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Infrastructure UK

Infrastructure procurement routemap:

technical note on application

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ISBN 978-1-909096-57-8
PU1445

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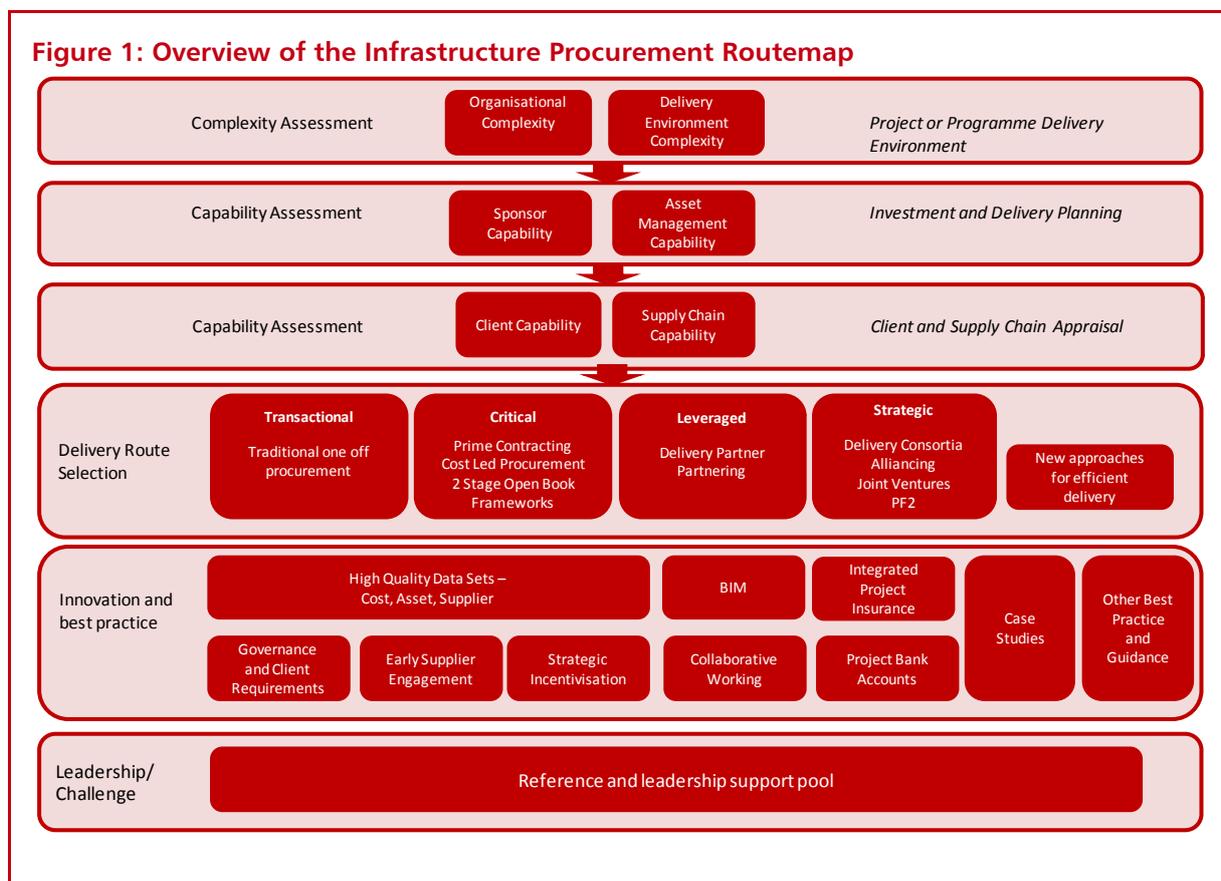
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1

The Infrastructure Procurement Routemap – Introduction and Overview

In 2011, Infrastructure UK (IUK) published a three-year Implementation Plan for the Infrastructure Cost Review, identifying the measures to be taken by Government and industry to make efficiency savings of at least 15 per cent by 2015, worth £2 billion to £3 billion per annum. Consistently, the capability of sponsors and clients to select and implement an appropriate procurement strategy, together with the wastage and inefficiency in procurement processes, are identified as key areas for reform. To meet this challenge, IUK in collaboration with the University of Leeds, have developed an 'Infrastructure Procurement Routemap: a guide to improving delivery capability' (Routemap), to enable organisations to make more informed procurement and delivery decisions.

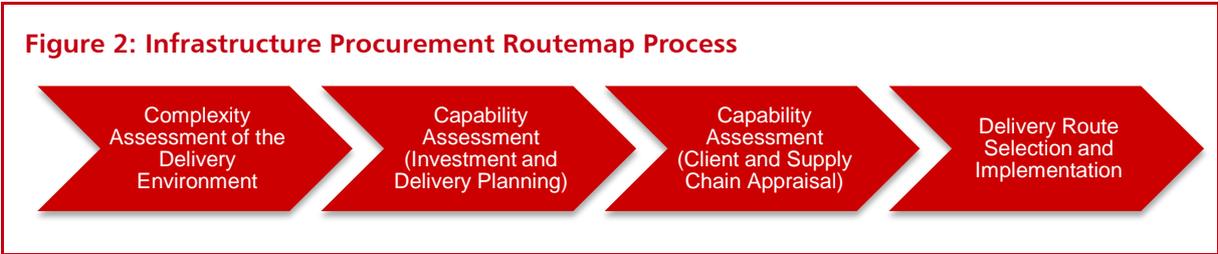
The Routemap, supporting tools and best practice resources will help clarify and identify required improvements in sponsor, client and supply chain capability to inform decision making and optimise procurement and project delivery outcomes. Figure 1 provides an overview of the Routemap. The case study of Crossrail, detailed in Annex A, demonstrates that the application of these principles has led to savings against the original budget of approximately 7 per cent. It is therefore reasonable to assert that other major investments could achieve similar levels of savings by adopting the Routemap principles.



The tools within the Routemap assess the capability of the sponsor, client, and supply chain, together with the complexity of the project or programme and organisation. The identification of any misalignment between this output and the critical success factors, key risks and opportunities can be identified allowing sponsors and clients to make more informed procurement decisions.

The capability and complexity assessments examine the conditions that can influence the achievement of successful outcomes, not individual ability or action. The sponsor is the organisation that owns the business case and is responsible for specifying the requirements to the client; the client is the organisation that is responsible for fulfilling the requirements and delivering the benefits; and the supply chain refers to the private sector participants that assist the client in meeting their needs.

The principles of the Routemap have been translated into an objective, systematic process that assists in the identification of potential opportunities and issues for achieving maximum value from the procurement route. The Routemap is not intended to be prescriptive: rather it is a reflective process. It does not lead to a single solution, but ensures that the 'right' questions are asked at the critical junctures in the project or programme lifecycle and that the key risks attributed to the delivery approach are identified. Figure 2 demonstrates the steps in intelligently arriving at an appropriate delivery route and planning for implementation.



This application guide explains the principles of the Routemap, and the process, including how to implement the assessment tools and how their outputs translate into efficient and effective outcomes. This has been achieved through the provision of:

- a process narrative detailing the assessment process and the supporting assessment tools and expected outputs (Chapter 2);
- an example of how the process can be applied in a structured format (Chapter 3); and
- further planning considerations for managing organisational change attributed to the selected delivery route (Chapter 4).

The Infrastructure Procurement Routemap referred to in this application guide can be found at http://www.hm-treasury.gov.uk/iuk_cost_review_index.htm. This site also contains links to other Infrastructure Cost Review resources.

In order to gain the maximum benefit from the application of the Routemap process to any given project or programme, it is essential that both sponsor and client organisations adopt the process principles at a senior level and that staff engaged in the process have responsibility for successful delivery of the project or programme. An overview of further best practice advice that is relevant to the Routemap stages is listed in Annex B.

Figure 3 provides a generic breakdown of the steps of the Routemap process, demonstrating the links between the reflective process, assessment tools and the outputs. The process has been expressed in a step-by-step format so that during application it can serve as a sanity check for readiness in moving forward to the next phase of the project or programme.

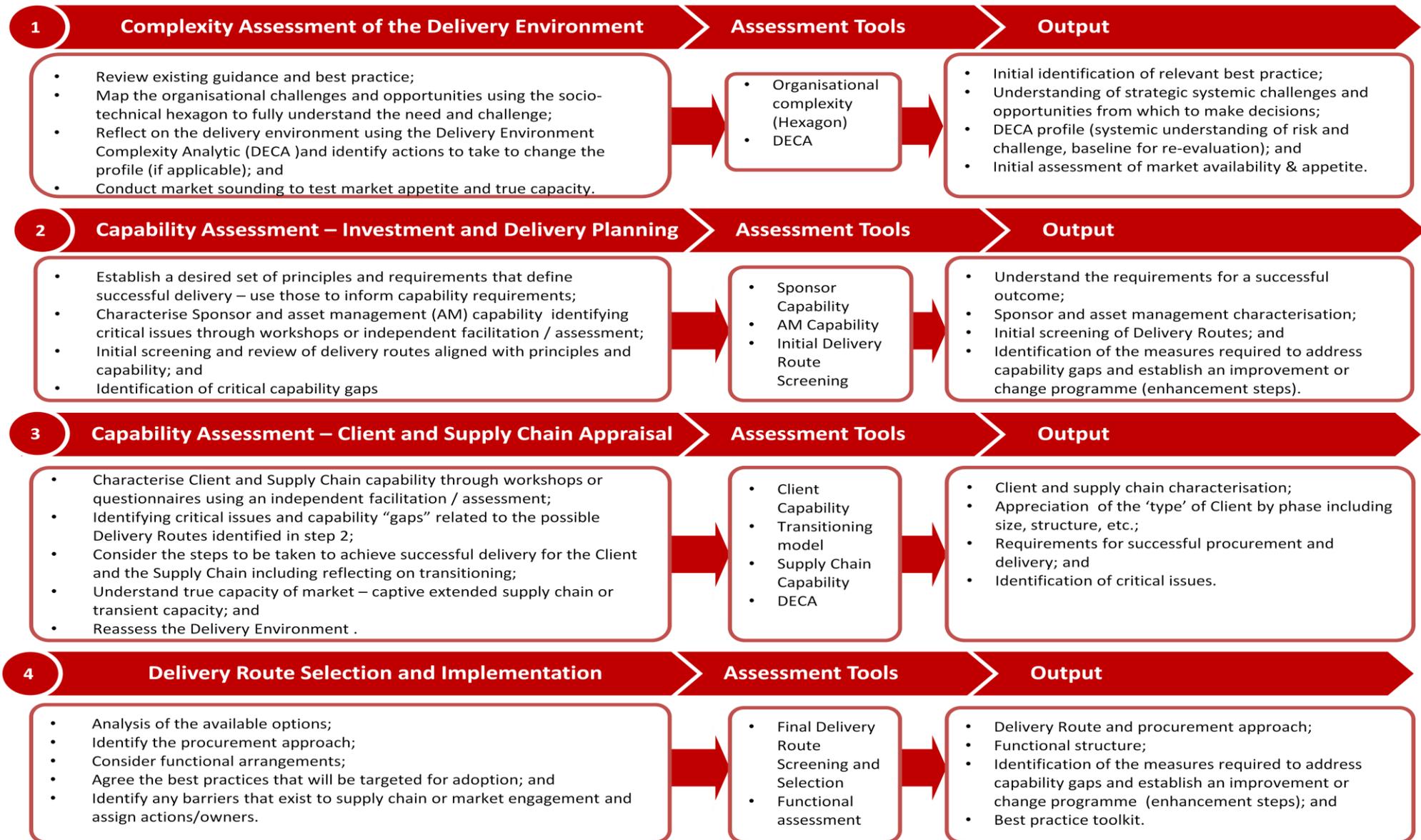
The four steps of the process are described in the remaining sections of this application guide. Illustrative examples of the application of the assessment tools in the form of a case study, of Crossrail, can be found in Annex A.

The anticipated benefits to the project or programme associated with utilisation of the Routemap include:

- value for money – systemic approach, matching capability to complexity ensures selection of appropriate delivery approaches, informs sponsor, client and supply chain requirements and enables real challenge of effectiveness and efficiency building on recognised and emergent good practice;
- continuity of performance – articulation of the challenges presented by the project or programme delivery environment, including the challenges related to the business change and achieving the optimum combination of capital and asset delivery to ensure key transitioning challenges are planned for and understood, so avoiding significant costs of delay;
- avoided costs – identification of areas for improved sponsor, client, delivery partner and key stakeholder relationship performance through systematic mapping and agreement of the requirements underpinning the delivery model, leading to more clearly aligned objectives with appropriate incentives;
- increased revenue – identification of opportunities to generate additional revenue, for example by developing land and property opportunities, by selling advertising space and promoting regeneration opportunities;
- increased understanding of the systemic challenges and opportunities associated with benefits realisation and with the selected delivery route identifying the potential to reduce costs; and
- development of a tailored best practice toolkit suitable to the challenge and level of capability.

