Submission No 17

PROCUREMENT OF GOVERNMENT INFRASTRUCTURE PROJECTS

Organisation: Agilience

Name: Mr Malcolm Dunn

Position: Founder

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Agilience

"The heart & science of agility"

Changing the game

Submission to Inquiry into the NSW Parliament Legislative Assembly
Inquiry into procurement of government infrastructure
February 2016

Introduction

Thank you for the opportunity to provide some insights that may be useful for your inquiry process.

We have provided some ideas based on recent megaproject research we conducted in Australia together with emerging insights from the joint Infrastructure New South Wales/ Australian Constructors Association working group process that we are currently facilitating.

There has been significant research completed on global best practices and this library is available to you on request. Notably the recent work prepared by UK HM Treasury and Infrastructure UK has started to bring together the next generation of solutions.

Framing of response

Please note that, based on this research, we have the view that there is a much bigger set of systemic changes beyond the procurement aspect of these large infrastructure projects. We have tried to provide a flavour of the overall approach while recognising your terms of reference. Based on this you may be able to make recommendations on both short term debottlenecking/fixes while also recognising the more strategic changes in the procurement and contracting models that would enable a more productive project eco-system and thereby the achievement ofteh desired business, community and poltical outcomes.

This submission takes the form of identifying some key observations from the research and subsequent working group process supported by the data and emerging findings from the group.

The insights were formed in partnership with a number of Government, Corporate and Educational institutions

Key insights

1. **Research findings:** From the recent research on Australian and Global projects we have seen a high failure rate of complex infrastructure projects (Australia > 50 %, Global > 85 %) in terms of budget and schedule. The achievement of their economic and social business cases was even more dismal (< 1 in 1,000 at a global level). The research looked at the key differences between successful and challenged projects in an attempt to understand the root cause of future success.

2. **Changing the Game:** We recognised there were a number of changes required for the next generation of infrastructure projects (social outcomes based not just engineering solutions). This required a total shift in mindset including a new view of what constituted the project eco-system. This in turn requires a set of holistic changes:
    i. Planning and business case development that engaged the diverse stakeholders involved in the project and operational delivery of the new services
    ii. An adaptive procurement process and business model that recognised the dynamic nature of the social and political environment and incentivised all partners to achieve a shared view of success over a 5 year project life and 20 year operational lifecycle.
    iii. A new form of distributed leadership that allowed empowered decision taking
    iv. A project culture across many delivery partners that was solutions focussed

Procurement is a critical inflection/pressure point in this process!

Upstream setting up for failure: We have an environment where there is a complex changing set of requirements for the services provided by the infrastructure. These have often been translated into an aspirational business case. The political, social and ego drivers are often ignored in an attempt to turn this into rational economics. It is often just not possible to provide reliable upfront forecasts of a 5 year project followed by a 20 year operational lifecycle (infrastructure, services, community impact). We then hide this inability to forecast the unknown in contingencies or an attempt at risk transfer in some form. We may try a create greater certainty from an engineering perspective through early works, but these often impact the ability to deliver truly innovative solutions based on community impact rather than sequential engineering logic.

Procurement and business model selection: The current procurement models of attempted transfer of risk and the fantasy of certainty create significant downstream issues. They are viewed as unilateral in nature and often take advantage of the prevailing competitive economic environment to create the winners curse. This may also be the case in the operational PPPs as future volume projections (Traffic, customer demand, patients) prove unreliable. There are a number of well understood issues here that need to be resolved but within the context of the whole system changes required to address the upstream and downstream challenges.

Downstream project and operational impact: The current models often create a conflictual project climate which is low in trust. The contractors try to get as much as possible because of the need for low winning bids and then delivery agency becomes mired in management of contractual variation and quality issues. There is little alignment based on shared performance outcomes. The style of Project Management becomes autocratic and controlling to try and meet the stringent goals and this ends up stifling the innovative adaptive responses of the project team.

Emerging Insights

From the working group process and the Infrastructure UK Project Initiation Routemap Model we are starting to address the whole value chain which can then ensure there is a coherent sourcing model (including procurement).

Some of the key points are:

1. It is about people and relationships not slavish adherence to processes (how do we rebuild trust and mutuality of interest in achieving shared outcomes).
2. We need to better understand the complex and dynamic nature of the outcomes required from the infrastructure project. This will help us sense the environmental changes and reshape the delivery responses in an agile manner.
3. We need to better understand the capabilities required to deliver social outcomes projects that are enabled by infrastructure. This is beyond engineering and needs social and political intelligence.
4. The strategic sourcing models (procurement and service delivery) need to reflect these skills required through the value chain life cycle phases and look for partners based on ability to deliver economic, social and political outcomes not just based on the cost of inputs.
5. Taking the perspective that the project is in fact a temporary organisation helps us better align the many delivery partners under one banner. This requires a boundary spanning, distributed leadership model and also a learning environment that creates space for innovation. The project plans and budget should recognise this as it will improve the NPV of the future portfolio of projects rather than be seen as an overhead on this project.

Appendices

1. Research Highlights
2. Infrastructure UK Project Initiation Routemap
3. Infrastructure NSW/Australian Constructors Association working group summary findings and collaboration process
4. Reference list

Doomed to failure?

From an international perspective there is a high rate of mega-project failure, with less than 1 in 1,000 projects achieving their promised business cases

Current mega-project performance

Source	Evans & Peck	Flyvbjerg	IPA	Accenture *
# Projects	16	258	> 1000	31
% on budget	-	10%	-	17%
Overrun (% budget)	10-20%	26.7%	25%	-
Overrun Schedule	-10 - +10	90%	60%	< 20%
Achieve Business Case	-	5%	-	17%

* Accenture (2012), 'Achieving Superior Delivery of Capital Projects', Global survey of the metals and mining industries

* Accenture (2012), 'Developing Strategies for the Effective Delivery of Capital projects', Global survey of the energy industry

Break Fix Model

"Generally mega-project planners and managers do not know how to deliver successful mega-projects and therefore they tend to break sooner or later. The fix often takes place at great and unexpected cost to stakeholders. The cure is to get projects right from the outset through proper front end management".

Faulty decision-making

"With the consistent errors and biases of forecasts that form the basis for business cases, cost benefit analysis and social and environmental impact assessments, such analysis will with a high degree of certainty be misleading".

There is a big prize at stake

The Australian projects performance gap identified by the research is significant and presents a valuable prize

Australian Mega-projects Survey Results

This study	Total	Successful Projects Average	Challenged Projects Average	Overall Performance Gap ($M)	Private Sector Gap ($M)	Public Sector Gap ($M)
# Projects	44	23	21	-	21	23
Budget ($M)	43,809	1,074	910	-	-	-
Budget overrun ($M)	6,021	83	196	3,629	-	-
Budget overrun (%)	13.74%	8.4%	27.4%	19%	19.1%	20.2%
Schedule overrun (%)	-	(.3)%	20.3%	20.6%	27.9%	27.6%

This is the most comprehensive set of survey data on Australian mega-projects completed to date. The survey covered 44 mega-projects (> $1 billion each) worth nearly $44 billion

- The total budget overrun across the portfolio was $6 billion or 13.7%, with both successful and challenged projects having budget overruns. This is good by international standards.
- Schedule overruns ranged between 0 – 20%, which is fair by international standards.
- However, there was still a significant gap (> 20%) between successful and challenged projects from both budget and schedule perspectives.
- There was little difference between private and public sector performance from a budget or schedule point of view.
- Closing the gap from average challenged to average successful (19%) would save over $3.5 billion on this project portfolio. This would be even greater if we could shift to the best-practice level of performance.

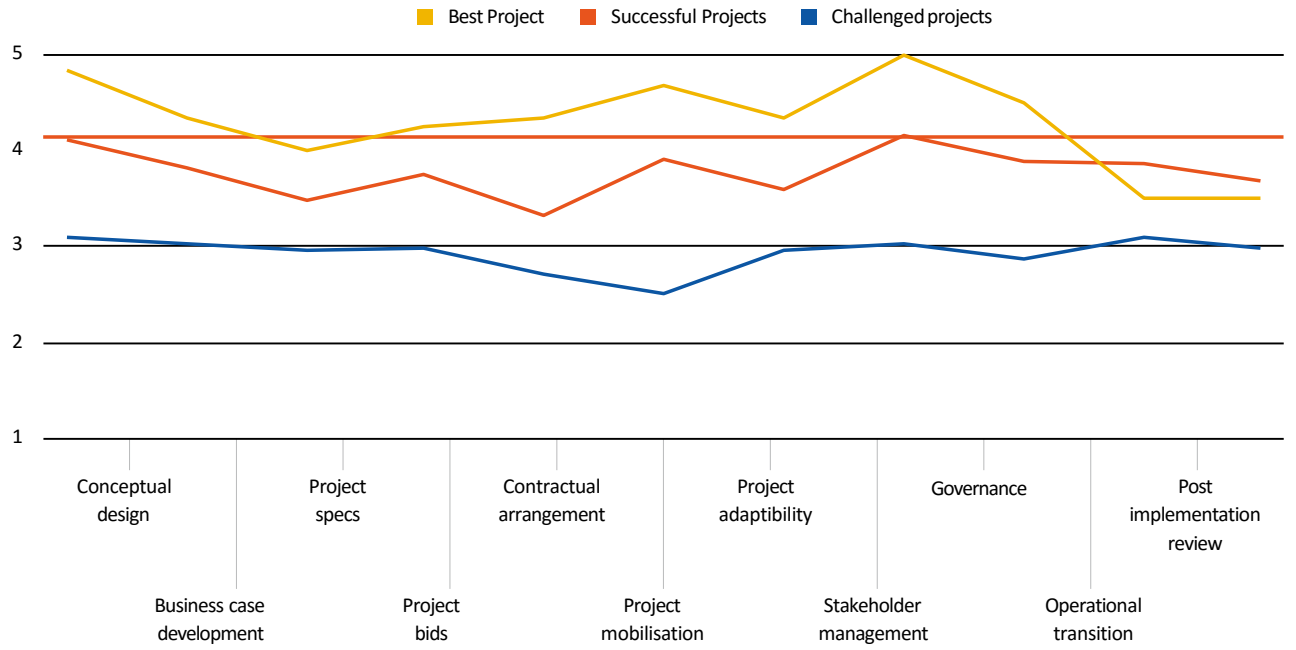
Understanding the root cause of future success

There was a significant difference in performance at all stages between successful and challenged projects

There were projects that were set up for success by the way those involved approached the early stages. Equally, the challenged projects started badly due to time pressures, inadequate stakeholder engagement, loosely specified requirements and aspirational businesses cases. Project managers then tended to compensate for this with risk-oriented contracts and overly strong project management and governance.

This chart records the average survey results by project stage for successful and challenged projects in comparison to the best project.

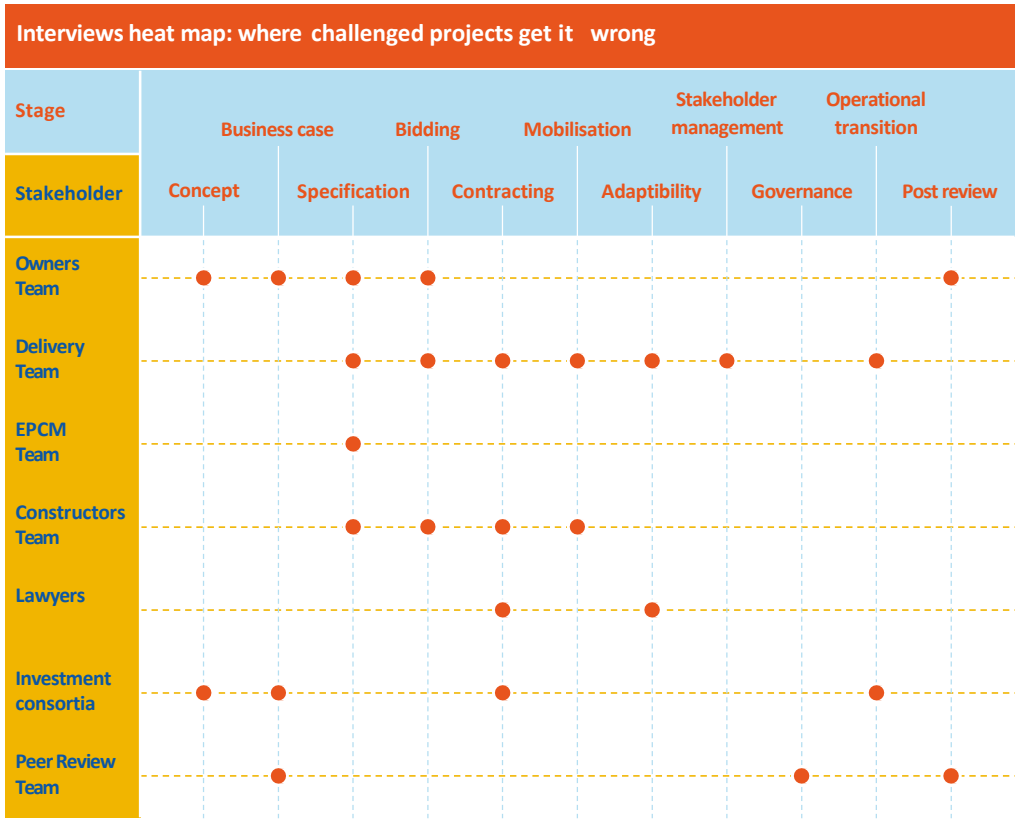
Project Stage Performance



There are diverse views of success

The research also identified a number of different risk hot spots for the various stakeholders on projects that are not necessarily aligned and can cause contention

Stakeholder hot buttons



Observations

1. Owners teams are subject to significant political pressure in both the private and public sectors. Long-term failure is discounted in favour of short-term drivers such as press announcements.

2. Delivery team are often handed a 'poisoned chalice' of an undeliverable project. They then try too hard to achieve an impossible outcome without having "stop" as an option.

3. EPCM Teams want to ensure there is a great design but potentially over-engineer for the desired economic outcome.

4. Consortium teams are looking primarily for expected financial outcomes. Bids are costly (> $15 million) and the cost of losing is high, which leads to underbidding and the 'winner's curse'.

5. Lawyers are seeking to protect their clients' interests (even against the group's). They often shape project culture through the contract model.

6. Delivery teams focus too much on the technological aspects of complex projects and negate the socio-political aspects in dealing with diverse unengaged stakeholders.

7. Peer reviews are regarded as annoying, rather than as sources of insight from experienced practitioners.

Adopting a fresh approach

From the research, we recognise that we need to start thinking about mega-projects from a different perspective

Key insights and implications

1. The nature of projects is changing

The nature of projects is changing to match changes in our society. Projects are becoming increasingly sophisticated and involve an ever-greater number of diverse stakeholders with different requirements, who need to be engaged to ensure a successful outcome. The failure to recognise this leads to poorly specified designs, continuous scope creep and major budget and schedule overruns.

2. Projects have become increasingly complex

Projects have become increasingly complex and are exposed to many more human variables and environmental and political uncertainties; they are no longer just engineering projects. We need to change our approaches to recognise these factors and be able to more rapidly adapt to emergent knowledge or external changes. Our new business models and governance processes need to be able to flex to allow change while still ensuring transparency, accountability and safety. We need a new form of more inclusive and pervasive agile project leadership.

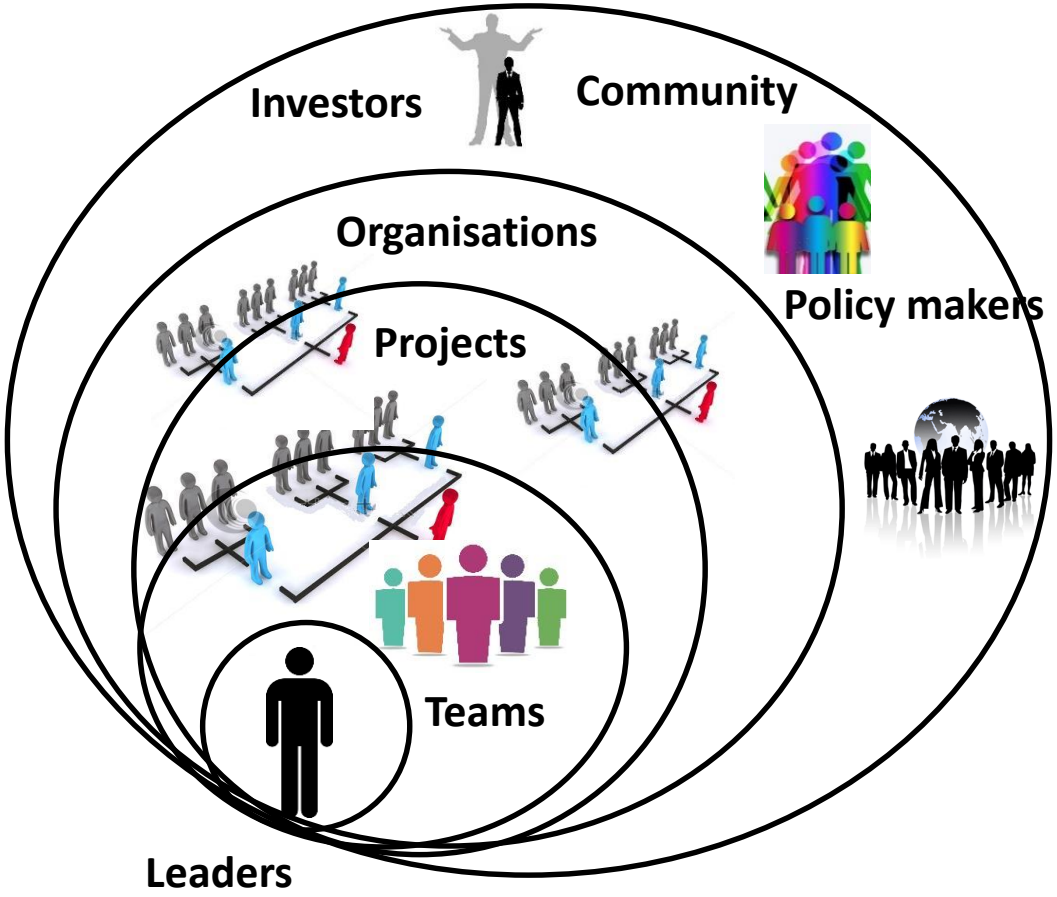
3. Changing mindset and models

Changing mindset and models are required for these new age mega-projects. The engineering mindset is critical but not sufficient. We need not only to broaden the inclusion of other stakeholders' perspectives, but also to build a new culture of collaboration across corporate and political boundaries.

4. Next generation distributed and pervasive leadership

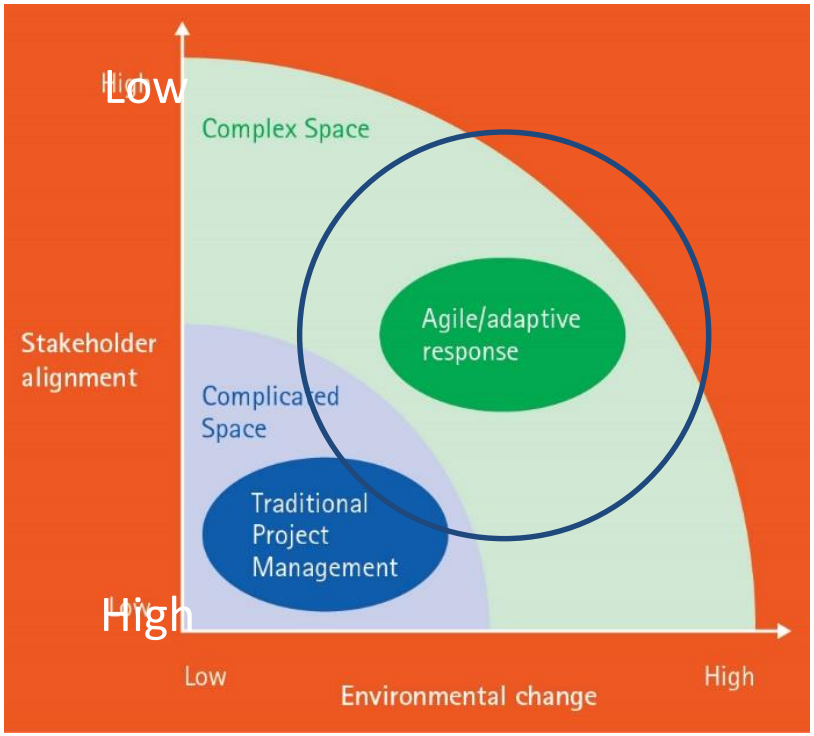
Next generation distributed and pervasive leadership is required that enables flexible decision-making at the distributed point of need.

