CHAPTER – 2
INTRODUCTION TO BENCHMARKING AND LITERATURE REVIEW

2.1. INTRODUCTION TO BENCHMARKING

Benchmarking is now regarded as a vital tool in the quality toolbox and the applications of benchmarking continue to grow in number and diversity as reflected in the literature. The last two decades have witnessed a surge in the quest for quality as the markets are shrinking due to stiff competition. This sustained interest on using the technique of benchmarking to improve quality has resulted in a surfeit of articles and books.

Decision-makers are constantly on the look out for new techniques, to enable quality improvement. While benchmarking, as a technique for quality improvement is not new or unknown, it has now found more subscribers, and occupies a prominent place in the action agenda. Quite often, the benchmarking concept is understood to be an act of imitating or copying. But in reality this proves to be a concept that helps in innovation rather than imitation, as stated by Thompson, et. al. (1997).

2.2. BENCHMARKING – CONCEPTS

2.2.1. A short history of benchmarking

Throughout history, people have developed methods and tools for setting, maintaining and improving standards of performance. One can trace the desire to improve performance and the actual process of improvement as far back as the early civilizations; the ancient Greeks left us with exemplary works of architecture, art and design. The Romans who built upon the achievements of both Egyptians and Greeks by developing the ability to construct bridges and roads to standardised designs. In a real sense, benchmarking is a natural evolution from principles of Quality Measurement and TQM.

The early benchmarking phase began in the late 1950s. The Japanese visited many thousands of companies round the world, mainly in America and Western Europe, specifically to absorb ideas that they could adopt and improve upon their manufacturing
processes. The Japanese investigated Western products and processes to understand their
good and bad features, and build superior alternatives at lower cost.

According to Camp (1993), benchmarking originated in the late 1970s in America
when the Xerox Corporation adopted a similar vigorous approach in 1979. During this time,
the Xerox business plummeted due to competition from Japan. Then, Xerox felt they had no
choice. Their competitors were able to sell products more cheaply than Xerox could make
them. To understand why this was, the product features and performance capabilities of
competitive machines were rigorously evaluated and Xerox was able to investigate the
practices of Fuji Xerox in Japan. The improvement opportunities that were identified and put
into place resulted in a swift turn around for Xerox's fortunes and led to Best Practice
Benchmarking becoming a central part of Xerox's business strategy. In the year 1982, Xerox
benchmarked its logistics and distribution unit against retailer L.L.Bean to improve its
warehousing and material handling operations.

In 1985, Metro Toronto Reference library in Toronto, Canada conducted the first
known library benchmarking study of its public service department. In the year 1991, the
term “benchmark” was added to the guidelines for the prestigious ‘Malcolm Balridge’ award
and benchmarking became a qualifying condition for companies aiming at this award.
Benchmarking as a research strategy emerged in the 1990s, in the business sector. The
American Productivity and Quality Center (APQC) opened its ‘International Benchmarking
Clearinghouse’ in the year 1992.

The history of benchmarking as described by Watson (1993) has been categorised
under five generations of benchmarking. The first generation was reverse engineering, which
was an engineering-based approach to product comparisons that included teardown and
analysis of technical product characteristics. The second generation was competitive
benchmarking which Xerox refined starting in 1976. This type of benchmarking went
beyond product-orientation comparisons to comparing processes with competitors. In the
1980s, the third generation of benchmarking was process benchmarking, which included
searching for best practices across industry boundaries. The fourth generation benchmarking
was strategic benchmarking; where it was used to fundamentally change the business, not
just alter the processes. Lastly, the fifth generation was global benchmarking, where
international trade, cultural and business process distinctions among companies are abridged and their implications for business process improvement are understood.

Till date, benchmarking has naturally evolved as a technique encompassing concepts of competitor and market analysis, quality improvement programmes, performance measurement and, perhaps most of all, Japanese practices.

In summary, it can be said that the origins of benchmarking, in one sense, be traced to the early method of examining products of competitors to see how they are made and how they could be made, whether the same or better.

2.2.2. Benchmarking – Meaning and definitions

Benchmarking as a Verb refers to a process of comparing agencies’ operations and performance against recognised standards and improving those operations to enhance the effectiveness.

