

CLIENT PROJECT GOVERNANCE CAPABILITIES: UNPACKING THE CONCEPT AND GOVERNANCE MECHANISMS IN PRACTICE

Selorm Emmanuel Adukpo¹ and Roine Leiringer

Department of Real Estate and Construction, The University of Hong Kong, Knowles Building, The University of Hong Kong

Globally public sector clients are increasingly being asked to do more for less i.e. produce more public value with fewer resources; at the same time as cost and time overruns on major projects are increasingly highlighted and subjected to public scrutiny. These developments are not lost on the research community and there is now an emerging body of literature that seeks to explore the relationship between how these organisations are structured and resourced and project outcomes. This paper seeks to build on this literature set. It does so through the theoretical lens of organizational capabilities. The particular focus is on project governance and associated governance capabilities. Drawing on an extensive review of the academic literature on project governance from both a supply-side and client perspective, as well as public policy sources, we propose that client project governance capabilities are underpinned by three sets of sub-capabilities: project assurance, project coordination and asset-integration capabilities. We unpack these capability sets with particular attention given to the multiple ways in which they can be deployed. Conclusions are drawn highlighting the importance of a strong owner for the successful realisation of the project and how project governance capabilities are key to achieving this.

Keywords: governance capabilities, public sector clients, project capabilities, project governance

INTRODUCTION

Infrastructure projects are seemingly fraught with poor delivery outcomes. They consistently exceed budgeted time and cost, fail to deliver expected benefits, and do not meet the demands for which they were built (Flyvbjerg, 2011; Flyvbjerg *et al.*, 2003; Mellow, 2011; Morris and Hough, 1987). In general, issues of poor project delivery outcomes have become the norm rather than the exception, with approximately 90% of projects exceeding budgeted cost and schedule (Flyvbjerg, 2014). Further, the demand and benefit side estimates are typically out of forecast by 20 - 70% (Flyvbjerg, 2011).

The poor outcomes of infrastructure projects have not gone unnoticed (see for example, NAO, 2009, 2012). The government organizations (public sector clients or in the terminology adopted in this paper the project owner) entrusted with project delivery are increasingly being questioned on their capability to deliver projects that provide value and make optimal use of citizen taxes. In general, such project owners are questioned on: their commercial capabilities, i.e. their ability to interact on an equal and professional terms with the private sector (e.g. NAO, 2009); their project assurance capabilities, i.e. their ability to independently and objectively verify whether the project is on schedule,

¹ sadukpo@hku.hk

within budget and will meet future performance (e.g. NAO, 2010, 2012); and their project delivery capabilities (e.g. LEGCO, 2014). This is despite the fact that these organizations have commonly experienced a reduction in the resources available to them and the inability to develop technical capacity as a result of budgetary constraints, growing welfare schemes, competing demands on public sector finances and adoption of New Public Management principles (Hood, 1991). Thus on the one hand, whilst these public sector clients are being questioned and criticized on project outcomes and being asked to improve performance; on the other hand they are being supplied with fewer resources. In effect, they are being asked to do more for less. Significantly there is now a growing literature that points that the role of the project owner is crucial for the successful delivery of projects (e.g. Miller and Lessard, 2001; Morris, 2013; Rowlinson, 2014).

This paper sets out to study these project owners by focusing on their capabilities, more specifically governance capabilities, i.e. the capabilities through which the owner manages the interface with the temporary project organization set up to deliver project. We start by reviewing the major causes of poor delivery outcomes and the role of the project owner to these outcomes. Attention is then drawn to research that highlights the link between the presence of strong owners and project success. Thereafter, literature on owner project capabilities, a build-up on the strong owner concept, is reviewed with particular attention to the roles of the three sub-capabilities that underpin it. The rest of the paper then focuses on project governance and its associated capabilities. The main focus is on the three sub-capabilities that underpin project governance: assurance, project coordination and asset integration. Various activities that underline each sub-capability, and some challenges they bring with them are also discussed. The paper concludes by arguing that each sub set of capability is essential to success and also project owners need to become strong owners. We further suggest that concepts from dynamic capabilities theory offers an insight into how project owners may use existing resources to develop capabilities.

