Summary

This paper is based on a project entitled “International Benchmarking of Value Management” funded under the EPSRC IMI programme. The paper outlines the prime objectives of the project which is to benchmark the performance of the value management methodologies described in the textbook “Value Management in Design and Construction: 2nd edition” by Kelly and Male against those practised in the UK and overseas, in order to arrive at a conclusion of best practice.

The paper supports the view that benchmarking in the construction industry is in its infancy with the majority of hard techniques being geared towards producing databases of site costs and duration of construction activity. The paper describes the first case study based exercise in determining what to measure and concludes that hard metrics are not appropriate for a subject such as value management and that soft metrics are required. Following the development of a benchmarking method using soft metrics extensive benchmarking was undertaken with value management practitioners in UK, Australia and USA. Further benchmarking is planned for Europe and Japan.

1. Introduction

The paper describes the formation of a method of benchmarking which involves distinguishing from literature those techniques which are considered “hard” as opposed to “information grazing” or “industrial tourism”. The techniques were formalised into strategies for action and bearing in mind these strategies four case studies were undertaken. This paper addresses a number of issues raised by the literature, defines the critical success factors of value management, assesses the outcome of the case study work, defines a soft metrics approach to benchmarking, and describes the extensive benchmarking undertaken with value management practitioners in UK, Australia and USA. The paper concludes with a definition of a soft metrics approach to benchmarking with an example based upon the pre-workshop activities. The paper concludes with a statement of the way forward in continually improving the value management service.
2. Benchmarking

For a definition of benchmarking Camp firstly quotes David T Kearns, Chief Executive Officer, Xerox Corporation; benchmarking is “the continuous process of measuring products, services and practices against the toughest competitors or those companies recognised as industry leaders”. Camp secondly adapts this definition to “Benchmarking is the search for industry best practices that lead to superior performance”. [Camp, 1989]

Benchmarking can be undertaken either with or without the co-operation, consent or even knowledge of the parties involved. Benchmarking products, for example computers, is an example of benchmarking which can take place without the knowledge of the party whose products are being benchmarked. In the context of benchmarking with co-operation, consent or knowledge there are three types:

- Competitive benchmarking where information is sought from a hostile competitor. This is generally considered the most difficult type of benchmarking.
- Co-operative benchmarking where knowledge is exchanged with the benchmarking partner. In this case it is generally observed that the initiator usually receives more information than they give.
- Collaborative benchmarking where there is full knowledge exchange between the parties.

In the context of value management it is anticipated that benchmarking will be either co-operative or collaborative. In selecting benchmarking partners four groups of organisation could be considered[Camp, 1989]:

- Current direct industry competitors.
- Latent competitors, including those in the same industry but not currently in your market.
- Best-in-class groups from within your own organisation.
- Best-in-class companies from other industries.

In addition to the above listed by Camp there are also:

- Best-in-class groups from within the same industry who may or may not be direct or current competitors.

This gives a useful framework within which to operate. Those relevant to this study are value management consultancies and in-house organisations operating in the construction, process and manufacturing fields. Latent competitors are not relevant immediately to this study.

Boxwell describes six basic steps to benchmarking [Boxwell, 1994]
1. Deciding what to benchmark.
2. Planning the benchmarking project.
4. Studying others.
5. Learning from the data.
6. Using the findings.

These steps will adopted for the methodology of benchmarking value management.

Robert Camp identifies ten success indicators which will ensure that a benchmarking exercise will run smoothly [Camp, 1989]:

- An active commitment to benchmarking from management.
- A clear and comprehensive understanding of how one’s own work is conducted as a basis for comparison to industry best practices.
- A willingness to change and adapt based on benchmark findings.
- A realisation that competition is constantly changing and there is a need to ‘shoot ahead of the duck’.
- A willingness to share information with benchmark partners.
- A focus on benchmarking first on industry best practices and second, on performance metrics.
- The concentration of leading companies in the industry or other functionally best operations that are recognised as leaders.
- Adherence to the benchmarking process.
- An openness to new ideas, being creative and innovative in the application of new procedures to existing processes.
- The institutionalisation of benchmarking.