Complex Mega-project eco-system



"we need to adopt an outside in perspective"

Complex mega-projects are not just scaled up large projects



"Traditional project management approaches, tools and techniques are inadequate for managing the increasing complexity and ambiguity in our rapidly changing business environment"

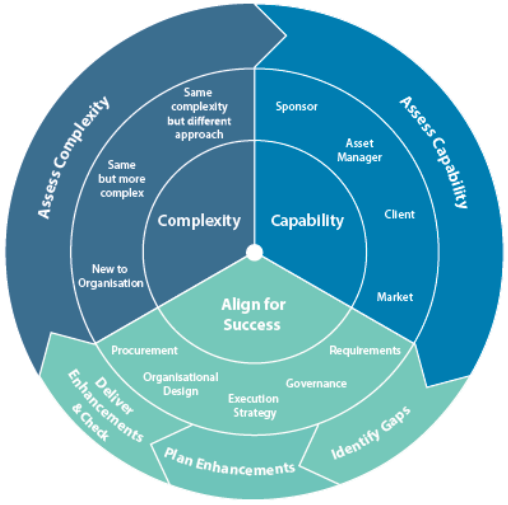
CPM Task Force Report

"Humans are central to the creation of complexity, the people involved, the ways they communicate and the relationships they develop constitute the behaviour and combined culture of the organisation or project"

Complex Project Management Task Force Report.

Source: ACA Changing the Game Mega Projects in Australia (2015)

Infrastructure UK Project Initiation Routemap)



Complexity Assessment - the consideration of the challenges, complexity and risks to delivery of the project, policy or area of work.

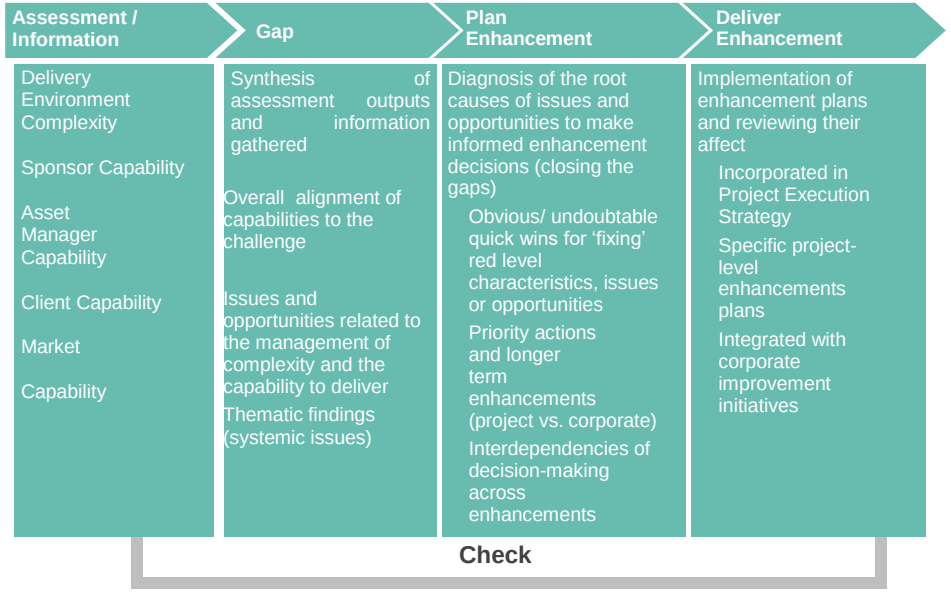
Capability Assessments

Sponsor - strengthens understanding of the requirements for the sponsor's capability during the investment and delivery planning process.

Asset manager - highlights key operational constraints and requirements to be considered.

Client - considers the ability of the client organisation to engage effectively with an appropriately selected supply chain, and to manage the delivery outcomes.

Market – reviews the market's ability and appetite to respond to the requirements.



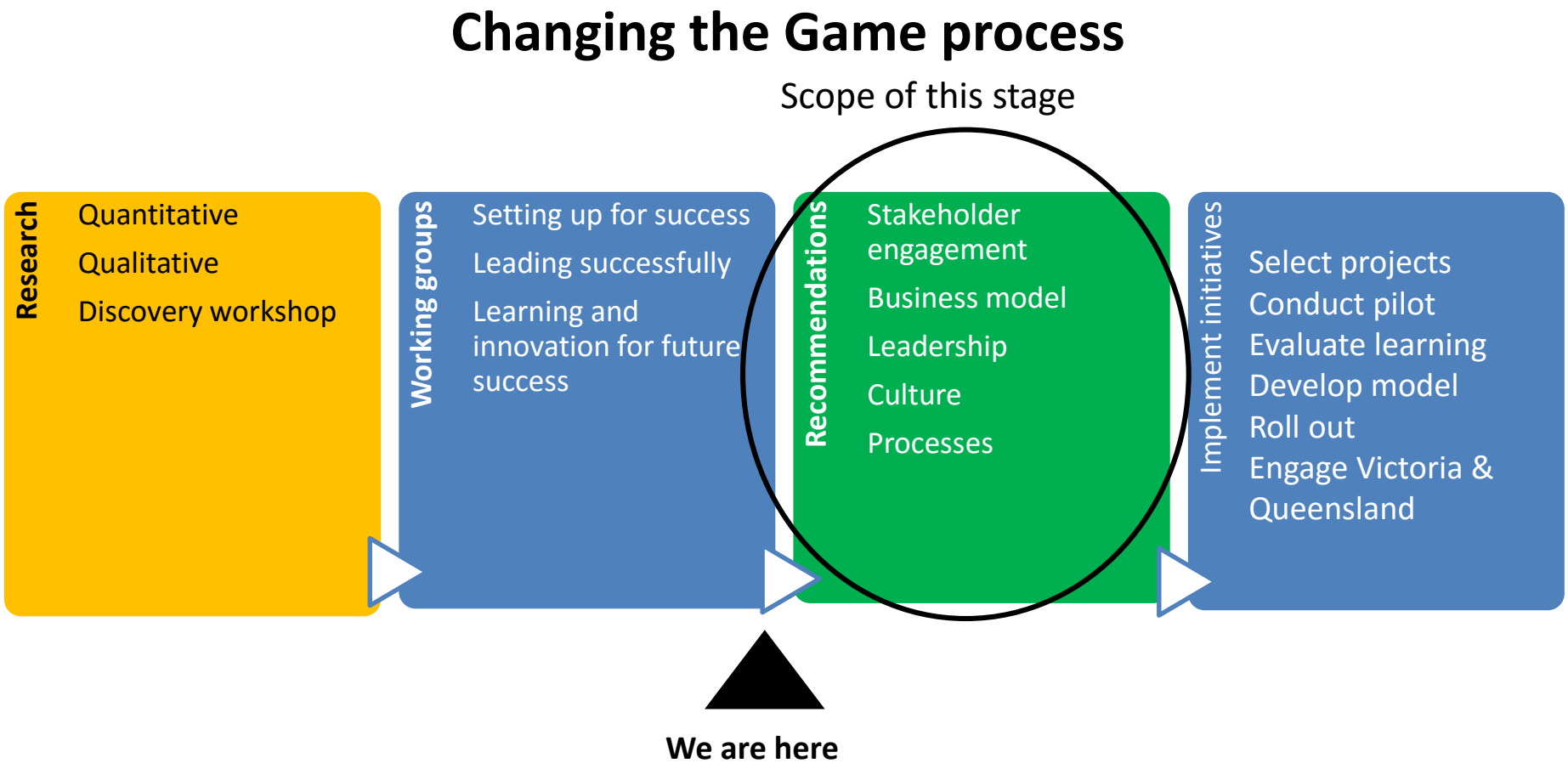
Align for Success modules

There are currently five Align for Success modules

- Requirements
- Governance
- Execution Strategy
- Organisational Design & Development

  Procurement.

Infrastructure NSW and Australian Constructors Association - working group process



These will then be implemented in an appropriate manner aimed at achieving the targeted benefits

Draft Recommendations Summary

Why?

We have a once in a generation opportunity in NSW and rest of Australia to design and deliver the infrastructure required to power our communities and economy for the future decades. Our resources are scarce and we need to ensure that we get the best value for our investment. This will mean changing the game from our current inefficient and bureaucratic risk averse processes to a model that builds on different mindsets, shared purpose, risk and reward enabled by collaboration across the boundaries of the project eco-systems.

What?

1. We need to change the relationship between Government and Industry to enable important discussions on how to optimise the delivery of next generation social/economic projects that are infrastructure enabled.
2. These are whole of purpose focused not just on the investment capex, and therefore need a greater long term perspective from bi-partisan parties, bureaucrats and the many providers of construction, maintenance and operations.
3. There needs to be a conscious institutional trusted mediator(s) who can pull the varieties of stakeholders together and start to shift mindsets and models.

How?

INSW/ACA can have the role of facilitating this process:

1. Developing a process of integrating vision and innovative community focused solutions
2. Selecting/developing a simple standard approach to assessing project complexity, capability and sourcing approaches across projects and industry boundaries (will simplify the process and reduce cost of procurement for all).
3. Changing the commercial models and processes to enable an outcomes focus and allow for emergent solutions.
4. Building a pipeline of next generation of Public and Private sector Project Leaders that can become integrators of services required to deliver complex sustainable solutions.
5. Ensuring that there is a safe way to share and learn from successful and challenged projects across the organisational and sector boundaries (use of task forces).

Setting up for success - Insights and recommended action

Issue	Government Impact	Industry Impact	Recommended action	Key stakeholders/ Resources
Community: We need to better engage the community through the full service life cycle from concept to development and ongoing operations	• Need to develop a new model of eco-system engagement (including the silent majority) as process of educated consumer choice. • Recognise and manage the political leverage that marginal groups have through media relationships	• Industry needs to recognise the nature of social outcomes and not focus only on engineering success. • Support the real engagement of stakeholders and meeting their social needs.	• Leverage social media for greater engagement and education of communities • Align capex to consumer outcomes and develop a balanced score card that measures social, economic and project success. • Adopt bi-partisan approaches to long term projects to minimise disruptive media.	Urban Growth INSW HI TfNSW RMS NSW Treasury Social service PPs
Integrity: Build greater integrity in the business case process to allow investors to participate fully and at lower risk for all	• Greater recognition of the nature of complex dynamic projects that cannot be estimated accurately up front and the inability to effectively pass this risk to the developer/operators. • Selection of appropriate business model that allows shared risk/reward.	• Need to collaborate in this process through greater willingness to share knowledge, seek mutual benefits through the lifecycle. • Avoid low balling to win business (consequences for future projects).	• Develop new process/governance model that reflects the nature of the inherent complexity of the projects/solutions and capability of the available resources. • Develop a process of early partner selection to enable joint review of approaches and business cases. • Process of cross sector independent peer reviews to review/educate.	IUK model INSW
Trust: Change the nature of relationships between partners in the concept/design/deliver/ operate process.	Requires a shift in culture to a sense of a joint (Government/Industry) team prosecuting a shared purpose with collective responsibility for outcomes.	Industry needs to recognise the inherent tension between shareholder and social returns and seek longer term triple bottom line outcomes.	• Develop joint task forces with bilateral charter to develop shared outcomes • Cross seed through secondments/rotations • Joint leadership development programs (temporary organisition) • Set up projects for success through choice of business model, team and performance expectations.	INSW ACA John Grill Centre

Leading successfully - Insights and recommended action

Issue	Government Impact	Industry Impact	Recommended action	Key stakeholders
Culture: The culture and leadership agenda flows from the principle relationships, project structure and nature of the procurement model.	• Improved integration between the many Government agencies and Industry organisations involved in the delivery of complex social projects. • Recognition of the impact of the procurement model on shaping downstream behaviours (not just commercial outcomes).	• Improved alignment of consortia partners with each other and Government agencies. • Early engagement allows for greater opportunity in shaping the business model and project culture.	• Build the relationships at the concept stage and recognise the role in shaping and effective project and operational culture. • Will require different approach to procurement while maintaining competitive tension. Consider the range of current and new business models that focus on shared outcomes, shared reward and risk for project components and stages.	• Industry partners • INSW • Delivery agencies • NSW Treasury
Time: Leaders across the project eco-system need more time to build the team (temporary organisation) and allow a culture of collaboration to emerge.	• Recognition of the extended team formation aspect of mobilisation. • Taking time to set up a shared project identity with respect for success measures of multiple parties.	• Recognition of the extended team formation aspect of mobilisation • Taking time to set up a shared project identity with respect for success measures of multiple parties	• Develop a resourcing model that considers the culture integration and behavioural fit as a critical part of the team selection process and has time for this to occur.	• INSW • NSW Treasury • ACA
Leadership Model: Complex community service projects enabled by infrastructure need a different form of distributed leadership focussed on different drivers of success at the project and operational level.	• Government to consider their role on this form of project/ operation. • Based on role as customer/delivery agent/initial owner/risk financer/ can then consider the models and capabilities required to contribute to a successful team.	• The industry needs to consider the vertical integration or partnerships required to deliver on the full community outcomes. • Develop set of commercial models that can factor in broader set of project and operational outcomes • Develop a new set of project Leaders and project leadership that allows for the right focus in adaptive way.	• Jointly develop an integrated capability and governance model for next generation projects that can factor in the alignment of diverse stakeholders with different views of success while focus on community, political and economic outcomes. • Run whole of eco-system leadership development programs	• INSW • HI • TfNSW • RMS • ACA

Learning and innovation for future success - Insights and recommended action

Issue	Government Impact	Industry Impact	Recommended action	Key stakeholders
Learning culture: Need to prioritise and create a learning environment/culture in Government, Contractors and all project eco-system stakeholders	• Government to shift from customer to engagement partner of joint project experience • Change procurement/selection models to include these processes and practices	• Industry to adopt a broader perspective than engineering and their own commercial success. • Demonstrate willingness to share lessons and take proactive stance from a professional development perspective across corporate boundaries.	• Government and Industry to collaborate to create this shift before and during projects. • Set up cross project peer learning groups to encourage knowledge and expertise sharing • Develop consortia leadership programs for projects where all parties follow same developmental processes	INSW ACA John Grill Mega Project teams
Change management: We need to better understand the barriers and constraints to innovation and leverage past solutions	• Tension with the need for financial and risk certainty with short response timeframes • Nature of probity and arms length relationship in procurement process	• Shift internal culture to provide focus and time/resource budget upfront to create longer term value across projects and corporate boundaries. • Build in innovation Worksteps to bid process	• Change procurement process to enable early opportunity for innovation concepts to emerge • Ensure that there is benefit sharing and resource availability to incentivise continuous innovation during projects and operational stages	INSW Mega Project Teams ACA
Capture past experiences: (successful and challenged) and ensure that project teams have access to and can contribute to this environment in a safe and constructive manner.	• Ensure that there is a formal review process that includes matching to like projects • Change to culture from blame for failure to learning for the future	• Ensure that there is a formal review process that includes matching to like projects • Change to culture from blame for failure to learning for the future	• Set up multi-disciplinary PIR teams as action learning projects • Set up industry wide shared database of learning outcomes • Educate peer review teams and project teams to use and contribute to them	INSW ACA

References

Ashurst (2014), 'Scope for Improvement: Project pressure points'

Australian Constructors Association (2001), 'D&C projects: A Model Procurement Process'

Australian Government (2012), 'Infrastructure Planning and delivery: Best Practice Case Studies', Volumes 1 and 2

Australian Governnment (2011), 'National Alliance Contracting Guidelines'

Axelos (2014), 'Portfolio, Programme and Project Management Maturity Model (P3M3)'

Booz&Co, Infrastructure Partnerships Australia, 'Integrating Australia's Transport Systems'

Business Council of Australia (2012), 'Pipeline or Pipe Dream? Securing Australia's Investment Future'

Caravel (2013), 'A Review of Project Governance Effectiveness in Australia'

Dingwal J., Ross J., Evans M. (2015), 'Smart collaboration in risk-transfer ('hard money') contracts', PCI Group

Dispute Resolution Board, 'Avoiding conflict before it occurs'

Doz Y., Hamel G. (1998), 'Alliance Advantage: The Art of Creating Value Through Partnering', Harvard Business School Press

Edmondson A. (2012), 'Teaming: How Organizations Learn, Innovate and Compete', Harvard Business School

Flyvbjerg B. (2003), Megaprojects and Risk: An Anatomy of Ambition', Cambridge University Press

Flyvbjerg B., Garbuio M., Lovallo D. (2009), 'Delusion and Deception in Large Infrastructure Projects: Two models for Explaining and Preventing Executive Disaster', California Management Review

Flyvbjerg B., Garbuio M., Lovallo D. (2014), 'Better forecasting for large capital projects', McKinsey & Co

Flyvbjerg B. (2014), 'What You Should Know About Megaprojects and Why', Said Business School

GAPPS (2007), 'A Framework for Performance Based Competency Standards for Global Level 1 and 2 Project Managers'

Infrastructure NSW (2014), 'Contingency Management Guidebook. Guidelines for optimising capital investment funding'

Infrastructure NSW (2014), 'State Infrastructure Strategy Update'

Infrastructure Partnerships Australia, 'Performance of PPPs and Traditional Procurement in Australia'

International Centre for Complex Project Management (2011), 'Global Perspectives and the Strategic Agenda to 2025, The Task Force Report'

Lenfle S., Loch C. (2010), 'How Project Management Came to Emphasize Control Over Flexibility and Novelty', California Management Review

Merrow E. W. (2011), 'Industrial Megaprojects: Concepts, Strategies and Practices for Success', John Wiley & Sons, New Jersey

NSW Government (2014), 'Benefits Realisation Framework'

Transport for NSW (2014), Annual Report

Victorian Government (2006), 'Project Alliancing Practioners' Guide'

Improving Infrastructure Delivery: Project Initiation Routemap

Procurement Module

Version 1.1 October 2014

Any enquiries regarding this publication should be sent to us at
public.enquiries@hmtreasury.gov.uk

You can download this publication from:
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Infrastructure UK and the Infrastructure Client Group

Infrastructure is the backbone for the UK economy. It provides the networks and systems that supply and support reliable and cost effective transport, flood protection, energy, communications, water and waste management. These are vital to ensuring that the UK remains a competitive force in the global race.

The Government is committed to establishing a long-term sustainable plan for infrastructure investment. **Infrastructure UK (IUK)'s** Cost Review Report 2010 identified the opportunity to improve infrastructure delivery. It set a target to remove wastage and make efficiency savings of at least 15 per cent by 2015 across public and private sector infrastructure delivery. The Government's Construction 2025 strategy goes further, setting a target of lowering costs by 30 per cent and reducing time by 50 per cent.

The Government, through IUK, continues to work with industry to drive improved productivity and remove wastage in the delivery of infrastructure investment. These measures are providing better value for money for taxpayers and consumers. Across public and private sectors, these combined efforts are starting to yield success. However, there is no room for complacency. There is still much to be done to match the levels of efficiency and productivity seen in some other sectors.

The **Infrastructure Client Group** is demonstrating of the value of effective collaboration between government and industry to support the development and exchange of best practice and delivery improvement. Initially brought together by IUK to support the Infrastructure Cost Review work, the membership of this group is representative of the major infrastructure clients. It has been instrumental in setting a common agenda for change and supports a programme of activities and applied knowledge transfer across the public and private sectors. The success of this initiative has been made possible by the continued and valuable support from industry and academic partners.

Lord Deighton
Commercial Secretary to the Treasury

Simon Kirby
Chair of the Infrastructure Client Group

Preface

The UK has a proven capability in delivering successful projects and innovation, where the imperative and conditions for success have been properly prepared. The Olympics demonstrated the benefits of having a clear set of requirements and delivery imperatives in place at an early stage. However, there remain many examples of poorly executed projects across both public and private sectors.

The Infrastructure UK Cost Review Report 2010 and successive studies, including the National Audit Office's Guide to Initiating Successful Projects, have all identified the need for a greater focus on the early stages of projects to ensure that they are set up to succeed. Rigorous focus on establishing the right delivery environment and capability, matched to the complexity of the project, is vital to improving outcomes.

