



Major capital programmes: a discussion document based on insights from recent experience

Contents

Introduction	1
Summary	3
1. The shifting boundary between the public and private sectors	5
2. New ways of working across government	9
3. The changing operating environment	11
4. A more capable public sector	15

Introduction

The UK has delivered, or is in the process of delivering, a number of high-profile major capital programmes. Lessons learned from their delivery have been applied to the design of subsequent programmes. For example, the lessons from the Olympics and Crossrail are being used in the design of the delivery arrangements for HS2. An execution strategy with a number of common elements has emerged that attempts to address the significant challenges inherent in these programmes.

This discussion document has been written by the Infrastructure and Projects Authority, supported by Deloitte, with the intention of drawing together some aspects of this experience in order to inform the design and delivery of future major capital programmes. It is based on a review of case study experience, and discussions with leaders from the programmes.

Some words of caution are necessary about what this discussion document is, and what it is not. This document considers various aspects of the key challenges that have been faced by major capital programmes, and the actions taken to deal with them. It provides examples of how the risks in a number of major programmes have been identified and mitigated, why a particular delivery, governance or commercial model has been chosen, the impact of financial arrangements, and the required capability to support these actions.

This discussion document is not intended to be the following:

- First, it is not intended to provide prescriptive guidance. Instead, it sets out the execution strategy that has been developed by a number of major capital programmes and, equally importantly, some of the reasons why this execution strategy has been adopted. The differing market, regulatory and technical contexts for major capital programmes mean that no simple guidance can be offered for all cases. However, the intention here is that useful insights for the design of future capital programmes can be obtained by understanding the reasons why recent programmes have been executed in a particular way.
- Second, this document is not a comprehensive review of all aspects of major capital programme delivery. It is a selective analysis, drawing out some key current trends and issues. There are a number of important aspects of capital programme delivery that are not considered here; for example, the importance of defining the purpose and outcomes of major capital projects first, and ensuring that there is a strong sponsor to delivery these outcomes in detailed project design. Equally, this document does not discuss many of the requirements for successful management of all programmes, such as effective leadership and strong governance.

The HM Treasury Infrastructure Routemap tool provides a good source of insight and guidance into many of the issues associated with the delivery of major capital programmes.¹

¹ <https://www.gov.uk/government/publications/improving-infrastructure-delivery-project-initiation-routemap>

Acknowledgements

The IPA is grateful to the programme leaders who have given their time generously in the development of this review. In particular, we would like to thank: Andrew Wolstenholme and Martin Buck, Crossrail Ltd; David Higgins, HS2; Jeremy Rolstone and Allison Phillips, Rail Executive; Nathan Phillips, Shareholder Executive; and John Clarke, NDA. We would also like to thank colleagues from Infrastructure UK, the NDA, Crossrail, TfL, DfT and the MoD for their comments on drafts of this document. The views expressed in this document nevertheless represent the opinions of the authors, not the programme leaders or departments.








Authors

Tom Le Quesne, IPA

Tim Parr, Deloitte

Case studies

The review considered the following major programmes, most of which are referred to in this document.

	Crossrail
	Terminal 5
	High Speed 2
	London 2012
	London Underground
	Thames Tideway Tunnel
	Network Rail
	MOD Astute Submarines
	Nuclear Decommissioning Authority

Summary

Whilst the context – including the market, regulatory and statutory environment – has differed in each case, a number of broad trends have emerged in the delivery strategies adopted for recent major capital programmes in the UK. Although the examples reviewed here constitute the very largest public sector capital programmes, many of the key issues and insights apply to other government projects and commercial relationships.

The very largest public sector capital programmes face a number of particular challenges: they are 'too big to fail'; they are very expensive, even in the context of public finances; and they have high levels of inherent uncertainty and risk. The examples reviewed here demonstrate the evolution of a programme delivery strategy that has responded to these challenges.

- First, **there has proved to be a need for significant public sector involvement in managing a programme or enterprise, in order to create the conditions under which the private sector will deliver effectively, as has been done successfully with Crossrail.** It has rarely proved possible to transfer effectively the contractual responsibility for the delivery of major capital programmes to a single private sector entity working in a 'prime' role. The private sector has often ultimately been unwilling or unable to take on this level of risk. Even where such arrangements are entered into, government may still hold the risk implicitly and be required to bear the costs in the event that risks materialise, for example in the cases of some NDA projects and the Astute programme. Attempting to contract with a single entity has also created significant challenges around effective incentivisation, particularly in the context of complex outcomes and in cases where suppliers hold the monopoly and/or incumbent power.