It has been shown that there is a tendency to get carried away when benchmarking, it is realised that there is a limit to how much information can be collected and assimilated at one time. The whole exercise must be properly time-tabled with clear goals and deadlines, the identification of what is crucial, especially when benchmarking ‘customer satisfaction’.

Watson [1993] defines a codes of conduct which generally highlights the do’s and don’ts of benchmarking and can be summarised as follows:

- There is a real need to make sure that all information gathering is within legal limits.
- Information is fully shared with benchmarking partners and information received is kept confidential if asked to do so.
- The expectations of the exercise are to be fully understood, both within the research team and when in contact with external parties.
Honesty towards potential partners is most important.

3. Benchmarking in the Construction Industry

The growing body of management literature dedicated to benchmarking deals with good practice procedures and a generic process model that can be used as a framework for carrying out benchmarking exercises. To date, UK managers have had little experience of the technique in practice [Lema, 1995]. This position is changing with an increased awareness of the technique, though there is still a general lack of awareness of what benchmarking actually means.

Literature supports the view that there are currently a lack of benchmarking standards for construction internationally, though industry and academia have recently turned their attention to developing them. One reason put forward for this [Lema, 1995], is that the concept and principles of benchmarking are more difficult to apply to essentially project based activities and “one-off” products. In the USA the absence of any identifiable benchmarked data has stimulated researchers to compile initial data of construction activities for use by the industry [Fisher, 1995].

A common feature of the construction activities that Fisher describes as being benchmarked is their ability to be measured in terms of cost and time, therefore, fulfilling a primary requirement of objective comparability. This type of data includes, for example, actual versus authorised project cost, actual versus target schedule, actual versus estimated labour etc., all data which can be given classic statistical treatment.

4. Benchmarking Value Management

An examination of the work of Fisher above leads to the conclusion that it is not realistic to expect that meaningful external benchmarking of value management activities can be derived from this type of “hard” analysis. On the other hand the ultimate in “soft” analysis, i.e. unstructured comparisons, could be criticised as being “information grazing” or “industrial tourism” from which few firm conclusions could be drawn.

The way forward appeared, in the first instance, to lie in the stripping down of value management into its critical success factors and then examining the hard techniques which lie within each factor. The hard techniques could be realised through an examination of case studies.

Value management is defined as:

a proactive, creative, problem solving service, using a multi-disciplinary team orientated approach to make explicit the client’s value system using functional analysis to expose the relationship between time, cost and quality. Strategic and tactical decisions are audited.
against the client’s value system at targeted stages through the development of a project or
the life of a facility. [Kelly & Male, 1993]

The critical success factors can be summarised as:

- Structuring the project information
- The structured approach through the “job plan”
- The skill of the facilitator
- The team structure, skills and working relationship
- The attitude of stakeholders

The above reflects a philosophical rather than a technical approach. If this can be presented as a series of
commonly used techniques then it is thought that true benchmarking can take place. An examination of case
studies was thought to enable:

- the identification of discrete techniques displaying time and performance characteristics
- the measurement of factors such as identified activity/hour e.g. ideas/hour, ideas/£, ideas
generated/ideas implemented, savings/cost of exercise, people involved/idea recommended,
facilitator efficiency in gathering material, client satisfaction on a proved scale.

5. Benchmarking value management case studies

The following case studies are based upon an examination of completed value management reports of studies
undertaken using the Kelly and Male methodology by the authors as value management consultancy projects.
The aim of the case study investigation was to determine the extent to which value management studies could
be the subject of benchmarking. The commonality of the authorship of the method, the facilitation of the value
management workshops and the authorship of the workshop reports is a useful means of ensuring commonality
of data for an initial trial bearing in mind the following:

- the workshop reports were contemporary with the workshop and were not written to facilitate
benchmarking.
- the workshop reports were of a similar style to those of other consultants undertaking similar work.
- workshop reports are the prime source of inert data for benchmarking.

