COSTAIN

Getting the right result

A playbook for achieving the right result on major complex programmes – how to optimise operations for overall success

We all ask ourselves, how can we be better, do better, achieve more. And we all want to do the right thing and achieve the right result for our clients and our organisation, *but something stops us.* Through a series of articles, we have developed a reference guide for professionals working to conceive, deliver and support strategic assets.

Navigation

Each play sets out the steps to achieve the right result for your organisation. Whether that be a standalone project or a complex programme of works, the fundamentals remain.

Introduction

The right consequences to get the right result

Our tried and tested approach to critical national infrastructure support gives clients access to relevant capability and experience combined with a readily available supply chain and innovation pool to collaborate easily, integrate systems effectively and deliver at pace.

By building your processes, metrics, responsibilities, and reward structure around the major asset life cycle, you can improve your chances of getting the right result. At the very least, it will ensure that decisions are consciously made with long-term operational impact and risks identified and importantly, transparent. It is particularly crucial that everyone involved in delivering the asset understands their role.

Taking the time to look forward to the consequences of our immediate actions will only prove beneficial to our teams, our clients and the success of a programme of works. We want to deliver long-term sustainable projects that make a difference to people's lives.

This playbook aims to help you establish your baseline and where you need to improve to get the right result. As you go through the plays, use the assessment questions to determine where your organisation sits in terms of maturity and what actions you can take to achieve better outcomes.

Every organisation is different and some plays will be more developed than others – *tailor this to your own journey.*

The common challenges

Watermelon reporting

In June 2020 the Government established a new Infrastructure Delivery Taskforce, 'Project Speed'. The purpose is to accelerate infrastructure and deliver major programmes efficiently with a focus on sustainable practices and value for money. With this added pressure there remains a strong incentive for optimism bias in project reporting. In 2013, supplementary Green Book guidance was issued by HM Treasury that identified a tendency for project appraisers to be 'overly optimistic'. It recommended three main strategies for reducing optimism bias however, there was no mention of behavioural leadership. It's unsurprising that the 'watermelon effect', where projects show green (healthy) on the outside but red (troubled) on the inside, is an all too common phenomenon.

Short term gain for long term pain

There are many examples of over budget and over running infrastructure projects in the UK. According to the Infrastructure and Projects Association, of the major projects identified between 2012-2019, the number of projects classified as "probable of a successful delivery" has fallen steeply from 48% in 2013 to just 17% in 2019. Without a through life approach to support and delivery the benefits will always be realised in the near term and potential issues pushed further downstream either into future projects inside a programme or into the next funding cycle. Either way, they don't just disappear.

Tightly coupled systems

The use of data on projects presents a huge, yet critical challenge. Establishing the right systems and subsystems of data where interconnecting elements are dependent on each other to the least extent practicable means that changes impact as few interfaces as possible.

Establish the right culture and leadership behaviours

Many people talk about the culture of their organisation and how it needs to change. The reality is that cultures, especially those in bigger and more complex organisations are deep-seated and take a long time to move into a significantly different place. So, trying to do so at pace is almost guaranteed to fail.

If culture is defined as 'the way we do things around here' then the reality is that the way to change the culture is gradually to change those ways in which things are done. Probably incrementally. Probably by prioritising the most important things. Probably by determination, tenacity and consistency. Sounds daunting, doesn't it? It needn't be, because as we all know, once a problem is broken down into smaller pieces then we can tackle them more easily.

The absolute key to success is to give our organisations the tools, language and confidence to make behavioural changes in a clear, common, consistent and simple way. This really is possible, and for 14 years, we have done this for ourselves in Costain and helped clients to do the same. The approach engages leaders at all levels rather than a specialist circle of consultants and progress is in the hands of the people best able to make changes that last - the organisation itself.

Quick wins need proper planning

A really important behavioural outcome is that when we make changes we want to see them work and quickly. This is another very good reason for making change by small, logical steps. Seeing quick, effective results is what programme managers call 'quick wins' and low hanging fruit. In behavioural terms these quick wins if they turn out well, yield consequences for the people making the change that are positively reinforcing, they come quickly, and they have high degree of certainty in their outcome. These are the most effective consequences for ensuring that a behaviour is repeated and amplified in future. But a note of warning, in behavioural terms, even the quick wins need to be carefully considered if they are to work.