A benchmark as a Noun refers to the numerical target or reference point for taking measures against.

This word has migrated into the business world, where it has come to mean: “A benchmark is a measured best-in-class achievement recognised as the standard of excellence for that business process”.

According to Webster’s dictionary (1990), the word benchmark has its origin from geographic surveying, where it means “A marked point of known or assumed elevation from which other elevations may be established”.

The International Clearinghouse for Benchmarking (1992) defined benchmarking as the “process of continuously comparing and measuring an organisation with business leaders anywhere in the world to gain information that will help the organisation take action to improve its performance”.

As stated by Mc Nair and Leibfried (1992), “To benchmark is to shrug off history and to embrace the future.

Andersen (1994) states the generic definition, as “Benchmarking is the process of comparing something or someone with best practice”.

Best practices are collections of activities within an organisation that are done very well and ultimately, are recognised as such by others.
According to the APQC (1997), benchmarking is “the process of identifying, understanding and adapting outstanding practices from other organisations to help an organisation improve performance”.

The core of the current benchmarking interpretation is:

- Measurement of own and the benchmarking partners’ performance level, both for comparison and for registering improvements. Comparison, of performance levels, processes, practices etc.
- Learning, from the benchmarking partners to introduce improvements in one’s own organisation.
- Improvements as the ultimate objective of any benchmarking study. Improvements encompass incremental change, major steps and innovations.

The concept of benchmarking, like TQM, has the concept of the internal business process as one of its central ingredients. The crucial internal processes of the business need to be identified, and measures and measurement points have to be established. Comparisons in processes and process performance have to be made externally, as well as internally, and process improvements need to be put in place.

In a nutshell, benchmarking is an advanced quality improvement methodology, which may be integrated into a TQM system. It is the most important contribution by the Western world to quality improvement methodology, since the foundations of quality revolution were laid by Walter A. Shewhart, Dr. Williams Edward Deming and Dr. Joseph Juran.

2.2.3. The need for External Comparisons

Today, competition is on the global level for many businesses and in many critical areas, the only sensible goals are the ‘World’s best practice’. For many other companies, competing in smaller arenas, the targets may not always be as stringent, but the need for realistic goal setting is just as important. Benchmarking is a method of making sure that the targets aimed for are relevant to market demands. The technique is equally applicable in manufacturing and service organisations.

Making comparisons with competitors is not a new idea. Acquiring data about how competitors are performing, what their product range comprises, what prices are they able to command, and perhaps their operating methods, has always been part of a businesses modus operandi. Thus benchmarking is a highly – respected proactive management tool which is
increasingly being used to identify and focus improvement activities with the goal of international competitiveness.

### 2.2.4. Benchmarking Barriers and Misconceptions

Gift, *et al.* (1994) have reported a few reasons for not conducting benchmarking. The barriers identified include:

- Lack of action
- Not involving the appropriate people (process owners)
- Not understanding that learning can happen even without inventing it.
- Lack of understanding the internal processes
- Weak leadership
- Inability to see opportunity to improve
- Organisation not promoting entrepreneurial behaviors, innovation or risk taking
- Failure to see need for change

As benchmarking emerged, an organisation that conducted any type of comparisons, such as comparing data with national norms, competitive analysis, or unstructured discussions with counterparts in other organisations, claimed it was benchmarking, as reported by Keehley (1997). A quantitative comparison of performance is only a small part of benchmarking process. An organisation needs to define the true meaning, role, and use of benchmarking in its own environment, including how it uses comparative data, as stated by Gift (1996).

Common misconceptions for benchmarking can be commonly grouped under the following:

- Benchmarking leads to rating and ranking of performance
- Participation in benchmarking is revealing trade secrets that would lead to compromising competitive advantage.
- Benchmarking leads to explicit cause-effect relationships with best practices.
- Benchmarking is a panacea.
- It is a one-time programme
- It is a reactive tool
- Benchmarking is just copying others.