THE PROBLEMATIC CLIENT

Infrastructure is typically delivered in a project organising domain. Three organizational types usually interact within this domain: the temporary project or programme; the relatively permanent owner and operator; and the project based firm or supplier (Winch, 2014). The project supplier is mainly a project based organization that predominantly undertakes tasks via projects and supplies the human and material resources required on projects; the temporary project or programme is the asset to be delivered; and the relatively permanent owner and operator supplies the capital resources required, charters the project and operates completed assets to deliver goods and services to its customers (Winch and Leiringer, 2016).

The literature on project organizing has over the years focused mainly on the role of the project supplier with less emphasis on the project owner (Winch, 2014). Further, the limited literature usually views project owners as clients interested in the purchase of a service rather than as a strategic actor with roles on the project. In recent times, however, this perspective has started to shift, and there is now an emerging body of literature that has started to focus its attention on project owners. A driving force behind this trend is the realisation that in many cases the causes of poor delivery outcomes lay in areas that are within the remit of the project sponsor (owner) rather than that of project execution by the contractor. Issues such as optimism bias and strategic misrepresentation have, for example, repeatedly been identified as key factors affecting delivery outcomes of

infrastructure projects (e.g. Flyvbjerg, 2011; Flyvbjerg *et al.*, 2003; Flyvbjerg *et al.*, 2009). So too have factors such as clients: inability to manage the front end definition; failure to properly drive the project; inability to shape strategy and cope with political, economic and social turbulence of outside institutions; failure to manage or influence project 'externalities' (e.g. Miller and Lessard, 2001; Morris and Hough, 1987). Such findings have led to the emergence of concepts such as smart clients, intelligent clients (Aritua *et al.*, 2009) and strong owners (Morris and Hough, 1987) among others.

Morris and Hough (1987) recognised the important role of project owners to the successful delivery of projects and thus proposed the concept of a "strong owner". More recently Merrow (2011), based on his research on engineering projects in the oil and Gas sector, has reinforced the strong owner concept and suggests that project owners should have a strong distinct team that will be able to interface interactively with the supply side. Winch and Leiringer (2016) building on this work sought to unpack the concept. Using organizational capabilities as a theoretical lens, they identified three conceptually distinct capability sets which the owner requires for project success. These set of capabilities they dubbed as 'owner project capabilities'.

OWNER PROJECT CAPABILITIES

Owner Project Capabilities is the set of capabilities needed by a project owner to define, implement and deliver its projects and may be broadly classified under into three distinct set of capabilities: strategic capabilities, commercial capabilities and governance capabilities (Winch and Leiringer, 2016). Strategic capabilities is the set of activities that the owner organization uses to successfully implement its investment projects. They mainly relate to activities that define, conceptualizes and outlines the benefits of the project for formal approval. Strategic capabilities, includes activities such as: project selection, project definition, raising capital, stakeholder management, and project portfolio management. Commercial capabilities refer to activities the owner organization undertakes to manage the interface between the owner organization and the project based firm.

Here project owners have the challenge of identifying which supplier is best suited for an activity, what mechanisms may incentivise or motivate a supplier, and how to manage that relationship. Commercial capabilities empowers project owners to manage its relationship with supplier by being able to engage in activities such as: the clear definition and packaging of works to be undertaken by a supplier(s); selecting and motivating potential suppliers to undertake a task at an optimal cost; and making use of appropriate contract mechanisms to engage suppliers. The last set of capabilities, Governance capabilities, is the capability set needed to manage the interface between the owner organization and the temporary project organization set up to deliver the investment. Activities here focus on assuring relevant stakeholders of project progress; managing or coordinating the project during its execution; as well as ensuring that completed projects are integrated into existing operations of the owner. The remaining section of this paper focuses on governance and associated capabilities.