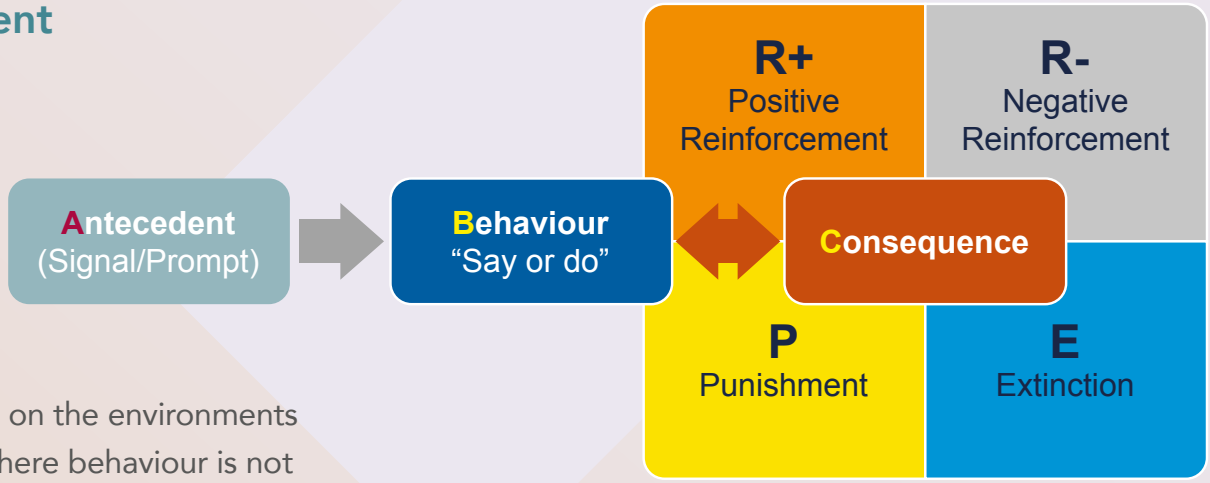
Behavioural dislocation

- Leaders and managers frequently consider that the behaviour problem they have in their organisation is to do with lack of compliance with processes and instructions
- Staff and followers frequently consider that the behaviour problem they have in their organisation is to do with leadership and management behaviour

All too frequently, both are correct. What to do about it?

Isolate and shape the environment

Our world is the world of portfolios, programme, projects and optimising assets to maximise performance through life. In this world we see leadership behaviour that works and all too often, we see behaviour that acts against the organisation's goals. Our experience and approach to leadership behaviour is to focus on the environments where leaders have their greatest impact. Where behaviour is not what the organisation requires then interventions can be designed and implemented, and the results observed and tracked. The key is hard, data-driven evidence and discipline in differentiating between opinions about people and their motivations on the one hand and observed, logged and pinpointed behaviour on the other.



Maximising the benefits of significant change requires early and sustained focus on behaviour to create the new culture.

Costain's behavioural programme has been accredited Platinum status by the Cambridge Center for Behavioral Studies.

How to establish the right culture

Preparation

- [ ] Do you have a clear definition of what you mean by behaviour?
- [ ] Have you set out your values with definitions and archetypal behaviours associated with these values?
- [ ] Have you identified the key leadership situations and the behaviours you want in these situations?
- [ ] Do you have a common language for behavioural management that everyone understands?
- [ ] Do you have guidance and a library of interventions that are known to encourage the behaviour you want?

In practice

- [ ] Are behaviours aligned to reward and does this work in practice?
- [ ] Are the behaviours being role modelled by leaders?
- [ ] Do you have a system for monitoring behaviour and systematically collecting behavioural data?
- [ ] Are the right people trained in behavioural management?
- [ ] Do people understand and practice how to give effective feedback?

Long term change

- [ ] Do you have a system for audit, advice and continuous improvement in behavioural management?
- [ ] Do you ensure new joiners understand your behavioural methods and ensure they adopt and practice them?
- [ ] Do you control, structure and sequence behavioural interventions in your organisation and allow time to embed change?

Contact the team for more information

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Claire Fryer
Behavioural management director

