

Project Governance & Controls Annual Review 2019



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The Project Governance and Controls Annual Review showcases interesting and practical academic papers focused on enhancing the governance and practice of project, program and portfolio management in the Australasian region. Each annual update is published in the months following the Project Governance & Controls Symposium held each year in August, in Canberra; and includes papers received in the preceding year.

To submit your paper for review, see: <https://www.pgcs.org.au/academic-papers/>



The Project Governance and Controls Symposium (PGCS) is designed to enhance the connection between project and program management, governance and controls. Project management cannot operate effectively without the support of senior management and the information from effective project controls. Frank and fearless reporting of status and issues cannot be assumed if the middle levels of management have the capability to restrict negative information. Conversely, executive management decisions depend on accurate and realistic assessments of risk, schedule and cost. Creating a culture where this type of information is not only available but accepted and used properly is the key governance issue within the project, program and portfolio domain.

For more information on this year's PGCS, see: <https://www.pgcsymposium.org.au/>

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The Walt Lipke Awards

The Project Governance and Controls Symposium (PGCS) sponsors the annual Walt Lipke Award in honour of Mr Lipke's contribution to enhancing the governance and control of projects world-wide.



Walt Lipke (brown suite – shown here presenting the 2017 award at PGCS) is the creator of Earned Schedule, which extracts reliable schedule information from earned value data (resolving the long-standing error in the calculation of SPI and SV). Earned Schedule is freely available to the project community from: <http://www.earnedschedule.com/>

The PGCS Walt Lipke award is open to the authors of papers submitted to the PGCAR journal since the close-off of the previous year's award, that have been accepted for publication, and are available for presentation at the PGCS Symposium in Canberra. The winning papers are selected based on:

- **Originality:** a new or innovative concept
- **Practicality:** the usefulness of the concept in the management of projects, programs and/or portfolios in the Australian context, and
- **Quality:** the academic merit of the paper.

Walt Lipke Award Winners

2017 Mr. Peter Slay

2018 Dr. Raymond Young

2019 Dr. Shankar Sankaran

2020 To be announced at PGCS 2020, Canberra.

For more information on the Walt Lipke award (and to read previous year's winning entries) see: <https://www.pgcs.org.au/academic-papers/#Walt>

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Editorial

This 2nd edition of the Project Governance and Controls Annual Review PGCAR and marks a significant step towards the creation of a refereed journal open to established and aspiring academics working in the Australian context. There are no charges associated with the review and publication of papers in this journal.

The **Project Governance & Controls Annual Review** (PGCAR) is an Australian publication, supported by PGCS and the Australian academic community, focused on improving the governance, control and delivery of projects, programs and portfolios. To achieve our aim of collecting and disseminating high quality papers and information in support of our objective, this journal uses a standardised double-blind review process, the review criteria for papers submitted to the PGCAR include the requirements for the paper to:

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- Be original – substantially similar papers published in other journals will not be accepted
- Describe research that contributes to the advancement of literature of and knowledge to support the advancement of project controls or governance
- Clearly state the research question and the nature and method of the research
- Include a literature review identifying the theoretical concepts and research upon which this work is based
- Demonstrate the value or significance of the research
- Include an abstract, conclusions, and statements about the limitations of the research and next steps
- Use American Psychological Association (APA) style of references.

PGCAR will accept papers for review throughout the year. Papers of between 3000 - 6000 words are preferred; the work may have been written for other purposes but not published. On completion of the review process, accepted papers will be published in the prepress section of the PGCS website, and included in our annual PGCAR publication.

For more information see: <https://www.pgcs.org.au/academic-papers/>

Academic Research Grants

The primary objective of PGCS is to advance the research into successful project delivery in the Australian Context. All profits from our Symposium are directed towards this purpose. Our three approaches are:

1. Publishing the PGCAR as a free resource.
2. Funding the annual Walt Lipke Award to encourage excellence in the writing of academic papers, see: <https://www.pgcs.org.au/academic-papers/#Walt>
3. Funding research grants, with the first grant to be awarded in 2020. For information on how to apply for a grant, see: <https://www.pgcs.org.au/research/>

2019 Papers

The eight papers in this edition of the PGCAR cover a diverse range of topics and are of an excellent quality. I hope you enjoy reading them and are then inspired to contribute to the 2020 PGCAR.

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A Model for Organizational Project Management and its Validation

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Abstract

It is important that an organization selects the right projects and carefully manages and governs them to deliver their intended benefits. This paper will describe a model for Organizational Project Management (OPM) to help organizations to do that. OPM is the integration of all project management-related activities of an organization linking strategic decisions (where the project management-related activities are to be carried out) with business decisions (portfolio management and benefits realization) with their management (program and project management) and their governance at both the strategic and project levels. This paper will describe a seven-layered model of OPM with its 22 elements – spanning from the organizational level to the individual project level – derived by the authors using academic literature and their own experience in managing projects. The model adds new elements to OPM such as governance, projectification, benefits realization and organizational design to the conventional 3P (portfolio, program and project management) elements resulting in a more comprehensive model. The developed model was validated with a random sample of organizations in the Netherlands and China. The findings from the validation led to patterns of implementation of OPM in a variety of organizations. The process used for validation as well as the results obtained will be discussed in the paper. The feedback received on this process from academics and practitioners at the PGCS symposium will assist in the development of a web-based diagnostic tool for OPM being put together by the authors.

Keywords: Organizational Project Management; Portfolio Management; Program Management; Project Management; Project Management Office; Megaproject; Project Governance; Corporate Governance; Strategy

Introduction

This paper is structured as follows. First, the origins of a seven-layered OPM model with its 22 elements, derived from the literature, is presented. The purpose of each layer of the model is then briefly described to show how it contributes to the integration of project-related activities in an organization. Next, the literature used to derive a research instrument used to validate the model are listed along with a questionnaire that was used for data collection. Following this, the outcomes from the process used to validate the OPM model are described. The patterns of OPM that were

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found from the validation exercise are then discussed. The paper ends with some conclusions and an outline of future work to be carried out for further validation of the model.

The OPM Model

The Organizational Project Management (OPM) model used in this paper is derived from organizational theory from an organizational integration perspective (Child 2005). The concept of OPM has its origins in the Capability Maturity Model (CMM) developed at Carnegie Mellon University in the late '80s (Paluk et al. 1993) to improve software delivery that was failing to deliver benefits. The application of CMM to project management started in the 1990's (Fincher & Ginger 1997). This gave rise to several models that prompted the Project Management Institute (PMI) to develop the Organizational Project Management Maturity Model OPM3 (Brookes et al. 2014; PMI 2003). The Office of Government Commerce subsequently developed the Project Management Maturity Model (P3M3) (Axelos 2015). P3M3 expanded the maturity model from a project level to include portfolio management and program management or 3Ps as it is commonly called. However, Mullaly (2006) who carried out an assessment on the use of the project management maturity models found that it was still unclear how underlying causes resulted in the results from a survey-based analysis that an organization improved its performance by adopting a maturity model. On the other hand, Brookes et al. (2014) found that 'PMMs [Project Management Maturity Models] based on different frameworks will have the propensity to stimulate different suggestions for project management performance improvement' (p. 243). However, the definition of OPM confined only to the 3Ps generated further discussion by project management scholars. Jugdev (2017) argued that OPM3 proposed by the Project Management Institute did not explain how it took into account the impact of classical organizational theories on project management. Crawford (2006) who used a discourse analysis to understand the 'nature and evolution of project management theory and practice' (p. 74) analyzed the discourse regarding the conceptualization of OPM alluded to the importance of the Project Management Office (PMO) and the importance of activities associated with portfolio and program management to the development of OPM. The term OPM was redefined by Aubry, Hobbs and Thullier (2007) to encompass the management of multi-project activities in project-based organizations to align these activities with portfolio and program management and their governance. Similar views were expressed by Drouin and Besner (2012) in a special issue on projects and organizations published in the International Journal of Managing Projects in Business that the focus of 'project management is changing from a focus on the management of individual projects to the wider organization' (Drouin 2017, p.9) in the context of managing multiple projects. Based on these developments Drouin (2017, p.1) defined OPM as: ***'The integration of all project management-related activities throughout the organizational hierarchy or network'***.

The concept of OPM developed by Müller et al. (2019), and used in this paper, broadens the scope of OPM defined by Drouin (2017) to other critical aspects of integrating project management-related activities in an organization such as governance and benefits realization to deliver beneficial change from projects. In addition, the model also extends the importance of OPM to process-based and project-oriented organizations as they also use projects to deliver some of their strategies. This

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extended view of OPM looks at an organization’s philosophical point of view based on the importance paid by them to their project-related activities in partnership with their stakeholders.

Based on a literature review of key project management literature, Müller et al (2019) developed a seven-layered model with 22 elements to conceptualize a systematic model of OPM to optimize the project-related activities within each layer while not forgetting the relationships between the layers.

Figure 1 shows the seven-layered OPM model developed from the literature. For more details on the literature used to derive this model readers can refer to a recently published paper about the model in the Project Management Journal (Müller et al. 2019). A brief explanation of the model is presented next.

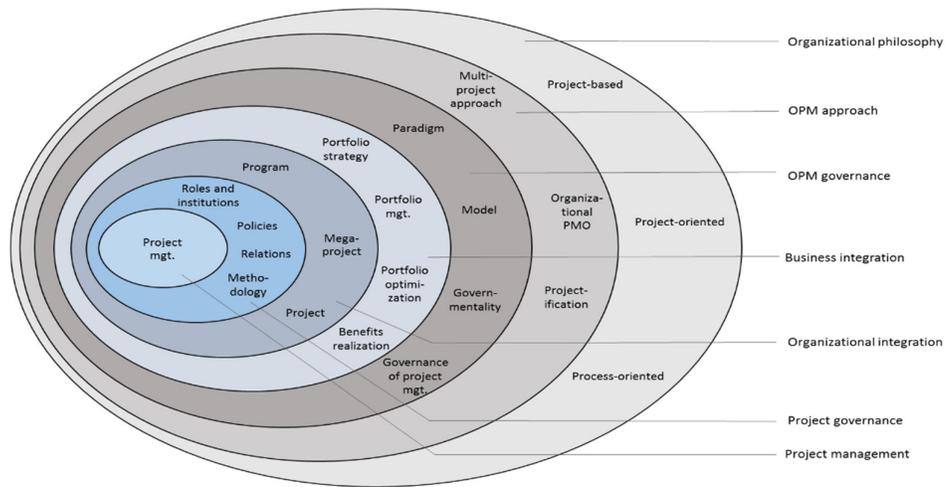


Figure 1: The onion model of OPM (Müller 2019)

Table 1 shows the 22 elements that make up the model.

Layers	Elements			
<i>Organizational Philosophy</i>	Process-based organization	Project-oriented organization	Project-based organization	
<i>OPM Approach</i>	Multi-project approach	Organizational PMO	Projectification	
<i>OPM Governance</i>	Paradigm	Model	Governmentality	Governance of project management
<i>Business Integration</i>	Portfolio strategy	Portfolio management	Portfolio optimization	Benefits realization
<i>Organizational Integration</i>	Program management	Megaproject	Project	
<i>Project Governance</i>	Roles and institutions	Policies	Relations	Methodology
<i>Project Management</i>	Project Management			

Table 1: The elements of the OPM Model

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A brief description of the layers from the outermost to the innermost is discussed next.

Organizational philosophy – An organization’s philosophy explains how it presents itself to external stakeholders such as its customers, partners and suppliers in terms of the importance it pays to project-related activities. While a process-oriented organization places importance on its processes (with some attention to projects when they need to be carried out) a project-oriented organization, while still being process based, will treat its projects more strategically and have structures and processes to manage these well. For the project-based organization its unit of production is a project.

OPM approach – This is the layer at which decisions are taken on how multiple projects are managed across an organization (Blomquist & Müller 2006). This will depend on how portfolios of projects are managed across the organization as well as the intensity of projectification within the organization. When a multi-project strategy is used projects are managed individually to maximize return on investment on independent projects. The goal of a programme strategy is to maximize the efficiency of project execution using a programme of projects. On the other hand, a portfolio strategy maximizes the effectiveness of using an organization’s resources in carrying out projects. A hybrid strategy balances both efficiency and effectiveness by combining the use of a programme and portfolio strategy as appropriate to the selected projects. An organization may also consider setting up an Organizational Project Management Office (OPMO) to strategically support the multi-project activities within the organization. Projectification refers to the extent of project thinking that is prevalent in the organization (Midler 1995).

OPM governance – OPM governance is the means by which portfolios, programmes and projects are directed and controlled. Managers in the organizations are also made accountable for governance activities. While establishing OPM governance the paradigm under which an organization operates becomes important. The paradigm adopted by the organization would depend its orientations – whether it is predominantly shareholder or stakeholder oriented and the way in which it controls its project managers – through behavior control or outcome control. Four paradigms have been conceptualized by (Müller 2017a) - conformist (shareholder orientation and behavior control); flexible economist (shareholder orientation and outcome control); agile pragmatist (stakeholder orientation and behavior control); and versatile artist (stakeholder orientation and outcome control). See <http://manapra.com/paradigms/questions> The models of governance an organization adopts can also be influential in setting up the governance at OPM level. The models could be designed as top-down or bottom-up or process or principles-based. Governmentality is a new concept that is gaining importance in project governance (Clegg 2019). This refers to the attitudes and behaviours of those who govern as well as those who are governed. It is the human side of governance that has its origins in Foucault’s (1991) work on the relationship between governors and people.

Business integration – The OPM approach adopted by the organization will determine how the organization aligns its projects with the business it is in. It will also establish the extent to which the organization sets up project portfolio management (selection, balancing and optimization of projects to be carried out and their relationships to business-as-usual in alignment with its strategy), and the importance it pays to realize benefits from all of its project-related activities. The governance of project management then determines how projects are governed at the project level.

Organizational integration – At this layer decisions will be made on the effective coordination of all the project-related activities authorized by the top management of the organization at the business integration level so that adequate resources are allocated to carry out these activities. Projects that

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have a common goal would be managed as programmes. A special purpose entity is likely be set up to manage a project as a megaproject by organizations managing such large complex endeavors. When the projects are not aligned towards a common goal but compete for resources they may be managed as discrete projects but with adequate provision made for resource allocation and optimization.

Project governance – This is done through setting up governance structures such as project boards or steering committees and PMOs at a tactical level, establishing policies to manage the project including reviews, setting up contracts between parties working together on a project and choosing appropriate project management methodologies. The relationship between the project sponsor or owner and the project manager is also considered to provide effective governance.

Project management – At this layer, the project manager uses their skills and knowledge to apply appropriate tools to deliver the projects within the constraints established while scoping the project. Delivering the projects within the agreed upon schedule, under budget and of appropriate quality are often used as a measure to evaluate project success.

Two other considerations were used to develop the OPM model – within-layer relationships between elements at a layer and between-layer relationships to enable appropriate governance of the project.

The elements at each layer were chosen to form a mutually exclusive set that work together within the layer to be able to govern the elements of the next layer. Each higher layer of the model helps to govern the decisions made at the next lower layer. For example, decisions made at the business integration layer about the portfolio of projects to be undertaken by an organization govern the approaches adopted at the organizational integration layer to manage the projects within a portfolio as programs, projects or as a megaproject.

Appendix A shows the literature that was used to come up in the assessment tool used for validation in a class of MBA students comprising of practicing managers in their organizations. They were knowledgeable about how projects were carried out within their organizations. The references used to develop this assessment tool are listed separately in this paper.

Data Collection

Data was collected using questions derived from the assessment tool based on the literature.

Appendix B shows the questions developed from the literature used to formulate the OPM model to validate the model. (Müller et al 2019 a) A web-based tool is being developed based on the experience of using it to validate the model.

Model validation

The OPM model was validated through a random sample of organizations in the Netherlands and China. For this, part-time students of an Executive Master/MBA program were trained in the model for three days and subsequently asked to assess their organizations against the OPM model. The goal of this exercise was to identify the presence and expression of the different elements, as well as

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their integration in the organizations. Variety sampling was used to identify the most basic patterns of the phenomenon. Table 2 shows the sample characteristics.

<i>Country</i>	<i>Industry</i>	<i>Company size</i>	<i>Informant roles</i>	<i>Organizational philosophy</i>
NL	Product Engineering	Large	Department manager, Marketing manager, Project manager (2)	ProcOO
	Electronic Engineering	Large	Program manager, Project manager, Technical manager	POO
	Healthcare	Small	Manager	ProcOO
	Product Engineering	Med	Manager	PBO
	Food	Large	PMO Manager and Supply Chain Specialist	ProcOO
	Engineering	Large	Managing Director, Operations Director, Project Manager	PBO
	Online retail	Large	Manager	POO
	Retail	Medium	Manager	ProcOO
	Food	Large	Planning Analyst	ProcOO
	Healthcare	large	PMO Manager	POO
	Food processing	Small	Manager	ProcOO
	Traffic	Small	Logistics Manager	ProcOO
	Bus services	Small	Consultant	PBO
	Healthcare	Large	Managers (4)	ProcOO
China	Pharma equipment	Large	Sales Manager	PBO
	Pharma	Large	Product Manager	PBO
	Telecom	Large	Project Manager	POO
	Automation	Large	Senior Manager	POO
	Engineering	Large	General Manager	POO
	Pharma	Large	Project Manager	PBO

Size: Small: 50 employees; Medium: 51-1000 employees; Large: >1000 employees

Philosophy: ProcOO – Process oriented organizations.

POO – Project oriented organizations.

PBO – Project-based organizations.

Table 2: Sample of organizations

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Twenty organizations were assessed, 14 in the Netherlands and six in China. Most of the organizations (14) were classified as large (>1,000 employees); two as medium (51-1,000 employees); and four as small (up to 50 employees), with a range from 10 to 58,000 employees. The organizations belong to a diverse set of industries, including pharmaceuticals, healthcare, engineering, retail, food processing and telecom. Students (mostly managers) assessed their respective organization either through self-assessment or by interviewing up to five managers of the organization. This resulted in 31 contributors to the study.

Eight of the organizations were ProcOOs, focusing on production. However, they had between three and 20 projects each year to improve manufacturing capabilities and quality. Six companies were project-oriented (POO), and six project-based organizations (PBO).

Validation of measures

Appendix A references and describes the measures and scales used to assess the OPM elements. Due to space limitations in this article, the measures and scales cannot be explained in detail. The readers are referred to the original publications listed as references in Appendix A. However, the questions used are included in Appendix B to show the types of questions used.

All measurement dimensions and their scales were fully used in the assessment, which validates both the existence of elements and the appropriateness of their measurements for the model described herein.

Discussion

Comparison of the assessment results identifies some implementation patterns. Thirteen of the organizations (65%) use an OPMO for the governance of their multi-project business. Overall, the implementation patterns differ in organizations with and without an OPMO. OPMO-driven organizations prefer a hybrid approach in governing their project business (62%). An approach describes the strategy selected by upper management to run the project-based part of the business as outlined above. A comparison of the different organizational implementations of the model elements identified six potential implementation patterns, which are shown in Table 3.

Both ProcOOs and POOs often prefer hybrid approaches to steer their multi-project business. Within each of these two organizational philosophies, the presence of an OPMO is associated with different implementation patterns. PBOs prefer both hybrid and multi-project approaches with OPMOs. Table 3 shows that projectification increases from pattern 1 to pattern 6, as the maturity in running projects is expected to be higher in organizations with more projects. Governance paradigms also vary across the patterns; while ProcOOs use all of the four possible paradigms, POOs prefer stakeholder-oriented paradigms, and PBOs adjust the paradigms to the project settings. With the exception of pattern 6, the existence of governance models appears to be associated with that of an OPMO. Within these governance approaches, all three governmentality approaches – authoritarian, liberal and neoliberal – are used. Again, pattern 6 seems to be an exception with its focus on liberal governmentality only.

In line with the argument for higher OPM maturity in more project-based settings, the governance of project management increases from ProcOOs to PBOs. Table 3's entry on portfolio is a combination of the three portfolio elements, that is, strategy, process for portfolio management, and use of optimization approaches. While high in PBOs, this seems to vary significantly in other patterns.

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Similarly, the use of benefits management is varied, and seems to be higher in organizations with hybrid approaches and OPMO. Organizational integration in ProcOOs and POOs seem to prefer program approaches, which is indicative of their longer-term focus and process orientation in general and lends itself to program thinking. PBOs use both project and program approaches to implement their business opportunities. Steering Groups are paramount as project governance institutions and complemented by PMOs in POOs and PBOs. Finally, the project management methodologies vary across the organizations, with predictive methodologies (such as PRINCE2) being popular across the patterns, occasionally complemented by emergent (Agile/SCRUM), or convergent (mix of predictive and emergent) methods.

<i>Elements</i>	<i>Pattern 1</i>	<i>Pattern 2</i>	<i>Pattern 3</i>	<i>Pattern 4</i>	<i>Pattern 5</i>	<i>Pattern 6</i>
<i>Philosophy</i>	ProcOO		POO		PBO	
<i>Approach</i>	Hybrid		Hybrid		Hybrid	Multi-project
<i>OPMO</i>	Yes	No	Yes	No	Yes	Yes
<i>Projectification</i>	Low	Low	Low	Medium	High	High
<i>Paradigm</i>	All	All	VA/AP	AP	All	VA/CON
<i>Model</i>	Yes	No	Yes		Yes	No
<i>Governmentality</i>	All	All	All	All	All	Liberal
<i>Gov of PM</i>	Medium	Low	Medium		Low/High	Med/High
<i>Portfolio (3)</i>	High/Med	High/Med	Med/High	Low	High	High
<i>Benefits</i>	Low/Med	Low/Med	High	Low	High	Low
<i>Org integration</i>	Program	Program	Program	Program	Program	Project
<i>Institutions</i>	SG		PMO/SG	SG	PMO/SG	PMO/SG
<i>Methodology</i>	Conv/Pred	Pred/none	Predictive	Emergent	Predictive	Pred/Conv

Table 3: Implementation patterns

Conclusions

Existing theories and literature were used to come up with the initial OPM model and further literature was then sought to refine and fine tune the model. The model represents a better combination of elements derived from the academic literature as well as the experience of the authors who manage projects. These elements were carefully included in the model using within-layer and between-layer relationships to minimize redundancy of activities within an organization making roles and responsibilities clear at each layer.

The findings across the 20 organizations validate the model, as all elements were identified, and the results indicate clear patterns of implementation for which the organizational philosophy and the presence of an OPMO appears to play a decisive role.

The instrument used by the authors for validation was a qualitative assessment tool A web-based instrument is being developed as a follow up to the qualitative evaluation that was carried out to

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validate the model in Canada, Australia, the Netherlands and China. The validation of the model in Australia and Canada appear as case studies in a book on OPM being published later this year (Müller et al 2019a). This paper has presented the validation of the model with managers from the Netherlands and China. The authors are continuing the validation of the model in different industry sectors to identify patterns of implementation that could serve as a reference for organizations that wish to implement OPM in their organizations.