Wider benefits from the adoption of the Routemap accrue to the sponsor and client from assessing their organisational capability, aligning it with the challenges they have to meet and implementing enhancement plans.

Figure 3: Infrastructure Procurement Routemap Process (Expanded)



2

Applying the Routemap

For application of the Routemap, the four steps of the process are described in the following sections. Key considerations for the assessment process associated with each of the four steps and the recommended outputs are provided. A list of relevant publications containing further guidance can be found in Annex B. Annex C contains a clarification of terms related to delivery routes for use with this document.

1 Complexity Assessment of the Delivery Environment

Considering Complexity

Assessment Process:

- Review existing guidance and best practice;
- Identify and map the organisational challenges and opportunities to better understand the size and shape of the challenge the project or programme presents;
- Assess the Delivery Environment using the Delivery Environment Complexity analytic (DECA) and identify actions to take to change the complexity profile (if applicable); and
- Conduct market sounding to test market appetite and true capacity.



How:

- Horizon/Environment Scanning - Searching for Comparators
- Workshops/Interviews
Hexagon
DECA
- Market Analysis

The focus of the assessment process undertaken in Step 1 is a consideration of the concept of complexity and how it may be assessed. A review of existing guidance and best practice should be completed by those responsible for investment planning, looking to comparable projects or programmes, for lessons learned. The tools help to identify the required actions related to the management of complexity. Market sounding is also necessary to gather input and data to inform decision-making as the Routemap approach is followed.

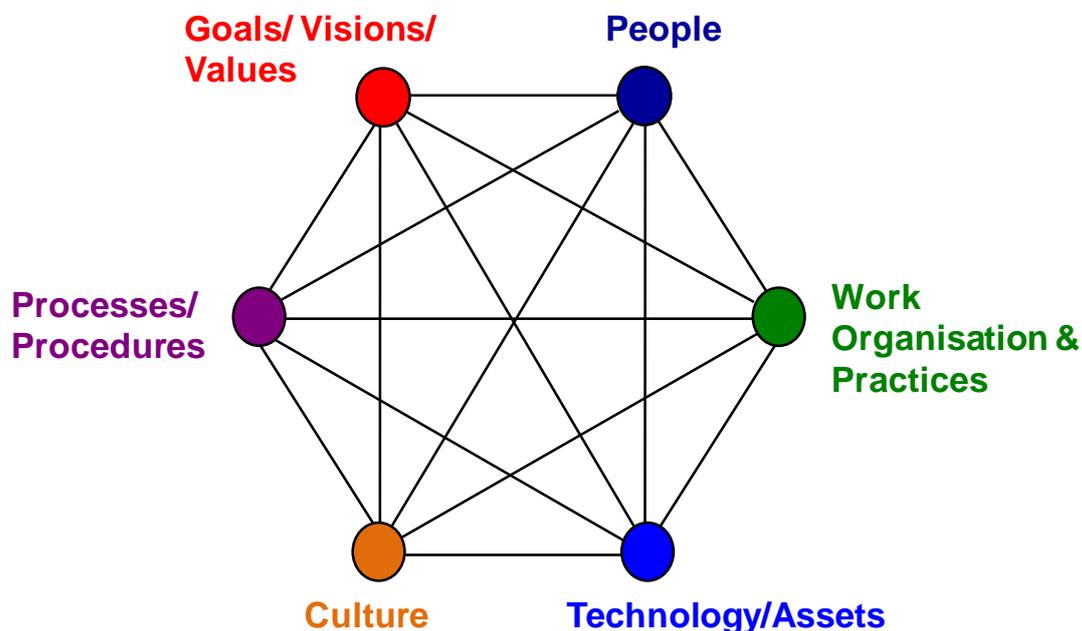
Assessment Tools

Organisational Complexity

An assessment of the complexity attributed to the organisational delivery environment using a socio-technical approach is recommended. This takes into account that people, organisational culture, goals and practices, together with technology and procedures, are all part of an interdependent and interacting system in which recognition of the combined effects is vital for success. The socio-technical hexagon¹ (Hexagon) (Challenger, R., Clegg, C.W., Robinson, M., and Leigh, M. (2009) *Understanding crowd behaviour – supporting evidence*. Cabinet Office – Emergency Planning College, London.) is a graphical representation of the relationships within organisational systems and is the model for this assessment. Figure 4 illustrates.

Taking each heading in turn the objective is to identify and map the key challenges and opportunities related to the project or programme under consideration. For example; are the goals and vision for the project or programme documented and understood? Will there be an impact, directly or indirectly, on working practices and people – either positive or negative? Capturing key issues in this way allows the broader landscape to be mapped and the inter-relationships to be identified.

Figure 4: The Socio-Technical Hexagon for Organisational Complexity Assessment



This mapping also provides a reference point for subsequent assessments in the Routemap to ensure that the assessments are validated and are compatible with these wider organisational issues.

It is suggested that this process is best carried out in a workshop environment with key sponsor and client representatives present. It is important that representation includes a good cross-section of people involved with and impacted by the project or programme.

Delivery Environment Complexity

Complementing the organisational complexity assessment is the Delivery Environment Complexity Analytic (DECA) as illustrated in Table 1. The DECA provides a means of stimulating reflection and action on the key factors, both individually and how they interact as system from a socio-technical perspective.

Whilst several approaches exist to evaluate the delivery environment, as a minimum, the factors in the DECA (Table 1) should be considered in the evaluation process. The approach contained in the DECA has been developed by IUK, in conjunction with the National Audit Office and the University of Leeds, and can be applied to both projects and programmes.

In the DECA, complexity is assessed across 12 separate factors by using qualitative statements that define complexity on a low, medium, or high rating. An overall project or programme complexity rating can be determined either by the predominance of factor ratings or by the rating associated with the most critical factors related to the specific project or programme. As with the organisational assessment, this process is best carried out in a workshop environment with a cross-section of representatives in order that differing views can be explored and a consensus reached, together with evidence collected to inform complexity management enhancement plans.

Completion of the assessment generates a profile that can be used by the sponsor and client to sanity check risk and readiness at various project or programme junctures allowing for a better understanding of the complexity of the delivery environment and the extent of the change required to support and sustain the viability of the investment.

The complexity assessment tools support users in gaining a more holistic understanding of the conditions contributing to complexity. They assist in the identification of both opportunities and challenges related to the organisational and delivery environments so that change can be implemented to create desired and manageable profiles. In this way, it is possible to determine how efficiency can be best achieved given the systemic conditions now and in the future.

Table 1: Delivery Environment Complexity Analytic (DECA)

Factor	Level 1 complexity	Level 3 complexity	Statement Rating		
			Low (1)	Medium (2)	High (3)
Strategic importance	Low priority operational level project/programme where the expected benefits are necessary but low in value terms. Externally, there is little political, media or public interest and failure would not have significant impact.	Critical to the delivery of business policy with very high expectation of benefits. High level political or public interest with strong media attention. Failure would have major impacts and consequences.			
Stakeholders	Low number of stakeholders. Stakeholders are aligned with the business objectives. Stakeholders are unlikely to change.	Significant number of stakeholders with high levels of influence and differing or misaligned objectives. Stakeholders may change.			
Requirements	Requirements and expected benefits are clear and linked to business policy. Key performance measurements link to goals, vision and values.	Ambiguity around requirements and how the expected benefits contribute to the realisation of the goals, vision and values. High uncertainty on project impact.			
Stability of overall context	Requirements, governance and delivery modes are clear and unlikely to change. Confidence in planning and project/programme authorisation guaranteed.	Good chance of the scope, structure, external requirements, economic and political landscapes changing.			
Financial impact	Investment is not significant relative to other investments in terms of capital expenditure. Anticipated revenues, efficiencies or returns on investment are not fundamental to the business.	Significant financial investment revenues, efficiencies or returns on investment and/or highly involved type / source of investment anticipated.			
Technology	No new technologies form part of the scope. No requirement for phased implementation or piloting.	New technology is required representing significant risks and changes in business practices. Failure to deliver successfully would have major impacts and consequences.			
Interfaces	Project/programme spans few boundaries (organisational, political, regional) and success is not dependent on relationships. Governance is not complex and enables support, decision making and reporting.	Project/programme spans many boundaries with internal and external partners and success is dependent on relationship management. Governance is complex.			
Range of disciplines and skills	Project/programme has few specialist disciplines or skill requirements.	Large number of disciplines and skills and/or potential for strain on the supply chain capacity and capability.			
Dependencies	Project/programme is not critical to the delivery of other projects.	Project/programme is critical to the delivery of other projects.			
Execution complexity & extent of change	Business as usual.	Large amount of organisational change required in organisation or business to deliver desired outcomes and benefits.			
Organisational capability	Demonstrated the capability to deliver project/programme through delivery of similar successful projects. Culture promotes 'intelligent client' attributes.	Has not demonstrate key capabilities underpinning delivery route and/or has not delivered under similar arrangements in the past.			
Interconnectedness	The understanding of the relationships and alignment between policy, culture, practices, technology, people, processes and procedures has been investigated, captured and communicated.	The extent of the inter relatedness between policy, culture, practices, technology, people, processes and procedure has not been investigated, captured or communicated.			

Complexity Assessment Outputs

Outputs:

- Initial identification of relevant best practice;
- Understanding of strategic systemic challenges and opportunities from which to make decisions;
- DECA profile (systemic understanding of risk and challenge, baseline for re-evaluation); and
- Initial assessment of market availability & appetite.



Outcomes:

- Greater understanding of risks, their consequences and potential opportunities.

Completion of the assessment process will result in the delivery of an initial identification of relevant best practice, a greater understanding of the strategic and delivery environment challenges and opportunities to inform delivery strategy selection, and an initial assessment of the market capacity, all resulting in a greater understanding of the risks, their consequences, and the potential opportunities available to the project or programme. The outputs should be discussed with those responsible for managing risk at strategic, programme and project levels to ensure that any issues are incorporated into the risk register and that the opportunity to maximise value is taken.

Considering Capability for Investment and Delivery Planning

Assessment Process:

- Establish a desired set of principles and requirements that define successful delivery – use those to inform capability requirements;
- Characterise Sponsor and asset management capability identifying critical issues through workshops or independent facilitation/assessment;
- Initial screening and review of delivery routes aligned with principles and capability; and
- Identification of critical capability gaps.



How:

- Workshops
- Reflective Analysis
- Workshops/Interviews
- Enhancement Planning

This assessment process assists understanding of the sponsor capability requirements through the investment and delivery planning process. It is important to articulate early on what success looks like in order to understand the capability required to achieve it. The tools help to identify the required actions with respect to sponsor capability and asset management capability, and how this should translate into an initial identification of potential delivery options and the beginning of an enhancement programme. During this step it is important to consider how the capability of the sponsor and the balance of responsibility within the potential delivery options influences the nature of client required.

Requirements for successful delivery

The requirements for successful delivery should have been discussed, developed and agreed as part of the business planning cycle. These should be clearly captured and communicated along with the complexity assessments to those participating in the Routemap process so that they are confident that the decision-making is driving towards a successful outcome. The level of clarity and understanding should be checked at the start of this part of the assessment process.

Assessment Tools

Sponsor and Asset Management Capability Assessment

The sponsor should assess their own capability to support the delivery of the project or programme and assess their level of asset management capability.

The sponsor is responsible for ensuring that the project or programme remains a viable proposition, aligned to the strategic objectives of the whole organisation. They should be the owner of the investment and overall business change and ensure that the change maintains its business focus, has clear authority, and that the context, including risk, is actively managed. They should manage the key business and community stakeholders. Therefore, it is imperative

to assess and ensure that the level of sponsor capability is equal to the challenge, and essential that any barriers to the sponsor organisation fulfilling their responsibilities are removed.

The level of asset management capability should be assessed at this time to highlight key operational constraints and/or requirements that need consideration in the project or programme process. The impact on existing assets and maintenance regimes is as relevant as consideration of how new assets will be taken into ownership. Early consideration of these matters allows time to introduce appropriate enhancement measures both in the existing organisations and to reflect these in the procurement process.

The sponsor and asset management capability assessments are based on the range of socio-technical criteria affecting the sponsor's ability to maintain the viability of the investment and take a systemic view of assets as enablers of strategic goals. Characterisation of the sponsor and asset management capability is illustrated in Tables 2 and 3.

The capability levels represent snapshots of systemic capability, not to be confused with individual ability or actions, but rather the conditions attributed to the sponsor organisation and how they interact with the project or programme. Both the sponsor and the asset management capability have been organised from low capability to high capability by systemic levels: vulnerable, governed and assured.

