

BENCHMARKING SYSTEMS IN CONSTRUCTION: A PROTOTYPE TOOL FOR SYSTEM SELECTION

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Construction organisations have historically had difficulty in accommodating change and installing new enhanced business performance systems. The contemporary management tools which facilitate change and improvement often appear complex and not readily understood, as reviewed and highlighted by the concept of benchmarking. The aim is to firstly investigate the benchmarking concept and assess its applicability to construction. Then in addition design a prototype management decision matrix to select and apply the optimum benchmarking technique to address specific, unique organisational objectives.

The primary research areas of the paper are a representative sample of the initial literature review and subsequent contemporary benchmarking proprietary systems. This furnished the researcher with the required underpinning knowledge to critically compare and contrast benchmarking systems through a set of formulated criteria that influence the selection of systems appropriate to medium sized construction organisations. The research methodology adopted is succinctly illustrated in an accompanying flow chart

A sample of construction organisations presently involved in benchmarking were interviewed to provide the researcher with an insight into contemporary benchmarking within the industry. Encouragingly the findings from the survey found that 84% of construction organisations would have been interested in a management decision matrix to facilitate selection of the appropriate benchmarking techniques whilst they were investigating the opportunity to benchmark. In addition, an industrial collaborator was involved with the design and pilot testing of the management decision matrix.

The paper culminates with conclusions and recommendations for the future vision and development of benchmarking within the construction industry.

Keywords: benchmarking, change management, management decision matrix

INTRODUCTION

The contemporary construction industry is undergoing significant change embracing innovative designs and procurement techniques with a sharper focus on value and customer satisfaction. Construction organisations in micro and macro environments have needed to accept change and develop their organisation's to maintain trading profitability. This may not be an easy task both in a cultural and resource context, compounded by the frenetic impermanence of the construction industry. Why should management at strategic level strive to identify new improvements? Sir John Egan states within the DETR's 'Rethinking Construction' Report (1998, paragraph 84) that, "*we propose to initiate a movement for change in the construction industry, for radical improvement in the process of construction. This movement will be the means of sustaining improvement and sharing learning.*" Organisations may be able to compare their products, processes or techniques with similar organisations, or

benchmark their own functions with those of others, to ascertain whether they are more efficient than the comparative organisation.

This process is commonly known as 'Benchmarking'. Benchmarking has historically been undertaken in many and varying industries throughout the world, some to great effect. However, the construction industry as is so often the case, has been pedestrian to investigate and evaluate the concept. In 1996 Sir Michael Latham under the auspices of the government of the day compiled a report entitled "Constructing the Team", this report outlined various changes that the industry would have to embrace, and no doubt comply with in the near future. The following year, with a different government and associated political agenda, witnessed the establishment of a task force chaired by Sir John Egan was tasked with the responsibility to advise the government, namely John Prescott Deputy Prime Minister, on the scope for improving quality and efficiency in the UK construction industry. The findings from the task force were launched mid 1998 within the "Rethinking Construction" report.

The latter report was to critically examine current practice with a view to improvement through innovations in products and processes. The report merely highlighted issues and aspects, which could be carried out to achieve improvement, but unfortunately not how to implement them. One issue highlighted by both Egan and Latham was the use of 'Benchmarking' as a recognised tool for implementing change within organisational activities, based on improving an organisation's competitiveness through adopting best practices. Large construction companies have reviewed the perceived benefits of benchmarking, some having implemented their own *ad hoc* systems of measurement, comparison and improvement. On the other hand, medium sized companies although keen, appear to be inhibited by the cost of allocating resources to conducting a benchmarking study. The often-confusing plethora of government bodies, organisations, associations and clubs who offer their services can be daunting. Furthermore, which form of study should be pursued i.e. internal, external, generic etc. The primary aim of this paper is to facilitate selection, by the compilation of a management decision matrix, of an appropriate 'benchmarking technique' as a tool for continuous improvement within a medium sized construction organisation.

RESEARCH METHODOLOGY

The research methodology undertaken is clearly and succinctly illustrated in the accompanying research flow chart. For the purposes of size and scale this research paper will only focus on the core issues highlighted within the chart (Fig.1).

