

Beyond the ‘iron triangle’: Stakeholder perception of key performance indicators (KPIs) for large-scale public sector development projects

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Abstract

Performance measurement criteria vary from project to project. Despite much work on the subject, there is no commonly agreed framework of performance measurement on mega projects. To bridge this gap, this research targets to investigate the perception of the key performance indicators (KPIs) in the context of a large construction project in Thailand. The study explores the significance of key performance indicators in perspective of various construction stakeholders (client, consultants, and contractors). Findings indicate that the traditional measures of the iron triangle (on-time, under-budget and according to specifications) are no more applicable to measuring performance on large public sector development projects. Other performance indicators such as safety, efficient use of resources, effectiveness, satisfaction of stakeholders, and reduced conflicts and disputes are increasingly becoming important. This implies that the Thai construction industry is slowly departing from the traditional quantitative performance measurement to a rather mix of both quantitative and qualitative performance measurement on large-scale public sector development projects.

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1. Introduction

Project success means different to different stakeholders. A project that may seem successful to the client may be a completely unsuccessful venture for contractors or end users (Toor and Ogunlana, 2008). Invariably, stakeholders have distinct vested interests in a particular project and therefore the perception of success may also vary across various stakeholders (Bryde and Brown, 2005). Particularly, in case of public development projects, where number of stakeholders usually large, it is important to assimilate the viewpoint of all interest groups about the project suc-

cess. Cox et al. (2003) note that the perception of project success may even vary according to management’s perspective. They ascertain that there is a substantial difference between the perception of construction executives and project management about KPIs. It is, therefore, not surprising that different participants think differently while they analyze the performance of a project (Cox et al., 2003).

To clarify some ambiguities related to the scale of project success, Lim and Mohamed (1999) argue that there are two possible viewpoints: macro-level success and micro-level success. The macro viewpoint takes care of the question “does the original concept tick?” Usually the end users and project beneficiaries are the ones looking at project success from the macro viewpoint. The micro viewpoint concerns the construction parties such as consultants and contractors. Furthermore, micro success pertains to traditional triangle of whether the project is on time, within

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budget, and according to specifications. Briefly, macro success is more concerned about the eventual operation/functions or long-term gains of the project; whereas micro success pertains to profitability or short-term gains.

Cookie-Davies (2002) also offers a distinction between project success – which is measured against the overall objectives of the project – and project management success – which is measured against the widespread and traditional measures of performance against cost, time, and quality. Cookie-Davies (2002) also highlights the difference between the success criteria and success factors. Success factors are those which contribute to achieving success on a project. On the other hand, success criteria are the measures by which the success or failure of a project will be judged. Factors constituting the success criteria are commonly referred to as the key performance indicators or KPIs. Cox et al. (2003) observe that the KPIs are helpful to compare the actual and estimated performance in terms of effectiveness, efficiency and quality of both workmanship and product. In short, success factors are the efforts made – or strategy adopted – to achieve the success on project. Whereas, KPIs are the compilations of data measures (either by quantitative or qualitative data) used to assess the performance of the construction operation.

Despite extensive research, there is no general agreement on a set of KPIs for construction projects to-date (Chan et al., 2004). Therefore, there is need for identifying a set of common indicators to be used by construction executive and project managers in measuring construction performance at the project level (Cox et al., 2003). However, it seems difficult as every project has certain unique features and limitations and therefore generalizing the taxonomy of KPIs for all kinds of projects looks fairly impractical. Regardless of these limitations, it is important to comprehend the perception of KPIs on different types of projects carried out in different contexts. Such research endeavors are helpful in sharing the lessons learnt on different projects and to expand the existing taxonomies of KPIs for future projects.

Considering these implications of research on project performance management, the current research attempted to achieve the following objectives:

1. to capture the perception of various stakeholders (client, consultants, contractors) about KPIs on mega construction projects,
2. to investigate if the perception of KPIs differs across:
 - a. various construction stakeholders,
 - b. firms working independently and in joint ventures, and
 - c. various levels of professionals' overall experience and experience as project managers.

2. Literature review

Phua (2004) is of the view that multi-firm project success can be defined and measured, at least at the operational

level, as the extent to which projects meet a combination of budget, timetable and technical specifications. Savindo et al. (1992) relate the success of a project to the expectation of its participants which may be owner, planner, engineer, and contractor or operator. According to Munns and Bjeirmi (1996), a project can be considered successful when it is able to achieve some specific objectives; have definite start and end dates; and is completed within a specified time period and according to a set specification. Nguyen et al. (2004) also support the traditional perspective that a construction project is successful when it is completed on time, within budget, in accordance with specifications and to stakeholders' satisfaction.

To explain how project performance is associated with project process, Toor and Ogunlana (2008) present a conceptual model in which they divide project management into process domain and performance domain. Process domain deals with project objectives, devising an adequate project management system, and delivery of product during input, process, and outcome stages, respectively. On the other hand, performance domain focuses on performance goals, establishment of performance enhancement strategy, and performance measurement during input, process and outcome stages, respectively. Toor and Ogunlana (2009) note that performance measurement can be carried out by establishing KPIs which offer objective criteria to measure the success of a project.

Performance measurement in construction project has been dominated by the conventional measures of time, cost, and quality. Atkinson (1999) termed these three measures together as the 'iron triangle'. Despite the simplistic nature of performance measurement through the iron triangle, practice, and research have departed from this approach and new direct and indirect measures are being employed for project performance measurement. For example, Low and Chuan (2006) argue that the measure of project success can no longer be restricted to the traditional indicators which include time, cost, and quality. They advocate the expansion of success measurement towards project management success or product success or both. This differentiation of success criteria is also suggested by various scholars who believe that project success is different from project management success (see: Cookie-Davies, 2002; Shenhar et al., 1997).

Other researchers suggest that in addition to the measures of iron triangle, customer satisfaction (Pinto and Slevin, 1988) and overall satisfaction of stakeholders (Bryde and Brown, 2005) should also be considered in performance evaluation criteria. Some have also given the notion of project team's ability to manage project risks and resolve problems encountered on the project to evaluate the project success (Belout and Gauvreau, 2004). Study of Freeman and Beale (1992) reveals that five most frequently used criteria to measure project success include: technical performance, efficiency of execution, managerial and organizational implications, personal growth and manufacturer's ability and business performance.

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