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Managing quality in projects: An empirical study

Ron Basu *

Henley Business School, United Kingdom
SKEMA Business School, France

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Abstract

The purpose of this paper is to establish the key role of quality in the 'iron triangle of cost, time and quality' and highlight the importance of implementing the people related 'organisation quality' amongst key stakeholders to deliver the success criteria of a project.

The field research design comprised three stages.

Stage 1: Semi-structured interviews
Stage 2: Questionnaire surveys followed by a conceptual research model. The research model was validated by Partial Least Squares (PLS) modelling
Stage 3: Case studies of two comparable large projects based organisations (Heathrow Terminal 5 and High Speed 1).

As a substantive contribution to knowledge the research defined project quality with three dimensions (viz. Design Quality, Process Quality and Organisation Quality) and identified the lack of attention to details to Organisation Quality. A mixed methodology of Partial Least Squares (PLS) and case studies was applied. The findings also helped to develop a simple but effective tool APEX (Assessing Process Excellence) to assess the key constructs of project quality and excellence. The paper also provides a summary of the best practices for managing quality.

Keywords: Project quality; Project excellence; Design quality; Process quality; Organisation quality; Project success criteria; Project success factors

1. Why project quality?

We all agree and accept that as an end user of a product or service we would like it 'as it says in the tin', when we want it and at good value for money. Being in a competitive world of consumer choice we also expect it to last. We understand it in a market driven economy and aim for the appropriate product and service quality. This is the domain of operations, services and supply chain management. And we define it as '*quality is what customer expects as a lasting experience*' (Basu, 2011). However in the field of project management the importance of quality is not so clear cut. Project managers appear to accept the 'iron triangle of cost, time and quality' (Atkinson, 1999) but focus more on 'on time and budget' delivery as the success criteria. Quality in projects is mostly relegated to a 'lip service' and to several documents with 'ticking boxes'. Project managers also appreciate the risk of a project because of its uniqueness, complexity and deliberate design details but appear not to prioritise the link between the outcomes of risks with the root causes underpinned by the dimensions of project quality. As a consequence we find many examples (as described later) of projects which were delivered on time and within budget but failed to meet the expectations of end users in the longer run.

* Little Maltmans, Maltmans Lane Gerrards Cross, UK, SL9 8RW. Tel.: +44 1753 886 701.
E-mail address: basurn@aol.com.
URL: http://www.perf-ex.co.uk.

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Therefore we need to ask 'how diligent are we in terms of project processes to deliver project objectives'? This is the minimum requirement of 'what it says in the tin'. Furthermore we should also investigate 'how good is our project management … as a vehicle for delivering the longer term outcomes and benefits as required by the sponsors and end users'. This is part of additional requirements of sustainable quality leading to project excellence. The relationship between project quality and project excellence will be discussed in more details later.

Let us now examine the current thinking and practices to address the above questions. The extant project management literature (Atkinson, 1999; Meredith and Mantel, 2003; Morris and Hough, 1997: Turner, 1999) identifies and supports three criteria or objectives for assessing the success of a project known as the 'iron triangle' of time, cost, and quality. The first two objectives are relatively simple to define and measure (Morris and Hough, 1997). Project quality as the third objective or dimension of the 'iron triangle' is more difficult to define and assess although it has received some attention in the academic literature (Heisler, 1990; Turner, 2002). Turner (2002) is amongst the few authors who attempts to more clearly define project quality comprising two dimensions as product quality and process quality. The guidelines for project quality in the project management bodies of knowledge (APM, 2007; PMI, 2008a; PRINCE2, 2009) also reflect procedures of design and process requirements. These definitions and guidelines appear to suffer from two important limitations, viz. a lack of clarity in the definition (Whitty and Schulz, 2005) and the exclusion of organisational learning practices. (Kotnour, 2000)

The lack of clarity around quality is often the source of project disputes and there are in fact more reports in the business world as illustrated below, documenting the link between inadequate attention to quality management and unsuccessful major projects.