In summary, benchmarking is not simply data comparison, a fad, a means for reducing resources, a quick-fix program, or consolidation of visits to different industrial establishments. Benchmarking is a means of doing business, a continuous and disciplined management process with a structured methodology.
2.3. BENCHMARKING MODELS

2.3.1. Requirements for a successful benchmarking Model

A benchmarking model should have logical flow of ideas. The attributes of the model should be clear so that people can describe it to others and the listener can understand in order to translate into action.

A benchmarking model should have the following requirements built in:

- A clear understanding of benchmarking requirements
- Identification of benchmarking team
- Use of effective project planning tools and techniques
- The model has to create a set of expectations regarding the information; how it is to be gathered, reported and used to review and adjust progress of activity.
- Identification and analysis of gaps.
- Feedback provision to take action and recycle.

2.3.2. A review of Benchmarking Models

Benchmarking is usually treated as a structured process. The structure is best provided by the development of a step-by-step model. The process models provide structure so that the user can see the benchmarking route. They provide a common process in a language understandable to all, by allowing a basic framework for successful planning and execution of a benchmarking exercise.

The literature has frequently cited benchmarking models. A few profound models have been noted for review. It is also true that every organisation will approach the benchmarking process from its own perspective and will need to customise the generic benchmarking model accordingly. A few of the models reviewed are:

- The Camp Model
- Meta-model developed by International Benchmarking Clearinghouse
- Baxter Benchmarking Model
- Spendolini’s 5-stage Benchmarking Process
- Watson Model
- Leibfried and Mc Nair Model
- Benchmarking process Model
- The APQC Model
Each of these models have exhibited benchmarking as a continuous process with successive phases being critical to the successful execution of the process. A Brief summary of these models is given in Table. 2.1.

**Table – 2.1. Summary of Benchmarking Models**

<table>
<thead>
<tr>
<th>NAME OF THE MODEL</th>
<th>STEPS/STAGES</th>
<th>REMARKS</th>
</tr>
</thead>
</table>
| a. **Camp Model** (1989) - Also called the Xerox’s 10 step model | - Planning  
- Analysis  
- Integration  
- Action | - Extremely detailed  
- Leaves no flexibility in terms of chosen procedure |
| b. **Generic “Meta-Model”** - Depicted by Andersen (1994) - Developed by International Benchmarking Clearinghouse (IBC) | - Plan  
- Collect  
- Analyse  
- Adapt/Improve | - Information given in the model is extremely limited  
- Can be structured to suit the needs of the user |
| c. **Baxter Benchmarking Model** - Developed by Baxter Corporate Consulting - Portrayed by Lenz, S., et.al. ((1994) - 15 Steps model | - Preparation Phase:  
5 Steps  
- Analysis Phase:  
10 Steps | - Model is based on the premise that the best ideas come from people who are closest to the process |
- Form a benchmarking team  
- Identify benchmarking partners  
- Collect and analyse benchmarking information  
- Take action | - A Circular model  
- Model portrays concept of ‘Recycling’ to denote the concept of continuous improvement |
| e. **The Watson – Model** - Developed by Watson (1992) - Six Steps Model | - Plan  
- Search  
- Observe  
- Analyse  
- Adapt  
- Improve | - It contains fewer steps than the Camp-model  
- Describes all steps in a complete benchmarking study |
Summary of Benchmarking Models [Contd..]

<table>
<thead>
<tr>
<th>f. The Leibfried and McNair – Model</th>
<th>g. Benchmarking Process Model</th>
<th>h. The APQC Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Model put-forth by McNair and LeibFried (1992)</td>
<td>- Plan</td>
<td>- Plan</td>
</tr>
<tr>
<td>- Identify core issues</td>
<td>- Search</td>
<td>- Collect</td>
</tr>
<tr>
<td>- Internal baseline data</td>
<td>- Observe</td>
<td>- Analyse</td>
</tr>
<tr>
<td>- External Data Collection</td>
<td>- Analyse</td>
<td>- Adapt/Improve</td>
</tr>
<tr>
<td>- Analysis</td>
<td>- Adapt</td>
<td></td>
</tr>
<tr>
<td>- Change Implement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Based on a logical sequence to the learning process that is embedded in benchmarking</td>
<td>Similar to Spendoloni’s Five State benchmarking process</td>
<td>This model is similar to the ‘meta-model’</td>
</tr>
<tr>
<td>It is more a system’s model with input / output criteria</td>
<td>Steps are similar to the Watson Model</td>
<td>Follows the ‘plan-do-check-act’ sequence</td>
</tr>
</tbody>
</table>

In summary, it can be said that models merely contributed structure and a common language for a process. These models in the literature review showed benchmarking to be a planned, formal, and structured process. Further, there should always be some flexibility built into any process or model to accommodate situational variation.

