WSP

IMPROVING GOVERNANCE IN INFRASTRUCTURE PROJECTS TO ACCELERATE DECISION-MAKING

How the SI:D[3] systems approach fosters delivery of intended benefits

Infrastructure projects are under constant scrutiny, primarily due to late delivery, significant overspend and not realising all the intended benefits for the end-user. This leads to the risk of reduced political support and difficulty in securing future funding to deliver infrastructure projects and programmes.

With this reputation and current challenges from the COVID-19 pandemic, there is an increasing emphasis on delivering projects in a timely and economical manner. (The issues highlighted by the pandemic have led to the UK government's initiative to build back better[1] by investing in the built environment to stimulate and carry the economic recovery.)

In the UK rail industry, Network Rail, released an initiative that has been developed with the Department for Transport to address the above, called project SPEED (Swift, Pragmatic and Efficient Enhancement Delivery); one of the outcomes is a new project management process: Project Acceleration in a Controlled Environment (PACE). PACE is replacing Governance for Railway Investment Projects (GRIP) as the mechanism for Network Rail to 'manage and control investment projects on the rail network'[2]. PACE is said to provide 'a more flexible control framework enabling Sponsors and Project Managers to tailor the controls to better meet the requirements of their project'[3]. The introduction of initiatives such as PACE is often the output of a government-led review,

reduction in available funding or to respond to changes outside of the organisation—an inevitable pattern that will continue.

This article explores some of the ways in which a systems approach can guide organisations looking to adopt new initiatives, such as PACE, or help those responsible for responding to the implementation of these new initiatives (e.g. the supply chain) adapt to the changing landscape of delivery; it also examines WSP's SI:D[3] framework to present specific ways a systems approach can deliver infrastructure projects and programmes with the intended benefits.

THE ROLE OF A SYSTEMS APPROACH

A systems approach is coming to the forefront of conversations through organisations such as the Institution of Civil Engineers and the Infrastructure and Projects Authority. (Both organisations have released papers within the last 18 months.)

---

[1] GOV.UK, 'Build Back Better: our plan for growth', 3 March 2021

[2] Network Rail, 'Project Acceleration in a Controlled Environment (PACE)', NR/L2/P3M/201 Issue 1, 06 March 2021, p. 6.

[3] Ibid.

Adopting new approaches to accelerate and provide flexibility to governance[4] and decision-making in the infrastructure space inherently introduces risk to the project, specifically not knowing how new processes will interact within a given environment and what the resulting challenges will be; all the while, the intention is to 'reduce the reputational and financial risk'[5]. Therefore, when initiatives to accelerate governance are introduced, it is important to keep in mind the long-term benefits the project is intending to deliver rather than allowing short-term delivery goals to dictate the project approach.

Before understanding how a systems approach may help, it is worth outlining some key points:

— A systems approach is 'a set of principles for applying systems thinking to engineering system contexts'[6].

— Key to the delivery of a systems approach is to consider the whole; this includes the system to be engineered, the lifecycle to engineer the system, and the stakeholder community developing and using the engineered system[7].

— Systems engineering uses a systems approach to define the activities required to develop, deploy, operate, and dispose of an engineered system.

— Systems engineering is itself a discipline that integrates a multidisciplinary team across the lifecycle to realise the output.

TIMING IS KEY

It is well understood that to get the best output from systems engineering, it must be applied upfront—to effectively specify what is needed, what can be afforded and what is practical to deliver. These factors are critical to the successful delivery of projects.

The application of systems engineering from the beginning provides the following benefits concerning governance and decision-making, increasing the chance of success:

— An accurate definition of the problem space, providing an understanding of the context where the system resides.

— Creates and maintains a collaborative environment through early and continuous engagement of the stakeholder community—taking into account the conflicting needs of all stakeholders at all stages of the lifecycle and facilitating easier problem resolution, especially where there are dependencies.

---

[4] Governance is the framework of authority and accountability that defines and controls the outputs, outcomes and benefits from projects, programmes and portfolios. The mechanism whereby the investing organisation exerts financial and technical control over the deployment of the work and the realisation of value. APM, 'APM Body of Knowledge' 7th Edition, 2021.

[5] Network Rail, 'Project Acceleration in a Controlled Environment (PACE)', NR/L2/P3M/201 Issue 1, 06 March 2021, p. 6.

