The development of key financial performance indicators for UK construction companies

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Abstract

The UK construction industry has been criticised for its underachievement, and several industry reports have emphasised the need for performance measurement. This research developed a set of Key Financial Performance Indicators (KPIs) based on a survey of performance measurement and benchmarking techniques in the accounting literature. A benchmarking model based on financial KPIs was produced for construction companies to benchmark and evaluate their business performance at the corporate level. Subsequently, two case studies of contractors were presented, showing the advantages and disadvantages of the developed model.

Keywords: performance measurement, performance management, key performance indicators, key financial measures, construction industry, benchmarking

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Introduction

In an increasingly competitive environment, performance measurement has emerged as a successful business tool. Over the past decade, it has gained enormous popularity amongst researchers and practitioners, with a new book being published on this subject every two weeks in the US alone in 1996 (Neely, 1999). Measuring performance has always been considered a fundamental element of management; modern business literature traces performance measurement back to the 1860s and 1870s.

The majority of financial performance techniques and methods, which are commonly used today, were developed at the beginning of the 20th century (Kennerly & Neely, 2002). These original financial performance measures, however, now attract criticism in so far that historical financial results were deemed to be lagging measures that describe the outcome of managerial actions/decisions after they occurred (Bassioni *et al*., 2003). Today, managers require more up-to-date, forward-looking information and mostly non-financial performance measures in order to make better decisions. Consequently, various performance measurement models and techniques have been developed, which utilise both financial and non-financial measures such as the Balanced Scorecard, Baldrige Performance Excellence Program and Business Excellence Models (Kaplan & Norton, 1992, 1996; Davis & Albright, 2004; Bassioni *et al*., 2004a). These models rely more on non-financial measures including customer focus, corporate social responsibility, leadership, strategic planning, workforce focus and process management. Less emphasis is placed on ratio analysis and other financial measures.

Numerous investigations and reports conducted on the performance of the UK construction industry have identified several areas that need to be improved in performance measurement. An industry-wide key performance measurement framework, the Construction Best Practice Program-Key Performance Indicators (CBPP-KPIs), was developed to enable construction companies to benchmark their performance against industry competitors and thus improve the productivity of the construction industry (Cox *et al*., 2003; Beatham *et al*., 2004). However, despite its success, it was criticised as it focuses largely on the construction executive project management level rather than organisational or corporate performance measures. Also, CBPP has no specific guidelines for performance measurement to be followed by management. A more comprehensive benchmarking model is needed that enables construction firms to evaluate their performance at the organisational level.

This current research developed a model applying ratio analysis to the CBPP-KPIs to show how effective this tool is in identifying gaps between contractors' results and developed industry norms for the construction industry. The original CBPP-KPIs model concentrates more on either the quantitative results of a construction process (i.e. dollars/unit) or the qualitative measures (i.e. worker behaviour on the job).

Cox *et al*. (2003) found that the six indicators, consistently perceived by management as being highly significant in measuring construction performance at the project level, are quality control, on-time completion, cost, safety, dollars/unit and units/MHR. The proposed model adds to the existing CBPP-KPIs by introducing a model for assessing the contractors' performance using ratio analysis, and by relating the results of such assessment to developed norms for the UK construction industry. The proposed model also allows contractors and consultants to identify their financial performance gaps and alert managers to difficulties and problems that require attention. The developed industry financial norms for the construction industry help to evaluate the performance of the industry's businesses against a large number of industry competitors. They also set a minimum standard that contractors and consultants need to attain for each key financial measure. In addition, the norms set performance improvement targets for contractors and consultancy companies whose financial performance metrics lie significantly below the benchmarks. The research framework suggested a record sheet and a set of financial guidelines for companies to follow in order to improve their performance, based on the benchmark/norms analysis. Such a framework would provide clear benefits for individual companies and dramatically improve overall productivity and competitiveness in this important industry sector. Individual companies are challenged to complete their projects more quickly, more safely and less expensively. This in turn will attract investors, increase profitability and share values, and attract more and more employees. Finally, the model will guide managers to analyse and detect causes of performance deficiencies and take corrective actions to achieve its strategic goals.

The introduction provided an insight into the research problem and related objectives. The next section reviews the literature related to performance measurement and benchmarking. Section 3 discusses the research methodology and the use of quantitative measures of performance to gather the research data. Section 4 presents the conclusions, limitations and recommendations of this research.

Performance measurement and benchmarking

The nature and techniques of performance measurement

In the literature, a distinction between performance management and performance measurement was made. According to Bititci *et al*. (1997), performance management is the '... closed loop control system which deploys policy and strategy, and obtains feedback from various levels in order to manage the performance of the system' (pp. 524). Performance measurement, on the other hand, is the '... information system which is at the heart of the performance management process, and it is of critical importance to the effective and efficient functioning of the performance management system' (Kagioglou *et al*., 2001, p. 85). In other words, performance management is the process that enables organisations to manage its performance in alignment with its business and functional strategies and objectives. The aim of such a process is

to ensure that the business and operating policies and strategies are deployed to all business practices, activities, tasks and personnel. The performance measurement process provides feedback that enables management to take appropriate decisions (see Figure 1).

Figure 1: The closed-loop deployment and feedback system for the performance management process (Bititci *et al*., 1997).

Nanni *et al*. (1990) drew a much more simplified analogy by which they compared the Performance Measurement System (PMS) with a thermostat to display how performance measures '… are part of a feedback loop that controls operations against a specific value' and are part of a '… planning and control cycle' (p. 36). Obviously, performance measures are required to compare the goal level against the performance level to determine how successful an organisation is at achieving its desirable strategic objectives and goals. To elaborate further on PMS, Neely (1998) argued that for the full benefit of measurement to be exploited, it is necessary for organisations to implement an effective PMS '… that enables informed decision to be made and actions to be taken, because it quantifies the efficiency and effectiveness of past actions through acquisition, collation, sorting, analysis, interpretation and dissemination of appropriate data' (pp. 5–6).

Many experts, however, reveal that a key element of a PMS is benchmarking, which is the use of results to aid managerial decisions. Alarcon *et al*. (1998) stated that performance measurement and benchmarking would result in challenging any industry to become world class. Benchmarking expands and enhances the performance measurement framework by comparing obtained results with benchmark data, and conclusions are drawn based on such comparisons. Performance measurement is just part of a business improvement process because actions need to be taken based on the results obtained; otherwise, performance measures would cost money to perform and not add value to the business (Bourne *et al*., 2000). Thus, according to Beatham *et al*. (2004), performance

measures must be incorporated into a system that examines performance in the light of stated benchmark data, decides on actions and changes the strategies and policies in which the business operates, if they do not meet the companies' goals. Organisations using performance measurement systems as a basis for management are believed to be more successful than those that do not use such systems (Schiemann & Lingle, 1997; Cox *et al*., 2003, Kaplan & Norton, 1992). Today, performance measurement has become imperative to any business success, and the performance measurement revolution has spread across various industries, including that of the construction industry (Bassioni *et al*., 2004). This is why it is important for research studies to continue to investigate such systems and identify those measures and tools, which will ensure businesses achieving their goals.

Camp (1989) also considered benchmarking as an important tool of performance measurement and stated that benchmarking is the process of measuring products, services and practices against the most successful industry competitors. A more refined definition is provided by Spendolini (1992):

> Benchmarking is a systematic and continuous measurement process, a process of continuously measuring and comparing an organizations business process against business leaders anywhere in the world to gain information, which will help the organization to take action to improve its performance. (p. 22)

In essence, benchmarking provides a management tool for corporations to measure and compare any element of its activities and services against the best to identify its weaknesses and strengths. It involves exploring practices inside and outside the industry so that they can be incorporated into a company's own operations. Figure 2 below summarises the basic philosophy behind benchmarking as discussed above.

The main objective of benchmarking according to Lema and Price (1995) is to ensure that the best practices across the industry are followed, which would inevitably lead to superiority. It involves incorporating best practices from external parties to improve internal processes and accordingly establish realistic performance targets for managers to achieve (Camp, 1989; Beatham *et al*., 2004). Thus, benchmarking helps managers to become more active in the process of a company's performance improvement and to better understand the methods and practices required to attain higher performance levels (Camp, 1995). Although the focus of benchmarking is usually planning and organising, one of its prime objectives is to introduce innovative ideas to an organisation. Benchmarking helps managers look outside the company for solutions to difficulties encountered by the organisation and to establish realistic goals as achieved in other companies (Ramirez *et al*., 2003).