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Appendix A: Assessment tools, their references and scales

<i>Layer</i>	<i>Element</i>	<i>Assessment model reference</i>	<i>Question /reference</i>	<i>Measures</i>
Organizational philosophy	Project-based Project-oriented Process-oriented	(Turner & Keegan, 2001) (Gareis & Huemann, 2007) Ditto.	Discussion	Predominant philosophy of the organization: process-oriented, project-oriented, or project-based
OPM approach	Multi-project approach OPMO Projectification	(Blomquist & Müller, 2006) (Müller et al., 2017a) (Müller, Zhai, et al., 2017)	p.85-98 p.54-58 p.391	Multiproject, program, portfolio, or hybrid-driven With or without organizational PMO Low, Medium, or High
OPM governance	Paradigm Model Governmentality Governance of PM	(Müller & Lecoivre, 2014) (Müller, 2009) (Müller, Zhai, et al., 2017) (Müller, 2009)	p.1346-1357 p.23-28 p.391 p.31-40	Conformist (CON), Flexible Economist (FE), Versatile Artist (VA), or Agile Pragmatist (AP) Existence of governance model Authoritarian, liberal, or neo-liberal Low, Medium, or High
Business integration	Portfolio strategy Portfolio management Portfolio optimization Benefits realization	(Kopmann et al., 2017) (Kopmann et al., 2017) (Cooper, Edgett & Kleinschmidt, 2004) (Bradley, 2014)	Discussion	Low, Medium, or High – link to strategy Low, Medium, or High – process for ptf. mgt. Low, Medium, or High – optimization Low, Medium, or High – benefits management
Organizational integration	Program Megaproject Project	(Turner & Müller, 2003) (Flyvbjerg, 2014) (Turner & Müller, 2003)	Discussion	Average approach to opportunity implementation: project, megaproject, or program
Project governance	Institutions and roles Policies Relations Methodology	(Müller et al., 2017a) (Müller, 2009) (Turner, 2004) (Müller, 2009)	Discussion	Steering group, PMO, others Existence of policies Contract types Predictive (e.g. Prince2), Emergent (Agile), Convergent (mix of predictive and emergent), or self-developed

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Appendix B: Questions used in the validation

Layer	Name of Layer	Element	Questions developed for validation
1	Organizational philosophy		<p>What is the nature of the customer/client deliverables and how are they delivered?</p> <p>Is the organization's interaction with customers/markets based merely on projects or continuous processes?</p> <p>How are projects with customers handled within the organization: as separate projects, or are the parts of the project subordinated to a production process?</p> <p>How many projects or programmes does the organization execute per year?</p> <p>Are project and programme management explicit processes and functions in the organization?</p>
2	OPM Approach		<p>What types of projects are accepted in the organization?</p> <p>How important are the existing skill-sets of employees and objectives of other projects in the acceptance of projects?</p> <p>Are projects grouped into programmes, or portfolios, or both?</p>
2	OPM Approach	OPMO	<p>Is there a central organizational unit for the organization-wide development and improvement of project management practices (often called strategic PMO or organization-wide PMO)?</p> <p>What is the mandate, scope of work and authority of this organization?</p> <p>Is this the only one of such organizations or are there other, probably more tactical, units that also work on the improvement of project management practices (often called PMOs or tactical PMOs)? If so, how is the work divided between them?</p>

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Layer	Name of Layer	Element	Questions developed for validation
2	OPM Approach	Projectification	<p><i>Status of project management in the organization:</i> how important is project management in the organization?</p> <p><i>Career progression for project managers:</i> is there a defined and implemented career path for and elements supporting (e.g. training) project management?</p> <p><i>Projects as a business principle:</i> are the relationships with its partner organizations and customer/clients based on joint projects, or merely handled as operations (such as outsourced services)?</p> <p><i>Percentage of business done in projects:</i> what proportion of the organization's business is based on projects?</p> <p><i>Project mindset and culture:</i> when talking about their work, do employees refer to the projects they work on or the company they work for?</p>
3	OPM Governance		<p>Is decision making in the organization governed by the aim of maximizing shareholder return, or by providing value to many different stakeholder groups simultaneously?</p> <p>Are project managers supposed to predominantly to follow the project management methodology (i.e. execute process compliance) or accomplish pre-set objectives irrespective of the process followed?</p> <p>How are project managers monitored?</p>
3	OPM Governance	Governance Model	<p>Is there a governance model for projects which is applied in the organization? If so, describe the model.</p> <p>Is the model based on rules or principles?</p> <p>What are the consequences of non-compliance with the model's rules or principles?</p> <p>What percentage of projects is governed using this model?</p>

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Layer	Name of Layer	Element	Questions developed for validation
3	OPM Governance	Governmentality	<p>How does the governance institution (e.g. steering committee) interact with its managers?</p> <p>Authoritarian: as indicated by giving clear directions, enforcing decisions, being authoritative in style.</p> <p>Liberal: as indicated by emphasizing the achievement of project objectives, using rational means to convince the managers, and flexible adjustment of organization structures to the manager's needs.</p> <p>Neoliberal: as indicated by communicating values and fostering a culture that allows managers to control themselves, expecting managers to decide for themselves, based on the collective interest of the organization's stakeholders, rarely steering through directives.</p>
3	OPM Approach	Governance of Project Management (Using Table in Chapter 4 of Müller et al. 2019a)	<p>What are the measures used in governance of project management?</p> <p>To what extent they are used?</p> <p>Overall, which step (1, 2 or 3) would you say the organization has reached?</p>
4	Business Integration	Portfolio strategy	<p>What are the strategies for the different portfolios in the organization?</p> <p>How are the strategies linked to corporate strategy?</p> <p>Are the strategies and their links static or dynamic over time?</p> <p>In the case of dynamic strategies, how often are they adjusted to the changing circumstances of the organization?</p>
4	Business Integration	Portfolio Management	<p>How does the organization select, prioritize, staff and authorize its projects?</p> <p>Is there a portfolio management process? If so, is it followed?</p> <p>What tools and techniques are used for the selection of projects?</p> <p>What criteria are used for the prioritization of projects?</p> <p>How is resource balancing carried out?</p> <p>How are projects in the portfolio authorized and controlled?</p>

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Layer	Name of Layer	Element	Questions developed for validation
4	Business Integration	Portfolio Optimization	<p>Are portfolios deliberately optimized for the accomplishment of strategic objectives?</p> <p>If so:</p> <p>What criteria or optimization strategy criteria are used?</p> <p>What tools and techniques are used to support the process?</p> <p>How often are portfolio optimization strategies applied to portfolios and how often is their performance controlled?</p>
4	Business Integration	Benefit Realization	<p>To what extent is benefits realization a subject at the management level?</p> <p>Are there accountabilities assigned for benefits realization? If so, to whom (which role)?</p> <p>Is there a benefits realization process, related criteria and goals to manage benefits realization?</p> <p>Are the results of the management of benefits realization controlled? If so, are they used to improve practices?</p>
5	Organizational Integration		<p>Is the work in the organization mostly done through projects, or programmes, or megaprojects?</p> <p>What is the percentage of revenue from projects, programmes and megaprojects?</p> <p>What is the percentage of human resources assigned to projects, programmes and megaprojects?</p> <p>What is the percentage of working time assigned to projects, programmes and megaprojects?</p>
6	Project Governance	Institutions and Roles	<p>Who is the project owner and/or sponsor of the project?</p> <p>Is there a steering committee and if so, what roles are represented there?</p> <p>Are there other governance institutions, such as tactical PMOs, quality committees, or other advisory groups?</p> <p>If so, what is their mandate and authority?</p>
6	Project Governance	Policies	<p>Which organizational policies outline the suggested practices for project management?</p> <p>Are the policies relevant and current?</p> <p>To what extent can the policies be adopted to projects in the organization?</p> <p>Is their use mandatory or voluntary?</p> <p>What are the consequences of non-compliance?</p>

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Layer	Name of Layer	Element	Questions developed for validation
6	Project Governance	Relations	<p>How are agreements predominantly made for and in projects (e.g. formal contracts versus psychological contracts, etc.)? If there are several, what is the percentage and context of each?</p> <p>What types of formal contracts are used and with whom?</p> <p>What types of informal contracts are used and with whom?</p> <p>Are the authorities to sign the contracts defined and communicated?</p> <p>What are the consequences of non-compliance with agreements?</p>
6	Project Governance	Methodology	<p>Which types of project management methodologies are used in the organization (predictive, iterative, emergent, or self-developed)? Can you name them?</p> <p>How many different types of methodologies are used in the organization?</p> <p>Which methodologies are suggested by the governance system?</p> <p>Are project managers free to choose their own methodology?</p> <p>What happens when project managers do not follow the suggested methodology?</p>
7	Project Management		<p>What type of project life-cycle underlies the project (e.g. sequential, incremental, agile or hybrid)?</p> <p>How is planning done in the project?</p> <p>Which documents constitute a project plan?</p> <p>How are projects implemented and controlled?</p> <p>To what extent is risk management and change management carried out in projects?</p> <p>Which leadership approach (vertical, horizontal, shared/distributed or balanced) is applied in projects?</p> <p>Which leadership styles (transactional/transformational, or goal-oriented/involving/engaging) are used by the project manager?</p>

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Project Benefits Realization- Academics' Aspiration or Practitioners' Nightmare

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Abstract

Project Management (PM) literature increasingly calls for making project outcomes (benefits) rather than outputs as criteria for project success. Therefore, PM literature proposes a number of frameworks and measures for effective benefits realization (BR). There is not substantial evidence, particularly in the public sector organizations, as to how benefits are identified, what frameworks are being applied, what role governance plays in effective benefits realization and what are the factors that inhibit and or drive benefits realization? This study aims to address these issues through a qualitative research, based on case study method and uses semi-structured interviews. Our findings show that there is widespread awareness about the significance of BR in the public sector and BR frameworks do exist but rarely used. This research also finds that Project governance does not play effective role in promoting BR. This research highlights the lack of adequate funding, human resources and skills that are haemorrhaging efforts for the implementation of BR. This research also points out that the top management is neither fully committed to the cause of BR nor ready to provide resources and leadership for the implementation of benefits realization in the public sector organizations.

Keywords: Benefits Management, Benefits Realization, Governance, PMO, Benefits Owner, Framework.

Introduction:

Project success has frequently been discussed over the decades in the PM literature and achieving project success has been the holy grail of project practitioners and researchers. According to Snyder (1987) modern PM emerged as a discipline during the 1950s and Ballard et al (2014) state that project success as an area of academic interest appeared in the 1980s. During the 80s, PM research started investigating project success beyond scope, cost and time, leading this debate Pinto and Slevin (1988) published a list of 10 project success factors, which is now considered a pioneering work on project success (Ballard 2014). Since the last decade and a half, the project success debate has moved from project outputs and has been focussing on project outcomes leading to project benefits management and realization. Bradley (2010) is credited to have introduced the concept of benefits management initially and later he rebranded it as benefits realization. Project Benefits Realization (BR) has assumed significance as a key success criterion in addition to delivery of projects within scope and on time and cost. Project Management literature is increasingly demanding for focusing on project outcomes rather than project output. A number of frameworks have been

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suggested to incorporate BR into project management processes. Some academics have also suggested to add a fifth phase to the existing project life cycle so that expected project benefits can be realized. This research explores projects in practice with a particular focus on BR and enriches the PM literature, which is currently normative and aspirational, with industry best practices. This study highlights how benefits are identified and aligned to the organizational strategic objectives; are there any BR specific frameworks being used; does project governance play its due role for BR, and finally what are the challenges being faced by the project practitioners in their pursuit for BR.

Literature Review:

Breese (2012) asserts that BR management, as an aspect of project management, has lately received growing attention and literature on BR has been growing rapidly. Association for Project Managers (APM) sets up a Special Interest Group (SIG) in 2009, which has been instrumental in developing survey reports among the members on the significance of benefits management in organizations of their employment. APM issued a survey report for the year 2017, according to which members have reported that there is a growing awareness in organizations that benefits management must be an integral part of project management particularly P3M (APM 2017). Breese (2012) states that despite benefits xxx started to evaluate investments in IT but BR is equally relevant to other disciplines and professions. Breese raises the question, whether BR can radically change management practices and become a panacea for achieving strategic goals. Breese (2012) highlights that there is a need to develop theories on BR based on in-depth analysis of practice.

The research results by Marnewick (2016) indicate that major processes of benefits management are followed by organizations irrespective of the type of organizations and the size of projects in South Africa and Holland. The author states that benefits gained from investment in IT projects, are not linked back to organizational strategies and it does not provide insight into organizations, whether the promised benefits have been achieved, therefore, there can be no certain answer whether the strategic intent has been successfully achieved as a result of investment. Elaborating further, Marnewick concludes that organizational culture does not play any role how benefits management is practiced in the understudy organizations, however, the adherence to benefits management practices depends on organizational maturity. He identified that organizations do not follow benefits management best practices, which subsequently impacts on how the benefits of the investment on Information Systems projects are realized. The organizations were found aware of the importance of business case and its role in benefits management; however, the research discovered a missing link between the delivered benefits and linking it back to the organizational strategies. A similar challenge has been highlighted by Chih and Zwikael (2015) that organization do not have the ability to formulate benefits and also do not have processes in place to link the delivered benefits to the promised benefits. In order to fix such problems, Marnewick (2016) suggests a closed loop system which connects the benefits promised in the business case with delivered benefits and also linking back to the strategic intent. The author asserts that despite organizations are conscious of the fact that the delivery of the promised benefits is a measure of success, but such organizations do not put in place the processes to ensure that benefits have been delivered. Benefits management literature offers varying at times contradicting pictures on the employment of benefits realization in practice. He dispels the common impression found in prevalent project management standards and methodologies that put benefits management in the domain of program management. However, Marnewick (2016) states that his research indicates that organizations do attach benefits to individual projects irrespective of project cost and scope. He proposes that benefits management

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should be a part of project management as another knowledge area and traditional project management lifecycle be expanded to include benefits delivery and realization. Marnewick (2016) in fact echoes the suggestion by Zwikael and Smyrk (2012) in which they have proposed to extend traditional project management cycle to project benefits realization and suggested that the focus of project management should be shifted from project outputs to project outcomes. Marnewick (2016) also suggest that the focus of project governance should be extended from project delivery to ensuring benefits realization, which also highlights the call for the inclusion of benefits realization in project management body of knowledge.

Badewi (2016) states that current research defines project benefits management as ‘the initiating, planning, organization, executing, controlling, transitioning and supporting change in the organization. He argues that his research nullifies the belief that completing project on time and cost does not necessarily lead to stakeholders’ satisfaction and delivering expected project benefits. He states that this research highlights a strong relationship between project management efficiency through project outputs delivery on time and cost with the desired project benefits realization. Badewi (2016) states that project management practices have a significant impact on project success and similarly there is co-relation between project management and benefits management. Therefore, he claims that the combining project management (PM) with benefits management (BM) in a single governance framework enhances the possibility of success. PM combined with BM ensures project success significantly as benefits owners are supported by reliable projects outs delivery, as compared to having [standalone] good outputs or good BM practices only.

Mossalman, and Arafa (2015) argue that BR has become a significant factor for projects and it is common that project success is assessed on the basis of project benefits rather than project completion on time and cost. The survey conducted by Mossalman, and Arafa (2015) shows that there is a significant dearth of benefits management at the project level than at the program level. They suggest a strong governance infrastructure in order to effectively implement benefit management.

There is no consensus yet, whether effective benefits management can be implemented at project, program or portfolio level. Eduardo et al (2015) argue that benefits are usually achieved through program and project management techniques. Therefore, programs and projects play a key role in the execution of business strategy and subsequently delivering value to the business. Therefore, effective management of projects helps deliver project outputs, outcome and enables benefits realization. They argue that effective benefits realization practices strongly contribute towards effective implementation of business strategy. In addition, BR practices also positively impact on project management performance. They claim their research findings suggest, in order to enhance the ability to define and manage success criteria, benefits realization strategy should be integrated into corporate governance processes. Referring to various sources, they argue that effective benefits realization management helps highlighting the value and the strategic relevance of projects which results in effective project governance but also enables the organization to deliver planned benefits through strategic governance.

Chih and Zwikael (2015) suggest that project target benefits must align to organizational goals. These benefits must be measurable and realistic, and should be time specific as well as target value. The authors offer a framework based on six propositions: 1) project target benefits can be appraised on the basis whether these fit in organizational strategic goals; 2) the employment of a formal benefit formulation process can improve project target benefits; 3) a highly motivated managers will contribute towards improved target benefits; 4) the presence of strong senior executive leadership

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can contribute towards improved target benefits; 5) the strong executive support in the form of resources allocation; and 6) the prevailing innovative climate provides enabling environment for all the other five constructs.

Chih and Zwikael (2015) state that in project management, very little research is available to inform how target benefits should be formulated and appraised. The available literature is too broad in scope and does not provide much guidance on benefits management formulation. They also state that PRINCE 2 managing successful projects approach, outlines four steps in project benefits management such as 1) identify the benefits, 2) select objective measures that reliably prove benefits, 3) collect baseline measures and 4) deciding how, when, by whom benefits measures will be collected, however, the authors argue that managing successful projects approach provides a high level guidance and it does not lead as to how these four steps should be implemented with what effectiveness. Chih and Zwikael (2015) propose conceptual framework for target benefit formulation and propositions. This framework comprises, strategic fit, target value, measurability, realism, target date, accountability and comprehensiveness.

Coombs (2015) study involves the exploration of inhibitors and facilitators in an IT enabled organization for Information System implementation. Coombs identifies two main types of inhibitors/facilitators of project benefits realization which are technical and organizational oriented. Technical inhibitors include matters such as poor design of reports and low system response in function response time, whereas organizational inhibitors include staff not showing engagement with new ways of doing things. Similarly, technical facilitators are training on the use of system and organizational facilitators include mapping and redesign on existing processes.

Zwikael and Smyrk (2015) assert that though project management literature is still preoccupied with the delivery of project outputs on time, cost and within specifications, however, lately, they see a movement towards project outcomes, but they claim that project governance has not evolved to accommodate this change. Zwikael and Smyrk perceive the challenges of project benefits realization as accountability and governance issue. They assign key role to project funder and project owner for project benefits realization. The authors offer a governance model for project benefit realization, which echoes the findings of Zwikael and Smyrk (2012), in which the authors give special responsibilities to project funder and owners in project benefits realization management. The authors are confident that the assignment of roles and accountability of project BR to project owner will enhance project performance.

The above brief literature review highlights that the existing PM literature on BR is normative and aspirational and lacks evidence on benefits management and realization practices in the public sector in Australia. Therefore, to bridge this gap in the existing literature, this research incorporates the project practitioner's perspective and BR practice into the academic knowledge domain and bridges the gap between theory and practice.

Methodology:

The methodology for this research is qualitative and is based on a case study method. A case study method has been selected due to the inherent ability to answer, 'how and why' questions (Yin 2009, 2014). The case study method is appropriate to explore a phenomenon, which is current, observable, allows interviewing and does not require control over the behavioural phenomenon, as well as, focuses on contemporary events. Punch (1998) argues that case study endeavours to

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understand a case in depth, Blomquist et al (2010) argues for research based on 'project as practice' to discover solutions for project managers and managers. This approach will enhance our understanding of the challenges faced by organizations. There is a dire need to understand how the practitioners actually employ various tools and find out how managers react to unseen and unexpected changes in circumstances. The art and skills of project manager can be explained by practice-based approach that captures and conceptualises the real issues. Therefore, this research employed case study method in order to investigate benefits realization in the public sector organizations, which would respond to a call by Blomquist et al (2010) for project as practice, to identify benefits realization practices.

For this research field data was collected through 30 interviews, conducted in six Commonwealth Government departments; this paper is based on the initial findings and presents the emerging themes and trends on benefits realization in the public sector in Australia. The transcripts of these interviews were analysed to identify emerging themes. As this is a work in progress, the initial themes are based on the research questions, though it is expected that more themes would emerge at the final analysis stage. However, this paper only presents the initial findings as the in-depth analysis is still in progress.

Research Objective:

This research aims to investigate the role of benefits realization as a measure of success in the public sector projects and develop tools for effective benefits management.

Research Questions:

1. How project benefits realization is actually being practiced in organizations?
2. What are the current frameworks, processes and practices employed?
3. How project target benefits are formulated and appraised in practice?
4. What is the role of governance in project benefits realization?
5. What are the enablers and inhibitors of benefits realization in organizations?

These research objective and subsequent research questions were developed in the light of literature review conducted for this research. As has been mentioned previously that benefits realization literature is normative and aspirational. Therefore, this research was conducted to investigate how far the debates in the PM literature on benefits realization are current and relevant to industry practices.

Results:

Interview questions were based on the above listed research questions and a number of themes were identified from interviews transcripts. The following figure 1- shows the initial findings of this research, which is based on the emerging themes from the participants' interviews in a number of public sector organization of Australian Commonwealth. Figure 1- is based on the inputs from 20

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semi-structured interviews of the participants. This figure shows in blue bars, where informants highlighted the existing themes.

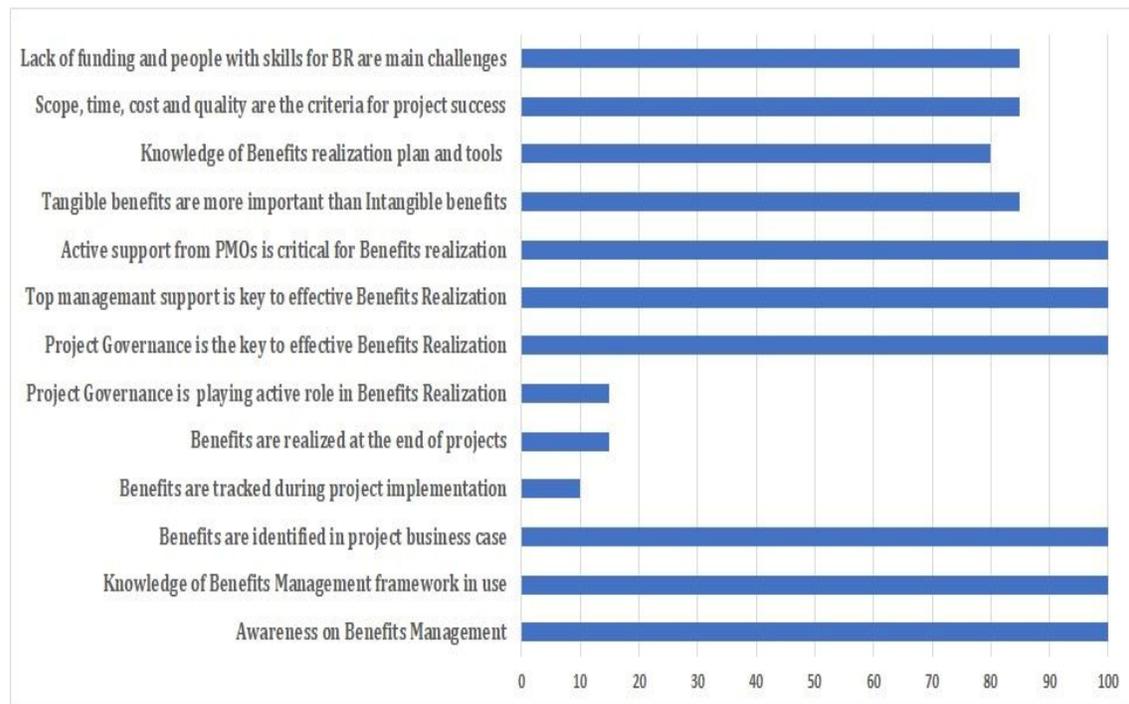


Figure 1- Initial emerging themes of BR practices

Discussion and Analysis:

What practitioners know about Benefits Management:

According to APM (2017) Special Interest Group (SIG) survey the members have reported that there is a growing awareness in organizations that benefits management must be an integral part of project management particularly P3M. The analysis of the initial findings of this research highlights that there is a widespread awareness on the significance of benefits management (BM) and benefits realization (BR) in the case study public sector organizations. All the interview participants in their discussions with the researchers exhibited their knowledge of the BM concepts and informed that in the initiation documents of all projects potential benefits are listed in the business cases. They informed that identifying promised benefits of all projects is a common requirement for the approval of a project concept and the business case. Most of the participants also acknowledged that they are aware of BM tools such as benefits profile, benefits mapping, BR plan and benefit owner. Majority of the interviewees informed they are not aware of anything such as benefits realization strategy.

BM Frameworks in practice:

Various researchers have proposed a number of frameworks for BM suggesting that these frameworks be implemented in conjunction with the existing PM methodologies (Zwikael and Smyrk 2012, Chih and Zwikael 2015). In the studied organizations for this research, benefits are managed

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through PM methodologies, specific BM frameworks and at times under risk and quality management frameworks. In some organizations benefits management frameworks have been made available but the use varies from program to program. The use of BM frameworks also depends on the discretion of project and program managers, as some project managers take BM more seriously than others. In one of the case study organizations, which has undergone organizational changes resulting from the mergers of various Commonwealth agencies, has about eight Project Management Offices (PMOs) running in parallel. Therefore, in this organization the application of BM and BR is at various levels and is moving slowly towards maturity, as one participant said, “we have our own [BM] framework, we have our own processes and methodology, but it is bit of journey at the moment”. In order to integrate all the existing PMOs, the case study organization is in the process of developing an Enterprise PMO (EPMO), which is expected to provide more integrated approach towards project management and BM. Explaining the progress towards an EPMO, the same participant said, “We have matured a tremendous amount but we are not quite there yet”.

Is governance to blame:

Bekker and Steyn (2008) state that with the advent of 21st Century, project governance has gained a visible traction in project practice and academic circles. With corporate governance having established itself as a discipline in its own right, the concept of governance has gained acceptance in various other areas, including project management (Bekker and Steyn 2008). This research corroborates Bekker and Steyn’s findings regarding the important role of project governance in the implementation of BR in the case study organizations.