Level 1 (vulnerable): provides insufficient direction and strategic guidance. Ownership of asset is fragmented and subject to conflicting sponsor / client priorities. Processes and systems are immature. This level is indicative of a 'failing system' and the ability to establish the clarity of policy and outcomes to the delivery organisation is very limited. If the assessment indicates that these characteristics are present then advice should be sought from relevant government departments on how they can be addressed, for example, from the Major Projects Authority or other sponsoring departments.

Level 2 (governed): provides direction and policy guidance. Responsible for asset. Demonstrates active stakeholder management. Informs and works with client to manage strategic risks.

Level 3 (assured): invests in strategic planning. Has assured governance structures and processes. Undertakes structured evaluation of asset performance and sets demanding but realistic efficiency targets. Actively seeks out best practice and incorporates into policy and strategy.

A review of the individual criteria set out under each level, in relation to current capability, will help determine the general level of capability as well as identify the specific issues that require action in order to address shortcomings.

This profiling will help determine future enhancement plans and help inform considerations of how best to address the issues highlighted. For example, any issues identified in asset management might impact directly on the ultimate scope of the procurement package, whereas sponsor issues can be reviewed in relation to client capability to arrive at a mutually supportive solution.

Table 2: Sponsor Capability Matrix

Sponsor Systemic Capability	Level
<ul style="list-style-type: none"> • lack of future thinking • political preference overrides good practice • reacting to specific project proposals • insufficient planning • alternative solutions are not considered • assessing project in isolation without reference to overall infrastructure strategy • not able to articulate the business need with realistic and justified objectives • projects handled as discrete entities • focussed on processes rather than on outcomes • uninformed transfer of authority/risk • suspicious culture • technology viewed as a panacea • work practices do not deliver the business needs • no basis for supply chain determination/requirements. 	<p>Level 1 (vulnerable):</p> <ul style="list-style-type: none"> • provides insufficient direction and strategic guidance • ownership of asset is fragmented and subject to conflicting sponsor/client priorities • processes and systems immature. <p>(seek advice)</p>
<ul style="list-style-type: none"> • maintains an accurate and frequently validated baseline • requirements and issues identified • scenario planning • front-end loading • robust business case • programme or project is reviewed before progressing to implementation • clarity of accountability and authority • the 'right' programme of projects is identified • smart management of the project / sponsor interface • stakeholder engagement. 	<p>Level 2 (governed):</p> <ul style="list-style-type: none"> • provides direction and policy guidance • responsible for asset • demonstrates active stakeholder management • informs and works with client to manage strategic risks.
<ul style="list-style-type: none"> • visible and continuous support and ownership of vision for the infrastructure that is aligned with policies and supported by strategies • feasibility of policy decisions is validated • adequate problem definition in terms of outcomes • rigorous decision making process that challenges assumptions • decisions reflect risk analysis and those that compromise benefits • 'shaping' culture established • programme aligned with policy • capitalises on interdependencies • has a true understanding of benefits and value, and aligns success measures accordingly • improved reliability • early relationship network identification and capacity enhancement • top-down confidence, not optimism bias • sufficient/independent authority and command of resources • programme remains a viable proposition over the lifecycle • evaluation involves both the policy and programme meeting expectations and lessons learned are fed back into the decision making process. 	<p>Level 3 (assured):</p> <ul style="list-style-type: none"> • invests in strategic planning • assured governance structures and processes • undertakes structured evaluation of asset performance and sets demanding but realistic efficiency targets • actively seeks out best practice and incorporates into policy/strategy.

Characteristics may not be confined to just one of the levels indicated. The sponsor organisation may exhibit characteristics across the levels but it is important to note that they are not progressive and certain conditions may decrease the assessment of overall capability. The presence of the lowest-level attributes may be holding the organisation back as these are attributes of a failing system.

Table 3: Asset Management Capability Matrix

Asset Management Systemic Capability	Level
<ul style="list-style-type: none"> • no Whole Life Asset Management (WLAM) • no reference to strategic outcomes, goals are ill-defined and not communicated • blurred governance structures/no compliance • reactive management and no defined roles and responsibilities • lack of risk contingency • unnecessary use of bespoke solutions and/or fragmented processes • no VfM proposition • no strategic investment or engagement within the supply chain or staff • assets do not deliver or enable organisational goals, or VfM, effectively • difficult, or changing, or no data management 	<p>Level 1 (vulnerable):</p> <ul style="list-style-type: none"> • provides insufficient direction and strategic guidance • ownership of asset is fragmented and subject to conflicting sponsor/client priorities • processes and systems immature. <p>(seek advice)</p>
<ul style="list-style-type: none"> • whole life asset strategy (grouped), PAS 55 • optimised asset grouping / KPIs • asset risk management • formalised WLAM processes / PM • compliance with SHE • contingency plans and communication with others • established management functions and roles • stakeholder communication • competency assessment and development framework 	<p>Level 2 (governed):</p> <ul style="list-style-type: none"> • provides direction and policy guidance • responsible for asset • demonstrates active stakeholder management • informs and works with client to manage strategic risks
<ul style="list-style-type: none"> • commitment to excellence • information sharing • continuity of infrastructure performance • improved governance; effective leadership and change management • integrated risk management • delivery of strategic goals • smart use of assets • investment efficiency • intelligent use of assets to deliver organisational goals • entire system buy-in • competency assurance • systemic thinking • value judgement and forward thinking 	<p>Level 3 (Assured):</p> <ul style="list-style-type: none"> • invests in strategic planning • assured governance structures and processes • undertakes structured evaluation of asset performance and sets demanding but realistic efficiency targets • actively seeks out best practice and incorporates it into policy/strategy

Following assessment of the sponsor and asset management capability, an improvement plan should be developed to ensure that the sponsor has the appropriate capability to support successful project or programme initiation and delivery. Furthermore, the plan should ensure that any asset management enhancements are addressed independently of, or in conjunction with, the procurement cycle.

Once the sponsor organisation recognises their existing level of capability and the asset management profile, this can be contrasted with what is desired for the project or programme under the previous assessment and consideration given to the level they can realistically improve to, with adequate bedding-in time.

Delivery Route Screening

At this stage a first pass of delivery route screening can commence to assess the extent of enhancement activity and/or de-scoping that is required to match project or programme aspirations and complexity with the reality of existing capability.

In doing so, the sponsor should:

- screen and review categories of delivery routes to check for alignment with requirements for a successful outcome and sponsor / asset management capability;
- verify whether any of the delivery routes have to be ruled out or would require significant organisational change;
- select a range of preferred delivery routes and consider what this requires of the delivery organisation; and
- capture critical issues and capability gaps. Initiate the sponsor enhancement programme.

Figures 5 and 6 provide illustrative examples of a screening process.

Figure 5: Delivery Route Positioning

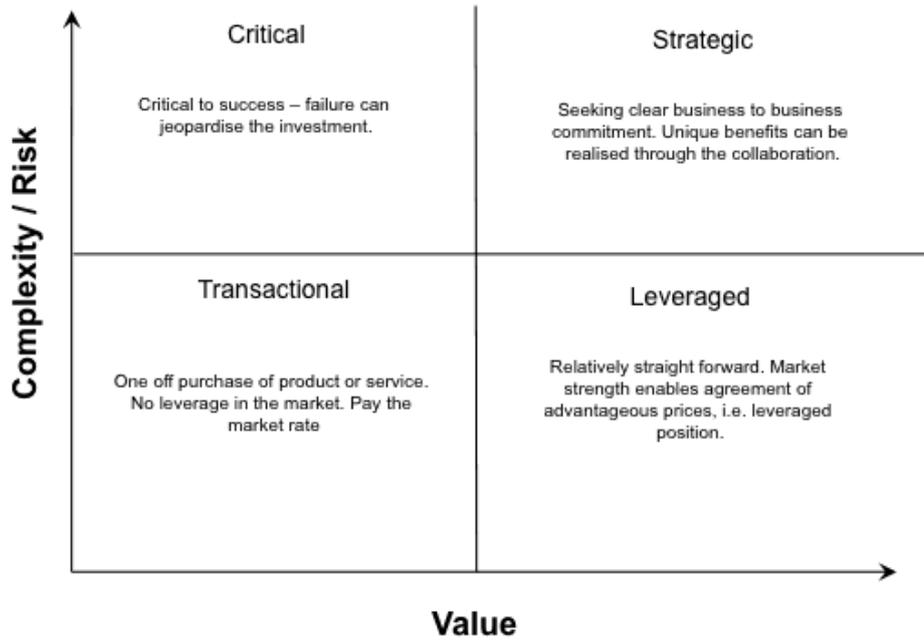
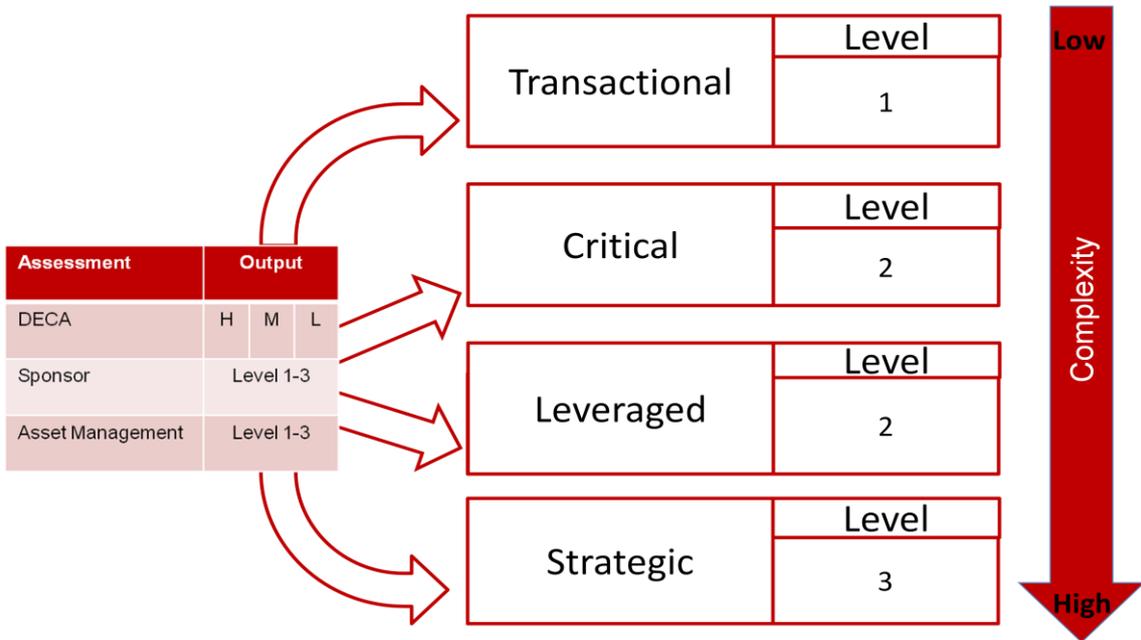


Figure 6: Initial Delivery Route Screening



Sponsor Capability Assessment and Delivery Route Screening Outputs

Outputs:

- Understand the requirements for a successful outcome;
- Sponsor and asset management characterisation;
- Initial screening of Delivery Routes; and
- Identification of the measures required to address capability gaps and establish an improvement or change programme (enhancement steps).



Outcomes:

- Understanding of the conditions related to the Sponsor organisation that can both promote and/or reduce efficiency and effectiveness within the project or programme.

Completion of the recommended assessment process will result in articulated requirement for success, an understanding of the current level of sponsor and asset management capability, and an initial narrowing down of the delivery routes based on the information gained so far. This leads to the development of an improvement programme that ensures the alignment of the existing and required capability and management of the conditions that could reduce efficiency and effectiveness.

Considering Capability for Client and Supply Chain Appraisal

Assessment Process:

- Characterise Client and Supply Chain capability through workshops or questionnaires using an independent facilitation / assessment;
- Identifying critical issues and capability "gaps" related to the possible Delivery Routes identified in step 2;
- Consider the steps to be taken to achieve successful delivery for the Client and the Supply Chain including reflecting on transitioning;
- Understand true capacity of market – captive extended supply chain or transient capacity; and
- Reassess the Delivery Environment.



How:

- Workshop/Interviews
- Supply Chain Engagement
- DECA

The assessment process in Step 3 prompts the consideration of the capability requirements of the client and its supply chain. The tools help to identify the required actions related to identifying client and supply chain requirements, including how that capability will change over time. This is then mapped against the true capability and capacity of the market to organise for the defined successful outcomes through a reassessment of the delivery environment.