Kelly & Male [1993] have described their approach to value management with reference to levels of decision in
the project life cycle associated with different stages of the RIBA Plan of Work (extended to include a pre-brief
stage) reproduced here as figure 1.
The case studies chosen to represent value management studies at different stages in the project life cycle are as follows:

- **Project 1:** Pro-forma briefing document for a Sheriff Courthouse
- **Project 2:** Design-build project at pre bid stage for an industrial works upgrade
- **Project 3:** Pharmaceutical clinical trials unit at outline sketch design stage
- **Project 4:** Crown court at final sketch design.
The techniques used are summarised in Table 1 below:

**Table 1: Analysis of case studies**

<table>
<thead>
<tr>
<th></th>
<th>Project 1 Sheriff Courthouse</th>
<th>Project 2 Works Upgrade</th>
<th>Project 3 Clinical Trials Unit</th>
<th>Project 4 Crown Court</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre workshop</strong></td>
<td></td>
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<td></td>
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<tr>
<td>Post Occupancy Evaluation of existing building</td>
<td>•</td>
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<tr>
<td>Document analysis</td>
<td>•</td>
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<tr>
<td>Facility walk through</td>
<td>•</td>
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<td>Interviews</td>
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<tr>
<td><strong>Workshop</strong></td>
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<td>Project context analysis</td>
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<td>Function analysis</td>
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<td>Function diagram</td>
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<td>Time/cost/quality</td>
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<td>User flows</td>
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<td>Adjacency matrix</td>
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<tr>
<td>REDReSS</td>
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<td></td>
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<tr>
<td>Brainstorming (ideas generated)</td>
<td>not recorded</td>
<td>392</td>
<td>205</td>
<td>90</td>
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<tr>
<td>Judgement</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Development</td>
<td>•</td>
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<tr>
<td>Procurement choice</td>
<td>•</td>
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<tr>
<td>Presentation</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Workshop time (hours)</td>
<td>30</td>
<td>12</td>
<td>24</td>
<td>40</td>
</tr>
</tbody>
</table>

The table supports no specific conclusions. There is no correlation between ideas generated and the time spent at the workshop; time preparing pre-workshop and ideas generated nor between tasks undertaken and ideas generated. There is some correlation between the number of techniques used and workshop time and possibly between time taken, the number of techniques used and overall workshop quality although this can not be judged from the reports.
In judging the workshops, Project 4, the Crown Court, could be said to be the closest to a textbook interpretation of a value management study aided perhaps by a previous study at outline sketch design stage. Project 3, the clinical trials unit, a study undertaken at outline sketch design stage highlighted a number of logical concerns of a strategic nature mainly related to time and cost certainty coupled with a risk averse client. These issues should strictly have been addressed earlier in the project life cycle. Project 2, commissioned by the design/build contractor with the co-operation of the client, was concerned with generating as many ideas as possible and getting client feedback. The other tendering contractor was also given the opportunity of undertaking a value management exercise. Project 1, the Sheriff Courthouse, was an exercise at producing a generic brief and as such had no specific project applicability. A part of the information stage was undertaken as a Post Occupancy Evaluation of an existing Sheriff Courthouse.

6. Findings of the first stage study

The literature on benchmarking has raised a number of issues of which the following are seen to be dominant:

- identifying the critical success factors and determining which of these to benchmark
- establishing quantifiable performance metrics (defined as measurable outcomes that indicate a degree of success in achieving some value management objective.

In terms of value management the critical success factors have been established as:

- Structuring the project information
- The structured approach through the “job plan”
- The skill of the facilitator
- The team structure, skills and working relationship
- The attitude of stakeholders

However, “what to measure?” posed a dilemma. The case studies support the intermediate conclusion that the analysis of a complete value management study is unlikely to yield any benefit. This led to the speculation that the answer to this dilemma lies in the value management toolbox, in the tools and techniques themselves. Performance metrics may be determined in two ways:

1. to analyse each tool in turn to determine a characteristic time taken to achieve a pre-determined objective. This could be carried out by experimentation and yield a measurable efficiency rating.
2. to build a series of example case situations to be presented to those practising value management with a request that they chose the appropriate tool to facilitate the solution to the problem.