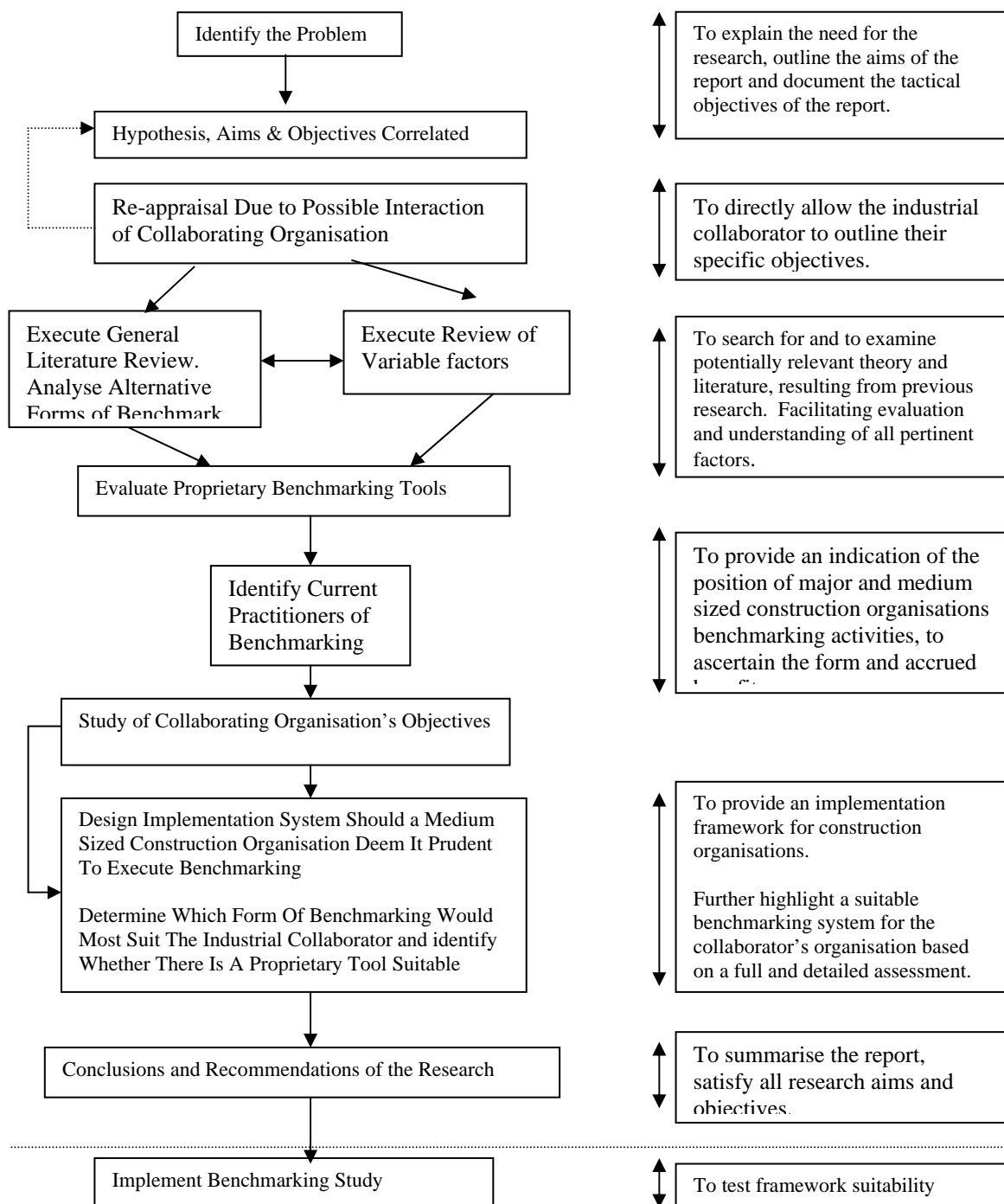
TOWARDS A DEFINITION

This section seeks to develop an understanding of the management concept of benchmarking through a review of related primary, secondary and tertiary literature sources. Defining Benchmarking is complex, not only as a result of 'fuzzy' definitions but, more importantly, due to the many and varied applications, each with their unique strengths, approaches and contributions.

Many management concepts are unfamiliar to construction professionals; interestingly benchmarking is no exception. McGeorge and Palmer (1997, p2) confirms this by stating that, benchmarking... would have been unheard of to either a busy Construction Manager or most Construction Management undergraduates in the decade of the 80s and will still be unfamiliar to many, even in the 1990s.

The main factor giving rise to confusion is the multitude of definitions associated with the concept, plus the various empirical examples of benchmarking carried out by organisations, each apparently adapting the concept to meet their own organisational objectives.

A benchmark, although precise, may still have specific meanings dependant upon the form or type of benchmarking which it is relating to, for example; in relation to process benchmarking, a benchmark is a detailed cumulative description of all the activities that constitute best practice. In relation to performance benchmarking, a benchmark is a number or metric that expresses the level achieved in that activity by a company considered representing best practice in that area often compared with an industry average.