The **Project Initiation Routemap (Routemap)** is a product of government working collaboratively with industry and the University of Leeds, through the Infrastructure Client Group.

Built on lessons learned by both public and private sector, the Routemap provides a much-needed framework to help identify and address many common and recurring problems, particularly during the early stages of projects. It enables sponsors and those responsible for project delivery to properly align complexity with the necessary capabilities and other enhancements to ensure a more successful outcome. Pilot applications have demonstrated its value as a tool for testing and developing the components and connections required to create a successful delivery environment. It identifies the characteristics common to successful project delivery while recognising there is no 'one size fits all' solution.

This version of the Routemap replaces the consultation draft published in January 2013. It adds a suite of additional supporting modules that provide further support to address some of the most frequently occurring issues found during the initial pilot applications. Further Routemap resources and case studies can be obtained by following these links:

www.gov.uk/government/organisations/infrastructure-uk
www.ice.org.uk/topics/Industry-initiatives/About

October 2014
HM Treasury

Introduction: Align for Success - Procurement

The Project Initiation Routemap (Routemap) is an aid to strategic decision-making. It supports the alignment of the sponsor and client capability to meet the degree of challenge during initiation and delivery of a project*. It provides an objective and structured approach to project initiation founded on a set of assessment tools.

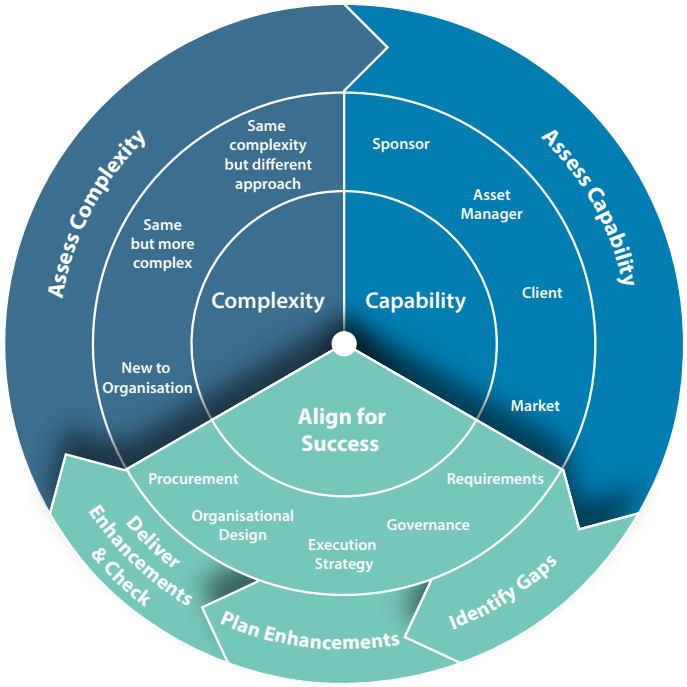
The assessment tools help determine:

- The context and complexity of the delivery environment;
- The current and required sponsor, client, asset manager and market capability;
- Key considerations to enhance capability where complexity-capability gaps are identified.

The Routemap provides further diagnostics on addressing common capability gaps that typically need to be enhanced, such as blurred governance structures, or lack of alignment between benefits and requirements. These areas are explored in more depth in a number of Align for Success modules.

The purpose of each Align for Success module is to help:

- Gain a greater understanding of the complexity-capability results;
- Identify and analyse options to better align complexity-capability;
- Plan for successful achievement of desired outcomes;
- Assure enhancement plans during implementation.



Application of the Procurement module helps the client engage with the market, determine optimum allocation of risk between the client organisation and the supply chain, package the work to be procured and identify the most appropriate procurement model.

*Throughout this guide the term project is used to mean both project or programme.

Tip:

This module should not be used in isolation. It is assumed you have already completed the Complexity - Capability Gap Analysis in the Project Initiation Routemap Handbook and have identified issues with Procurement.

● Primary module for help

◐ Related module for help

Typical findings relating to procurement

If the findings from your complexity-capability assessment identify any of the following issues (or similar ones) then this Align for Success module on **Procurement** may help. Use the **Considerations** tables that follow to diagnose enhancements that may be required.

Modules that help

Typical findings relating to procurement	Requirements	Governance	Execution Strategy	Organisation	Procurement
The accountability for risk does not match the organisation's capability or appetite to manage the risk.		●	◐	◐	◐
There is a fractious relationship between sponsor, client, asset manager and supply chain.		●	◐	◐	◐
Through the life of the project there is little provision for or anticipation of potential scope changes caused by changes to external factors.	◐	◐	●	◐	◐
A Client Model (e.g. alliancing) is being proposed that the client/supply chain organisations do not have previous experience of applying successfully, therefore may need capabilities they currently do not have.			◐	●	◐
Contract incentives appear to be misaligned to sponsor's requirements or Client Model, which may mean the supply chain performs contrary to expectations.	◐	◐	◐	◐	●
A procurement model is being proposed that the client/supply chain organisations do not have previous experience of applying successfully, therefore may need capabilities they currently do not have.			◐	◐	●
The client over-prescribes how work should be done and thus may miss out on innovation and value-add from the supply chain.			◐		●
The market appetite to support the project is unproven.			◐	◐	●
There is a lack of understanding of the extent of capability development required by the market to deliver the project.			◐		●
The current supply chain structure for the market is convoluted resulting in inefficiencies and failure to integrate.			◐		●

Why Procurement Matters

Procurement is a dynamic process that sources the best value solution to a requirement through the sustainable allocation of risk between a client organisation and its supply chain. Procurement exists to explore the market opportunities and to implement strategies that deliver the best possible outcome to the organisation, its stakeholders and its customers.

Procurement can be defined as:

"...the business management function that ensures identification, sourcing, access and management of the external resources that an organisation needs or may need to fulfil its strategic objectives".

The Chartered Institute of Purchase and Supply

Why is good procurement important?

Four of the Cabinet Office's Common causes of programme/project failure (2012) relate to how a project is set up to be delivered and two causes specifically relate to procurement:

- Lack of understanding of and contact with the supply industry at senior levels in the organisation;
- Lack of effective project team integration between clients, the supplier team and the supply chain.

In addition, the early adoption of the Routemap has identified the importance of aligning the procurement strategy with the specific requirements and objectives of the project as shown by the quotes below;

- "need to be able to explain why the relationship is strategically important to existing and future partners and suppliers";
- "ensure the approach to incentivisation and reward drives effective collaborative working to maximise productivity".

This is especially relevant where behavioural and cultural alignment is critical to success.

Finally, its important to ensure compliance with procurement regulation and process to avoid unnecessary challenges and wasted effort during the award process.

Characteristics of good procurement

Good procurement:

- fosters and supports strategic ongoing or early engagement to encourage market capability development;
- enables a client and the supply chain to fully appreciate the risks related to the delivery of the requirements;
- is based on understanding of the shared drivers. This will enable client and the supply chain to work towards better alignment and thus engender a truly collaborative relationship;
- recognises that there is always likely to be shared reputation benefits, risk and reward;
- adopts and complies with a clear and transparent process;
- supports the overall execution strategy and client model.

Considerations

Tip:

It may be helpful to review the procurement model diagram contained in the supporting material page 19 prior to using the following consideration tables.

This section lists a series of questions that might be considered when validating an existing procurement strategy or testing the design of a new one. Considering these questions helps the project team to form an effective procurement strategy and target areas for enhancement. It is beneficial to review the considerations with key stakeholders or use them as prompts to facilitate a dialogue.

Prior to asking these questions the output from the Routemap capability and complexity assessments should be reviewed for any factors relating to procurement, and specifically the output from the market capability assessment.

It is important to note that the procurement strategy will need to develop and evolve in line with the requirements and execution strategy. It is useful to revisit the considerations at major decision points.

Pillars of procurement

Good procurement optimises both the delivery of requirements and the clear articulation and allocation of risk for the client and the supply chain.

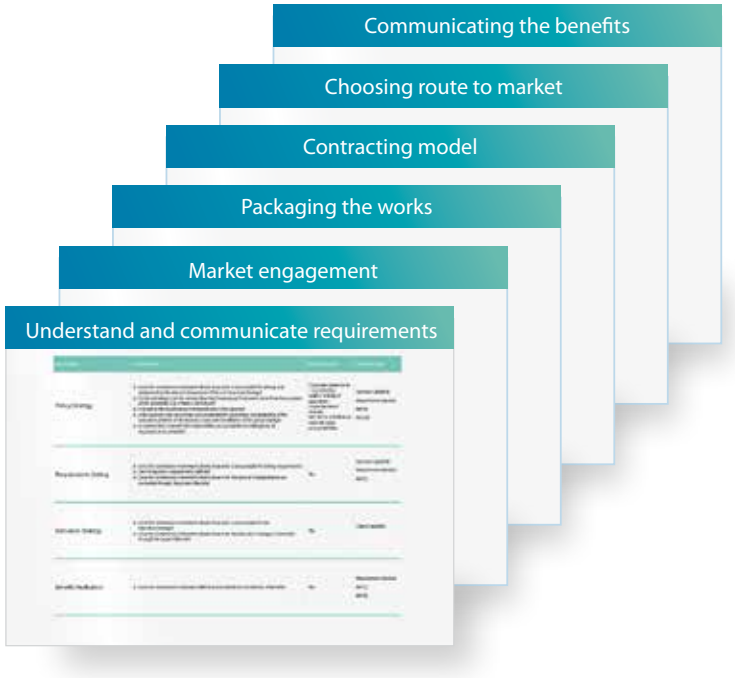
To engage in good procurement, the client needs to know:

- What the requirements of the project are and the outcomes and benefits expected;
- The market appetite capability and capacity to provide the services required and engage in a longer term strategic relationship;
- Which risks are best managed in-house, based on the organisation's risk appetite, and which risks are best placed with and managed by the supply chain;
- The key business drivers for the suppliers, both reputational and remunerative, within the various markets that will deliver the requirements;
- How the procurement will support the proposed target operating model and client model being adopted.

Good procurement has six primary sets of activities:

1. Understand & communicate requirements
2. Engage the market
3. Package the works
4. Choose the risk allocation model – Contracting Model
5. Choose the route to market
6. Communicate the benefits

It is important that these six pillars link together to form an effective procurement approach. If one of the pillars is missing or out of balance the procurement will be inefficient and likely to lead to heightened risk or loss of value. The relationship between the pillars is shown in the Supporting Material on page 19.



Considerations: Understand and Communicate Requirements

Tip:

It may be helpful to review the following documents:

- Governance Module and reflect on the Target Operating Model
- Sponsor Requirements
- Business case
- Execution Strategy.

Key prompts	*Considerations*	*What may help*
Requirements and benefits	■ What is the status of the business case? ■ Are the requirements well articulated and understood? ■ Is the client fit to deliver the requirements in terms of its structure? ■ Has the client undertaken a capability assessment to inform the procurement strategy and scope? ■ Has a clear timeline for actions been established? ■ Has a policy document been prepared to govern procurement activities? ■ Is there a balanced scorecard to enable requirements to be prioritised, evaluated and communicated? ■ Have the risks been identified that may impact the delivery of the requirements? ■ Would an expert panel be useful to act as advisor or as compliance unit? ■ Are 3rd party obligations understood (including funders / regulators / assurance bodies)? ■ Is the interface with the asset management and operational strategy understood? ■ Have impacts on operations been assessed and what is the responsibility and liability for the supply chain in respect of continuation of operations? ■ Is the corporate risk strategy understood, and how will this influence procurement activity? ■ Has consideration been given to the impact of the project funding and financing of the procurement options?	Execution Module Requirements Module Supporting material pg 17 and 18 Ref [2], [6], [7]

Note: Further Guidance contains details and links for each document reference - Ref [ ]

Considerations: Market Engagement

Key prompts	*Considerations*	*What may help*
Market relationship	■ Does the client understand the marketplace for the goods and services required? ■ Has the client's position been analysed in relation to its own demand and the market's capacity to supply? ■ What is the client's experience of the market and its ability to deliver what is needed? ■ Is there an understanding of the market perception of the client, and of the client's maturity level? ■ Is there a long-term strategic relationship with the supply chain? ■ Is there a programme and/or pipeline that supports a strategic relationship? ■ Does the client understand how and where the market can most add value to the project? ■ Does the market offer a service approach not previously considered? ■ Have the key factors required been identified to facilitate a strategic relationship with the market?	Supporting material pg 17 and 20 Ref [1], [2], [3]
Market engagement	■ Has a target supply chain been identified? Are their capabilities and capacity suitable? ■ What are the areas where improvement is required? ■ What approaches have other clients successfully adopted? ■ Has an initial proposition of the demand to be created been scoped and the client's preferred risk allocation been established? ■ Has a variety of market engagement methods been considered? Has use been made of pre-established supplier networks (e.g. Trade Associations, business networks, etc)? ■ Has the outline packaging and contracting strategy been drafted for testing in the market place, and sufficient time allowed for in the schedule to enable meaningful engagement? ■ Do the market engagement test results give the client confidence in the market response to its procurement opportunities? ■ Are there legislative or statutory provisions that need to be adhered to prior to market engagement ie OJEU? ■ Have you considered how market engagement activity may affect existing, incumbent relationships? ■ Has due consideration been given to the engagement of the sub-tier supply chain – has the strategy been market tested with them?	Supporting material pg 17, 20 and 21 Ref [3], [4], [7]
Market Appetite	■ Does the client understand the appetite of the market to meet its demand? ■ If market appetite is lower than expected, are the reasons for this understood? ■ Are there any steps identified to encourage and increase market appetite? ■ Is there awareness of procurement activity by other clients who may seek to use an identical supply chain? ■ Is there recognition of 2nd tier/sub-tier supply chain members and understanding of how they can be engaged through the procurement? ■ Does the commercial model reflect the alignment of corporate risk and rewards that will result from the investment? ■ Do the market appetite results give the client confidence in the market response to its procurement opportunities? ■ Does the procurement process allow the client to avoid surprises by tracking appetite and gain understanding of the underlying reasons to any changes? ■ Have the outline commercial models been tested within the marketplace? ■ Has the relationship between asset creation, operation and market appetite been understood to bring these together?	Supporting material pg 17, 20 and 25 Ref [1], [3]

Tip:

It may be helpful to review the following documents:

- Corporate Procurement Policies
- Existing Framework Agreements.

Note: Further Guidance contains details and links for each document reference - Ref [ ]

Key prompts	*Considerations*	*What may help*
Risk approach	■ Are the risks clearly understood, evaluated and articulated? ■ How much risk should be retained in-house and how much can be placed with the supply chain, and in what form? ■ Is the risk allocation aligned with the balanced scorecard measures? ■ Is the risk allocation aligned with the cost certainty and schedule requirements? ■ Is risk allocation clear and sustainable? ■ Is risk and reward transfer equitably balanced? ■ Has the proposed risk transfer been tested with the market? ■ Does the risk transfer strategy align with the corporate risk approach, including 3rd party requirements? ■ Does the risk allocation and management strategy reflect the capability and complexity assessments?	Execution Module Governance Module Supporting material pg 25 Ref [3], [6], [7]
Interfaces	■ What soft (non-contractual) and hard (contractual) interfaces have been considered in the formulation of the packaging strategy? ■ Is the client organisation structured to manage the technical /commercial /operational interfaces that the packaging strategy will create? ■ What approaches, such as alliancing or partnering arrangements, would help soften contractual interfaces and encourage collaboration? ■ Has the management of the scope boundaries between packages been considered? ■ Have the packages been appropriately sized and scoped to enable the client to manage the interfaces?	Execution Module Organisational Design & Development Module Supporting material pg 23 and 24 Ref [1], [2], [5], [9]
Packaging strategy	■ Does the packaging strategy encompass the entire scope? ■ Has the feedback from the market engagement been used to inform and develop the packaging strategy? If changes have occurred, have these been tested by going back to the market for input (to test appetite for packaging)? ■ Has the use of categories and/or clusters been properly considered? ■ Has the timing and availability of funding been considered when developing the packaging? ■ Is there an open dialogue with the suppliers throughout development and delivery? NB. This communication should be two way to take advantage of suppliers expertise. ■ Have suppliers been selected to match the skills and capabilities required for different works and thus achieve improved confidence in their performance and more competitive pricing? ■ Have packages of work been arranged so they can be commissioned and handed over to enable the commencement of operation? ■ Has the packaging size been tested against the corporate risk philosophy? ■ Do the economic conditions have an impact on the packaging strategy ? ■ Has the benefit of early transfer of assets into operation been assessed in terms of revenue?	Execution Module Supporting material pg 23 and 24 Ref [2], [3]

Tip:

It may be helpful to review the following documents:

- Risk management Strategy
- Organisational Design and Development Strategy.

Note: Further Guidance contains details and links for each document reference - Ref [ ]

Key prompts	*Considerations*	*What may help*
Contracting approaches	■ Is a suitable mix of contracting solutions proposed in order to realise the benefits? ■ Is the form of contract understood by the market place and is it as close to industry standard as possible? This will help clarify client and supply chain obligations and risks. ■ Do contracts incorporate a balanced scorecard with clear and measurable parameters and are there appropriate key performance indicators (KPI's)? ■ Are the required levels of control established in the contracts? ■ Have incentivisation and collaboration tools been considered in order to encourage the type of behaviour needed to realise the benefits? ■ Is the desired relationship with the market transactional or relational ? ■ Is there a clear commercial strategy that underpins and enables the commercial drivers of all parties to be realised? ■ What is the proposed extent/duration of the desired relationship? ■ Has ownership of design been considered? ■ What opportunity/benefit there is for supply chain to contribute to design?	Execution Module Governance Module Supporting material pg 19, 26 and 27 Ref [2], [4], [5], [8], [9]
Testing the contracting strategy	■ Has the Client adopted this approach before? If so, what were the lessons learnt? ■ Were the client's and supply chain's attitudes to risk established before finalising the contracting strategy? ■ Does the contracting strategy complement the packaging strategy? ■ Does the contracting strategy cover all physical and contractual interfaces ? ■ Is the client's organisation structure sufficient to effectively administer the proposed contract strategy? ■ Does the strategy correspond with the sponsor and client priorities as defined in the balanced scorecard? ■ Is the strategy deliverable within the organisations' budget constraints?	Organisational Design & Development Module Supporting material pg 24 Ref [3], [6]
Managing delivery	■ Is there clarity on the management of the project during the contract period to control costs and avoid disputes? ■ Is there clarity on requirement for regular monitoring and reporting to analyse all aspects of the project as construction progresses? ■ Has there been consideration of fair payment practices throughout the supply chain? ■ Has consideration been given to oversight of testing and commissioning procedures, production of operation/ maintenance manuals and as-built records? ■ Have the exit strategies been considered?	Execution Strategy Organisational Design & Development Module Supporting material pg 29

Tip:

Wherever possible use unamended standard forms of contract.

It may be helpful to review the following documents:

- Execution Strategy
- Existing Frameworks

Note: Further Guidance contains details and links for each document reference - Ref [ ]

Key prompts	*Considerations*	*What may help*
Route(s) to market	■ Have design considerations and ownership been evaluated? ■ Is it clear that all requirements have been considered and that the proposed route(s) will support their achievement? ■ Is it accepted that all three routes (single stage, multi-stage and framework) may be needed to realise the benefits, especially for major programmes of work? ■ Do the proposed route(s) enable the client to best allocate the risks with the market? ■ Do all proposed routes factor in the feedback from the market, and the decisions made when considering packaging and contracting? ■ Have effort, efficiency and effectiveness all been considered in the selection of the route? ■ Has sufficient time been allocated to secure the optimal route versus desire to allocate risk? ■ Have all procurement regulations that the project is legally and corporately obliged to follow been addressed? ■ Does the chosen route provide the most effective basis for identifying/managing risk, and enabling innovation to be identified from the supply chain? ■ Does the client understand the European Directives and Regulations that apply to the procurement of the Requirement?	Requirements Module Supporting material pg 28 Ref [4], [5], [7], [8], [9]
Evaluation process	■ Does the evaluation criteria reflect the business case and the balanced scorecard? ■ Has the process been clearly described to the market? ■ Does the process comply with legislative criteria? ■ Does the process comply with internal governance procedures? ■ Has the evaluation model been tested to ensure that it is appropriate and clearly understood? ■ Is the length of process commensurate with the risk/reward associated with the procurement? ■ Has the evaluation model been tested to ensure that it is appropriate and clearly understood? ■ Has adequate feedback been given to the unsuccessful parties?	Supporting material pg 20 and 25 Ref [2], [7]

Tip:

Do not assume one route fits all circumstances, as with the Contract Model multiple routes can be used for the project if its procured in separate packages.