However, for smaller scope 'packets', or once major risks have crystallised, it has in some cases been possible to contract successfully for the holistic delivery and management of risks.

- Second, **these major capital programmes have been managed through a different approach in the centre of government.**

In some cases, it has been judged beneficial to move away from the government's standard financial and approvals processes, as these do not always align with the need for long-term management of risk and contingency finance, or with the fact that HM Treasury is – implicitly or explicitly – acting as a funder of last resort for these programmes. This has therefore led to the development of bespoke financial and approvals processes, characterised by higher levels of cross-government collaboration, as in the case of HS2.

- Third, **the delivery of these programmes has taken place in the context of a robust project control environment, overseen by the public sector,** within which the private sector can deliver. This has allowed for control of a disaggregated contracting environment and the structured management of risk. This has been supported by an effective management information regime, integrated from suppliers through to senior sponsors in the top of government, as in the case of Crossrail and the Olympics.

- Fourth, **enabling a more sophisticated commercial and operating environment has typically required significantly enhanced public sector capability**, in particular – but not only – in the client function. In the programmes reviewed, this has been undertaken through a combination of in-house capability development, often secured with the use of pay freedoms, consultant support, and delivery partners. In many cases, enabling this has also required the development of a new public sector client organisation. Bespoke entities need to be understood in these cases as a means for public sector client organisations to develop the capabilities to succeed, rather than being an end in themselves. In some cases, adjustments have been made within existing organisations, for example the establishment of the Rail Executive within the Department for Transport. Experience has demonstrated the importance of client arrangements that evolve through time.

In the most effective cases, the different elements of the execution strategy were designed and understood as a coherent whole.

1. The shifting boundary between the public and private sectors

In recent years effective delivery strategies for major capital programmes have been built around a more nuanced boundary between the private and public sectors, with a renewed recognition of a greater necessary role for the public sector in creating the conditions under which the private sector will deliver successfully.

In recent major capital programmes, the role of the public sector has been substantial, as sponsor, client and sometimes partner in the delivery organisation; and the public sector has been required to take on some of the roles that, under previous arrangements, it had attempted to transfer to the supply chain. Primarily this is because the public sector has recognised that there needs to be a relationship in which the private sector can be incentivised to deliver effectively, and held to account when they do not, especially with the largest and riskiest programmes.

1.1 Learning from experience: the challenges of transferring overall delivery responsibility to the private sector

Previously, in major capital programmes, there was an attempt to package up a significant portion of the client role and contract with a single 'prime' supplier. This was driven by a view that the public sector could be reduced in size, thereby cutting direct costs, and that the expertise to act as a client was more readily available in the private sector. However, recent experience has demonstrated that this did not always work.

Effective risk management

The re-growth of the public sector role in recent major capital programmes has reflected the challenge of transferring in a meaningful way bulk risk in major capital programmes to private sector suppliers, which is a prerequisite to incentivise and hold private sector providers to account. A number of recent experiences, including the early phases of the Astute programme and more recent experiences with Sellafield, have illustrated the issues around attempts at transferring bulk risk. There are two main challenges that need to be considered.

First, the scale and complexity of these programmes means that the private sector is often not the natural 'owner' of the risk of unsuccessful outcomes and is therefore unwilling or unable to take responsibility for the required levels of risk associated with overall delivery. Shareholders in private sector companies are unlikely to tolerate taking on risk except where it sits within a narrow definition of the company's control and competence, for example construction companies taking on civil engineering risk, or oil companies taking on oil price risk. By definition, major capital programmes have a broad set of risks that no single private sector company is likely to be able to manage or offset. In other cases, it may be that no organisation has a balance sheet sufficiently strong to take on overall programme risk: this was one of the considerations that led to the management of Crossrail by a public sector-controlled entity. As a corollary to this, companies are likely to charge a high premium where they are asked to take on risk for major capital programmes with high levels of uncertainty which they cannot control.

Second, these programmes are often of national importance. Government often cannot tolerate delivery failure; and if delivery failure is imminent, the government is typically required to step in regardless of the contractual position. An example was the use of the Armed Forces to provide security at the Olympic Games. Government 'step-in' is most likely when programme delivery is highly time-sensitive, such as defence equipment and the Olympic Games.