Case studies

New behaviours improve relationships

Enabling the right behaviours

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Continuous service delivery

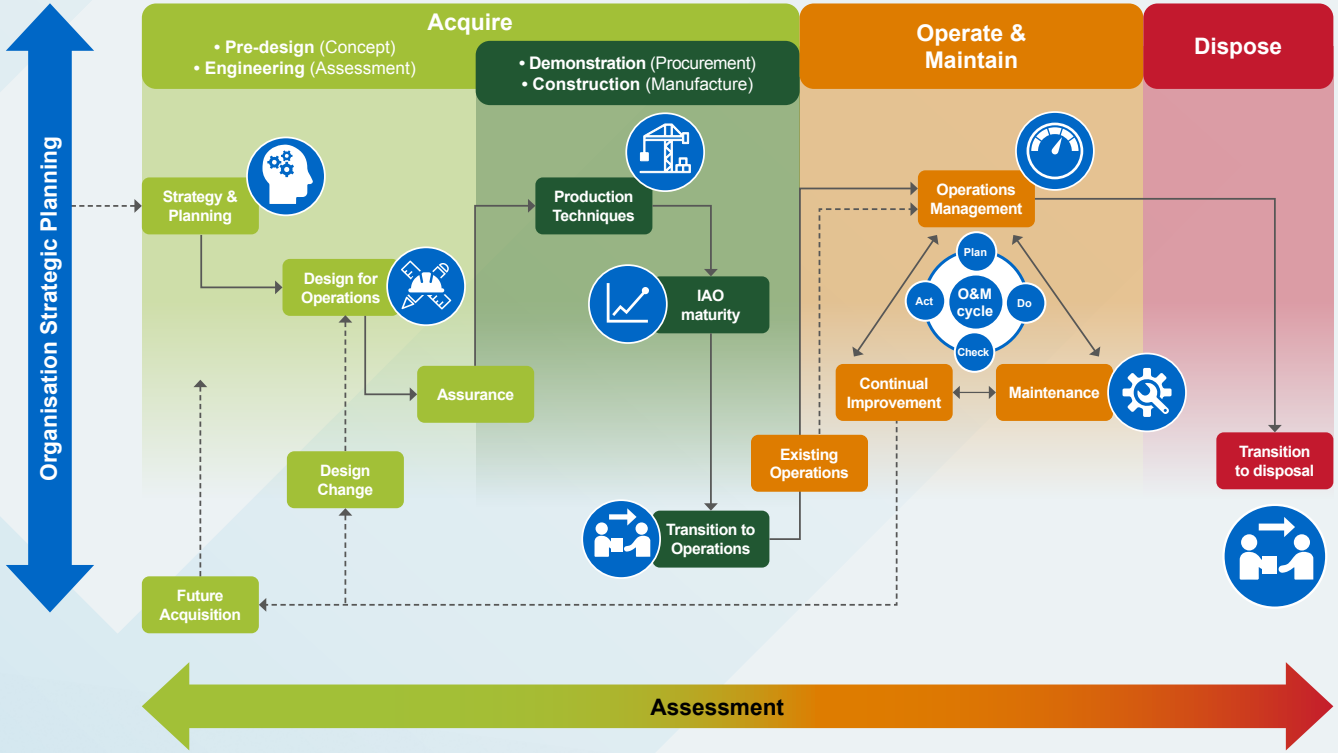
We live in a world where delivery of a service is non-negotiable and the safety, resilience, reliability, and security of Critical National Infrastructure (CNI) is paramount. Whether it be transport networks, supply of energy, water or broadband or a military response to an international crisis, *there is an expectation that your services will meet the demand without fail.*

Now more than ever it is essential to integrate a through-life approach from the start of the design process. It's not just the engineering design of the major asset that is needed to deliver availability but also the other elements required to operate and maintain it such as trained personnel, the right infrastructure, efficient processes, data and information, supply chain and logistics as well as how you need to be organised to deliver it.

Operations and Maintenance (O&M), In Service Support, Through-life Engineering Support – the terminology may differ, but the desired outcome for CNI is the same: sustaining availability of major assets in environments where continuous operation is critical. The question is, who is responsible for it and how do you ensure that its delivered?

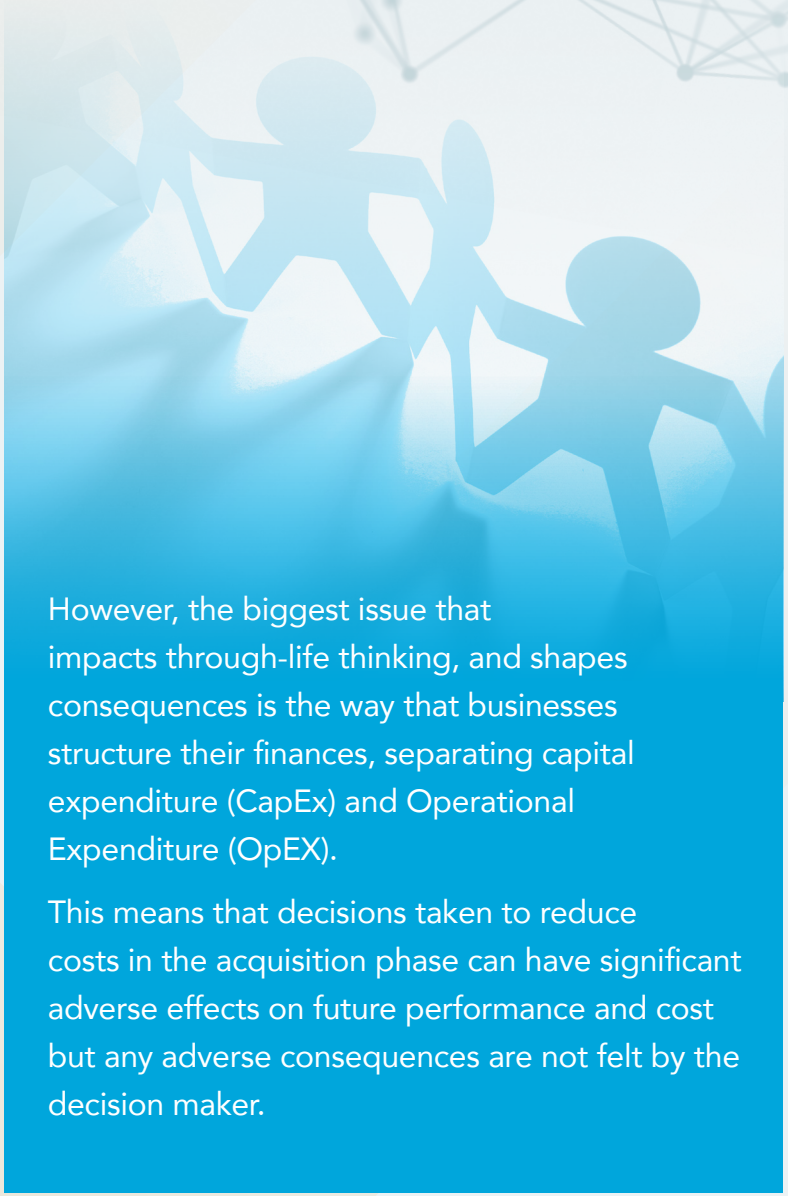
Whose responsibility is it?