The initial findings paint a consistent picture on the role of governance in the effective implementation of BM and BR. All participants of this study informed that effective PM governance is the key in the pursuit of BM and BR. About 80 percent respondents expressed similar views that the project governance is not playing a proactive role in the implementation of BM and BR in project management processes. The people sitting in project boards and committees are at times not fully aware of their roles and responsibilities and there is no reporting requirement on BR, when the progress reports are submitted and discussed in project boards. One participant said, “They [project board] like when you provide benefits realization plan but if you do not, no body loses their sleep”. Another informant commented, “you may find very professional people sitting in the project board but at times they just sit in the meeting and play with their mobile phones during the meetings”. All participants think BR can be taken seriously only when project governance shows its seriousness about it. One participant said, “despite a lot of time of project managers is spent on reporting but benefits do not figure in progress reports to project committees, as mostly these reports focus on cost and time”. “If the project governance makes reporting on benefits tracking mandatory, the project managers will do it, in no time”. Another participant, who is personally committed to the cause of BR said, “people in [project] governance do not understand benefits, they look at it with a scatter-gun approach and do not see at BM as a process from start to the end”.

Young and Poon (2013) argue that top management support (TMS) is more critical for project success than other traditional success factors. They highlighted that TMS has been more critical in necessity than sufficiency, as compared to other success factors, which are stronger in sufficiency than necessity. By necessity, the authors mean that the demonstration of TMS is indispensable even if it may not be sufficient. The majority of participants agreed that the push for BR should come from the top management. The powerful role of project governance in the successful implementation of

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BR has been demonstrated in one case organization. In this organization BR has been taken seriously at all levels right from the minister level and down to the project manager. This success case study has been discussed in the following pages.

Benefits realization- a persistent challenge:

Chih and Zwikael (2015) state organization do not have the ability to formulate benefits and also do not have processes in place to link the delivered benefits to the promised benefits. In the public sector organizations, all projects cannot be judged for benefits in dollar terms as a large number of the projects are geared towards capability enhancements, which is at time difficult to measure accurately. Therefore, in the business cases for capability enhancements projects, project managers, identify high level benefits and further interdependency of projects with other departments makes it near impossible to measure benefits in such projects. However, benefits are not realized formally in those projects, even where possible such as the induction of new applications and automation of various processes resulting in efficiencies in reduced number of human resources. In a similar tone, another participant said about BR, "it is just like washing a dirty laundry in the public". However, it does not mean that BR is a mission impossible, as it is being pursued at least in two case study organizations, albeit with a less than desirable success rate and these organizations expect to improve results in a period of three years.

Benefits realization- who's responsibility:

PM literature has highlighted the role of benefits owner in effective BR. Peppard et al (2007) argue that benefits owners should be nominated and the responsibility for the realization of each benefits must be assigned to benefits owners. Almost all research participants have unanimously agreed on the key role of benefits owners in BR and they pointed out that the benefits owners should be nominated from amongst the operation managers/business managers, whose departments would be the end users of a given project product. However, the nomination of business owner/operations manager, as benefits owner would warrant the involvement of benefit owners in the very early phase of project life cycle. But in one case study organization, where billions are spent on the maintenance and development of new IT applications, three departments (i.e. Business, Delivery (IT) and Operations) are involved in project management. Business department identifies and develops project proposals; IT department delivers applications; and on completion the applications are handed over to the Operations department. The participants informed that business department does not frequently involve the managers of operations department, who are the end users, at the initial phase. They also identified a lack of engagement and highlighted existing disconnect between the business and operations departments, which ultimately impacts efforts for BR. In this organization, informants stated that in some projects, nominating a benefits owner can be challenging, if the end user is not confident about the expected benefits of a proposed system. In another case study organization, a participant said, "for effective benefits realization, benefits owners need funding, human resources and skills, which are not provided, neither by the PMO nor as a component of project budget".

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Impediments to effective benefits realization:

Impediments to effective BR have not been given much attention by the researchers and only Coombs (2015) has discussed inhibitors in an IT enabled organization for Information System implementation. This research highlights key impediments to effective BR in the public sector organizations. One of the unique challenges is the election cycle at the Commonwealth level. Since projects get budgets on an annual basis and as a result of elections if a new government comes into power, some projects may be entirely shelved or funding can be drastically reduced, which results in a serious blow to expected benefits. In the public sector, overwhelming dependence on contractors for project delivery is posing another challenge, as the contractors are focussed on project delivery by the financial year cycle and that leads to oversight of benefits tracking for intermediate benefits during the delivery. One participant said, some of the project managers are from the era when benefits management was not a component of PM processes. He further said, "I know there are probably a lot of project managers out there, who do not do [BR] well, only for the fact they do not get asked for that." Another interviewee said, "we do not have funding, time and skills for benefits realization". In another public sector organization, one informant suggested, "the project funding should also include allocation for benefits realization", and BR can be completed as post project component. He concurred with Zwikael and Smyrk (2012) who proposed to extend project life cycle to another phase to include BR.

A success story for benefits realization:

Despite slow progress, challenges and impediments, lack of funding and required skills for effective benefits management and realization, one Commonwealth agency has come up as a shining success story. In this organization, Project, Program and Portfolio Offices (P3O) has actively promoted benefits management and realization throughout all PM processes within all departments of this agency. The success story started with a push coming from the top at the minister level. One participant informed, "One of our ministers always asked the question on all project proposals, what would be the benefits to the tax payers and this turned our focus from project outputs to outcomes and benefits". The department developed a benefits framework three years ago but the last 18 months have seen tangible results in our pursuit of effective BR. The benefits framework is an overarching framework used in the department to identify and measure benefits. This framework works in conjunction with change management and project management framework. However, it has been a slow journey, as the informant said, "For a while, benefits were a kind of afterthought and we were doing it but we really thought about these at the end". But now benefits have taken a central stage and "we have been trying to change the mindset and now we are trying to address benefits at the concept stage". Now when someone comes up with a project idea, "we ask what the potential benefits could be, and then at the business case stage, we go back and revisit the benefits to revalidate, whether or not the initial assumptions were still true, then at the planning phase, we further articulate and validate potential benefits, and subsequently, we develop benefits profiles and assign owners to benefits". The identification of benefits owner is the key problem area for effective benefits realization in many case study organizations but in this case study organization, the business benefits owners are required to sign off the possible business benefits, which makes them accountable for benefits harvesting.

In all other organizations studied, PMO has been playing a passive role in project management. But in this organization P3O has been very proactive in the development of benefits management framework. "P3O has been driving the development of framework and policy, which has resulted in

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the form of a 'Planning Hub' which looks after governance, project management and benefit realization". The journey of benefits management starts with the alignment of benefits to the objectives of the business area, which ultimately aligns to the organizational strategic directions. In this organization normally the project manager initially identifies potential benefits and at times contractors are brought into play if help is required and P3O reaches out to the project manager and help to validate the benefits. A research participant stated that project managers need to know the difference between project outcome and benefits. "At the moment the big challenge is to get people's minds around what is outcome versus benefit". However, this lack of clarity around outcomes and benefits have been noted in most of the interviews in other case study organizations, where informants considered outcomes and benefits as similar in meanings.

Unlike other counterparts in the public sector, studied by this research, the studied organization focus on both tangible and intangible benefits at the start of a project. However, tangible benefits are more important for the finance department, as one informant said, "the Chief Financial Officer is always looking at the financial benefits but the department is looking at both [tangible and intangible benefits]." About the measurement of intangible benefits, the informant said,

"In our framework, we do have an allowance for non-quantifiable benefits and generally a lot of time for those benefits, we feel that we have enough evidence to prove that there would be benefits regardless of the quantity. We have to show a very direct linkage to demonstrate that there is without a doubt, a benefit out there, before we claim that".

The P3O has been instrumental in the implementation of benefits management and realization in the case study organization right from the benefits identification to realization. One informant said, "The Planning Hub is supposed to alert us about the coming up benefits, then we contact the business owners and say look, you have got these benefits and you are supposed to be harvesting, how you are going to do that". Due to the planning hub, "now all that people have to do is to go to the online system, identify the benefits, put in some measures, open up the benefit profile", said the informant. The benefits harvesting starts from three, six and twelve months after the handing over of project output but some projects continue for 20 years therefore, benefits tracking could not continue for such as long duration, hence, the informant said, "in such a case what we say to the people, you only need to measure until you are satisfied that you have harvested [early] measures".

About success of the benefits management journey, the informant said, "We have 50 percent success rate in benefits harvesting. Now we are getting to point where we are quantifying and harvesting [benefits] and we are starting to get to the point, where we are going back [to the benefits owner] and saying okay now where are your benefits".

Lack of skills for successful BR has been frequently highlighted in all case study organizations but in this success case study organization BR has been adopted seriously through the training of all staff involved in project management, restructuring of P3O and training of senior executives, who sit in the governance boards for projects, development of BM framework, the availability of IT system in the form of 'Planning Hub' and the commitment of top management through effective project governance.

Conclusion:

The initial findings of this research highlight that there is a widespread awareness on the importance of benefits management and realization in the public sector organizations of the Australian

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Commonwealth. It shows that benefits are identified in the project initiation documents such as business case as a normal requirement but commitment to benefits realization wanes out as the projects progress. Majority of the respondents agreed that project governance can play a key role in the effective BR but they also expressed disappointment over the lacklustre support from the project governance for BR. However, one organization, discussed in this research, supports the argument that governance can play anchoring role in sending down the top management seriousness on benefits realization. This study finds that PMOs need to play active role in supporting benefits management and realization. Among the factors that impede BR are the lack of funds for conducting BR and required human resources with requisite skills. Effective BR can become a reality with the consistent support of the top management through active project governance, allocation of funds as a component of project budget and training of benefits owners to harvest benefits effectively. This paper is based on initial findings of this research and the findings present the emerging trends and themes. This research endeavoured to explore the benefits realizations frameworks, strategies, plans, processes and practices in six major agencies of Commonwealth government. This is the first qualitative research on benefits realization in the public sector at the Commonwealth level but it is not exhaustive. In order to have a comprehensive understanding of the BR practice across public sector and make sound generalization, more public sector organizations need to be investigated for benefits realization practices.

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How an Enterprise Project Management Office (EPMO) can enhance organisational performance through the right members?

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Abstract

Project-Based organisations (PBOs) need to keep up with the trends of projects and programmes in changing environments. Large PBOs require an Enterprise Project Management Office (EPMO), as a central independent office, to equip the organisations with appropriate functions and governance, to ensure effective support, and to drive organisational values. This assists them to mature and standardise their frameworks, practices, and tools to achieve more benefits in their defined projects and programmes. Despite the mission of EPMOs to contribute to enabling teams to deliver their objectives successfully and facilitate benefits realisation, they often fail to adhere to their goals and be disestablished. Although choosing the right functions and having the defined responsibilities are the main challenges of EPMOs, few studies suggest how organizations can overcome these challenges. To address this gap in existing knowledge and to provide new insight into EPMO models, this paper contributes to the literature by discussing the influence of EPMOs on organisation performance, and argue the functions and responsibilities required for an effective EPMO.

Keywords: Central Office, Enterprise Project Management Office, Organisational Performance.

Introduction

The number of Project-Based Organisations (PBOs) have increased over time in various industries (Ren et al., 2018). PBOs deliver products, services, or results through projects or programmes, aligning with their organisational strategic goals, to create benefits for stakeholders and organisations (Boh, 2007). The survival and growth of PBOs depend on the successful implementation of their projects/programmes (Backlund & Sundqvist, 2018). Projects/programmes require a temporary team (often from different units/departments in the organisation) with diverse capabilities working together for a limited time (Ajmal & Koskinen, 2008). Since traditional Enterprise, Portfolio, Programme, and Project (EP3) management practices cannot respond rapidly to dynamic environments, the need for a central independent office is significantly emerging in PBOs to adapt to organisational strategy shifts (Aubry et al., 2007; PMI, 2012). This office should support the formation of the EP3 team; provide requirements, processes, tools, and techniques to facilitate defining the right projects/programmes (Hill, 2007), and optimising EP3 management activities to deliver outputs successfully (Thiry & Deguire, 2007); integrate and share knowledge between EP3 units to prevent repeating the same mistakes, duplicating the same activities, and reinventing the wheel (Pemsel & Wiewiora, 2013); and manage performance to make sure that strategic goals are fulfilled through the implementation of EP3 management efficiently (Müller et al., 2019). This central office, under many different names (i.e. Enterprise Project Management Office, Project

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Portfolio Management Office, Programme Management Office, Project Management Office), has different types and structures based on their position in organisations (i.e. enterprise, portfolio, programme, project) (Patel et al., 2012), range of responsibilities and services (i.e. supportive, controlling, directive) (PMI, 2017a), and life spans (temporary and permanent) (Axelos, 2013). This office, therefore, has different structure, size, and characteristics. PBOs significantly have been setting up their bespoke central office customising methodologies and standards (Salameh, 2014).

In large PBOs, Enterprise Project Management Office (EPMO) is the central office that performs the aforementioned duties. EPMO Managers work closely with other managers (i.e. portfolio, programme, project managers) (Rad, P & Levin, 2007) and key stakeholders to ensure effective support and performance to realise benefits and drive values (Aubry, 2015). Beside capabilities and mindset of PBOs (i.e. useful processes, tools and techniques), EPMO members play an important role to increase their performance or efficiency. An EPMO can enhance delivery performance in PBOs, through the right team members. The skills, knowledge, and competencies of each functions help to have an effective EPMO (DiTullio, 2010). The Australian Institute of Project Management (AIPM) and KPMG (2018) in their survey stated that 30% of organisations disestablish their PMO during last 2 years. The rates of PMO disestablishment have been reducing but is still high and PMOs continue to fail. Thus, PBOs needs to not only choose the right structure and members with the right knowledge and skills for EPMOs, but also improve their capabilities with dynamic teams. This paper reviewing literature aims to identify the influence of EPMOs on organisation performance, and the characteristics of the right functions and responsibilities of the EPMOs. To achieve these goals, the following questions will be answered: What are types of central offices?; What can EPMOs do to improve organisational performance?; What are the characteristics and responsibilities of each functions in EPMOs?

Central Office Types

Project-Based Organisations (PBOs) set up a central office to increase performance, reduce costs, increase team members' collaboration, facilitate sharing knowledge, and ensure projects/programmes become successful. Project/programme management helps organisations to deliver projects/programmes right (Cooke-Davies, 2004), while portfolio management is about doing the right projects/programmes (Cooke-Davies, T, 2009). Organisations set up a central office to facilitate defining and managing the right projects/programs in the right way with the right team.

Enterprise Project Management Office (EPMO)

Project-Based Organisations (PBOs) seek ways to enhance organisational performance, improve portfolios, programmes, and projects, facilitate information and knowledge sharing, and advance resource management (Spalek, 2013). EPMOs help organisations develop the capabilities to deliver the right projects/programmes successfully and achieve excellent organisation performance by setting standard governance and processes (Dai & Wells, 2004). EPMOs have consolidated their position in today's PBOs and have an impact on not only projects/programmes success but also portfolios management and organisational performance. EPMOs are considered at the executive and managerial level of organisational structure to reach global objectives (Rad, P & Levin, 2006a). EPMOs provide valuable services including: aligning all projects, programmes, and portfolios with strategy and policies; providing standard tools and techniques; implementing and integrating

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project/program management processes; assessing project/programme progresses and delivering reports; making investment decisions to achieve objectives and strategic values (Mossalam & Arafa, 2016; Salameh, 2014). There is a direct relationship between the maturity of EPMOs and the value provided for PBOs. Their maturity is achieved by standardising, measuring, controlling, and improving processes continuously (Crawford, JK, 2014). EPMOs focus on standardising processes, improving reporting systems, and setting up managerial dashboard tools (Hill, 2004). EPMOs have direct responsibility for other lower-level of central offices (PPMO, PgMO, PMO) as demonstrated in Figure 1.

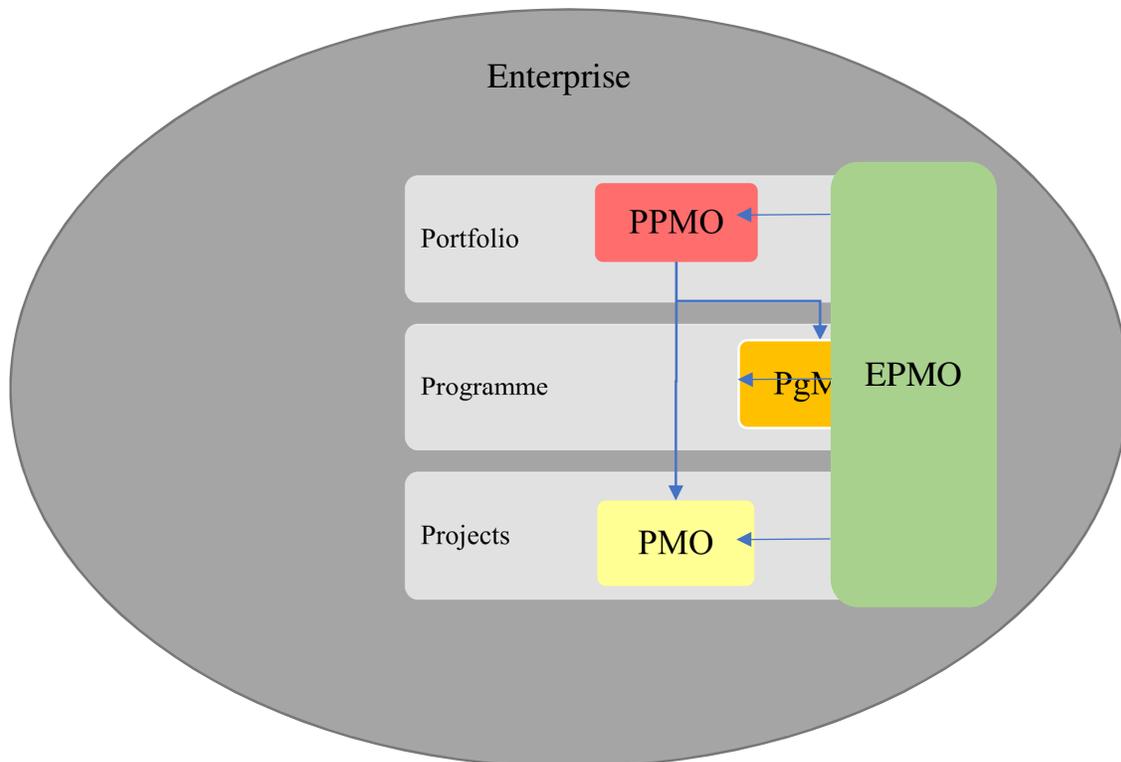


Figure 1: Structure of Central Offices

Project Portfolio Management Office (PPMO):

PPMOs are responsible for selecting, assessing, prioritising, and monitoring portfolios of projects and programmes (Patanakul, 2015). They manage resources based on their availabilities and projects' priorities. Organisations utilise PPMOs to manage portfolios of projects and programmes simultaneously and improve their return of investment (Martinsuo, 2013). PPMOs are responsible for: decision making based on resources; prioritising and selecting projects and programmes based on business objectives and requirements; planning of strategic portfolios; managing risks; providing progress reports; analysing and improving project portfolio performance; offering project portfolio management methodologies, tools and techniques (Unger et al., 2012).

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Programme Management Office (PgMO):

PgMOs focus on benefits management and overall programmes success but PMOs just focus on individual projects' success (Letavec, 2006). The PgMOs protect programmes against failures and put them on the right way based on internal and external clients' needs (Aubry & Hobbs, 2010). PgMOs duties include: defining principles and responsibilities; managing communication and making collaboration between related projects and programmes; tailoring processes, tools and techniques; managing programme deliverables to reach objectives; planning and monitoring, and realising programme's benefits; setting key performance measurement methods to assess performance; and managing risks and issues (Mosavi, 2014; Tjahjana et al., 2009).

Project Management Office (PMO):

PMOs based on organisation maturity provides or tailor governance, methodologies, processes, tools and techniques for projects/programmes (Axelos, 2013; Paton & Andrew, 2019). Some important responsibilities of a PMO include: expert mentoring and project management training; defining key performance indicators and key results indicators to measure the performance and analyse projects efficiency; supporting communication; supporting projects based on best practices; providing information to facilitate decision-making; providing quality assurance; collecting and controlling documents and lessons learned; controlling project progresses; and supporting project delivery (Hill, 2007; Lacruz et al., 2019; Sandhu et al., 2019).

The influence of EPMOs on organisation performance

Effective EPMOs boost organisational performance by minimising the likelihood of project/programme failures (Dai & Wells, 2004). They provide support for EP3 units to make sure that strategic objectives are reached and benefits are realised (Ameri & Awad, 2016; Ramani, 2016). To reach this goal, PBOs need to concern about both short term and long term EPMOs strategy (Spalek, 2013).

EPMOs support all project, programme, portfolio, strategic activities by providing a common approach and governance frameworks, processes, workflows, and form templates (Gurtu, 2010). They introduce associate tools and share lessons learned with team members. Effective EPMOs specify performance standards and KPIs (Rad, P & Levin, 2006a). They coach and monitor EP3 performance and provide performance reports to define improvement points (Anantatmula & Rad, 2013).

They support information management and coordinate communications across all organisation members to speed up knowledge and information exchanges. Building an Information System (IS) helps EPMOs archive and share documents and information and develop and manage data and reports simply (Koh & Crawford, 2012) and effectively. EPMOs use IS to manage changes during project/programme life cycles. IS assist all team members to be aware of performance status in any time they wish (Senior & Copley, 2008). EPMOs monitor EP3 performance and try to do preventive action instead of corrective action. They hold several meetings throughout the life of projects/programmes to get sure that team members are following plans and having high performance (Van Der Linde & Steyn, 2016).

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EPMOs set up an effective infrastructure and environment by developing required policies and establishing mechanisms to reach organisational competency and high performance (Williams & Parr, 2004). They facilitate stakeholder management to become sure that all requirements are defined and balanced where there is a conflict (Rad, P & Levin, 2007; Ramani, 2016).

EPMOs provide teambuilding support and facilitate acquiring team by developing procedures helping to form an EPMO team. EPMOs manage the competency and performance of human resources by supporting acquiring and managing EP3 managers and team members (Ramani, 2016). EPMOs should work closely with relevant EP3 members to advise them, make sure that developed processes and tools are used correctly, and provide needs and requirements to achieve organisational goals (Cuthbert, 2012). EPMOs conduct routine reviewing and auditing human resource performance to plan and coordinate trainings as needed (Crawford, J, 2011) and meet Key Performance Indicators (KPIs) (Yeong & Lim, 2011). These trainings enhance team member abilities and upskill them to make the best use of technology to help their organisations achieve their goals, and enhance their performance (Ramani, 2016). They can use motivation and reward systems to encourage team members to enhance day to day effectiveness, collaboration, and performance (Williams & Parr, 2004).

The characteristics of an effective EPMO functions and members

When organisations are implementing an EPMO, there is always a question of functions and capabilities which are required to set up the EPMO successfully (Anantatmula & Rad, 2013). Structuring effective functions and defining the boundaries of EPMOs is key to undertake in the beginning of setting up EPMOs to manage expectations. The structure and function of EPMOs can vary from organisation to organisation and it is based on the expectations and maturity of the organisations. The advanced functions of EPMOs can be Strategic Management; Portfolio Management; Business governance and process analyst; Benefits and value management; Communication and stakeholder management; Information and knowledge management; Performance management; Finance management; Change management; Resource management; Risk management (Crawford, J, 2011; Gurtu, 2010; Philbin, 2016; PMI, 2013). Table 1 shows effectively and concisely the responsibilities for an effective EPMOs.

Besides designing the right structure and function, a high-performing team (HPT) is essential for successful EPMOs. This HPT is a group of employees with high skills and abilities to interchange their roles. They have clear processes and responsibilities to help members work at their highest standard, make decisions and solve conflicts quickly. HPTs have high level of collaboration, are aligned with a common objective, and clearly understand their contribution to objectives (Bojeun, 2013). HPTs are shaped when EPMO leaders and top managers collect talented people as team members. For EPMOs, they need to recruit talented team members with key skills. Furthermore, members perform in a safe and collaborative environment where they feel secure to express their ideas and share their knowledge with other members (Anantatmula & Rad, 2013). Members can trust their managers to express their feeling and share opposed views. In EPMOs, team members know how to work together and collaboration is based on quick and fast communication (Metuge, 2015). Everyone in a team has strong collaboration with other members and share their experience with others (Nousala et al., 2009). An effective team distributes information transparently and all members be aware of the latest updates. All members are on the same page and know clearly their

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responsibilities and goals. A HPT performs their responsibilities to meet stakeholder expectations and needs (Adusumilli, 2011).

