

EXECUTIVE SUMMARY: THE LARGE HADRON COLLIDER PROJECT

In this report, we analyse the project management techniques used in the planning and construction of the Large Hadron Collider (or LHC) by CERN. The extreme scale of such a project, coupled with its scientific nature, make this both a fascinating case study and a good example of how traditional project management techniques do need adapting to fit some unusual projects.

First envisioned in 1977, the LHC project was intended to increase the energy imparted to collided particles to 1 TeV (Tera-electron-Volt). The use of Hadron collisions was deemed the only practical way of achieving this goal. At least initially, the project was championed by Nobel Prize winning physicist Carlo Rubbia, who staunchly promoted the project, which was approved shortly after his ascension to Director General of CERN.

Due to the LHC's nature as a scientific project, it was not expected to bring in any revenue directly. This means that the Triple Bottom Line model does not directly apply: there is no financial bottom-line. Furthermore, as scientific progress is by nature unpredictable: a "scientific bottom-line" would be impossible to correctly predict. Furthermore, this renders Return On Investment modelling very difficult, completely discounting the possibility of using Quantitative measurement. While CERN did take cursory consideration of the environmental and societal impact of the project, these were by no means exhaustive.

The LHC deviates from the project lifecycle model in a couple of ways: most notably – due to the duration of the project – much of the concept and planning phase had to be extended in order to accommodate changing technological and political situations. Much of the concept and planning work occurred concurrently, as without some of the more detailed plans, CERN were unsure of the project's feasibility. Furthermore, due to the large number of components which were required by the project – and the desire to use technology which had not yet appeared at the time of the project's conception – much of the detailed planning was interleaved with the execution phase.

Midway through the project – during the execution phase – CERN found that the existing systems (both in-place at CERN and commercially available) for monitoring and managing the project during its construction were inadequate for their environment. At this (somewhat late) stage of the project, a new system was developed internally: the Earned Value Management System (EVM).

Amongst the changes to the management of the LHC project, the most important we would make are including more people trained in project management – the bulk of the project was managed by physicists – and to split the project up into smaller sub-projects which could be better managed (using the Project Lifecycle method) individually.