The literature, however, does not seem to wholly agree on the various types of benchmarking. Camp (1989), Zairi and Ahmed (1999), and Watson (1993) stated that benchmarking can be categorised into four different groups: internal benchmarking,

competitive benchmarking, functional benchmarking and generic benchmarking. McGeorge and Palmer (1997) accepted the first two groups of internal and competitive benchmarking but added a different third level as illustrated in Figure 3. The first level, internal benchmarking, is performed within the company to monitor the progress and achievement of objectives, and to compare the performance of different businesses or units within the company. It enables identifying the areas of best practice, which could be transferred throughout the whole organisation.
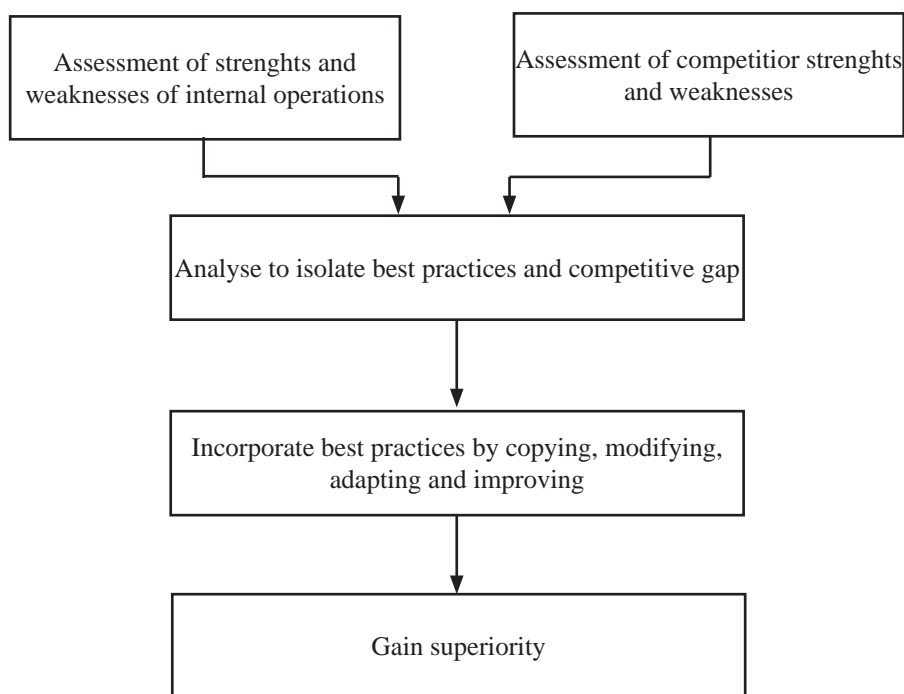

Figure 2: Benchmarking philosophy (Lema & Price, 1995)

Level 2, competitive benchmarking, is the comparison against external organisations within the same industry. The third level focuses on comparing the performance with other industries. This inevitably would generate the biggest change in an organisation process, as the comparisons here are with those who are best in practice. According to Beatham *et al*. (2004, p. 98), this '… provides the greatest opportunity for superiority'. Despite the fact that authors differ on types of benchmarking, they all agree on the fact that the idea of any form of benchmarking is to allow competition and continuously improve companies' performance (Fisher *et al*., 1995). Lema and Price (1995) argued that for benchmarking to be applied successfully, a number of preconditions need to be satisfied and recognised by an organisation. Firstly, the organisation needs to accept that it requires change and performance improvement. Secondly, it needs to accept that there are lessons to be learnt from others, which can lead to improved performance. Finally, the organisation must be willing and capable of changing its policies and strategies accordingly.
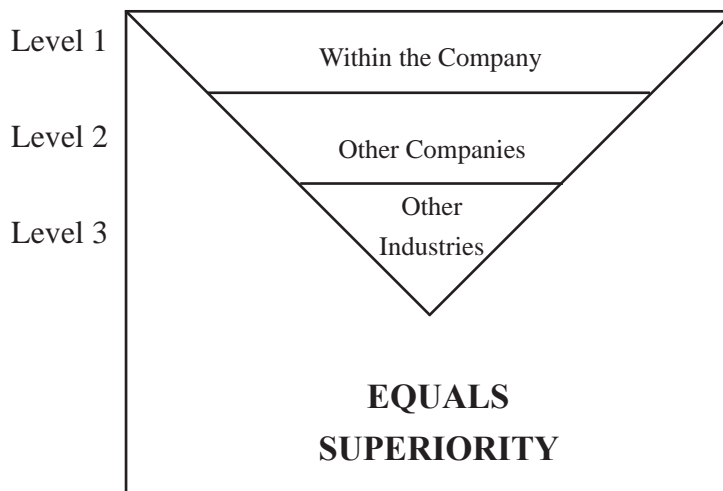
Level 1

Level 2

Level 3

Within the Company

Other Companies

Other
Industries

EQUALS

SUPERIORITY

Figure 3: Levels of benchmarking (McGeorge & Palmer, 1997)

A number of researchers have developed various frameworks to demonstrate how benchmarking is adopted. For instance, Watson (1993) employed the Deming Cycle to model the benchmarking procedure. The model uses the plan, do, check and act functions (see Figure 4). The actual benchmarking procedure superimposed on the Deming Cycle created by Watson comprises five simple and basic steps as shown in Figure 5 below.
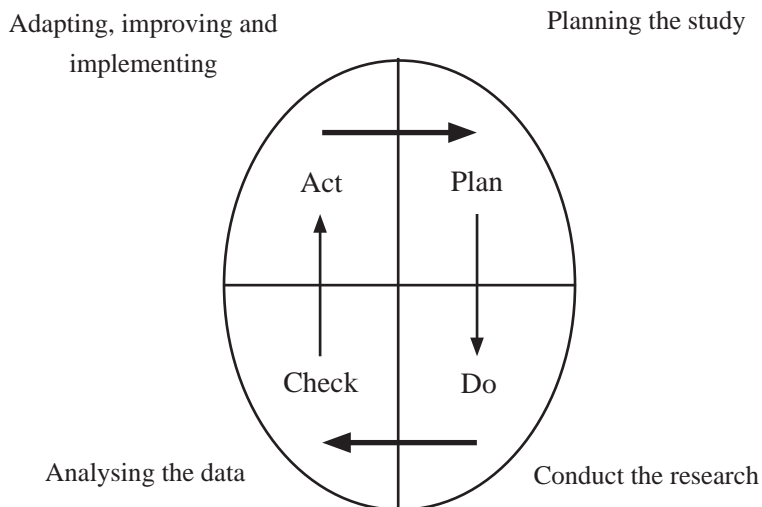
Adapting, improving and
implementing

Planning the study

Act　　　　Plan

Check　　　Do

Analysing the data

Conduct the research

Figure 4: Deming Cycle (Watson, 1993)

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┌──────────────────────────────────────────────────────┐
│          Identify the function to be benchmarked        │
└──────────────────────────────────────────────────────┘
                            │
                            ▼
┌──────────────────────────────────────────────────────┐
│              Select the superior performers             │
│             (competitive or non-competitive)            │
└──────────────────────────────────────────────────────┘
                            │
                            ▼
┌──────────────────────────────────────────────────────┐
│           Collect data and analyse for pinpointing      │
│        gaps in performance, processes and practices     │
└──────────────────────────────────────────────────────┘
                            │
                            ▼
┌──────────────────────────────────────────────────────┐
│      Set performance goals for improving and surpassing │
│                     the best in class                   │
└──────────────────────────────────────────────────────┘
                            │
                            ▼
┌──────────────────────────────────────────────────────┐
│    Implement plans to bridge the gap and monitor results│
└──────────────────────────────────────────────────────┘
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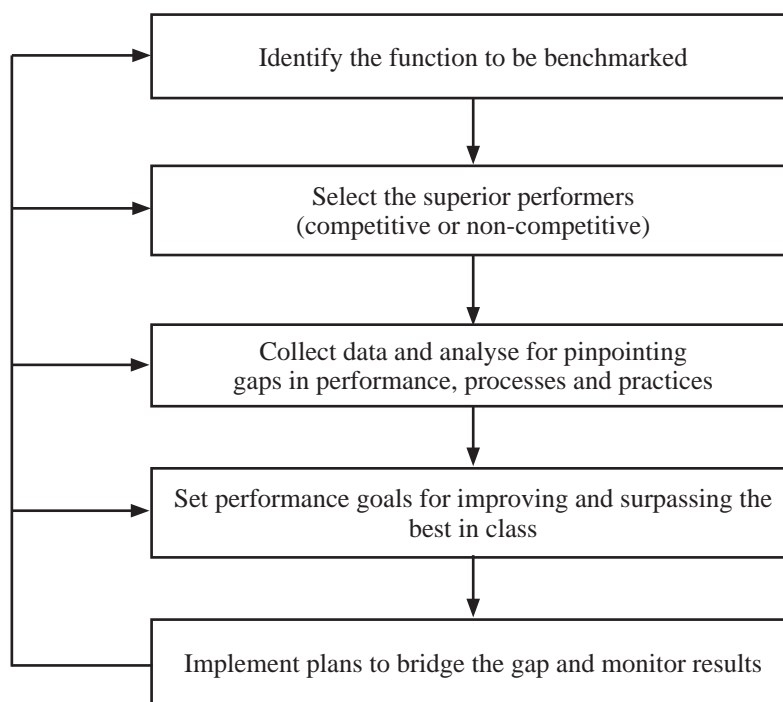
Figure 5: Simplified process of benchmarking (Shetty, 1993)

Camp (1989) and Spendolini (1992) argued that identifying what needs to be benchmarked is often the crucial and most difficult step in the process and must be linked to business or strategy objectives of the business. Once such key measures have been identified, the process is simple and straightforward. The process emphasises the need to take corrective action, and the feedback loop between each of the five basic steps is noticeable. According to Lema and Price (1995), this is required so that data is provided for setting new performance goals for continuous improvement. Based on our review of the literature for performance measurement and benchmarking, this research will assess how the above performance measurements and benchmarking (including competitive benchmarking) have been used in the construction industry, and what improvements need to be implemented to ensure that companies in this industry achieve superiority in their performance.

