BENCHMARKING AND KEY PERFORMANCE INDICATORS FOR THE CONSTRUCTION INDUSTRY IN SAUDI ARABIA

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Saudi Arabia has been experiencing a construction boom over the past four decades. This boom is continuing, due to rapid growth in the oil industry and increasing revenues. The construction industry is one of the major contributors to the Saudi Arabian economy. It is expected to have contributed up to £10.5 billion to GDP in 2010. The construction industry plays a crucial role in social and environmental development in Saudi Arabia. Currently, the industry is lacking performance measurement systems. These systems are critical in order to identify necessary areas for improvement. The aims of this paper are to identify how the construction industry in Saudi Arabia is currently measured and the critical success factors (CSFs) on performance. Further, it briefly investigates the barriers that impact Saudi construction performance measurements. The first step towards achieving performance improvement is to understand current performance, by looking at structured methods of performance measurement. Thus, a credible method of construction performance measurement is required for achieving any sustainable performance improvement. Benchmarking and key performance indicators (KPIs) are widely seen as such credible methods. The literature on performance measurement, both in general and in the construction industry in particular, is reviewed. Interviews were conducted to investigate aspects of Saudi construction performance measurement. The outcomes showed that construction industry performance in Saudi Arabia is currently measured through both financial and non-financial measures. However, a more structured approach to performance measurement, through model creation, is required.

Keywords: benchmarking, construction, critical success factors (CSFs), key performance indicators (KPIs), Saudi Arabia

INTRODUCTION

Saudi Arabia has the largest construction market in the Middle East, with multi-billion dollar projects in both the public and private sectors. The key dynamics stimulating both public and private sector investment in construction projects are population growth and the strong increase in oil revenues. Currently, the Saudi construction industry is lacking performance measurement systems. These systems are critical in order to identify necessary areas for improvement. Kaplan and Norton (1996) stated that the first step towards achieving performance improvement is to understand current performance, by looking at structured methods of performance measurement. Thus, a credible method of performance measurement for construction is required in order to achieve that. One of the most debated and controversial topics about Performance Measurement Systems (PMS) is the impact that PMS implementation and usage have upon business performance, in terms of clear, tangible results. There is not much related work in the Saudi context, although KPIs have been well established in certain contexts. Martinez et al. (2004) stated that there is only a small amount of research on this topic, as reported mainly by consultancies and commercial research companies. They have two limitations: a lack of a strong methodological basis and a quantitative approach that lacks explanations regarding results. The aims of this paper are to investigate the application of benchmarking and KPIs, as used in the UK, and to measure the performance of the construction industry in Saudi Arabia. Moreover, it will explore how Saudi construction performance is currently measured, and the influence of factors and barriers that impact on the achievement of improvements in business results.

THE CONSTRUCTION INDUSTRY

The Chartered Institute of Building (CIOB) defined construction management (CM) as one of a family of disciplines concerned with the complex phenomenon known as the ‘Built Environment’ (BE). The planning, design, production, adaptation, maintenance, restoration, conservation, management, evaluation and recycling of the built environment requires interaction between disciplines, just as healthy living requires multi-professional support. CM is exercised at a variety of levels, from sites and projects, through corporate organisations, clients and whole communities (Bale and Shirong, 2009).
Egan (1998) stated that the UK construction industry, at its best, displays excellence, but he also thought that substantial improvements in quality and efficiency are possible. Beatham et al. (2004) were critical of the construction industry for being inefficient. Egan (1998) and Latham (1994) stated that the construction industry had long been recognised as having problems in its structure, which inhibited its performance. Moreover, poor performance in construction has been identified with regularity (Puddicombe 1997). However, every industry faces obstacles and constraints, which are unique to its operational environment. Construction projects are organised by different parties such as clients/owners, architects, engineers, general contractors, subcontractors and suppliers. Because of this diversity, each party tends to have its own goals and objectives, which can lead to conflicting relations (Love et al., 2004). The argument within the construction industry has shifted from tendering prices, and is now centred on what should be included as performance measurement criteria (Cheung et al., 2001). In the construction industry, cost and time over-runs are the main reasons for the industry's inefficiency. In the public sector, the average costs of over-runs on projects are within the range of 30%. Two-thirds of private sector projects go over budget, and are delayed by around the same amount (Audit Commission, 1997). There are several other factors that contribute to inefficiency in the construction industry. Egan (1998) found that “30% of construction is rework”, labour working at 40–60% potential efficiency; “accidents can account for 3–6% of total project costs, and at least 10% of materials are wasted” (Egan, 1998:15).