From when an asset is commissioned and transitioned into service, responsibility for delivering output obviously lies with the organisation's operations management team. However, their ability to meet demands can be constrained by decisions made early in the design process that they might not have been involved in. During the design and construction phases of a complex project, if you ask someone what they are working on the answer is typically 'we are building the latest power station, rail line, submarine'. This mindset needs to change. The answer needs to be aligned to providing the capability that the asset will be delivering throughout its operating life.



The reality is that despite through-life O&M contributing to over 75% of the total cost of acquisition, when the programme is challenged in terms of cost or schedule, the O&M requirements are frequently 'traded out' as they are 'someone else's problem' in the future. The consequences from an operational perspective are neither immediate or certain, whereas from a project delivery perspective they are positively reinforced through a bonus or by avoiding punishment for missing targets. The reality is that by cutting out these requirements today, you are not trading them out but deferring costs to a later date, minimising the scope for operational efficiency and potentially adversely impacting the asset availability. There are a whole range of factors that influence decisions during the acquisition of major assets:

- Lack of involvement from skilled and qualified operations professionals in the design process
- Lag between any decision and when the impact is felt
- Delivery of major assets is frequently high profile whereas the ongoing support is seen as less glamorous.



However, the biggest issue that impacts through-life thinking, and shapes consequences is the way that businesses structure their finances, separating capital expenditure (CapEx) and Operational Expenditure (OpEX).

This means that decisions taken to reduce costs in the acquisition phase can have significant adverse effects on future performance and cost but any adverse consequences are not felt by the decision maker.

Setting up for continuous service delivery

Even at the very early acquisition stage, every function and department has a part to play in ensuring that the support system will deliver effective, efficient, resilient, safe, sustained, and secure operation of the asset. Is your organisation set up to deliver the right result?

- [ ] Does the senior management team deliver horizontal integration which drives efficiency?
- [ ] Have you defined the Operations & Maintenance (O&M) strategy in line with any business constraints and considered how this works across all your assets?
- [ ] Are senior leaders exhibiting and reinforcing the desired behaviours?
- [ ] Do project managers ensure that their project management plan includes the support requirements?
- [ ] Have you put in place a transition to service plan that is back scheduled from the hand over date?
- [ ] Are your planners ensuring that O&M requirements are reflected in the project metrics and are a mix of lead and lag indicators?
- [ ] Are you actively managing the change process so that any impact on O&M is minimised?
- [ ] Has consideration been given to obsolescence through the operational life?
- [ ] Are you driving desired behaviour through the construct of the contract?
- [ ] Do the operations team own the requirements for all the elements that they need to have in place when the asset is handed over and enters service?

Contact the team for more information

Nick Jacques
Principal consultant

Article

Making continuous service delivery a 'now' requirement

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Rolling wave planning and assurance

How far ahead can you reasonably build a detailed plan for a large, complex programme? Six months ahead? Hopefully. 12 months? Probably. 2 years? 5 years? Probably not. The reality of critical national infrastructure programmes, whether in defence, transportation or water and energy, is that they are years long covering lifecycles of 10 – 20 years.

The very nature of these projects means that we are in untested territory, and there is sometimes no precedent or neat template plan to follow. The environment is new, the challenges are normally unique, the risks and issues will be different, and the technology will probably be novel. But how often are programmes forced to plan to the day, years in advance? This is at best a waste of effort (time and money) and at worst delusional and misleading.

Establishing a robust plan for a long, high-value programme is intuitively and logically attractive. However, the reality is that we are generating the illusion of control. The world moves fast and a lot can change in a year in terms of capability, technology, and expectations.

Common pitfalls of long-term planning

Not understanding the requirements over the full lifecycle, and the part all stakeholders play. Absolute clarity of requirements is the necessary first step to planning, and an essential step prior to developing scope statements. Unless the final deliverables are well understood, as they are in highly technical engineering projects, it's almost inevitable that some things will be left off the plan.