It may be helpful to review the following documents:

- Execution Strategy
- Existing Frameworks

Note: Further Guidance contains details and links for each document reference - Ref [ ]

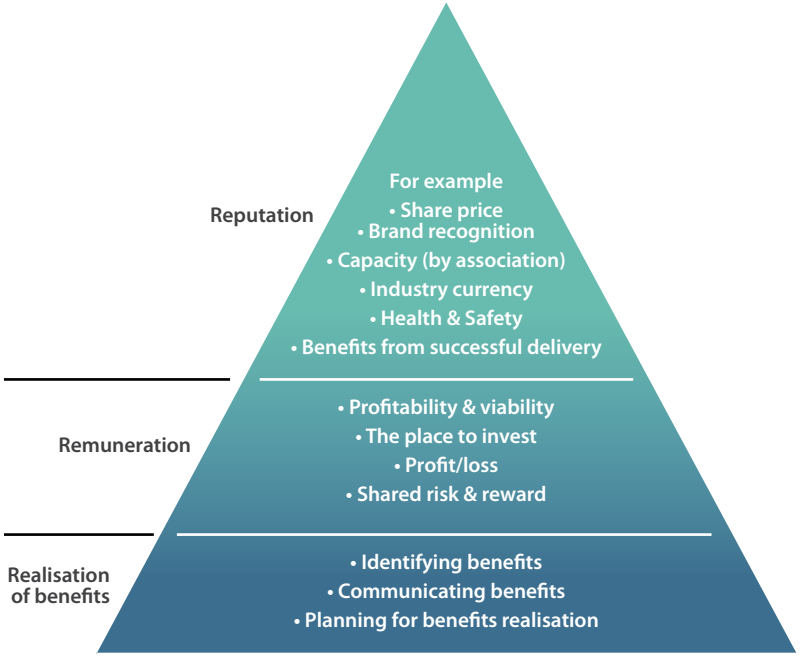
Considerations: Communicating the Benefits

Key prompts	*Considerations*	*What may help*
Measuring the benefits	■ Has a mechanism been established to measure the benefits of the procurement exercise? ■ How will the supply chain's performance be measured, assured and fed back? ■ What is the approach to on-going relationship management including governance? ■ Is there a mechanism to obtain external data to benchmark performance/benefits delivered?	Supporting material pg 20 and 29 Ref [6]
Lessons learned and feedback	■ How will lessons learnt be identified/captured and fed back during the delivery phase? ■ Is time built into the back end of the project to allow a period of reflection? ■ How will the lessons learned be communicated to the supply chain/broader industry and within the client organisation?	Ref [1]

Note: Further Guidance contains details and links for each document reference - Ref [ ]

Supporting Material

In order to understand and communicate the requirements, it is essential to understand and align the key drivers for both the client and the supply chain.



Reputation is an overarching driver for both the client and the supply chain. High profile examples of how badly reputations can be damaged by failures can be seen in the aftermaths of Enron and the collapse of auditors Arthur Anderson, or the Blackwater Horizon disaster and the impact upon BP (particularly shareholder damage).

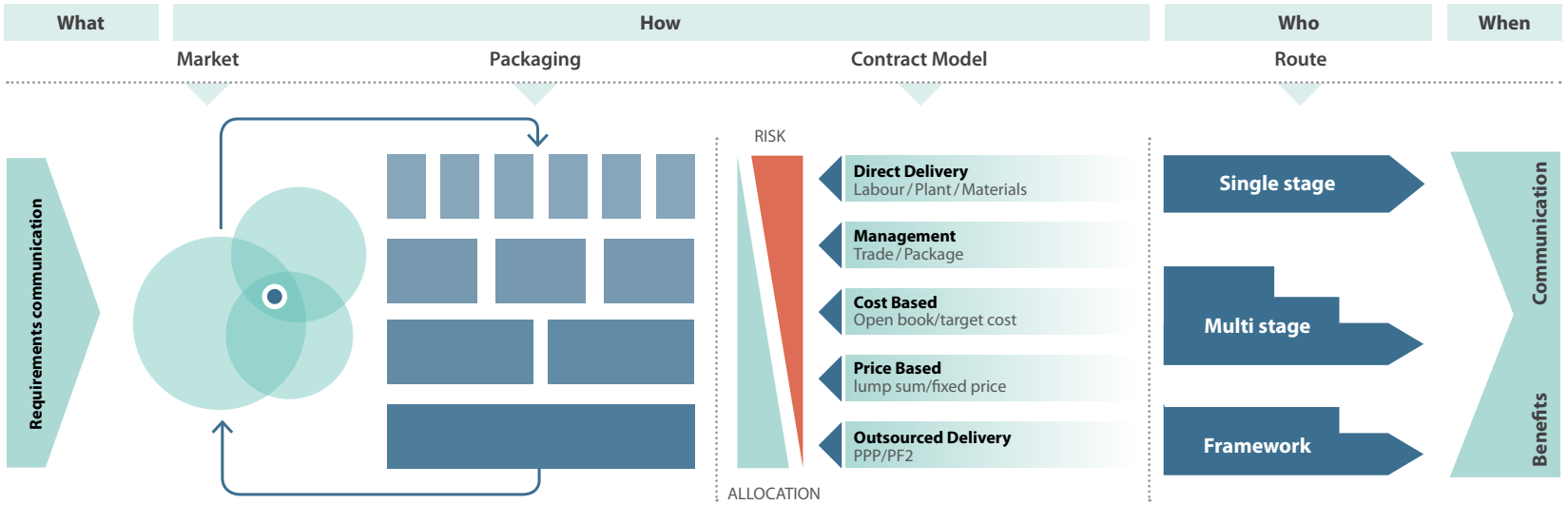
Remuneration, often the most overt driver of client and supplier behaviour, is critical to the viability of the project, and the viability of the supply chain within the market. Lack of supplier profitability can see investment withdrawn and market appetite diminish to the detriment of all stakeholders.

Once the key drivers of reputation and remuneration risk have been considered and understood by the client and the supply chain, the realisation of benefits will then be effectively pursued.

In the most effective relationships the alignment of reputation and remuneration will lead to consistent delivery of the benefits. Building a longer term strategic relationship with the market provides greater potential to unlock value. This is particularly relevant to serial procurers and where asset maintenance and support are part of the service being procured. For example, the Rolls Royce 'Power by the hour' approach. Activities that would support this are:

- Regular, consistent and strategic engagement with the market;
- Sustainable allocation of risk;
- Commitment to programmes and pipelines of work;
- Commitment to innovation;
- Collaborative working;
- Alignment of objectives.

Example: Aligning the interests of all parties from a strategic and whole life perspective is key to maximising value from contracted relationships. Rolls Royce pioneered their customer focused, maintenance programme 'power-by-the-hour'; an approach to aligning the manufacturer and operator through the provision of a fixed cost for maintenance that allowed them to achieve the required level of service with accurate cost forecasts from their assets.



The above diagram illustrates the stages of procurement, with the starting point being an understanding of both the project requirements, the client's understanding of its position within the market and the market's appetite to transact.

The model shows how the client and the market work together to determine the best packaging and contract model based on risk, complexity, capability and technical interfaces. It is an iterative process to define what, how, who and when. The approach balances risk and value outcomes to inform decisions on the packaging strategy, approach to risk, and the market's ability to deliver the requirements.

There are many labels used to describe different procurement models ('design/build', 'alliances', 'ECI', 'two stage', etc) - more often than not these just serve to characterise different bundled approaches to such areas as contracting, payment type, incentivisation, design responsibility and risk transfer. The categorisation under Contract Model above shows the generic range based on indicative risk allocation from Client to Supplier. This is also indicative of the range from an input specification approach to an output specification approach..

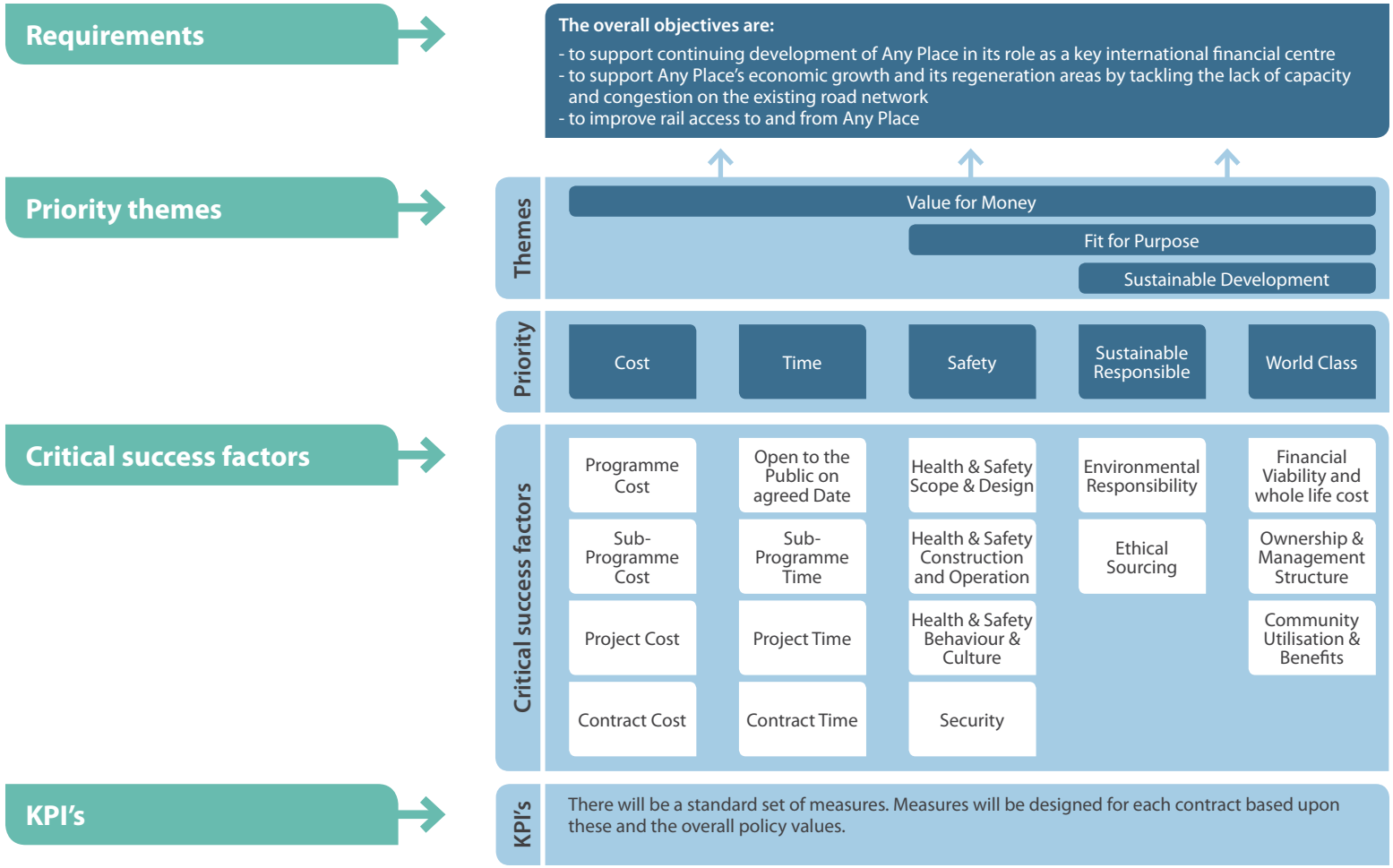
Example: A cost-based Contract Model can combine early market engagement and packaging with development of the risk profile through multi-stage procurement. Surrey County Council on Project Horizon achieved savings of 15% and other economic and social benefits through cost-based Two Stage Open Book procurement, including engagement with sub-tier supply chain members. https://www.gov.uk/government/publications/government-construction-strategy-trial-projects

Tip:

The balanced scorecard approach can be used to drive the client priorities deeper into the supply chain, thus smaller firms (including SMEs) gain direct exposure to client-led initiatives.

The balanced scorecard is a tool that supports a client in identifying and communicating its priority themes and the underlying critical success factors that will support delivery of the Requirements. Underpinning each critical success factor, there is a set of key performance indicators which are measured and which enable the client to manage performance during the delivery phase.

In terms of how this affects the procurement module, the balanced scorecard (as shown in the example below) can be divided into specific areas to enable testing during the procurement process, each priority theme and critical success factor weighted according to their value to the client. Each tenderer would be assessed against the scorecard during the procurement process and their strength or deficiency against each item would contribute to their overall score.



Engagement with the market has a dual benefit:

- to the client - understanding what the market can or cannot do (capability), and what the market will or will not bear (capacity) in pursuit of an opportunity;
- to the suppliers - insight into future opportunities, as well as the risks and rewards associated with that opportunity.

Successful market engagement allows the supply chain to begin planning their tender resources in anticipation, i.e, get themselves ready to supply. More importantly, it enables the client to identify potential risks in its packaging strategy.

The market capability assessment in the Routemap Handbook will provide a good characterisation of the wider marketplace and the supplier capability table contained within this supporting material can be used to assess specific supplier capability.

Once a client organisation has considered and reflected on the market environment it operates within, and the maturity of its strategic relationship, the client can test the market on various options, or more specifically, gauge the market's reaction to risk transference, technical solutions, funding, interfaces, methodology.

The greater the maturity level of strategic market relationships, the greater the possibility of achieving an enhanced offering and of nurturing market appetite over the longer term.

Appetite in the market is key to successfully procuring and delivering a project. Mead et al (2013) state that the 'level of competition is a function of the appetite of firms to enter into the procurement process, based upon their view of the risks associated with the tender, the chances of success and their capacity to meet the level of demand.' In effect, the greater the appetite for an opportunity, the higher the competition is likely to be, which will lead to the client achieving better value.

Fact: It is not against EU procurement law to talk to potential suppliers before starting the formal procurement process

Pre-procurement engagement with the market (including talking to potential suppliers) is not prohibited by EU procurement law, nor is it subject to any detailed procedures provided that it does not prevent an effective competition taking place once the procurement has started. In fact, engaging with the market before starting the formal procurement process is best practice and helps to maximise value for money from the resulting procurement.

Source: Procurement policy note 04/12: procurement supporting growth, supporting material for departments 9th May 2012

What is the Supplier capability assessment?

Consistent with the capability assessments in the Routemap Handbook, this assessment examines the wider project-related capabilities of suppliers to organise for effective and efficient delivery of a project. The importance of assessing capability, and aligning this with project complexity, is set out in Section 3 of the Routemap Handbook, together with the assessments for sponsor, asset manager, client and market capability.

Purpose

To assess the capability of suppliers to effectively deliver the project within the chosen Client Model and procurement model. Capability assessment will support alignment with client organisation capability and will inform organisational design and development for the client. This will be particularly relevant where an integrated client/supply chain approach is being adopted i.e. alliancing. See also the market capability assessment in the Routemap Handbook .

How to assess supplier capability

The client carries out this assessment. Consideration should be given as to whether to include prospective suppliers in interviews and workshops regarding supplier capability.

Review the characteristics in the table on the next page and tick those that you consider are currently present in the supplier and those that should be in place, to successfully deliver the project.

The groups of characteristics in the table are seen in organisations that demonstrate the following:

- **Red:** minimal capability to integrate engineering design with other designers and suppliers, and holds the minimum standards of accreditation and quality control. Investment in people is not a priority and relationships with the extended supply chain are transactional in nature rather than relational;
- **Green:** organised and coherent with a track record of integration with clients and supply chain. Repeatable control methodology and evidence of acceptable performance in the applicable sector;
- **Blue** able to integrate design information with other designers and suppliers. Surpassing quality accreditation and standards is a priority, as is investment in the organisation, production equipment, people and skills. Has extensive experience and a track record of successful and efficient delivery in a diverse range of projects and environments.

Note: These three sets of characteristics should not be seen as a progressive scale. An organisation can demonstrate a mix of all three at any one time. The important thing is to understand which capabilities are important to projects success.

Level	*Current*	*Needed*	*What supplier characteristics do you recognise?*
Red	☐		Informal governance with undefined links to projects and control
	☐		Highly reactive managerial approach
	☐		Lack of standard roles and defined responsibilities
	☐		Stakeholder engagement and communication rarely used
	☐		Benefits defined in terms of fixed outputs rather than performance improvement
	☐	N/A	One size fits all approach to project delivery. Little flexibility
	☐		Approach to sub-supplier relationships is traditional and transactional in nature
	☐		Seeks to transfer risk down the extended supply chain regardless of circumstances
	☐		Does not create back-to-back incentive or reward arrangements
	☐		Work winning approach based on lowest cost. Value of proposition given little consideration
	☐		Contractual commercial approach post contract to mitigate lowest cost tendering. Seeks to exploit uncertainty to maximum advantage
Green	☐	☐	Creative open decision-making guided by well developed management systems
	☐	☐	Takes strategic decision to employ and develop business to business partnering approach
	☐	☐	Independent reviews take place to verify systems and processes are operating and fit for purpose
	☐	☐	Centrally managed and consistent framework for defining and managing business objectives
	☐	☐	Risk management embedded in culture
	☐	☐	Managerial approach and interventions are based on reliable data and intelligence
	☐	☐	Roles and responsibilities are clearly defined. People have a career path and scope for professional advancement
	☐	☐	Flexible and able to adapt to alternative client strategies and delivery environments
Blue	☐	☐	Demonstrable high business performance across multiple sectors and clients
	☐	☐	Demonstrates successful alignment of business goals with those of clients in differing environments and strategies
	☐	☐	Process is embedded in the organisation and based on reliable performance data.
	☐	☐	Maintains a competitive supply chain and has a clear strategy for appointing suppliers
	☐	☐	Utilises best practice in framework agreements for critical resources
	☐	☐	Creates back to back incentives for the supply chain
	☐	☐	Demonstrable evidence of timely management interventions based on high quality performance data
	☐	☐	Demonstrable evidence of investment in business, people and skills
	☐	☐	People within the organisation are "expert" in their fields and are able to provide people for client level roles or to enhance client capability
	☐	☐	Long standing track record in industry for high performance in complex and uncertain environments
	☐	☐	People lead industry thinking in areas of specialism
	☐	☐	Business and management processes are optimised, making use of latest tools, process and technology
	☐	☐	Actively utilises the supply chain to deliver greater efficiency for its clients
	☐	☐	Seeks to exceed or set new standards for accreditation
	☐	☐	Senior Management are incentivised to deliver greater value to clients as well as the business
	☐	☐	Long-standing commitment to investment in business, people and skills
	☐	☐	Considers interdependencies between projects and optimises the businesses approach
	☐	☐	Feedback and lessons learnt captured across all projects and made available for the future

Tip:
The matrix on page 24 will help with these considerations.

The technical aspects of the scope need to be fully considered and prioritised when packaging the requirements. This will include the specific trade requirements and skill sets, size and of scope, methodology and timing.

If the packaging strategy leans towards multiple scope packaging then the client may want to consider using a clustering model to enable efficiencies in the procurement process.

Clustering

The use of clustering or categories enables the production of standard sets of contract solutions (see Contracting Model). Clustering or categorisation can provide consistency in the tendering process, allowing bidders to become familiar with documents, risk allocation, pricing requirements and the criteria used in assessing capacity and capability.

It is important to cluster or categorise similar elements of work, design or service at a high enough level to allow effective communication with the target market(s).

The key themes which need to be considered when grouping scope into clusters or categories are:

- The technical aspects of delivery including methodology and technologies;
- Timing of the delivery;
- Physical location of the work or service, in relation to others e.g. interfaces;
- The economic benefits;
- That the market exists, is recognisable and able to provide healthy competition;
- The capacity and resource is available in the supply chain to deliver the required quantity and quality.

Common components

There are economic and delivery advantages to considering common components and commodities. It is important that this standardisation is considered early in the development of the procurement strategy.