THE CONSTRUCTION INDUSTRY IN SAUDI ARABIA

Scanning the terrain in Saudi Arabia, the construction situation is no different from that in the UK. Assaf et al. (1995) identified nine factors that cause delays to large building projects in Saudi Arabia, by conducting a survey of contractors, owners and architectural and engineering firms. These factors are materials, manpower, financing, equipment, changes, government relations, scheduling and control, the environment and contractual relationships. The three fraternities involved in the survey had different responses (agree/disagree) to each factor. However, these factors have a profound effect on the performance of the construction industry in one way or another. 76% of the contractors and 56% of the consultants indicated that average time over-run was between 10% and 30% of the original estimate. The most common cause of delay identified by all three parties was changes to orders (Assaf and Al-Hejji, 2006).

BENCHMARKING AND KEY PERFORMANCE INDICATORS

Performance measurement is the process whereby an organization establishes the parameters in which programs, investments and acquisitions reach the desired results (Office of the Chief Information Officer (OCIO) Enterprise Architecture Program 2007). Neely et al. (2002) defined performance measurement as the process of quantifying the efficiency and effectiveness of past actions. Such performance measurements are typically identified by KPIs, or benchmarking.

BENCHMARKING

Camp defined benchmarking as “the search for industry best practices that will lead to superior performance” (Camp, 1989). The definition emphasises the value of the learning of best practices (internally or externally) for the purpose of achieving superiority or competitive edge over competitors. McCabe (2003) argued that genuine benchmarking means comparing the performance of one company against others, and then using lessons from the best organisations to make improvements. The best performance achieved in practice is called the benchmark. Benchmarking is one of the most powerful tools for initiating and sustaining continuous improvement. In today's highly competitive marketplace, there is a critical need for managers to continuously improve their firm's efficiency and effectiveness. In order to determine overall success, managers need to be familiar with the necessary critical performance measures. El-Mashaleh et al. (2007) stated that benchmarking can accurately identify successful companies and the underlying reasons for their success, if carried out properly. It can also be used as a goal-setting process (Voss et al., 1997). Moreover, it is seen as an aid in setting performance objectives to achieve performance improvements (Venetucci 1992). In order to stay competitive, leading organisations compare their own products, services and business processes against the best from the same or outside their industry on a regular basis, to seek best practice implementation from whatever source. Kyrö (2003) stated that benchmarking has established its position as a tool to improve organisational performance and competitiveness in business life. It involves a comparative analysis between at least two parties. The comparison between one company and another may depend on different types of benchmarking, which are performance, process and strategic benchmarking (Luu et al., 2007). Watson (2007) defined benchmarking according to two criteria: categories of practice and sources of data.

Benchmarking Categories

Watson (2007) stated that all benchmarking is process benchmarking. He states that the starting point of benchmarking is measurement. The act of measuring performance and the process of benchmarking must be distinguished. Generally, the process uses a common measurement standard for comparison across organisations, in order to determine the best practices based on results.
Benchmarking Sources of Data

Benchmarking sources of data was identified as another criterion. Watson (2007) divided the sources of data into four different types, namely competitive, functional, internal and generic. Competitive benchmarking targets the specific product designs and process capabilities used by direct competitors. Functional benchmarking seeks information from a functional area in a particular application or industry. In internal benchmarking, the approach is to learn from sister companies, divisions, or operating units that are part of the same operating group or company. Finally, generic benchmarking seeks process improvement from a different industry.