Confusing scope with work; the scope is broadly non-negotiable. The project scope must be defined clearly and should involve the stakeholders. The work to deliver the scope though is entirely dependent on the approach chosen, the capability of the delivery team, the cost and time available. Are we confident that we can accurately and precisely plan for activities not required to start for another three, four or 10 years? For example, further into the project we may choose to change the approach to 'Buy' rather than 'Make' – completely different work, delivering the same scope. In this example, the detailed plan will be entirely different.

Immature estimates that add no overall value. If you are not clear on the detail of the work, the estimates of time, cost and quantities will inevitably be immature leading to funds misused, wasted or unavailable. The further along a project is allowed to proceed without adequate financial controls and checks in place, the higher the overall costs involved.

Setting unrealistic schedules that have no connection to reality. Simply setting a milestone does not automatically ensure that it will be achievable or achieved. The world moves fast, and the delivery approach that was envisioned at the start of the programme may be inappropriate as time goes on and our understanding of the challenges, constraints and resources becomes clearer.

Insufficient relationship with uncertainty and risk. Long term projects require a much greater feel and comfort with the ideas of uncertainty and risk. Better to be honest about how much we don't know and instead use diverse expert groups to assess uncertainty and risk and model the range of outcomes

As a result of the issues above, the baseline is subject to constant revisions. These are disruptive, inefficient, and cause the project team and the stakeholders to lose confidence in the plan.

> Managers expect they can plan for all the variables in a complex project in advance, but they can't. Nobody is that smart or has that clear a crystal ball.
>
> [Harvard Business Review Sep 2003]

The progressive elaboration of the detail plan is known as rolling wave planning and is an effective way to approach the planning challenge of long complex programmes. The APM Planning, Scheduling, Monitoring and Control publication refers to this as an 'incremental approach to planning high-density detail'.

Rolling wave is an approach that mitigates the challenges of planning long, complex programmes. But it isn't a perfect solution, and brings its own issues. On all critical national infrastructure and major complex programmes, there is a continuous conflict between the funding cycle and the planning process. We all acknowledge that funding drives the programme however this is sometimes out of sync with the overall programme…

Riding the rolling waves

More mature applications of rolling wave planning will plan the rolling wave in accordance with the programme's lifecycle (e.g. Concept-Assessment -Demonstration-Manufacture-In-Service-Disposal) and associated major milestones.

Benefits of this approach:

- **Consistency between the plan and the lifecycle.** Planning is undertaken in discrete chunks, aligned with the known scope (usually on contract) of the imminent phase of the programme. Assumptions are documented and applied consistently across all elements of the programme.
- **An accurate baseline can be set.** Planning each phase is a collaborative effort, ensuring that interfaces, dependencies, and deliverables are confirmed as part of the baselining process, and before execution of that phase commences against which change can be accurately measured and controlled.

- **Progressive assurance of the baseline plan.** Phase focused Integrated Baseline Reviews assess the maturity, integrity, and completeness of the detailed plan, using the documented planning assumptions as a foundation. The structure, logic and assumptions underpinning the future phases are also reviewed, but in the context of future, higher level plans. In this way, rolling wave planning can be supported by rolling wave assurance.

How funding can impact the programme

Programme planning can be aligned to programme funding cycles, and hence approval gates and phase contracts. Whilst this is intuitively a sensible approach, major difficulties can arise in practice. Few programme sponsors are willing or able to fully commit funding to the full duration of the programme. Numbers are huge, sometimes into £billions, and fiscal governance for programmes requires a complex web of requirements and arrangements.

Different industrial sectors apply this in different ways, to differing drumbeats. Regulated industries (such as the utilities sector) work to longer funding periods aligned to contract frameworks. For example the water industry works to a 5 Year Asset Management Plan (AMP), energy to the 5 year RIIO funding period. And in transport, rail's 5 Year Control Periods (CP), highway's 5 year Road Investment Strategy (RIS).

Where funding is allocated in stages, the outcome can be that the programmes often have to stop / start or fluctuate in intensity whilst awaiting decisions; the so-called planning blight. This means there is additional time 'on pause' and lost time re-energising activities. ***It may be more efficient to recognise and control the risks of continuous funding by keeping funding and planning as separate as possible.***

How to apply rolling wave planning and assurance

We should only try to plan in detail what we can reasonably predict. Anything beyond this should remain in higher level planning packages, supporting the programme strategy and high-level objectives. This approach avoids fooling ourselves and the programme stakeholders that we know exactly what will happen in the future.