PROJECT GOVERNANCE

Governance of projects relates to the set of activities that the project owner exhibits towards the temporary organization it finances. This set of activities include assessing and reporting progress of work to relevant stakeholders; using appropriate tools and techniques to monitor the project; creating the organizational structure of a project and integrating completed project into operations. To appreciate project governance it is

necessary to first look at corporate governance (Too and Weaver, 2014). Corporate governance is described as that which “involves a set of relationship between a company’s management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives, and monitoring performances are determined.” (OECD, 2004: 4). What this suggests is that governance systems, including that of project governance, consist of two main components: the governance framework and the people (management) (Too and Weaver, 2014). While the governance framework sets out the structure of the organization, its roles and accountability processes among others; the management component focuses on decision making and performance monitoring to ensure that objectives are achieved. Effective usage of governance on projects may lead to: the efficient delivery of projects, and ensuring that delivered projects are beneficial to the organization (Too and Weaver, 2014). Project governance consists of a myriad of activities, which may be broadly categorised under three sub-categories of governance (Winch and Leiringer, 2006). These are project assurance capabilities, project coordination capabilities and asset integration capabilities.

Assurance capabilities

Assurance capabilities relates to the ability of the project owner to assess a project, establish that the required elements to deliver it successfully are in place and report project progress to relevant stakeholders (NAO, 2012). Project owners that possess sufficient assurance capabilities and can deploy them are able to assess progress of a project; identify relevant early warning signs likely to cause project failures, and assist mitigate against them; and highlight any breach of time, cost, and quality control limits established earlier at the front end stage (NAO, 2010; Williams *et al.*, 2012).

Project assessments are mainly undertaken via various assessment models. Typical examples of such models include: project reviews - applicable throughout project lifecycle; project health checks - for fraud; benchmarking - for comparison of two projects; project audits - to check executed against standards; and post project evaluations (Williams *et al.*, 2012). Most of these assessment models, including project reviews, are underpinned by stage-gate processes which addresses the “who, when, what” questions of who should make decisions on project progress, when such decisions should be made and on the basis of what information (Williams *et al.*, 2012; Winch and Leiringer, 2016). In terms of occurrence, assessments may be performed at a 'point-in-time' or 'continuous' (regular intervals) throughout the project lifecycle (NAO, 2012).

A drawback of using project reviews and stage gate processes for assurances is that they are lagging indicators, i.e. they report on issues that have already occurred rather than that which may occur in the future. This thus makes them most suitable at the front-end phase where the cost of cancellation is low (Winch and Leiringer, 2016). The use of a mechanism that has the ability to forecast, complementary to stage gate processes, mitigates the lagging indicator effects. An Early Warning Signs (EWS) is such a forecasting mechanism that leads to a proactive response and ensure that problems that may arise are identified and corrected at a stage where its cost effects is lowest.

Two such early warning mechanisms which project owners may make use of when undertaking assessments are: a focus on processes; and informal "gut-feeling" approaches (Williams *et al.*, 2012). A focus on process assists in identifying the more technical and measurable “hard issues” on a project, whilst “gut-feelings” helps identify “soft issues” that are related to attitudes and values which are harder to measure (ibid). For instance, when undertaking assessment at the early stage of a project, a process approach may

bring to the fore, formal issues likely to signal problems such as the lack of a good business plan, lack of a common definition of roles and responsibility and disputed major decisions. Similarly, in using a “gut-feeling” approach, signals such as: leadership issues, uneasy comments and body languages, parties voicing reservations and politically hedging their positions among others may signal the presence of problems on the project.