Assessment Tools

Client and Supply Chain Capability Assessment

The client should be capable of specifying the requirements to external participants and managing the delivery outcomes by selecting the appropriate supply chain participants to deliver their needs. Fundamental to this is the ability to maximise value from the supply chain through the management of relationships. Therefore, it is imperative to assess and ensure that the levels of client capability, and that of the delivery organisation established, are capable of navigating the range of potential delivery routes and delivering the complexity of the project or programme. The assessment of both the client and supply chain capability ensures that the levels of capability are aligned and appropriate to the undertaking. Misalignment of capabilities can result in a reduction in efficiency attributed to the ability required of the participants to deliver under a given approach. Characterisation of the client and supply chain capability is illustrated in Tables 4 and 5.

The client and supply chain assessments are again focused on a range of socio-technical evaluation criteria that categorises the organisations into one of five levels:

- an initial system;
- a system that uses processes and procedures;
- a system that is effectively governed;
- a managed system; and
- an optimised system focused on outcomes.

The levels are indicative of how organisational systems mature from the failing state to optimal effectiveness and efficiency.

Level 1 (initial system): high degree of inefficiency as a result of informal governance arrangements structured around simple transactional relationships with poorly defined or over prescribed requirements and little or no investment in performance improvement and capability development.

Level 2 (uses processes and procedures): clearer and repeatable, yet incomplete implementation of business management tools with a greater understanding of performance and improving value but evaluation is in terms of objectives not outcomes.

Level 3 (effectively governed): an organised and coherent process that recognises discrete elements at the strategic level. As a result there is greater consistency in decision making, challenge of requirements, a greater flexibility to market change and clear roles and responsibilities related to performance targets.

Level 4 (a managed system): policies are developed in accordance with complex outcomes such as future proofing, carbon reduction, and whole life costing. New standards for performance are established based on win/win scenarios and a commitment to sector or industry development.

Level 5 (optimised system focused on outcomes): an adaptive and sustained system focused on learning and continuous improvement both in terms of strategy, behaviour and continuity of investment. New standards for the sector or industry are set focusing on more efficient outcomes, alignment of the interfaces for deriving maximum value and a long-standing commitment to capability and capacity enhancement.

A review of the individual criteria set out under each level, in relation to current capability, will help determine the general level of capability as well as identify any specific issues that require action in order to address shortcomings.

Table 4: Client Capability Matrix

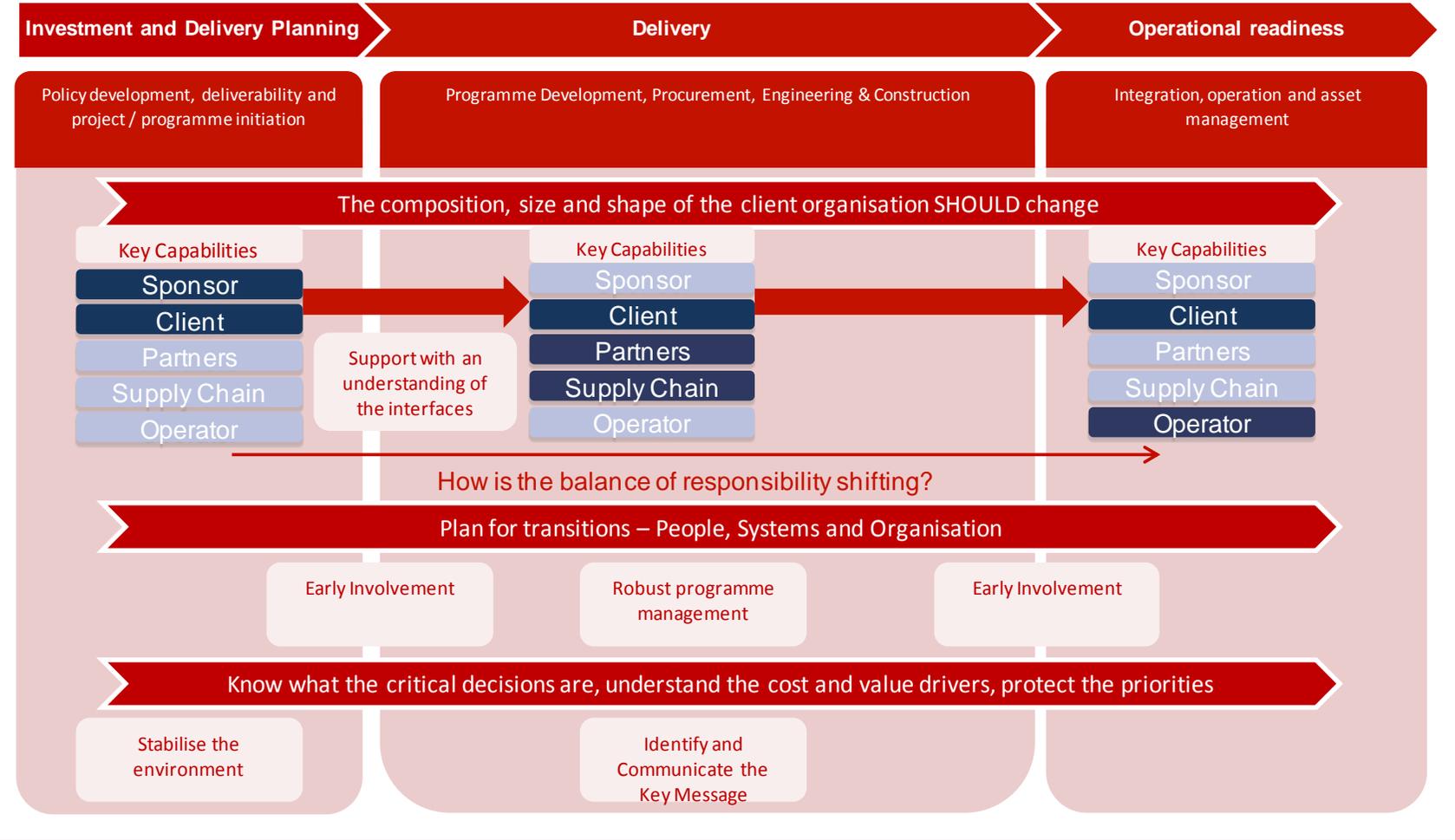
Intelligent Client Systemic Capability	Level
<ul style="list-style-type: none"> • start/stop infrastructure investment • lack of clarity and direction causing incomplete or unclear requirements • blurred governance structures • multi-layering of programme/project contingencies that do not reflect actual risk position • application of unnecessary standards • unnecessary bespoke solutions • competition process does not result in desired outcome • highly risk-averse in behaviour, regardless of supply chain capability • does not adapt or change behaviour to the circumstances • does not incentivise investment within the supply chain • no investment in development of client organisation capability 	<p>Level 1 (Initial System)</p>
<ul style="list-style-type: none"> • knows what they need and can prioritise • able to translate service requirements into clear functional/technical requirements • establishes correct measurements, metrics and targets for success • benchmarks performance and understands value of industry comparators • cost intelligence – understands the cost of its assets and seeks industry comparators • implements processes and understands their benefits • investment in information management • incentivises supply chain; risk and reward are balanced appropriately. 	<p>Level 2 (Processes and Procedures)</p>
<ul style="list-style-type: none"> • establishes project purpose, principles, roles and tasks before the detail • consistent in its attitudes towards others • able to constructively challenge changes from above • flexible and adaptable to change • advocates on behalf of the team – no blame culture • makes timely decisions • balances risk and reward appropriately with the supply chain 	<p>Level 3 (Governance)</p>
<ul style="list-style-type: none"> • understands and applies whole life cost and carbon reduction principles • able to future-proof asset • able to challenge 'specialist' requirements • able to bridge interfaces between organisations • ensures project or programme supersedes individual stakeholders 	<p>Level 4 (Managed System)</p>
<ul style="list-style-type: none"> • continuity of infrastructure investment • improved governance via clear accountability to sponsoring organisation • objectively challenges the specification • objectively challenges requirements and cost estimates • makes informed use of competition process and regulations • adopts Lean process principles and concepts • agenda is one of efficiency, not short-term commercial gain • continuous capability and capacity enhancement 	<p>Level 5 (Optimised)</p>

At Level 1, a client will only have the capability to procure the most simple projects or commodities and will need to either plan and develop capability or procure capability from the market (e.g. through a delivery partner approach). If the latter option is chosen this still requires the client to develop as a minimum the processes and procedures necessary to manage their relationship with the private sector partner. In contrast a Level 5 client will be highly capable, with effective systems and processes that it invests in and improves over time. The client is able to define its requirements and the anticipated benefits clearly, and establishes longer-term relationships with the supply chain to generate best value.

Again, the client organisation may exhibit characteristics across the levels but it is important to note that they are not progressive and certain conditions may decrease the assessment of overall capability. The presence of the lowest-level attributes may be holding the organisation back as these are attributes of a failing system. Based on the outcome of this capability assessment and their understanding of the delivery environment, the client can develop an enhancement programme to bridge any capability gaps.

In planning the capability enhancement programme, it is important to consider how the composition of the delivery organisation will change or transition between the phases of the project or programme. Change is necessary to ensure the organisation remains organised as an effective and efficient entity with a focus on continuity of performance and value for money. Figure 7 provides an overview of the organisational change considerations over the life of the project or programme reflecting the change in emphasis from investment planning phase through to operational asset. This consideration will also help inform at what stages in the project or programme the capability assessments should be repeated in order to ensure that the organisation has suitable capability to respond to the changing profile.

Figure 7: Transitioning Model



Following client capability assessment, the client can make an assessment of the supply chain capability that is available and necessary based on market soundings and market intelligence (Table 5).

The supply chain assessment uses the same structure to examine the supply chain organisational capability and its approach to engineering and construction. A Level 1 supplier will have minimal capability to integrate engineering design with other designers and suppliers, and will hold the minimum standards of accreditation and quality control. Investment in people will not be a priority and relationships with the extended supply chain will be transactional in nature rather than relational. In contrast a Level 5 supply chain organisation will be able to integrate design information with other designers and suppliers. Surpassing quality accreditation and standards will be a priority as is investment in the organisation, production equipment, people and skills. Level 5 clients and supply chain members in the 'Optimised System' category will have extensive experience and a track record of successful and efficient delivery in a diverse range of projects and environments.

Table 5: Supply Chain Capability Matrix

Supply chain capability – organisational	Level	Supply chain capability – engineering & construction	Level
<ul style="list-style-type: none"> informal governance with undefined links to projects and organisational control highly reactive managerial approach lack of standard roles and defined responsibilities stakeholder engagement and communication rarely used informal approach to client care and relationship management benefits defined in terms of fixed outputs rather than performance improvement '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. 	Level 1 Initial System	<ul style="list-style-type: none"> no capability to integrate engineering design no investment in common systems or standards no investment in production and assembly planning capability for sub-systems and major components no procedures for monitoring and controlling the quality of components delivered to site and their sub-assembly into the works production management capability is low project information is not stored in a structured manner information is not freely available or easily interpreted by the asset owner or operator holds minimum levels of accreditation and compliancy. 	Level 1 Initial System
<ul style="list-style-type: none"> concepts of programme present within organisation. desire to build longer-term business-to-business relationships evidence of project-based controls and tools being applied to some programmes managerial approach and intervention is more considered stakeholder engagement limited to personal initiatives rather than a structured approach displays some flexibility in approach to project delivery centrally managed processes, tools and templates adversarial attitudes remain ad-hoc controls and no clear strategic controls from organisational perspective inconsistent roles and responsibilities. 	Level 2 Processes and Procedures	<ul style="list-style-type: none"> basic systems and processes exist to integrate 2D design information. business has in place basic systems, processes and standards basic systems exist for production planning and assembly. some limited investment in developing production management techniques and capability higher levels of QA compliancy are evidenced some but not complete independent verification takes place production information is handed to client on completion for integration into third-party asset management strategy. 	Level 2 Processes and Procedures
<ul style="list-style-type: none"> 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 organisation's culture managerial approach and interventions are based on reliable data and intelligence consistent roles and responsibilities flexible and able to adapt to alternative client strategies and delivery environments. 	Level 3 Governance	<ul style="list-style-type: none"> advanced system capable of managing 3D design information; client-driven approach to leading or specifying the requirements for design co-ordination. staff receive extensive training to manage production stage and unforeseen events business strategies and processes exist to support site production and make timely and effective interventions clear understanding of manufacturing cost base and benefits of alternative strategies suppliers incentivised to improve their monitoring systems processes and procedures for the testing and commissioning of assets are fully defined and implemented throughout the organisation; staff are trained in use and application. 	Level 3 Governance

Source:

Table 5: Supply Chain Capability Matrix (continued)

Supply chain capability – organisational	Level	Supply chain capability – engineering & construction	Level
<ul style="list-style-type: none"> • 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 • senior management have the capability to challenge technical solutions • 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 • high levels of accreditation • demonstrable evidence of timely management interventions based on high-quality performance data • roles and responsibilities are clearly defined; people have a career path and scope for professional advancement • recognised in industry as a high-performing organisation • demonstrable evidence of investment in business, people and skills. 	Level 4 Managed System	<ul style="list-style-type: none"> • industry leading processes (e.g. BIM) and systems with demonstrable benefits on a variety of programmes over time • industry leading production processes and systems with demonstrable benefits on a variety of programmes over time • extensive data set managed in real time providing value-based reporting data during design, engineering, manufacturing and delivery stages • all information is stored and managed in real time, providing data during design, engineering, manufacturing and delivery stages • invests in development of capability: demonstrable success across sectors. 	Level 4 Managed System
<ul style="list-style-type: none"> • 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 environment • people-led 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. 	Level 5 Optimised System	<ul style="list-style-type: none"> • demonstrable evidence of implementing and delivering design integration solutions during production and manufacture to meet business goals. long-standing commitment, and investment to innovation in this field • demonstrable evidence of implementing and delivering technically complex logistics solutions to meet business goals • demonstrable evidence of best-in-class production management techniques • high levels of accuracy are achieved in performance data, demonstrable examples of senior management action being informed by data for complex issues resulting in proven efficiencies • commitment to improvement of processes and procedures by senior management over the long term • demonstrable evidence of capability through a number of programmes of varying, scope, size, and complexity. 	Level 5 Optimised System

Client Supply Chain Assessment Outputs

Outputs:

- Client and supply chain characterisation;
- Appreciation of the 'type' of Client by phase including size, structure, etc.;
- Requirements for successful procurement and delivery; and
- Identification of critical issues.



