

# Methodology for Analysing Construction Effectiveness Using Non-price Measures



THE JOINING UP CONSTRUCTION CONVERSATION

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## 1.0 Background

The construction industry is undergoing massive transformation in Australia and globally. There are many claims made about how one technology, methodology or building composition leads to smarter, better, faster and more cost-effective construction outcomes. Construction clients and supply chains across the industry have no universally accepted benchmarks to guide the implementation of more effective construction design, procurement and delivery practices.

The construction industry is measurement resistant. Often that resistance is affected by concerns regarding price sensitivity or argued intellectual property defences. While these barriers to measuring construction effectiveness continue, the resultant poor construction productivity, unpredictability and rising costs are unsustainable.

Governments worldwide are now faced with the need to massively invest in new public infrastructure. All governments are under pressure to demonstrate how they might leverage their forward capital and asset operations to achieve more for less. There is also an imperative to deliver more functional, resilient and compliant assets and services faster.

## 2.0 Research Problem

Effectiveness is the degree of achievement of objectives and a synonym for success (Baccarini 1999). Projects are formed to accomplish objectives and success is measured in terms of how well these objectives have been met. Criteria such as meeting project time, budget, technical specification and mission to be performed are

the top priorities of project objectives (Takim and Adnan, 2008).

An evaluation of project success can be drawn from efficiency and effectiveness dimensions of a project (Crawford and Bryce 2003). While project efficiency (“doing the thing right”) is concerned with cost and process management (i.e. the efficient conversion of inputs to outputs within budget and on schedule) and a wise use of human, financial and natural capital, project effectiveness (“doing the right thing”) is concerned with the development of worthiness or appropriateness of the chosen project goal (Takim and Adnan, 2008).

A project may be efficient (i.e. implemented on or ahead of time and cost schedules) and, at the same time, ineffective if the internal logic of the project is not grounded in reality (i.e. the development hypothesis is invalid) or if the goal of the project does not address what are in fact the core vulnerabilities of the target community (i.e. the initial development problem analysis was weak) (Takim and Adnan, 2008). Atkinson (1999) asserts that measuring project success for the process criteria for project management is measuring efficiency, while measuring effectiveness refers to measuring the success of the resultant system or organisation benefits, getting something right and meeting goals.

The concept of success in a construction project is corresponding to the efficiency and effectiveness measures (Pinto and Slevin, 1988: 1989; Smith, 1998; Belout, 1998; Atkinson, 1999; Crawford and Bryce, 2003). According to Pinto and Slevin (1988: 1989) efficiency measures refer to strong management and internal organisational structures (adherence to schedule and budget, and basic performance expectations), or in other words, efficiency measures deal with ‘time, budget and specifications’ while effectiveness measures refer to the

achievement of project objectives, user satisfaction and the use of the project.

Therefore, project success must consider both the project outputs (efficiency) and project outcomes (effectiveness) (Pinto and Slevin 1988:89; Atkinson, 1999; Nyhan and Martin 1999; and Mbugua, 2000). Preliminary investigation of the potential to deploy new 'non-price' based measures that focus on on-site construction effectiveness suggest projects should be delivered 15 to 20-percent cheaper, up to 40-percent faster and achieve at least 80-percent less on-site generated construction waste and injuries. If a concentrated procurement focus were to be applied to establishing new construction effectiveness trajectories which captured this potential, it is likely that the systemic changes involved would lift compliance and quality.

As a result, this research project aims to develop a Construction Effectiveness Index for construction projects utilising non-price project indicators.

### **3.0 Provisional Research Plan and Expected Outcomes**

This research project will assess the current availability and use of non-price measures related data in Australia. Based on the identification and analysis of the drawbacks of existing databases used for measuring construction performance, this project is aimed at establishing a new database for measuring construction performance using identified non-price parameters from readily available data. It will involve creating benchmark levels for each of the non-price parameters for the data set selected. These benchmark levels created can then be used to monitor the status of new projects.

The initial benchmarks created will feed in to the design, testing, and validation of a methodology for analysing Construction Effectiveness using non price methods second project. The research will explore the use of Multi Criteria Decision Making (MCDM) methods and Artificial Intelligence techniques such as Fuzzy Logic and Neural Nets finally selecting one and creating a methodology for evaluating construction project performance using non-price measures. It may involve developing non-price measure based indices for measuring construction performance and effectiveness.

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