Performance measurement and benchmarking in the construction industry

Over the past few years, the construction industry has come under heavy criticism for its underachievement. Beatham *et al*. (2004) accused it of being wasteful, inefficient, ineffective and having problems within its structure. The findings of other studies identified several areas within the industry that need improvement. In his report, Latham (1994) emphasised the need to improve the efficiency and competitiveness within the construction industry by carrying out a number of reforms across different disciplines

such as tendering, quality management and contracting procedures. Egan (1998) was largely concerned about the fact that the industry '… was underachieving, had low profitability and invested too little in capital, research, development and training, and that too many clients were dissatisfied with the industries performance' (p. 30). In his study Rethinking the Industry, Egan constantly put emphasis on the importance of implementing specific improvement targets (i.e. benchmarks) in terms of quality, profits, productivity, safety and project performance (see Figure 6). Nevertheless, Egan stressed the importance of performance measurement in improving the overall performance of an organisation.

The reports of Latham and Egan triggered the need to apply performance measurement framework across the industry. Subsequently, many governmental and institutional bodies addressed the need to apply Egan's principles, and more pressure was put on the industry to develop its own benchmarking model (Garnett & Pickrell, 2000). As a result, the Construction Best Practice Program (CBPP, 2002) launched the key performance indicators for performance measurement (Bassioni *et al*., 2003).

Andonov-Acev *et al*. (2008) defined KPIs as '… financial and non-financial measures used to quantify objectives to reflect strategic performance of an organization' (p. 185). Key performance indicators are a collection of data that are used to assess the performance of organisations according to specific parameters that are critical to the business success. The CBPP-KPIs present a performance measurement framework that directly reflects performance targets set by Egan (1998). It includes performance indicators for both project and organisational performance measurement, which are listed in Table 1.
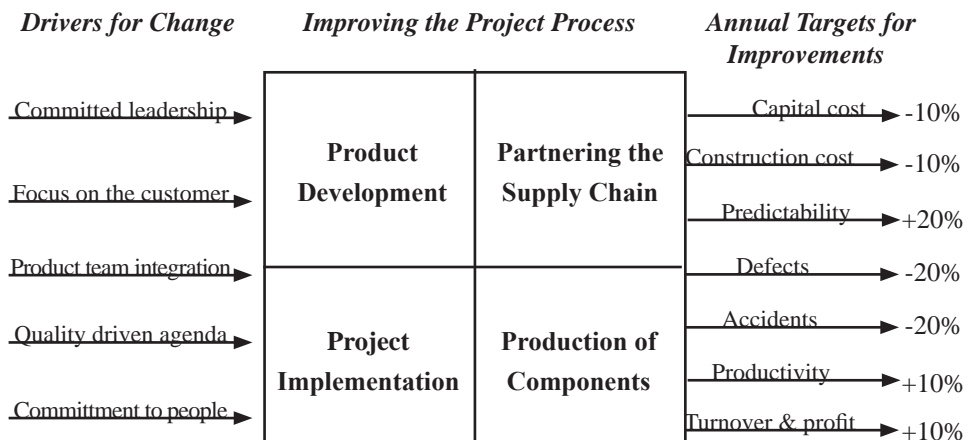

Figure 6: Rethinking construction 5-4-7 principle (www.ccinw.com)

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Table 1: Key performance indicators for construction firms (CBPP, 2002)

Project Performance	Company Performance
Construction cost	Safety
Construction time	Profitability
Predictability—cost and time	Productivity
Defects	
Client satisfaction—product	
Client satisfaction—service	

As the construction industry naturally is a predominantly project-oriented industry, it focuses more on the project performance rather than organisational performance measurement (Kagioglou *et al*., 2001). Traditionally, projects were evaluated in terms of cost, time and quality (Lee *et al*., 2000), a concept that is known as the iron triangle according to Kaplan and Atkinson (1998). However, Ward *et al*. (1991) believed that these three categories are insufficient, and they argued that other factors such as productivity, profitability, safety and satisfaction of project team members will determine to a certain degree how successful a project is.

Such criteria for project success have been incorporated into the CBPP-KPIs framework, which additionally includes defects and predictability measures. The CBPP-KPIs introduced many construction organisations to the subject of performance measurement, and according to Chan *et al*. (2002) and Bassioni *et al*. (2005), construction companies have increasingly shifted towards applying performance measurement frameworks in their businesses. This wave of applying performance measurement techniques was also tied with the use of advanced performance measurement models such as the Balanced Scorecard, the Baldrige Performance Excellence Program and the European Foundation for Quality Management (EFQM) Excellence Model (Bassioni *et al*., 2004a). A recent survey conducted by Bassioni *et al*. (2005), investigating the usage of performance measurement frameworks amongst construction contractor organisations (see Figure 7), revealed that 89.6% of contractor companies employ the CBPP-KPIs to evaluate their project performance. This is a considerable increase compared to lower percentages identified in earlier studies of McCabe (2001) and Robinson *et al*. (2004).

To achieve a more visual assessment of the companies' performance, a newly developed CBPP-KPIs model was used as a benchmarking tool for the whole construction industry. With this tool construction firms can benchmark their performance against a large sample across the industry. To implement the KPIs, the Construction Excellence produced a set of wall charts that include ranking curve and radar charts, which are updated on an annual basis. The charts show the benchmark scores of the industry for each set of the 10 KPIs including profitability, construction cost and time, productivity and safety. Participating companies can access the developed online software and benchmark their scores against the industry sample and identify best practices within the industry for productivity and performance.
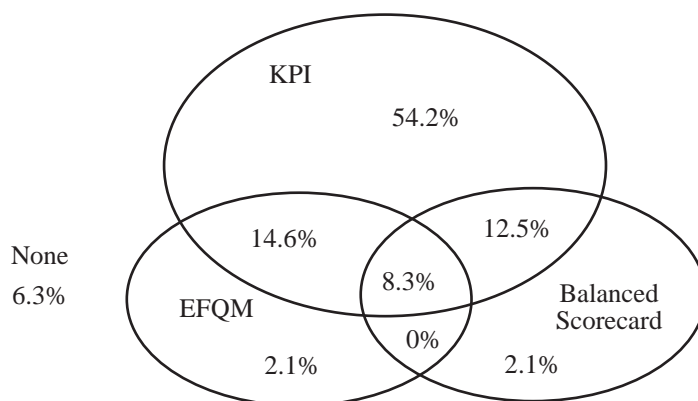
Figure 7: Performance measurement frameworks used in the construction industry (Bassioni *et al*., 2005)

Despite the benefits assumed by companies from introducing KPIs, the model came under heavy criticism by several experts (Bassioni *et al*., 2004). According to Beatham *et al*. (2004), the current CBPP-KPIs model does not offer the opportunity for organisations to change since they are employing mostly lagging KPI measures. Many commentators have constantly put emphasis on the need to use '… leading measures to provide early warnings, identify potential problems and highlight any need for further improvement' (Costa *et al*., 2006, pp. 160–161). Kagioglou *et al*. (2001) questioned the fact that KPIs were implemented to be used as a benchmarking management tool. According to him, KPIs are limited in their application, as they do not provide insight into how a company can improve its performance; accordingly, they have limited use for internal management decision-making. Nanni *et al*. (1990) questioned the viability of such a benchmarking system due to the lack of certainty of data and validation of results. They argue that the CBPP-KPIs model was mainly introduced as a marketing tool rather than a performance improvement tool. Moreover, KPIs are not aligned to the strategy or business objectives of construction companies. They tend to be a complete group of project performance indicators, which may or may not be aligned to an organisation's business requirements. The majority of literature from other industries suggests that measures should always be developed from the business objectives of an organisation (Kaplan & Norton, 1996) in order to be successfully implemented. Financial indicators, however, provide important measures to give a more company-wide performance evaluation.

