vast and varied capability literature is that of 'project capability' introduced by Davies and Brady (2000), which stems out of research on innovation in complex product systems and project-based firms. This construct refers to the specific skills, knowledge and experience required by the project-based firms to develop bids and implement or execute projects, including pre-bid, bid, project, and post-project activities. This work has subsequently been developed in a number of publications (e.g. Brady and Davies, 2004, Davies and Brady, 2016) and has also influenced research work elsewhere. For example, client-specific capabilities and project management capabilities are identified as important in the software services industry (Ethiraj *et al*., 2005). In the construction industry, Wethyavivorn *et al*., (2009) identified six types of organisational capabilities which are essential to the performance of construction firms, such as procurement capability, construction capability, etc. Furthermore, Miozzo and Grimshaw (2011) analyzed the organisational capabilities (project capabilities) needed in outsourcing of IT services firms. Hence, there is a growing literature on project capabilities, which applies them on studies of the performance of project-based firms and in continuation the projects they work on. However, research on project capabilities has mainly focused on the project supplier side, rather than the owner side.

Building on the work on project capabilities and the realisation that investment projects are fundamentally about change in the owner organisation - either extending in scope its existing operational capabilities or resource base or creating new ones to meet challenges - it is possible to view project capabilities from the owner side as the permanent owner (client) organisation's ability to mount temporary projects. Indeed, what are operational capabilities for the supplying firm may well be dynamic

capabilities for a purchasing organisation (Winter, 2003). Owner project capabilities, thus, can be understood as the dynamic capabilities that are required to extend, improve or reconfigure operational capabilities or existing resource base to develop infrastructure assets and deliver public services.

For public sector clients in charge of providing infrastructure assets to the public, it is necessary to make good use of their limited resources (Pablo *et al*., 2007). We argue that acquiring appropriate owner project capabilities is a good way to do so. Indeed, prior research has identified the importance for public sector clients to develop and deploy project capabilities. The term of 'intelligent client' (see for example Aritua *et al*., (2009)), emphasizes the critical skills, competences, and capabilities needed by the public sector clients in the delivery of projects and programmes. Extensive reviews of UK National Audit Office reports and relevant interviews have found that for most public sector organisations, owner project (management) capability is an indispensable factor and can help facilitate better management of public projects (Cha *et al*., 2015). Research has, indeed, shown that project owners with higher levels of owner dominance could lead to a higher chance to achieve better project outcomes (Hui *et al*., 2008).

We take this argument a step further by unpacking the different sets of owner project capabilities. Corresponding to the three domains of project organising (Winch, 2014), owner project capability is made up of three distinct sets of capabilities, strategic capabilities, commercial capabilities, and governance capabilities (Winch and Leiringer, 2016). The term - strategic capabilities - refers to the capabilities the owner needs to manage its investment projects within its own organisation. Governance capabilities are those which are needed to manage the interface between the relevantly permanent owner organisation and the temporary project organisation. Commercial capabilities mainly focus on the interfaces between the permanent organisations, the owner organisations and the project-based firms or project suppliers who provide resources into the projects. The rest of the paper will particularly focus on the role of owner commercial capabilities.

For large infrastructure projects, it is rarely possible for public sector clients to undertake the whole project within its own organisation. Instead, they rely on resources from the project-based firms. Hence, these projects can be understood as a network of formal (contractual) and informal (trust-based) relationships, or interfaces, among different project parties. Managing these commercial relationships between the owner organisation and the relevant supplier organisations is crucial to project success (Winch, 2010). If not dealt with properly, interface problems may easily occur such as: lack of communication, coordination and trust between project parties; improper packaging design; mismatch between contract type and project nature; insufficient or lack of alignment between work-breakdown structure and awarded contracts (Weshah *et al*., 2013).

To be able to effectively manage such interfaces there is a need for a blend of contractual and organisational arrangements (Hartmann *et al*., 2010). The more complex the projects, the more important such commercial skills and competences become (Caldwell and Howard, 2010). We, therefore, argue that public sector clients need to acquire commercial capabilities to maintain a healthy commercial relationship with their suppliers. These capabilities allow the project owner to manage the broad commercial relationship with the suppliers of the services that allow the project to be developed and delivered (Winch and Leiringer, 2016).

The above realisation is of course not new and a variety of relevant research has been conducted, albeit not always explicitly, on different aspects of commercial capabilities in the project context, such as contractual and relational capabilities (e.g. Poppo and Zenger, 2002, Hartmann *et al*., 2010, Caldwell and Settle, 2011), as well as owners' decision of work packaging (Globerson, 1994). Activities that fall under in the commercial relationship between project owners and their suppliers include but are not limited to package scope, contracting strategy development and contract management, knowledge and information exchange, and trust building. Below we synthesise these activities into three sub-sets of owner commercial capabilities, namely packaging, contracting, and relational capabilities.