Outcomes:

- A means for identifying and ensuring the capability requirements both in terms of the nature of the delivery organization and how success is achieved.

Completion of the recommended assessment process will result in a characterisation of the capability of the client and the supply chain, an appreciation of how the client and delivery entity should transition across the life of the project or programme, the requirements for successful procurement and delivery and the identification of any further issues related to the ability to deliver.

Considering Delivery Route Selection and Implementation

Assessment Process:

- Analysis of the available options;
- Identify the procurement approach;
- Consider functional arrangements;
- Agree the best practices that will be targeted for adoption; and
- Identify any barriers that exist to supply chain or market engagement and assign actions/owners.



How:

- Workshop
- Review Meeting
- Peer Challenge

The assessment process in Step 4 leads to the final selection of an appropriate delivery route. The tools help to identify any barriers to implementation. After a systematic process of assessing complexity and capability has been carried out, the aspects coalesce to enable the determination of the preferred delivery route designed to maximise value.

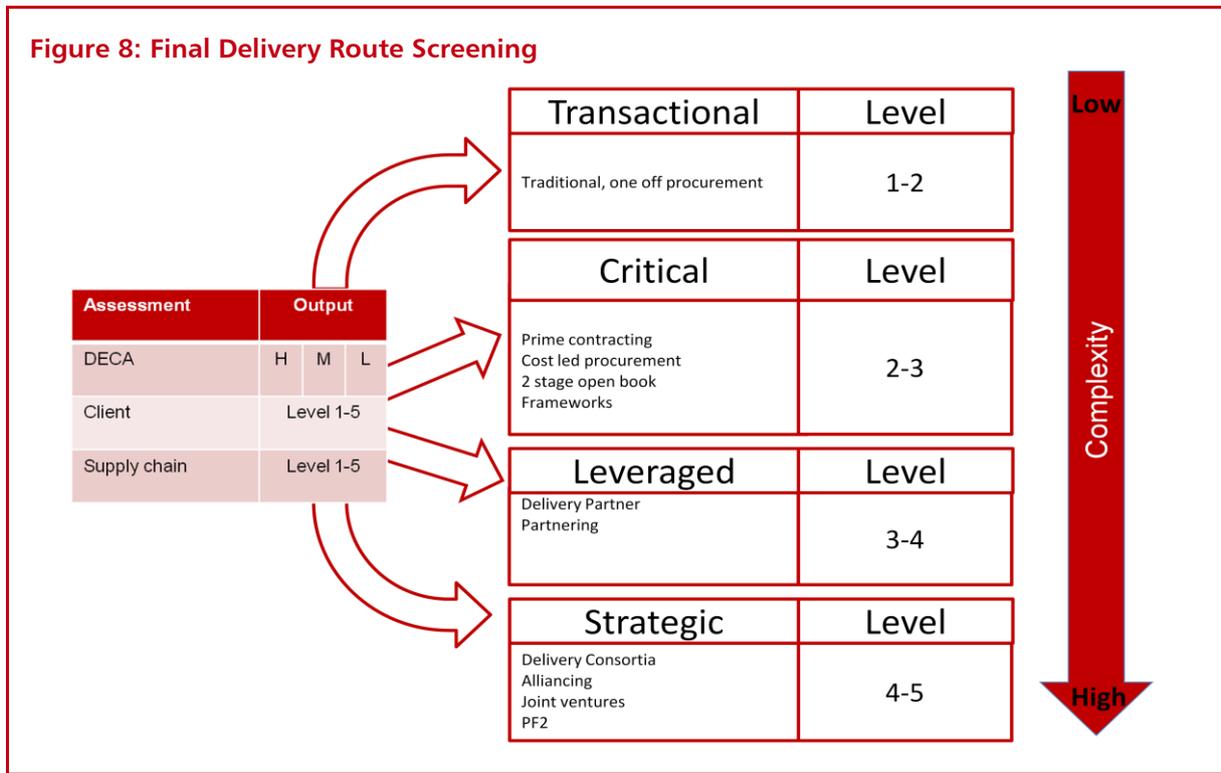
Assessment Tools

Delivery Route Screening

An illustrative example (Figure 8) of how the outputs from the assessment tools come together for the final delivery route screening is provided. If the project or programme is highly complex then the most appropriate procurement approach is aligned with leveraged or strategic models that require a higher level of capability than transactional or critical approaches.

The ideal scenario is to achieve alignment between complexity of the challenge and the capability of the client and supply chain to deliver maximum value, supported by a sponsor who can provide appropriate oversight. Where such alignment is not achieved following the assessments, then the enhancement plans which each category should be focused on converge to achieve an alignment – either by reducing complexity or enhancing capability.

Figure 8: Final Delivery Route Screening

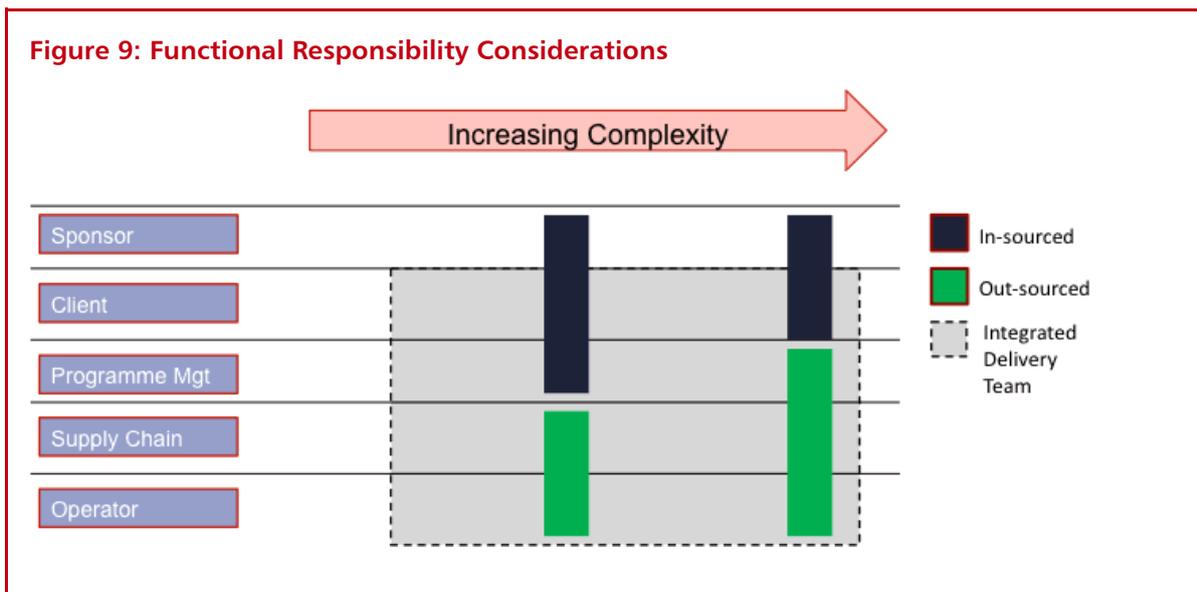


Functional Assessment

In selecting the preferred delivery routes, consider the functional arrangement, the existing level of client and supply chain capability, and if enhancement is required and reasonable given the challenge identified in the complexity assessments (Figure 9). and risk under the contracts should be matched to capability. Choosing the right delivery model is about managing the risks in the most appropriate way and about dealing with resource constraints and fluctuating demand.

At this juncture, it is important to reflect back upon the market sounding, since appetite and forms of organising are not always true reflections of capability.

Figure 9: Functional Responsibility Considerations



Delivery Route Screening and Functional Assessment Outputs

Outputs:

- Delivery Route and procurement approach;
- Functional structure;
- Identification of the measures required to address capability gaps and establish an improvement or change programme (enhancement steps); and
- Best practice toolkit.



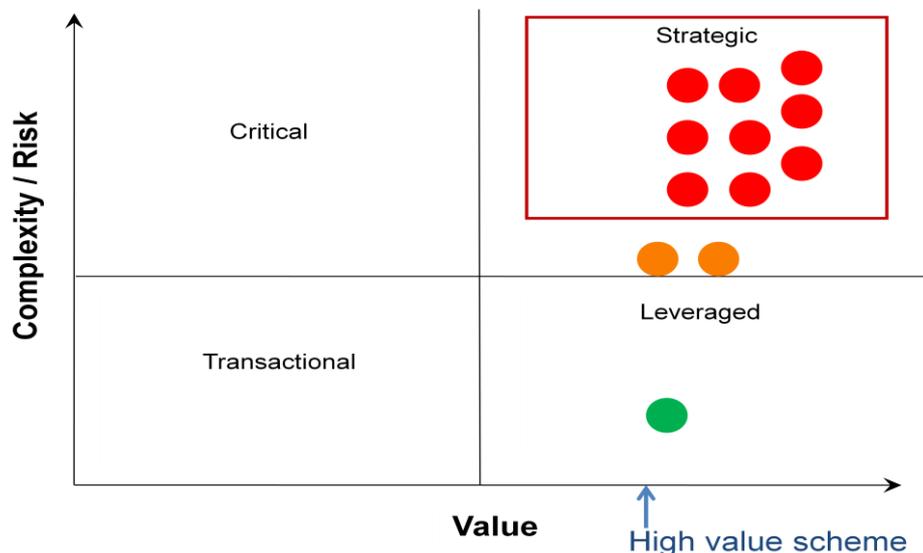
Outcomes:

- Holistic understanding of the capability requirements of the challenge, the required organizational change to achieve alignment and the best practice to support implementation

Completion of the assessment process will result in the selection of a procurement approach and an articulation of the functional structure appropriate to that approach in terms of the availability and location of capability. Outputs may also include an enhancement plan to address any capability gaps hindering successful implementation and a toolkit of best practice relevant to the strategy. Annex D contains a checklist of best practice approaches that may be applicable.

Figure 10 provides an illustrative example of how the DECA complexity assessment (from Step 1) can be used to inform delivery route selection. This then needs to be related back to the capability in delivery route screening. In the example provided below the delivery environment assessment resulted in nine of the factors being assessed at a high level of complexity, two at a medium level and one at a low level.

Figure 10: Procurement Option Positioning related to Complexity Assessment



As illustrated, the steps from the Routemap process inform the selection of an appropriate approach to delivery and procurement and the composition of the delivery organisation. They provide a structured process for understanding the capability requirements of the challenge and identification of the required organisational change needed to achieve alignment and derive maximum value from the strategy.

3

Process Application - Summary

This section provides a summary of the how the overall process could be applied. The table show how the reflective process can be translated into activities and the potential resources required to generate the outputs.