One of the main challenges seen by EPMOs is developing qualified members and improving their competency skills. Like other positions in organisations, EPMO team members need to have some special internal personal skills: ability to interact with different organisational levels; build relationships; negotiation; communications; problem solving; presentation; facilitation; flexibility; consultancy; leadership; analytical skills (Ginger Levin & PMP, 2010; Rad, PF & Levin, 2006b). EPMOs identify knowledge and skills and try to hire professional and optimise staffing (McLaren, 2009). Effective EPMOs need to rely on skilled staff to make sure that they can deliver organisational goals. EPMOs support, mentor, and train members to add value to organisations. They assist in identifying proper resources and proper knowledge and skills requirements for team members. EPMOs should be staffed with experienced and skilled people to have reliability and efficiency (Kendall & Rollins, 2003). Sometime they cannot find enough skilled resources and they should train inadequately skilled people. EPMOs with appropriate coaching activities help members to do their best. They facilitate learning and provide training to ensure EPMO objectives are achieved (Salameh, 2014). They concentrate on improving required skills and related software within organisations. EPMOs define and run training plans covering the knowledge of portfolio/programme/project management, the use of tools and processes, and internal personal skills (Kaleshovska, 2014). They work closely with team members to provide ongoing guidance, point out potential problems, and provide continuous improvement (McLaren, 2009). These mentoring and training plans standardise the level of knowledge and skills to enhance performance which results in increasing probability of success.

No	Responsibility	Description	Reference
1	Strategic Management	<ul style="list-style-type: none"> Develop strategic plan and tactical master plan Ensure that portfolios, programmes, and projects are aligned with strategic objectives. 	(Crawford, J, 2011; Philbin, 2016; PMI, 2013)
2	Portfolio Management	<ul style="list-style-type: none"> Define initiatives and facilitate and support project and programme selection and prioritisation based on strategic plan. 	(Crawford, J, 2011; Gurtu, 2010; Philbin, 2016; PMI, 2013)
3	Business governance and process analyst	<ul style="list-style-type: none"> Define and implement portfolio, program, and project management governance vertically and horizontally. 	(Crawford, J, 2011; Philbin, 2016; PMI, 2013)
4	Benefits and value management	<ul style="list-style-type: none"> Ensure that benefits realisation are applied throughout portfolios, programmes, and projects and values are optimised. 	(Crawford, J, 2011)
5	Communication and stakeholder management	<ul style="list-style-type: none"> Ensure that stakeholder engagement and analysis is undertaken regularly, and communication plan is prepared and implemented. 	(PMI, 2013)

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6	Information and knowledge management	<ul style="list-style-type: none"> • Provide collaborative work place and networks of people to share their experiences. • Gather and share all data, information, documents related to portfolios, programmes, and projects. • Record and analyse lessons learned from different levels of organisations to make governance and processes improvements. 	(Crawford, J, 2011; Philbin, 2016; PMI, 2013)
7	Performance management	<ul style="list-style-type: none"> • Increase organisation performance by providing consultancy to improve and maintain processes. • Define and control KPIs to ensure that organisations reach targets. • Provide data and generate reports for different kinds of audiences in different managerial levels. 	(Philbin, 2016; PMI, 2013)
8	Finance management	<ul style="list-style-type: none"> • Establish a professional finance system for portfolios, programmes, and projects to ensure an appropriate funding and effective financial control. 	(PMI, 2013)
9	Change management	<ul style="list-style-type: none"> • Make integrated change control to guarantee the effectiveness of the identifying, monitoring, and delivering changes process aligned with information system. 	(Philbin, 2016)
10	Resource management	<ul style="list-style-type: none"> • Provide the proper skill requirements • Recruit adequate project staff with right skills based on project plan as efficiently as possible. • Conduct performance evaluations. • Training and mentoring. • Conduct motivation and reward system • Managing team conflict 	(Crawford, J, 2011; Philbin, 2016; PMI, 2013)
11	Risk management	<ul style="list-style-type: none"> • Have access to the last updated and reliable information and have appropriate control and response to deal with risks. 	(Crawford, J, 2011; Philbin, 2016; PMI, 2013)

Table 1: EPMO Functions and Responsibilities

Conclusion

EPMOs have been setting up in PBOs with different types to advance organisational capabilities in achieving their goals and benefits by building enterprise, portfolio, programme and project level management offices. EPMOs improve organisational performance by developing governance, processes and tools to increase the chance of project/programme successes, and providing support

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for EP3 units to make sure that strategic objectives are reached and benefits are realised. To reach these goals and enhance organisation performance, EPMOs require to acquire the right teams and support them by providing training to enhance knowledge, skills, and competencies of the team members. Advanced EPMOs responsible for strategic management, portfolio management, business governance and process analyst, benefits and value management, communication and stakeholder management, information and knowledge management, performance management, finance management, change management, resource management, and risk management.

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The Nexus of Definitions and Understandings in Complex Defence Procurements.

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Abstract

Many authors have examined the e-procurement process to formulate precise definitions in an attempt to place them within discrete categories. Given the broad spectrum that encompasses e-procurement, this attempt to qualify a rapidly evolving field could prove unsuccessful. It would also yield inconsistent results if not considered from a multi-faceted and interdependent viewpoint. Within this complex environment it has long been considered that the adoption of e-procurement has been uneven. This contention is mainly due to the broad scope of what opportunities it presents and the aspirations of the businesses considering them. The aim of this paper is to consider the problematic nature of definitions of e-procurement via a narrative outlining some of the existing previously defined categories. This narrative will concentrate on a well-documented project failure, the Super Seasprite project. This is undertaken to illustrate how competing definitions of procurement and the nature of the procurement complexities can contribute to a project failure.

Keywords: E-procurement, Super Seasprite; SEA1411, E-commerce; Defence, Helicopter, Definitions, Project Failure

Introduction

The changeable and indistinct nature of definitions of commerce can seem largely unconnected to project failure. However, some of the issues which played a role in the failure of the Super Seasprite project (designated SEA 1411) can be identified where there were existing gaps between a comprehensive and universally understood set of definitions for procurement processes and the actual project progress. Hence definitions can be seen as a critical factor in the failure, or success, of projects which rely on complex understandings between contracted parties. This work is intended as a catalyst for discussions into these phenomena. It uses a Defence project to apply some initial ideas used as a working premise and considers some areas for future consideration.

The advent of a means to quantify a relative value of goods and/or services requires the development of some form of exchange mechanism. These exchange mechanisms have continuously evolved in complexity throughout the agricultural, industrial and computer revolutions, allowing for a continuous improvement in the methods of procurement.

Adoption Challenges

The current phase in the evolution of procurement displays the tendency to prefix existing terms that relate to goods and service with 'e' to denote *electronic*. This trend is becoming ubiquitous, but has not always been evenly and/or pro-actively adopted. Whilst industry has actively embraced these technologies, there is a disparity between the stated aims and implementation. As recently as

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2018 Brandon-Jones asserts *“Despite the widespread organisational adoption of e-procurement systems, we continue to witness disappointing performance outcomes from their implementation”* (2018). Most medium to large scale industries already employ e-procurement as part of their online business strategy. However, this evolution and the increased level of sophistication which is required in the contemporary transfer of goods and services via e-procurement has not always enjoyed consistent adoption.

This uneven progression towards e-process dominance occurred at the same time as other major influencing factors which complicate the task of quantifying e-procurement as distinct from the wider technological advances adopted by commerce. In this regard, advances in communications technologies have significantly influenced commerce processes. E-commerce, in some instances, generates unnecessary activity without a corresponding increase in productivity, whilst others have streamlined everyday tasks providing valuable productivity gains.

Most accept that e-procurements have had a positive impact on the commercial procurement process (Brandon-Jones and Carey 2011, Toktaş-Palut, Baylav et al. 2014). Despite this apparent success, a standardised definition remains unformed. This may in part be due to the ongoing nature of this phenomenon which replaces existing procurement processes. This varies from systematic to ad hoc, successful to unsuccessful and sometimes a combination of the interaction of all these factors. As electronic based systems become central to industry they are often not replaced by completely new, improved systems, creating incompatibilities and/or gaps in process implementations. Hence the definition of e-procurement morphs in response to this uneven process.

The ongoing effort to define e-procurement falls into the category of a ‘wicked problem’ (Rittel and Webber 1973). Two (of the many) hallmarks of wicked problems are they have no obvious resolution and have contradictory or changing requirements making them difficult to reconstruct. This theory is often used when discussing economic or political issues with “...no determinable stopping point” as Tonkinwise asserts (2015). In short, there is no reliable moment in time when have we reached an effective definition of e-commerce or a reliable means of categorisation.

Categorisation requires unique and complex systems to be reduced to their constituent parts to analyse how particular practices and strategies can be used. However, the relevant literature broadly advances three less than definitive notions of what constitutes e-procurement, each of which has an impact on a different part of this seemingly nebulous process.

Definitions: Extent and Nature of E-procurement

At its most advanced, e-procurement utilises machine learning / artificial intelligence (AI) to predict requirements using ‘big data’ (Wang, Gunasekaran et al. 2016) which can support significant innovations such as *“raw materials, lead times, environmental and business risks”*, which have proven invaluable (Chopra 2019). The dynamic and complex nature of using AI for full automation as a mainly knowledge-based economy means that e-procurement in defence is likely to largely remain an ad-hoc hybrid system used to support traditional procurement methods and not to replace them. Wang and Gunasekaran argue that big data’ offers not only the benefits of automation but the accompanying challenges for organisations *“that would like to reap the benefits from analysing this massive influx of big data.”* (2016 p.98). However, the use of ‘big data’ in supply chain logistics has

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the potential (if used in government procurement) to support a new set of tools which could analyse and identify systematic irregularities that currently exist.

A less complex definition of e-procurement reduces the previous definition whilst emphasising automation, and mostly removes the need for human interaction from the procurement process.

The least complex definition of e-procurement centres around the use of information technology to streamline the communications involved in a procurement process (Mahalik 2012). This includes implementation of electronically transmitted e-catalogues, invoices, orders, payments, automatically generated status emails or ad hoc correspondence all using electronic document storage via web or peer to peer protocols (Palmer and Gupta 2011). These implementation improvements to the procurement cycle timeframe coupled with the resulting improvements to the integrity of the information can be best considered as evolutionary not revolutionary as it is essentially traditional procurement made paperless (Bulut and Yen 2013, Aminah, Ditari et al. 2018). As would be expected in an age of electronic communication ubiquity, these overlapping definitions, share the internet as a common factor enabling data exchange, analysis and/or automation.

The attempt to develop inclusive definitions for procurement and e-procurement could be combined with the assertion by Weber and Khademian (2008) who identified six areas that could be attributed to collaborative problem-solving as it relates to procurement. These are: understanding and communication; the balance between innovation and accountability; building capacity by enlarging public, private and political landscapes; flexibility; establishing trust-based relationships and employing substantive policy knowledge. These ideas were embraced by Defence Materiel Organisation (DMO) as part of their acquisition reform program (Gray 2008). Most of the six areas which could be generally described as qualitative would be greatly supported by the use of a dynamic communication and accounting system. Using these definitions should provide a clearer understanding of strategic procurement or conversely used to comprehend the nature of any project failure.

Procurement Complexities

Attempts to quantify e-procurement are numerous, and hence any definition that tries to encompass all the factors of e-procurement would be inconsistent or inappropriate when applied to any single organisation. These definitions are often difficult to formulate as there are no clear boundaries. Some academic publications that address this issue suggest the distinction between types of e-procurement be divided into at least six categories (Brandon-Jones and Carey 2011).

However, there seems to be an anecdotal consensus that traditional paper-based procurement is becoming obsolete. Therefore, the most relevant debate centres around the most appropriate features of e-procurement to adopt in particular situations. One of the most obvious advantages of e-procurement is offered by the ability to track and interrogate purchases with greater ease and detail (Harris 2002). This tracking feature becomes particularly useful in defence as 'real-time' status of goods or knowledge services are critical to the satisfactory operation of defence readiness and in health to locate virtual prices of medical apparatus.

Moreover, any system which requires record keeping with integrated intelligence as more than just data archiving would greatly improve the issues encountered in complex projects. Hence, applying e-procurement methods could and should be invaluable to avoid project failures. By learning from the failures of the past, especially unsuccessful Defence projects which become unviable, the

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recurrence of similar mistakes can be avoided or lessened, if not eliminated if e-procurement is employed appropriately.

Defining and categorising procurement is largely an intellectual pursuit, and as such offers an invaluable overview to a landscape of competing notions. A well-documented example of how such notions interact producing a particular outcome could be the Australian Government's project for the upgrade of the intermediate multi-role helicopter fleet, the Super Seasprite project (Australian National Audit Office 2009).

Case Study: Introduction

On 17th January 1997, Australia's Defence Minister, Ian McLachlan, announced that Kaman's Super Seasprite was the Government's choice for a new fleet of multi-role naval helicopters, designated as Project SEA 1411. Following a tumultuous 12 years of financial and technical issues, the project was cancelled in March 2008, as *"none of the Super Seasprite were ever accepted as a full capability helicopter"* (Australian National Audit Office 2009 p.24). The issues that effectively ended the SEA 1411 project were complex and numerous (Blenkin and Ferguson 2008, Mortimer 2008, Australian National Audit Office 2009). Hence, SEA 1411 became a cautionary tale for the Defence Department of how not to procure.

The Mortimer Review (2008) in general, and the Auditor General's report (2009) specifically, ensured that the lessons learnt from SEA1411 were documented for future reference. Blenkin and Ferguson (2008) contends *"The Super Seasprite debacle had its genesis in four decisions made by the Department of Defence during the mid-1990s"*. These areas were,

- Undertaking joint venture with Malaysia for the Offshore Patrol Craft
- Specifying the requirements to fit both vessel styles
- Requiring a highly capable anti-ship missile defence
- Continually changing the technical specifications requiring a one-off procurement rather than Military off the shelf (MOTS).

They concluded that *"these decisions effectively doomed the project to an ignominious death"* (Blenkin and Ferguson 2008).

Case Study: Background

The project began in the 1980's, when the Commonwealth of Australia's Department of Defence began an investigation into possible replacements for the six river class destroyer escorts naval roles (Fairall-Lee, Miller et al. 2007). This project, whilst not the subject of this paper, had a major influence on SEA 1411. The design the Royal Australian Navy (RAN) decided upon what would become the ANZAC (Australia New Zealand Army Corps) class frigates, a joint undertaking with the Royal New Zealand Navy (RNZN) (Jones 2001). Central to the design requirement was the capability to operate ship borne helicopters. Simultaneously, Defence were considering a new offshore patrol class (OPC) vessel, to be developed and built with the Malaysian government (Revolvy 2019). Hence, initially the tendering process for the helicopters were developed not only to comply with the requirements for the ANZAC frigates, but also with the planned joint offshore patrol vessels. This dual role requirement dictated the technical criteria relating to this tender in regards to the size and

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weight requirements, ruling out many of the available medium to large scale helicopters (Australian National Audit Office 2009).

On 18 October 1995, a request for tender was released for helicopters that could meet the design criteria. Tenders for the 14 helicopters were received from America's Kaman Corporation and Britain's Westland Helicopters, covering the overall helicopter package; both responses were significantly higher than the original estimates (Australian National Audit Office 2009 p.19).

Case Study: Influencing Factors

During the course of the SEA 1411 project, various technical shortages and contractual issues made the project unworkable for the Australian government. Issues such as the ADF airworthiness rules, (which were introduced a year after the contract was signed) were indicative of evolving specifications which added to an already fluid set of requirements that were not captured clearly in the contractual specifications (Australian National Audit Office 2009 p.26). Also, Defence opted to manage the project in-house hence adopting this risk; a theme common throughout the project. Also, budgetary constraints, which precipitated a reduction of 3 helicopters, and a renegotiation from new to refurbished airframes (Australian National Audit Office 2009 p.25) affected the project scale and hence the 'economies of scale' (O'Sullivan and Sheffrin 2003).

The RAN's decision to reduce the crew requirements from the traditional three to two could be seen as an innovation. However, this decision to reduce crew numbers required a reconfigured Integrated Tactical Avionics System (ITAS) which ANAO argues "*was fundamental to achieving the objective*" (2009, p.19). Further, the agreement to accept an interim solution/configuration by Defence, whilst adding schedule complexity, reinforced the notion that the procurer was willing to accommodate a supplier who had repeatedly failed to produce the contracted deliverables (Australian National Audit Office 2009).

Case Study: Discussion

Project SEA 1411 was based on a critical milestone-based contract in preference to a contract using liquidated damages as a disincentive. A milestone or deliverable based contract has payments linked to completion of specific deliverables or outputs for a set price (Lysons and Farrington 2016). Whilst milestone-based contracts are not an uncommon practice, their success relies on sticking to the delivery milestones to ensure appropriate and timely delivery (Priya Datta and Roy 2011). However, deficiencies in agreed milestones need to be adequately identified, communicated, addressed and must be accompanied by the courage of the procurer to make the supplier aware of a breach and to enforce its contractual obligations. Literature supports the argument that Defence has a unique relationship that differs from the standard public-private partnership (PPP) (Quick 2006, Stewart and Ablong 2013). As Wylie and Markowski indicatively assert, "*Defence procurement is a more complex process than most procurements*" (2010).

The use of milestones as a project accountability device is normally considered more effective in procurements that have a precedent in a similar project where that system worked successfully. Milestones show static points in time and are more suitable to traditional manual procurement methods, whereas a dynamic and ongoing relationship could and should indicate important stages of a project in real time. Hence, by the time they are realised the requirements for the milestone

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may no longer be relevant. In a strategic procurement, milestones can be difficult to define and run the risk of being interpreted incorrectly or measuring some dimension of the project which is no longer relevant to the project success as it was at contract commencement. Defining what is a critical milestone or deliverable can often also be misconstrued.

Of the six areas cited previously by Weber and Khademian (2008), understanding and communication are closely connected and both enhanced by the speed and ease of electronic communication (email, instant messaging etc) in preference to more traditional paper-based methods as part of the general e-procurement communication process and are discussed by Weber and Khademian as a “balance”. At first glance innovation and accountability may seem to be incompatible. However, it is possible to have both as the National Museum of Australia project showed (Australian National Audit Office 1999) by the use of committees populated by representatives of all contracted and subcontracted parties.

Political landscapes are reliant on success for ongoing health. The Seasprite project yielded little political capital to the incumbents (Liberal/National Coalition Government) who terminated the project. Also, it gave limited ammunition to the opposition (Labour Party) as they had approved the project originally. Hence, the politics of the project was problematic to both sides. In comparison the public landscape just wants its tax money spend on worthwhile project's that would benefit Defence and therefore the safety of Australia at large.

These factors generated collectively a perception of lack of certainty within the Seasprite project and a widely held view that this project was ‘troubled’. As a general proposition, uncertainty has a negative effect upon levels of trust or perceptions of skill by both involved. Hence, uncertainty about trust or competency is reliant on continuity and professionalism and is damaged if needlessly interrupted or seen to be of lesser importance (Mouzas, Henneberg et al. 2007, Camén, Gottfridsson et al. 2011). This can be seen with the move of the software development carried out by Kaman to a series of subcontractors adding unnecessary levels of separation between the procurer and the prime contractor. This is one example of the numerous issues which fostered an atmosphere of continuing uncertainty which continued to erode levels of trust in the project as a flagship project. The acrimonious end to the project and the expedited re-sale which took place after its termination illustrated the lack of trust between parties. Trust as a factor in innovative and complex relationships/projects traditionally require long-term engagement, but can be aided by ongoing indications of good will and open communication.

However, a mix of technical over-confidence by the supplier, coupled with a 33% reduction in the human resources per helicopter crew, lead to a need for both supplier and procurer to change their traditional relationships continually; hence the procurement option used was unsuited to such dynamic challenges. This uncertainty was incompatible with a milestone-based contract and as such the work program degenerated into a constant state of flux. This lack of clarity of information and objectives became problematic in an evolving and increasingly interdependent relationship. In short, insufficient financial leverage was applied to Kaman despite demonstrable failure in adherence to the project's schedule. SEA 1411 also did not have, or did not adhere to, traditional procurement risk management practices (Elmar and Mark 2010). The risk rating regime in April 2009 was, at the time, the only defence project that was “*showing all three traffic lights as red for cost, schedule and capability*” (Australian National Audit Office 2009 p.45).

The change of government's procurement body for the project also exacerbated the governance as, initially, the responsibility for managing the procurement was the Naval Aviation Project Office, mainly a uniformed office which was moved to a primarily civilian office. This was also made worse

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by a significant loss of staff who did not want to relocate to another state; the 2000 implementation of the Defence Material Organisation (DMO), bringing together the separate procurement agencies under one umbrella (Australian National Audit Office 2001). Further, in 2005, the agency was commissioned as a prescribed agency, constituting three major changes to the procurement authority over the life of the project.

This reorganisation of the project resulted in a critical loss of specialist staff (Australian National Audit Office 2009). This loss of experience should have been addressed through a process of succession planning and detailed record keeping to mitigate any loss of both specific and institutional knowledge. This is articulated best by the ANAO when they published their First Lesson Learnt as Defence major capital equipment procurement is a complex long-term venture that is heavily reliant on the skills of personnel employed within DMO. Careful consideration is required in the planning of major capital acquisition projects to confirm that personnel with the right skills will be available, in sufficient numbers, to enable the smooth conduct of procurement and technical activities required to support capability delivery (2009 p.65).

The complexity and scope for the SEA 1411 project created through an inappropriate contract framework and the lack of due diligence created an environment in which a single miscalculation could and did adversely affect the project. This series of missteps, according to the ANAO, resulted in a misadventure which cost in excess of a \$1.4 billion (2009). Any single reason attributed to the failure of the project would prove inadequate for use in determining a governance structure for future projects. As ANAO stated, *“the decision to cancel the Project cannot be attributed to any individual factor”* (2009 p.14). This report which was the widest ranging and detailed investigation into SEA 1411, listed the major factors affecting the failure of the procurement as:

- Inadequate understanding of the procurement, and changing requirements
- Inability to retain qualified staff throughout the procurement process
- Inadequacies in cost estimation
- Lack of understanding and recording risks
- Acceptance of interim solution to Super Seasprite which did not deliver desired outcomes
- Prime contract was not updated to include new airworthiness rules
- Poor contract management processes and applications

The nature of custom defence acquisition procurement requires necessary innovation by either the supplier or the procurer, or a combination of the two. This innovation is pivotal, regarding the potential for cost and time overruns are a recurring feature of this type of procurement method. Innovation in SEA 1411 seemed to be ill-directed, however, it assumed prominence over issues of accountability.

Due to the idiosyncratic nature of Defence’s application of e-procurement strategies the only reliable indication of the advantages, lessons and implications is best explained using an indicative example. One such pertinent example of how e-procurement has developed as a capability retrospectively looking at how major projects were recorded 25 years ago. At that time, it was predominantly paper-based record keeping, relying on human involvement to archive information into manual corporate filing systems. Hence, significant amounts of information were incomplete due to inexperience of staff or the assumption that the information was not relevant.

Over time losses due to staff turnover decreases and degrades the corporate or institutional memory of where information is located and consistent working definitions. Currently with the

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advent of software knowledge management systems such as sharepoint® and objective®, all information and correspondence are corporately held and easily accessible, ensuring there is no reliance on any one staff member for particular corporate knowledge. This includes procurement, decisions and other factors that influence the major project acquisition. This use of e-procurement methodologies could mitigate any potential recurrence of the issues that adversely affected the Super Seasprite project. Similarly, the use of electronic processes provides an easily auditable trail for future enquiries or political scrutiny.

Contemporaneous Comparisons

This level of complication and unique requirements meant that the procurement process would have been more successfully pursued as a strategic alliance procurement between the parties (Edler and Georghiou 2007). This type of relationship allows for the development of technology in a collaborative environment (Yates 2012) rewarding both parties for positive performance in time and budget and holding both parties accountable for performance below the agreed standard. An example (concurrent) of how SEA 1411 could have been arranged can be seen by another Federal Government flagship project, the construction of the National Museum of Australia (NMA) as the ANAO report highlights,

Project alliancing is a relatively new method of contracting that seeks to deliver a cost-effective outcome within a set time frame for a project through the project owner—in this case the Commonwealth— sharing project risks and rewards with contractors. (Australian National Audit Office 1999 p.11)

However, major factors that could be identified for implementing an improved procurement strategy are ones ensuring that experienced and qualified personnel are appointed in overseeing defence procurements, safeguarding the continuity of experience or detailed succession planning for long term projects. This, incorporated with improved procurement processes such as strategic procurement for major defence acquisitions would improve the likelihood of a successful outcome.