Bogan and English offer a brief and holistic definition, which acknowledges the variances, that is, their definition could be linked to the comparison of either performance or process, or indeed both. It is this somewhat open definition that will be adopted in the initial stages of this paper. What has yet to be achieved in industry is an increase in the understanding of the concepts and an evaluation of related benefits and weaknesses. Although this paper has highlighted benchmarking, as a concept for improvement, the researcher does not regard it as the only option or indeed that the industry shall become an inefficient burden on the economy if benchmarking studies are not conducted. Senior Executives must choose concepts, approaches and tools, which best reflect their organisation's unique circumstances. It is interesting to note that medium sized contractors who have little or no spare resource would appear to be taking a "wait and monitor" approach to facilitate a thorough evaluation of methods which prove versatile and sustainable. This in a fast moving industry could of course have far reaching effects.

REASON FOR BENCHMARKING?

"A business must change to stay ahead or to get ahead. If a business does not keep up then its only option is to fall behind (McDonald and Tanner, 1996, p9)"

A sobering and lucid statement which reflects the factors indicating the need for business to be continually questioning existing processes and practices in light of the ever changing business environment. It is without doubt that there is opportunity and scope for greater business flair and vision in construction, from all involved, as stated below;

"No individual, team, or operating unit – no matter how creative or prolific – can possibly parent all innovation. No single department or company can corner the market on all good ideas.(Bogan and English, 1994, p1)."

Surveys carried out by the Construction Best Practice Programme (CBPP) and American Productivity and Quality Centre (APQC) have concluded that companies world-wide have found that there are significant gains to be made from benchmarking their activities with the corresponding amount of time and effort involved being repaid many times over. With benchmarking it is possible to select the level of resource input from simple performance measurement through to complex but rewarding benchmarking of processes. Accrued benefits may be:

Enhanced control of business through objective measurements which

Compare a company's year on year results, or compare a company's performance against others.

identify where improvements are necessary

Prove the gains from improvements.

Greater understanding of customer needs and their competitor's activities.

Fewer complaints and more satisfied customers.

Corporate enhancement through greater efficiency of products, processes and performance.

Product comparisons, comparing with competitors or best practice organisations.

A stronger reputation within markets, thus facilitating market advantage.

Goal setting and target hitting!

As a result of the above increased profit and turnover may be anticipated.

The external environments (in the form of fiscal regulation and industry clients) are calling for construction companies to benchmark their performance. Leading clients have called for a league table to rank major contractors according to cost, speed and reliability. Those contractors who have conducted benchmarking prior to the possible implementation of the league will reduced the likely hood of being relegated. Additionally, informed contractors will have conducted industry comparisons, identified poor performing areas and executed improvement techniques.

BENCHMARKING WITHIN THE OVERALL MANAGEMENT OF CHANGE

The management of change process is prominent within every industry and extremely important within the construction industry at present. Historically construction contracting has been adversarial with complex contractual arrangements governing numerous aspects of the construction process. This adversarial situation is fading with contemporary partnering and prime contracting arrangements becoming increasingly popular. Construction firms must therefore adapt with the changing environment; the following quotes identify how benchmarking can encourage effective change management.

*“Construction Firms Who Embrace Change – Make Better Profits
(Construction Best Practice Programme, 1999, p4)”*

“Construction Firms Who Learn from Experiences of Others Make Greater Profits (Inside UK Enterprise, 1998, p2)”

The quotes above illustrate the linkage of how benchmarking and change management interacts, each quote relating directly to how a company’s approach to change can affect corporate improvement and profitability. All construction organisations companies whether contractors, specialists, professionals or consultants must deliver both improved ‘frontstage’ client satisfaction and ‘backstage’ organisational effectiveness and efficiency. Organisational effectiveness shall only come to fruition if construction companies are willing to change to meet the needs of their external customers.

Sir John Egan within his landmark report, ‘Rethinking Construction’ outlined the need to improve with a focus on;

. **Table 1:** Seven Key Indictors.

Capital Cost	Construction Time
Predictability	Defects
Accidents	Productivity
Turnover and Profits	

Industry clients are also encouraging the impetus for change and increased efficiency within the industry, in particular, repeat or frequent construction clients, as they are most likely to reap the rewards. Innovative procurement routes have seen the traditional tendering system’s demise over the last decade, alternative selection criteria for contractors have emerged which reflect value for money (VFM) to the customer rather than lowest tendered bid. But how does the customer recognise that

Company A is superior to Company B and that Company A represents greater VFM? Benchmarking of performance is one recognised method.