Need for Benchmarking in Construction

The European Commission has been a strong advocate of the benchmarking process. Since the mid-1990s, it has led a number of benchmarking initiatives in response to requests for guidance from the construction industry (Commission of the European Communities, 2003). Benchmarking programmes for the construction industry have been initiated recently in several countries. Costa et al. (2006) investigated the KPIs launched in the UK, the National Benchmarking System (NBS) in Chile and the Performance Measurement System for Benchmarking in the Brazilian Construction Industry (SISIND-NET Project). Each initiative was analysed by taking into consideration three main issues: type of benchmarking, scope of the performance measurement system and the implementation of initiatives. The data were analysed in two stages: independently for each initiative to determine the results and compare them to identify similarities and differences. Costa et al. (2006) stated that it is important to understand the differences between the approaches adopted in different countries in order to identify the generic measures that can form the basis for international benchmarking. Based on the analysis of the initiatives adopted in the UK, Chile and Brazil, the findings showed difficulties in data collection and lack of resources for implementation in all countries. Despite these difficulties, transferring the knowledge and data that can be used for comparing performances of the participating companies can potentially improve benchmarking initiatives for comparing companies from different countries and industries (Costa et al., 2006).

Benchmarking is used in the construction industry for many purposes. Hamilton and Gibson (1996) identified benchmarking as a sufficient tool for pre-project planning in the construction industry. On the other hand, Abdel-Razek et al. (2007) identified benchmarking as a reliable indicator for project labour performance. Moreover, Lema and Price (1995) considered benchmarking as an accelerator towards achieving Total Quality Management (TQM).

KEY PERFORMANCE INDICATORS

Key performance indicators (KPI) are quantifiable measurements that reflect the critical success factors of an organization. According to the KPI Working Group (2000), the purpose of KPIs is to enable the measurement of project and organisational performance throughout the construction industry. Chan and Chan (2004) stated that KPIs are general indicators of performance that allow focus on important aspects of outputs. They found that only a limited number of KPIs are maintainable for regular use. A list of objective measures, such as construction time, time variation and unit cost, and subjective measures, such as quality, functionality and client satisfaction, were introduced and discussed by the authors. Alarcon et al. (1998) indicated that most KPIs measured are results-based; talks had been held with governmental and private organisations to conduct an international benchmarking initiative with the companies involved in KPI measurement.

The Department of Trade and Industry’s KPIs

The Department of Trade and Industry’s (DTI, 2000) KPIs are among the most widely used systems for performance measurement in the UK construction industry. They are specific to construction rather than production-line industries, and they are sensitive to project requirements. The DTI KPIs were created by The Construction Best Practice Programme (CBPP), funded by the DTI and operating in conjunction with Constructing Excellence (Burgess, 2000; Department of the Environment: Transport and the Regions, 2000). The origins of the DTI KPIs lie in the findings of Egan (1998), who firmly stated the need for year-on-year improvements in construction performance. The DTI KPIs have seven topic areas, within which all other indicators fall. They are time, cost, quality, client satisfaction, changes to orders, business performance and health and safety (Department of the Environment Transport and the Regions, 2000). The performance data were gathered and translated into a performance benchmark percentage score, using benchmarking conversion curves and plotted on a radar chart. The shape of the graphs was defined by the data collected from previous years. This allowed refinement of the curves and for performance requirements to continually rise, and, as a result, an effort towards the year-on-year improvements advocated by Egan (1998).
The Use of KPIs in the Construction Industry

Grillo (1997) proposed a model that shows how different processes and variables influence the result of a project. He selected KPIs that seek to measure the final level of success that a project has achieved. Performance in the most important of the construction processes and other variables, decisions and strategies that affect projects were highlighted. The KPIs related to results include cost variation, schedule variation, the cost of client claims, changes to the contract of sale, the accident index, risk rate and labour efficiency. Those related to process are productivity over output, urgent orders, planning effectiveness and administration productivity. Workforce training and subcontractor ratios are included in the types of variable that the KPIs measure (Grillo 1997). On the other hand, Yeung et al. (2008) developed a Partnering Performance Index (PPI) for construction projects in Hong Kong. The PPI can assist in developing a benchmark for measuring the performance of partnering projects. The authors established a set of Quantitative Indicators (QI) in order to measure the most important KPIs. Face-to-face interviews, a Delphi questionnaire survey and an empirical questionnaire survey were employed. The QI with the highest mean ratings for each of the seven KPIs was selected. “By incorporating these indicators into the evaluation process, assessors could perform their evaluation based on quantitative evidence” (Yeung et al., 2008: 298). The KPIs used were performance in the areas of time, cost, top management commitment, quality, trust and respect, effective communications, innovation and improvement.