In line with the Federal Government's policy position regarding public service staffing levels, the necessity for procuring external research becomes essential to the success of Defence's operations. Effectiveness, as used in the literature, constitutes an ongoing and real time competitive advantages between alternative suppliers of goods and services. Defence is less reliant on e-procurement as a strategic tool in this regard, as there is a smaller requirement for competition as it has routine recurring traditional product procurement activities.

The impact on Defence's procurements is appropriately examined through the types of procurements it most commonly undertakes. At the most reductive level changes to 'ways to work' as influenced by e-procurement at Defence would be modest, such as documentation would be increasingly held on computer servers rather than in filing cabinets. The literature concerning e-procurement in national government bodies does give a close approximation to Defence's role, however the European Union (EU) conducted research on the impact of e-procurement in government (Ferreira and Amaral 2016). It concluded that the most appropriate definition for government e-procurement would be based upon the transition from paper to paperless methods of service delivery.

"According to the European Commission, e-procurement refers in general, the replacement of pre-contractual procedures, on paper, by communication and processing based on technology

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and information systems. And should, however, be developed taking into account the political and legal specificities of the public sector” (Ferreira and Amaral 2016 p.10).

This aligns with other aims of

“e-procurement, in terms of governance, increases competition, empowers more transparent decision-making processes, combats corruption, regarding the management, reduces paperwork, allowing time and money gains” (Ferreira and Amaral 2016 p.9).

These two factors, (a) paper to paperless and (b) overarching political considerations, are substantial influencing factors in any institutional analysis of Defence.

Conclusion

E-procurement has the potential to reduce timeframes, costs and to increase internal integrity to the process (Daffen, Daffen et al. 1996). Following this argument, the key advantages of Defence’s knowledge management regime is affected by e-procurement lies in its ability to store, sort, track and identify specific project data. The advent of mobile communications and moreover mobile device applications provides significant improvements in processing time for essential communications.

As the Gallaher report on the American federal government data storage survey of capital facilities details, there are vast resources expended upon reproducing technical information (a phenomenon with the term ‘interoperability’) which, whilst generated accurately, was never systematically archived.

Owners and operators have the largest interoperability costs of all the stakeholders: over \$10.6 billion, or about 68 percent of the total \$15.8 billion of inadequate interoperability costs calculated for the capital facilities supply chain (Gallaher, A. C. O'Connor et al. 2004 p.120).

The Australian Defence Organisation as part of the Commonwealth Government, is restricted by commonwealth procurement regulations. This restriction exacerbates the negative propensity to impact on their ability to incorporate innovative e-procurement methodologies. This conflict between requirement for innovation and availability of robust systems contributes to the wicked problem which affected the SEA 1411 project. SEA1411 highlights in very obvious ways the impact a wicked problem can have on a project, even a project which cost the Australian public \$1.4b. As a result, the constant change of requirements coupled with a lack of understanding of the impact of these changes impacted on the delivery of the helicopters.

Defence employs the term ‘acquisition support’ as a definition different in scope to e-procurement possibly so unrelated as it understands it, that standard definitions are insufficient. In this case the e-procurement process that supports this the most is the use of Information Technology (IT) to streamline documentation. All documentation is executed electronically, supported by the extensive use of electronic signatures and digital certificates. Hence the future changes for e-procurement ensures a need to be innovative and necessarily hybrid (Pongsuwan 2016).

Following this line of thought, there is the restriction that Defence processes are dictated by central applications. This diversity of procurement types requires perfunctory items to be obtained in line with other government arrangements. whilst research based contractual activities and one-off expensive items would be problematic if not impractical to attain at the more sophisticated level.

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Some purchases challenge easy qualification and some have intangible elements which do not fall into a binary state such as supplied or not supplied. The challenges are to use these emerging tools where they would represent the most effective gains.

Almost inevitably every commercial function will become electronically based, and e-procurement will render paper-based methods of data handling a curiosity, as all procurement will become e-procurement if even the most simplistic definition is applied. Therefore, whilst the definitions of e-commerce and other forms of structured communications of meaning require fluid and coherent levels of understanding to function, conversely with ill-defined understandings, dysfunction should not be unexpected. Hence, the intersection of a complex and competing set of definitions and the understandings of multiple parties involved in diverse activities remains the pivotal interaction around which the efficiency and effectiveness of Defence procurement rotates.

This paper has considered the initial ideas of how current academic definitions of contributing factors have affected the delivery of a specific project. It has offered a narrative that pertains to the Seasprite project, and outlines what e-procurement is as well as examining the qualitative descriptions that are used to define the delivery of a project. Further work could be undertaken including investigating other failed projects in a similar manner to ascertain if there are common themes such as changes in scope and overseeing agencies. Further work may also include clarifying definitions for what constitutes e-procurement.

Acknowledgements

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Management of the Defence Science and Technology Research Portfolio in a Dynamic Strategic Environment¹

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Abstract

Portfolio management practices are adopted by organisations to meet three major goals: maximising the value of the portfolio; achieving the right balance and mix of projects; and linking the portfolio to the business strategy. These goals are sought by both private and public sector organisations and are also applicable to organisations where a significant portion of the portfolio is dedicated to research, development and innovation. Research and development (R&D) and innovation projects are high-risk endeavours and the decision to modify, postpone or cease investment is an ongoing and dynamic process. This process becomes even more challenging where the strategic environment is subject to rapid change. This paper examines a number of practical approaches used to re-align a R&D portfolio in response to a shift in strategic direction. In a portfolio with fixed resources, this means that difficult decisions need to be made regarding the re-allocation of financial and human resources. It was observed that changes to programs and projects to meet changes in strategy and priority are more easily achieved where there is a single, clear line of decision-making and the impact is limited to a program or project. In cases where the strategic change has a broader impact across the portfolio, the decision-making process is more complex, and it is difficult to change investment from the status-quo. The approaches used have had mixed success and further work is required to develop new approaches and to effectively integrate them.

Keywords: project portfolio management, strategy, PPM, P3M.

Introduction

The Defence Science and Technology Group (DST Group), a group within the Australian Government Department of Defence, has been on a journey since 2016 to implement portfolio, program and project management (P3M) practices (Young, Vodicka & Bartholomeusz, 2017; Young, Vodicka & Bartholomeusz, 2018). Portfolio management practices are adopted by organisations to meet three major goals (Cooper, Edgett & Kleinschmidt, 1997): maximising the value of the portfolio, achieving the right balance and mix of projects and linking the portfolio to the business strategy. These goals are sought by both private and public sector organisations and are also applicable to DST where a

¹ **Editor's Note:** This is the third paper mapping the evolution of the management of the DSTO Research Portfolio. See also:

2017: *Implementing Strategy through P3M and Benefits Management: A Case Study of the Defence Science and Technology Group.* https://www.pgcs.org.au/index.php/download_file/view/361/244/184/

2018: *Strategic management of the Defence S&T Portfolio: Are we there yet?*
https://www.pgcs.org.au/index.php/download_file/view/404/244/184/

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significant portion of the portfolio is dedicated to research, development and innovation. Research and development and innovation projects are high-risk endeavours and the decision to modify, postpone or cease investment is a dynamic and ongoing process. This process becomes even more challenging where the strategic environment is subject to change.

DST introduced an investment process and P3M decision-making framework to strategically select projects and allocate resources. This approach successfully addressed the shortcomings of a largely bottom-up process that did not consistently provide clear alignment with strategy and often lacked transparency (Young, Vodicka & Bartholomeusz, 2017; Young, Vodicka and Bartholomeusz, 2018). The annual DST investment process provides a transparent decision-making mechanism to construct a portfolio of projects, which directly aligns with the strategies and goals of the organisation and its Defence stakeholders. While this approach has been largely successful, the portfolio needs to be revised and updated as new information is gathered and strategic priorities are refined and changed. Without a mechanism to capture strategic change, create new programs and projects, re-allocate resources and divest, it is difficult to maximize the benefits of investment across the portfolio.

This paper examines a number of approaches that DST used to re-align its portfolio in response to a major shift in strategic direction and to provide assurance that these changes will deliver value. In a portfolio with fixed resources, this means that decisions need to be made regarding the re-allocation of financial and human resources. DST has observed that changes to programs and projects based on changes in strategy and priority have been achievable where there is a single, clear decision-making process and the impact is limited to a single program or project. In cases where the strategic change has a broader impact across the portfolio, there is a need for a decision-making process and defined roles and responsibilities to avoid a return to the status-quo. The approaches used have individually had mixed success and further work is required to develop new approaches and to effectively integrate them. A proposed value assurance process is also discussed which intends to provide an evidence base that changes in the portfolio are achieving their intended aims.

The Defence Science and Technology Portfolio

DST Group provides scientific advice, R&D outcomes and innovative technologies to meet Australia's Defence and National Security challenges. It is part of the Department of Defence and is Australia's second largest publicly funded research organisation with approximately 2,100 staff consisting mainly of scientists, engineers, information technology specialists and technicians. DST Group is organised into Major Science and Technology Capability (MSTC) areas that deliver outcomes against Defence and National Security strategies.

Research and development (R&D) and innovation projects are high-risk endeavours and the decision to modify, postpone or cease investment is an ongoing and dynamic process. This process becomes even more challenging where the strategic environment is subject to rapid change. DST Group operates in an environment of high uncertainty and rapid global technological innovation and this provides a challenge to decision-makers who need to ensure that the portfolio is strategically aligned, balanced and resourced to deliver high value outcomes. Portfolio management is a "dynamic decision process, whereby a business's list of active new product (and R&D) is constantly updated and revised ... the portfolio decision process is characterised by uncertain and changing information, dynamic opportunities, multiple goals and strategic considerations, interdependence among projects, and multiple decision makers and locations" (Cooper, Edgett & Kleinschmidt, 1997). Portfolio management should be viewed as a holistic management system that supports faster and

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less bureaucratic decision-making. The decision-making process also needs to ensure that it is based on the best possible information at the time and it must be transparent to promote organisational buy-in.

The DST portfolio is developed through an annual investment process that utilises a strategy-led approach to define strategic priorities (Young, Vodicka & Bartholomeusz, 2017) and ensure that investments clearly align to these priorities. The portfolio is defined and managed using a P3M construct which allows investments to be partitioned and aligned to strategy (Figure 1). DST Group utilises a number of published strategies that shape the portfolio at the program level. A whole of organisation strategy is also used to shape priorities at the portfolio level. These strategies are derived from the Defence White Paper, Defence Industry Policy Statement and Defence Planning Guidance. Changes in priority and demand are documented and agreed within these strategic frameworks before any significant changes to investments within the portfolio are considered. The DST Group investment process also defines the decision-making roles and responsibilities in making changes in strategy and investment prioritisation and the process is inclusive of relevant stakeholders.

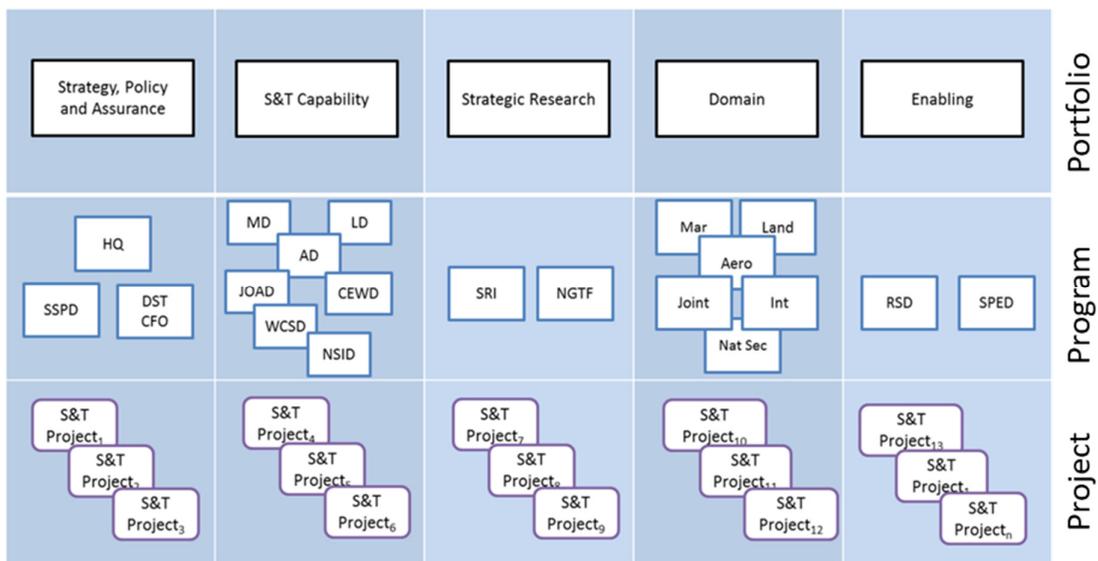


Figure 1 DST Group Portfolio, Program and Project management framework.

Re-Balancing the Portfolio

The portfolio management process is in essence a decision-making process that enables an organisation to assure that investments provide maximum benefit to the stakeholder and effectively implement strategic objectives. Maintaining the portfolio includes continual evaluation of the components against these objectives and controlling the process of portfolio change. The need for change in the portfolio is often initiated by a change in strategy or availability of resources. In a portfolio with fixed resources, this often means that decisions need to be made regarding the re-allocation of financial and human resources to meet new strategic priorities. Without a clear decision-making process and defined roles and responsibilities, these decisions may be avoided and there also may be a strong desire to maintain the status-quo.

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DST Group has utilised a number of approaches to re-balance its portfolio using its annual investment process over the period 2016 to 2019. Some of these approaches were implemented as a one-off exercise while others are being utilised at each investment cycle. Additionally, new approaches are being considered for introduction in future investment cycles. The five major portfolio-wide change processes that have been implemented or are under consideration are listed in Table 1.

Portfolio Change Process	Primary Resource Impact	Implemented?	Role and Responsibility
Allocation of a Strategic Portfolio Reserve	Finance	Yes - annually	Executive suite
Modified Zero-based budgeting	Finance	Yes – as needed	Program Managers and Stakeholders
Cross-Portfolio Prioritisation	Financial and Human Resources	Yes – as needed	Program Manager and Stakeholders
Divestment	Financial and Human Resources	No – process being developed	Executive suite
Value Assurance	Financial and Human Resources	No – process being developed	Program Office

Table 1: Portfolio-wide change processes

Allocation of a Strategic Portfolio Reserve

The DST Group annual investment process includes a provision to allocate a Strategic Portfolio Reserve. This reserve is a portion of the portfolio funding (the discretionary operating budget) that is available after staff salaries are deducted from the total budget. Over the past three years, this reserve has been set at about five percent of the discretionary operating budget. This reserve is set aside at the initial step and allocated in the final step of the investment process. It is typically assigned to procure or upgrade high value capital items that cannot be funded from a single project or to allow for the inclusion of new projects that could not have been funded within existing program budgets. This approach is aimed at partially addressing the issue of ‘pipeline gridlock’ (Cooper, Edgett & Kleinschmidt, 2000) which occurs when the programs are fully aligned to high-value projects and there is no resource available to allocate to something new.

The final allocation of the Strategic Reserve is conducted at the executive-board level and takes place by assessing bids received from program managers. Successful bids result in an increase in funding to the program manager. The challenge in this process is that it is almost inevitable that more bids are received than the available reserve and there is a need to ensure that the bids aligned with agreed strategic portfolio priorities. Strict prioritisation needs to be applied in this process and the resulting impact on the overall portfolio investment balance also needs to be considered.

The use of the Strategic Reserve has been partly successful. It has value in that it creates opportunities at the portfolio level that need to be considered by the executive-board level and allows for projects and initiatives to be funded that would otherwise have been turned away by program managers due to lack of financial resources. The result has been additional funding for a

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program or project, but it may not always result in the re-allocation of any required human resources. This approach has been more effective at addressing funding shortfalls and less on the re-allocation of staff effort.

Modified Zero-based budgeting

In 2017 concerns were raised by DST Group Executives that project and program budgets were based on long-term historical funding allocations which may no longer be relevant given changes to strategy and priorities. In 2018 a revised budgeting approach was implemented that enabled examination of the relative priority of current activities and associated costs in the context of broader Defence and DST Group strategy and priorities. The approach also allowed new activities to be funded through reallocation of funds from lower priority areas within a fixed overall funding envelope. This Zero-based budgeting (ZBB) approach aimed to realign budget to strategy.

ZBB was invented to address problems with traditional budgeting techniques. It was applied within the US government and subsequently adapted for other government and industry environments (Pyhrr,1977). Under traditional planning and budgeting processes, the focus is primarily on planned changes from the previous year's budget or expenditure, i.e., incremental budgeting. The limitations of traditional budget processes include factors such as lack of alignment of funding to strategy, budget bids frequently exceeding funding availability, lack of flexibility to address strategic shifts in budget terms and current unaddressed inefficiencies.

When originally applied in the 1970s (Pyhrr,1977) ZBB zeroed budget lines across the entire portfolio. No one was guaranteed funding and projects and programs were redeveloped for approval based on organisational strategic priorities. This can be time consuming and disruptive, and is potentially viewed as a punitive budget process rather than part of the overall strategic management of the organisation. There is a not a strong history of success with this comprehensive level of ZBB implementation, particularly in the public sector, where "competing" activities are not assessed on profit, but rather strategic outcomes or public good objectives.

The key issue in government organisations is more likely to be to assign priorities and identify possible savings, rather than to eliminate functions or activities. Also, staff costs are a significant proportion of total costs and staff cannot be removed or reassigned easily in short periods of time. This is particularly true for DST Group as highly skilled and experienced researchers are required and it takes time to develop these staff. For this reason, it was decided it may be unnecessarily disruptive to require a scenario of abolishing all activities (an actual zero-base) in DST Group. Instead, DST Group applied a 85% ZBB approach, which meant allocating 85% of the historical budget as the starting point. The remaining 15% of budget was held as a reserve as discussed above.

A key element for a ZBB approach is the level at which budget decisions are made. These need to be isolated for analysis and prioritisation. In DST Group the portfolio consists of about 20 programs which comprise approximately 130 individual major projects. To make the process more efficient it was decided to apply ZBB at the program level and then subsequently ask program managers to allocate their project budgets. Project Leaders were required to redevelop project plans within their program budget allocation, but were asked to highlight high priority areas that could be included if additional funding was provided.

Through the Investment Process the projects within each program were assessed and prioritised. If a project was experiencing a budget shortfall of strategic significance, the project was awarded

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additional funding from the Strategic Reserve. Eighteen of the projects in DST Group received additional funding. As a part of the process, each project was also assessed to determine whether their budget should be reduced, which occurred in one case. The process also identified areas of savings in enabling or supporting areas.

The process reshaped the overall budget at the program and portfolio levels. At the portfolio level, additional funding was allocated to the S&T Capability Stream at the expense of DST Groups support functions (Enabling and Strategy Streams) as shown in Figure 2. Changes were also observed within programs. For example within the Research Services Program, budget was reallocated to areas of higher priority based on the assessment of the investment panel that included senior client and DST Group leadership team members (Figure 3).

The DST Group workforce constitutes the majority of the portfolio's resources, but the ZBB approach was not used to reprioritise workforce. In addition, other Defence groups and the services fund projects either through Defence's major capital acquisition program or through direct funding to DST Group. Thus while the modified ZBB was able to allocate the strategic reserve from DST Group's operating budget to areas of high priority, it did not make radical changes to the program of work as this is also shaped by workforce allocation and external funding (Young, Vodicka & Bartholomeusz, 2018).

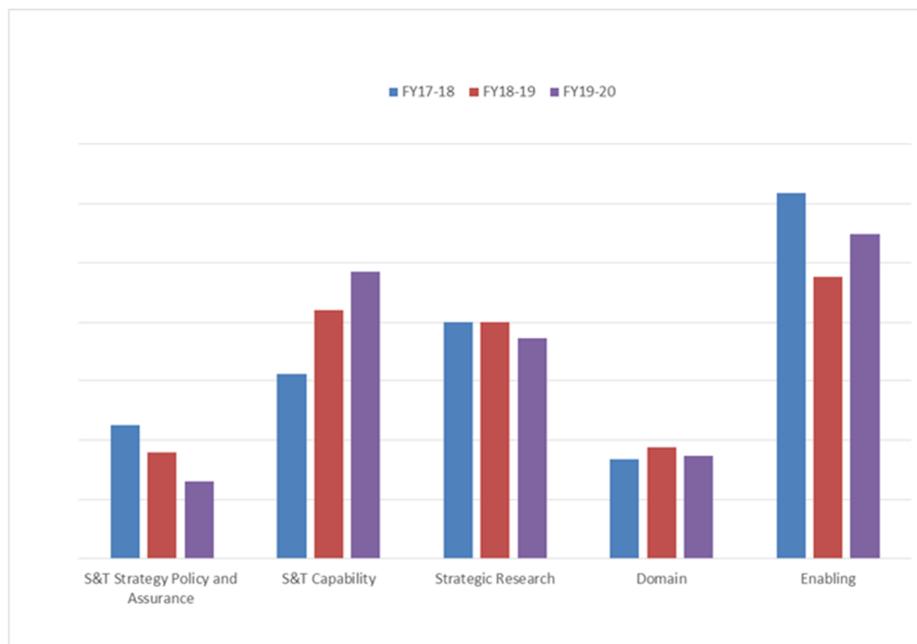


Figure 2: Operating budget distribution across portfolio. The ZBB process reallocated budget from the Strategy and Enabling streams to the S&T Capability stream to enable raise, train and sustainment of S&T technology areas.

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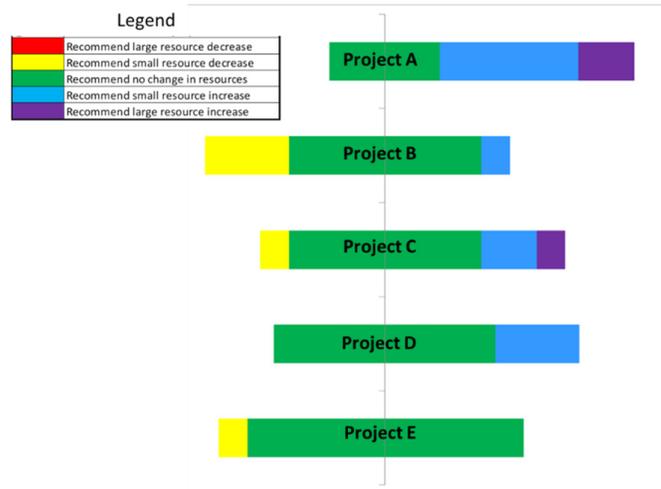


Figure 3: Investment panels made recommendations to increase or decrease Project budgets within a Program. The budgets of Project A and C were increased in this case.

Cross Portfolio Prioritisation

In 2018 critical science and technology capability skill sets were identified through analysis of the combination of strategic demand expressed through the investment process and through interviews with senior stakeholders. These critical skill sets were in areas where demand exceeded the current human resource capacity and therefore limited the potential outcomes from projects and programs. This capacity constraint often resulted in the same staff being allocated to multiple projects and programs which resulted in a highly fragmented staff effort. The 2019 Investment Process introduced an additional cross-portfolio prioritisation step to determine the best balance of human resources in these critical technology areas through considering: how investment is currently balanced; what are the current and future strategic demands; and what investment options are required to satisfy these and their implications. Key to delivering the cross portfolio prioritisation step are:

- Identifying the new strategic demands through the review of related strategic documents and tailored interviews;
- Understanding the current DST Group investment allocation along with major deliverables and benefits based on program and project data;
- Discovering potential misalignments of the current projects to priorities, and these new strategic demands;
- Competing the demands across programs; and
- Developing options to correct any misalignments and prioritise competing demands within and across programs.

The options were developed, in consultation with Defence stakeholders and include the status quo and two scenarios: 1) re-prioritisation of investment within the portfolio; and 2) grow investment in the technology area to meet the strategic demand. Analysis of the options included identifying the implications of delaying or cancelling currently endorsed major deliverables.