At this stage there is no mention of process comparison with industry. Best class - in this instance refers to metrics (outputs in quantitative data format) but this is still deemed as benchmarking. (Adapted from 'Building' 14 May, 1999, pp24-27)

Client organisations such as the Design and Build Foundation (DBF), Construction Clients Forum (CCF) and British Property Federation (BPF) are all encouraging construction firms to benchmark. Clients require a “no fuss system” of determining how valuable a certain service provider can be. Furthermore a recent article in 'Building' (21 May 1999, p3) has stated that the DBF has launched a contractors register that their members can use for selection and appointment of contractors. It must be noted that major clients, such as ASDA, shall eventually tire of constantly pushing the industry, then it will be in the hands of construction organisations to take a central stakehold in rethinking construction practices.

THE MANAGEMENT DECISION MATRIX

Having reviewed (briefly) in a macro context the need for business improvement, it is now essential to highlight the micro significance of the research in terms of innovation and applicability to the construction industry.

There are numerous proprietary benchmarking tools available, clearly it is not possible within the confines of this research paper to define and describe each system, which was assessed. However, those evaluated (10 No.) are contained in the management matrix (placed vertically on the left-hand side) in Fig 2. The primary aim at this juncture was to produce a management decision matrix to facilitate the choice of a benchmarking tool, which would be appropriate to the needs, and aspirations of participating construction companies. The decision matrix has been designed and developed to its present structure through structured interviews with construction executives and close collaboration with a medium sized construction company who acted as an industrial collaborator, facilitating feedback and testing through the development phases.

The matrix is designed to allow key or core criteria to be placed on the upper portion of the table, with specific company weighting applied as appropriate. The central portion of the matrix (open cells) are also given a weighting, the benchmarking system with the highest aggregate score is the most suitable for the organisation, thus giving context and focus for further research of that particular benchmarking tool. This eliminates abortive management time reviewing appropriateness of each system, and draws the interrogator expediently and efficiently to the most suitable tool or highlights the fact that a hybrid system may be required to meet the specific requirements of the company.

CONCLUSIONS AND RECOMMENDATIONS

The paper whilst reflecting on benchmarking issues focused on its applicability within construction and more specifically to Medium Sized Construction Companies. There have been few sources of information available where benchmarking and construction have come together, with even less where benchmarking has been linked with Medium Sized Enterprises (MSE's) in construction. The estimation of costs for implementing benchmarking will be an area for detailed analysis and further

investigation and may prove to be the necessary springboard for true industry acceptance, particularly if the cost/benefit analysis proves positive.

Although it has been concluded that benchmarking offers potential benefits it is highly dependant upon the form of benchmarking adopted by a company. Of the two main forms available (performance and process) performance benchmarking appears to be the most favoured by the industry at present, despite the greater return that process benchmarking may provide.

There are reasons for this situation: -

The process benchmarking method is complex and resource intensive.

Most stakeholders in the construction industry are strangers to a collaborative culture and are not willing to share information that may enhance a competitors position.

Construction companies and projects are unique and differences in processes are explained by alternative structures and cultures existing within one's own organisation.

In contrast performance benchmarking produces quantifiable data that is more readily compared and does not directly improve a competitor's performance when shared. As a result most construction organisations adopt this form of benchmarking. A substantial amount of respondents surveyed (88%) confirmed this. To summarise, the researcher also recognises performance benchmarking as the favoured form, but does not discount the significant benefits from the process benchmarking principles and suggests, culture permitting, that this should be seen as the next step once results have been measured and compared. Consequently, this does not appear to be happening within the industry, with construction organisations using metrics to identify deficient areas, then introducing alternative improvement initiatives. While this procedure is relevant, there is an element of 'reinventing the wheel'! Careful evaluation of this suggestion could save companies valuable internal resources, especially when initiatives such as the IUKE promote this approach.

Proprietary benchmarking systems reduce the work concerned with establishing benchmarking mechanisms within a company. If a suitable system is found, again valuable internal resource expenditure could be saved. There are two key aspects that must be considered, these are: -

That there are few proprietary systems available relating to the construction industry, and

Once a system is found, it may not be compatible with company objectives. It may therefore be necessary to select two systems, using either both or where possible adapting them to provide a hybrid system.

A decisional matrix was designed (see Fig 2) and implemented (with industrial collaborator) to compliment and reduce the input of resources to re-investigate appropriate systems. The new and innovative matrix supplies an objective assessment of the systems in lieu of a qualitative comparison. This in turn provides Senior Executives with a tool to eliminate unsuitable systems expediently while leaving selected systems for further detailed examination, prior to final selection.