Chart 3.A: Process Application – Summary

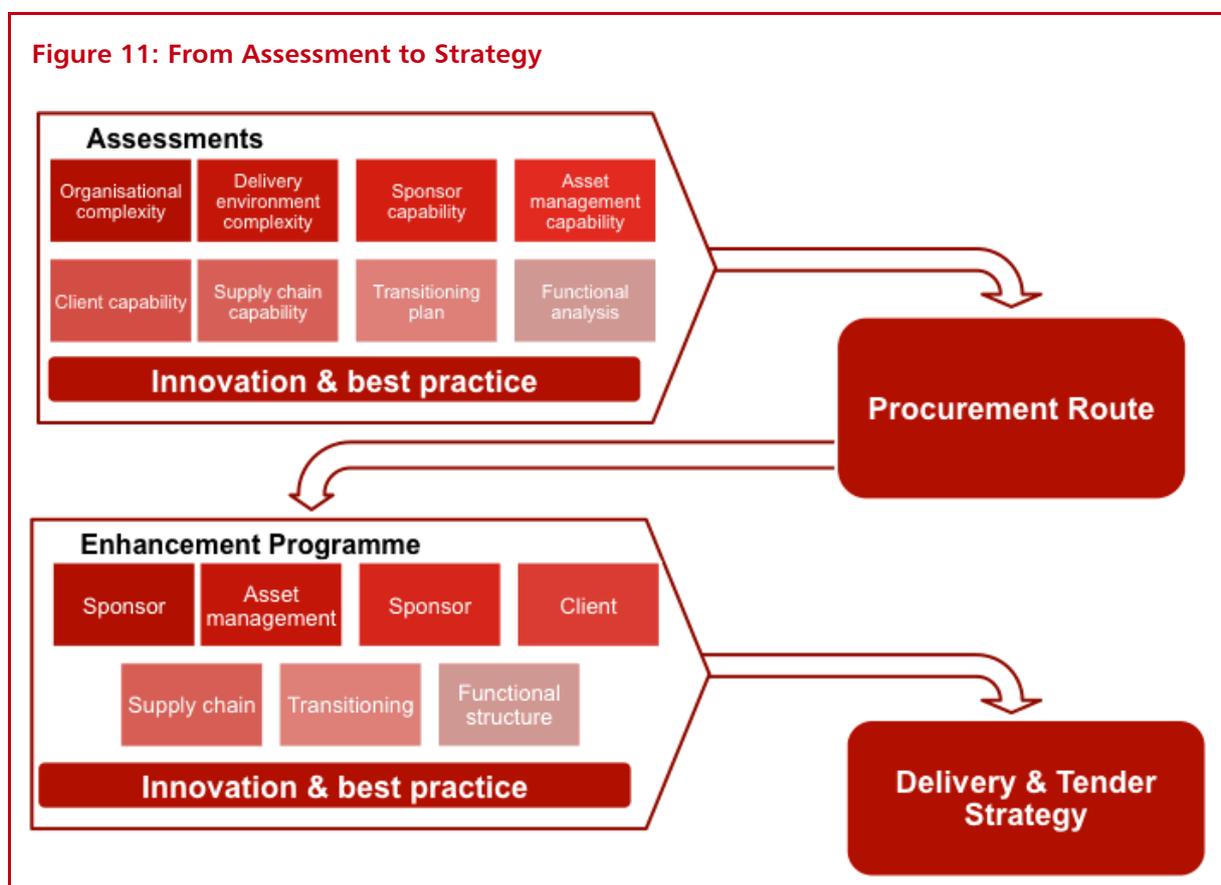
Step	Reflective Process	Actions	Participation	Outputs
Complexity Assessment of the Delivery Environment and Capability Assessment – Investment and Delivery Planning (Steps 1 & 2)	<ul style="list-style-type: none"> • identification of the systemic challenges and opportunities related to benefits realisation • mapping of the organisational challenges and opportunities to fully understand the need <ul style="list-style-type: none"> ◦ reflecting on the complexity of the delivery environment using the DECA • articulation of successful delivery • characterisation of sponsor and asset management capability • initial delivery route screening and identification of capability requirements attributed to preferred routes (<i>client should have conducted best practice identification and initial market sounding prior to workshop</i>) 	<ul style="list-style-type: none"> • pre-workshop interviews for environment scanning (5–6 interviews of 1–2 hours) 	<ul style="list-style-type: none"> • <i>key strategic client personnel</i> • <i>Interviewer</i> 	<ul style="list-style-type: none"> • platform for decision-making based on a systemic understanding of the challenges, opportunities and risk • agreement of the requirements for success
	<ul style="list-style-type: none"> • Investment and Delivery Planning Workshop (1/2 day) 	<ul style="list-style-type: none"> • <i>sponsor representative</i> • <i>key strategic client personnel</i> • <i>workshop facilitator</i> • <i>peer reviewer</i> 	<ul style="list-style-type: none"> • baseline complexity profiles for readiness checking and revaluation • existing sponsor and asset management characterisations • initial selection of a preferred range of delivery routes • identification of the measures required to manage complexity and address capability gaps (improvement or change programme) 	
Resource Requirements – Interviews and ½ Day Workshop				

Capability Assessment – Client and Supply Chain Appraisal and Delivery Route Selection (Steps 3 & 4)	<ul style="list-style-type: none"> • characterisation of client and supply chain capability/requirements – is this aligned with the range of preferred delivery routes? • identification of critical issues and capability gaps • consideration of overall assessment profile against the range of preferred options including the required functional arrangements and the adoption of best practice • reflection on true market capacity and any barriers to delivery • consideration of organisational change related to achieving successful delivery and the changing nature of the delivery organisation over the life of the project or programme 	<ul style="list-style-type: none"> • Capability Appraisal Workshop (1/2 day) 	<ul style="list-style-type: none"> • <i>key strategic client personnel</i> • <i>workshop facilitator</i> • <i>peer reviewer</i> 	<ul style="list-style-type: none"> • existing client characterisation • supply chain characterisation and requirements • delivery route and procurement approach including functional arrangements over the life of the project or programme • identification of the measures required for successful procurement and delivery and to address capability gaps (improvement or change programme) • best practice toolkit
	Resource Requirements – ½ Day Workshop + Additional Interview			
Implementation Review	<ul style="list-style-type: none"> • client presentation of delivery planning and change programme • consideration of alignment of reassessments with planned review points 	<ul style="list-style-type: none"> • meeting (3 hours) 	<ul style="list-style-type: none"> • <i>client representative</i> • <i>sponsor representative</i> • <i>Routemap representative</i> • <i>peer reviewer</i> 	<ul style="list-style-type: none"> • review of approach and assessment of readiness to proceed and 'bedding in' time • peer challenge • agreement of reassessment 'triggers'
	Resource Requirements – 3hr Meeting			

4

Planning for Successful Delivery

Delivering a major infrastructure project or programme will inevitably require organisational change. Forward planning of this change will prevent costly backward reconciliation and ensure the delivery organisation remains fit for purpose over the life of the project or programme. In concluding consideration of the appropriate procurement model, a review of all the assessment findings is required in order to identify the enhancement activity that is required to maximise performance. This may range from up-skilling the client organisation through to seeking a level of supply capability to complement the client capability. Figure 11 illustrates the process from the assessments to the solution.



Where current capability is assessed at levels below that required for the complexity of the project or programme, then the options are either to reduce the complexity or to improve capability. In practice, there will be options for how best to achieve this, and the detailed analysis undertaken in the assessments will provide the level of understanding required to address this.

These enhancements should take due consideration of, and draw support from, the existing suite of best practice that exists. By reviewing how other organisations have faced similar challenges a client will be able to develop the solution that's right for their specific needs.

In planning organisational change consider:

- the capability requirements of the preferred range of delivery routes;
- the composition and functional arrangements and how the balance of responsibility will change over time;
- the available guidance and best practice characteristics; and
- the development, deployment and embedding of the enhancement plans.

Having developed the enhancement requirements and finalised what is required to make the project or programme successful, the client can then reflect this in the delivery and tender strategy and commence the procurement exercise. Throughout the procurement process, the procurement model selection logic and the knowledge and data derived from the assessments can be used to test and validate that the requirements and needs identified are being fulfilled. Furthermore, the systematic process adopted under the Routemap provides a visible and evidence-based audit trail of the issues identified and the decisions made in the development and delivery of the procurement strategy. It is not an approvals process in itself, but the outputs can feed into government approval criteria and evidence by demonstrating that the user has made informed decisions in terms of both 'how' and 'what' is to be delivered.

A Case Study

Infrastructure Procurement Routemap – learning from Crossrail, examining the journey

'Understand the delivery environment you HAVE, then CREATE the one you need.' Andy Mitchell, Programme Director, Crossrail

Introduction

Crossrail is the biggest engineering project in Europe and forms a major part of the Mayor's Transport Strategy. This case study looks retrospectively at whether the key decision-making on capability and capacity, which enabled Crossrail to achieve increased efficiency and effectiveness, is reflected in the Routemap. It follows the journey as the scheme has moved from development, to delivery, and as it begins to gear up for operational readiness.

The purpose of the case study is to inform those embarking on a similar journey so they can benefit from a greater degree of understanding and rigour in the key decisions that they must make. The case study highlights how the components of the Routemap correspond to the challenges that Crossrail faced and how they were actually dealt with (many intuitively), to illustrate the benefit of applying an objectively systematic approach. The case study describes key aspects in line with the Routemap elements of complexity assessment, sponsor capability assessment (related to investment and deliverability) and client capability and how this varies by project phase.

The benefits associated with the adoption of the Routemap principles will be discussed in the light of transferable practices that at Crossrail have led to savings against the original budget of approximately 7 per cent.

Assessing the Complexity of the Project or Programme Delivery Environment

Prior to planning the investment and/or delivery approach it is important to understand the key issues and opportunities and the level of complexity they can create. This will help to identify any potential 'deal-breakers' and lead to a range of preferred options.

Box A: Assessing Complexity

Step 1: Reflect on the complexity of the project or programme.

Step 2: Agree the critical factors (and those that interact to create complexity) that comprise the degree of challenge.

Step 3: Identify the implications of the profile – how can efficiency be best achieved in the delivery environment?

The tools outlined in the first layer of the Routemap and the steps in Box A will help in raising the important questions related to the delivery environment.

Complexity Assessment Tools – in Practice

An investment review workshop was conducted with the Crossrail team to reflect on what the development and delivery phase profiles would have looked like at Crossrail at significant points in time. This was to see whether the tools would have provided useful insight had they been available at the time and to check whether there were any key issues and opportunities that they would not have identified.



Photo: Mapping exercise using the Hexagon

Table 7 is an illustrative example of a retrospective Crossrail DECA profile (circa 2004–5). It represents a snapshot of the degree of challenge.

The profile illustrates the high degree of complexity that the programme faced at the time. Notably, the areas identified as associated with high complexity, indicated the risk attributed to ensuring the programme was a viable proposition.

'There's sometimes a lot of focus on how you're going to deliver the project rather than thinking about the complexity of the environment you're in.' Project Manager, Crossrail

Some of the high complexity factors were addressed intuitively, such as the need to stabilise the environment. A programme of this size and scale is likely to be deemed extremely risky by investors. The inability of the programme to attract private funding led the Crossrail team to seek public funding via Royal Assent. This allowed the development team to stabilise aspects of the delivery environment that were previously a deterrent to other investors.

Had there been a means for issue identification and complexity assessment of this form there may have been a more rapid appreciation of the extent of the complexity attributed to the *stability of the overall context*, and the required *financial investment*. This would have readily identified the unlikelihood of the programme attracting private investment (e.g. PFI as a delivery approach).

Identify any actions that have the potential to increase or decrease the degree of challenge associated with the delivery environment.

Other factors from the profile were considered at length, including level of *strategic importance* and the potential complexity of the *stakeholders* involved.

The profile readily highlights the need for action to address complexity in these areas. It also calls attention to the nature and capability of the delivery entity required to manage the interfaces and dependencies.

Outcomes of Understanding Complexity

Efforts to manage complexity through the assurance of financial feasibility and clear requirements worked to achieve the required funding arrangements in 2004–5 and 2007–8. Funding was secured as 1/3 business rate supplement, 1/3 Transport for London (TfL) and 1/3 Central Government including £200 million from the City of London Corporation, £230 million from BAA and other developer contributions.

Further Opportunities

The Crossrail Act was passed in July of 2008 and while this secured partial funding for the railway, it necessitated a reassessment of the environment to identify the new areas of complexity associated with the incorporation of the requirements and undertakings committed to in the bill process, the greater degree of stakeholder involvement, changing European railway legislation, the delivery approach, and the organisational change needed to ensure sponsor and client bodies were capable of navigating this new delivery environment.