An issue that arises in project assessment and is of importance is whether the assessor should be independent of the project team or an integral part of it. It is the case that having an assessor that is a part of the project team leads to a scenario where the assessor questions their own work. In contrast having an assessor fully independent of project team leads to a reliance on reports by project suppliers which may not capture issues detrimental to the project supplier. An approach that makes use of the positives of both methods, resulting in findings that are independent, have both an inside and outside perspective, and improves credibility is preferable (Klakegg *et al.*, 2016). One such approach is the three “lines of defence” for assurance (Hone *et al.*, 2011). The "three lines of defence" approach consist of having: 1) effective project controls by the owner team in direct contact with project, 2) internal assurance independent of the project team that is provided by say the programme management office, and 3) an external audit (Hone *et al.*, 2011). The first line of defence may be made up of those directly accountable for the delivery of the project, i.e. the project teams and line management; the second line of defence team may be made up of the programme assurance office supplemented with relevant functional professions; whilst the third line of defence may be constituted of an external audit unit.

Project Coordination Capabilities

Project coordination focuses on ensuring that the various parts of the project organization work in harmony for a successful project outcome, as well as the planning and monitoring of performance. Project coordination can, thus, be described as the ability of an organization to: harmonise the activities of various actors on a project (Hui *et al.*, 2008); plan, monitor (measure and report), take necessary corrective action and also authorise project teams to deliver (Morris, 2013). This ability of the owner organization to coordinate its projects and suppliers and also undertake project control is its project coordination capabilities.

Infrastructure projects consist of work packages that are to varying degree dependent on each other and need to be synchronised. Project coordination serves as the glue that binds the various packages and sub-packages and ensures that there is a smooth workflow among the involved parties. The various work packages needs to be scheduled such that dependent activities are harmonised in terms of workflow. This entails having an overall work plan that considers all aspects of the project, specifies how the various work packages will fit together and delineates roles and responsibilities. Additionally the process of coordination needs to take place throughout the project lifecycle i.e. at the front end, during project execution, and from the construction stage to the operational stage. Such a systematic approach to co-ordination leads to the avoidance of issues such as backlogs, accidents, mistakes, and wastes thereby contributing to successful project outcomes (Merrow, 2011). This ability to undertake co-ordination may however be affected by factors such as the degree of complexity of an activity, procurement method, the number of firms and work packages on a project (Child and McGrath, 2001; Hui *et al.*, 2008).

Project controls, are complementary to coordination. Project control involves planning and monitoring, taking corrective measures and re-planning of projects (Merrow, 2011).

It is initiated with the planning and establishment of baselines in cost, schedule, scope, and quality. Once a project is implemented, current progress is compared and forecasted against the baseline at agreed periods. Results from undertaking the comparison provides basis for either taking corrective measures, re-planning or maintaining existing pace (Morris, 2013; Winch and Leiringer, 2016). Processes that are used for project control include: earned value method, milestone tracking of schedule, use of key performance indicators, critical path analysis, PERT/CPM etc (Hone *et al.*, 2011; Morris, 2013). Additionally the use of qualitative assessment such as project manager commentary on progress and critical issues is encouraged as most of the process tools are quantitative in nature and may not capture issues that need to be described but are important (Hone *et al.*, 2011).

An issue with project control is whether the owner organization has to rely on information supplied by the project supplier or prepare their own set of information for the purpose of project control. Where information for project control is provided by the project supplier, they may not provide information regarding problems they face, unless such problems are at an advanced stage and noticeably by all. An alternative is for project owners to take charge of preparing information for project control purposes themselves. This more high level of involvement in the delivery of projects has been attributed with positive project outcomes (Hui *et al.*, 2008; Merrow, 2011). This, however, requires more resources, which are not always available.

Asset Integration Capabilities

It is not uncommon that projects fail to function or operate properly after hand-over. This is irrespective of whether they have been completed on time and to budget, or over budget and time (Brady and Davies, 2010; Davies *et al.*, 2009). This tendency for projects to experience operational failure arises from the discontinuity between the processes required to deliver the project and those needed at the operational phase (Brady and Davies, 2010). The ability of a project owner to integrate its assets first at the construction stage, and then from the construction stage into existing operations of the owner organization for beneficial use, is its asset integration capabilities (Winch and Leiringer, 2016). Project owners that are able to properly deploy asset integration capabilities ensure that operational failures are prevented post completion. Two mechanisms by which the owner organisation can achieve asset integration are operational readiness and system integration.