Both of these methods had their own attraction and formed the focus of the next stage of this study.
7. A Case Vignette Approach

A vignette is a brief but clear verbal description. A case vignette in the context of this study is a brief written description of a construction situation conducive to value management. MacPherson (1994) used a case vignette approach in his study of decision making in the design of building services systems. The proposal was made that if a number of case vignettes were developed to represent various construction project situations then these could be used with benchmarking partners to explore best value management practice.

A number of case vignettes were developed from a matrix describing projects under headings of:

- Public or privately funded
- Owner occupier or speculative (which in the latter case required a surrogate user)
- Complex- high value, complex- low value, straightforward- high value, straightforward-low value.
- High quality, low quality
- Tight time constraints, no major time constraints
- Procurement route i.e. design/build, traditional, management contract, construction management.
- The stage in the project at which the value management study was to be held.

A seminar was held to test the case vignettes involving the research team and a client representative. After extensive trials and discussion the consensus was reached that the factors which were important from a value management standpoint were:

- whether or not the client and/or user were to be present at the study and
- the stage in the project at which the study was to be undertaken:

All other factors were addressed within the value management study but did not impact the style of study. The extensive development of case vignettes was therefore abandoned in favour of two direct preliminary questions.

8. Development of a Benchmarking Methodology for Value Management

An extensive review of the benchmarking literature summarised earlier identified the following attributes of benchmarking which distinguished it from subjective comparisons, industrial tourism or information grazing:

- the identification of best in class value management practitioners and the attempt to arrange benchmarking exercises with these.
- the frank, honest and open sharing of information.
- the focusing first on industry best practice and then on performance metrics
- the respecting of confidentiality.
This is further reinforced by McGeorge and Palmer (1997) who summarise the stages of benchmarking as being:

- The analysis of own systems and methods of working and make any necessary improvements
- Look at own industry to learn the best methods and try to achieve the best practice
- Look outside of own industry to learn the best methods and try to achieve those best practices also.

The benchmarking methodology adopted for value management is based upon a soft metrics approach and synthesised from the above as follows:

Stage 1 Make explicit the value management method derived from research and used by Kelly and Male in consultancy activity.
Stage 2 Identify performance metrics
Stage 3 Identify best in class value management practitioners and make contact with these with the aim of organising a benchmarking activity.
Stage 4 Undertake benchmarking
Stage 5 Revise Kelly and Male methodology in order to reflect benefits from the benchmarking exercise. The final document becomes a best practice manual which is tested at expert seminars.

9. Application of a Benchmarking Methodology

Stage 1 - Make explicit the Kelly and Male methodology

The Kelly and Male methodology was reduced to the diagram as shown in figures 2 and 3. The diagram embodies the stages of the value management process and the techniques used by Kelly and Male in value management consultancy.

Stage 2 - Identify performance metrics

The diagram therefore provides a breakdown of the value management process into discrete performance metrics. These metrics are characterised by their capability of being described in terms of activity and an approximate time associated with the activity.

Stage 3 - Identify best in class value management practitioners

The RICS Geographic Directory identifies 78 surveying organisations which offer a value management service. From information gleaned primarily from clients of value management services, best in class organisations
Pre-Workshop (Input)

0. PRE-WORKSHOP INFORMATION
- Information Gathering
- Information Synthesis
- Agenda Production

Workshop Start

1. INFORMATION
- Project Task
  - Opening Technique
  - Function Brainstorming
- Closing Technique
  - FAST
  - Prime Functions

Briefing - O.S.D.
- Opening Technique
- User Flow Diagram
- Spatial Analysis

F.S.D.
- Elements/Components
- Closing Technique
- Select: BIVLV HULC
- Histogram of Cost
- Model + Plan

Time

3 - 4 Days

Note: O.S.D. = Outline Sketch Design stage in the project life cycle. F.S.D. = Final Sketch Design

Figure 2 Pre-workshop and first day
Figure 3 Workshop day 2 (or alternative if development outside workshop)
were identified as being two contractor based organisations and seven value management consultancies of which six were either Quantity Surveying practices or wholly owned subsidiaries of Quantity Surveying practices. Arrangements were made to undertake benchmarking in the early part of 1997.