RESEARCH METHODS

The selection of which method to use is the most important choice in research design. The researcher should look for the most beneficial method available. In theory, the choice of methods depends on the nature of the research problem and the researcher’s philosophical orientation. However, there are certain practical limitations, such as time and funding, which might influence researchers’ choices (Boyd et al., 1985). The research aims to explore how the performance of the Saudi construction industry is measured, and how the use of KPIs and benchmarking develops a model to measure Saudi construction projects, with a view to obtaining new insights. Therefore, the exploratory method best suits the aims of the research. The research focuses on the qualitative methods that examine subjects’ words, behaviours and actions in descriptive ways, and more closely represents the situation as experienced by participants (Maykut and Morehouse, 1994). The holistic nature of qualitative methods is thought to be useful for the purpose of understanding the performance of the Saudi construction industry. The researcher will take part in the construction of data to better understand the phenomena under study and to provide detailed description.

Data Collection

A semi-structured interview approach was chosen for data collection, because it helps to better understand how individuals construct meaning and significance from their personal framework. It is a flexible and an adaptable approach to exploring the Saudi construction industry by means of conversation. Moreover, it provides the opportunity for further discussion and further exploration of thoughts and ideas as the interviews proceed.

Respondents

Respondents were carefully selected from among those with knowledge, experience in the field and understanding of the subject under research (Easterby-Smith, 2008). In order to ensure that they have relevant experience to address the questions, decision makers involved in performance measurements were chosen. They were all Saudi nationals working directly in organisations involved in both public and private construction projects. Moreover, they were selected to represent different parties in the industry with different qualifications and expertise. The first one is a policy maker working for the government. The second is an owner of a private consultancy company and the third is a concrete supplier. The findings can be further enriched by interviewing clients, contractors, academics and other parties involved in the industry.

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<th>Table 1: Interviewee Information</th>
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<td>CONSTRUCTION PARTY</td>
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<td>Supervisor general of projects</td>
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<td>Consultant</td>
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<td>Supplier</td>
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Semi Structured Interview Questions

The interviews were carried around the main research questions. They focused on understanding the current performance measurement in Saudi construction, exploring the factors influencing the projects and the barriers that impact performance measurement. Although these themes guided the interviews, the researcher did not ask exactly the same questions each time. In so doing, each successive interview was used to expand understanding of the subject under research.
RESULTS AND DISCUSSION

CURRENT PERFORMANCE MEASUREMENT OF THE CONSTRUCTION INDUSTRY IN SAUDI ARABIA
The supervisor general of projects (KSA1) stated that there is no proper system in place to measure the performance of the construction industry in Saudi Arabia. Each organisation has its own way of measuring performance, depending on its targets, which, in most cases, are basic measures only applicable to the organisation. The basic measures include schedule over-run and cost over-run, which are used at the project level. Only few well-known organisations in the kingdom use KPIs. The consultant (KSA2) confirmed that the performance of the industry is currently measured through financial and non-financial measures. These measures include budget, time, return on investment, customer satisfaction and quality of products/services. On the other hand, the supplier (KSA3) stated that the Saudi construction industry is currently measured based on the following factors:

Demand
There is a sustainable demand for construction projects in the kingdom, due to the growth of the native population, the infrastructure, electricity, utilities and commercial sector projects.

Government
Government expenditure plans, strong capital and funding plans set by the government are key measures for Saudi industry performance.

Opportunities
Opportunities to investors reflect strong growth for the construction industry and are considered a key performance measure for the construction industry.

