

# Crossrail – embracing uncertainty on major programmes

New ways of approaching programme management best practice will be crucial for the realisation of future mega and major infrastructure programmes across the UK and internationally, says *Russell Pilgrim* of Jacobs.

Having overseen some of Jacobs' key contributions over the past three years on the Crossrail project, I can't help but feel proud of everything people have achieved on this landmark project.

One thing is for sure, the Elizabeth line will revolutionise travel and benefit millions of people, attracting both economic and social investment, reducing journey times, creating additional transport capacity, improving accessibility and providing a huge economic boost to the capital and beyond. With new stations and travel links, the Elizabeth line will support new housing and jobs across London, Berkshire, Buckinghamshire and Essex.

The Elizabeth line, delivered by Crossrail Ltd, stretches more than 100km, connecting London from East to West and integrating with Heathrow airport, the Great Western and Great Eastern national railways. Thanks to innovative programme and technical management solutions, we are nearing the opening of the Elizabeth line in the Queen's Platinum Jubilee year.

No mega or major project of this length of time, scale and complexity is completed without significant challenges and solutions. This mega, safety-critical project has had stratospheric complexities which generated several challenges and solutions along the way.

There is also keen global interest to share these lessons and solutions to help inform future major programmes across the world.

## Become the ultimate collaborator and disruptor

Several organisations have been responsible for bringing the Elizabeth line into passenger service. Some of its recent success has been driven by transformational leadership, demonstrating humility which has created an environment of 'owning the whole' and 'shared values'. At all career levels people require diverse thinking, shared goals and values, effective communication, trust, agility and resilience to be successful. There is now a significant opportunity for major programmes to look beyond sector experience and instead focus on skills and competencies learned that could be transferable into other programme types.

## Embrace the modern digital world

It has been well documented that all involved in Crossrail did not fully appreciate the immense complexities in delivering the UK's first-in-kind, fully digitised railway. Everything is digitised on the Elizabeth line, with centralised management systems, sub-systems and around 500,000 digital and physical assets all integrated. On Crossrail we found Programme Plateau teams, used a lot in aerospace to co-locate teams in a fully integrated end-to-end way and have provided successful outcomes in areas such as programme and systems integration. In addition,

with the operator placed at the front, our strategy and execution changed to place integration central to everything.

## Create a minimum viable product

In going back in time to the design conceptualisation stage, Crossrail would have benefited in locking a minimal viable product (MVP) into its configurational requirements. This is bare minimum scope to provide a safe, reliable, operational and maintainable railway – with high customer experience. Over the past three years, the programme successfully locked down the minimal viable staging, migration strategy, convergence and configuration. Introducing an MVP is now considered a key mitigation to risks, allowing the minimal version of service that would meet programme and user requirements.

## Modularise as much as you can

Design for modular assembly (DfMA) and modern methods of construction (MMC) offer significant improvements to productivity, cost certainty and sustainability benefits. In the past, including Crossrail, the rail industry has suffered from a lack of modularisation, otherwise known as 'plug and play'. Pushing the boundaries of what is already achievable in assembling and testing in a factory could make a significant difference in optimising productivity around the world.

The industry faces a significant challenge in balancing projects' need to be unique, the requirement of industry to work together in scaling continuity and a sustainable approach to the pipeline of work.

## Centralise programme and systems integration

The concept of having three onboard train signalling systems is very ambitious. However, that is the case on Crossrail, leading some to consider it the world's most complex railway. It is the UK's first-in-kind fully digitised system. Such

programmes need the skills of end-to-end (whole life cycle) decision-making programme management, technologists, digital and railway experts. This, combined with the introduction of an MVP and modularisation brings great benefits, such as simplifying designs which could save significant time in construction

The evolution of these infrastructure projects sees the UK constantly improve its infrastructure through future-smart places. Now is the time to show how we can solve the greatest challenges by transforming uncertainty into interventional and intelligent solutions. In turn, these

connect people and places with the means to work smarter, live better and make a positive difference in the world. It's very exciting to see the Elizabeth line open in the Queen's Platinum Jubilee year and create a transport system that will be used by many generations to come.



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