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This step has been successful in enabling reprioritisation of human resources to align with strategic demands. Key to delivering this was agreement by senior stakeholders that this new demand had primacy over previous work. Resources in separate projects in multiple domains were prioritised and amalgamated to meet the new strategic demand in one of the technology areas (Figure 4). Here six separate projects were amalgamated into one larger project to reduce fragmentation of staff effort. In other technology areas it was agreed by stakeholders that DST Group's resources had reached their capacity and additional resources were required to meet the new strategic demands.

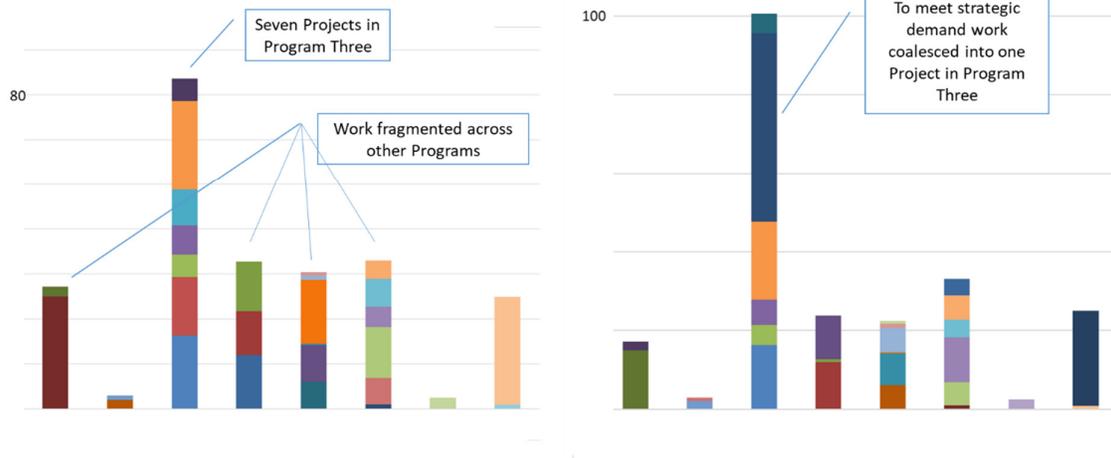


Figure 4: The cross-program prioritisation identified a fragmented program that was amalgamated to deliver a strategic effect.

Divestment

DST Group utilises Investment Logic Maps (ILM), a tool developed by the Victorian Government in the early 2000s, to provide a standard means to outline the business case for investment proposals ("Investment Management Standard Version 5", 2017). This approach is utilised in the DST Group investment reviews and is supplemented with a five-minute pitch that is provided to a stakeholder group to outline the strategic relevance, expected benefits and major deliverables for each candidate project. Each business case is then subject to a voting process around a small number of well-defined criteria including alignment with strategy. Business cases that score lowly in this process are subject to a deep-dive to further refine their value proposition or they may be put on hold or rejected. Ongoing projects are reviewed on an annual basis to ensure that they are aligned with priorities and are delivering value.

Major changes in strategy may require some portfolio elements to be divested to free resources to pursue higher priority strategic outcomes. DST Group is currently exploring the capability to utilise the ILM process to make a case to divest resources from low-value projects or those that are no longer strategically relevant. The divestment of resources can create major disruptions to current funding allocations and human resource allocation, and therefore requires careful consideration. The use of the ILM process to divest may provide a formal and rigorous mechanism to deal with

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portfolio changes. It is proposed that this divestment process will require approval at the executive-board level and be supported formally by senior level Defence stakeholders.

Value Assurance

Planning the portfolio investment has been the major focus of the DST Group investment process to date. This approach has been effective in project selection and resource allocation. The outcomes and benefits derived from these programs and projects need to be tracked to ensure that they are capable of delivering on their initial value proposition, including the realisation of their stated benefits and value. DST Group has historically used stakeholder satisfaction surveys to assess the value generated by its projects. These surveys assess the level of engagement, timeliness and quality of outputs and outcomes and is conducted with stakeholders at different levels including senior Defence leaders and lower-ranked officers. While these surveys have been a good gauge of performance of the portfolio, the surveys do not capture benefits and outcomes in a consistent manner and the surveys are more descriptive than quantitative. To provide more rigorous assurance of the portfolio, a value assurance framework (VAF) has been recently developed and is being considered for adoption in the near future.

A pithy description of Value Assurance might be “the process that delivers confidence that value is and will be delivered”. It is very closely related to Benefits Realisation, defined here as “the process of identifying, executing and measuring benefits”, where the former (value assurance) is the process of assuring that the latter (benefits realisation) has occurred. All of this is also closely aligned with the concept of Pathways to Impact, which sets out to explicitly trace the impact delivered from a chain of inputs, activities, outputs, outcomes and benefits. DST Group has developed a modified form of the CSIRO Impact Framework (Figure 5) (“CSIRO Impact Framework”, 2019) and mapped it to the P3M levels to create a minimalist description of P3M levels and associated types of delivery. The next step that is currently underway is the identification and description of the complete set of impacts, benefits, outcomes and outputs that are linked coherently and provides full coverage of the range of DST Group work.

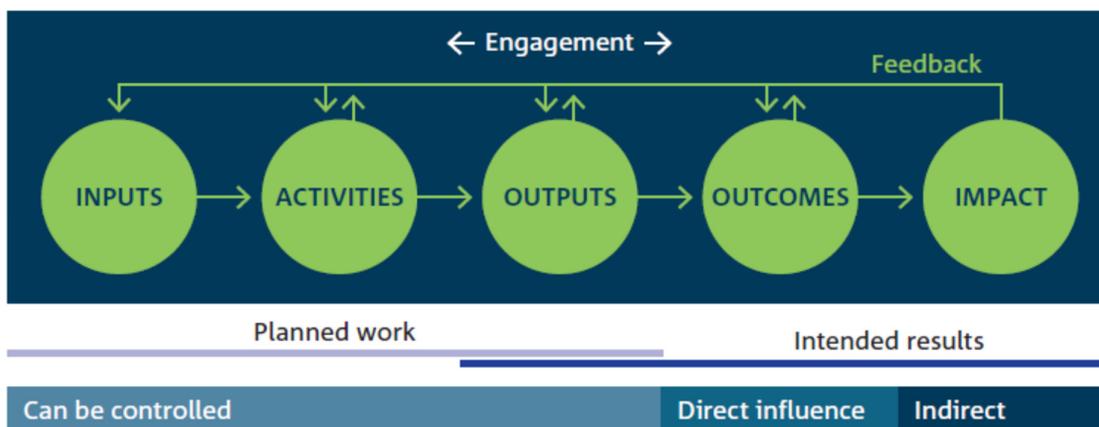


Figure 5: CSIRO Impact Framework (2015) (“CSIRO Impact Framework”, 2019)

As mentioned previously, DST Group has adopted the not uncommon approach of collecting similar functional programs into a small number of separate streams. Figure 1 shows the five streams that comprise the portfolio. As part of the VAF it may be useful to construct a value chain comprised of

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these streams (Figure 6). This has potential to create a natural and coherent narrative for the organisation based transparently on its portfolio.

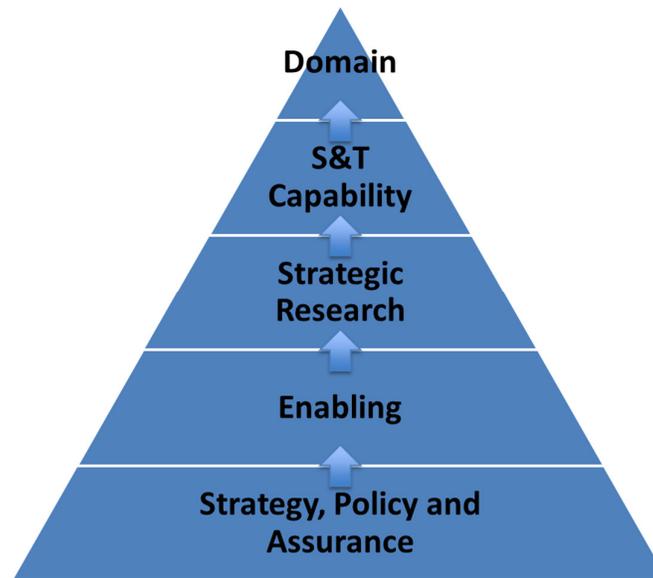


Figure 6: Portfolio value chain

The goal of the VAF is to provide a consistent means to communicate and measure the value of the portfolio and to provide assurance that strategic changes in the portfolio are reflected in future outcomes and benefits. DST Group has already laid the foundation for benefits management by adopting business cases based on ILM, which require a clear statement of expected benefits and associated key performance indicators (“Investment Management Standard Version 5”, 2017). The VAF will leverage these existing tools and extend them so that value assurance can be conducted at the portfolio, program and project level in a more detailed and structured way. It is expected that the previously utilised client satisfaction surveys will be integrated with the VAF to provide both qualitative and quantitative assessments of value generated across the portfolio through feedback at the point of delivery.

Information to Support Portfolio Decision Making

DST Group has also embarked on the introduction of a new management information system (MIS) to support effective project management and to support decision-making. The new system aims to provide a collaboration platform for program and project managers and includes the capability to capture the initial business case, resource allocation awarded during the investment process and to track project outputs. The entire DST portfolio will be included in the system and key metadata will provide a means to aggregate elements of the portfolio and to provide views as to how they effectively align with strategic priority areas. To this end, the system implements powerful business intelligence capabilities to provide users with a view of the portfolio that is directly relevant to them. The system also provides a means to track project outcomes and benefits, which will leverage previous research to develop and introduce a benefits management framework (Young, Vodicka & Bartholomeusz, 2017).

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DST Group believes that this information system will be vital in providing the evidence base for making future portfolio decisions and to implement the value assurance framework. The quality of data within the system is therefore a strong determinant of the usefulness of such a system.

Discussion

DST Group has been on a journey since 2016 to better demonstrate the alignment and value generated from its portfolio of investments. This has required the adoption of a suitable P3M framework to logically and hierarchically partition its investment decision-making process. This framework and the related investment process has provided greater transparency into the decision-making process and has allowed DST to better demonstrate the alignment of its programs and projects with Defence strategic needs. The ability for the portfolio to effectively respond to changes in strategy and investment priorities is a challenge and may often require major changes to existing programs and projects. These changes may require the movement of both financial and skilled staff resources to areas of greater priority and strategic need. DST Group has used a number of approaches to re-align its portfolio of work in response to these changes.

Management of the DST portfolio fundamentally requires the capability to effectively capture changes in priorities and strategic need on an ongoing basis and use this to inform investment in the portfolio. While the current strategy for each program is published and used to inform investment decision-making, updates and changes are constantly sought through engagement with Defence stakeholders using a team of scientific advisers. This approach ensures that the portfolio of work is driven through a top-down strategy-led approach and that any changes to current work reflect changes in high-level strategic needs and priority areas. These changes are easier to achieve where the impact is to a single program of work as the decision-making can be affected at the program level through a re-prioritisation of existing projects. In cases where the change in strategy and priority is likely to affect a number of programs within the portfolio the ability to change the balance of investment is more complex, as there is a need to move both financial and staff resources, and may also require divestment of some projects.

DST began the process of aligning its portfolio using its investment process and used a funding reserve which could be used to invest in new priority areas or major capital items. This approach had limited success as it only addressed funding and did not necessarily re-allocate staff effort in an effective way. The use of a modified zero-based budgeting approach went further to enable larger amounts of funding to be re-distributed according to priority areas and address the issue of programs being funded on a historical basis. This approach did provide a greater impact to the allocation of financial investment but again had limited impact on the direct allocation of staff resources. To address this shortfall, a cross-program prioritisation approach was utilised to address the allocation of staff effort. This approach did not attempt to re-allocate staff across the entire portfolio but was targeted to areas of the portfolio where Defence strategic priorities had substantially changed. This approach provided a mechanism to understand current staff allocation within the portfolio and examined options to re-allocate staff to work on programs and project of higher priority. This process is still ongoing and its effectiveness will be assessed in the future. A formal mechanism to divest in projects of lower priority is currently being examined and may adopt the same ILM format used for investment business cases.

Any changes in the portfolio need to be assessed to ensure that the outcomes are delivering value against their strategic objectives. DST has been developing a value assurance framework to assess

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the effectiveness of its portfolio in delivering strategic value to Defence. This is a key step as the process of re-aligning the resources within a portfolio only addresses the portfolio planning stage. The performance and outcomes from the portfolio need to be periodically assessed to ensure that value is still achievable and to capture the benefits against the original business case in a systematic manner. DST will use a new management information system to capture its current portfolio of work and the value generated.

More work is required to provide systematic and effective approaches to manage the DST portfolio, especially in times when major strategic change is experienced. DST is integrating a number of existing approaches and adding new ones to ensure that portfolio management decisions are based on a rigorous evidence base and can be effected using agreed processes.

Conclusion

This paper examined a number of practical approaches used to re-align a portfolio in response to a shift in strategic direction. In a portfolio with fixed resources, this means that difficult decisions need to be made regarding the re-allocation of financial and human resources. It was observed that changes to programs and projects to meet changes in strategy and priority are more easily achievable where there is a single, clear line of decision-making and the impact is limited to a program or project. In cases where the strategic change has a broader impact across the portfolio, the decision-making process is more complex, and it is difficult to change investment from the status-quo. The approaches used by DST needed to target both the re-allocation of financial and staff resources in order to make the portfolio management process effective. Improved approaches and decision-making tools are being considered, including a formal approach to divest from current projects. In addition, a value assurance framework and information system is being developed to demonstrate the value generated by the portfolio and its performance against original strategic requirements.

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A framework to manage uncertainty in early planning of projects, an ICT project

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Abstract

Identifying sources of uncertainty and tailoring decision-making approaches to meet specific contexts, creates opportunities to reduce effort expended in the early planning phases of project planning. Practical application of these approaches is not yet being widely reported in research on Business Case and Decision-making Frameworks, so this paper seeks to fill the gap by describing an approach based on the Cynefin Framework (C. F. Kurtz & D. J. Snowden, 2003; Snowden, 2018) which distinguishes between complicated and complex decision contexts based on the types of operational constraints (governing and enabling) and nature of practices involved (good and emergent). Recognising the differences during project initiation, improves accessibility to streamlined decision-making, by ensuring 'fit-for-purpose' methodologies are chosen rather than relying on an undifferentiated single method. This paper describes how use of the Cynefin framework, during initial project planning, enables better alignment of plans with situational constraints, and ensures effective calibration of plans to meet required outcomes.

Keywords. Cynefin, Complex project, ICT, uncertainty, business case, planning, decision framework.

Introduction

In the initial planning phase of projects - especially those with multiple stakeholders and intricate sets of outcomes, there are opportunities to avoid wasted effort through considered application of the Cynefin Framework (David J. Snowden & Mary E. Boone, 2007), used as a categorisation model to address ambiguity in goals and scope definitions through tailoring approaches for problem solving and disagreement resolution. Planning conversations can be easily derailed when issues associated with complex and complicated problems are mixed together such as happens in analysis-style workshops, or reliance on experts sorting through the issues to arrive at recommended action strategies. Derailment often occurs when workshops and meetings planned to last a couple of hours result in ongoing conversations and disagreements lasting sometimes for weeks or months.

Sources of complexity have been identified in regard to research on projects (Remington & Pollack, 2008a), business case frameworks (van Putten, Brecht, & Günther, 2013) and linked to the degree of uncertainty associated with interpreting real-world events via use of case studies (S. French, 1995b).

This paper reports insights emerging from use of the Cynefin framework during the early planning phase prior to developing the business case for an ICT project. The approach allowed team members to categorise the types of decisions required in early planning, consequently allowing tailoring of the decision-making formats to suit differing levels of uncertainty and complexity for each item. This

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resulted in a significant reduction in the effort required to make key decisions, allowing a set of decisions that had remained unresolved for 3 months to be finalised in two days.

Relevant theoretical background—including the theory of complexity, navigation of uncertainty, the Cynefin Framework itself and decision making methodologies—is introduced and the methodology for implement the approach in a particular ICT project is described before the outcomes are explained. A concluding discussion illustrates the connections between practice and theory.

Complexity and Uncertainty

Complexity and uncertainty are acknowledged as regular disruptors of decision making, especially when senior managers are required to make decisions without the availability of sufficient information (Gorzen-Mitka & Okreglicka, 2014) conditions which usually happen during the early stages of planning new projects. To better understand such complexity Remington and Pollack (2008b) identified four types of project complexity: structural; technical; directional; and temporal. Directional uncertainty arises from uncertainty and lack of agreement about project goals, and stakeholder disagreements: unshared goals, unclear meanings and hidden agendas (Remington & Pollack, 2007, p. 7). When technical and directional complexity are not well managed the result is prolongation of early planning and emergence of wicked problems. Mis-managing technical complexity in early planning leads to over estimation of requirements or poor understanding of values and benefits realisations (Ward, Daniel, & Peppard, 2008). A framework has been proposed for managing complexity of projects in the initiation phase through breaking down key decisions into 15 areas. This is relevant to creating a business case for large IT Projects and table 1 (van Putten et al., 2013) sets out three categories for key topics relevant to the final decision. Reuse topics indicate use of information from similar business cases; Adaptation topics refer to items which can be adapt from previous business cases and Collaboration topics are those where project teams can collaborate to generate specialised information for each business case.

Topic	Reuse	Adaptation	Collaboration
Reuse of content	X		
Reuse of structure	X		
Aggregation	X		
Comparison	X		
Provider vs. Customer Perspective	X		
Market Potential Estimation	X		
Changing Assumptions		X	
Product Innovation Lifecycle		X	
Business Model Adaptability		X	

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Topic	Reuse	Adaptation	Collaboration
Clarifying Reasoning			X
Stakeholders 'opinions			X
Information Sources			X
Information Quality			X
Sharing			X
Security			X

Table 1 – Research areas within the solutions for a business case framework [from van Putten 2013]

Whilst these topics resulted from implementation of a Business Case Framework (BCF) over a 14-month period, the quality of information developed during creation of the business case was fine questionable and even ambiguous. And this ambiguity, if unresolved during early planning for adaptation and collaboration, can turn into wicked problems (Childs & McLeod, 2013) needing further research to establish the actual requirements for particular frameworks for action.

Conversely Table 2 (adapted from S. French, 1995a) categorises the types of uncertainty identified during analysis of a real-world example. This categorisation framework provides indicators to detect sources of uncertainty in an inductive process of making sense from a real-world case study (Simon French, 2017).

Sense-making - Uncertainty <i>about</i>	<ul style="list-style-type: none"> • meaning / ambiguity • what might happen (the science) • Likely potential impacts (values) • released decisions
Analysis - Uncertainty <i>because of</i>	<ul style="list-style-type: none"> • physical randomness • lack of knowledge
Analysis - Uncertainty <i>about the</i>	<ul style="list-style-type: none"> • evolution of future beliefs and values • accuracy of calculations
Induction - Uncertainty <i>about</i>	<ul style="list-style-type: none"> • depth to which to conduct an analysis

Table 2 – sources of uncertainty (adapted from S. French, 1995a)

Table 2 lists four types of uncertainty likely to create complexity in early planning stages, however, there is, as yet, limited application to practice of the frameworks discussed in this section. Furthermore, while mechanisms to manage uncertainty and their application to early planning wicked problems are important, they too are yet to be fully integrated into contemporary practice.

Navigation of Uncertainty

Uncertainties are usually events beyond the analysts' ability to predict, and thus cannot be measured in terms of risk (Quade, 1989). Quick-changing environments are a reality of business

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environment, and the kinds of uncertainties called 'Black Swans' (Taleb, 2007) can derail business operations. Sudden changes influence decision makers' perceptions about choosing actions and identifying decision criteria. Christiansen and Varnes (2008) suggest that decision makers have to deal with multiple criteria and sometimes conflicting interests at the same time. Thus, decision makers often find themselves moving away from rational thinking and towards intuitive thinking (Huang & Pearce, 2015) inevitably adapting a sub-optimal problem solving approach (Shalbahfan, Leigh, Pollack, & Sankara, 2017).

Seeking to make sense of complexity leads to more proactive identification of sources of uncertainty and a watchfulness for early signs of failure. In this regard Kalleman, Mckeeman and Zhang (2006) and Weick (1995) argued that people apply sense-making as a tool to overcome ambiguity and associated interpretations of such conditions. Access to a framework for making sense of complex situations can help planners to manage uncertainty in the early planning stages. "Cynefin provides a framework in which to discuss different forms of uncertainty from the deep uncertainty through the growth of knowledge as we learn about the world" (Simon French, 2017, p. 1636).

Cynefin framework

According to Kurt and Snowden (2003), the Cynefin framework provides ways to open up discussions, identify barriers, stimulate attractors and encourage dissent and diversity, thus enabling planners to better manage starting conditions, monitor for emergence of uncertainties and manage complexity in order to find the appropriate actions to stabilise uncertain conditions.

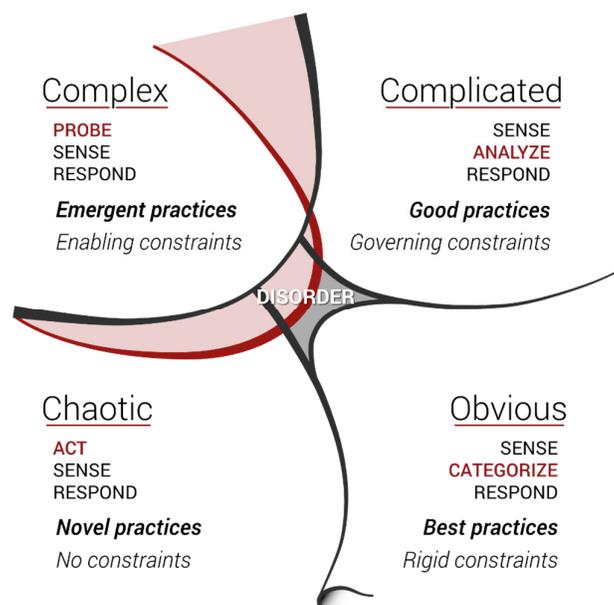


Figure 1- Cynefin Framework (Cognitive-Edge 2019)

Figure 1 is a current depiction of the Cynefin framework including the domains of Obvious, Complicated, Complex and Chaotic and the central condition of Disorder. Table 3 illustrates characteristics of the Cynefin domains as they were adapted in the analysis conducted for this research. The use of a Cynefin framework to analyse complex and complicated domains and fluidity

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of decision making approaches is discussed in the context of managing multiple projects in Childs and McLeod (2013) and Shalbafan and Leigh (2017).

Complicated	The context's Characteristics	The Leader's Job	Danger Signals	Response to Danger Signals
	Expert diagnosis required Cause and effect relationships discoverable but not immediately apparent to everyone; more than one right answer Known unknowns Fact-based management	Sense, analyse, respond create panels of experts Listen to conflicting advice	Experts overconfidence in their own solutions or in the efficacy of past solutions Analysis paralysis Expert panels Viewpoints of non-experts excluded	Encourage external and internal stakeholders to challenge expert opinions to combat entrained thinking Use experiments and games to force people to think outside the familiar
Obvious	The context's Characteristics	The Leader's Job	Danger Signals	Response to Danger Signals
	Repeating patterns and consistent events Clear Cause and effect relationships evident to every one; right answer exists known knows Fact-based management	Sense, categorise, respond Ensure that proper processes are in place Delegate Use best practice Communicate in clear, direct ways Understand that extensive interactive communication may not be necessary	Complacency and comfort Desire to make complex problems simple Entrained thinking No challenge of received wisdom Overreliance on best practice if context shifts	Create communication channels to challenge orthodoxy Stay connect without micromanaging Don't assume things are simple Recognise both the value and the limitations of best practice

Table 3- Adapted from a Leader's Guide (David J. Snowden & Mary E. Boone, 2007', p. 73)

This article aims to present how an application of familiar language representing three domains in the table 3. This approach helped an ICT Project team to categorise critical decisions and adapt

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appropriate approaches for each set of decisions by aligning as either obvious, complicated or complex problems. This is an original approach to researching the concepts within a single project.

The story of an ICT Project

Experiment and design of methodology

The Cynefin Framework (Cynthia F. Kurtz & David J. Snowden, 2003) is a great tool for early project planning and decision-making (Shalhafan et al., 2017). In approaching the project, it was decided that team members could best benefit from its principles by using common (non-technical) words to connect participants' knowledge of factors emerging in the context to the theoretical framework. After consultation with key stakeholders, the decision was made to use a trio of common terms suited to the project and the team. Thus, the Obvious domain was identified as Easy, the complicated domain was designated as requiring Analysis, and the complex domain became the Can of Worms. Use of these terms meant the principles behind the Cynefin Framework could be applied immediately without a detailed explanation being required (Ballestrin, 2015). If project team members wanted to learn more about the underlying principles, the full Cynefin Framework explanation could be explored later.