- [ ] Do you recognise the concept of rolling wave planning in your own organisation or on your programmes?
- [ ] Are there undesired behaviours causing you to make decisions that solve a near term problem whilst generating a bigger one in the future?
- [ ] Some Programme Managers will only plan within the current funding limits (time or value), essentially adopting a short-term view. It is an inherently inefficient way of working. How often is there a gap between funding allocations that drives a break or pause in the programme?
- [ ] Can you ensure that the programme's termination liability (essentially spend + commitment) never breaches the limit of funding?
- [ ] Have you seen an increase of spend on your project towards the end of a Fiscal Year?
- [ ] Are your project managers clear on the definition and purpose of Budget and Funding? Not the same thing. So why treat them as if they are?
- [ ] Think about the unintended consequences of staged funding on the overall programme. Would structuring your approval, funding, governance and assurance processes, metrics and reward mechanisms in a way that positively reinforces the right behaviour, make the consequences immediate and likely?

Contact the team for more information

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Case studies/articles

Customised education and training

Implementing EVM on complex projects

Life on the rolling wave

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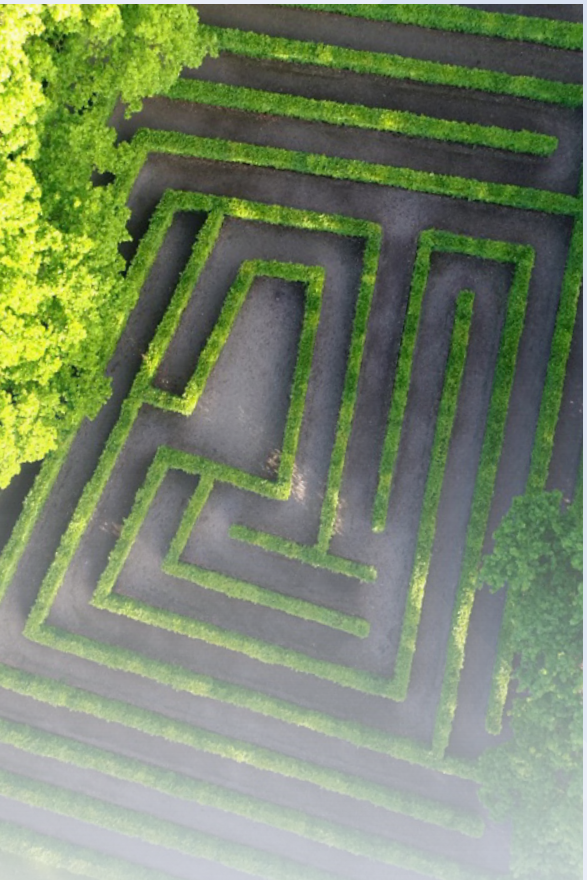


Projects without boundaries

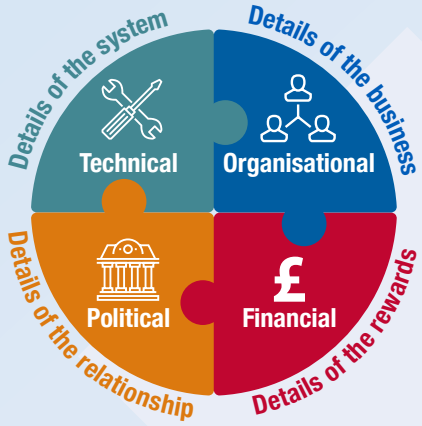
Imagine working in a project where the technical interfaces align perfectly with the organisational boundaries, subsystems are all loosely coupled and the culture is focused on the outcome of the whole system rather than any organisational or personal aims.

There are many reasons why this is challenging, but we can still strive to come closer to this ideal. Progress towards this idealised situation would deliver real value in terms of data visibility, supply chain collaboration and quicker decision making leading to overall effectiveness and efficiency. In an ideal world, the system would be analysed in the concept phase and an architecture drawn up that will minimise coupling, maximise use of standardised interfaces, and maximise re-use of existing work. In reality, problems occur and compromises need to be made.

On projects of any scale there are four key boundaries you need to manage (and on major complex programmes these become more challenging):

Technical boundaries

The technical boundaries, or what we would think of when we hear the word interfaces, should be simple to put in place.



Political boundaries

Where the system is publicly funded there is pressure to buy the home-grown solution and to share the work between regions that require investment. Where the system is an international collaboration then there is pressure to divide the work between the collaborating nations.

Organisational boundaries

Cooperation across these boundaries is reduced due to cultural differences, unclear accountability and responsibility assignments, tribal mentality, data boundaries, empire building and other dysfunctional behaviours. This problem persists without incentives to behave otherwise.

Financial boundaries

There can be significant financial incentives to optimise a subsystem at the expense of the wider system, and there is rarely a financial incentive to help a different organisation, a SME or part of the supply chain or even the community the project is potentially impacting.

Mismatched and moving boundaries

We should not compromise the technical solution based only on a desire for fully aligned boundaries, rather we should work to reduce the impact of those misalignments and consider some scope for fluidity in the structure of organisations that are working to deliver the project.