MAIN INFLUENCING FACTORS ON THE PERFORMANCE OF SAUDI CONSTRUCTION PROJECTS
According to KSA1, the continuous delay to projects is the main factor influencing the performance of construction projects in the Kingdom. The average time over-run versus target delivery date is 20%. In some cases, projects can be delivered up to double the target date (100% over-run). This is mainly due to the lack of project planning and scheduling by the contractors, which leads to over-commitment to deliver projects within stretched targets. On the other hand, KSA3 emphasised that there are external and internal factors influencing the performance of construction projects in Saudi Arabia.

External factors
- The environment: the world financial crisis, financial recession and political instability in the region.
- Client: payment delay from clients and their under-the-table expenses.
- Suppliers & sub-contractors: increase in construction costs and schedule delays.
- Financial sources: non-ability to access sources of funds.

Internal factors
- Engineering department: delay in design face & consultancy.
- HR Department: non-availability of skilled manpower.

ALTERNATIVE METHODS OF CONSTRUCTION PERFORMANCE MEASUREMENT
KSA1 stated that KPIs are the only recognised tool for some big organisations and the only method used for performance measurement. These KPIs are mainly actual cost and time compliance to the agreed target. Project planning and scheduling software (i.e. MS Project and Primavera) are used for formalities. However, KSA2 thinks that one of the most effective methods for construction performance measurement is the Earned Value Analysis & Management System (EVMS). On the other hand, KSA3 identified three methods for measuring the Saudi construction industry: the Performance Measurement System (PMS), KPIs and the Benchmarking System (BS). PMS is a general method of which the criteria are set by the project sponsor. On the other hand, KPIs and BS are structured methods using pre-set criteria for performance measurements.

BARRIERS THAT IMPACT SAUDI CONSTRUCTION PERFORMANCE MEASUREMENT
According to KSA1, the lack of qualified personnel who can work with the performance measurement tools is a main barrier impacting construction performance measurement. Moreover, there is no enforcement from decision makers to put a system in place. KSA2 agrees with KSA1, and added that the lack of established metrics, lack of a measurement baseline, as well as the non-
implementation of benchmarking and TQM are barriers impacting Saudi construction performance measurement. KSA3 stated more barriers such as:

1. Lack of valid data and real-time control.
2. Commitment of companies to standardisation measures (i.e. no standardisation measures across the construction industry).
3. Commitment of companies to implementation of improvement based on findings (i.e. commitment for taking action based on findings).

USE OF THE KPIS OF OTHER DEVELOPED AND DEVELOPING COUNTRIES TO MEASURE CONSTRUCTION PERFORMANCE IN SAUDI ARABIA

In order to use the KPIs adopted in other countries, such as the UK, to measure Saudi construction performance, the following steps are required according to KSA1:

1. Understanding the differences between measures and KPIs systems adopted in different countries.
2. Developing collaborative working processes and convincing all the parties directly involved in construction projects to use the tools, by explaining their benefits.
3. Devising new KPI measures.
4. Developing frameworks that support the migration of other countries' KPIs to Saudi performance management measures and systems.
5. Developing a theoretical framework for Saudi performance management outside of the above.
6. Providing training to personnel on how to use KPIs.
7. Tracking and monitoring progress.

CONCLUSIONS

The construction industry is one of the major contributors to the Saudi Arabian economy. It is critical to have a performance measurement method in place, in order to identify the gaps and work on actions for improvements. Currently, there is no proper system to measure the performance of the construction industry in Saudi Arabia. However, some organisations have their own measures, such as cost and time. Saudi construction performance is influenced by internal and external factors. Availability of data, commitment to company measures of standardisation and implementation, as well as the lack of opportunities for real-time control, are the barriers that impact construction performance measurement in Saudi Arabia. In order to implement the KPIs used in the UK for the Saudi construction industry, a seven-step model can be used to enable a structured approach to performance improvement. In order to obtain accurate results, all parties influencing factors performance have to be measured (i.e. client, contractor, management team, end user… etc). The next step is to apply the model in a Saudi construction organisation in order to capture learning and establish recommendations.

REFERENCES