The client may therefore 'pay' for risk twice – once to pay the supply chain for holding or managing the risk, and then to bear the actual costs of the risk when its transfer ultimately proves impossible.

Monopoly and incumbent power

In the context of major capital programmes, the public sector also needs to counteract supplier side power. This may be either because of monopolistic characteristics in the industry, or because incumbent private sector suppliers are the only organisations capable of continuing to deliver the programme regardless of their performance.

Understanding market conditions will enable the client to take an informed view of the most appropriate commercial approach. In some cases this may include market building in order to introduce an element of competition. Alternatively, structuring the aggregation of packages of work within the programme can encourage different behaviours from the market.

Terminal 5: The client holds all the risk, all of the time

The Terminal 5 programme risk strategy was that 'BAA held all the risk, all the time'. Contracts were let to Tier 1 suppliers on a cost-plus basis, with profit margins held in project-by-project incentive pots, calculated by BAA, through pricing of risks and opportunities with the supply chain. The incentive pot remaining at the end of the programme would then be split on a 50:50 basis between the Tier 1 suppliers and BAA;

The only Tier 1 contractor 'liability' was a reduction in the proportion of the incentive pot that they might receive. This aligned BAA and Tier 1 contractor objectives around effective risk management, contributed to a culture of collaboration for mutual benefit, and prevented costly and disruptive litigation.

NDA, Sellafield: The challenge of incentivising private sector delivery in the context of high risk

A multitude of first-of-a-kind risks and ultra-long-term programmes are inherent in nuclear decommissioning. Indeed, realisation of escalating waste management liabilities led to the wind-down of British Nuclear Fuels Ltd (BNFL), resulting in the establishment of the Nuclear Decommissioning Authority (NDA) in 2005. The NDA implemented an arms-length approach to delivering nuclear decommissioning, based on US and military models, contracting operations for managing the Site Licence Companies (SLCs) to private sector Parent Body Organisations (PBOs). The intention was to 'encourage innovation...improve contractor performance and deliver best value to taxpayers'.²

For many of its operations, particularly where meaningful short-to-medium-term closure milestones were present, this strategy worked well. At Sellafield, however, the level of complexity and uncertainty, multi-decade timelines and the scale of the liabilities proved unacceptably large to the private sector. As a result, the contract signed in 2008 was fully cost-reimbursable, with no risk attributed to the PBO management organisation except where deficiencies could be proved to be the fault of the PBO. Whilst performance targets were set (in the context of strategic long-term objectives) they could only ever represent short-term assumptions.

As the implications of previously unknown risks became apparent and delivery performance did not meet cost and schedule targets, the NDA commercial team was inundated with requests for changes to the baseline, driven in part by a desire to protect the fee position for the PBO. The ultimate liability associated with inherent uncertainty remained with the government under the PBO model, and the NDA had only limited incentive mechanisms in place to drive for improved delivery performance. Additionally, within the PBO model underlying drivers did not align themselves naturally: PBO interests are inevitably relatively short-term and underpinned by a low risk appetite, whereas the programme required a longer-term focus and a greater appetite for risk.

The NDA therefore made the decision in 2014 to assume management of the Sellafield SLC as a subsidiary company, fully integrating the enterprise into its remit, and accepting that it is the only institution able to discharge its responsibilities effectively at such a level of risk. Importantly, this model seeks to prioritise more agile and extensive use of the supply chain beneath the enterprise level, starting with one or more strategic partners, and seeking to tailor contracting models on key projects to improve the calibration of incentives and risk transfer. The model is premised on appointing a world class Board and management team.

² NDA Strategy (2006), p. 10

Complexity and uncertainty

The scale and complexity of the challenges faced by major capital programmes create an environment where it is difficult to develop a meaningful single contract for the entirety of the programme. It is a challenging task to specify time, cost and quality outcomes in major capital programmes without creating perverse incentives. The experience of the London Underground Public Private Partnership (PPP) contracts illustrates this point: recognising the need to exercise control over very large private sector consortia, the response was to create lengthy and detailed contracts, which attempted to anticipate and provide for the whole range of programme management and operational circumstances that might occur.