Packaging capabilities refer to the owner's ability to develop contracting strategies by packaging the project scope into market-friendly clusters of work and coordinate the interfaces between different work packages (Winch and Leiringer, 2016). For a large or complex project to be properly managed and delivered, there is a need to slice it into manageable work packages. The approach to break down a large project into proper segments are often called the work-breakdown structure (WBS), which defines various tasks and is the building block of project planning, execution, monitoring and control (Globerson, 1994). Packaging is a starting point for scope management in projects and it underpins the interfaces between different packages, which should be managed by the project owners. Inappropriate work packaging design would hamper the control and coordination of project work. It is, thus, important for project owners to define work packages and coordinate between different packages.

To ensure the delivery of the whole project, project owners need to coordinate the interfaces between different work packages or project suppliers. Work package is a collection of related tasks and different packages are related to each other to some extent. Normally a work package is the basis for the subsequent management of tasks. Different types of interdependence between work packages require different coordination mechanisms from the project owners, as reflected in the seminal work of Thompson (1967). Various WBS patterns also call for different organisational structures and management styles during the project implementation (Globerson, 1994). Therefore, project owners should probably pay attention to packaging capabilities on how to coordinate the relationship between different project suppliers.

Contracting capabilities refer to the owner's ability to identify potential suppliers, select and motivate project suppliers (Winch and Leiringer, 2016). Contracting capabilities underpin the project owners' ability to select appropriate contracting strategies and procurement methods. The contracting strategy is considered as a critical factor influencing project performance. Different project contexts with different contracting strategies require different contracting capabilities for project owners. This issue has been exacerbated by the increasing use of new and complex procurement forms (Morse, 2009), such as public-private partnerships. Different procurement forms may need various combinations of corresponding capabilities to manage the contractual interfaces.

An important sub-set of contracting capabilities is contractual capability, which refers to the ability to design, write, negotiate, monitor, and enforce contracts (Argyres and Mayer, 2007). The construction project is supported by performance incentive and contractual relationship networks (Pryke, 2004). The aim is to manage the contingencies within transaction relationships with other parties so as to deliver the projects effectively and efficiently (Hartmann *et al*., 2010). The appropriate match

between contract design and transactional attributes contributes to higher performance (Poppo and Zenger, 2002). Research has shown that when contracting parties have competences and knowledge about the exchange services or products, they are more likely to benefit from the experience and prior interactions and learn insights about how to better specify technical clauses in contracts (Vanneste and Puranam, 2010). Those with contract design capabilities could learn to write better contracts (Argyres and Mayer, 2007). Public sector clients need to pay attention to such contractual capabilities to deal with transactional relationships using contracts.

Most contracts are incomplete due to human bounded rationality and it is impossible to foresee all kinds of situations and anticipate possible contingencies (Poppo and Zenger, 2002). Relational mechanisms, such as trust and relational norms, are needed to complement contractual governance mechanisms in order to mitigate exchange hazards associated with asset specificity and uncertainty (Schepker *et al*., 2013). Hartmann *et al*., (2010 p.2) defined relational capabilities as "application of socially complex routines, procedures, and policies in inter-organisational relationships", comprising organisational solutions, procedures, and competences.

In this paper, we define relational capabilities as abilities needed by project owners to interact effectively with project suppliers in informal (trust-based) relations. Good owner-supplier relationships bring about a smooth project working atmosphere (Wethyavivorn *et al*., 2009), which are important for project implementation and firm performance. With the increasing adaptation of alliances, frameworks, and public-private partnerships, there is a call for more attention into the relationships between project parties. Such relationships between different parties could generate advantages by creating relationship-specific assets, access to complementary capabilities, knowledge flow between different partners, and effective governance to reduce transaction costs (Kale *et al*., 2002).

Recent research on procuring complex performance (Caldwell and Settle, 2011, Hartmann *et al*., 2010) has also identified the importance of owners 'relational capabilities' on complex projects to complement the more commonly highlighted transactional focused capabilities. These capabilities enable project owners to interact effectively with their supply chain and to select and implement the appropriate mix of formal or contractual and trust-based relations on the project (Poppo and Zenger, 2002; Hartmann *et al*., 2010). Relational capabilities are thus considered as an important aspect for public sector clients to facilitate the relationship with their project suppliers. These three sub-sets of owner commercial capabilities are systemic. Different capabilities should be developed by project owners in different contexts. Packaging is the very first step to contracting strategy and the selection of procurement methods depend on the nature of packages. Project owners need to use different coordination mechanisms to manage the interfaces between project suppliers in different situations. The contracting strategy, in turn, influences the decision of contract forms and terms. Different contracting strategies require project owners to develop different contracting capabilities. Meanwhile, contractual and relational mechanisms often interact with each other and there is a call for more research into the relationships between project parties. By illustrating the important roles of the three sub-sets – packaging, contracting, and relational capabilities, we further emphasize the importance of commercial capabilities in ensuring a healthy commercial relationship between the project owner and its suppliers.