Some of the benefits of a common component strategy, as a sub-set of the overall packaging strategy, include:

- having a co-ordinated approach to certain components;
- a potential for consistent design;
- improved quality;
- reduced cost;
- controlled capacity and delivery;
- a reduced need for testing.

Example: Component approaches include, the joint Lift and Escalator procurement between TfL and Crossrail and the successful provision of bulk concrete supply at London 2012 (reducing a significant number of lorry movements and all the benefits that went with it, both social and economic).

Tip:

A facilitated workshop with commercial and technical stakeholders, using a discussion tool like this, may be an effective way to develop an optimised strategy that balances construction and commercial considerations.

For many infrastructure projects the decision as to how the works are packaged is complex. Typically the optimum packaging (or contract bundling) approach needs to balance potentially conflicting construction, commercial and market issues.

Mapping these competing objectives in a simple matrix (see example below) can be a useful way of ensuring the procurement strategy takes into account some of these broader objectives that can often get lost in the drive to optimise commercial considerations.

Work Breakdown Structure (WBS) ...or similar functional breakdown of activities	***Construction/engineering***							***Commercial***			***Market***			***Issues***
	Geography or asset types?	Scope for building off-site?	Interdependency/complexity?	Whole life impact?	Safety impact?	Optimum design transfer?	Outcome based specification?	Procurement model?	Contract value?	Impacts on risk allocation?	Impacts on market appetite?	Market maturity / capability?	Depth of supply chain?	
Employers design	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Surveys & investigations	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Civil engineering	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Structures	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M&E systems	Asset	High >10%	High	High	None	RIBA B	Yes	D&B	£100k	High	none	High	1st and 2nd tier	Standard components may be better VfM if procured as a separate contract
Systems integration	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Maintenance services	...	...	...	...	...	...	...	...	...	...	...	...	...	...
etc...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

NOTES:	
Geography vs asset classes	Would this package be business wide, regional or based on asset type?
Scope for build off-site (DFMA potential)	Does the package present a low, med or high design for manufacture assembly. i.e. offsite?
Interdependency/Integration/Complexity	Does this package have a low, med or high integration requirement with other packages and as such what is the level of complexity?
Whole life consideration	What is the impact on whole life outcomes?
Safety specific considerations	In delivery of the package are there any unusual safety considerations?
Design ownership and transfer	Who will own the design and will there be a transfer - if so when will this happen?
Outcome based specification	As a discrete package could it be specified in output terms (e.g. "power by the hour" approach)?
Optimum procurement model	Not withstanding package size and integration what would the optimum procurement strategy be?
Size / Volume (£m)	Package value - what would be the optimum size for the market based on risk and capacity?
Risk allocation	Is sponsor/client risk best managed through large or small packages – impact on client resourcing?
Likely market appetite	Is there likely to be market interest and sufficient competition?
Market capacity	Is there good capacity in the market to deliver the scope or very few suppliers / organisations with the capability?
Sub-tier model	Will sub-tier suppliers be procured directly by the client or through a 1st tier?

Tip:

A more comprehensive list of risk categories can be found in Annex 4 of the 'Green Book' and the Infrastructure Client Group report on Managing Cost Risk and Uncertainty in Infrastructure Projects [ref 12] provide additional supporting material.

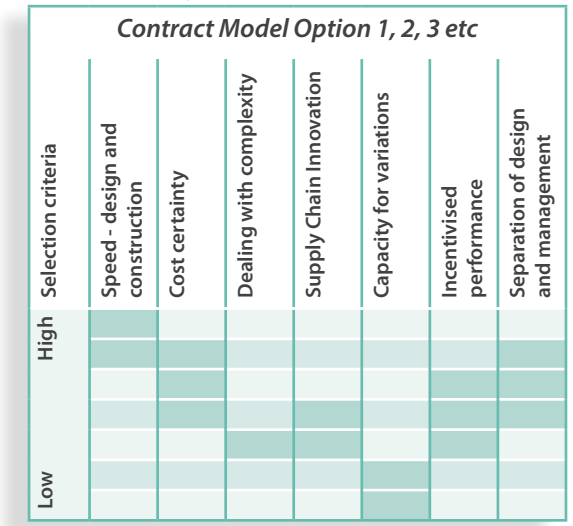
Considering the allocation of risk is a pre-requisite to considering the optimum procurement approach and contracting model. For example, "price certainty" is bought by paying the contractor to accept the risk of fixing a price in a commercial, changing market. The degree of risk involved in key aspects of the delivery must therefore be assessed to consider whether it is more economic for the sponsor, client or the contractor to manage these risks. This should be considered in relation to the capability to manage risk and the client model adopted for delivery.

It is often common practice to construct a risk allocation matrix to help inform these decisions, as set out in the example below.

Example risk allocation table	*Potential allocations*			*Key issues*
	Sponsor/Asset Mngr	Client	Supply Chain	
Policy risk	✓			
Sponsor requirements	✓			
Planning and consents		✓		
Design		✓		
Construction (to cost and time)			✓	
Availability and performance	✓			
Commissioning			✓	
Procurement risks		✓		
Technology and obsolescence risks	✓			Low level technology...
Funding (or financing)	✓			
Legislative and regulations	✓	✓	✓	
Other risks				

The preferred risk allocation will then need to be considered in relation to other criteria to determine the preferred Contract Model and ensure the risk allocation is appropriately reflected.

Other criteria are reflected in the tables on the following pages and may be used in a format as shown in the illustration below.



"Risk allocation in infrastructure projects is often ill-structured and can be the main reason for cost overruns or even failure."

Infrastructure Risk Group

The different contracting models illustrated in the table below represent a spectrum of risk allocation.

The table gives some basic advice about contract choice.

Model & features	*Pro*	*Con*	*Considerations*
Direct Delivery **The works are constructed by directly employed in-house management and labour using owned or hired plant and materials purchased on a supply only basis.** ■ **Expertise in-house** ■ **Clear Requirements** ■ **Limited complexity and innovation** ■ **Majority of risk held internally** ■ **Confidence in budget**	■ Subject matter expertise ■ Prior experience ■ Prior cost, quality and schedule indicators and learning	■ Sufficient internal resource (labour, plant, materials) for delivery ■ Business continuity as majority of risk resides internally ■ Reputational considerations	■ Capacity ■ Learning from prior projects is available and utilised
Management **A management contractor is engaged by the client to manage the construction process. The management contractor has direct contractual links with all the works contractors and is responsible for all the construction works. The management contractor is paid a fee on top of the construction costs for the services provided.** ■ **Need specialist expertise** ■ **Need support defining Requirements** ■ **Project lends itself to clear packages** ■ **Risk split across trades but ultimate integration and management with client** ■ **Budget may be released in gateways**	■ Schedule advantage if no complexity ■ Market availability ■ Enables performance of supply chain to core strengths so reduces "learning curve" risks	■ Relationship between Management Contractor/Consultant lacks definition so risk transfer does not occur as intended ■ Trade contracts exploit interfaces/ dependencies ■ Risk transfer does not occur as intended ■ Budgets and programme/s are not fixed	■ Scope any management appointments clearly and define responsibilities of Construction Manager if external appointment ■ Plan interfaces and dependencies ■ Share internal data with construction manager
Cost Based **The works are designed and/or constructed by a main contractor that is reimbursed for all of its allowed costs plus additional payment to allow for a profit. The arrangement can be incentivised via a target price.** ■ **Performance on quality and schedule to be enhanced through commercial incentives** ■ **Reliant on Market knowledge for complex elements** ■ **Shared risk profile**	■ Can support collaborative initiatives if correctly implemented ■ Clear visibility of actual costs to support benchmarking and efficiency challenges' ■ Proactive management of risk if correctly managed	■ Inadequate client understanding of risk transfer erodes incentive scheme ■ Incorrect or inflexible performance or commercial measures ■ Collaborative in letter not in spirit ■ Reactive management of risk	■ Does the client have cost data to make informed decisions, if not then seek this out or seek advice ■ KPIs/commercial incentive needs validation against balanced scorecard ■ Informed understanding of optimal level of risk transfer ■ Requires engagement of client

Continued over

Model & features	*Pro*	*Con*	*Considerations*
Price Based **The works are designed and/or constructed by a main contractor that is paid based on tendered prices.** ■ **Price key driver** ■ **Commodity or prior category delivery** ■ **Limited complexity** ■ **Risk allocated and included in price**	■ Client familiarity with subject matter ■ Simple procurement process ■ Speed to market, reduced negotiation time ■ Price certainty if scope is locked down	■ Least likely to consider balanced scorecard although not irrelevant ■ Quality considerations not captured in tender ■ Price risk entirely with contractor (subject of course to client change)	■ If used for complex/innovative projects then change erodes price risk transfer ■ No regard to benchmarks ■ Has to be clear scope and known or limited variations
Outsourced **The client transfers ownership of an asset for an extended period of time, such as under a PFI arrangement. An organisation with design, construction, maintenance and operational expertise and financing capability is appointed under a single contract to design, build, operate and maintain the asset.** ■ **Complexity or frontier in scale and in scope** ■ **Client unable to manage and/or carry delivery risk**	■ Full transfer of delivery and operational risks ■ Life of project considered in detail at outset as contract needs to cover extended period ■ Temporary transfer of financial risk to private sector	■ Deal complexity ■ Time to market and costs of preparation/negotiation ■ Obtaining opex value for money ■ Sustainability of contractor delivery entity	■ Whole-life considerations to be consistent in both design & operations phase to get an availability regime and opex costs that deliver ■ Client to consider where it can support process and generate value e.g. planning and regulatory. Risk transfer should not engender "sit on hands" approach ■ Client carries reputational risk ■ Client underestimates resource to manage contract

Whenever possible the contracting model should be kept as simple as possible and have a consistent, logical approach.

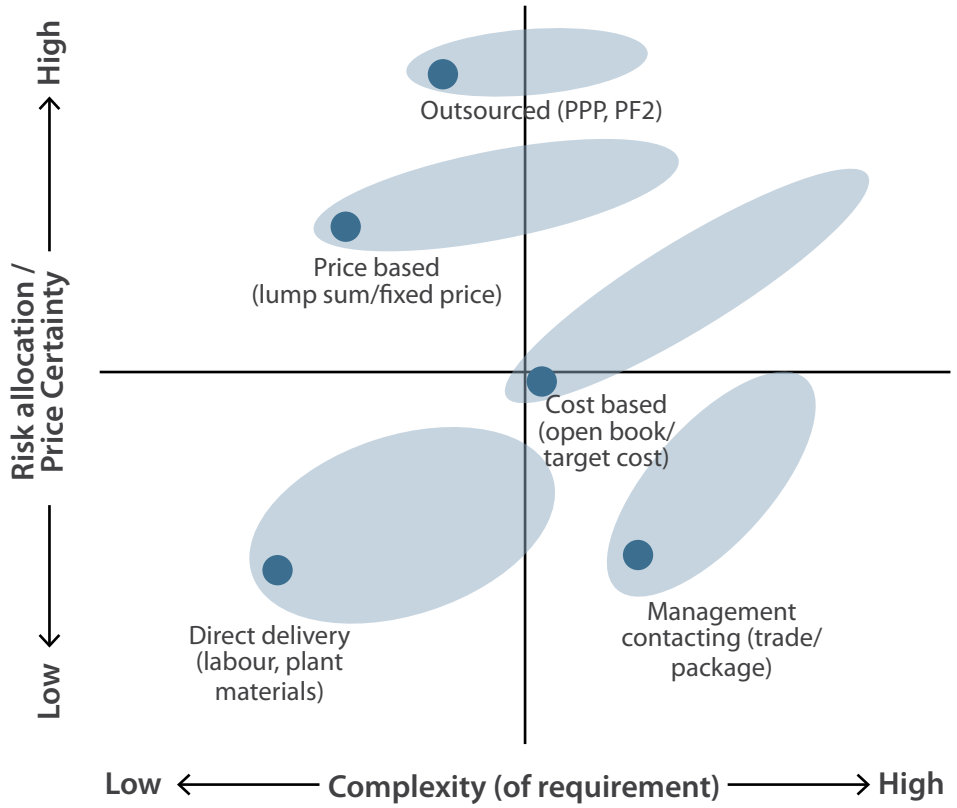
As described earlier it is important for the Client to have worked through in some detail its desired risk allocation so that it is clear who is best placed to manage the appropriate risks. This risk allocation exercise will have led to clarity on which interface risks are best managed by each of the parties.

The contract models represented in the table above have different risk profiles which in turn are applicable to different programmes of different complexity. In order to give some guidance on the relative 'uses' of each of the contract models the diagram on the next page has been developed.

Tip:

Table 1 of BS 8534 outlines a number of areas to consider when choosing a contract model. These are; Source of funding, selection method, price basis, responsibility for design and then construction and supply chain integration.

The selection of an appropriate contract model will be informed by consideration of: requirement; market; packaging; risk appetite; etc, as set out in this module. It should also take into account wider assessment of complexity / capability, target operating model and delivery model considerations (see also Governance module). The matrix below illustrates how two of these elements (risk and complexity of requirement) relate to alternative contract models.



NOTE: In different delivery environments these 'basic' models may be more or less appropriate. The 'light blue' areas in the diagram above illustrate how extensively the base models can be adapted in the right circumstances to deliver improved outcomes e.g. PF2 can be applied to deliver more complex projects but this can result in higher financing costs as a result and greater certainty on cost based model can be achieved by introducing a target cost approach.

Tip:

Ensure you understand which Procurement regulations apply to your procurement.

Frameworks should not be used as a convenient way to delay the finalisation of project requirements.

The term Route is used in this module to describe the selection process adopted by the Client to determine the Supplier. There are a variety of routes to market available which can be broadly characterised as:

- Single stage

A more traditional route. To be effective, the client needs to have absolute clarity on requirements. This is suitable for less complex procurements or ones with unique attributes. The leverage risk position is understood by the client in a one step process;

- Multi Stage

Suitable where there is a lack of definition on what is required. An initial filtering stage is needed to determine whether the entity is fit to supply. A subsequent stage/s determines the delivery and price elements. Unless carefully structured this route may increase the cost of bidding for both the supply chain and the client. This approach provides the opportunity for the client to work with the supply chain on requirements and scope definition;

- Framework

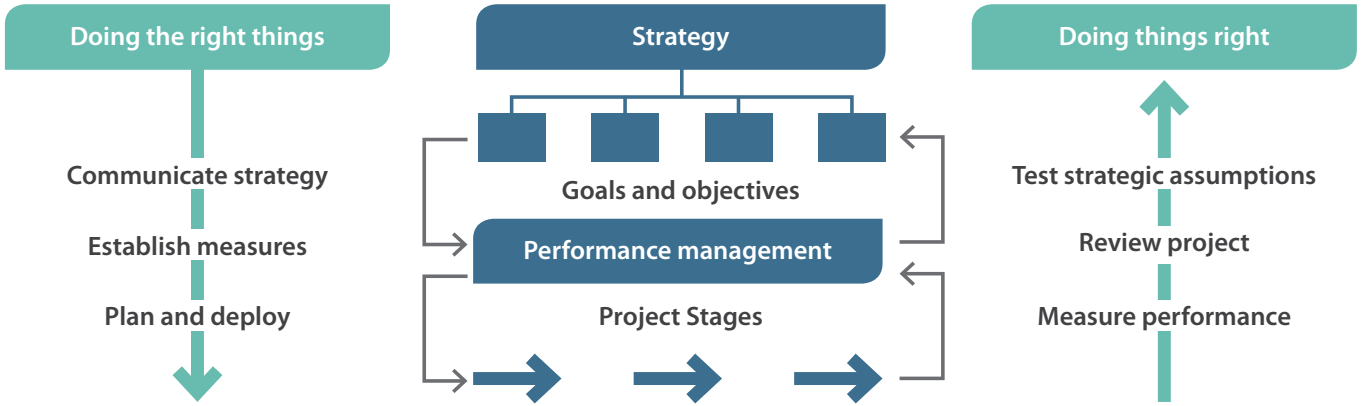
Suitable where there is a lack of definition on what is required. An initial filtering stage is needed to determine whether the entity is fit to supply. A subsequent stage/s determines the delivery and price elements. Unless carefully structured this route may increase the cost of bidding for both the supply chain and the client. This approach facilitates engagement with and contribution from the supply chain in the development of project scope and detail. This approach lends itself to long term relationships where repeat work is required but actual composition of projects is as yet unknown. i.e. AMP6 water frameworks.

The single and multi stage routes can be defined by the number of formal or informal supplier down selection steps that are taken. The Framework route can be subject to down selections but, most commonly, results in multiple contract awards being made to provide the facility.

The selection of the route to market is essentially a balance of 'Effective plays Efficient'. The thinking being that a multi down selection approach can be the most effective in its outcome and have the ability to drive a better solution and reduce risks, but it may be inefficient from both the market(s)' and the client organisation's perspective with regard to the resource and time involved. This is opposed to a single stage approach which can be very efficient but it might lack the required effectiveness to drive out all the risks and realise opportunities.

It is therefore important to determine the resource requirement that will be necessary to undertake the down selects on both the client organisation and the supply chain side, together with the elapsed time for the process. This should then be balanced against the risk reduction and the benefits created.

In order to ensure alignment with the project's priority themes and critical success factors, as set out in the balanced scorecard (page 18 refers), the cascade of performance KPI's into supply chain contracts is advisable. This provides the framework for a performance management system to support project delivery and is illustrated below.



Things to consider in support of the balanced scorecard approach include:

- accountability for deliverables;
- quantification of success;
- contribution to overall project deliverables and outcomes;
- defined KPI's in a consistent manner so that performance can be reviewed across packages;
- targets to promote continuous improvement;
- linking performance to incentivisation;
- cultural and behavioural measures;
- benchmarks.

Final Check

Final Check

Will the proposed procurement strategy:

1. Cover the concerns identified by the core complexity-capability gaps?	☐
2. Cover gaps identified by answering the considerations in this module?	☐
3. Provide confidence that requirements are clearly understood and communicated?	☐
4. Enable a structured engagement with the market, and allow assessment of the appetite for the project?	☐
5. Enable full consideration of the scope when packaging the requirements, which has been tested with the market?	☐
6. Ensure a full assessment and sustainable allocation of the risk between the client and the supply chain in order to ensure value for all parties involved?	☐
7. Enable a fair and appropriate consideration of all possible routes to market?	☐
8. Provide a clear plan to communicate the benefits of the project?	☐

Further Guidance

Further Guidance

Guidance	*Usage*
[1] Armitt, Sir John, (2012), London 2012: A global showcase for UK plc, Department for Culture, Media and Sport, (July 2012) https://www.gov.uk/government/publications/london-2012-a-global-showcase-for-uk-plc-a-report-by-sir-john-armitt`	■ Demonstration of 'major programme' added supply chain value ■ Ingredients for future major programme success
[2] Baldry, Sir Tony et al (2012), A Better Deal for Public Building, All Party Parliamentary Group for Excellence in the Built Environment, (September 2012) http://cic.org.uk/admin/resources/appg-for-ebe-report-.pdf	■ A thirteen-point plan for a better deal in public building ■ Understanding how to set up an approach to public sector procurement ■ Establishing team systems, processes and scorecards ■ Processes and systems for effective public sector procurement
[3] Mead, J et al (2013), Programme Procurement in Construction. Learning from London 2012	■ Establishing an effective supply chain management strategy ■ Major programme procurement gateways for success
[4] NEC 3 Procurement and Contract Strategies (April 2013), Institution of Civil Engineers	■ An overview of NEC3 procurement and contract strategies to help establish the most appropriate procurement and commercial model Note: There are other contract forms available for use with different procurement and contracting strategies e.g. see item [9] below.
[5] British Standard - BS 8534:2011, Construction Procurement Policies strategies and procedures – Code of practice	■ Guidance on codes of practice and British Standards
[6] ODA – Learning Legacy Balanced Scorecard - Champion Products http://learninglegacy.independent.gov.uk/publications/balanced-scorecard.php	■ Guidance on the ODA London 2012 approach to creating, implementing and managing a balanced scorecard
[7] NAO, Achieving Excellence in Construction Series (2009)	■ The document provides a brief overview of procurement for construction projects. It explains the key considerations for projects and outlines the main project stages aligned to the Gateway process.
[8] The Joint Contracts Tribunal Limited (2012) – Practice Note 6	■ A practice note on tendering, including the preliminary enquiry, invitation to tender (ITT) and assessment and award stages Note: There are other contract forms available for use with different procurement and contracting strategies e.g. see item [9] below.
[9] Cabinet Office 'New Models of Construction Procurement' July 2014 https://www.gov.uk/government/publications/new-models-of-construction-procurement-introduction	■ Contains three documented procurement models that support the principles of collaborative working between the client and the supply chain; Cost Led , Two-stage open book and Integrated Project Insurance'

Glossary

Asset Manager
The asset manager is the organisation (or parts of) that is responsible for day-to-day operations and maintenance of the asset. The asset manager may be a part of the sponsor or client organisations or a separate entity. Similarly the operator and maintainer of the assets might be separate entities.