This was supported by a fully-staffed arbitrator. Not only was the contracting process itself very long and costly – the contracts took up to four years to reach financial close, with two years of negotiations from best and final offers – but the management of the contracts required significant investment from the ‘thin’ client to oversee the performance of the contractors. In effect, this meant paying twice for programme management, once to the supplier to manage, and then again for London Underground as client to monitor.

Astute: Prime model in the context of a monopoly provider

The *Astute* programme marked the first time the MoD had transferred the management of the majority of risk for construction of a class of submarines to a prime contractor. There was a prevailing sentiment that although the production of the Vanguard class submarines had been a success, VSEL (the owners of the Barrow shipyard where the majority of the submarines were produced) had made excessive profits. The MoD sought to mitigate VSEL’s supplier monopoly through open competition for the *Astute* contracts. Moreover, the contractor was to assume total design responsibility in its prime contractor role, allowing MoD to reduce significantly much of its internal capability. This move to a ‘hands off, eyes on’ approach was symptomatic of the general trend at that time towards cost reduction in the public sector and a reliance on private sector innovation.

The prime contractor relationship proved unable to deliver the cost efficiency and innovation expected. The MoD reduced its direct oversight of the programme, and lacked the visibility to understand problems as they arose. This was compounded by the low level of design maturity when construction started. There was a breakdown of relations between prime contractor, shipyard and Tier 2 suppliers. Costs eventually soared by 53% over the original contract price³, and the delivery of the first boat was 57 months late. As a result, the contract was unsuccessful in its original form and had to be renegotiated. As part of the necessary re-balancing, the MoD assumed design responsibility and ultimate cost risk for overspend above a reduced prime contractor liability threshold. In addition, the overall fee increased by over £1bn.

³ Learning from Experience, Vol. III: Lessons from the United Kingdom’s Astute Submarine Program, (2011), p. 38

2. New ways of working across government

The major capital programmes considered in this document have been delivered through more innovative, collaborative and flexible ways of working at the centre of government (the sponsor level) and between government and public sector client bodies.

The traditional government structures and ways of working, with HM Treasury setting annual spending limits, Departments defining policy and delivering, and HM Treasury holding Departments to account, were judged in some cases to be inappropriate for managing government interests in major capital programmes. In some cases, notably London 2012, Crossrail and HS2, a much more collaborative approach to managing government's role as sponsor has been developed. This is particularly apparent in the more involved approach taken by HM Treasury, Cabinet Office and the relevant Department to the design and operation of the major programme operating environment. It has often meant the creation of joint sponsor Boards (London 2012, HS2) enabling the interests of all the relevant Whitehall departments to be represented. In the case of Crossrail, a Crossrail Sponsor Board was established with both DfT and TfL represented.

2.1 The development of more bespoke approval and financial frameworks

In some of the cases reviewed here, flexibilities have been developed in three main areas when compared to the 'normal' public sector operating environment, all of which are the result of a more considered approach to managing greater uncertainty and financial risks. In many cases, HM Treasury has taken a much more active interest in creating the conditions that enable the public sector to manage financial risk, aligning the capability to manage risk with programme accountability in a more transparent way.

In high-risk major programmes that are 'too big to fail', HM Treasury has chosen to hold ultimate financial liability in a role, implicitly or explicitly, akin to that of an insurer. HM Treasury has therefore needed to understand the underlying cost model and risks to a much greater degree than in the 'normal' course of its public spending control activity. To do that effectively, it has to be engaged early in the programme, working closely with the sponsor Department as an active partner in the programme's development. London 2012, Crossrail and HS2 all demonstrate how this has worked.

The variation of the traditional Main Gate 'big bang' approach to programme approvals

The traditional approach to securing funding for large programmes has been to develop a 'Main Gate' final business case, through its various stages for final financial and political (including Parliamentary) approval before the programme can commence in earnest.

This approach has been supplemented in programmes such as Crossrail and HS2 with a stage gate 'Review Point' process, whereby financial and procurement authorities are delegated only once departments and HM Treasury have confidence in budgetary certainty and the plan for delivery. This has been because it is questionable whether, for programmes with such uncertain and risky characteristics, sufficient certainty can be created so as to 'cost out' the entire programme, which may last for decades, for a one-off approval. In addition, decisions on execution strategy are needed well in advance of decisions on major funding commitments; and both these decisions could potentially be required at a different time from when it makes most sense to obtain political and parliamentary approval. Review points can also provide an opportunity for decisions to stop or re-scope programmes.