DISCUSSION

As a major actor in the construction process, the project owner could be argued to play the most important role in the process of project management and delivery. However, as we have argued above there is a growing awareness that public sector clients might well lack necessary capabilities to deliver the projects they promote. In no small way, this is caused by the increasing use of various forms of management contracting, the outsourcing technical expertise, as well as the inability to retain necessary in-house resources, skills, competences, and knowledge. Against this backcloth, there is a real need for public sector clients to realise the importance of building in-house capabilities rather than consulting and outsourcing; as well as deciding which capabilities should be maintained and which could be sourced from the suppliers.

Commercial capabilities, as an important dimension of owner project capabilities, are essential for project owners to manage the commercial relationship with project-based firms, which supply tangible and intangible resources to the projects. Few, if any, public sector clients (project owners) have the internal resources to undertake major projects in-house; instead they need to rely on project suppliers for these resources. The commercial interfaces between owners and suppliers are, therefore, crucial for achieving acceptable project performance. Meanwhile, we have here, based on the extant literature, put forward three sub-sets of commercial capabilities: packaging, contracting, and relational capabilities. All these capabilities could help project owners facilitate the commercial relationship with suppliers. Public sector clients thus need to develop in-house commercial skills and competences so as to ensure successfully infrastructure project delivery.

We claim no novelty to the included activities and tasks. These have all been dealt with at length in previous research. What is important here is the context. It would, however, be erroneous to suggest that public sector clients simply need to acquire all sets of owner project capabilities or these capabilities could simply be transferred across different contexts. Different contexts call for different combinations capabilities to ensure project management and delivery. To acquire all sets of commercial capabilities may not always be possible, or desirable. Instead, what is needed is a comprehensive understanding of what kinds of capabilities are needed to manage projects and deliver assets in different contexts. For instance, different scope packaging, various procurement types or contracting strategies, and different contract types demand project owners to acquire different corresponding capabilities to deal with the commercial relationship with project suppliers. These commercial capabilities need to be contextualized and match with the nature of projects and the attributes of the relationship between project owners and suppliers. In this scenario, a key area deserving of research, in order to further our understanding, is that of how different capability sets can be configured by project owners in different contexts for project management and delivery.

Further to the above comes the question of how project owners can develop and deploy these capabilities in practice. This is another key area which deserves further research. The questions are many. For example, is it better to develop the capabilities within the own organisation or depend on consultants? If the latter, how can the owner organisations learn and accumulate experiences and knowledge through repeated interactions? Is it feasible for them to invest in specific human and material resources? This line of inquiry could lead to a more comprehensive understanding of how to make use of owner project capabilities in practice. It could also add theoretical

contribution to the literature of dynamic capability view on how to develop and maintain dynamic capabilities.

Finally, the project management literature often focuses on the project itself in terms of achieving goals of time, cost, and quality and current project management practice concentrates on tools and techniques and an execution-oriented approach to managing projects (Morris, 2013). However, a project is part of the larger organisational context. It is within this context that the project is shaped, defined, delivered, and managed. So, instead of treating project management or management of projects as a best practice toolkit, focus should be directed on to the skills, competencies, and capabilities needed by project owners and project-based organisations. We therefore suggest the need for more attention towards the owner organisations and call for more research exploring into their critical role in managing and delivering projects.

CONCLUDING REMARKS

To sum up, the role and capabilities of public sector clients have to some extent received inadequate attention. The aim of this paper is to contribute to a better understanding of owner project capabilities and calls for public sector clients in the construction sector to develop owner project capabilities in general, and commercial capabilities in particular, to deliver and manage infrastructure projects. The important role of commercial capability and its sub-sets is emphasized. With the concept of 'owner project capabilities' as our starting point, we have highlighted the commercial interfaces between owners and suppliers as an area worthy of further attention. We have attempted to provide a broader organisational perspective and more comprehensive understanding of project management research by focusing on the capabilities which need to be developed by project owners.

By addressing the above ideas, we hope to have taken a step ahead in illustrating the role of project owners in the project management domain, especially in the infrastructure project delivery area, and stimulating following research work. Though this paper has outlined why owner project capabilities, as well as commercial capabilities, are needed by infrastructure clients, no empirical data was collected to support such arguments. Recent research (Cha *et al*., 2015, Davies *et al*., 2016, Winch and Leiringer, 2016) does, however, provide a good starting point for following empirical studies to focus on the project capabilities needed from the owner perspective. Further work is needed before we can achieve a comprehensive understanding of owner project capabilities and how firms could obtain and, more importantly deploy, different sets of owner project capabilities in different contexts.

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