Financial performance measurement

Financial measures have long been recognised as the basis for corporate performance measurement. Despite the fact that they have been criticised by many experts, Burgess *et al*. (2007) argued that financial measures are '… still popular among most of the companies, because non-financial measures, such as customer satisfaction, quality of the product, market share and human resources, tend to be subordinate to financial

figures (p. 586). Additionally, managers rely on financial performance indicators as the basis for corporate strategy predominantly in the short term (Eccles & Pyburn, 1992). Moreover, Manoochehri (1999) claimed that financial measures, such as profit, revenue, return on investment and return on sales, are amongst the key measures for organisations striving for superiority.

There are many different ways to analyse a company's financial statements. One of the most popular and significant methods is calculating a number of accounting ratios. Ratio Analysis is an integral part of financial management. It can be defined as the measurement of the relationship between different features shown in a company's financial statements. This relationship can be conveyed in terms of a percentage, a rate or a simple proportion (Fraser & Ormiston, 2001).

Financial ratios facilitate financial information included in a firm's financial statements to be extracted, interpreted and analysed (Gibson, 1987). Moreover, financial ratios are equally important to management for budgeting and forecasting purposes. Trend analyses facilitate management to forecast their future position and to make better decisions accordingly. With the aid of various financial ratios, conclusions can be drawn concerning the liquidity position and long-term financial solvency of a company. In addition, there are other ratios, which measure the leverage or capital structure and profitability of the business enterprises.

Most experts, however, proclaim that financial measures are of little value to a company if they are used in absolute terms, and only gain their significance and effectiveness when used for comparative purposes (Rees, 1995; Parker, 1999). According to Parker, the baseline can be a budgeted one (set by the company itself), a historical one (based on past performances of the company) or an industry one (based on obtained ratios) from an array of companies in the same industry (Chen & Thomas, 1981; Altman, 1968). According to Robinson *et al*. (2004), the most important and widely used ratios are classified into five main groups: liquidity ratios, leverage ratios, activity management ratios, profitability ratios and market values. This classification by Robinson *et al*. will be used in the KPIs modified model to assess performance in the construction industry.

Research methodology

Selection of key financial measures

One of the main objectives of this research is to examine existing key performance indicators within the construction industry to develop a similar set of financially based KPIs. The literature review provided a wide range of financial metrics, all of which are applicable to develop industry norms. However, many authors have constantly emphasised that to achieve an effective performance measurement, the indicators must focus on the critical aspects of the players in the construction industry. And, according to Chan *et al*. (2002), '… only a limited, manageable number of KPIs is maintainable

for regular use, and too many KPIs can be time and resource-consuming' (p. 123). Thus, it was necessary prior to collecting the data to select the financial measures/ratios that are critical to corporate performance success. The following were identified: current and quick ratios, times interest earned, gearing, accounts receivable turnover, average collection period, inventory turnover, gross profit margin, net profit margin, return on equity and return on investment ratios. The criterion for selecting the above ratios was the ability to cover the main groups of ratio analyses presented in liquidity, leverage, activity, profitability and market values as emphasised by Robinson *et al*. (2004).

Sample construction and data collection

To develop financial industry benchmarks, top companies 'best in practice' were selected based on their latest turnover figures for the year 2008. The researchers collected data from the top 100 contractor and top 50 consultancy companies listed in the Building Magazine (www.building.co.uk).

The selected financial information, represented in a pre-determined set of financial ratios, was obtained from the Financial Analysis Made Easy database (FAME), which was accessible via the Athens system. Data from several selected companies were unavailable, and these companies were subsequently replaced by companies of the next highest ranking.

To determine the industry averages (i.e. industry norms) for each of the selected financial metrics on a yearly basis, a number of descriptive statistical values, such as the central tendency measures including the mean, median and the mode, were calculated. Subsequently, the mean values were used as they reflected the best central measures and took account of all the data. There are, however, difficulties associated with calculating mean values as they are influenced by extreme outliers.

Researchers measure variation in three ways: range, percentile and standard deviation. Standard deviation and range (minimum and maximum values) were computed to give a better picture of the spread of the results. However, to be able to compare the spread of data between the financial measures, which are of different magnitudes, the coefficient of variation was also computed. To present the findings and analyse the financial data, the results were tabulated and graphically displayed.

The researchers analysed the performance of the construction industry based on the generated industry averages (benchmarks). In compliance with the existing CBPP-KPIs model, a financial KPIs benchmarking model was developed, which comprises a series of wall charts (ranking curve) and radar charts. Two distinct benchmarking models for contractors and consultants were developed. Detailed discussions with contractors were undertaken in the research as an example to show the application of the modified KPIs model. Finally, case studies, using examples of two randomly selected contractors, were conducted to demonstrate how the proposed benchmarking model might be adopted to evaluate the financial performance of these companies.

Results and discussion

Financial KPIs benchmarking model

The key financial measures used to assess the performance of the industry and then to construct the benchmarking model are presented in Table 2 below.

The industry financial norms for contractors are outlined in Table 3. These generated averages form a benchmark for contractors to evaluate the performance of their businesses against a large number of industry competitors. They set a minimum standard that companies need to attain for each key financial measure. In addition, the norms set performance improvement targets for contractors whose financial performance metrics lie significantly below the benchmark. Additionally, companies outperforming such norms may want to further distant themselves from industry competitors.

Table 2: Summary of key financial measures

Liquidity	Leverage	Activity Management	Profitability	Shareholder Values
Current ratio	Gearing	Accounts receivable turnover	Gross profit margin	ROI
Quick ratio	Times interest	Average collection period	Profit margin	ROE
		Inventory turnover		

Contractors working benchmarks

Table 3: Contractors financial benchmarks (2008)

Current ratio	Quick ratio	Gearing	Times interest earned	Accounts turnover	Inventory turnover	Average collection	Gross profit margin	Profit margin	ROI	ROE
1.53	0.89	106.9	24.19	33.83	106.96	15.78	12.77	4.49	7.29	31.42

The proposed benchmarking model for contractors, which is presented below, consists of several charts to enable companies to benchmark and evaluate their performance. Two case studies for contractors were conducted to demonstrate how such charts could be employed.

Financial KPIs wall charts

The first set of charts (the wall charts, see Figures 9–13) for contractors enables companies to determine their percentile position for each financial KPI relative to the industry. To calculate the benchmark score (see Figure 8), the analysts should follow the procedures set below:

1. Select the appropriate graph.
2. Plot the measured performance for the company on the horizontal axis (1).
3. Read above the performance line (2).
4. Read across the vertical axis (3). This is the company benchmark score out of 100%.
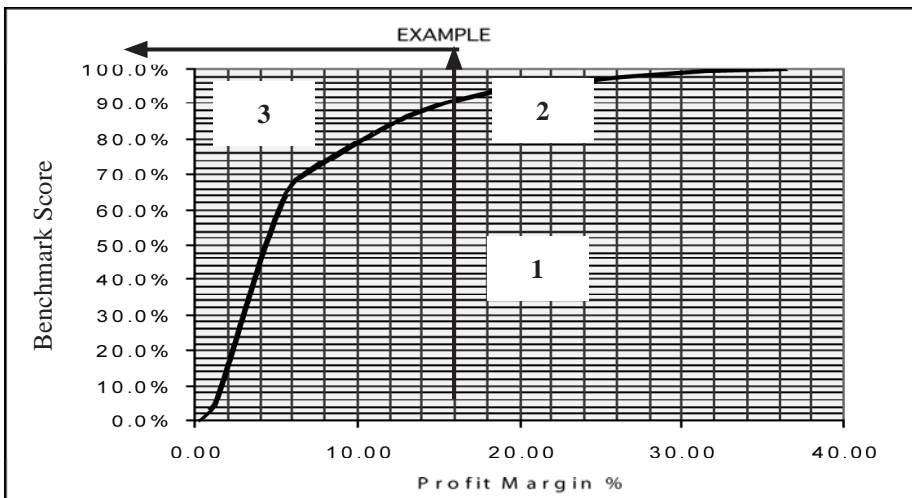
Figure 8: Calculation of benchmark score worked example

In this example, a profit margin of 20% is achieved, which equals a benchmark score of 92%, meaning that 92% of companies are achieving equal or lower performance; 8% are achieving a higher performance.

Financial KPIs radar charts

The benchmark scores for each financial KPI are plotted on a radar chart (see Figures 14 and 15). Each axis on the radar chart represents a financial KPI, and the plots/ benchmark scores on the radar chart are all connected with a line. In general, the nearer the plotted line is to the outer perimeter of the chart, the higher the overall performance of the company for each financial KPI.

Performance record sheet

The scores of the analysis can then be summarised in the performance record sheet for the contractors' case studies (see Tables 9 and 10; and for a comparison of benchmark scores see Tables 4–8). This can help managers to keep a record of their performance if results are updated on a monthly/yearly basis. In addition, it aids managers to identify weaknesses and strengths of the company so new improvement targets and goals can be set.