At Sellafield, regular review points drive efficiency, allowing project teams to relay cost information to the NDA as the programme's scope becomes clearer and risks mature.

The development of formal, structured contingency arrangements

In cases where the programme is subject to high levels of uncertainty, for example where there are high levels of technological innovation, a formal structured set of contingency arrangements that can be drawn down over time has proved helpful. These are underpinned by the development of a thorough understanding of risks at the outset of the programme, with the potential to allocate elements of the contingency to particular risks. Maintaining this clarity builds confidence in delivery and supports collaboration through openness between stakeholders.

In the case of London 2012, £2.7bn of formal contingency was included within the overall £9.2bn Public Sector Funding Package. There were clear procedures in place for applying for the use of the contingency, and £238m was set aside within the contingency specifically to cover higher security costs in the event of an increase in the threat level. As risks did not materialise over the course of delivery, funding in the contingency was re-directed to operational requirements.

The creation of multi-year and flexible budgets

Annualised budgets for multi-year programmes are a key financial control mechanism intended to mitigate against potentially wasteful underspends, which is of particular importance in times of public spending constraint. However, successful management of very large, long-term capital programmes has benefitted from the ability to move resource between years, as risks materialise and the programme matures. The development of structured, multi-year contingency funding cannot be easily accommodated within conventional annualised budgets. Other financial flexibilities that have proved useful for programme budgets have included the ability to move resource between revenue and capital expenditure as required.

Network Rail and Highways England have been working to a five-year funding cycle, based on a financial profile linked to forecast spend; and, consideration is now being given to longer-term funding cycles for major Network Rail projects). Such flexibilities are contingent on a degree of isolation of the budget from other pressures, i.e. ring-fencing. Trust in the underlying estimates around cost and the development of an appropriate approval process are important prerequisites to the granting of financial freedoms and flexibilities.

3. The changing operating environment

Enabling and incentivising successful private sector delivery has required the public sector to create and manage a sophisticated commercial and project control environment, and to oversee the long-term development and maintenance of scarce skills.

The development of a more sophisticated operating environment has manifested itself in a range of features. These include the development of more collaborative approaches to commercial arrangements, the design of more sophisticated programme control architectures, and the involvement of the public sector in ensuring private sector capability is in place.

3.1 Greater innovation in the development of disaggregated and collaborative commercial arrangements

The ‘traditional’ approach to contracting and commercial strategies involved clear delineation between the client and the supply chain, perhaps facilitated by delivery partners, with an objective of transferring as much risk as possible out of the client organisation. This encouraged some inefficient practices within the supply chain and client, with the fear of litigation resulting in closed books and opaque cost-tracking.

The programmes reviewed here highlight two key approaches. First, the move away from a ‘prime’ relationship with a contractor to whom risk is passed means that the public sector has contracted with a more disaggregated supply chain. This can include both contracts with multiple parties and multiple contracts through time with key (‘Tier 1’) suppliers. This has encouraged private sector involvement at more attractive prices, motivated by targeted incentives around manageable packets of work, focusing on collaborative risk mitigation.

Programmes have attempted to strike a balance between awarding numerous small contracts and a small number of large contracts. Where there are a large number of small contracts, the consequence is that integration risk – tying together the work packages to deliver the required outputs – remains with the public sector client. It is tempting therefore to consolidate packages of work into large commercial arrangements, reducing the size of the contract management function, encouraging economies of scale and reducing the number of interfaces with the supply chain. This does, however, limit the number of commercial levers available to the client. Similarly, clients must consider the length of the contract. Continuity is an attractive attribute of long-term arrangements, but without continued incentives there is a risk that innovation and performance are stifled. Framework Agreements, as at Terminal 5, have been used effectively to create long-term commercial arrangements within which shorter-term incentive packages can be developed.

Second, more collaborative commercial arrangements have been developed: both clients and contractors are seeking many of the same certainties, specifically in terms of cost, delivery timescales and quality standards. Contrary to previous practice, it has been shown that collaborative working facilitates this and is particularly successful when risk is held at the right level, not necessarily transferred to the supply chain.

Contracting methods have changed over the past 20 years, with a trend towards collaborative and new standardised commercial arrangements between the public and private sector. Contracting structures have moved away from procurement of a ‘product’ and towards incentivising joint delivery of a common endeavour.