Asset management is the coordinated activity of organisations to realise value from their assets.

Capability
The Routemap uses capability to describe the ability of the sponsor, client, asset manager and market to organise for effective and efficient delivery. It refers to a part of the business and not the individual as most barriers to effective practice are rooted in systemic issues and not individual action.

Client
The client is the organisation that is responsible for fulfilling the requirements and delivering the benefits. The client translates the requirements from the sponsor and manages the delivery outcomes. The client selects the most appropriate supplier/s to meet project objectives.

Complexity
Project complexity is a measure of the inherent difficulty of delivering a project based on factors such as: stakeholder alignment; interconnectedness of projects; systems & organisations and the level of innovation required etc. The Routemap uses the Delivery Environment Complexity Assessment (DECA) published by the NAO for complexity assessment.

Client Model
The Client Model refers to how the client organisation will structure and resource the responsibilities for project execution between the client, advisors/partners and supply chain (e.g. thin/fat client). This is a key consideration in determining organisational design and procurement strategy.

Delivery Model
The Delivery Model refers to the organisational entity that will be appointed to deliver the project (e.g. establishment of a special purpose vehicle). This is a key consideration in determining governance arrangements.

Infrastructure
Infrastructure includes the networks and systems that supply and support reliable and effective domestic and international transport, digital communications, energy, flood protection, water and waste management.

Market
A market is a group of organisations that integrates and competes to provide goods or services to one or more clients. The construction and infrastructure market is often characterised by a large number of suppliers and SMEs.

Procurement Model
The approach taken and the contracting model used to procure the supply chain.

Project
Throughout this guide the term project is used to mean both project or programme.

Sponsor
The sponsor organisation secures the funding, owns the business case and is responsible for specifying the requirements to the client. The Sponsor ensures that the project remains strategically aligned and viable, and that benefits are on track to be realised. In some contexts the Sponsor and Client could be from the same organisation.

Target Operating Model
The end state of how the asset will be: used; funded; owned; operated and maintained.

IUK would like to thank the following organisations that contributed time and expertise to the development of the Routemap.

Infrastructure Client Group

Simon Kirby, HS2 Ltd (Chair)

Adam Green, Carillion

Andrew Wolstenholme, Construction Leadership Council Association

Andy Mitchell, Crossrail

Beth West, HS2 Ltd

Dale Evans, Anglian Water @one Alliance

Prof. Denise Bower, University of Leeds/ Major Projects Association

Jim Barlow, Environment Agency

John Oliver, BG Group

Mark Hagger, Environment Agency

Mark Worsfold, Ofwat

Martin Buck, Crossrail

Miles Ashley, Transport for London

Nirmal Kotecha, UK Power Networks

Peter Adams, Highways Agency

Phil Wilbraham, Heathrow Airport Limited

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Infrastructure UK (HM Treasury)

Institution of Civil Engineers

Steering Group & Contributors

Other Contributors

In respect of this Procurement Module we would like to thank;
- Gardiner and Theobold
- BSI committee CB/500
- Rowsell Wright

AUSTRALIAN CONSTRUCTORS ASSOCIATION

Changing the game

How Australia can achieve success in the new world of Mega-projects

"The ACA recognised the need to change the way we think about the projects of the future. We pride ourselves on engineering excellence but we have also recognised that our world is changing. Both the private and public sector are searching for long-term viable economic solutions. We recognise we need to develop the capabilities to better understand and support the diverse sets of stakeholders that are engaged in this process. Our traditional project management processes need to evolve to provide far more predictable outcomes for the future. This research explores our new world and identifies some of the changes we will need to undertake to be successful. We are looking forward to engaging with the industry stakeholders in a robust discussion so we can all make the changes required to ensure our investment dollars achieve their maximum impact."

David Saxelby
President
ACA

"We have reached an inflection point in the way we think about and manage the delivery of services projects in Australia. As with many step changes, we seldom solve them with the same mindsets that created them. This research has identified the need to take a much broader perspective on the nature of what we are trying to achieve and then adopt a far more reflective and adaptive model that can deliver a different outcome that meets the expectations of the diverse stakeholder groups involved."

Malcolm Dunn
Lead Researcher and Learning Integrator
Agilience

In the media today

We have a mega problem that is threatening our economic growth

Headlines

"Global mega project* spending to hit US$6 - 9 trillion per annum or 8% of global GDP. The Australian infrastructure pipeline is greater than A$300 billion for the resources and infrastructure sectors (approximately 100 mega projects are underway at any time)."

"The nature of projects is changing from engineering success to delivery of sustainable services and economic outcomes. Accordingly, projects are becoming increasingly larger, longer and more complex (compounding at 2.5% p.a.)."

"The complication is that these complex projects have low success rates (international estimates are in the order of 1/1000 for economic success, with Australia's experience less than 50%, based on budget and schedule)."

"The iron law of mega-projects has become 'over-time, over-budget and over again'."

"The value at risk for Australia is in the order of 20% or greater than A$60 billion based on conservative estimates of pipeline and success rates. So the imperative to better manage these projects is high."

Traditional models are failing us and we need to understand why and adopt a new approach: 'the conventional way of running mega-projects has reached a tension point where tradition is being challenged and reform is emerging'.

Our challenge

"We have a nation-shaping pipeline of infrastructure projects and need to create ways to share experiences."

John Fitzgerald Infrastructure Australia

This research has been commissioned by the Australian Constructors Association to explore the nature of this next generation of complex mega-projects

The challenge

Despite recent cutbacks in the Resources sector, Australia's investment pipeline still includes greater than $300 billion of Resources and Infrastructure projects over the next decade.

Unfortunately, there is a very low success rate (measured by achieving budget, schedule and economic business case) for complex mega-projects both globally (less than 15 %) and in Australia (40 – 50 %). If we apply even the most optimistic assessment, this implies an overrun of approximately $60 billion (20 % of $300 billion), which corresponds to many roads ($1 – 5 billion), LNG plants ($10 -20 billion), mines ($1 billion), schools ($1 billion) and hospitals ($1- 2 billion).

So our challenge is to really understand the evolving nature of these projects in our increasingly sophisticated and socialised economy, and explore why existing approaches are proving insufficient or inconsistent. From this understanding, we can develop the next generation of approaches and create a supporting environment to ensure mega-project success and maximise social, political and economic investment returns.

Changing the game

We require a completely new perspective for the next generation of complex mega-projects.

Flyvbjerg (2014) defines mega-projects as "large-scale complex ventures that typically cost $1 billion or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational, and impact millions of people. They are not just magnified versions of smaller projects, they are a completely different breed in terms of their aspiration, lead times, complexity and stakeholder involvement."

Australian mega-projects of the past have been complex engineering achievements, such as the Sydney Harbour Tunnel, the Victorian Desalination Plant and the Snowy Mountains Scheme.

However, there is an emerging view that not only is the nature of projects changing, but also the social environment in which these projects occur. Accordingly, these mega-projects require a completely different perspective, level of stakeholder engagement, cultural environment and project leadership than that practiced at the moment, which is based on up-scaled large project management disciplines.

We will explore the nature of this mega-project world in several ways, including:

- Identifying the challenges
- Studying key research insights
- Taking a different perspective
- Exploring new solutions to change the game

Critical research question

Most importantly, we will filter our research through the following question: "What do we need to do differently to improve our project success rate in this new environment?"

Research/Discovery Approach

We wanted to understand the changed social, political and technological environment for mega-projects and, based on this, consider what new perspectives and approaches are required. We reflected that there were also successful projects in Australia that we could learn from. We purposefully explored the views of a range of new stakeholders who are now intimately involved in this next generation of projects to understand their views of what is required for a successful outcome. Our research approach involved three key elements:

Quantitative

Assess the performance gap in Australia through a survey of successful and challenged projects from the perspective of Owners Teams, Delivery Teams, Engineering Procurement & Construction Management (EPCM) Contractors and Constructors.

Qualitative

Understand the root causes of success and failure, and identify potential solutions through success case/appreciative enquiry interviews with > 30 stakeholders (Policy-makers, Government and Private Sector Owners and Delivery Teams, EPCM Contractors, Constructors, Lawyers and Infrastructure Investors.

Action forums

Engage key stakeholders in discussing the research insights to help identify solutions able to change the game.

Doomed to failure?

From an international perspective there is a high rate of mega-project failure, with less than 1 in 1,000 projects achieving their promised business cases

Current mega-project performance

Source	Evans & Peck	Flyvbjerg	IPA	Accenture *
# Projects	16	258	> 1000	31
% on budget	-	10%	-	17%
Overrun (% budget)	10-20%	26.7%	25%	-
Overrun Schedule	-10 - +10	90%	60%	< 20%
Achieve Business Case	-	5%	-	17%

* Accenture (2012), 'Achieving Superior Delivery of Capital Projects', Global survey of the metals and mining industries

* Accenture (2012), 'Developing Strategies for the Effective Delivery of Capital projects', Global survey of the energy industry

Break Fix Model

"Generally mega-project planners and managers do not know how to deliver successful mega-projects and therefore they tend to break sooner or later. The fix often takes place at great and unexpected cost to stakeholders. The cure is to get projects right from the outset through proper front end management".

Faulty decision-making

"With the consistent errors and biases of forecasts that form the basis for business cases, cost benefit analysis and social and environmental impact assessments, such analysis will with a high degree of certainty be misleading".

There is a big prize at stake

The Australian projects performance gap identified by the research is significant and presents a valuable prize

Australian Mega-projects Survey Results

This study	Total	Successful Projects Average	Challenged Projects Average	Overall Performance Gap ($M)	Private Sector Gap ($M)	Public Sector Gap ($M)
# Projects	44	23	21	-	21	23
Budget ($M)	43,809	1,074	910	-	-	-
Budget overrun ($M)	6,021	83	196	3,629	-	-
Budget overrun (%)	13.74%	8.4%	27.4%	19%	19.1%	20.2%
Schedule overrun (%)	-	(.3)%	20.3%	20.6%	27.9%	27.6%

This is the most comprehensive set of survey data on Australian mega-projects completed to date. The survey covered 44 mega-projects (> $1 billion each) worth nearly $44 billion

- The total budget overrun across the portfolio was $6 billion or 13.7%, with both successful and challenged projects having budget overruns. This is good by international standards.
- Schedule overruns ranged between 0 – 20%, which is fair by international standards.
- However, there was still a significant gap (> 20%) between successful and challenged projects from both budget and schedule perspectives.
- There was little difference between private and public sector performance from a budget or schedule point of view.
- Closing the gap from average challenged to average successful (19%) would save over $3.5 billion on this project portfolio. This would be even greater if we could shift to the best-practice level of performance.

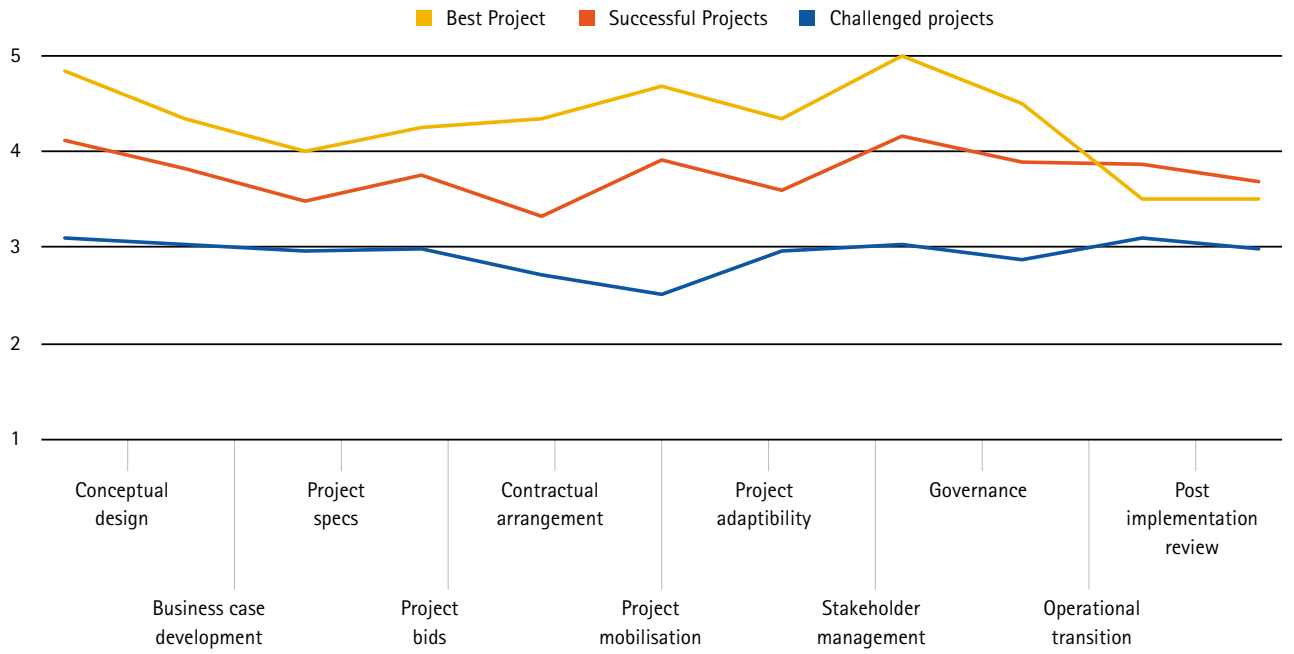
Understanding the root cause of future success

There was a significant difference in performance at all stages between successful and challenged projects

There were projects that were set up for success by the way those involved approached the early stages. Equally, the challenged projects started badly due to time pressures, inadequate stakeholder engagement, loosely specified requirements and aspirational businesses cases. Project managers then tended to compensate for this with risk-oriented contracts and overly strong project management and governance.

This chart records the average survey results by project stage for successful and challenged projects in comparison to the best project.

Project Stage Performance



The performance gap was clear

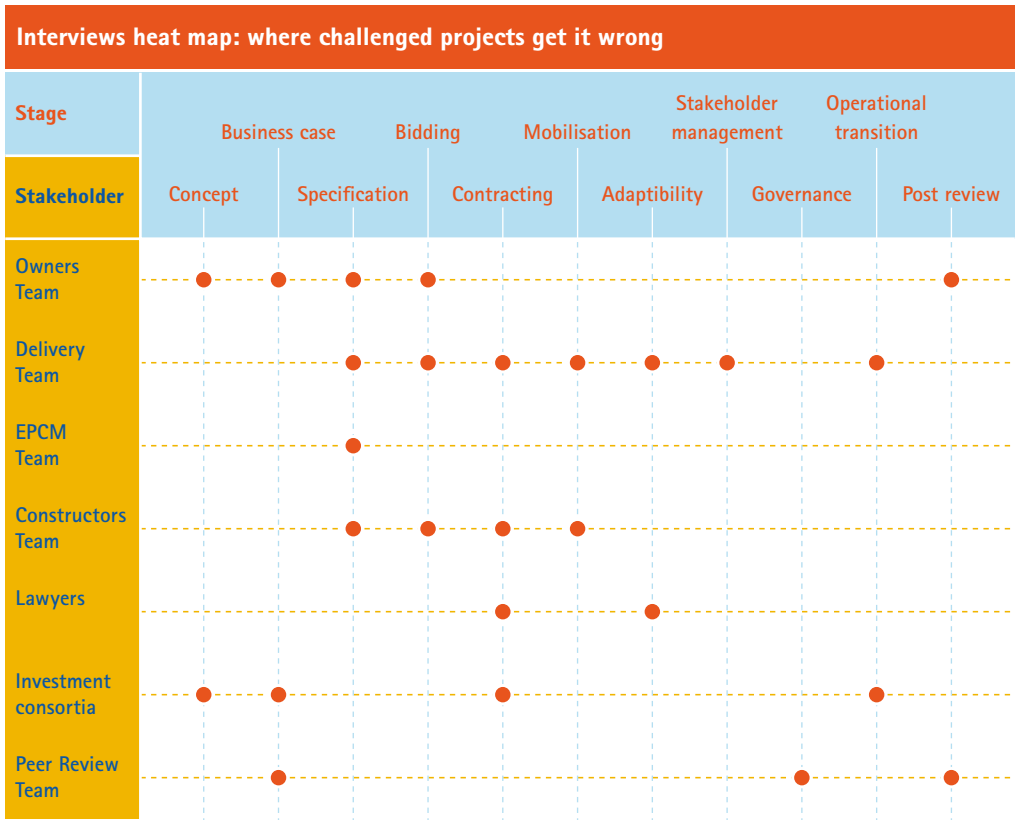
We identified a number of critical differences between successful and unsuccessful projects at all stages.

Project stage	Successful Projects	Challenged Projects
Concept Design	Wide support/time-staged/stakeholder engagement	Fast-tracked, aspirational, too high-level
Business Case Development	Alternate scenarios/sensitivities/staged	Reverse-engineered/optimism bias/no reference benchmarking
Project Specifications	Outcomes focused with flexibility for innovative input	Either light on or too much detail that stifled innovation and added cost
Bidding process	Set the stage for formation of collaboration and problem-solving	Excessive focus on competitive tension and risk management
Contracting	Different strategies based on flexibility and alignment	Focused on task details and risk transfer
Mobilisation of team	Whole of extended team including external stakeholders	Driven by strong project management and schedule
Stakeholder Management	Good upfront and continuous engagement through process	Transactional when needed and too late
Governance	Self-managed and accountable team	Strong project management and schedule-driven
Operational Transition	Early and continuous engagement of owners' teams in process	Lack of engagement and disconnected process with blame
Post review	Genuine opportunity to learn	Firing of Project Manager

There are diverse views of success

The research also identified a number of different risk hot spots for the various stakeholders on projects that are not necessarily aligned and can cause contention

Stakeholder hot buttons



Observations

1. Owners teams are subject to significant political pressure in both the private and public sectors. Long-term failure is discounted in favour of short-term drivers such as press announcements.

2. Delivery team are often handed a 'poisoned chalice' of an undeliverable project. They then try too hard to achieve an impossible outcome without having "stop" as an option.

3. EPCM Teams want to ensure there is a great design but potentially over-engineer for the desired economic outcome.

4. Consortium teams are looking primarily for expected financial outcomes. Bids are costly (> $15 million) and the cost of losing is high, which leads to underbidding and the 'winner's curse'.

5. Lawyers are seeking to protect their clients' interests (even against the group's). They often shape project culture through the contract model.

6. Delivery teams focus too much on the technological aspects of complex projects and negate the socio-political aspects in dealing with diverse unengaged stakeholders.

7. Peer reviews are regarded as annoying, rather than as sources of insight from experienced practitioners.

Adopting a fresh approach

From the research, we recognise that we need to start thinking about mega-projects from a different perspective

Key insights and implications

1. The nature of projects is changing

The nature of projects is changing to match changes in our society. Projects are becoming increasingly sophisticated and involve an ever-greater number of diverse stakeholders with different requirements, who need to be engaged to ensure a successful outcome. The failure to recognise this leads to poorly specified designs, continuous scope creep and major budget and schedule overruns.