Contractors financial key performance indicators wall charts
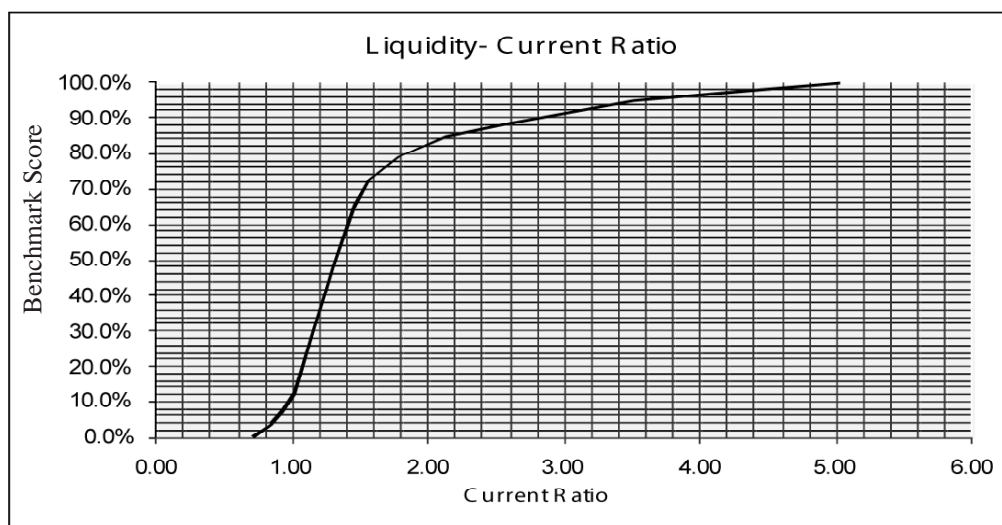
Contractors liquidity wall charts

Figure 9: Contractors current ratio wall chart

Table 4: Contractors case studies current ratio benchmark scores

Company	Current Ratio	Benchmark Score
Carillion	0.94	7% (0.7)
Daniel Contractors	0.97	11% (1.1)
Industry	1.59	74% (7.4)

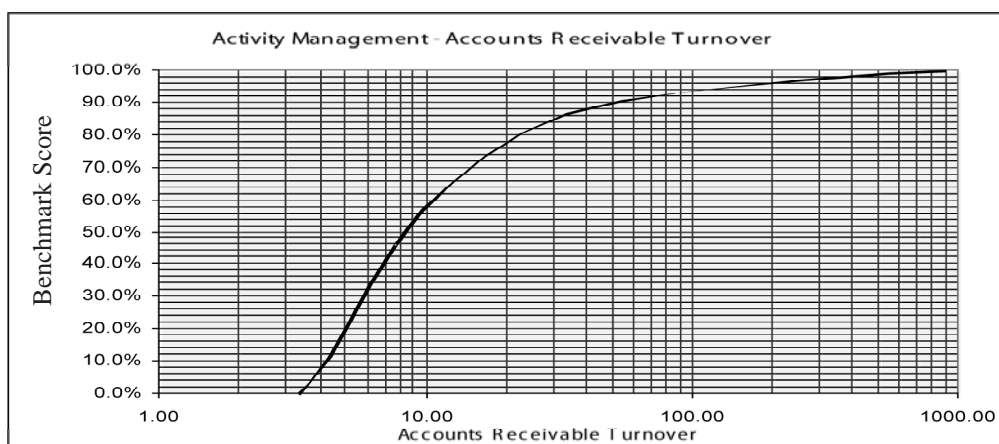### *Contractors leverage wall charts*
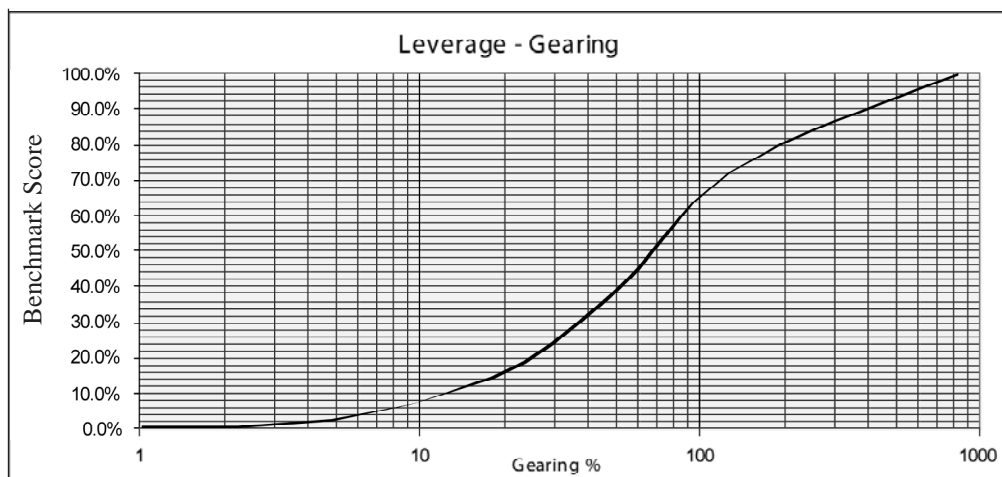
Figure 10: Contractors gearing wall chart

Table 5: Contractors case studies gearing benchmark scores

Company	Gearing %	Benchmark Score
Carillion	96.4	63% (6.3)
Daniel Contractors	171.85	74% (7.4)
Industry	135.84	72% (7.2)

Contractors activity management wall charts

Figure 11: Contractors account receivable turnover wall chart

Table 6: Contractors case studies accounts receivable turnover benchmark scores

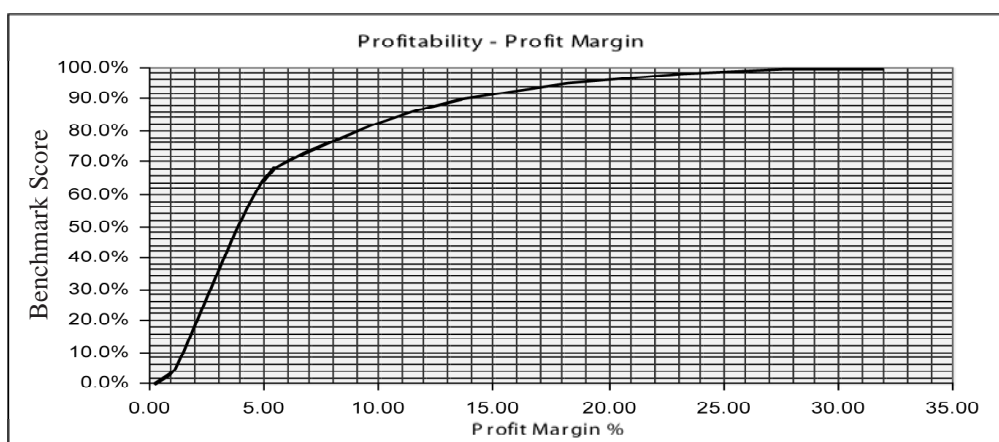| Company	Accounts Receivable Turnover	Benchmark Score
Carillion	16.52	67% (6.7)
Daniel Contractors	6.06	14% (1.4)
Industry	35.51	82% (8.2)

Contrators profitability wall chart

Figure 12: Contractors profit margin wall chart

Table 7: Contractors case studies profit margin benchmark scores

Company	Profit Margin	Benchmark Score
Carillion	2.55	26% (2.6)
Daniel Contractors	1.17	5% (0.5)
Industry	5.9	69% (6.9)

Contractors shareholder values charts
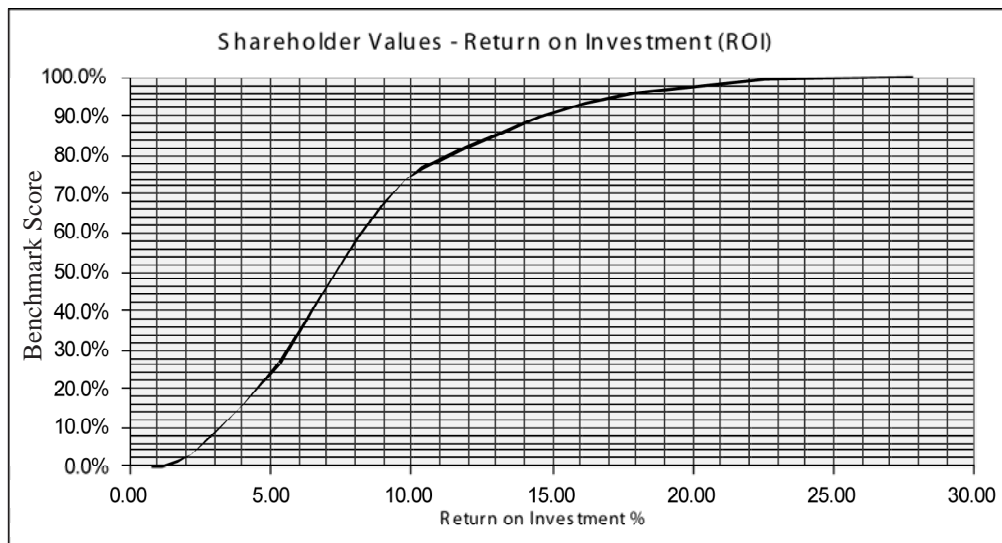
Figure 13: Contractors return on investment wall chart