Such approaches have become standardised over time with the express intention of moving away from confrontational negotiation around minutiae and towards a stronger focus on more substantive matters that are bespoke to the programme in question, often termed outcome-based contracting or cardinal point specifications. Disaggregating the supply chain to reduce supplier power creates the risk of complexity, but standardised contracts such as the New Engineering Contract (NEC) help mitigate this risk.

Experience suggests that within an alliance, all parties need to have 'skin in the game' and be incentivised to work as a partnership. Incentives need to be sufficiently large enough to motivate collaborative behaviour. Given major programmes are long term, stretching over many years (and sometimes decades), alliances need to be sufficiently flexible to accommodate varying levels of supplier primacy at different phases of the programme. The required 'share' in the upside may need to fluctuate between phases. It may also be necessary for the parties to the contract to change over time.

Crossrail: Management of a disaggregated supply chain

Once funding agreements were secured in 2009, Crossrail Ltd was established as a subsidiary of TfL working under a Project Delivery Agreement between DfT and TfL as joint sponsors. It was recognised that it would not be appropriate for Crossrail Ltd to contract for delivery with a single delivery partner. Crossrail Ltd therefore entered into contractual relations with a number of different suppliers, including a handful of large contractor joint ventures, who themselves contracted with a large number of sub-contractors. As a result, Crossrail Ltd is supported by the provision of commercial and programme management by a number of delivery partners.

The more recent trend towards 'alliancing' continues on the collaborative theme, as an explicit attempt to secure the benefits of disaggregating supply while mitigating the integration risk that comes with moving away from a prime contractor model. It also represents a shift away from bilateral arrangements between a supplier and the client, to multilateral relationships between numerous suppliers and the client, with the aim of strengthening collaboration.

Terminal 5: Delivery through a commercial alliance structure

In contracting for the T5 programme, BAA opted for an Alliance arrangement with its supply chain. All Tier 1 contractors signed up to the 'T5 Agreement', a document which doubled as a ways of working handbook as well as a legally binding contract. The partnership approach that BAA adopted required all contractors to work collaboratively in fully-integrated transparent teams. This allowed the supply chain to focus on risk management rather than litigation avoidance which, combined with a gainshare mechanism, encouraged best-in-class performance. Without liability in the supply chain, BAA was able to demand contractually that its contractors delivered to this best-in-class level.

Importantly, this departure from traditional contracting methods required a step-change in culture for many of the supply chain organisations. In some cases, BAA leaders were forced to intervene when contractors began to depart from the Alliance ethos, for example when construction of the terminal roof deviated from plan and organisations began to brief their legal teams.

The evolution of the London Underground contracting strategy

London Underground has adopted the New Engineering Contract (NEC) for its standard form of contracts. NEC is based on a requirement for mutual trust and co-operation, and promotes timely decision making. Variations to the contract are agreed as the programme progresses rather than at the end. There is an incentive for parties to work closely together and to maintain an effective working relationship. LU varies the contract type depending on the project in question, for example fixed price or target price. Whilst there were various reasons why LU decided to adopt NEC as its main form of contract, the main reason was that it promotes sound project management practice and collaboration with the supply chain. The highly specialised and exceptionally complex types of contract that were seen under the London Underground PPP arrangements are no longer used.

3.2 Effective programme controls

A robust framework that enables the client to exercise the required control over programmes has proved to be an important component of recent successful execution strategies. In a highly complex operating environment with significantly enhanced client responsibility, multilateral contracts and high levels of uncertainty, the public sector client has needed to satisfy itself that the programme is proceeding as planned, and that it can intervene if required. A well-designed programme control framework, underpinned by data architecture that gives the client real-time, independent overview of programme progress, has become a key aspect of successful major capital programmes in the UK, enabling timely and evidence-based decisions to be made.

Crossrail: Programme controls and data architecture at the heart of major capital programme management

The programme controls function was set up as a priority by Crossrail, and used to drive delivery throughout the programme. Crossrail procured strategic and delivery partners to support it in its role, creating an integrated and streamlined set of business processes and procedures, backed by a robust data model and systems architecture, that enabled leaders and stakeholders to gain one version of the truth. Initially, Crossrail had relied on disparate systems across various functions. The lack of consistently-mapped centralised data created inefficiencies, and so three years into the programme a re-mapping exercise and implementation of a centralised data warehouse were undertaken. The result was a reduction in the headcount required for reporting and higher-quality, consistent information for management.