This Easy / Analysis / Can of Worms approach uses familiar terminology and definitions that are quickly understood. The three terms were initially chosen 'at the moment' of time-pressure to start a project and are now used in workshops and conference presentations as a practical explanation of the Cynefin Framework. The term 'Can of Worms' has been particularly well-received. In one instance, after the approach was outlined to a team, there were reports of it being used in the very next meeting to challenge an item threatening to derail the conversation by identifying it as a 'can of worms. At first the approach was applied to lists of items of work required to deliver a project so that workshops and other early project activities used time more effectively during business case development. However, it has been found to apply broadly to other sets of activities with various levels of un/certainty. Prior to the development of this approach, it was common to hold 4-5 days of workshops with 10-15 participants in order to 'discover' the work needed to complete the project. The Easy, Analysis, and Can of Worms approach means that much smaller and shorter workshop activities can be designed and the project team members assigned to 'Easy' types of decisions can be freed up to get on with other work.

Revised Project Methodology

in terms of 'methodology' the shift to using proxy definitions for the relevant three Cynefin domains creates enabling constraints (Juarrero, 2015) and allows project team members to more easily categorise work items into increasing levels of uncertainty.

- Easy – is proxy for the Obvious domain where there is one best practice and we can use the pattern Sense, Categorise, Respond. The description - as applied to project planning is 'We can name a person we can speak with and in a conversation of 20 min or less they are likely to tell us that it will take X long and cost Y much'
- Analysis – is proxy for the Complicated domain where there are often several good ways to achieve an outcome and we can use the pattern Sense, Analyse, Respond. The description as applied to project planning is 'We can name the experts that we could give the work to; or

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we can design a workshop of 2-3 hours and by the end of the analysis we would have a scope with which we can determine cost and timeframe.'

- Can of Worms – is proxy for Complex where the linkages between cause and effect are not easy to determine and we need to use the pattern Probe, Sense, Respond. The description applied to project planning is 'Everything that does not fit into Easy or Analysis.'

Once all the known items of work are categorised, project activities can be planned because the people to be involved can be aligned with the work assigned to each of the 3 categories. For example, if the same group of experts is required for all analysis items, one large workshop can be facilitated to tackle all - and only - the relevant items.

The Results

Commencement of the ICT project, which is the basis of this paper had been stalled because of lack of clear and agreed decisions about new software elements to be included.

In order to keep focused on the work, proxy definitions were used for three of the Cynefin framework domains.

The organisation had an aging technology stack that was mission-critical and required to operate 24 x 7. It required replacement because any new features and updates added to the systems increased the risk of catastrophic failure, it was at 'end of life' for systems support. For 3-4 months there had been an architectural white paper circulating and no clear decision about the new technology choices for the replacement systems. The desired technology would make it easy to implement continuous delivery and automated release management.

A set of 140 technology decisions were documented by a continuous delivery expert consultant. These were determined based on several workshops and conversations to determine the nature of the issues with the current technology stack and the desired functionality keeping the mission-critical functions and removing the fragility associated with the decades-old legacy codebase. These questions were then classified in collaboration with the lead enterprise architect using the proxy definitions as described above, for the three critical domains in the Cynefin Framework.

- Easy - meant that the technology question could be answered in less than 20 minutes and often would be related to the SOE (Standard Operating Environment). For example, 'Do you use Windows or Linux?'
- Analysis meant that it was agreed that a team of known experts could discuss the question and the length of the discussion could be estimated with confidence (maximum 1 hour)
- Can of Worms meant everything else. For example, when answers began with "I think..." or the length of analysis conversations could not be estimated, the issue automatically became a Can of Worms

A 2-day workshop was designed to tackle all the remaining Analysis and Can of Worms decisions (there were only about 10 'Easy' questions).

Day one was scene-setting so that the 20 or so attendees fully understood the desired outcomes for the technology replacement project.

On day two, there were 3 teams of experts in one room answering the Analysis questions and in a separate room, all the other attendees addressed the Can of Worms (Complex) questions.

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Figure 2 shows that the group identified assumptions about the question, placing them on a grid indicating low to high risk. If the assumption was invalid, Risk would increase on the Y-Axis and the Ease of testing would increase on the X-Axis. A key success factor was that the group tackling the Complex questions did not have to be experts in software architecture. It is much easier for non-experts to articulate assumptions because the role of an expert is to provide the answer. In the top right corner were the assumptions that were high-risk if invalid and easy to test. The group then called experts, searched the internet etc. to determine if the assumption was valid or invalid and this drove enough certainty into the question for it to be delivered to the teams of experts for an answer.



Figure 2 – Prioritisation of assumptions for each decision/question

Discussion

By the end of the 2-day workshop, all 140 questions were answered and the project to replace the aging technology had a good enough starting point. Until the execution of the two-day workshop, the project had stalled due to the lack of clarity about which technology could be used for the replacement systems.

The Easy, Analysis, and Can of Worms (EAC) approach uses the Cynefin Framework as a classification tool by imposing a definition of the Obvious, Complicated and Complex domains so that they become enabling constraints for project planning.

Table 4 shows key expected actions for decisions in each category. This allowed us to blend techniques for project planning. In the case study we were able to very quickly decide the Easy items and then ensure that we keep the Analysis and Can of Worms items isolated from each other.

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Category	Typical Actions
Easy (Obvious)	Identify the people who can provide the information and create a schedule for those conversations/ tasks
Analysis (Complicated)	Identify the people and groups that have the required expertise and plan/schedule workshops or other analytical activities
Can of Worms (Complex)	Keep these isolated from the other activities to avoid the risk of derailing that work and then design 'probes' or experiments with very rapid feedback cycles to explore the items and move them across to the Complicated or Obvious domains

Table 4- Actions expected in each category of EAC approach

It has been observed that most workshop styles are suited to analysis (Complicated) decision-making and that when a can of worms (Complex) topic arises, the workshop can be derailed, sometimes for weeks. Complex topics require special design to allow for surfacing and testing of assumptions. The workshop used in this case study, was one of successful approaches to explore complexity effectively.

The workshop described was designed to move the Complex decisions into the Complicated domain by surfacing and testing assumptions for validity/invalidity. This process drove sufficient certainty into the question that the teams of experts could answer it. This is a common movement pattern on the Cynefin framework and with the aim of ICT projects being to use technology to deliver an outcome, it is one of the key patterns that is useful to the early planning of projects.

This case study demonstrates a way to effectively manage uncertainty in a complex ICT project. Table 5 shows the main causes of uncertainty in the case study and the impact from applying the EAC model to facilitate making complex decisions. were in the Sense-making and Analysis stages.

- There was uncertainty about related decisions – the architectural whitepaper had stalled because it was a set of complex inter-related decisions about what types of software could provide the required functional and non-functional needs.
- There was uncertainty about lack of knowledge – the project team had insufficient experience and expertise with modern software to be able to determine a good enough starting point

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Stage	Sources of uncertainty relevant to each stage	Observation in the ICT Project
Sense Making	Uncertainty about meaning / ambiguity	The EAC framework helped to manage ambiguity by applying targeted approaches to each category of decisions
	Uncertainty about what might happen (the science)	N/A
	Uncertainty about how much impacts matter (values)	N/A
	Uncertainty about related decisions	All 140 decisions were related to identification of the new technology required for the project. The EAC framework removed some of this uncertainty by grouping them and treating the types of decisions differently
Analysis	Uncertainty because of physical randomness	N/A
	Uncertainty because of lack of knowledge	The 'can of worms' category identified the decisions that could not easily be answered by experts (the people who had the knowledge) and the facilitated approach to identify and test assumptions meant that people without expert knowledge could make progress with the decision until it had enough certainty for the experts to answer it
	Uncertainty about the evolution of future beliefs and values	N/A
	Uncertainty about the accuracy of calculations	e.g. Not applicable to this case study
Induction	Uncertainty about depth to which to conduct an analysis	N/A

Table 5- EAC model impact on decision makers in early planning decisions

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The Easy, Analysis, Can of Worms approach provided a clear pathway of facilitation for the 140 key decisions to be made. Had this approach not been taken, there was a high likelihood that the project would have been delayed further due to the mixing of complex and complicated questions. When a group is focused on analysis and a ‘can of worms’ comes up, it halts the progress on the analysis component and leads to the feeling of ‘spinning wheels’ as conversations go around in circles. Another data point was also captured as part of this case study. There had been many observations of ‘can of worms’ topics derailing analysis work – however, at one point during the workshop, a couple of the analysis experts walked over to the ‘can of worms’ room to see what they were doing. They nearly disrupted the session when they started to ask the group why they had not considered this or that about a particular question and were very quickly asked to leave. The thinking required to surface, and test assumptions is completely different to that needed for analysis and it is not effective nor efficient to mix the two together.

Topic	Reuse	Adaptation	Collaboration
Reuse of content	N/A		
Reuse of structure	NA		
Aggregation	N/A		
Comparison	N/A		
Provider vs. Customer Perspective	N/A		
Market Potential Estimation	N/A		
Changing Assumptions		N/A	
Product Innovation Lifecycle		N/A	
Business Model Adaptability		N/A	
Clarifying Reasoning			O
Stakeholders ‘opinions			O
Information Sources			O
Information Quality			O
Sharing			O
Security			N/A

Table 6- Observed impacts of using EAC model on BCA Framework

Referencing the Business Case Framework, Table 6 shows those elements which were observed with letter O and NA for not applicable. This case study reflects elements from the collaboration area

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- Stakeholders opinions - prior to the engagement, the white-paper reflected the stakeholder opinions about the required new technology
- Clarifying reasoning - the consultation clarified the current technology landscape and classifying the set of 140 decisions identified effective collaborative approaches to finding the answers
- Information sources – for the Analysis (Complicated) decisions, the experts held the information and for the Can of Worms (Complex) decisions, many information sources were used collaboratively to drive sufficient certainty into the decision so that it could be determined by experts.

Conclusions

Whilst Planning for projects can go beyond a complicated problem into complex or chaos domains, the paper provides insights how implementation of the categorisation model known as Easy, Analysis, Can of Worms (EAC) can facilitate critical decisions during early planning. EAC has provided a collaborative approach to extend stakeholders opinions, the through consultation with diversified expertise and increased certainty on sources of information in order to help decision makers with approval of final business case.

The case study was used from an ICT project, and data and the model were analysed against Cynefin Framework, business case framework and the categorised sources of uncertainty to interpret real-world in a case study.

The paper concludes the EAC model as an effective categorisation model for complex decision making and early planning for projects. “Fixing deep uncertainties or strong disagreements about societal values in interesting scenarios might help us inform debate and make sense of very complex issues” (Simon French, 2017, p. 1643). Further assessment of the model across different industries can result in generalisation of the EAC as a viable ad-hoc to the business case framework for planning purposes.

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Exploring Project Teams' Collaborative Behaviours in Hong Kong's Relational Contracting Projects

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Abstract

Relational Contracting in Hong Kong is used as a key approach for delivering successful outcomes. However, the reality of the practice differs significantly. Projects still face significant delays and cost overruns. In this, researchers suggest focussing on attitudes and behaviours of project teams, which would deliver better results.

This study aims to explore project teams' attitudes and collaborative behaviour in Hong Kong's relational contracting projects. A qualitative approach was employed to explore attitudes and behaviour using interviews guided by the theory of planned behaviour. Interview participants included ten mid-senior-level professionals with active involvement in Hong Kong relational contracting projects. Later, interview data was analysed using thematic analysis procedures.

Results suggest that to enable collaboration among project teams in Hong Kong relational contracting, project teams may develop relational attitudes by ensuring senior management commitment to the project and relational norms. Exhibit collaborative intentions for integrating project team, and promote collaborative behaviour through teamwork, affective trust and extra-role behaviour. Collaborative behaviour developed through the proposed framework in the study would smoothen relationships and improve the chances of project success.

Keywords: Collaboration; Relational Contracting; Relational attitudes; Relational behaviour.

Introduction

Complexity of construction projects is a major source of changes in the construction business process. This leads business to adopt more collaborative approaches in project governance.

Relational contracting (RC) as a collaborative approach in project governance is widely used in Hong Kong's construction industry. RC in Hong Kong was introduced by foreign contractors when they entered the market by setting up joint ventures with local counterparts. This approach was popular because of the expertise of foreign contractors, and market awareness of local contractors played a crucial role in achieving a positive outcome. This paved strong footing for RC in Hong Kong construction industry. However, a positive outlook was short lived for the industry because many projects suffered delays and cost overruns. Researchers in this suggested focussing on a comprehensive approach to deal with issues. In this studies in Hong Kong and the UK argued for

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cultural change, teamwork and collaboration from project teams (McKinsey & Company, 2016; Latham, 1994).

RC literature emphasises on two main directions for improving collaboration among project teams. First focuses on “hard elements” for improving collaboration and later on “soft elements”. Both these directions contribute to successful RC (Bygballe et al., 2015). “Soft elements” however, are considered more beneficial because these provide a rational purpose to “formal elements” (e.g. Pinto et al., 2009, Kadefors, 2004). With this, scholars such as Bresnen and Marshall (2000) have suggested that research should focus on a theoretical perspective of social processes (exploring soft elements for collaboration) for understanding RC as a concept and how it may enable a collaborative project environment.

In a similar effort researchers in construction management highlight teamwork, trust, attitudes, team integration as most important features for developing a collaborative environment (e.g. Ling et al., 2013, Rahman and Kumaraswamy, 2012, Ng et al., 2002, Chan et al., 2003, Eriksson et al., 2009, Gadde and Dubois, 2010, Bresnen and Marshall, 2000, Eriksson et al., 2008). Thus, this study aims to explore project teams’ attitudes and behaviour for collaboration in Hong Kong’s relational contracting projects.

Theory of Reasoned Action/ Theory of Planned Behaviour

Theory of Reasoned Action/Theory of Planned Behaviour (TRA/TPB) suggests attitude help explain behaviour through the mediation of intentions (Ajzen, 1991). The theory suggests attitude is a ‘mental process assisting decision-making for potential or actual response’ (Ajzen & Fishbein, 1980). The relationship of constructs, in theory, was initially proposed in TRA. However, various changes in the framework are considered in TPB framework (Ajzen, 1991).

TPB explains behaviour through its three antecedents attitudes, subjective norms, and perceived behaviour control, and mediation of intentions (Ajzen, 1991). The framework is widely accepted in the quantitative exploration of health-related behaviours (e.g. Booth et al., 2015, Rich et al., 2015), and relational behaviours and partnering intentions (e.g. Cheng, 2016). This study adapted TPB for explaining the relationship between attitude and behaviour through the mediating role of intentions. In this, two of the constructs of the theory were not considered in this study. Authors anticipated the role of delivery modalities to act in motivating and constraining behaviours. Delivery modalities such as new engineering contract, guaranteed maximum price, act as motivators of behaviours. Whereas, low bid contracts and lump sum tendering, as constraining factors. Thus, the spirit of discarded constructs is partly achievable through delivery modalities.

Research Methods

This study adopted a qualitative approach to explore the RC concepts borrowing constructs from TPB. A pool of ten project managerial staff were invited to participate in semi-structured interviews. Interview questions were guided by TPB to allow interviewees to share knowledge, experience, and opinions about the concepts. Table 1 presents profile of professionals interviewed for this study.

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Company	Code for interview participant	Position	Experience in the industry (in Years)	Experience in RC (in Years)
Contractor	PSI01	QA/QC manager	33	10
	PSI02	Project director	39	25+
	PSI06	Operations manager	25	7
	PSI07	Project manager	16	4
	PSI08	Project manager	17	8
	PSI09	Project manager	15	5
	PSI10	QA/QC manager	16	3
Sub-contractor	PSI04	Project control manager	17	6
Consultant	PSI03	Consultant advisor for relational contracting projects	40	20
	PSI05	Director- Team alignment and collaborative culture among teams	25	15

Table 1 Profile of interviewees

Data Analysis

This study adopted a thematic analysis for analysing data. Thematic analysis provides a rigorous approach for qualitative data analysis. It provides a fifteen step checklist to ensure reliable and trustworthy results of the analysis (Braun and Clarke, 2006).

First step of data analysis was to transcribe the data obtained through interviews. Initially transcribed data was highlighted based on initial thoughts, keywords, literature related terms, and essential aspects mentioned by interviewees.

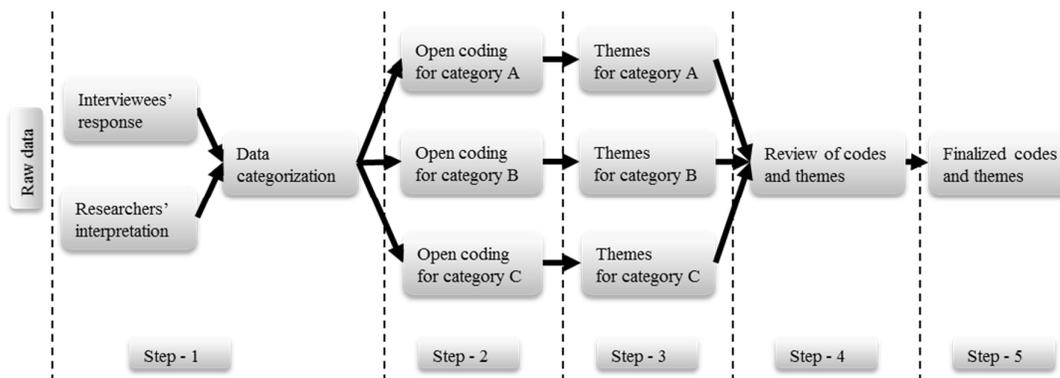


Figure 1 Research process adopted from Braun & Clark (2006)

The data was then organised based on theoretical categories suggested by TRA/TPB. In the next step of open coding, a nominated word/words assigned to the highlighted information. For ensuring correct coding (avoiding repetition or duplication across categories), a review was helpful. Open coding reflected a total of 138 codes representative of the recorded transcripts. In the next step of the analysis, three aspects were important. 1. "Internal consistency", 2. "Coherence", and 3.

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“Literature-suggested grouping” (Braun and Clarke, 2006). A total of 24 themes representing 138 codes were extracted by the end of the mentally challenging exercise. Themes and codes were further reviewed to have a manageable number of themes and codes for explaining a purposeful story. In this, five Doctor of Philosophy (PhD) students and three professionals were invited, as independent reviewers. Aim of involving independent reviewers was to ensure the reliability of results (Alhojailan, 2012; Miles & Huberman, 1994). In the final step of the analysis, all finalised themes and codes were considered for presenting analysis results.

Findings

Relational attitudes (RA)

Attitudes have been imperative to change work practices in construction projects. It has been argued that RC projects require an attitudinal change from project teams. According to Bresnen and Marshall (2000), embedded practices in projects are challenging to reverse. Changing those practices require involvement from all project partners. Thus, collaborative behaviours may have a profound impact once project teams have assumed new attitudes (Bresnen & Marshall, 2000). Results in this study suggest senior management commitment (SMC) and support as a critical attitudinal trait for shaping project direction. Besides SMC, a collective effort is argued for formations of normative practices. This collective effort is considered as relational norms of the team developed and shared within project teams (Suprpto, 2016).

Senior management commitment

Senior management commitment (SMC) drives collaborative mission and vision in a project (Cheng, 2016; Rahman & Kumaraswamy, 2012; Rowlinson et al., 2006; Rowlinson & Cheung, 2005; Suprpto et al., 2015b). Commitment and support from project seniors drive the collaboration and ensure effective implementation of RC (Rowlinson et al., 2006; Rowlinson & Cheung, 2005). Results in this study suggest SMC is essential for driving collaborative philosophy, providing resources and delegating authority [PSI02a-01]. Thus, it acts as an essential tool for achieving successful project outcomes. Rowlinson et al. (2006); Rowlinson and Cheung (2005) pointed out the role of senior management as a leader in sharing “project beneficial opinions, plans and behaviour”. It applies to leadership roles in mentoring and being open to engage in discussions with the team members [PSI04a-08]. Senior management needs to value relationships over commercial gains. One of the respondents mentioned:

“I have seen excellent managers; they open up and say this is our fault and may cost your team. ... Due to the partnership, they value the relationship more than monetary gain.” [PSI03a-08]

This culture is not common in the construction industry. However, if senior management changes attitudes from self-centric to project-centric, it may help to develop a flexible environment in the project.

Relational norms

Mutually developed and shared norms of the team (Poppo & Zenger, 2002; Suprpto et al., 2015a). These norms include ‘no-blame’, ‘fair treatment’, ‘best for the project’. Relational norms establish a foundation for future behaviours of project teams in a relationship.

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In this, no-blame culture is considered as a driver of collaboration in projects, which is the willingness of teams to accept/welcome responsibility for problems as they occur (Lloyd-walker et al., 2014). No-blame culture enables project teams to discuss problems openly and strive for solutions without fear (Rowlinson et al., 2006). The no-blame culture encourages early problem identification and reporting [PSI02a-09a], what Lloyd-walker et al. (2014) termed as facilitating mechanisms for a no-blame culture [PSI04a-02]. No blame culture will also encourage project teams to act by fair rules of the game.

Fair treatment is identified as a relational norm in this study. Moorman (1991) reported that people with fair treatment contribute more towards their teams and improve resolution for their teamwork. People treated with prejudice show a lack of trust, loyalty and motivation (Kadefors, 2005). One of the interviewees mentioned that the whole point of RC is to collaborate. 'If you do not treat partner fairly, how can you expect others to be fair and collaborate? Thus, fair treatment would initiate constructive interactions among teams and eventually allow the trust to evolve and emerge — fair treatment within a project setting shapes the assessment of fairness in a project [PSI03a-09, PSI08a-03]. It has been argued that RC projects require best for the project approach. It is witnessed that projects employing best for project approach in RC are more successful [PSI03a-03], due to the linkages between commercial interests and project outcomes (Sakal, 2005).

Collaborative Intentions (I)

Collaborative intentions are the decisions a team endures with the partner team. Team integration reflects these decisions of the project team. Active involvement in team integration activities informs positive intentions. If the project team seek to collaborate, it encompasses team integration activities (Lawrence & Lorsch, 1967; Ronken & Lawrence, 1952). Team integration provides practices and methods that promote a flexible environment for collaboration, where information and knowledge are exchanged freely among the members of teams (Baiden & Price, 2011; Baiden et al., 2006). It is achievable by developing an integrated project team, goal setting and alignment, and regular team building activities (Bosch-Rekvelde et al., 2011).

A delay in team integration is often due to the emphasis on completing the project. Partners realise the effectiveness of team integration once problems are escalated. This is why team integration workshops and exercises (e.g. partnering workshops) are recommended at the start of the project [PSI05I-11, PSI04I-08, and PSI05I-05]. Team-building activities enable trust among the individual members and trust in the project (Kadefors, 2004). This is done through informal gatherings to enable members to feel they are a part of the team (Lahdenperä, 2012), encouraging communication and coaching them to avoid bad behaviours and how to develop an integrated project team [PSI04I-07]. Bosch-Rekvelde et al. (2011) suggested that integrated project teams result in the constant flow of information regarding “design adjustments”, “scope changes” and, eventually, improved efficiency. An integrated project team refers to a team whose members are organised based on the objectives of the project; they work beyond the boundaries and identities of their parent organisation (Baiden & Price, 2011; Izam Ibrahim et al., 2013; Mollaoglu-Korkmaz et al., 2011; Moore & Dainty, 1999). Bosch-Rekvelde et al. (2011), reporting the results of their study, pointed out that a project suffers interface problems resulting in difficulties with aligning goals, but an integrated project team could have managed issues of objective alignment among the teams effectively. Thus, it is necessary for the teams to sit down together, finalise objectives and align their objectives with the project objectives (Bromley et al., 2003; Forgues & Koskela, 2009). Results in this

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study suggest that teams with aligned objectives can focus on a single direction [PSI07I-02] and thus ensures better teamwork (Love et al., 1998), and sustainable relationships [PSI05I-03].

Collaborative behaviour (RB)

Collaborative behaviour is the most commonly used term in RC literature. However, there are alternative explanations of collaborative behaviour. This study defines collaborative behaviour into three dimensions: (1) Teamwork, (2) Trust, and (3) Extra-role behaviour. A team is said to be espousing collaborative behaviour, when it exercises teamwork behaviours, have emotional attachments to one another, and members of each team voluntarily strive for excellence of the team.