Table 8: Contractors case studies return on investment benchmark scores

Company	ROI	Benchmark Score
Carillion	4.21	17% (1.7)
Daniel Contractors	4.89	23% (2.3)
Industry	8.26	58% (5.8)

Case Study 1: Carillion performance record sheet

Table 9: Carillion performance record sheet (the value in brackets represents the industry benchmark)

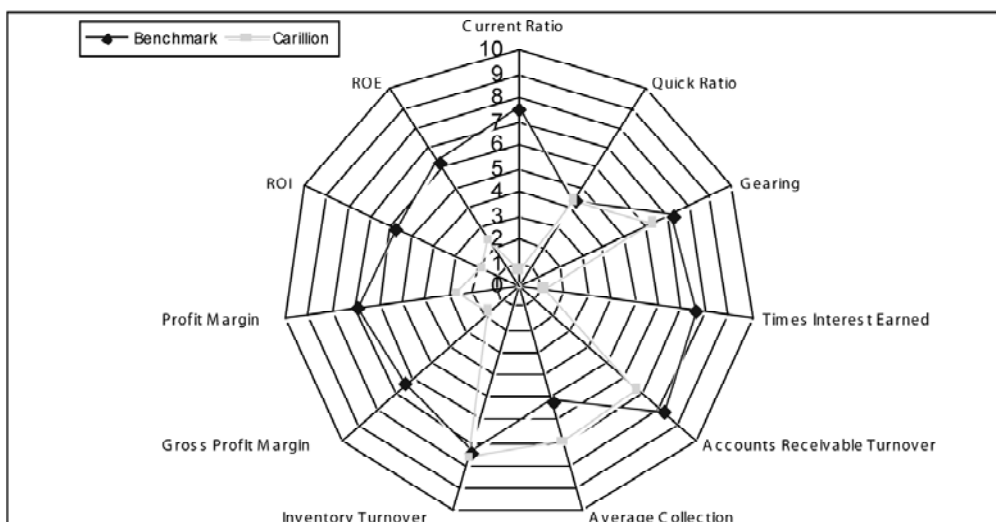|	Financial KPI	Value	Benchmark Score	Comments
Liquidity	Current ratio	**0.94** (1.59)	**0.7** (7.6)	**poor (risky)**
	Quick ratio	**0.91** (0.9)	**4.3** (4.3)	**okay**
Leverage	Gearing	**96.4** (135.84)	**6.3** (7.2)	**low**
	Times interest earned	**1.89** (32.06)	**1.1** (7.6)	**very low (risky)**
Activity Management	Accounts receivable turnover	**16.52** (35.51)	**6.7** (8.2)	**low**
	Average collection period	**24.11** (36.02)	**7.6** (7.3)	**good**
	Inventory turnover	**95.94** (93.45)	**6.9** (5.1)	**good**
Profitability	Gross profit margin	**7.19** (14.21)	**1.7** (6.4)	**poor**
	Profit margin	**2.55** (5.9)	**2.6** (6.9)	**poor**
Shareholder values	ROI	**4.21** (8.26)	**1.7** (5.8)	**poor**
	ROE	**20.67** (34.42)	**2.3** (6.3)	**poor**

Figure 14: Carillion benchmarking radar chart

Case Study 2: Daniel Contractors performance record sheet

Table 10: Daniel Contractors performance record sheet

	Financial KPI	**Value**	**Benchmark Score**	**Comments**
Liquidity	Current ratio	**0.97** (1.59)	**1.1** (7.6)	**Poor (risky)**
	Quick ratio	**0.84** (0.91)	**3.7** (4.3)	**Somewhat low**
Leverage	Gearing	**171.85** (135.84)	**7.4** (7.2)	**Okay**
	Times interest earned	**7.39** (32.06)	**3.8** (7.6)	**Poor (risky)**
Management	Accounts receivable	**6.06** (35.51)	**1.4** (8.2)	**Poor**
	Average collection period	**61.16** (36.02)	**6.0** (7.3)	**Low**
	Inventory turnover	**36.39** (93.45)	**1.6** (5.1)	**Poor**
Profitability	Gross profit margin	**17.51** (14.21)	**7.3** (6.4)	**Good**
	Profit margin	**1.17** (5.9)	**0.5** (6.9)	**Poor**
Shareholder values	ROI	**4.89** (8.26)	**2.3** (5.8)	**Low**
	ROE	**27.95** (34.42)	**4.4** (6.3)	**Low**
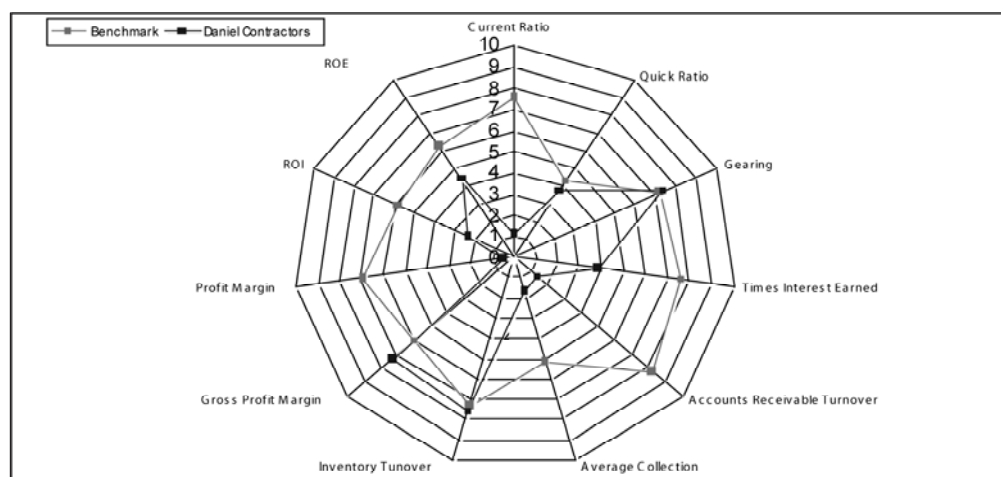
Figure 15: Daniel Contractors benchmarking radar chart

Assessment of developed financial industry norms and recommendations

The developed financial industry norms and various benchmarking models will enable construction organisations to identify their performance gaps, strengths and weaknesses. Accordingly, management may focus on the areas within the company that are at risk or are underperforming so that improvements can be made. The model will alert managers to possible problems and difficulties the company may encounter in the future. The analysis of Daniel Contractors's performance when compared to industry benchmarks for instance revealed that the company has a low liquidity position. In particular, the current ratio is well below the industry average, implying that the company is at risk of not being able to pay its debts. This may be due to inefficiency in collecting the company's debts, inability to get adequate credit terms from suppliers and other creditors, and poor management decisions for selecting profitable projects. Moreover, the activity management ratios for Daniel Contractors are significantly below the benchmarks, indicating that the company is not utilising its assets efficiently. Possible reasons for such inefficiency are the decrease in the size of the company's activity, extended average collection period of receivables and longer inventory turnover ratios compared with other competitors.

At the same time, it was evident from the assessment of Carillon's performance that this company does not make enough profit from its sales since the profitability ratios are relatively low, which in turn has affected the shareholders values. The reasons behind such low profitability may be due to the inability of management to sustain a significant growth in the construction market, poor marketing and advertising campaigns and inadequate cost systems, which negatively affected the company's success in winning tenders for new projects. The above comparisons support the notion that benchmarks are an effective performance assessment tool that enables managers to identify weaknesses and strengths of an organisation.

The researchers, however, believe that managers must be aware of the limitations and problems associated with financial industry norms. For example, it is difficult to generalise in some cases whether a particular ratio is good or bad, based on such comparisons. For instance, a relatively high liquidity ratio may indicate a strong liquidity position, which means that the company is capable of paying its debts at ease. It may also imply that the company is not using its assets adequately since excess cash in a bank is considered a non-earning asset. Moreover, a considerably high inventory turnover may signify greater efficiency. Also, it may denote that the inventory is exceedingly low relative to sales, meaning the company is at risk of inventory stockouts. In addition, a firm may have some strong ratios and others that are poor, thus it may be difficult to tell whether the company is on balance strong or weak. Managers need to be aware that recession and inflation have severe impacts on the individual financial ratios. Inflation affects both depreciation charges and inventory charges, and consequently profits may be affected. Recession may also affect the receivables turnover or average collection period since sales are expected to decrease during such a period.