3.3 Public sector investment in the private sector skills base

Skills shortages in specific industries and regions in the UK have proved significant challenges for major programmes. Under certain circumstances, the market has proved incapable of providing these skills in the timeframes required, in particular niche skills without broader market demand where long-term training is required. Examples include engineering skills in nuclear decommissioning and railway signalling.

Investing in nuclear decommissioning skills

Historically the NDA's Site Licence Companies had responsibility for skills development, with the NDA providing oversight of the approaches taken.

A review of this approach concluded that the NDA needed to be more proactive in ensuring that SLC Resource and Skills Strategies are aligned to the delivery of the NDA's long-term mission, and a new Skills and Capability Strategy was launched in 2008.

In this regard NDA has developed the case for a National Skills Academy for Nuclear (NSAN), part-funded a new £20m centre of excellence for skills and training in West Cumbria, supported the creation of around 400 apprenticeships, and launched the national nuclear graduates scheme.

Leaders of such programmes have been required to focus on longer-term skills planning rather than relying on the supply chain. Addressing skills shortages in the supply chain (many of which are long-lead specialisms) requires long-term planning and an upfront assessment of what skills will be required when compared against the current market, and how the required capabilities will change over time.

Developing specialist rail skills

The UK lacks people with the right skill sets to deliver high-speed rail programmes. Consequently, HS2 have committed to establishing a college to train the next generation of engineers, and will provide the specialist training and qualifications required for high-speed rail. It will focus on training British workers to have the technical capability to deliver HS2 and also other major infrastructure programmes in the future.

In a similar fashion, Crossrail established a Tunnelling and Underground Construction Academy with the objective of ensuring it had the skills it needed for construction. The Academy will be retained following the completion of Crossrail as a specialist training centre for other tunnelling projects.

4. A more capable public sector

To enable a more sophisticated operating environment in the major capital programmes reviewed here, the capability and the capacity of the public sector to deliver the enhanced client role have grown. This has required the development of approaches to building stronger public sector clients, including the establishment in some cases of bespoke delivery organisations.

4.1 Make or buy?

The programmes reviewed in this document have used different combinations of in-house development, external support and the tactical or strategic use of delivery partners, in order to develop the required capability. To build capability organically it has been necessary to invest directly in skills. It has been acknowledged that for particularly scarce skills, it may be necessary to provide substantially more generous remuneration packages than are typically available in the public sector.

For example, the new delivery strategy being implemented at Sellafield has been premised on pay freedoms in order to secure a world-class board and management team. Relaxation of pay constraints has been considered on a case-by-case basis, requiring the explicit approval of HM Treasury. The standard of evidence required has been high, particularly for evidencing skills scarcity.

Pay freedoms in London 2012 delivery

London 2012 had to be 'ready on time and right first time'. With global scrutiny, there was no scope for poor delivery and so the ODA, LOCOG and GOE took the decision that pay should not be allowed to prevent the attraction of talent. Instead, remuneration packages were designed to attract high-calibre individuals from the private sector and leaders who could 'speak the same language as ... delivery bodies.'

Additional capability has also been bought in. Partners can be tactical (to meet specific skills gaps not readily available in the current client organisations and that would take too long to fill through in house growth) or strategic partnership (to work together with the client organisation over the lifetime of the programme as a more equal partner in the delivery of shared outcomes). More than one delivery partner may be appointed at the same time. However, the recent experience of major capital programmes suggests that the appointment of strategic delivery partners has not always proved the optimal way of developing capability, in particular for longer-term programmes and enterprises. HS2 has decided from the outset to build its capability internally, without reliance on external partners, with particular regard to the fact that it will require this client capability over a long timeframe.

Crossrail: Evolving use of delivery partners

Crossrail Ltd was intended to be a 'pop up' client, preferring to contract for capability rather than develop it in-house. Cross London Rail Links Ltd (CLRL), the development organisation charged with demonstrating the feasibility of the Crossrail project, recognised that there was a gap in the leadership and project management of this major capital programme. A world-class leadership team was recruited, alongside the appointment of delivery partners with subject matter expertise in project management. Crossrail Ltd appointed two partners, one at the strategic level – the Programme Partner (PP) – and one at a project delivery level – the Project Delivery Partner (PDP). However over time, the size and cost of the delivery partners started to increase. Crossrail Ltd has therefore moved to a strategy based on building up its internal understanding of project management processes, leading to less reliance on its partner organisations.