	Business Objectives			Business Focus		Structure		Culture			ROI			Duration			Resource Requirement / Intensity		Quality of Feedback			Readily Accessible Information		Experienced External Assistance		Applicability to the Construction Industry			Existing Users within Construction			Score		
	Measurement	Comparison	Improvement	Operational	Strategic	Separated	Whole	Closed	Semi	Open	High	Moderate	Low	Long - Continuous	Short - Continuous	Governed	Intensive	Non - Intensive	Good	Moderate	Poor	Yes	No	Yes	If required	No	Applicable	Partly Applicable	Not Applicable	Fair Amount	Very Little		Unknown	
Company Specific Weighting:	4	3	2	4	2	4	3	2	3	2	4	3	2	1	3	3	2	3	4	3	1	3	2	2	2	1	3	2	1	3	2	1		
CalIBRE	4			4		4			3						3	2							2	2			3							36
ImPACT	4			4		4		2					2		3			4					2	2			3						2	32
BREBench (To Be Assessed)																																		0
The Benchmarking Centre			2		2		3		3		4			1			2							2	2			2			1			25
ASSESS	4			2	2	4			3			3			3			3		3			3		2				1		2			33
PILOT	4			2	2		3		3		4				3			3		3			2	2					1		2			33
CBI - Probe	4			2	2		3		3				2		3			3		3			3						1		2			30
Benchmarking Index	4			2	2		3	2				3			3			3		3			2						1		2			31
CIB - KPI's	4			4		4			3		4				3			3		3			2				3			3			39	
Performance Measurement	4			4		4			3			3			3			4		3			3		2		2			3			35	

Only one figure should be summed from each section, where there are two, the higher weighting should be used.
The systems with the highest scorings are those most suitable for one's organisation, these should be subject to further investigation.

Note:- The factors are interdependant and not mutually exclusive.
The matrix can be added to as other systems are developed by simply carrying out the same analytical review as used on other systems, based on the above factors.
Prior to other construction organisations utilising the matrix substantiation should be attained from an experienced management consultant.
It is the intention for the matrix to be available in an active software format.

Methodology for use of Matrix

Acknowledgement of factors influencing selection of benchamrking system
Understanding of Section 3
Apply weightings of importance to the matrix at each factor
Insert the weightings into the matrix and sum the total scores for each system
Select the highest scoring
Thoroughly investigate these to ensure compliance with company.
Select most appropriate system/s or produce hybrid.

Figure 2

The representatives from the Construction Best Practice Programme (CBPP) were very interested in the potential of the matrix as their 'Gateway to Initiatives' identifies the available proprietary systems, but fails to compare and contrast between them. Instead, interested website visitors are supplied with contact names and addresses where further advice on the systems can be obtained. This would involve personnel from organisations executing similar research to that carried out for this project. Subsequently, the CBPP benchmarking team has expressed their interest in viewing the matrix on completion of the project. Furthermore, one Senior Executive from the respondents interviewed commented on the fact that, "a tool that penetrates the market and provides differentiation within that sector, shall be most useful to Senior Executives."

The core issue surrounding the matrix is the ability to supply an objective comparison in a highly subjective arena. The matrix has limitations in its applicability namely:

It is constrained through choice, by the number of systems on it. However additional systems may be added at a later juncture.

The variable factors are business environment sensitive thus is susceptible to change, confirming the addition/reduction issues highlighted above.

The weightings applied to the matrix must reflect the unique company characteristics.

The survey respondents furnished the researcher with a valuable insight into the empirical benchmarking activities of industry practitioners. The respondent's interests in the benchmarking concept ranged from basic internal year on year performance benchmarking through to complex generic benchmarking of processes.

The most appropriate benchmarking approach for the Industrial Collaborator is identified as performance related at this particular juncture of the organisations development. The reason being that performance measures can be removed, added or adapted to suit changes in the external environment, in a similar way to the BEM facilitating change to accommodate partnering as part of their proposed model.

The league table culture and associated issues requires further consideration by the industry, with detailed second phase research, obtaining clients views and suggestions on the formulation and possible adaptation of the decision matrix. A carrot has been issued to client bodies informing them of a concept called benchmarking where performance by contractors can be uniformly measured and compared to facilitate contractor selection. This on the whole is a perfectly justifiable approach, however reported figures may have to be externally verified. Unscrupulous activities shall not only harm a company but in the long term the industry as a whole. The CIB may take a strategic role policing the performance indicators, but this would be at a cost, possibly absorbed by participating organisations.

Thus research in the topic area is also still in its infancy, however this paper has provided a canvas on which to paint future business development options and increase competitiveness through the application of appropriate benchmarking techniques.

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