2. Projects have become increasingly complex

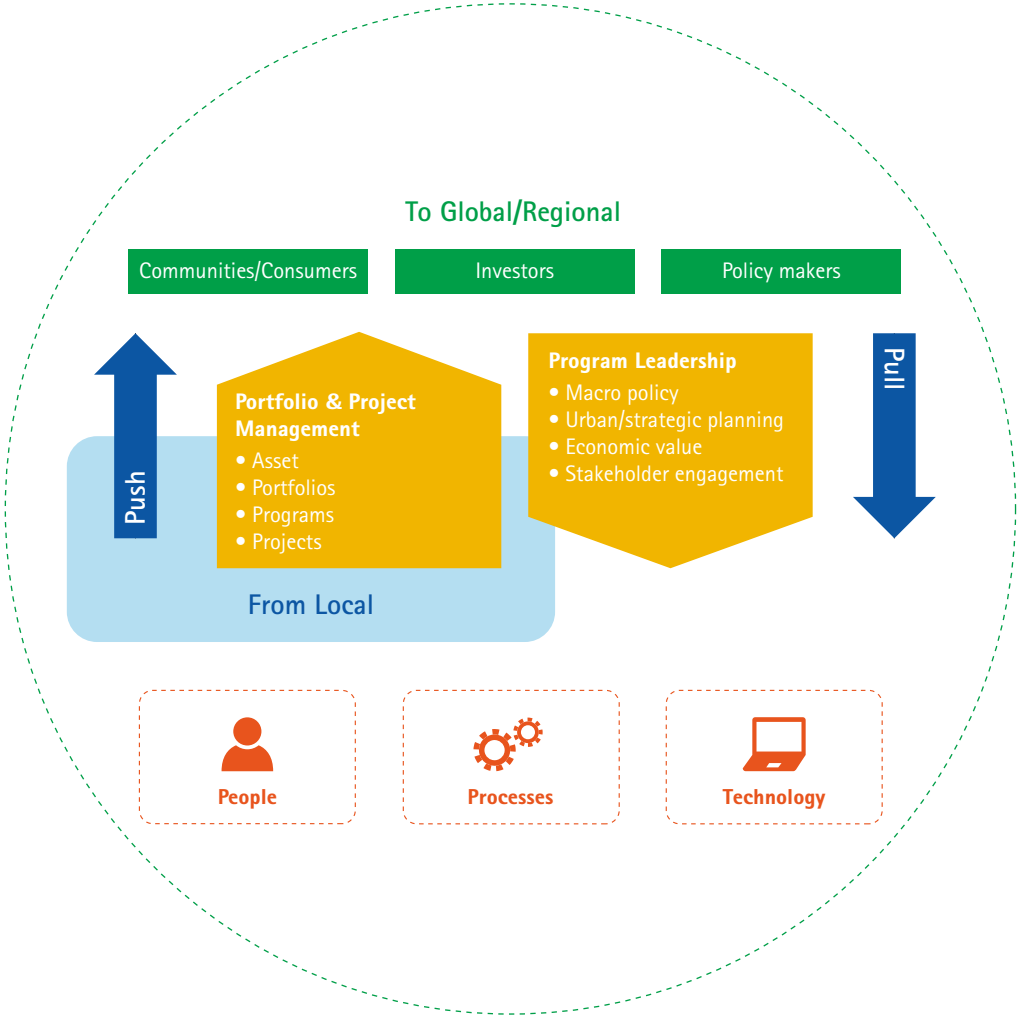
Projects have become increasingly complex and are exposed to many more human variables and environmental and political uncertainties; they are no longer just engineering projects. We need to change our approaches to recognise these factors and be able to more rapidly adapt to emergent knowledge or external changes. Our new business models and governance processes need to be able to flex to allow change while still ensuring transparency, accountability and safety. We need a new form of more inclusive and pervasive agile project leadership.

3. Changing mindset and models

Changing mindset and models are required for these new age mega-projects. The engineering mindset is critical but not sufficient. We need not only to broaden the inclusion of other stakeholders' perspectives, but also to build a new culture of collaboration across corporate and political boundaries.

4. Next generation distributed and pervasive leadership

Next generation distributed and pervasive leadership is required that enables flexible decision-making at the distributed point of need.



"The psychological commitment to projects happens early, from then on we just backsolve"

Insight 1.

The nature of projects is changing and this requires a different response

The focus of projects is changing in many aspects, as the construction of components develops into the provision of sustainable, high-quality operational services.

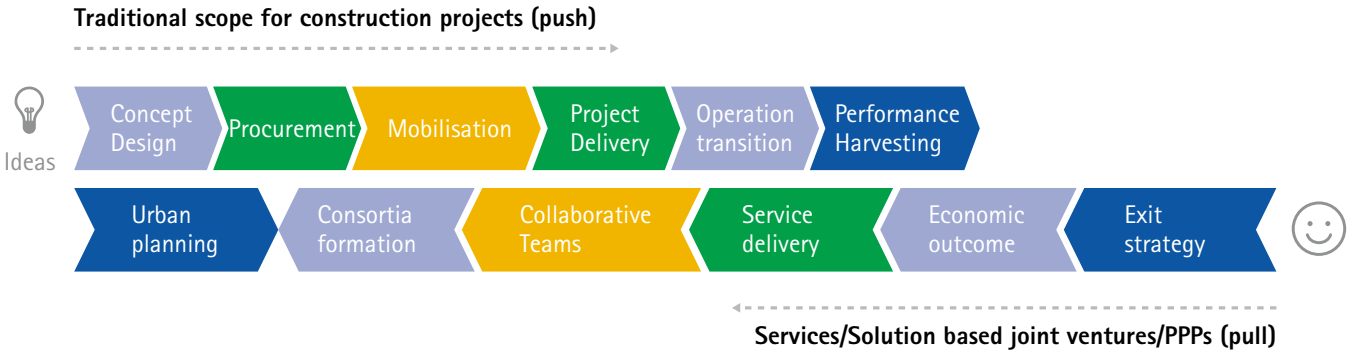
This shift involves different stakeholders throughout the process and requires early involvement of the ultimate operators. There are now global sources of funding for projects, with international companies included in development consortia. This applies especially to infrastructure projects such as airports, ports, hospitals, prisons, toll roads and light rail, but it is also applicable to next-generation mining and gas projects with significant local community and regional consumer market involvement.

In addition to these global sources of capital, there are global views on risk (project and sovereign) that shape project expectations and have consequences for follow-on projects.

Environmental expectations and international labour mobility (457/FIFO/DIDO) are also part of the ever-changing dynamic of projects. Because of their nature, the size and duration of mega-projects is also increasing, with some projects involving over 20,000 staff (many from offshore) for durations of more than 5 – 10 years, as well as up to 100 sub-contractor businesses. This implies a shift from the somewhat transactional nature of traditional project teams to the formation of high-performing project communities with a shared sense of purpose.

"The structure is only there to keep the rain off the services"
Anthony Manning, NSW Health, Northern Beaches Health PPP

"We need to run projects backwards with the ultimate owners involved from day one
Brett Himbury, IFM Investors



Insight 2.

Increasing project complexity requires more adaptive processes

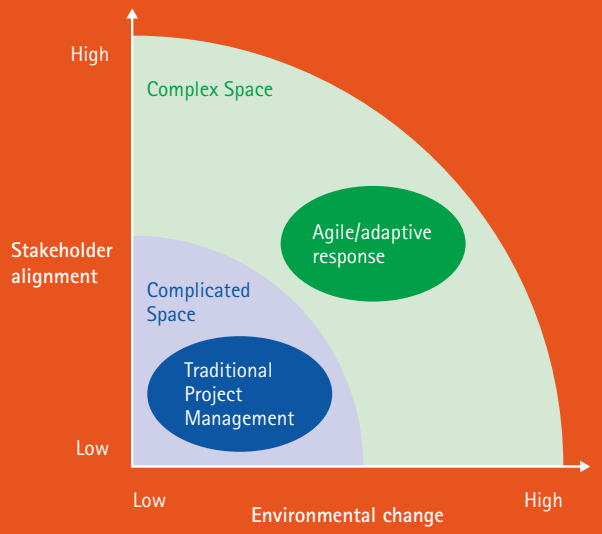
There has been limited improvement in the performance of mega-projects over the last few decades and projects will only become increasingly complex and human-centric in the future. There is much research underway on how to improve our performance on mega-projects. Areas of focus include better modelling of risk, the development of more accurate estimate classes and improved institutional design for accountability. However, it may be useful to apply a different set of lenses to the whole phenomenon of mega-projects. By using some of the thinking from the complexity sciences and organisational behavior, we can better understand the issues at play in this environment and seek novel solutions.

We have learned that a different set of leadership capabilities are required to manage complex systems. They allow us to gain a better sense of the environment, shape an identity that can drive self-management, rapidly adapt to emerging trends and regularly seek agile pathways in order to achieve better outcomes.

"Complex projects have been characterised as embodying uncertainty, ambiguity, dynamic interfaces and significant external influences"
IBM

"Humans are central to the creation of complexity, the people involved, the ways they communicate and the relationships they develop constitute the behaviour and combined culture of the organisation or project"
Complex Project Management Task Force Report

"Traditional project management approaches, tools and techniques are inadequate for managing the increasing complexity and ambiguity in our rapidly changing business environment"
Complex Project Management Task Force Report



Insight 3.

We need change mindsets to build a new culture of collaboration across corporate and political boundaries

We know that for the complex eco-systems that we call mega-projects we need a different culture and type of leadership (everywhere) that can rapidly adapt – within agreed boundaries – to meet emerging challenges.

From organisational behaviour, we have learned that shaping such a performance culture takes time. It requires trust and authenticity, the freedom to adopt alternate views, emotional engagement with a sense of purpose, an environment of coaching not blaming and a sense of shared accountability.

In this environment, the incremental discretionary effort is high and the ability to collaborate to solve problems or deal with emergence is prevalent. This culture works best when it is supported by an appropriate business model, but can also transcend one.

Another key notion here is that of boundary-spanning leadership, as on complex mega-projects we are working across organisations and even across different layers of Government. We need to manage using influencing techniques, as we may not have recourse to direct line authority. Alpha project managers often struggle in this space and can cause collateral damage in the name of project progress.

These lenses of complexity and behavioural science will be used to frame a set of responses to the challenge of mega-projects.

Our next generation service oriented projects are complex not complicated. They require a different approach to being guided rather than managed. Traditional project management approaches used in the Simple (routine) or Complicated space are useful for engineering projects but are not able to deal with the ambiguity and emergence of complex social service delivery projects.

Insight 4.

Changing mindsets and models

Inside out to outside in

We are changing from an inside out to an outside in approach to how we think, sense and architect the way we look at and drive projects. We need to be aware of the business and service impact of decisions at all times and optimise outcomes to deliver value to all stakeholders. This requires the business model to flex as we move through the project stages and requires delivery agencies to collaborate and align their contributions to achieve the best outcomes. In this complex eco-system, the people best able to take decisions make them because there is trust, transparency and shared accountability. The role of the leader is to create the flourishing environment that enables distributed leadership.

"Alliances change the focus of what adds value and become a catalyst for behavioural change and collaboration"

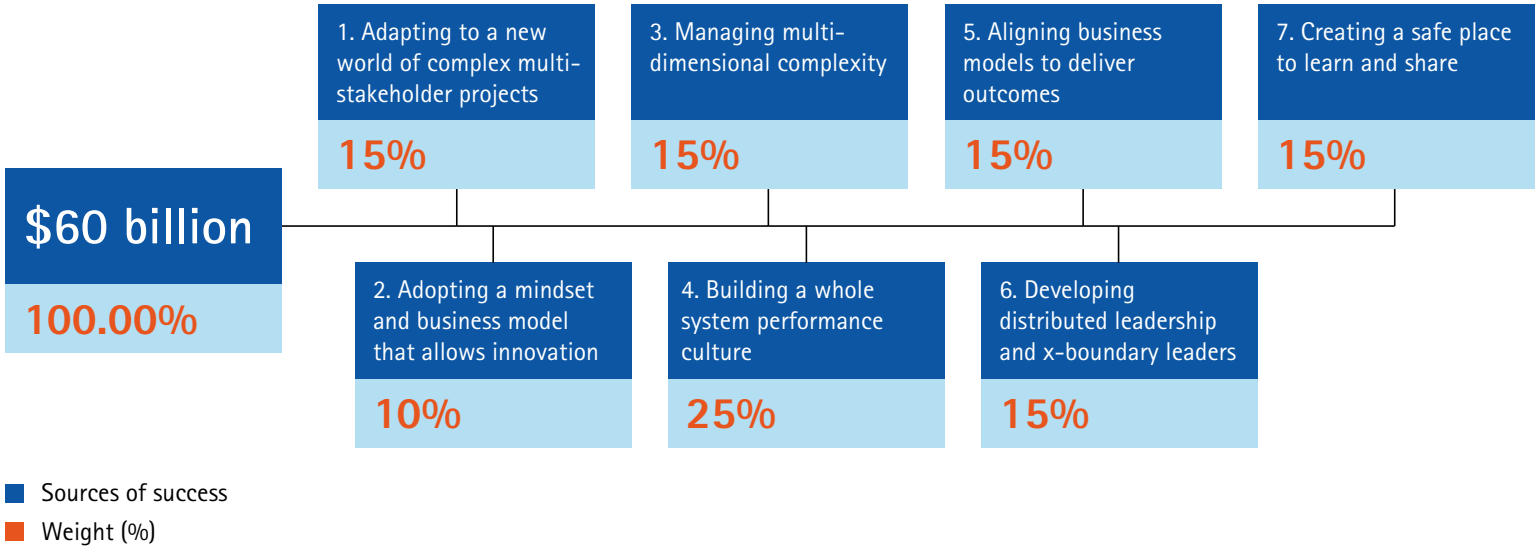
	Traditional Project Management	Next generation Project eco-system leadership
Aspect	**From**	**To**
Outcomes	Engineering and budget success	Business case and operational performance success
Primary Stakeholders	Owners and Contractor teams	Customers, Service providers, Investors, Owners and Constructors
Timescale	Construction project	Operating asset use lifecycle
Locus of attention	Project resources	Service consumers, delivery agents and
Leadership	Hierarchical and centralised	Distributed leadership at point of events
Vision and engagement	Top-down and siloed	System-wide and engaged
Decision-making	Centralised	At point of need
Business model	Protecting interests	Agile creation of value for all
Risk	Tightly controlled	Managed as emerges
Governance	Adherence to plan, variation-oriented	Achievement of outcomes, value-oriented

"Psychology is prime and will override any business model"

Emerging Solutions

From over 30 interviews we identified the following root cause of future success

From the research process, we have focused on what we can do differently from a behavioural perspective to achieve better outcomes for the next generation of mega-projects. These are additive to the well-known Prince 2 approaches, processes and systems that we use for traditional engineering-oriented projects. The degree of impact will depend on the nature and complexity of the new project. The clear areas for improvement identified below come from the domains of leadership, social, behavioural and organisational sciences. We use many of them in steady-state organisations but now have the challenge of using them adaptively for complex projects in a dynamic environment. The goal is to select from well-known bodies of engineering/ financial knowledge, while building an adaptive, performance-focused organisation that spans many diverse stakeholders and engages them in an emergent process.



Tackling complexity

Based on these insights we have developed a new behavioural-based model for the world of complex mega-projects

Model elements

1. Engaging the Eco-systems: Mega-projects need to address many diverse stakeholder communities and we need to shift our project focus to people and social needs that pull through supporting processes and technology.

2. Enabling innovative solutions: Our engineering and contracting models need to allow for continuous innovation, rather than being too rigidly specified upfront in an ineffective attempt to reduce risk.

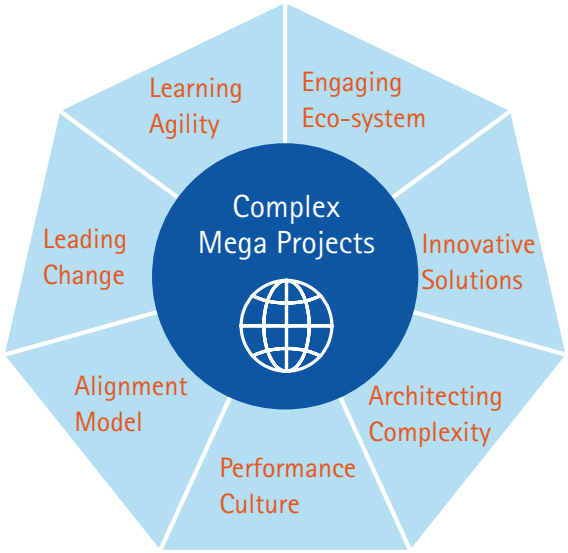
3. Architecting complex change: We need to look at how we best break down these complex solutions into viable related component parts. This will be as much about managing human change as about structural engineering.

4. Building a performance culture: We need to develop a culture of collaboration across all the diverse delivery agents on mega-projects so that they can make continuous optimisation decisions at the point of need, rather than relying on centralised control.

5. Aligning business models: New projects need contract models that align outcomes across diverse stakeholders, and can flex with the dynamic environment.

6. Changing leaders: We need to change the capability and focus of mega-project leaders and leadership from task management to achieving political, social and economic outcomes.

7. Learning agility: We need to embrace learning and rapid adaptation during and between projects so we can develop new processes based on a different form of project outcome.



1. Engaging eco-systems

What needs to change?

- Stakeholder engagement: We need to recognise that in the new world of solutions-focused projects, there is a large and diverse set of stakeholders with different views of success. These views can be political, social and economic. We will need to develop a new market-facing and inclusive project eco-system that engages and aligns these stakeholders.

- Adaptive concept-scoping: Many current projects are aspirational (strategic or social infrastructure projects) in both the private and public sectors. They are large, complex and hard to specify. Because of their nature, these projects are exposed to global and local economic, political and social volatility that does not allow for reliable estimates or promised outcomes. We need a new, more flexible project business model that can evolve as greater knowledge emerges or flex as the external environment changes.

- Human engineering: Our focus is often drawn to the now complicated world of technology and we ignore the complex human social-engineering aspects of projects at our peril. We need a shift in focus to include the far broader range of deliverables and processes that these future projects require. This implies a different governance and leadership model that incorporates the external and internal communities that are part of the project eco-system.

What can we change?

1. Engage the broader set of eco-system stakeholders in an inclusive and sustainable way: Former BCA Chairman Tony Shepherd spoke of the community engagement program for the Sydney Harbour Tunnel. By genuinely listening and creating an environment of openness and trust, the team enabled an easier resolution of the inevitable challenges that came later.

2. Change the way we manage iconic projects: From a psychological perspective we need to recognise the importance of iconic projects in both the private and public sectors, but make this recognition more transparent. If we deny our ambition for these projects we are left trying to reverse-engineer viable business cases. This will require changes to our project parameters that allow other factors to be included in place of unconscious bias or deception.

3. Adopting a new more holistic perspective: Using some of the approaches from complexity science such as sensing and sense making, we can ensure we can flesh out the concepts sufficiently so that we better understand their cost of construction/ service provision. This can involve structured creative processes that include multiple key stakeholders – such as scenario planning, design thinking and simulations – to allow for more robust tested concepts.

"The psychological commitment to projects happens early, from then on we just backsolve."

"We are trying to produce a recipe that ignores humans."

2. Enabling innovative solutions

What needs to change?

- Trapped in a cycle: Senior executives feel that they are subject to relentless BAU strategic planning cycles, market reporting cycles and election cycles which drive the pace and timing of new project announcements for publicity purposes, rather than allowing space for diverse or disruptive thinking.
- Trapped in probity: Many construction companies believe that they are asked for orchestrated, risk-averse answers and are not allowed to challenge or change the questions.
- Trapped in risk adversity: In seeking the fantasy of certainty, we specify the unspecifiable and wish risks away through rigid processes and registers. Innovation needs an environment of creativity and a willingness to fail and learn that is not present in most project environments.

What can we change?

1. Creative space for innovation: There is a need to create time and thinking space to allow for more mature stakeholder engagement, debate and co-creation of new/alternative solutions. Open innovation platforms or parallel task forces can uncover novel solutions.
2. Adopt a different procurement model that allows time and parallel processes: From NASA and many of the other great innovative projects, we see an environment of shared visions and value alignment, incentivising all parties to consider viable and sustainable operational outcomes rather than just the input costs of components.
3. Minding risk: "Creative approaches to risk management recognise the need to develop a shared interest in successful outcomes through identification of resultant mutual opportunity, rather than perceived protection against risk of failure and loss". **Complex Project Management Task Force Report**

"We sometimes see innovation in a crisis that cannot occur in a structured environment!"

"On many bids we are not allowed the time, space and attitude for innovation to occur."

3. Architecting complex change

What needs to change?