Table 7: Delivery Environment Complexity Analytic (DECA) and Illustrative 2004-5 Crossrail Profile

Factor	Low Delivery Environment Complexity Statement	High Delivery Environment Complexity Statement	Rating Statement
Strategic Importance	Low-priority operational level project or programme where the expected benefits are necessary but low in value terms. Externally, there is little political, media or public interest, and failure would not have significant impact.	Critical to the delivery of business policy with very high expectation of benefits. High-level political or public interest with strong media attention. Failure would have major impacts and consequences.	High
Stakeholders	Low number of stakeholders. Stakeholders are aligned with the business objectives. Stakeholders are unlikely to change.	Significant number of stakeholders with high levels of influence and differing or misaligned objectives. Stakeholders may change.	High
Requirements	Requirements and expected benefits are clear and linked to business policy. Key performance measurements link to goals, vision and values.	Ambiguity around requirements and how the expected benefits contribute to the realisation of the goals, vision and values. High uncertainty on project impact.	High
Stability of Overall Context	Requirements, governance and delivery modes are clear and unlikely to change. Confidence in planning and project or programme authorisation guaranteed.	Good chance of the scope, structure, external requirements, economic and political landscapes changing.	High
Financial Impact	Investment is not significant relative to other investments in terms of capital expenditure. Anticipated revenues, efficiencies or returns on investment are not fundamental to the business.	Significant financial investment revenues, efficiencies or returns on investment and /or highly involved type / source of investment anticipated.	High
Technology	No new technologies form part of the scope. No requirement for phased implementation or piloting.	New technology is required representing significant risks and changes in business practices. Failure to deliver successfully would have major impacts and consequences.	Low
Interfaces	Project or programme spans few boundaries (organisational, political, regional) and success is not dependent on relationships. Governance is not complex and enables support, decision-making and reporting.	Project or programme spans many boundaries with internal and external partners and success is dependent on relationship management. Governance is complex.	High
Range of Disciplines and Skills	Project or programme has few specialist disciplines or skill requirements.	Large number of disciplines and skills and/or potential for strain on the supply chain capacity and capability.	Medium
Dependencies	Project or programme is not critical to the delivery of other projects.	Project or programme is critical to the delivery of other projects.	High
Execution Complexity and Extent of Change	Business as usual.	Large amount of organisational change required in organisation or business to deliver desired outcomes and benefits.	High
Organisational Capability	Demonstrated the capability to deliver project or programme through delivery of similar successful projects. Culture promotes 'intelligent client' attributes.	Has not demonstrated key capabilities underpinning delivery route and/or has not delivered under similar arrangements in the past.	High
Interconnectedness	The understanding of the relationships and alignment between policy, culture, practices, technology, people, processes and procedures has been investigated, captured and communicated.	The extent of the inter-relatedness between policy, culture, practices, technology, people, processes, and procedure has not been investigated, captured or communicated.	Medium

Consider the degree of challenge. What capability and capacity does it require and what form should it take?

Assessing the Capability of the Sponsor Organisation in Practice

The degree of challenge attributed to the delivery environment in which many large infrastructure programmes exist requires consideration of the capability of the sponsor organisation. The level of sponsor capability also needs to reflect the challenge presented by the programme and the delivery environment at any particular time. Certain more challenging profiles may require a more mature sponsor organisation to maintain the business case.

The tools outlined in the second layer of the Routemap and Box B will help in raising the important questions related to sponsor capability.

Box B: Sponsor Capability

Step 1: Reflect on the level of capability of the Sponsor organisation.

Step 2: Determine whether the Sponsor capability is appropriate given the degree of challenge.

Step 3: Identify areas requiring Sponsor capability enhancement. Where can efficiency and effectiveness be improved? Discuss with the Sponsor.

Using the Sponsor Capability Matrix the level of systemic sponsor capability for Crossrail was retrospectively assessed at key points in time. This was to see whether the matrix would have provided useful insight had it been available, and to check whether there were any additional attributes that could be incorporated from the Crossrail experience. The level of sponsor capability was reflected on at two critical points: 2004–5, during initial development; and 2009, during major organisational change. This was conducted with support from the current sponsor representative. It was agreed that in 2004–5 the sponsor demonstrated a number of the systemic attributes associated with Level 1, or a ‘vulnerable’ system. This was primarily attributed to the lack of a clear line of sight between the business need and the objectives and the fragmented ownership of the asset.

By 2009, the sponsor capability had been enhanced to Level 2 – a governed level of capability providing policy guidance and stakeholder management support.

The capability enhancement was achieved in two ways: the creation of a *Joint Sponsor Board* between the Department for Transport and TfL; and the establishment of the *Project Development Agreement (PDA)*.

With the use of the Sponsor Capability Matrix, systemic attributes in conflict with the sponsor responsibilities could have been readily identified and developed into a clear action plan for improvement.

‘Stability of the overall context – what’s good with Crossrail is the PDA, which sets out what it is we’ve got to do, how we meet the requirements of the Act.’ Commercial Manager, Crossrail

Outcomes of Sponsor Capability Enhancement

The Joint Sponsor board removed the fragmented nature of the sponsor interface and clarified the accountability and authority with respect to the overall business case. This allowed the projects to be managed as a programme with reference to the overall strategy. Helping to support this, the PDA aligned the objectives and clearly articulated the requirements across the sponsor-client interface. As a result of the level of sophistication found in the client-sponsor relationship, Crossrail was able to deliver savings of £1.1 billion. This was done through Project Assure (£350M), an aggressive value management exercise. The outcomes from this formed a key component of the client's submission to the sponsor in support of the UK Government's Comprehensive Spending Review that saw another £750M in savings.

Understanding the Capability of the Client and the Required Delivery Entity – Planning for Change

The alignment of capability and challenge is extremely important when considering the existing capability of the client organisation and deciding the nature of the delivery entity. The capability of the client body may be the key factor in deciding the most appropriate delivery mechanism, so it is important to adequately consider what defines an 'intelligent client' and the implications of this.

Recognise the capability transition at an early stage – differing skills, structures and processes are required at different phases.

The delivery of a major infrastructure such as Crossrail and the London Olympics, has demonstrated the need for a 'delivery entity' with capability that can:

- support the sponsor and client organisations as the nature of the programme changes over time;
- manage the programme interfaces;
- maintain the key message related to benefits realisation; and
- ensure the crucial elements underpinning programme success continue to progress during organisational change.

By recognising these requirements along with those associated with the task, the degree of challenge, and the delivery approach, a robust profile of the programme management capability needed will emerge. This capability needs to exist within or alongside the client organisation throughout the programme lifecycle.

The tools outlined in the third layer of the Routemap, the transitioning diagram and Box C will help to answer the important questions relating to the delivery entity.

Client Capability Transitioning and Assessment Tools

For intelligent clienting, the client organisation needs to be able to articulate the capability requirements beyond the individual attributes. This includes flexibility in the scope and scale required to meet the degree of challenge presented by the environment at various points in time. This is achieved by making smart decisions regarding the selection of the delivery approach and how the balance of responsibility will change over the life of the programme. Value is gained through learning from and incorporating people and practices from similar investments.

Once the nature of the client organisation has been determined, ensure there are clear governance structures to reinforce who is doing what and that this is translated to the

contractual relationships. In planning for transitioning, early involvement of the main actors in the next phase is an important step in assessing the readiness to move forward. In doing so, the degree of integration appropriate to the task – and what constitutes ‘appropriate’ for each phase – can be determined. This includes the level of challenge the market can realistically organise to meet. Entering the next phase without sufficient preparation can result in a strain on capacity.

Lastly, in the face of organisational change, robust programme management ensures that what is important keeps progressing. Whether success is dependent on time, cost, quality or benefits, it is imperative to maintain the crucial programme elements. Part of this is ensuring that they are represented in the strategic and programme risks, and that their criticality is reflected in the incentivisation mechanisms.

Box C: Transitioning

Step 1: Determine what the client needs to be. Plan for the capability transitions in terms of composition, scope and scale of the client organisation and delivery entity. Is this appropriate to the degree of challenge?

Step 2: Consider the transitioning relationships and the key capability requirements.

Step 3: Develop a clear way forward. Who should be engaged?

Client Capability Transitioning in Practice

One-on-one interviews with key programme and procurement personnel were conducted to capture specific examples of how Crossrail considered the transitioning requirements and whether the Routemap adequately described the critical considerations. As the client organisation, Crossrail recognised that the complexity of the delivery environment and the need to gear up quickly required robust programme management capability. The deployment of the programme partner (Transcend) in conjunction with a programme delivery partner (Bechtel) ensured that there was a programme management function with sufficient reachback supporting the client independent of those focused on delivery.

As delivery progressed it was felt that in order to increase the capability level of the client and reduce some inefficiencies and duplication, the programme partner and delivery partner should become an integrated part of the client organisation. This also required a change in the resourcing strategy, bringing resourcing responsibility into the client organisation while still providing access to Delivery Partner staff for short-term, critical assignments.

In doing so, it was recognised that this would improve the management of both the internal and external interfaces through the complete alignment of the client, programme partner and delivery partner objectives. Along with this, Crossrail moved from separate tunnelling and stations packages to geographical delineation in order to better handle the risk posed by the interfaces between the two. Understanding how the challenge drives the capability and functional requirements, the degree of integration and where value can be lost was fundamental to these gains made by the Crossrail team. Had there been a systematic process originally adopted for transition planning at Crossrail, the organisational change would not have been reactive, and further gains attributed to continuity of performance might have been achieved. Learning from this, Crossrail is planning for the next transition two years in advance to ensure the client organisation has adequate time to evolve into the most efficient organisation

without compromising current capability needs. Fundamental to this is early operator involvement.

'Most programmes end up with the interfaces by accident, expending resources and risks to try and overcome them. Determine them now'. Procurement Director, Crossrail

Further examples of good transitioning planning have been adopted within Crossrail's procurement team.

Without the Routemap as a systematic process, Crossrail intuitively recognised the need for procurement capability enhancement and adopted the lessons from the 2012 London Olympics. Key to this was the migration of the procurement team to contract management. This ensured efficiency in size and shape, as well as effectiveness, by making sure the capability was placed where it is most needed. The transitioning of successful processes and teams from projects with similar delivery environments can lead to significant value. Lastly, it is important to consider the cost and value drivers, in order to protect what is critical to programme success.

As Crossrail moved from design to tunnelling, and now to the upcoming railway integration, the understanding of what was and is 'mission critical' has always been clearly communicated. The message is driven on an annual basis throughout the organisation.

PROTECT and keep the crucial programme elements MOVING, even in the face of organisational change.

For example, in 2010 it was 'protecting the design', in 2011 it was 'pulling back £1.1 billion in value' and in 2012 it was '13km x 13 periods'.

Notwithstanding the importance of high-level, clear statements of intent it is important to maintain full visibility of a wider range of programme critical indicators, such as would be incorporated in a dashboard of controls – performance, staff turnover and absence, and the cost associated with rework.

Crossrail uses performance league tables in a 'dashboard', monitoring supply chain performance including compliance and responsible procurement.

Outcomes of Client Capability Transitioning

The full integration of the client function, including resourcing responsibility, and the removal of existing duplication of effort resulted in further significant efficiency savings. Planning for an organisational transition not only ensures adequate consideration of the most effective and efficient composition, but prevents reactive mid-phase organisational change that can impact decision-making. In a programme the scale of Crossrail, the cost of delay could be as much as £5 million a day in direct and indirect costs. Recognising the importance of early involvement led to the incorporation of OCI into the procurement policy and contracting arrangements.

Through this process the Crossrail civil designs were jointly validated and improved by client, designer, and contractor, following the award of construction contracts. Whilst significant benefits were realised, undertaking such an exercise earlier may have delivered further benefits still.

Benefits of the Routemap – Shortcuts for the Journey

Through examination of the Routemap principles in light of Crossrail's journey so far, lessons or 'shortcuts' to assist other major investments have been identified within the case study.

These include:

- the need to firmly establish the key principles, systems, roles and tasks before the detail of delivery and procurement;
- the need to determine the interfaces prior to transitioning – what is the impact on risk and complexity and how should procurement be used to maximise benefit (e.g. common procurement)?;
- insufficient planning for organisational change can result in a loss of client identity, the blurring of governance and accountability, and the need to redefine the relationship with partners;
- the need to assess the functional requirements against the partnering and systemic relationships: efficiency can be lost through duplication of effort, conflicting culture and not knowing ‘when to step in’; and
- the need to protect not only the key programme elements but the capability required to manage them during organisational change.

Conclusions

Crossrail saved in excess of £1.1 billion, approximately 7 per cent of the original budget, using principles that are reflected in the Routemap (a mature sponsor-client relationship, client capability transitioning and OCI). It is reasonable to assert that the adoption of an objectively systematic approach, as advocated in the Routemap, would enable other major investments to achieve at least similar levels of savings. Therefore, from examination of the Routemap principles at key stages in the Crossrail programme, the IUK Procurement Routemap as an approach has been demonstrated as good practice and a very applicable and appropriate tool.

More generally, the capability of sponsors and clients is often found not to be at this level. There are a number of National Audit Office (NAO) reports that identify the need for attention to be paid to sponsor and client capability as, historically, project and programme outcomes have not been met. As a form of rapid appraisal, the Routemap will identify critical aspects requiring in-depth review, and how to systematically take steps to increase both effectiveness and efficiency. This should lead to savings in excess of those accrued at Crossrail.