Operational readiness in projects deal with the process of ensuring that a project is ready for the functions it was designed for at completion. It is an activity that is undertaken throughout the lifecycle of the project and during the handing over stage. At the early stage of projects, operational readiness may consist of a core operations team incorporated into the project team to give inputs that will make operations post completion easier, and also assist correct errors at a stage when they cost less to resolve. At the latter stages, operational readiness will consist of a series of tests, trial soft openings, simulation of real life scenarios, possible loading of asset to its maximum capacity among others in order to identify any issues which may affect operations after hand-over and also ensure project performs optimally during its operational phase (Davies *et al.*, 2009). Conducting these activities as part of operational readiness also enables the operational team become familiar and confident with the asset and its operations post hand-over.

Systems integration involves the logical coordination of the component part of a system to make it a whole unit. In an infrastructure project, system integration coordinates and

controls the network of contractors and suppliers involved in the design of the infrastructure and specialist work package; construction of the infrastructure and subsystems needed for operations; and integration, testing, commissioning and handover of a fully operational system (Davies and Mackenzie, 2014). It may involve the transition from the construction to the operational phase, or the combination of two different work packages. This activity includes the management, governance and logical co-ordination of the project throughout its lifecycle: planning, design, construction and operational readiness (Davies *et al.*, 2009). The scope of systems integration requires knowledge of the total effort of integrating the whole project that goes beyond any of the contracting parties. This is, however, difficult, and the owner organisation faces the challenge of being able to perform this systems integration function required throughout the project lifecycle with varying capabilities. Three suggested approaches by which owner organizations may undertake systems integration are: 1) internally by having all the capabilities in house, 2) via a prime contractor and 3) as a joint venture between owner organization and other firms possessing requisite capabilities needed (Davies and Mackenzie, 2014).

Challenges with Developing Governance Capabilities

As the above discussion shows, possessing governance capabilities by project owners is essential for successful project outcomes. However, there are challenges that public sector clients encounter in developing this capability set. There are a myriad of governance frameworks all of which are context dependent and have different intended outcomes. For instance, in a case study of governance schemes Klakegg *et al.* (2016) found that the Governance framework of the Norwegian state had its goal as maximizing value for society, and the reduction of costs and increase in cost control; whilst that of the UK was designed to focus more on achieving financial target. Additionally in terms of implementation, whilst the governance frameworks in the UK focused on a “how to achieve” perspective, that from Norway shows a “what to achieve” perspective (*ibid*). The non-generic nature of the governance frameworks makes it difficult for project owners to decide on the type of governance capability set to develop. Added to this is the fact that research is yet to establish what capability set may work well within a particular context and under what conditions they may be effective. Even where these project owners are able to develop a particular capability set, policy changes by government in terms of intended outcomes may render the capabilities ineffective. Project owners will then face the challenge of developing new sets of governance capabilities to match the change in environmental conditions.

Another difficulty that affects the development of governance capabilities is the anchoring and centralisation of governance frameworks at top political levels and Finance Ministries (NAO, 2010; Winch and Leiringer, 2016). The non-localization of such governance frameworks prevents project owners from being able to develop capabilities needed for governance to manage its projects and further transfer knowledge that may have been gained to subsequent projects. The centralization of governance also prevents assurance from being continuous as staff from centralized units (e.g. Finance Ministry) are mainly released to undertake assurances based on their availability. This leads to a situation where the assurance team is not embedded within the project. As a result the assurance team is unable to have an in-depth and up to date understanding of issues affecting deliverability and respond quickly to them rather than at a later stage where effecting corrections might be difficult (NAO, 2010)