4.2 Evolving client capability

The delivery arrangements and organisation structures required to deliver these major capital programme have not been static; instead they have evolved as the programmes have moved through feasibility, design, construction and handover phases before the asset is moved into operation.

It has proved appropriate that different levels of authority should be delegated to the client from the sponsor, and from the client to the suppliers, at different phases of the programme life cycle. A common feature of these programmes has been progressive delegation of authority as confidence in the competence of the client and the supply chain has increased and the nature of the decisions has changed from being mostly strategic to mostly tactical. In some cases, rather than being planned at the outset, the evolution of client structures and capability has been in response to a change in delivery strategy during operation, for example recent changes at Sellafield, and the evolution of approaches to client capability in Crossrail.

The delivery structure of major programmes has required upfront planning to meet changing resource requirements, including a need to scale up (and down) parts of the project organisation rapidly. The recent trend is for programme leadership to dedicate more time looking forward, to determine necessary changes to their delivery model.

London 2012 and HS2: Evolving management capability and arrangements

London 2012 transitioned from a bid team of 20 to a team of about 250,000 at the peak of the Games, reverting back to very few in seven years. The London 2012 team identified seven stages in the lifecycle of the Games and the capabilities required to execute each stage, confirming specific requirements for delivery partners and external recruitment. The organisation also amended governance structures during the life of the programme. For example, in the final year leading up to the Games a more agile approach to decision-making was required, and this led to the Senior Responsible Owners Group being disbanded in favour of a more responsive committee with representation from a wider range of stakeholders, better suited to the needs of the programme.

HS2 have adopted an approach of planning the delivery structure of the programme early. They have appointed an Organisational Development Director to the executive team, to plan the organisational transitions.

4.3 The development of bespoke organisations

In many recent examples such as London 2012 and Crossrail, the response of the public sector has been to set up bespoke entities that are able to create the conditions for success. It is important to recognise that bespoke entities have been a means for the public sector client organisations to develop the capabilities to succeed, rather than being an end in themselves.

Such entities have typically been created so that they can operate outside the normal boundaries of the public sector. By establishing bespoke organisations it has been possible to develop fit-for-purpose arrangements and organisational cultures that enable programme delivery, without constraint from existing governance, processes and ways of working. Governance arrangements have been tailored to suit the needs of stakeholders, and specific freedoms around headcount and salaries have been secured to ensure that these programmes have sufficient capacity and capability to deliver value for money. Often these freedoms and flexibilities have to be earned by the organisation and increase over the life time of the programme. As discussed previously, trust is a crucial requirement.

The timing of establishing a new entity (if required) has proved important. Crossrail Ltd, as we now know it, only became a separate entity immediately prior to the commencement of construction and after the major financial and commercial risks had been identified and quantified. At this point, Cross London Rail Links (a distinct body charged with the development of Crossrail) was liquidated and replaced with Crossrail Ltd, the delivery body. In contrast, HS2 was set up as a development organisation with the expectation that it would evolve into a delivery organisation.

This does not mean that the setting up of a new organisation is a prerequisite for success. In some cases, amendments have been made within existing organisations to create some of the required enabling conditions, for example the establishment of the Rail Executive within the Department for Transport.

HS2: A bespoke delivery organisation

High Speed 2 will be the biggest infrastructure programme in Europe, and will be a unique programme in the UK. A decision was made to set up HS2 Ltd as a non-departmental public body, still answerable to the public but with bespoke freedoms and flexibilities to deliver this major infrastructure programme. The sponsor and programme organisations are supported by structures, such as governance and financial arrangements, which are appropriate for the HS2 programme. The financial freedoms afforded to HS2 Ltd have allowed the programme to offer competitive remuneration packages to attract talent. The governance structures detail how the unique relationship between HS2 Ltd, the DfT and Network Rail will operate and change over time.

HM Treasury and Cabinet Office
1 Horse Guards Road
London SW1A 2HQ

Publication date: March 2016

© Crown copyright 2016

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence.

To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/
or write to the Information Policy Team,
The National Archives, Kew, London TW9 4DU,
or e-mail: psi@nationalarchives.gsi.gov.uk.

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

Ref: J4414