Case example: The Millennium Dome

'The Millennium Dome project was one of the most controversial public works projects ever undertaken.' (National Audit Office, 2000). The National Audit Office report also stated that the New Millennium Experience Company experienced severe financial difficulties. The main cause of these difficulties was the failure to achieve the visitor numbers and other contributing factors included the quality of project delivery and the contents within the dome.

Case example: Wembley Stadium

'The company that built the new Wembley Stadium, which opened after years of delays and almost tripling its cost, is suing the engineering consultants behind the project for £253 m, claiming that their services were unsatisfactory.' (The Observer, London, March 16, 2008). A preliminary search of legal cases (British and Irish Legal Information Institute, http://www.bailii.org, accessed 26/11/08) indicated several instances (2512 hits) of litigations because of 'poor quality' in projects. For example, in the recent Wembley Stadium project, there were eight major litigations related to project quality and three of these litigations were related to the *definitions* of project quality. In the case between Multiplex Construction Ltd and Honeywell Control Ltd (both being the contractors of Wembley Stadium) the dispute was to resolve the statement in the contract, "It will have extensive, high quality corporate hospitality facilities and a state of the art communications system (installed by Honeywell)." (Neutral Citation Number: 2007, EWHC 447, TCC, www.bailii.org, accessed 26/11/08).

Case example: West Coast Rail Upgrade

The rail line between Glasgow and London was undergoing an £8.6bn upgrade from 2003. The modernisation of the West Coast Main Line will deliver the following enhancements:

- 125 mph route capability for tilting trains delivering much faster journey times.
- Capacity for significantly more long distance passenger and freight trains than today.
- Better and more resilient performance in travel time and safety measures.

The National Audit Office said it might not be able to cope with current levels of growth beyond 2015. The auditors' report on the west coast line warned that electronic signaling equipment might become obsolete significantly earlier than expected. The auditors were also concerned about the ineffective communications between key stakeholders (Government, Network Rail, Rail Track and Virgin Trains). To sustain train operations, the line's operator, Virgin Trains, was paid £590 m more in subsidy in the period 2002–06 than envisaged in its franchise agreement, their report said. In January 2008, an over-run on work results in one of the worst delays yet. Network Rail is fined £14 m.

The above examples of major project failures appear to focus on the quality of design, the quality of execution processes and the quality of communications between stakeholders. Many papers and studies in 1990s (Belassi and Tukel, 1996; Kirby, 1996; Tam, 1999) highlighted project failures but the problems still exist (MPA, 2003). Recent academic publications (Abdelsalam and Gad, 2009; Jamieson and Morris, 2008; Ling et al., 2009; Zou et al., 2007) also suggest that causes of project failures include inadequate risk evaluation and quality management. These papers also highlight that there is a lack of clarity regarding the dimensions of project quality and its application with key stakeholders.

When we search the domain of operations management we may observe some proven paths to follow. The area of operations management enjoys some success stories, (along with failures) of the application of quality based operational excellence concepts such as Total Quality Management, Six Sigma, Lean and Supply Chain Management (Oakland, 2003). The application of operational excellence concepts are now extended to non-manufacturing processes. 'Firms such as Motorola, General Electric…successfully implemented Six Sigma. Motorola saved $15 billion in an 11 year period. General Electric saved $2 billion in 1999 alone.…Although Six Sigma initiatives have focussed primarily on improving the performance of manufacturing processes, the concepts are widely applied in non-manufacturing, administrative and service functions' (Weinstein et al., 2008). Even though operational excellence concepts (such as Six Sigma) are often driven by the objective of cost effectiveness the enablers of these concepts are rooted to the fundamentals of quality management (Oakland, 2003).

In the domain of operations management, the dimensions and definitions of quality have been identified by some authors (Garvin, 1984; Parasuraman et al., 1984). The early leaders of