In a situation where governance is not centralised and project owners are allowed to exercise localized governance capabilities, it is the case that governance as a whole requires that sufficient resources are dedicated to the project. In most cases, however, this is lacking as most of these project owners have faced cut in resources due to the adoption of principles of New Public Management and budgetary constraints (Hood, 1991). This suggests that these project owners need to be able to make use of existing resources and modify such resources during the project lifecycle. How they can do this is less explored. It is here that the concept of owner project capabilities - with its origins in the dynamic capabilities literature (Winch and Leiringer, 2016) - comes into play. It offers an insight into how these project owners may adapt or modify their resources to changing environmental conditions so as to develop required capabilities (see Helfat *et al.*, 2007; Teece *et al.*, 1997).

Additionally very little is known of how governance arrangements work in practice. Studies of governance from a project owner perspective have mainly focused on governance mechanisms at the front end (see Klakegg *et al.*, 2016; Williams *et al.*, 2012; Williams *et al.*, 2010). There is less focus on governance mechanisms such as coordination and operational readiness. This makes it difficult to determine what mechanisms work effectively in practice or otherwise and within what context.

CONCLUDING REMARKS

Infrastructure projects, despite their importance to the economies of countries, consistently experience poor project outcomes. The focus of the literature in improving project outcomes has mainly been on the project supplier, despite the fact that the project owner has been identified as a major cause of project failure. This paper contributes to the emerging literature on project owners and their importance to the success of a project as strategic actors. In particular, we argue for and reemphasize the need for strong owners from an organisational capabilities perspective. This requires project owners to be involved in defining, interacting with its suppliers and managing the delivery of the project throughout its lifecycle.

The focus on governance capabilities shows that simply defining the project by way of strategic capabilities, and procuring the project supplier will not be enough to ensure success. The owner organization has to be involved in the project during actual implementation to assess the progress of the project, monitor progress and report to relevant stakeholders. This process serves as a check on the project supplier and provides insight to stakeholders on what needs to be done and when it has to be done. Further, it is also the case that completion of a project does not mean it is successful as projects completed within time and cost may nonetheless encounter operational failures. The owner needs to be able to integrate the completed asset into existing operations in order to operate and derive benefits from it. We have introduced project assurance, project coordination and asset integration as three sub-sets of governance capabilities and argued for how they form one part of the necessary owner project capabilities. Here we do acknowledge that project owners face resource constraints in being able to develop these capabilities. As a result we have suggested the use of the dynamic capabilities theory as a useful theoretical lens for understanding how public sector clients can develop the needed capabilities. This theory focuses on how organizations create new resource configurations using existing resources in pursuit of improved performance.

We have, through this paper, started to unpack the concept of project governance capabilities for an infrastructure owner. However, this only forms a baseline for further development of the construct, and we recognize that these may not be the full range of

mechanisms. There is the need for further research especially on how governance mechanisms work in practice, what context they are most suitable, and how operational readiness for instance occurs on projects.

ACKNOWLEDGEMENT

The work described in this paper is supported by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, China (Project No. HKU 1751214)

