Making Innovation Happen in a Megaproject: London’s Crossrail Suburban Railway System

Andrew Davies, School of Construction and Project Management, University College London, United Kingdom
Samuel MacAulay, UQ Business School, University of Queensland, Brisbane, Australia
Tim DeBarro, Consultant, Nichols Group
Mark Thurston, Regional Managing Director, Europe CH2M HILL

**ABSTRACT**

This research explores how the innovation process can be systematically organized to improve the performance of mega infrastructure projects. It presents the initial findings of a research project between Crossrail and researchers at Imperial College London and University College London. The aim of action research is to formulate and implement an innovation strategy to improve the performance and outcomes of the project.

**THE PROBLEM**

“In the world of megaprojects, innovation is often avoided because of its association with uncertainty and increasing costs. Sponsors, clients, and contractors are reluctant to introduce novel ideas and innovative approaches and often seek to minimize the risks involved by relying on tried-and-tested methods.”

Megaprojects are often late, over budget, and fail to achieve their original specifications and revenue targets. This presents a paradox, because more megaprojects continue to be executed despite their poor record of productivity.

In most industries it is widely understood that improvements in performance depend on innovation. However, in the world of megaprojects, innovation is often avoided because of its association with uncertainty and increasing costs. Sponsors, clients, and contractors are reluctant to introduce novel ideas and innovative approaches and often seek to minimize the risks involved by relying on tried-and-tested methods. They prefer to select the lowest-price bid, transfer risks to contractors, freeze the design as early as possible, and stick rigidly to the original plan.

**THE STUDY**

This research presents the findings of an ongoing three-year (2012–2014) research project between Crossrail and researchers at Imperial College London and University College London. More specifically, the study focuses on the findings emerging from the action research1 part of the study, which aimed to formulate and implement an innovation strategy to improve the performance and outcome of the project.

---

1 Action Research is either research initiated to solve an immediate problem or progressive problem solving led by individuals working with others in teams or as part of a community of practice to improve the way they address issues and solve problems.
FINDINGS AND PRACTICAL IMPLICATIONS

The research identifies four opportunity windows to intervene and promote innovation in a megaproject, which are presented in the following table, and that can be generalized to other innovative megaprojects.

<table>
<thead>
<tr>
<th>Innovation Opportunity Window</th>
<th>Key Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bridging</strong>&lt;br&gt;During the preparations and front-end planning</td>
<td>Targeted search for and integration of innovative practices, technologies, and organizational processes that will improve the current project’s performance. Search focused on previous projects and related industries.</td>
</tr>
<tr>
<td><strong>Engaging</strong>&lt;br&gt;During design of tendering process and contracting processes</td>
<td>Develop new ways of contracting/tendering. Create incentives and rewards to encourage the search for innovative solutions.</td>
</tr>
<tr>
<td><strong>Leveraging</strong>&lt;br&gt;Occurs after contracts have been awarded and core supply chain formed</td>
<td>Develop a strategy and process to mobilize delivery partners, contractors, and suppliers to develop new ideas, technologies, and organizational practices. Apply innovation to improve the performance of different phases of the project.</td>
</tr>
<tr>
<td><strong>Exchanging</strong>&lt;br&gt;Occurs during and after the project has been executed</td>
<td>Connect with the wider project ecosystem to share and trade innovations. Partner with other parts of the ecosystem to pool resources to fund the pursuit of common innovation needs.</td>
</tr>
</tbody>
</table>

**Bridging:** The bridging window occurred when Crossrail’s sponsors were planning the project and establishing CRL\(^2\) as the client organization responsible for managing the program. Efforts were made to learn lessons and recruit senior managers able to apply experience gained on other megaprojects and combine successful practices, technologies, and approaches in innovative new combinations.

**Engaging:** The engaging window occurred when CRL began the tendering process of selecting the major works involved in the design; construction of tunnels, platforms, and stations; and supply of rolling stock and signaling systems.

**Leveraging:** The leveraging window occurred after the CRL contracts were procured and involves encouraging selected contractors and their suppliers to develop and apply innovation in different phases of the project.

**Exchanging:** The exchanging window describes the opportunity associated with connecting the Crossrail megaproject with the wider project ecosystem to trade existing innovations, as well as partnering to pursue common innovation objectives.

\(^2\) Crossrail Limited
FINAL REMARKS

The action research with Crossrail provided a unique opportunity to observe and participate in a pioneering effort to develop and implement an innovation strategy. The framework of four innovation opportunity windows could provide a useful heuristic tool, for creating and capturing significant additional value during each phase of a megaproject.

Crossrail innovation strategy was tailored according to the requirements of a megaproject involving a large coalition of contractors and suppliers who were coordinated by a temporary client organization. The strategy was implemented in early 2013 and it is too early to assess the impact of the innovation program on the performance of the project.

FULL CITATION


FOR MORE INFORMATION

- PMJ articles and Sponsored Research monographs are available to members for free download.
- Monographs can also be purchased at the PMI Store on PMI.org.