Subsystems that are loosely coupled, that is where there is as little dependency on the interfacing subsystems as possible, will reduce the complexity we see at the whole system level. Removing these difficult issues and putting them in the scope of a single organisation helps reduce the risk associated with them.

Integrating the Alliance

The problems arising from boundaries centre around ownership and communication and simply recognising a boundary for what it is can ease these problems. By making these problems visible we can encourage people to address them. Leaving boundaries misaligned without active management to encourage desirable behaviours, leads to a systemic problem that cannot be solved by a few diligent individuals.

Setting up your project without boundaries

One of the ways to address silo mentality is to increase visibility through sharing data in the supply chain, as live traceable data rather than out of date exports. Engineering data is an obvious candidate, but project progress, integration issues, and simple contact information helps. Optimising one component can lead to sub-optimising the whole and when we share data, we stand a better chance of seeing how to optimise the whole.

The second way is through shared ownership of the outcome (sharing the whole problem risk and reward). This is a healthier approach for the stakeholders as it encourages the right behaviours.

Boundaries can move during a project as milestones are reached. Design, production, operation and maintenance all affect the owner of a subsystem and as this moves, the financial and organisational boundaries may shift at different rates or not at all. There may also be new boundaries created as an integration team are rewarded, formally or informally, for finding fault with production or design output leading to an 'us and them' mentality.

- [ ] Do you have an Interface Definition Owner setting up the required architecture on your complex project?
- [ ] Have you created a low risk resilient enterprise that can adapt to change?
- [ ] Do you know what is 'over the wall' and the impact on surrounding components?
- [ ] Can you confidently say that your programme interfaces are clear, well documented and well managed?
- [ ] Have you got mismatched boundaries that are leading to confusion over accountability and responsibility and are difficult to re-align?
- [ ] Have you created a loosely coupled system i.e. interconnecting elements are dependent on each other to the least extent practicable? The benefit of this approach is that elements can be changed with least impact.
- [ ] If you can identify where boundaries are mismatched, can you work to understand how to align them and therefore manage them?

Contact the team for more information

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Articles

Hitting the restart button

Systems thinking

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Fostering a supportive risk culture

It's common for major projects and programmes to have in place sophisticated risk management arrangements, but this isn't any guarantee of success.

Projects often put in place best practice procedures, use the latest risk register and analysis software and employ risk professionals with extensive experience from other complex projects. But despite this, some major projects fail to deliver against their time, cost and quality objectives.

Risk culture is often talked about in terms of a team, or an organisation. But complex projects and programmes involve several organisations with their own distinct cultures, customer teams, suppliers, joint ventures, subcontractors, sponsor and regulatory bodies, third party stakeholders. And all of these have to work together – pull in the same direction – to make things work.

Behaviour – and that of the whole team or enterprise –is the critical factor behind project risk management performance. Performance in this context means the successful outcomes (delivering the planned outputs / benefits on time and on budget) enabled by early exposure of risks, full understanding of those risks, and prompt action to respond, exploit or mitigate.

So, what are the practical things we can do to foster a supportive risk culture and improve performance? It's not realistic or necessarily advantageous to aim for a homogeneous culture across all of the entities involved in a programme, but there are four key attributes which underpin successful risk behaviour across the enterprise:

Risk awareness / Attitude: Awareness that projects involve risk and we need to take certain risks to succeed. There also needs to be a consistent demand for good quality risk information and an appetite for investing in opportunities, despite that fact they may fail.

Engagement: Active participation of all parties involved – the project team, suppliers, client and sponsor – in identifying, defining, evaluating and responding to risks

Responding positively to new information. Ensuring that people – and in particular leaders and senior management in an organisation – respond in the right manner to bad news

Transparency. Between parties and within teams about changes in risks, emergent areas of risk and status / effectiveness of response activities.

	Awareness / Attitude	Engagement	Positive response to news	Transparency
Quotes indicating counterproductive behaviour	*"This is all stuff we've done before – there's no real risk here"*	*"That's not our problem – it's your risk"*	*"Those results can't be right – do it again and make sure it matches the contract date this time"*	*"Reduce the risk provision in the bid – we'll recover the margin through change"*

Self assessment: **Steps to create a supportive risk culture**

Development of a risk culture involves the Enterprise taking on a balanced view of risk, focussing on outputs and benefits, not just costs and everyone in the Enterprise understands that managing risk is a central element of their role – whatever that is.

