Chapter 10
Key Success Drivers for Large High-Technology Projects: Prediction and Practice

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ABSTRACT

Success in project management, and particularly in large, high-technology projects, continues to test the resources of organisations and their sponsors. This chapter revisits the conclusions of an earlier meta-study (Crosby, 2012a) that examined a large number of published case investigations and research efforts relating to the success and failure of projects. In that study, the success factors for general, and high-technology, projects were grouped and ranked as strategic success drivers for use prescriptively by project practitioners and approvers, and the principal drivers were examined closely to reveal any less obvious characteristics influencing project success. This chapter takes the original findings of ranked success drivers and investigates how these align with the experiences of three large contemporary high-technology projects. The conclusions show that, while the original set of drivers remains valid as predictors of project success, the ranking is likely to vary, even between projects that are technically and structurally similar. Two additional success factors are added as a result of the present study.

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INTRODUCTION

Despite present global financial constraints, the world is currently in an era of great innovation realised through many large science/engineering projects (e.g. the Large Hadron Collider, the ITER Fusion Reactor, and the Square Kilometre Array). These breakthrough projects, by their nature, have inherent high-risk, yet their international scale and huge cost implications demand that success measures are achieved and project performance is maximised. Many modern studies (Jugdev & Müller, 2005; Williams et al., 2009; ICCPM, 2011; Crosby, 2012c) show that traditional (i.e. PMBoK style) project management and execution techniques alone are insufficient to meet the demands placed on complex high-tech mega-projects. A fuller understanding of success drivers, professionally applied in the early stages, is required to lift project performance.

My original meta-study (Crosby, 2012a) of project success factors (based on analyses of 2820 cases) concluded that sound project management control and execution systems, and a clear project definition and goal set, are by far the two most important drivers of project success. Competent information management systems ranked third in importance followed by 15 other significant factors empirically shown to improve project outcomes (See Table 1). Many of these success drivers are wholly or partly newly ranked 'soft' drivers, indicating the importance of leadership, motivation, expectations, and team engagement. The study findings encouraged further research to benchmark the performance of contemporary large engineering and science projects against the reported strategic drivers to further our knowledge of factors for project success.

This paper takes the original findings of ranked success drivers (beyond the fundamental project management artifacts e.g. project plans, WBS, etc) and investigates how well these align with the recent experience of three large high-technology (high-tech) projects. The cases are purposely selected from the astronomy world, each being an example of a new breed of large and expensive array-style radio telescopes.

A precise definition of a "large" project (also referred to as a mega or giant project) is not offered, except that these endeavours are characterised by multi-million or even billion dollar budgets,

Table 1. Success drivers ranked by relative importance (from Crosby, 2012a)

#	Success Driver	High-Tech Project Ranking
1	Project management (PM) control & execution systems in place, with robust policies, planning, procedures, document control, audit, etc	23.87
2	Clear project definition, requirements, goals, objectives, scope, and project mission; sound business case	19.53
3	Mature project communication, information systems; effective public relations management	11.18
4	(Top) management (or sponsor) support with sustained commitment, appropriately engaged	8.96
5	Project baseline, budget estimates accuracy, schedule and project phasing, effective project performance (reviews) and measurement	8.96
6	Leadership skills, PM experience & stability; motivating & socially capable PM	5.79
7	Agreed realistic customer / user expectations; frequent customer contact	3.37
8	PM/Organisational understanding & competence in project management	3.37
9	Adequate resourcing of the project	2.37
10	Aligned perceptions of project goals & success - management and team; sense of urgency instilled	2.37
11	Effective stakeholder engagement / partnership (e.g. client, contractors, etc)	2.37
12	Organisational responsibilities assigned to right-sized capable team	1.64
13	Mature, effective project management change control process; effective deviations handling & configuration control	1.64
14	Understanding & continuous management of risk; visibility of risk register	1.13
15	Project Manager & PM systems matched to project complexity, and culturally aligned	1.13
16	Effective means of learning from experience and continuous improvement environment	0.78
17	Full understanding, and early engagement, of host government environment and institutional requirements	0.78
18	Right-sized systems engineering; managing and procuring in right sized project 'chunks'	0.78