- Deconstruction of complex projects into component packages or parts is reductionist and primarily driven by technological drivers. It ignores both the complex intra- and inter-world of the project. Such packaging can create human interfaces that are a source of greater complexity, misunderstanding and friction with many different contractors.
- Drive for certainty: the attempt to eliminate change creates rigidity, and endless scope variations. When coupled with a risk-averse contracting strategy, it creates contention and disputes rather than an aligned problem-solving approach to novel issues.
- Negative feedback loops end up prioritising reporting and managing variances, when we know the original estimates were never accurate in a dynamic multi-stakeholder environment.

What can we change?

1. The project architecture needs the psychological and sociological knowledge on how to manage change. The construction engineering is often challenging, but the human engineering is far more complex and yet given such little attention by or within the project.
2. Complex Project Management: we must learn to observe and guide rather than constrain the forces involved. We can also build the abilities of the people at the primary interfaces by trusting them to make the myriad of optimising decisions they need to on a daily basis, without having to resort to a centralised command-and-control model.
3. Learning to tolerate uncertainty and ambiguity by building a culture of trust and results agility.

"We create our own complexity by the way we try to manage complexity – endless documents, risk logs, contracts."

"If it is bigger than $2 billion or has more than 3 interfaces it is too complex and will fail."

4. Building a performance culture

What needs to change?

- The new model involves a far broader range of people that need to be engaged, aligned and committed. This cannot be achieved by Gantt charts. There needs to be an environment across the many aspects of the project that promotes a sense of shared purpose, constructive engagement, collaborative problem-solving, trust, accountability and self-management.

- Decisions made at point of impact not at the centre: As a response to project complexity and consequent anxiety we try to centralise decision-making. This ends up as a bureaucratic logjam on complex projects where work often has to continue in spite of the governance.

- Shared accountability: Under the current model there is a run-for-cover shifting of blame or contracts when things go wrong. This needs to change to a sense of mutual achievement and learning how to work better in the future.

What can we change?

1. Build a performance culture upfront: We need to focus much more on the creation of sustainable project environments where we have a clear sense of "why" and aligned teams across boundaries. The formation of the partnership should come from organisations and people who have both the ability to deliver and the willingness to collaborate to achieve success.

2. Build trust and transparency in everyday actions: The challenge is for us to move beyond platitudes and to consciously develop a nurturing environment by the way we conduct ourselves in the many transactions and interfaces we have on a daily basis. Culture is emergent, not proclaimed. We need to call out non-values aligned behaviours immediately, at any level.

3. Conflict resolution: The fear of conflict or avoidance is just as problematic as uncontrolled conflict. Creating a safe place to offer alternative solutions and challenge status quo is healthy. This can be both a value and a process. Dispute Avoidance/ Resolution Boards can be useful safety nets but the stakeholders can learn how to have difficult conversations with positive outcomes by using a coaching mindset.

"We need experienced and collaborative people with just enough governance not technocrats and autocrats."

"Governance is more useful at head office than on the site, we need experienced people not paper."

5. Aligning business models

What needs to change?

- Moving beyond the contract: At present there is a view that the contract form needs to be the mechanism to ensure compliance and order on projects – assuming that bad behaviour will occur. We need to see that human collaboration is the key to success and ensure that the form of agreement (alliance, D&C, schedule of rates, lump sum) supports, not supplants this.

- Flexibility: In complex mega-projects, it is not possible to know all the 'right stuff' on day one, so we need to create a business model that reflects the emergent nature of these projects, aligns stakeholders around success and allocates a fair share of value and risk.

- Contracting in a complex world: There are numerous examples today where the legal document is driving significant contention, claims and disputes, or has been put aside to allow project progress. We need to develop a more accessible way of creating an agreement around outcomes that guides successful solutions and incentivises performance.

What can we change?

1. Mutuality of interest is where the ultimate project results and the relative contribution of all parties (both resources and collaborative behaviours) can be agreed on and then captured in an appropriate form. The process needs to be shaped in the real world of projects using social, emotional and political skills to align the different stakeholders in achieving success.

2. Joint ventures to create value, not limit exposure: The model needs to be able to flex and adapt to external and internal changes as part of the core process, not as an exception.

3. Project issues should be resolved by people raising them early and seeking to solve them, not by resorting to at best historical records of an imprecise understanding of scope and costs from several years before. Otherwise, we may win the skirmish in a contract dispute, but then create a lose-lose cultural impact that ultimately undermines the sensitive collaborative culture of the project and the economic and social benefits it delivers.

"Hard money contracts can engender adversarial behaviours where ambiguities arise, as parties tend to protect their individual positions, each interpreting the contract in their own favour."

"We need to put the Partnership 'P' back in PPP!"

6. Changing leaders

What needs to change?

- New leadership model: The shift from managing complicated technological projects to leading complex social solutions needs a different form of leadership that is distributed through the project eco-system, not resident in a single person.
- New Leaders: The current form of centralised project leader who is a single point of responsibility is not viable in a large, complex project environment. There are just too many variables and interfaces. Their role needs to change to one of enabling leadership, rather than acting as the choke point for decisions.
- Leadership development: At the moment there is a limited cohort of jumbo project pilots. They tend to learn by surviving the school of hard knocks and often burn out or lose their edge. There is limited development of the next generation on an apprenticeship basis.

What can we change?

1. Develop a distributed leadership model: As the project eco-system is set up, it can be designed in such a way that it enables timely leadership decision-making close to the operational parts of the project. Leaders can collaborate as a team to review, assess and solve the myriad of daily issues that emerge. They can communicate and share performance outcomes and take joint accountability for success.
2. Identify the behavioural capacities required for your next generation leaders: The project leaders of the future will have to have a 360 degree leadership style and become orchestrators and integrators of distributed leadership. They will need to transcend boundaries (political, national and organisational) and unify disparate stakeholders into an aligned mega-project team.
3. Create a pipeline of project leaders: Develop an action-learning model for project managers as part of their everyday activities. They can have defined learning stretch goals, formal peer groups and experienced mentors.

"We need to use large projects as an environment to blood younger people, they bring energy and drive to the project."

"They appointed Alpha Project Managers to difficult contracts to contain the costs, but they ended up destroying the team."

"The perceived complexity of a situation or system is relative to the capacity of the responsible individual or group to comprehend it."

Complex Project Management Task Force Report

7. Learning agility

What needs to change?

- Risk appetite limits learning: Typically the level of anxiety on complex projects does not allow learning or experimentation to occur. The emphasis is on risk minimisation and therefore tight governance and procedural adherence.
- Wrong approach: Research has found that the use of absence of governance frameworks and methodologies makes very little difference to project outcomes. People tend to rely on their own experience and that of those around them. Yet we spend a great deal of training and control effort on mechanisms that have limited impact. We need to shift approach and learn through experience and reflection.
- Limited learning appetite: Project post-implementation reviews seldom take place or have sufficient attention paid to them. There is limited appetite to explore failure and learn, and typically project managers end up as the immediate collateral damage.

What can we change?

1. Change the culture: The project needs to create a way to fail safely. This way we can genuinely explore what happened and what needs to change and avoid making the same mistake again. NASA created a safe space to be expected to "not know" and therefore be open to learning.
2. Adopt a new, embedded learning model: NASA also recognised the apprenticeship process of learning to deal with complexity and supported this with knowledge management, mentors and simulations to give real-life experiences.
3. Learn across projects: We can leverage great models of successful transfer of learning across projects through knowledge management. This can be a first port of call for novel project problems, allowing teams to explore others' experiences and even use new technology platforms for crowd solving and learning.

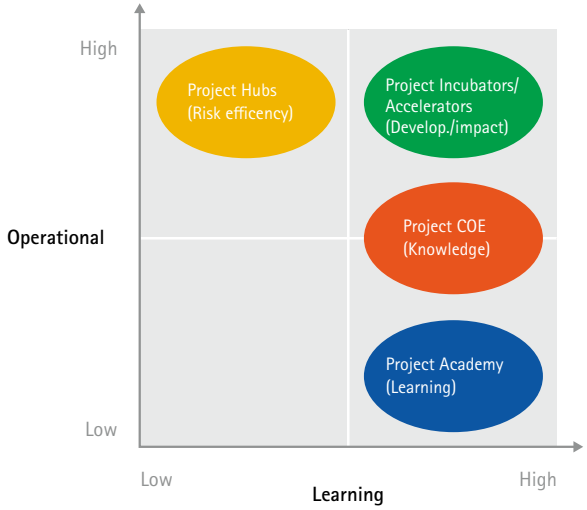
"We will make the same mistakes again, just with different people."

"I have been asking for lessons learned for 30 years but never get them."

Changing our approaches will be challenging

Changing the way people think, relate and operate is complex but we have some models to draw on

Model	Project HUBS	Centres of Expertise	Project Academy	Project Incubators/Accelerators
Approach	Centralise mega/major projects	Virtual or physical sharing of knowledge and methods	Specialised learning environments for developing project leaders	Built into mega-projects to develop leadership and culture
Benefits	Reduces risks if few very capable mega-project managers	Low-cost, low-touch, available 24x7, can be outsourced	Brings like-minded cohorts together and is a focused development activity	Real-time learning in the project environment with the real systems and project team
Limitations	Can alienate the owners and other site and eco-system stakeholders. Is also susceptible to economic cycles.	Relies on being kept up to date and relevant. Is optional and does not change behaviours	There is an abstraction from the real project environment that requires deliberate application of learning	Takes some upfront investment of time and a commitment to ongoing development as part of a sustainable practice
Examples	BHPB	Rio Tinto	NASA John Grill Centre Accenture	Telstra VC start-ups



A real concern unearthed by the research was the low rate of improvement over the years. We explored different ways that organisations had used to either try to ensure consistency through centralisation or share best practices through centres of expertise. Both approaches had their challenges. The Project Academy model used by NASA developed a good pipeline of experienced project leaders who leveraged knowledge supported by mentors. However, as with the Project Hubs this investment could not be sustained through the usual boom/bust cycles. Learning as an integrated part of the project itself and across and between projects using a leadership incubator approach appears to best create the culture that is required to break the cycle of repeated errors. This is regarded as normal practice in many U.K. projects.

Measuring success in the new world

We need to change the way we look at these projects and measure their outcomes. This will drive the behavioural changes required for success. This entails engaging with key external and internal stakeholders and really understanding the drivers of performance. We need to know we can measure success and then be able to use the performance data to help us all adapt our inputs and processes to focus on outcomes. We can no longer live in the world of engineering success and economic failure.

Value	From (Challenged)	To (Successful)	Prize (based on $ 1 Bn project)	through...
Social Value Capture	Disconnected	Aligned with community needs	Multiplier effect	• Services outcomes specified • Early engagement of community • Service delivery lifecycle perspective
Political Value Capture	Aspirational	Inspirational	Multiplier effect	• Visionary • Planned • Policy enabled
Economic Value Capture	< 5 % Business case achievement	> 50 %	> $ 500 m	• Stakeholder alignment and engagement • Adoption of innovative techniques • Focus on value harvesting
Improved budget success	Overruns > 30 %	< 5 %	> $ 250 m	• Realistic estimates • Flexible outcomes based business model • Collaborative rapid problem solving
Meeting schedule	Overruns > 30 % LD Fees 5 %	< 5 % Early bonus 5 %	> $ 100 m	• Architecting bite sized and parallel chunks • Stakeholder alignment and engagement • Delivery teams work as one
Reducing Risk	Liquidated damages 5 %	0 %	$ 50 m	• Reduced risk through early intervention • Aligned business model

How do we know if our project is complex?

It is important that we apply the right mindsets to the nature of the project. Routine projects are predictable and low risk. They can be well managed using traditional project management approaches. Complicated projects have a higher risk profile from an engineering perspective. They need a disciplined framework and business model that can adapt us the unknown aspects become clearer. Complex projects are far more emergent. We don't understand the risks upfront and can constrain innovation and incur endless variations by being too rigid. They require a more adaptive approach and business model that can align the different stakeholders interests as they collaborate to deliver successful shared outcomes.

Complexity Factor	Routine Project	Complicated Project	Complex Project
System properties: Variety & domain knowledge	Stable, known & repeatable	Stable & linear Known & unknown but discoverable	Emergent & non-linear Unknown but knowable
Example	Highway, Mine	Desalination plant, Port	Health service, Space station
Nature of outcome	Clearly defined and know approach	Defined but approach to be refined	Conceptual and changing with adaptive approach
Stakeholder relationships	Limited, aligned and engaged	Known set, may be influenced	Wide variety and wicked (oppositional)
Impact intensity	Product-only failure	Impact beyond system	Broad social and political implications
Resources	Known, available and engaged	Known, scarce and sought after	Known/Unknown, rare and to be developed
Technology	Known & stable	Known/Unknown and evolutionary	Known/Unknown and revolutionary
Interfaces	Stand-alone	1 -3 modules	Many-to-many
Methodology	Known and repeatable	Discoverable and reductionist	Discernible but adaptive
Value capture	OTOBOS	Economic value captured	Social, political and economic value captured
Governance	Structured process, risk averse	Structured discovery, innovative, transparent, trust & communications	Shared purpose, distributed leadership, transparency and outcomes accountability

2020: In the media

We have experienced a portfolio of successful projects that have developed Australia's fundamental economic infrastructure for the next 30 years

Headlines

"These projects were complex and costly but they were well managed and met all of the performance hurdles in terms of social engagement and impact and economic success for venture partners, as well as sustainability and safety."

"We had many learning challenges and a number of mistakes along the way, but we learned from them and shared this knowledge with others to ensure we did not make the same mistakes again."

"We established project communities made up of many diverse stakeholders, unified by a shared sense of purpose and a fair economic model. The culture was collaborative and 'can do' outcomes-focused, where any issues were dealt with quickly in a generative manner."

"We now have an amazing generation of complex project leaders who are in demand by the rest of the world, and we are comfortable that our processes will continue to build both the leadership and the leaders we need for the ever-increasing complexity we face in the future."

Acknowledgements

The interview/ discovery process was conducted through 30 interviews with different stakeholders to get their perspectives of success and failure

Political leadership

- Former Premier of New South Wales

Infrastructure Agencies:

- Infrastructure Australia
- NSW Treasury
- Infrastructure NSW
- Infrastructure Partnerships Australia

Professional Peak bodies:

- Australian Constructors Association
- Project Management Institute
- Australian Institute of Project Managers

Business Leadership

- Former Chair of Business Council of Australia
- President of Australian Constructors Association

Owners team Mega-project Managers

- Resources
- Transport
- Health

Construction companies

Engineering Design organisations

Law firms

Infrastructure Investors

References

Ashurst (2014), 'Scope for Improvement: Project pressure points'

Australian Constructors Association (2001), 'D&C projects: A Model Procurement Process'

Australian Government (2012), 'Infrastructure Planning and delivery: Best Practice Case Studies', Volumes 1 and 2

Australian Governnment (2011), 'National Alliance Contracting Guidelines'

Axelos (2014), 'Portfolio, Programme and Project Management Maturity Model (P3M3)'

Booz&Co, Infrastructure Partnerships Australia, 'Integrating Australia's Transport Systems'

Business Council of Australia (2012), 'Pipeline or Pipe Dream? Securing Australia's Investment Future'

Caravel (2013), 'A Review of Project Governance Effectiveness in Australia'

Dingwal J., Ross J., Evans M. (2015), 'Smart collaboration in risk-transfer ('hard money') contracts', PCI Group

Dispute Resolution Board, 'Avoiding conflict before it occurs'

Doz Y., Hamel G. (1998), 'Alliance Advantage: The Art of Creating Value Through Partnering', Harvard Business School Press

Edmondson A. (2012), 'Teaming: How Organizations Learn, Innovate and Compete', Harvard Business School

Flyvbjerg B. (2003), Megaprojects and Risk: An Anatomy of Ambition', Cambridge University Press

Flyvbjerg B., Garbuio M., Lovallo D. (2009), 'Delusion and Deception in Large Infrastructure Projects: Two models for Explaining and Preventing Executive Disaster', California Management Review

Flyvbjerg B., Garbuio M., Lovallo D. (2014), 'Better forecasting for large capital projects', McKinsey & Co

Flyvbjerg B. (2014), 'What You Should Know About Megaprojects and Why', Said Business School

GAPPS (2007), 'A Framework for Performance Based Competency Standards for Global Level 1 and 2 Project Managers'

Infrastructure NSW (2014), 'Contingency Management Guidebook. Guidelines for optimising capital investment funding'

Infrastructure NSW (2014), 'State Infrastructure Strategy Update'

Infrastructure Partnerships Australia, 'Performance of PPPs and Traditional Procurement in Australia'

International Centre for Complex Project Management (2011), 'Global Perspectives and the Strategic Agenda to 2025, The Task Force Report'

Lenfle S., Loch C. (2010), 'How Project Management Came to Emphasize Control Over Flexibility and Novelty', California Management Review

Merrow E. W. (2011), 'Industrial Megaprojects: Concepts, Strategies and Practices for Success', John Wiley & Sons, New Jersey

NSW Government (2014), 'Benefits Realisation Framework'

Transport for NSW (2014), Annual Report

Victorian Government (2006), 'Project Alliancing Practioners' Guide'

The research team

Malcolm Dunn

Lead Researcher

malcolm.dunn@agilience.com.au
m. 0412 474 423

Malcolm is an Executive Change Coach. He has been involved in applied research for the last five years in the areas of human behaviours in a business context, accelerated development of leaders and boundary spanning leadership. He is currently part of the coaching team at the John Grill Centre for Project Leadership and Adjunct Faculty at AGSM.

As an Asia Pacific Industry Managing Partner in major international consulting firms (Booz & Co and Accenture) and Director of Business Schools (AGSM and MBS) he has executive teams plan and transform their organisations.

He has worked extensively in both the private and public sectors with large-scale Resources and Oil industry multinationals, as well as with the Federal and State Governments.

Malcolm has focused on adult learning/capability models and successfully used action-learning techniques to build cross-business unit/agency collaboration in both large organisations and Government. He conducts applied research in the application of complexity and behavioural sciences to organisations and mega-projects.

Malcolm has postgraduate degrees in Business, Science, and Psychotherapy.

James Bawtree

Research Support

james.bawtree@agilience.com.au
m. 0419 533 678

James is an internationally-accredited strategy & execution, portfolio project, programme, PMO, benefits and project management consultant. James is an approved trainer with an extensive proven history of uplifting the capability of over 1,000 executives, programme, project, PMO, benefit and change managers.

He has supported executives and teams to better understand their roles and responsibilities, increasing speed of delivery within the project/programme/portfolio environment.

Clients leverage James' deep experience as a Programme Director, PMO Manager, Organisational Change Manager and Portfolio Advisor to optimise organisational project delivery. He has delivered many of his clients' most challenging programmes while coaching clients to ensure ongoing delivery capability uplift.

For the last four years James has led the MBA course in Strategy Implementation, Queensland University of Technology for full- and part-time Executive Masters students. He is a sought-after speaker at conferences and workshops.

Craig Tapper

Research Support

craig.tapper@agilience.com.au
m. 0414 616 012

Craig focuses on Executive Development, Digital Marketing Strategy and Operational Excellence.

He has been a long-standing Program Director and Faculty member on AGSM's MBA, MBT and Executive Education Programs. He has consulted to major telecommunications, consumer products and resources companies. In addition, he led a boutique management consulting firm for over six years and accumulated over 15 years' experience as a director on boards.

Craig's career includes more than 25 years' experience at senior levels in the corporate and public sectors in both Australia and the United Kingdom, including senior sales, marketing and executive roles in major Australian and international companies.

Craig brings a breadth of functional expertise coupled with genuine adult learning experience to help organisations change. He understands how to engage the participants of change in the process.

He has an undergraduate degree and postgraduate degrees in economics, industrial relations, marketing and an MBA. He is a Fellow of the Australian Institute of Company Directors and a Senior Fellow of Finsia as well as being a Certified Practising Marketer.

About Australian Constructors Association (ACA)

The Australian Constructors Association represents leading construction and infrastructure contracting companies. ACA members operate globally, with member companies operating in Australasia, Europe, Asia, North and South America and the Middle East. Collectively ACA member companies have combined annual revenues in excess of $A50 billion and employ over 100,000 workers in their Australian and international operations.

About Agilience

Agilience is engaged in action based research, execution impact and learning. We have studied the heart and science of agility, and from this position we seek to become a catalyst in your process of outcomes driven strategic change. This applies to strategy and project execution in a complex world."