REFERENCES

- Aritua, B, Male, S and Bower, D (2009). Defining the intelligent public sector construction procurement client. *Management. Procurement and Law*, **162**(MP0), 75-82.
- Brady, T and Davies, A (2010) From hero to hubris: Reconsidering the project management of Heathrow's Terminal 5. *International Journal of Project Management*, **28**(2), 151-157.
- Child, J and McGrath, R G (2001) Organizations unfettered: Organizational form in an information-intensive economy. *Academy of Management Journal*, **44**(6), 1135-1148.
- Davies, A, Gann, D and Douglas, T (2009) Innovation in megaprojects: Systems integration at London Heathrow Terminal 5. *California management review*, **51**(2), 101-125.
- Davies, A and Mackenzie, I (2014) Project complexity and systems integration: Constructing the London 2012 Olympics and Paralympics Games. *International Journal of Project Management*, **32**(5), 773-790.
- Flyvbjerg, B (2011) Over budget, over time, over and over again: Managing major projects. In: P W G Morris, J K Pinto and J Söderlund (Eds.) *The Oxford Handbook of Project Management*. Oxford: Oxford University Press, 321-344.
- Flyvbjerg, B. (2014). What you should know about megaprojects and why: An overview. *Project Management Journal*, **45**(2), 6-19.
- Flyvbjerg, B, Bruzelius, N and Rothengatter, W (2003) *Megaprojects and Risk: An Anatomy of Ambition*. Cambridge: Cambridge University Press.
- Flyvbjerg, B, Garbuio, M and Lovallo, D (2009) Delusion and deception in large infrastructure projects: Two models for explaining and preventing executive disaster. *California Management Review*, **51**(2), 170-193.
- Helfat, C E, Finkelstein, S, Mitchell, W, Peteraf, M, Singh, H, Teece, D and Winter, S G (2007) *Dynamic Capabilities: Understanding Strategic Change In Organizations*. Oxford, UK: Blackwell Publishing.
- Hone, D, Higgins, D, Galloway, I and Kintrea, K (2011) *Delivering London 2012: Organisation and Programme*. Proceedings of the Institution of Civil Engineers-Civil Engineering, **164**, 5-12.
- Hood, C (1991) A public management for all seasons. *Public Administration*, **69**(1), 3-19.
- Hui, P P, Davis-Blake, A and Broschak, J P (2008) Managing interdependence: The effects of outsourcing structure on the performance of complex projects. *Decision Sciences*, **39**(1), 5-31.
- Klakegg, O J, Williams, T and Shiferaw, A T (2016) Taming the 'trolls': Major public projects in the making. *International Journal of Project Management*, **34**(2), 282-296.
- LEGCO (2014) *Select Committee to Inquire into the Background of and Reasons for the Delay of the Construction of the Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link*. Hong Kong.

- Merrow, E W (2011) *Industrial Megaprojects: Concepts, Strategies and Practices for Success*. Hoboken: NJ: John Wiley & Sons.
- Miller, R and Lessard, D (2001) The strategic management of large engineering projects: shaping risks, institutions and governance. *International Journal of Project Management*, 437-443.
- Morris, P W (2013) *Reconstructing Project Management*. Chichester, West Sussex: John Wiley & Sons.
- Morris, P W and Hough, G H (1987) *The Anatomy Of Major Projects: A Study Of The Reality Of Project Management*. Chichester, West Sussex: John Wiley & Sons.
- National Audit Office (NAO) (2009) *Commercial Skills for Complex Government Projects*. London: The Stationary Office.
- National Audit Office (NAO) (2010) *Assurance for High Risk Projects*. London: The Stationary Office.
- National Audit Office (NAO) (2012) *Assurance for Major Projects*. London: The Stationary Office.
- OECD (2004) *OECD Principles of Corporate Governance*. Paris, France: OECD Publications Service.
- Rowlinson, S (2014) *Cost Escalation in the Hong Kong Construction Industry Report*. Hong Kong: The University of Hong Kong.
- Teece, D J, Pisano, G and Shuen, A (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, **18**(7), 509-533.
- Too, E G and Weaver, P (2014). The management of project management: A conceptual framework for project governance. *International Journal of Project Management*, **32**(8), 1382-1394.
- Williams, T, Klakegg, O J, Walker, D H, Andersen, B and Morten Magnussen, O (2012). Identifying and acting on early warning signs in complex projects. *Project Management Journal*, **43**(2), 37-53.
- Winch, G M (2014) Three domains of project organising. *International Journal of Project Management*, **32**(5), 721-731.
- Winch, G M and Leiringer, R (2016) Owner project capabilities for infrastructure development: A review and development of the strong owner concept. *International Journal of Project Management*, **34**(2), 271-281.