

Abstract

Project management put the U.S. astronaut Neil Armstrong on the moon and has made possible the realisation of some of mankind's wildest dreams. Recent project management trends would indicate that the discipline has not only departed from the traditional practice of delivering projects based on an engineering design (with appended cost and schedule estimates), but that project scope, scale and complexity have drastically increased as well.

It would however transpire from the numerous and recurrent unsatisfactory outcomes of Large Infrastructure Projects (LIPs) that traditional project management has not necessarily kept pace with such new developments – especially their ever-increasing complexity. Massive costs and schedule overruns on such projects attest to the severity of this problem. Similarly, instances of substantial changes to the initial project scope will suggest that modern project management approaches would still require enhancements.

Project management is defined as *“the application of knowledge, skills, tools, and techniques to project activities in order to meet project requirements”* (PMBok Ver. 5) – Hence, to improve project delivery performance, a particular attention should be given to managing requirements throughout the project lifecycle, which constitutes the essence of System Engineering (SE).

Systems Engineering, as a discipline and as a way of thinking, is gaining popularity and acceptance in its applications to Large Infrastructure Projects (LIPs) due to the benefits emerging from its ability to manage escalating complexity, particularly in large and complex infrastructure projects such as transportation (e.g. railways, ports), energy, and water infrastructure projects. These LIPs drive economic growth, through both their construction phase (e.g., job creation) and their successful outcomes (e.g., better services).

This study has considered Systems Engineering principles and concepts for incorporation by way of enhancements into a holistic project lifecycle model that improves delivery effectiveness – which shall then result in substantially reduced cost and schedule overruns on Large Infrastructure Projects (LIPs).