Awareness / Attitude	Engagement	Positive response to news	Transparency
☐ *Is appropriate investment made in resources and training to carry out risk activities?*	☐ *Do contract arrangements encourage / enable collaboration between parties?*	☐ *Do senior leaders set an example in welcoming bad news as an opportunity to improve confidence and intervene promptly?*	☐ *Do you share information openly with your suppliers?*
☐ *Do senior leaders create the demand for high quality risk information?*	☐ *Are incentives aligned between parties and against holistic project / programme objectives?*	☐ *How do you behave as a customer to new risk information from your suppliers?*	☐ *Do contract arrangements promote timely and open sharing of the latest risk information and status?*
☐ *Is risk information the basis of decision making?*	☐ *Are risks being managed by the party best placed to do so?*	☐ *Is new risk information acted on promptly?*	☐ *Does the approach to risk analysis and forecasting recognise the full range of potential outcomes?*
☐ *Does your procurement process help you to select for risk awareness?*			☐ *Do you regularly seek – and act on the feedback from – independent assurance (the 'outside view')?*

Contact the team for more information

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Claire Fryer
Behavioural management director

Case Study

Targeted mitigation strategies

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Creating a digital enterprise plan

Shaping the national digital transformation agenda is a result of collaborative efforts between government, academia and industry. Costain is taking a lead in encouraging industry collaboration, with the aim of driving the UK towards a centre of excellence and setting the global standard for digital twin.

A digital twin is a realistic virtual representation of an asset, process or system. A digital twin can be used to optimise assets and business functions across the whole lifecycle. Significant value can be realised through a fully integrated, collaborative approach across the supply chain to deliver better project outcomes. However, there remains significant challenges in ensuring trustworthy data sharing, integration of silo's, the lack of digital and data standards and cultural impacts creating a barrier to adoption for many.

Defining a digital twin within your own enterprise to cover both new and existing assets seems like a significant task, however taking a systems thinking approach helps to understand the challenges in ways that consider the whole system and its relationship to key stakeholders and your end customers.

Here are a few use cases:

- An asset owner with a strategy of lifecycle building information modelling (BIM), using the model to adjust parameters and assess the impact of real-world behaviours in a digital simulation, to understand how an asset will perform over its whole life.
- Real-time operational technology providers, who can demonstrate how real-time systems, old and new can be integrated with business systems to run different scenarios for risk-based planning
- An IT provider might define a digital twin as being able to portray a vision of enterprise systems, such as workforce management, which enables owner/operators to prioritise scheduling and optimise maintenance budgets.

The huge potential of integrating digital twins

All of the above are great examples of digital twin capabilities when considering the Gemini Principles definition: 'a realistic digital representation of assets, processes or systems in the built or natural environment'. The real value can be realised when we consider integrating all these capabilities to create a fully digital enterprise, to include supply chains, and perhaps even citizens.

Instead of organisations working in independent business functions, they could be integrated with each other and the supply chain to test and model different scenarios. This simulation could test performance and measure the impact on cost, risk, sustainability, and other business metrics. The possibilities are quite literally endless. Importantly, many businesses already have the component pieces, they are however isolated.

Your strategy needs to take account for both new and existing assets:

- **New assets** - the creation of a cyber-physical asset that includes addition or extensions to an existing base (a new asset on an existing road / rail / water infrastructure for example)
- **Existing assets** - bringing legacy assets into the digital realm is a challenge across infrastructure but key to providing an enterprise model.

Taking this very broad, all-encompassing view, is tough for businesses to digest as they identify likely investment needs, work through value creation and understand risks. This is difficult when thinking about things on such a grand scale. You need to be clear on the vision and understand the specific stages of development:

Programme level – Digitally transforming the assets, processes and systems utilised for the delivery of complex infrastructure assets

Enterprise – Developing enterprise ready strategies and solutions for digital transformation, leveraging leading edge Digital Twin approaches to maximise value

National – The next big step from an integrated enterprise is thinking about federating information across multiple organisations to create a National Digital Twin.

How to kick start your digital enterprise plan

- [ ] Think about setting a high-level vision – what would that look like and who would you need to involve in the formulation?
- [ ] Have you taken the time to develop a roadmap for what a digital twin could be for your organisation? Set the direction and create early value.
- [ ] Can you take a step by step approach to work backwards to prioritise what to do now, in the mid- and long-term to help you get there?
- [ ] Have you got too focused on what a digital twin is rather than what a digital twin can be?

Profiles

Kevin Reeves
Director of IOT and digital twin

Articles

Know why to invest in, and how to develop, a digital twin

What could a digital twin be for your organisation

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At Costain we work on large scale projects with conflicting demands from diverse stakeholders, complicated funding models, in joint ventures, and with a technically complicated or complex system to deliver. We are not unique in finding ourselves having to navigate these issues, and the same circumstances appear in other industries.

Getting the right result for the end system means collaborating and acting in the interest of the bigger picture. We have seen how behavioural science and understanding the desired outcome can help, as well as the impact rolling wave planning can have. There is no one easy answer, but there are solid contributions that can be made in the building blocks of a successful result.

The goal is a One Team mindset. Know where the boundaries are, know who the stakeholders are, know where the money flows, but work in an open and collaborative environment to get things done better, more efficiently and to deliver value.

COSTAIN

#therightresult

Discover more at www.costain.com