B

Relevant Guidance Material

This Annexe contains a list of guidance material that may assist those going through the Routemap process. It is not intended to be an exhaustive list.

Cabinet Office / Major Projects Authority

Bradley G (2010) *Fundamentals of Benefit Realization*. The Stationery Office (TSO), London.

Franklin M (June 2008) *Focus on Skills: Leadership Skills for Project and Programme Managers*. TSO, London.

Office of Government Commerce (OGC) (September 2007) *Managing Successful Programmes*. The Stationery Office (TSO), London.

OGC (2007) *For Successful Programme Management: Think MSP*. TSO, London.

OGC (2006) *Business Benefits through Programme and Project Management*. TSO, London.

Cabinet Office (2012) Portfolio, Programme, and Project Management Maturity Model (P3M3). <http://www.p3m3-officialsite.com>

Sowden R (2011) *Managing Successful Programmes – A Basic Overview White Paper*. TSO, London.

Department for Business, Innovation and Skills (BIS)

BIS (2010) *Understanding programmes and Programme Management*. BIS, London.

Institution of Civil Engineers (ICE)

ICE Best Practice Panel (2009) *Client Best Practice Guide*. Thomas Telford, London.

Jisc

Jisc (2012) *Programme management infoKit*. <http://www.jiscinfonet.ac.uk/infokits/programme-management>.

HM Treasury (HMT)

HMT (2004) *The Orange Book – Management of Risk, Principles and Concepts*. Her Majesty's Stationery Office (HMSO), London.

NAO

NAO (December 2011) *Initiating Successful Projects*. NAO, London.

NAO (April 2011) *Lessons from PFI and other projects*. TSO, London.

NAO (March 2010) *Management of Major Projects*. NAO, London.

NAO (March 2010) *From Private Finance Units to Commercial Champions: Managing complex capital investment programmes utilising private finance. A current best practice model for Departments*. NAO, London.

NAO (2009) *Opinion pieces on improving commercial skills for complex government projects*. NAO, London.

Office of Government Commerce (OGC)

OGC Best Practice Portfolio

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/documents/OGC_Best_Practice_Portfolio.pdf

OGC Best Practice Guidance

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/procurement_documents_best_practice_guidance_.asp for more information. (

Successful Delivery Pocket Book

<http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/documents/cp0043.pdf>

Government Procurement Code of Good Practice

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/documents/cp0080_Gov_Procurement_Code_Good_Practice.pdf

Introduction to Public Procurement

http://webarchive.nationalarchives.gov.uk/20110601212617/http://www.ogc.gov.uk/documents/Introduction_to_Public_Procurement.pdf

Managing Successful Programmes

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/guidance_managing_successful_programmes.asp

Introduction to Programmes

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/programmes___projects_introduction_to_programmes.asp

OGC Gateway Review for Programmes and Projects

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/what_is_ogc_gateway_review.asp

PPM, Assurance and Procurement Landscape Map

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/documents/PPM__Landscape_.pdf

Managing Risk with Delivery Partners

<http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/documents/cp0013.pdf>

Managing Business Benefits Key Principles

<http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/documents/KeyPrinciplesOfBenefitsManagementv1.pdf>

Achieving Excellence in Construction

http://webarchive.nationalarchives.gov.uk/20110601212617/http://www.ogc.gov.uk/ppm_documents_construction.asp

How to Buy Guide:

http://webarchive.nationalarchives.gov.uk/20110601212617/http://www.ogc.gov.uk/policy_and_standards_framework_welcome_to_the_how_to_buy_guide.asp

Complex Procurement

http://webarchive.nationalarchives.gov.uk/20110601212617/http://www.ogc.gov.uk/policy_and_standards_framework_complex_procurement.asp

A Formula for Success

[http://webarchive.nationalarchives.gov.uk/20110601212617/http://www.ogc.gov.uk/documents/A_Formula_for_Success\(2\).pdf](http://webarchive.nationalarchives.gov.uk/20110601212617/http://www.ogc.gov.uk/documents/A_Formula_for_Success(2).pdf)

Procurement Policy: Guidelines on Factors that can be considered when trying to reduce the risks of over-dependency on a supplier:

http://webarchive.nationalarchives.gov.uk/20100503135839/http://www.ogc.gov.uk/documents/Guidance_to_reduce_the_risks_of_over-dependency_on_a_supplier.pdf



Delivery Route Definitions

Delivery Consortia

The Delivery Consortia approach is adopted in sectors such as the regulated utilities where clients seek to transfer high-value performance-based contracts to a first-tier organisation over the course of a regulatory control period. Project values are typically in excess of £300m. Under the contract the supplier undertakes the design of the projects from solution development stage against an output specification. The supplier also provides programme management services alongside design and build capability.

Delivery Partners

A Delivery Partner can bring programme management, design and construction capability to temporary client organisations that can be rapidly demobilised on completion of the project. The client organisation retains a significantly higher degree of risk than the Delivery Consortia approach but has a far greater influence over the final outcome.

The Delivery Partner procurement model is highly flexible and can be used to stimulate collaborative working through integrated working. A key driver to the success of the Delivery Partner Model is the development of performance management measures and incentivisation for the Delivery Partner aligned to the client organisations strategic objectives.

Alliancing

Government research has shown a degree of confusion between the terms alliancing and partnering. Features such as establishing long-term collaborative relationships, shared risk management and incentivisation at project and programme level are interchangeable. True partnering requires the parties to work under a single multi-party contract whereas research has shown that in the alliancing model clients in the infrastructure sector prefer direct contracts with each member of the alliance.

This allows the client greater flexibility in developing the supply chain and offers greater freedom for suppliers to join and leave the alliance.

Frameworks

Frameworks are a procurement tool used to appoint preferred suppliers in advance of either directly awarding work or competing in a subsequent mini-competition. In the infrastructure sector, mini-competitions held following appointment to a framework are very common.

Under framework agreements clients are free to adopt either collaborative or risk-averse procurement strategies. Effective frameworks achieve direct procurement efficiencies and savings but require proper planning and management to deliver efficiency in design and construction.

Prime Contracting

Prime contracting is a procurement strategy most commonly adopted to deliver Ministry of Defence contracts. The strategy is based on awarding a contractor the responsibility to deliver a contractually defined requirement on time and to budget whilst meeting fitness for purpose.

The objective of Prime Contracting is to achieve better long-term value for money through improved supply chain Management, incentivised payment mechanisms, continuous improvement, economies of scale, and partnering. Requirements are drawn up in output terms to stimulate industry to devise innovative solutions and enable risk to be clearly allocated to where it can best be managed.

Private Finance – PF2

The principle characteristic of these contracts is the presence of private finance, usually in the form of both debt and equity. Debt is limited recourse and may be corporate, bank or capital markets based. These contracts entail a single contract with a single entity which is usually a Special Purpose Company (SPC) formed from a consortium or JV. The contract between client and supplier is a long-term service contract, based on a stable requirement and predominately involving the up-front delivery of a capital asset. The requirements are set out in an output-based specification (OBS) and the contract entails material risk transfer to the private sector.

Integrated Project Insurance (IPI)

IPI is based on the adoption of a single (third party assured) insurance policy to cover risks associated with delivery of the project. This policy would package all insurances presently held by the client and supply chain and an element of commercial risk (over and above a traditional pain or gain mechanism) should a cost overrun occur.

Cost Led Procurement

Cost Led Procurement is based on a client appointing one or more integrated teams under a framework agreement to deliver a series of projects. Teams are selected on their ability to work in collaboration to deliver a project below an established cost ceiling and achieve cost reductions on subsequent projects without compromising quality. Between two and three integrated framework supply teams in competition are then given the opportunity early in the life of projects to develop their bids with the client team. This provides the supply chain to innovate and drive project cost reductions. Appointment is based on the ability of the supply chain to deliver the project beneath the cost ceiling and a range of quality-based evaluation criteria.

Two-Stage Open Book

Finally, the Two-Stage Open Book approach is based on a client inviting suppliers to bid for projects on the basis of an outline brief and cost benchmark. The first stage consists of a competition based on the supply chain's capacity, capability, stability, experience, strength of supply chain and fee (profit plus company overhead). The second stage is then developed with the supply chain maintaining an appropriate level of commercial tension to ensure that value for money is achieved during the second stage of the bidding process. A target cost is agreed for the delivery phase with all stages verified by an independent third party assessment.

D

Checklist of Common Characteristics of Effective Delivery

Stage	Description
Investment planning: Developing policy, assessing deliverability and initiation	Establish longer term pipelines of work and programmes with clear evidence base for efficiency
	A clear benefits rationale established by the Sponsor
	The use of asset performance data to inform benefits rationale
	Risks and opportunities identified in relation to Sponsor capability and delivery environment
	Capability assessment used to inform and develop the Strategic Outline Case (SOC) under public sector approval and assurance process (or private sector equivalent)
	Sponsor draws upon asset management data provided by the Client to establish a performance measurement regime and efficiency targets based on best practice from the regulated utilities sector
Programme development: Establishing the Business Case and defining benefits	Project or programme brief identifies clear strategic objectives
	Delivery organisation identifies clear alignment of benefits, strategic objectives and anticipated cost
	Brief is informed by existing asset performance data. Client sets minimum standards for performance and specification rather than aspirational goals
	Define approach to early market testing prior to SOC approval. Identify strategy for obtaining Early Supplier Engagement to assist in defining strategic objectives
	Risks and opportunities identified in relation to Client and Supply Chain capability and delivery environment
	Risk position of the delivery organisation established and strategic procurement options identified based on full understanding of capability prior to SOC approval
	Opportunities identified to establish integrated teams to deliver ongoing series of projects and programmes achieving greater consistency and programme awareness
Procurement planning and execution: Structuring the Supply Chain and implementing strategy	Identify where greatest value and criticalities lie in the supply chain prior to early market engagement. Identify key markets and suppliers and related risks and opportunities
	Undertake early market engagement in accordance with Cabinet Office public procurement guidance and LEAN principles
	Establish integrated delivery team appointed on the basis of technical, commercial and behavioural competency
	Identify the approach taken to balance risk and reward through the Supply Chain and incorporate in Outline Business Case (OBC or private sector equivalent)
	Apply PAS91 or equivalent standards in pre-qualification. Eliminate unnecessary duplication and provide access to Client organisation procurers rather than relying wholly on automated systems

Stage	Description
	<p>Undertake Early Supplier Engagement to assist in developing and defining options. Apply greater incentives to bring innovation to the process earlier. Prioritise a structured approach to ESE early in the programme</p> <p>Consider incentivising supply chain against downstream operation costs rather than just upfront capex</p> <p>Establish robust systems for monitoring supply chain performance risk (e.g. insolvency or liquidation risk)</p> <p>Clearly articulate the approach to the above items in the Procurement Policy and Strategy documents and feed into the Full Business Case (FBC or private sector equivalent) at OGC Gateway Review 3</p> <p>Undertake competition stage applying best practice (e.g. Incentive Based Alliancing in Construction, European Construction Institute, 2000)</p>
<p>Engineering & construction: Delivering the Brief and realising benefits</p>	<p>Align contract forms and conditions through the extended Supply Chain ensuring incentives do not fall to the first tier organisation only</p> <p>Integrate supplier processes and systems that support efficient workflow and effective decision-making</p> <p>Produce Full Business Case (FBC or private sector equivalent) prior to contractual commitment</p> <p>Require the Supply Chain to integrate their design information or to develop the capability to do so</p> <p>Require the Supply Chain to demonstrate efficient production planning and management techniques</p> <p>Require the first tier integrator to establish robust systems for monitoring and reporting, performance measurement and production control with the extended Supply Chain</p> <p>Undertake Operational Readiness appraisal and establish plan prior to Transition stage engaging with all key stakeholders</p>
<p>Transition: Implementing the Operational Readiness strategy</p>	<p>Apply Operational Readiness plan to enable "Soft Landing" in accordance with Cabinet Office best practice (or private sector equivalent)</p> <p>Undertake post project review and lessons learned. Compare outcomes against risks and opportunities identified in early stage capability assessments and delivery environment analytic</p>



Acknowledgements

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Tesco

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Roger Bailey,

Thames Water

Miles Jordan,

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Simon Murray,

London School of Economics

Mark Worsfold,

OFWAT

Other organisations that have contributed

University of Leeds, Engineering Project Academy

Institution of Civil Engineers

Civil Engineering Contractors Association

Association of Consultancy and Engineering

Constructing Excellence

Construction Products Association

Thomas Telford Limited

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This document can be found in full on our website: <http://www.hm-treasury.gov.uk>

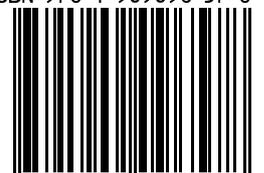
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ISBN 978-1-909096-57-8



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