In addition, companies apply different accounting and financial policies, each of which has its own strategies and objectives. The construction industry in nature comprises a heterogeneous group of companies. Despite the fact that companies were categorised under consultants and contractors, each category performs different tasks and activities, which in turn acquires different policies. Many large firms operate different divisions in various industries, which makes it even more difficult to obtain a meaningful set of industry averages. Therefore, the researchers believe that such industry norms would be more useful to smaller companies than large, multidivisional ones. Besides, companies end their accounting periods at different dates, and industry norms are conflicting averages of ratios calculated at different dates. All of the above policies may have affected the consistency of results obtained. Moreover, companies want to be better than the average, so merely achieving an average performance is not good enough.

Finally, the researchers believe that ratios should not be analysed in isolation since each measure has an influence on the other. Short-term liquidity affects profitability, and efficiency of asset management influences cost and availability of credit, which in turn forms the capital structure of the company. Therefore, it is vital to integrate all measures to give a better interpretation of the overall performance of a company. Finally, the researchers recommend that the following guidelines, outlined in Table 11, need to be considered when setting performance targets to improve the performance of individual financial KPIs.

Table 11: Recommendations: How to improve your financial KPI performance

	How to Improve your Financial KPI Performance
Liquidity	• Ensure efficient collection of company debts. • Ensure a quick turnover of inventory into cash within industry average days. • Ensure that minimum funds are available in cash for day-to-day operations. • Limit amounts paid in advance for goods and services expected to be received. • Agree with suppliers and creditors about good flexible credit terms. • Assess the company's liquidity position on a daily basis and take appropriate action.
Leverage	• Expand activities and operations and make sufficient funds available. • Transfer some of short-term obligations to long-term by obtaining new long-term credit facilities and diversify your credit facilities among financial lenders. • Maintain shareholders confidence and ensure adequate return so funds can be provided to the company when new investments are needed. • Compete in the market to ensure an adequate share in the market for more reliance on the company's generated profitability. • Maintain financial guarantees and collaterals to provide to creditors and suppliers for credit facilities provided.
Activity Management	• Recruit high calibre, qualified personnel and provide funds to finance such recruitments. • Compare total amount of sales realised with previous year(s) and study reasons behind growth or decline and take necessary actions. • Control amounts of costs incurred from company's operations. • Compare results of assets turnover ratio with industry and competitors averages and take quick actions.
Profitability	• Compare ROI & ROA against competitors/industry averages and the market to ensure owners and investors satisfaction. • Ensure adequate amount of total revenues compared with industry averages. • Compare and analyse total amounts of administrative expenses with those of other competitors and industry benchmarks and minimise such expenses accordingly. • Promote efficient and effective marketing and advertising programs with appropriate budgets to maximise profitability.
Shareholder Values	• Analyse the market share of the company and assess its increase or decrease in relation to ever-changing needs of shareholders, investors, financial institutions and governments. • Increase the volume of sales/revenues whilst minimising expenses to ensure adequate return to shareholders and investors. • Acquire only assets that adds value to the business rather than investing in inefficient resources. • Make comparisons between the company's market shares and those of competitors, and assess its effects on the company's ability to obtain funds from the market when required.

Conclusion

The current research developed financial norms for UK construction companies. A financial benchmarking model was developed using data from the top 100 contractors and top 50 consultancy companies. Detailed discussions about the developed model were held with contractors to show how the model can be used to improve these companies' performance. The key financial measures incorporated into the model were identified based on an extensive analysis of the literature for both performance and management measurements. Despite the clear shortcomings of the existing CBPP-KPIs model (CBPP, 2002)—it is limited to only being project specific and does not contain guidelines for performance assessment—the proposed model provides insights into the overall performance of companies. In addition, as opposed to the existing CBPP-KPIs model, the proposed model is aligned to the strategy or business objectives of the construction industry. Financial measures incorporated into the model form the basis of strategic business. Moreover, financial measures are the most significant measures, and they considerably enable companies to identify practices that lead to superior performance.

The model consists of a series of wall and radar benchmarking charts, a record sheet for each company analysis and a set of guidelines, which will enable construction companies to benchmark their performance relative to the performance of the construction industry. Despite the fact that financial measures are considered 'lagging', the benchmarking charts can not only be used to monitor progress within the company's internal benchmarking, but can also be used to forecast future performance. Thus they provide an early warning system for managers. Furthermore, these charts can also be employed by companies for external benchmarking purposes by means of comparing the progress of their performance against industry competitors. A series of wall charts have been produced in accordance with the existing CBPP-KPIs, which is particularly useful for companies to determine their percentile rank within the industry for each key financial measure. Such a model, if successfully implemented, would inevitably encourage and motivate companies to continuously improve their performance.

The difficulties experienced in this research study are related to the data collection process. Some financial measures were not available on the FAME database, such as the days to collect inventory, dividend yield and price earning ratio, which could have provided wider insights into the companies' overall performance, especially from a market perspective. Furthermore, the analysis and interpretation of the results of this research were based on ratio calculations only, without considering the financial, administrative and work environment surrounding the construction business activities. The above elements, which represent a venue for future research, would have contributed further to the analysis and interpretation of the ratio results, which are considered effective performance measures. Moreover, the financial industry norms are limited to the fact that they do not provide answers and solutions to the problems and do not predict the companies' future performances. They provide a guideline for

companies to improve their performance. The researchers strongly recommend that companies should not rely heavily on industry norms. Managers need to analyse the situation and the environment the company operates in and be highly subjective when analysing and interpreting results to determine appropriate actions.

Future research may be undertaken with a larger sample size of contractors, where companies can be grouped according to their capital, turnover and size. Such a research may limit the discrepancies between the results and provide benchmarks for different categories of companies. A comparison between the current and future research results may later be performed to identify the appropriate benchmarks. Similar research may be undertaken to identify benchmarks in the industry sector in other European countries, aiming to identify differences between the industry benchmarks in different countries, which could be used to assess the weaknesses and strengths of the UK construction industry. Furthermore, a study should be conducted to identify companies who are outperforming or underperforming the generated industry norms and to establish the reasons behind those companies' success and failures. This may require an extensive knowledge of financial, accounting, management behaviour and other market issues. The findings can then be used by companies to improve their performances respectively.

References

Alarcon, L., Grillo, A., Freire, J. and S. Diethelm (1998) *Learning form Collaborative Benchmarking in the Construction Industry*, IGLC-9, Proc., 9th International Group for Lean Construction Conference, National University of Singapore.

Altman, E. (1968) "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy", *Journal of Finance*, Vol. 23, No. 4, pp. 589–609.

Andonov-Acev, D., Buckovska, A., Blagojevic, Z. and V. Kraljevski (2008) *Enterprise Performance Monitoring*, Proceedings of the 30th Conference on Information Technology Interfaces, 23–26 June, Cavtat, Croatia.

Bassioni, H., Price, A. and T. Hassan (2003) *The Development of a Comprehensive Business Performance Measurement Framework*, Postgraduate Researchers of the Built Environment (PROBE) Conference, 18–19 November, Glasgow, Scotland, pp. 447–456.

Bassioni, H., Price, A. and T. Hassan (2004) "Performance Measurement in Construction", *Journal of Management in Engineering*, Vol. 20, No. 2, pp. 42–50.

Bassioni, H., Price, A. and T. Hassan (2004a) *The Integrated Use of the Balanced Scorecard and the EFQM Excellence Model in Construction*, Working Paper, Loughborough University, Loughborough, UK.

Bassioni, H., Price, A. and T. Hassan (2005) "Building a Conceptual Framework for Measuring Business Performance in Construction: An Empirical Evaluation", accepted for publication in *Construction Management and Economics*, Vol. 23, No. 5, pp. 495–507.

Beatham, S., Anumba, C. and T. Thorpe (2004) "KPIs: A Critical Appraisal of Their Use in Construction", *Benchmarking an International Journal*, Vol. 11, No. 3, pp. 93–117.

Bititci, U., Carrie, A. and L. McDevitt (1997) "Integrated Performance Measurement Systems: A Development Guide", *International Journal of Operations & Production Management*, Vol. 17, No. 5, pp. 522–534.

Bourne, M., Mills, J., Wilcox, M., Neely, A. and K. Platts (2000) "Designing, Implementing and Updating Performance Measurement Systems", *International Journal of Operations & Production Management*, Vol. 20, No. 7, pp.754–771.

Burgess, R., Ong, T. and N. Shaw (2007) "Traditional or Contemporary? The Prevalence of Performance Measurement System Types", *The International Journal of Productivity and Performance Management*, Vol. 56, No. 7, pp. 583–602.

Camp, R. (1989) *Benchmarking – The Search for Industry Best Practices that Lead to Superior Performance*, ASQC Quality Press, New York.

Camp, R. (1995) *Business Process Benchmarking: Finding and Implementing Best Practice*, American Society for Quality Control, Quality Press, Milwaukee, Wisconsin.