[6] SEBoK, 'Systems Engineering Body of Knowledge' version 2.5, 2021,

[7] An open, concrete system of technical or socio-technical elements which is the focus of a SE life cycle. Its characteristics include being created by and for people, having a purpose and satisfying key stakeholders' value propositions when considered as part of a broader system context SEBoK, 'Systems Engineering Body of Knowledge' version 2.5, 2021.

— Provides a tailored approach specific to the problem to be solved and the needs of the project.

— Integrates a multidisciplinary team to evolve the system over its lifecycle and increase the likelihood of success; this step reduces risk from the beginning and minimises risk from change, and ensures the right people are involved at the right time.

— Encapsulates the use of heuristics to aid the decision-making process whilst providing a framework to maintain quality and keep the end-goal at the forefront.

The application of systems engineering provides a structured approach to identify and control the risks of 'quicker and cheaper', reducing the risk of delays and overspend—justification for a systems approach to play a central role not only in governance and decision-making but in all the functions of infrastructure projects.

APPLYING SI:D³ TO INFRASTRUCTURE PROJECTS

Railways and other infrastructure systems can be classed as life-long (if not immortal)—demonstrated by the enhancement and/or upgrade works required to keep them operating, including the addition of new capability.

Infrastructure projects can fall short of the required progress to maintain financial and political support for them. This can result in 'boots on the ground' for early works on major elements such as the civil engineering works, requiring the commitment of project costs before the system design is understood.

A driver of governance is being able to commit at a point with confidence; a systems approach seeks to give the decision-makers the

confidence that when they commit to early works, which may be due to long lead times, the system can be delivered and will meet the needs of the stakeholders.

SI:D³ is a process framework that provides the foundations for exploring and evolving the whole solution from the beginning—developing the strategy, defining the system, and delivering integration; the framework uses proven systems engineering techniques to connect technical management with established program management processes.

By its very design, SI:D³ provides the platform for a collaborative and engaged stakeholder environment.

Below is a breakdown of some key activities associated with processes from each of the three Ds to show how SI:D³ can help improve governance to accelerate decision-making.

DEVELOP THE STRATEGY

Developing the strategy creates the foundations from which the problem space can be defined and later addressed; the focus is on defining the concept to be achieved—described in benefits and outcomes.

— Identify and categorise the stakeholders from across the lifecycle, establishing the appropriate governance for robust management, effective stakeholder engagement and decision-making.

— Establish and agree upon the benefits to be realised by the solution, in terms of outcomes not assets.

— Tailor the activities specific to the project and the problem space.

DEFINE THE SYSTEM

Defining the system enables an accurate understanding of the problem space and the specification of a solution to realise identified benefits and intended outcomes; the use of heuristics and genericised artefacts can be readily applied and refined to meet the specific project needs.

— Analyse the complete scope of works necessary for delivery, identifying gaps and providing optimised scope allocations—minimising the procurement risk.

— Analyse and decompose outcomes into functionality and performance requirements that are captured, apportioned and traceable.

— Collaborative development of system architectures enables visualisation of written specifications enabling rapid refinement and update of candidate options.

— Define a clear 'route map to success' by optimising the sequence of benefit delivery.

DELIVER INTEGRATION

Delivering integration enhances the established foundations and focusses efforts on the identification, management, and mitigation of engineering-related threats to achieve the defined outcomes.

— Establish and control the baseline and changes to ensure the scope remains known and changes are evaluated and controlled with the whole system in consideration, ensuring rework is minimised.

— Make key and binding decisions related to the specification and acceptance of the system solution, decomposed and traceable to the outcomes and benefits.

— Define, develop, and agree upon interfaces, leading to collaborative specification between all parties, minimising risk to delivery and providing an integrated solution.

— Verify and validate early and often to ensure the solution still meets the outcomes, providing confidence in the project success.

***

SI:D^3 is made possible by the collective know-how of the diverse experts within WSP who facilitate the process framework for any given project or programme and help people arrive at informed decisions. In turn, SI:D^3 helps systems engineering practitioners overcome challenges and implement initiatives that improve governance and accelerate decision-making for infrastructure projects and programmes. Adopting a systems approach can help organisations deliver projects on-time, on-budget and with the intended functionality and long-term benefits.

Author

Alex Catley

Associate Systems Engineering Consultant

United Kingdom

Alex.Catley@wsp.com

About WSP

WSP is one of the world's leading professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. We design lasting solutions in the Transportation & Infrastructure, Property & Buildings, Environment, Power & Energy, Resources and Industry sectors, as well as offering strategic advisory services. Our talented people around the globe engineer projects that will help societies grow for lifetimes to come. wsp.com