Teamwork (RB1)

Teamwork is an essential contributor to enhanced performance in an inter-organisational setting (Baker et al., 2006; Salas et al., 1992). Because it is dependent on the intensity of the interactions among partners (Hoegl & Gemuenden, 2001). Teamwork is defined as shared knowledge and skills to facilitate collaboration (Baker et al., 2006; Cannon-Bowers et al., 1995; Salas et al., 1995). It has been argued that chaotic situations can be well managed using better teamwork and task work due to high uncertainty and equivocality (Morgan et al., 1986). Similarly, teamwork is essential for construction projects due to the high uncertainty and equivocality (Rowlinson & Cheung, 2004; Walker & Lloyd-Walker, 2015) to reflect 'beliefs' and 'intentions' for the shared goals (Cohen & Levesque, 1991). In these situations, open communication paves a way forward to reduce uncertainty and equivocality by accurate information sharing [PSI02b-06, PSI07b-03-a, PSI04b-02].

Besides communication between project partners, it is necessary that the capabilities of the partners match needs. This situation is particularly common in construction projects, where people with varied background, experience and personalities undertake a responsibility. Thus, project leadership has the responsibility to appoint the best-suited person for the job [PSI03b-02] or re-assign/remove non-aligned members [PSI03b-04]. Because non-aligned/misaligned members would not extend support to others, which is essential in cross-functional teams [PSI07b-01]. As mentioned 'mutual support' and 'encouragement' are essential characteristics of cooperation (Phua, 2004; Phua & Rowlinson, 2004), on the contrary, a low focus on "capabilities-task matching" would result in the selection of unwarranted employees [PSI09b-02].

Affective trust (RB2)

Trust improves project team's ability to collaborate (Zineldin & Jonsson, 2000). Trust has been viewed as social interactions among project teams (Dyer & Singh, 1998; Larson, 1992; Ring & Van de Ven, 1992; Uzzi, 1997). It is developed through "successful repeated interactions" among partners for promoting good relationships. Trust plays an essential role in the multidisciplinary and inter-organisational teams (Zolin et al., 2002). A higher level of trust encourages partners to assume more risk, thereby reducing the relationship between 'assets- specificity' and 'contractual complexity' (Mellewigt et al., 2007). Trust in integrated project delivery (a form of RC) is considered a determining factor for successful outcomes (Pishdad-Bozorgi 2012). Results in this study suggest trust as the most central feature in collaborative relationships [see PSI05b-04, PSI09b-02, and PSI04b-03]. It has been argued that affective trust is central in determining a "team's satisfaction with relationships and project success (Pinto et al. 2009). Affective trust, which is considered as "shared beliefs of teams to willingly accept vulnerability based on the positive prospects of each

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other” (Rousseau et al., 1998). It enhances participants capability work collaboratively (Costa et al., 2018).

Extra-role behaviour (RB3)

Extra-role behaviour is defined as the “behaviour which benefits the organisation, which is discretionary, and goes beyond existing role expectations” (Vandyne et al., 1995). It validates individuals’ resolve for partnership (Tyler & Blader, 2000). Two of four dimensions of extra-role behaviour are empirically tested to improve team performance (Van Dyne & LePine, 1998). Helping as the first dimension of extra role behaviour is a cooperative behaviour of the individual in sustaining lasting relationships. Interviewees in this study reported without helping each other, the essence of collaboration will be lost [PSI07b-01]. Whereas, voice as the second dimension of extra role behaviour is a constructive challenge for improving the general environment (Van Dyne & LePine, 1998). In alignment with this explanation, this study pointed action learning [PSI02b-04]. Action learning, as the third dimension is about challenging routines and practices for improving processes. Action learning is not about drastic changes in the processes but minor and straightforward adjustments to produce better results.

Proposed Framework

Figure 2 presents a framework for explaining the collaborative behaviour of project teams in Hong Kong relational contracting projects. The framework presents three constructs and six dimensions to achieve collaborative behaviour. Project teams may develop relational attitudes for collaboration with: (1) SMC and (2) relational norms. Relational attitudes would provide a suitable foundation for the development of a trusting relationship among project teams. By playing a leadership role, senior management may delegate authority and mentor junior team members (Rowlinson et al., 2006; Rowlinson & Cheung, 2005). Whereas relational norms would enable project teams to adopt normative practices. Successful development of relational attitudes would strengthen the belief of the partner team to “act collaboratively”, “to integrate”, to be involved in “joint exercises”, and “focus on relationships”. Once teams have reflected collaborative intentions through the team integration process, project teams would be able to reflect it in teamwork behaviours such as “open and honest communication”, “mutual support”, and “development of team cohesion”. Franz et al. (2016), argued that “team integration” plays a vital role in improving “group cohesion” and “performance”. It has been reported that collaborative intentions have a positive impact on teamwork (Baker et al., 2006) and trust (Rousseau et al., 1998; Suprpto et al., 2015a). Collaborative intentions developed will strengthens team members’ willingness to involve in volunteer activities as they see other team members as self and act more collaboratively (Tajfel & Turner, 1979). Anvuur (2008) suggest attitudes and intentions facilitate extra-role behaviours for promoting cooperation. Whereas Thompson and Sanders (1998) maintained a collaboration stage as moving a step ahead of cooperation, which focuses on long-term sustainability. In this extra-role-behaviour of members plays a significant role. Team members adopt duties, which are not conventionally part of their job requirement.

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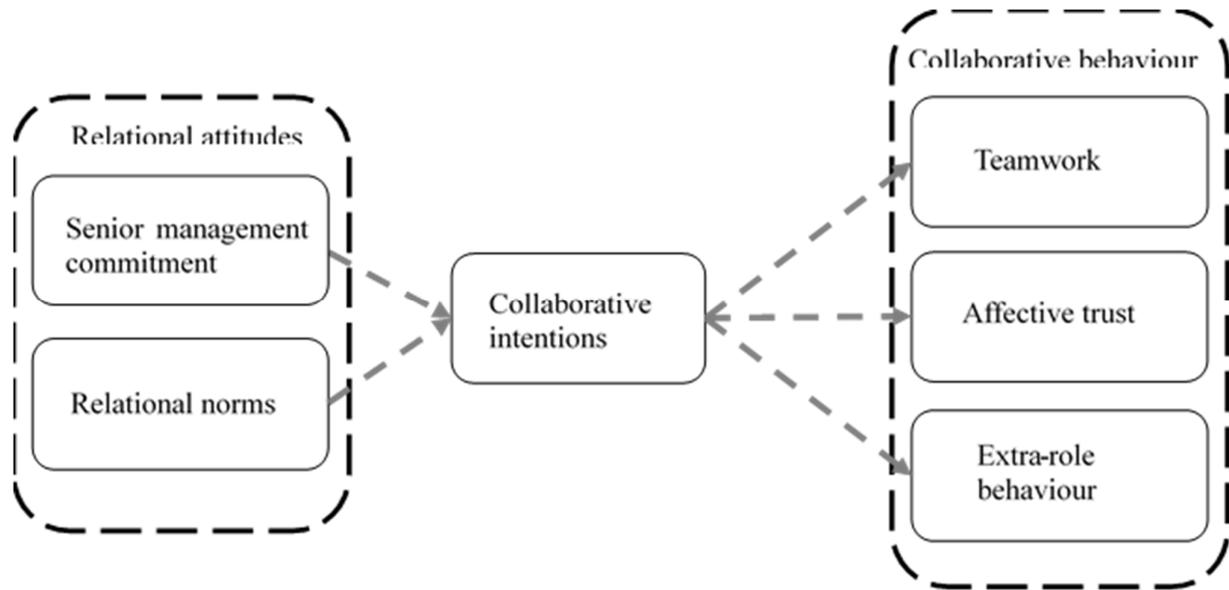


Figure 2 Framework for explaining the collaborative behaviour of project teams in RC (Memon, 2017)

Conclusion

The proposed framework helps to explain project teams' collaborative behaviour in relational contracting. Collaborative behaviour of project team developed through the proposed framework would enable them to espouse project focused behaviours. Project teams should cultivate relational behaviour to develop and sustain collaboration across the project lifecycle. By developing relational attitudes in terms of (1) commitment from senior management and (2) relational norms, i.e. co-developed by interacting teams in a relation, teams can show their intention to collaborate by integrating their team with the project team in terms of aligning objectives, initiating team-building exercises. Flexible environment will enable them to engage in teamwork. Continuous working interaction during the team integration process will allow trust in other teams and members of project teams will participate in voluntary exercises to support the system.

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For Boards and their 'Accidental Sponsors' 6 guiding questions to implement Policy, Strategy and create value through projects

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Abstract

In the management literature, it is well established that projects are undertaken to implement strategy but the evidence suggests there is a very large strategy to performance gap. A potential solution is the 6Q Governance™ framework is based on research that found for success there were just six key questions that needed to be addressed at different stages in a project lifecycle. These questions approach projects from the perspective of board members, their 'accidental' project sponsors, the business project manager and their project advisors. These questions can be thought of as the essence of project governance (that apply whatever governance structure is adopted). This paper addresses the '6 Questions', and suggests that 6Q Governance™ offers boards and their top management teams a way to govern their projects more actively, and based on the research, increase project success rates.

Introduction

In the management literature, it is well established that projects are undertaken to implement strategy [1]. However, when we pause, reflect and examine the success rates of strategy and projects, all the evidence suggests there is a very large strategy to performance gap [2]. Fewer than 10% of strategies are fully implemented [3], most large projects fail to live up to expectations [4] and between half to two thirds of projects either fail outright or deliver no discernible benefits [5]. This result appears to be no better in the public sector where hundreds of billions of dollars are invested annually in projects that contribute little to policy goals [6].

- For small businesses ineffective strategy contributes to the problem of 50% surviving no longer than 5 years and 64% surviving less than 10 years [7].
- Poor strategy in large businesses results in underperformance. Booz Allen Hamilton found in a five year study of under-performing US organisations [8] that 60% of the value destroyed was due to strategic errors, 27% to operational errors and 13% to compliance problems.
- In the public sector, strategy is a confused concept [9] and we often talk about policy instead. A study of the State of Victoria in Australia, normally considered an exemplar, found \$100B had been invested into projects over a 10 year period without any evidence any high level policy goals had improved [10]. A follow up study in the State of NSW also in Australia suggested that more generally, only one in five policy goals are positively impacted [6].

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There is a paradox in project management: Project management is a mature discipline but following the standard guidelines does not automatically lead to success. There is widespread confusion [11] between project management success (on-time on-budget) and project success (realisation of business benefits) and most project management books incorrectly imply that one will lead to another.

What most project management books overlook is that projects rarely succeed in realising their expected benefits without top management support [12], [13]. These books provide little to no guidance for top managers and as a result, top managers are often not sure how to govern their projects to succeed. A complicating factor is that top managers seldom consider projects to be a matter of direct concern [14].

However, it is neither practical nor desirable for top managers to be overly hands-on at the project level. The key is to get the right input at the right time through the project governance process. Boards and their delegates need to know how to 'steer' their projects to success [15]. This insight informed the development of an international standard ISO38500 and HB280: a Handbook for boards and their senior managers on how to govern ICT projects to succeed [15], [16]. The HB280 approach has been tested with an international dataset to prove it works [17], has been trademarked as the 6Q Governance™ framework to improve memorability and is in the process of being disseminated more widely as a book to be published by Wiley.

The 6Q Governance™ framework is based on research that found for success there were just six key questions that needed to be addressed at different stages in a project lifecycle. These questions approach projects from the perspective of board members, their 'accidental' project sponsors, the business project manager and their project advisors. These questions can be thought of as the essence of project governance (that apply whatever governance structure is adopted).

Literature

Project governance has received a lot of attention in the academic literature [18] since it first appeared around the year 2000 [19], [20]. However, the literature on project governance is not mature. Ahola et al.'s [18] literature review on project governance found only 19 key articles and they concluded there was a lack of consensus on what actually constituted project governance. More recently Musawir et al. [21, p. 1659] and Simard, Aubry and Laberge [22] updated the literature and came to the same conclusion "there is generally a lack of consensus on a single definition of project governance". As a result, there is a lack of agreement on what constitutes an effective project governance framework.

Currently there are project governance guidelines from project management organisations [23]–[28], the IT audit industry [29] and Standards organisations [30]. However, the awareness and adoption of these project governance guidelines in practice has been sporadic. Furthermore, there is hardly any theory explaining why project governance guidelines should work in practice. One problem is that there is no logic to most project governance guidelines to make them memorable enough for use and few have been tested to see if compliance leads to better results. The two exceptions to this are Joslin and Muller [31] and Young et al. [17]. Joslin and Muller test a project governance model derived from the UK's Association for Project Management [23] and report a small but significant correlation between project governance structure and project success [31]. However they did not specify in detail how project governance should be implemented in practice. In contrast

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Young et al. present a process model of project governance questions that logically relate to different times in the project lifecycle and they have tested these questions against an international dataset and found there is good correlation between these six questions and project success [17].

The remainder of this paper presents the governance framework developed and tested by Young et al. [17].

6 Guiding Questions

The six project governance questions can be used by a board, project sponsor or their advisors to make sense of any given number of projects in their organization and steer a project to success. These six questions were derived by rigorously looking at both successful and unsuccessful projects and asking what could a project sponsor have done to improve the business outcome. The questions are presented schematically in Figure 1 below and each question is elaborated in more detail in the text to follow.

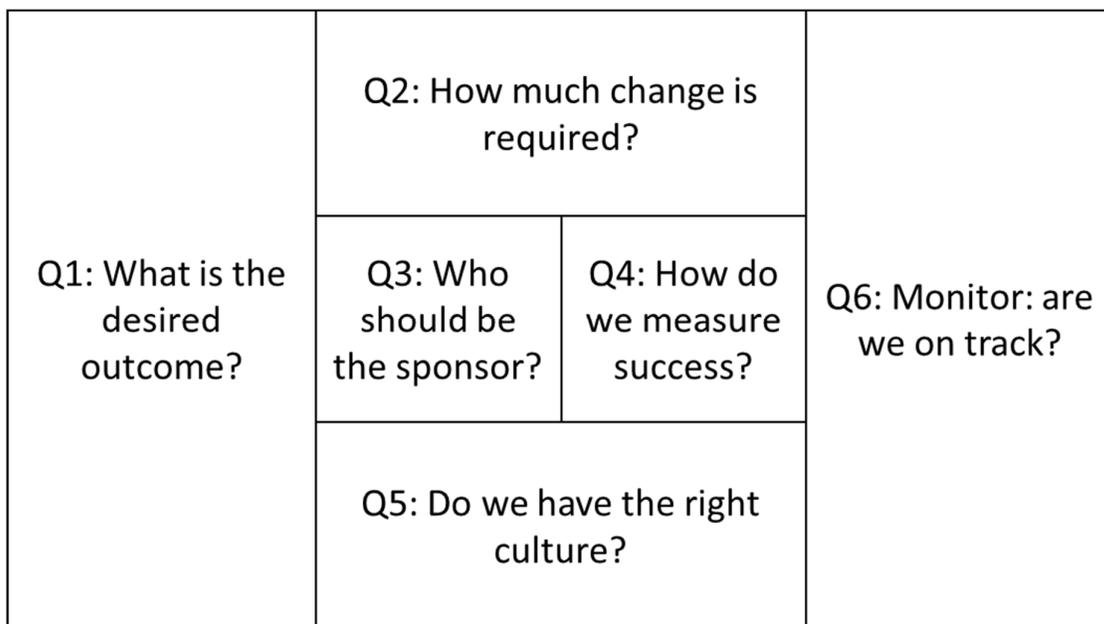


Figure 1: 6Q Governance™ questions

Q1. What is the desired outcome?

Effective project governance requires clarity on the desired outcome. The first 6Q Governance™ question (Q1) is to clarify the link between business outcomes, benefits and strategy. Research suggests that projects are funded without a business case 33% of the time [32]. In addition to this, 27% of the time project sponsors admit that they exaggerate the benefits in order to get funding [33]. The implication is that at best, only 40% of projects have any clarity on the desired business outcome. The problem is that the business case is commonly treated as a hurdle to be jumped rather than as the first opportunity to seriously evaluate where effort should be directed. It is up to the board and the top management team to call out such behaviour and impose more rigorous discipline to investment decisions.

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Q2. How much change is required?

The second 6Q Governance™ question (Q2) is to make an assessment on how much behavioural change is required to realise to desired benefits. The first 6Q Governance™ question (Q1), is to seek clarity on what benefit is being targeted. The second 6Q Governance™ question (Q2), is to evaluate whether the benefit can be realised or not. Recall that half to two thirds of projects either fail outright or deliver no discernible benefits [5] hence, the biggest risk of any project is that the benefits will not be realised and the strategy/policy not be implemented effectively. It is the responsibility of those charged with the governance of the project to focus on this overarching risk because those at the project management level need to focus on the on-time on-budget delivery of an output which is not the same thing as the realisation of benefits.

The particular insight of Q2, is to recognise that benefits are generally achieved through organisational and behavioural change. It is relatively easier to deliver a new output e.g. software, road, bridge. It is much harder to get people to change to use the output in a way that the desired benefits are realised. It is a common error to define a project too narrowly around the delivery of an output and forget about the need to promote behaviour change. KPMG conducted a study and found that change is considered only 40% of the time [34]. This is not appropriate. If it is going to be too difficult to get people to change their behaviour, then there will be times that it is better to defer or even not to start a project.

Q3. Who should be the Sponsor?

The third 6Q Governance™ question (Q3), is to ensure we have the right sponsor for the project. The sponsor is important because projects depend on behavioural change for success. The right project sponsor must be personally committed to pushing through the necessary changes and will have the authority to influence the key stakeholders.

Assessing the commitment of the sponsor is necessarily very subjective. The sponsor will generally appear very enthusiastic and committed at the time a project is presented for funding. The board, or its delegates, need to assess whether the sponsor is lying or deceiving himself/herself. Imagine for example it were possible to put a very large dipstick into the sponsor and then pull it out to find out how much BS had been presented. If the sponsor passes this subjective test, the project can proceed, but if it does not then it is likely the project will suffer from a lack of top management support and eventually fail.

A project should not proceed until the right sponsor has been found. The right sponsor will personally intercede to resolve issues as they arise and use his/her own political capital to influence the key stakeholders to make the necessary changes for the desired benefits to be realised. The larger the scale of change required (Q2), the more influential and committed the sponsor needs to be.

Q4. How do we measure success?

The fourth 6Q Governance™ question (Q4), is to determine how success will be measured. It is important to do this before a project commences because a powerful project sponsor will instinctively change the success measure to match whatever is achieved. It is important to have a success measure in place that will alert the board if a project turns out to be unlikely to achieve the

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desired benefits. The success measure that is chosen should motivate both the sponsor and key stakeholders.

Sometimes it will be possible to address Q3 and Q4 at the same time. For example it might be possible to gauge sponsor commitment by asking if s/he is willing to link his/her annual bonus to the successful realisation of the desired benefits. This is a common technique in the financial sector because here money is a strong motivator. In the public sector a different approach may be required. For example, a status incentive might be offered such as a knighthood if someone can pull something off.

Q5. Do we have the right culture?

The fifth 6Q Governance™ question (Q5), is to ask whether there is the right culture to ensure all the relevant information is being reported. The insight underpinning this question is that all projects operate with varying degrees of uncertainty and success is dependant on the teams ability to adapt and change plans to respond to emergent issues arising in the project [35]. Therefore there needs to be a culture where all stakeholders feel free to raise issues as they emerge when they sense the benefits may be affected. The culture is shaped by the response of the sponsor and project manager to potentially bad news. If unexpected information is welcomed and explored staff will continue to raise issues as they arise. If the culture is not right, information will not be as freely volunteered. Another way to express Q5 is 'are we getting all the relevant information?'

Q6. Monitor: are we on track?

The sixth 6Q Governance™ question (Q6), is related to Q1 and Q4: are we on track to realising the benefits? The literature suggests only 13% of the time are projects tracked through to benefits realisation [34]. Similarly, in a preliminary survey conducted for this research none of the board members interviewed have stated they have an effective process to cancel failing projects. Q6 should be asked everytime the steering committee meets and there has to be the willingness to intercede to change the scope or cancel a project.

When during the project do you ask the 6Q Governance™ questions?

Young et al. [17] analysed whether the six project governance questions correlated with project success. They also asked when in the project lifecycle the 6Q Governance™ questions most correlated with success (initial, early, middle or late stage of a project). Their results are reproduced in Table 1 and discussed below. The key detail in Table 1 is the number of asterisks in each cell which indicate how strong the correlation is with project success:

- *** denotes significance at a 1 percent level,
- ** denotes significant at 5 percent level, and
- * denotes significance at 10 percent level.

The numbers in Table 1 are correlation coefficients and they give an indication of the strength of the relationship with project success; however, they will not be discussed in this paper.

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Governance Question	Stage of project				Total
	Initial	Early	Middle	Late	
Q1 Vision	0.275*			0.207**	
Q2 Change	0.285*	0.451**	0.311*		0.371***
Q3 Sponsor	0.333**				
Q4 Success Measure				0.264*	
Q5 Culture					0.522***
Q6 Monitor			0.671***	0.507***	

Table 1: Correlation coefficients of Project Governance constructs against project success

Initial stage of a project

Q1, Q2 and Q3 were found to be the most significant project governance mechanisms at the initial stage of the project. The implication is that it is important to appoint a sponsor that will drive organisational understanding to the point of agreement with a vision and gaining acceptance of the need for change. Note that 'agreement with the project vision' is more important than 'understanding the project vision' a finding quite different to that advocated by the project management and change management literatures [36]. This is an important finding because it contrasts with the existing literature which emphasises project methodologies and tools rather than trust and competence of leaders at all levels. Project success in the initial stage requires sense-making in an organisation rather than project planning or communicating of the vision (for understanding).

Initial-Early-Middle stages of a project

Q2 is an important project governance mechanism for success from the initial stage through to the middle stage of the project. Specific factors are managing change, trust in business unit leaders, and responding quickly to change issues. This research provides quite a clear picture that 'they are all change projects' and they need to be governed accordingly.

Middle-Late stages of a project

Q1, Q4, and Q6 are project governance mechanisms that correlate strongly with success in the middle-late stages of a project. It seems that as a project nears its completion it is important to measure and monitor progress against the vision of what is to be achieved. These control mechanisms are not only useful tools to curb potential opportunistic behaviour but also valuable mechanisms to keep stakeholders informed about the project and able to react to changes in a timely fashion.

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General mechanisms throughout the project lifecycle

Q2 change and Q5 culture were found to be important across the entire project lifecycle. Change has already been noted earlier and we repeat the finding that 'they are all change projects'. Culture however, was found to correlate quite significantly to success across the project lifecycle as a whole but not at any specific stage in the project lifecycle. We cannot draw any strong conclusions from this result but we venture an opinion that culture should be found to correlate with success in further research because uncertainty is inevitable with projects.

Conclusion

Boards approve around 40% of all projects [34] and the management of these large-scale expenditures is a fiduciary duty requiring careful oversight. However,

- 50-80% of the time projects do not deliver the expected benefits? [5]
- 29-46% of the time ICT projects are approved with either inadequate or no information? [39].

Nobel Laureate Daniel Kahneman reported statistics that suggest the problem is widespread with ¾ of mergers and acquisitions never paying off, most large capital projects failing to live up to expectations, the majority of efforts to enter new markets abandoned in a few years and 70% of new manufacturing plants closed in their first decade [4]. We believe it is only a matter of time before boards and their management teams are held to account for these lapses in corporate governance.

The research reported in this paper has implications for how the problem can be addressed. This research suggests that following the 6Q Governance™ framework should increase project success rates. This research suggests a focus on change management to ensure realisation of business benefits. In contrast, the conventional project management wisdom focusses on methodology, user involvement, top management support, high level planning and competent project teams [37], [38] and we suggest the conventional wisdom overemphasises mechanisms to manage time and cost considerations and under-emphasises the realisation of business benefits.

This research points to a project governance framework that is supported by evidence and addresses corporate governance concerns. We suggest 6Q Governance™ offers boards and their top management teams a way to govern their projects more actively and that they would be unwise to continue with the current practice which ranges from benign neglect to what Deloitte have called "tantamount to negligence" [39]. The key is for the governance team to use their time strategically and focus firstly on clarifying the benefits and then on managing organisational change to realise the benefits. There needs to be a recognition that projects deal with varying degrees of uncertainty and effective governance needs to monitor and respond to emergent events.

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