CBPP (1998) *Key Performance Indicators. Project Delivery and Company Performance,* Construction Best Practice Program publication, Watford, UK.

CBPP (2002), *Welcome to CBPP e-news: CBPP to introduce new KPI implementation service*, Construction Best Practice Program publication, viewed at July 2009, <http://www.cbpp.or.uk>.

Centre for Construction Innovation (1999) hosted by University of Salford, Manchester, viewed at July 2009, <http:// www.ccinw.com>.

Chan, A. P. C. and A. P. L. Chan (2004) "Key Performance Indicators for Measuring Construction Success", *Benchmarking an International Journal*, Vol. 11, No. 2, pp. 203–221.

Chan, A., Scott, D. and E. Lam (2002) "Framework of Success Criteria for Design-Build Projects", *Journal of Management in Engineering*, Vol. 18, No. 3, pp. 120–128.

Cheah, C., Gavin, M. and J. Miller (2004) "Empirical Study of Strategic Performance of Global Construction Firms", *Journal of Construction Engineering and Management*, Vol. 130, No. 6, pp. 808–817.

Chen, H. and A. Thomas (1981) "An Empirical Analysis of Useful Financial Ratios", *Financial Management*, Vol. 10, No. 1, pp. 51–60.

Construction Industry Institute (CII) (2002) *Benchmarking and Metric Program*, viewed at July 2009, <http://www.cii-benchmarking.org>.

Costa, D., Formoso, C., Kagioglou, M., Alarcón, L. and C. Caldas (2006) "Benchmarking Initiatives in the Construction Industry: Lessons Learned and Improvement Opportunities", *Journal of Management in Engineering*, Vol. 22, No. 4, pp. 158–167.

Cox, R., Issa, R. and D. Ahrens (2003) "Management Perception of Key Performance Indicators for Construction", *Journal of Construction Engineering and Management*, Vol. 129, No. 2, pp. 142–151.

Cross, K. and R. Lynch (1988) "The SMART Way to Sustain and Define Success", *National Productivity Review*, Vol. 8, No. 1, pp. 23–33.

Davis, S. and T. Albright (2004) "An Investigation of the Effect of Balanced Scorecard Implementation on Financial Performance", *Management Accounting Research*, Vol. 15, No. 2, pp. 135–153.

Eccles, R. and P. Pyburn (1992) "Creating a Comprehensive System to Measure Performance", *Management Accounting (US)*, October, pp. 41–44.

Egan, Sir J. (1998) *Rethinking Construction: The Report to the Construction Task Force to the Deputy Prime Minister*, Department of the Environment, Transport and the Regions, London.

EL-Mashaleh, M., O'Brien, W. and R. Minchin (2007) "Management of Construction Firm Performance Using Benchmarking", *Journal of Management in Engineering*, Vol. 23, No. 1, pp. 10–22.

Fisher, D., Mierschin, S. and D. Pullock (1995) "Benchmarking in Construction Industry", *Journal of Construction Engineering and Management*, Vol. 11, No. 1, pp. 50–57.

Flapper, S., Furtuin, L. and P. Stoop (1996) "Towards Consistent Performance Management Systems", *International Journal of Operations & Production Management*, Vol. 16, No. 7, pp. 27–37.

Fraser, L. and A. Ormiston (2001) *Understanding Financial Statements*, (7th ed.), Pearson Education Inc., Upper Saddle River, New Jersey.

Garnett, N. and S. Pickrell (2000) "Benchmarking for Construction: Theory and Practice", *Journal of Construction Management and Economics*, Vol. 1, No. 8, pp. 55–63.

Gibson, C. (1987) "How Chartered Financial Analysts View Financial Ratios", *Financial Analysts Journal*, Vol. 43, pp. 73–76.

Globerson, S. (1985a) "Issues in Developing Performance Criteria System for an Organization", *International Journal of Production Research*, Vol. 23, No. 4, pp. 639–646.

Jafaari, A. (2000) "Construction Business Competitiveness and Global Benchmarking", *Journal of Management in Engineering*, Vol. 16, No. 6, pp. 43–56.

Kagioglou, M., Cooper, L. and G. Aoudad (2001) "Performance Management in Construction: A Conceptual Framework", *Construction Management and Economics*, Vol. 19, pp. 85–95.

Kaplan, R. and A. Atkinson (1998) *Advanced Management Accounting*, (3rd ed.), Prentice Hall Inc., Englewood Cliffs, New York.

Kaplan, R. and D. Norton (1992) "The Balanced Scorecard – Measures that Drive Performance", *Harvard Business Review*, January–February, pp. 71–79.

Kaplan, R. and D. Norton (1996) "Using the Balance Scorecard as a Strategic Management System", *Harvard Business Review*, January–February, pp. 75–85.

Kennerly, M. and A. Neely (2002) *Performance Measurement Frameworks: A Review. Business Performance Measurement: Theory and Practice*, A. Neely (ed.), Cambridge University Press, Cambridge, UK.

KPI Working Group (2000) *KPI Report for The Minister for Construction*, Department of the Environment, Transport and the Regions, UK.

Latham, Sir M. (1994) *Constructing the Team: Final Report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry*, HMSO, London.

Lee, A., Cooper, L. and G. Aouad (2000) *A Methodology for Designing Performance Measures for the UK Construction Industry*, Bizarre Fruit Postgraduate Research Conference on the Built and Human Environment, University of Salford, Manchester, UK.

Lema, N. and A. Price (1995) "Benchmarking: Performance Improvement Toward Competitive Advantage", *Journal of Management in Engineering*, Vol. 11, No. 1, pp. 28–49.

Manoochehri, G. (1999) "Overcoming Obstacles to Developing Effective Performance Measures", *Work Study*, Vol. 48, No. 6, pp. 223–229.

McCabe, S. (2001) *Benchmarking in Construction*, Blackwell Science Ltd, London.

McGeorge, D. and A. Palmer (1997) *Construction Management: New Directions*, Blackwell Science Ltd, Oxford.

Nanni, A. J. Jr, Dixon, J. R. and T. E. Vollmann (1990) *The New Performance Challenge*, Richard D. Irwin Inc., Homewood, IL.

Neely, A., Richards, A., Mills, J., Platts, K. and M. Bourne (1997) "Designing Performance Measures: A Structured Approach", *International Journal of Production and Operations Management*, Vol. 17, No. 11, pp. 1131–1152.

Neely, A. (1998) "Measuring Business Performance", *The Economist*, London.

Neely, A. (1999) "The Performance Measurement Revolution: Why Now and Where Next?" *International Journal of Operations and Production Management*, Vol. 19, No. 2, pp. 205–208.

Neely, A., Gregory, M. and K. Platts (1995) "Performance Measurement System Design, a Literature Review and Research Agenda", *International Journal of Operations & Production Management*, Vol. 15, No. 4, pp. 80–116.

Parker, R.H. (1999) *Understanding Company Financial Statements*, (5th ed.), Penguin Group, New York.

Ramirez, R., Alarcon, L. and P. Knights (2003) *Benchmarking Management Practices in the Construction Industry*, Proc., 11th International Group for Lean Construction Conference, Blacksburg, Virginia.

Rees, B. (1995) *Financial Analysis*, (2nd ed.), Prentice Hall International, UK.

Robertson, H. (1997) "A Construction Company's Approach to Business Performance Measurement", *Total Quality Management*, Vol. 8, No. 2&3, pp. 254–255.

Robinson, T., Munter, P. and J. Grant (2004) *Financial Statement Analysis: A Global Perspective*, Pearson Education Inc., Upper Saddle River, New Jersey.

Schiemann, W. and J. Lingle (1997) "Seven Greatest Myths of Measurements", *Management Review*, May, pp. 29–32.

Shetty, Y. (1993) "Aiming High: Competitive Benchmarking for Superior Performance", *Long Range Planning*, Vol. 26, No. 1, pp. 39–44.

Spendolini, M. (1992) "The Benchmarking Process", *Compensation and Benefits Review*, Vol. 24, No. 5, pp. 21–29.

Suwignjo, P., Bitici, U. and A. Carrie (2000) "Quantitative Models for Performance Measurement System", *International Journal of Production Economics*, Vol. 64, No. 1-3, pp. 231–241.

Ward, C., Curtis, B. and C. Chapman (1991) "Objectives and Performance in Construction Projects", *Construction Management and Economics*, Vol. 9, pp. 343–354.

Watson, G. (1992) *The Benchmarking Workbook: Adopting Best Practices for Performance Improvement*, Productivity Press, Portland, Ore.

Watson, G.H. (1993) *Strategic Benchmarking: How to Rate Your Company's Performance Against the Worlds Best*, Wiley, New York.

Zairi, M. and P. Ahmed (1999) "Benchmarking Maturity as We Approach the Millennium", *Total Quality Management*, Vol. 10, No. 4 & 5, pp. 810-816.