At the same time contacts were being made in Australia, Japan, USA and Europe with the intention of identifying best in class. In the case of Australia a start was made by making reference to the New South Wales, Public Works Department’s list of approved value management practitioners and a number of benchmarking sessions were arranged before travelling to Australia. On arrival in Australia Kelly and Male made a presentation to the Institute of Value Management Australia and subsequently took advice on best in class and sought these practitioners where they were not on the original list.

A similar approach was used for the USA with the SAVE International conference in Seattle being the focus and site of 18 benchmarking exercises.

**Stage 4 Benchmarking**

In the UK two client interviews gave focus and direction towards 11 benchmarking studies of which 2 were undertaken with manufacturers. In Australia 10 studies were undertaken including 2 with national and state government representatives which also provided focus. In the USA 12 construction and 6 manufacturing benchmarking studies were undertaken. Some work has been done in Europe which presents a patchy picture of the application of value management generally and some work has been undertaken in making contacts in Japan although to date no benchmarking studies have been arranged.

**Stage 5 Application of Results**

The sorting of data gained is currently being undertaken, it is hoped to complete stage 5 before the end of 1997.

10. **Illustration of Preliminary Results**

The following is an illustration of the preliminary results from Benchmarking the metric pre-workshop information gathering. The Kelly and Male methodology requires structured information gathering by the value management facilitator(s) comprising:

- Facilities walk through, in situations where the client is proposing a building of a similar corporate style to an existing facility.
- PoE reports, the study of any post occupancy report data.
- Questionnaire, the studying of any user satisfaction surveys as appropriate.
- Stakeholder analysis, the discovery, usually in discussion with the client, of all those who will have a stake in the completed project.
Document analysis, the study of client files to map a history of the project, primarily to gain an insight into the brief which would also be studied.

Interviews, with key people who may or may not attend the value management workshop e.g. client’s project sponsor, the architect and project manager.

Presentation of the information at a pre-workshop meeting which would be held on the evening before the first day of the workshop.

The Kelly and Male methodology requires the use of two facilitators during the workshop which is generally of two or three days duration. However, normally information gathering would fall to one facilitator.

Benchmarking highlighted different approaches to this stage as follows:

- Pre-workshop meeting of the full value management team to highlight the main issues was used by three facilitators in Australia, two in the USA and four in the UK. This meeting could precede the main workshop by up to three weeks. This meeting prompted an information pack prepared by the facilitator in two cases in Australia and one case in the UK. In the USA it was common for a meeting to be held between the facilitator and the client only and/or a further meeting with the facilitator and a cost consultant. The issuing of information packs prior to the workshop was a common feature of value management studies in the USA.

- No pre-workshop activity was the preferred situation for three facilitators in Australia, three in the USA and one in the UK. The cost of such an activity in a competitive commercial environment was the most common reason for it not being undertaken.

- Some variant of the Kelly and Male approach was used by one facilitator in Australia (also nominated as best in class by other facilitators), four in the USA of which two were manufacturers and four in the UK of which one was a manufacturer and another construction organisation was considered best in class by the majority of those surveyed.

The issue of fee bidding was mentioned by the majority of facilitators with those who undertook up to three man days on pre-workshop activity stating that they could not compete on price and relied on repeat commissions.

It was noted that the Kelly and Male methodology at the pre-workshop stage was used in some form by two best in class practitioners, one in Australia and one in UK. However, the Kelly and Male methodology focused on briefing the facilitator only whereas others used the information gained to form the basis of an information pack which was circulated to the team prior to the workshop. This it was argued was an efficiency gain and allowed the team a faster entry into the workshop. The extent of the efficiency gain will be measured and if it is considered appropriate the Kelly and Male methodology will be modified.
11. Conclusion

A considerable amount of research in this project has been devoted to identifying and defining soft metrics and realising a method of their measurement. At the time of preparing this paper a Microsoft Access based database is being compiled with all of the results of the benchmarking exercises. From this database it is expected to draw a meaningful correlation between individual items of data. As a part of the benchmarking procedure complete confidentiality has been maintained, with the benchmarking partners gaining the most through an anonymous version of the full database. It is confidently anticipated that a best practice manual for value management will be available during the early part of 1998. The realisation of soft metrics and a method of benchmarking will promote continuous improvement in value management services.

12. References