2.4. TYPES OF BENCHMARKING

Literature does not suggest consensus on the types of benchmarking. A number of authors seem to capture different categories of benchmarking. However, in general there are four types of benchmarking:

- Internal Benchmarking

Internal benchmarking means comparison of internal operations between different divisions or similar functions in different operating units within an organisation. Internal
benchmarking compares similar internal functions within an organisation, and it often serves as a pilot project for conducting external benchmarking.

- **Competitive Benchmarking**
  Competitive benchmarking compares a work process with that of the best competitor in the same market. It reveals the performance measure levels to be surpassed. Competitive benchmarking is basically benchmarking against external direct product competitors.

- **Functional Benchmarking**
  Functional benchmarking compares a work function to that of the functional leader in the same industry or cross-industry. Functional benchmarking is done with functional competitors or industry leader firms, even if the industries themselves are dissimilar.

- **Generic Benchmarking**
  This focuses on the best work processes. Instead of focusing on a company’s business practices, similar procedures and functions are benchmarked.

  Further, as reported by Zairi and Pervaiz (1999), one recent categorisation has been from the European Commission initiative that proposes three levels in benchmarking:
  - Company
  - Sectorial
  - Benchmarking of framework conditions.

Table 2.2. shows the different categories of benchmarking. It is clear that at the moment several varieties of benchmarking exist and there could be some overlapping also. However it is pertinent here to look at the categories as suggested by different authors.
<table>
<thead>
<tr>
<th>Author/s</th>
<th>Types of Benchmarking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp (1989) and Andersen (1994)</td>
<td><strong>Internal benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>Means comparison of internal operations between different divisions or similar functions in different operating units within an organisation.</td>
</tr>
<tr>
<td></td>
<td><strong>Competitive benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>Compares a work process with that of the best competitor in the same market.</td>
</tr>
<tr>
<td></td>
<td><strong>Functional/generic benchmarking</strong></td>
</tr>
</tbody>
</table>
|                          | Compares a work function to that of the functional leader in the same industry or cross-industry. Processes are compared across dissimilar organisations. Also termed “transnational” benchmarking, it is documented as assisting “processes common to most enterprises, defined in the most common way”.

<table>
<thead>
<tr>
<th>Lema and Price (1995)</th>
<th><strong>Internal Benchmarking</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is performed within one organisation by comparing similar business units or business operations.</td>
</tr>
<tr>
<td></td>
<td><strong>Competitive Benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>Is a measure of an organisation’s performance compared with competing organisations.</td>
</tr>
<tr>
<td></td>
<td><strong>Functional/Industry Benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>Is an application of process benchmarking that compares a particular business function in two or more organisations.</td>
</tr>
<tr>
<td></td>
<td><strong>Process / Generic Benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>Is used when the focus is on improving specific critical processes and operations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elmuti et. al. (1997)</th>
<th><strong>Internal Benchmarking</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benchmarking against operations. This is one of the simplest forms, since most companies have similar functions inside their business units.</td>
</tr>
<tr>
<td></td>
<td><strong>Competitive Benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>This is used with direct competitors. Performed externally. The goal is to compare companies in the same markets that have competing products/services.</td>
</tr>
<tr>
<td></td>
<td><strong>Functional/Industry Benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>This is performed externally against industry leaders or against certain companies’ bet functional operations.</td>
</tr>
<tr>
<td></td>
<td><strong>Process / Generic Benchmarking</strong></td>
</tr>
<tr>
<td></td>
<td>This focuses on the best work processes. Instead of focusing on a company’s business practices, similar procedures and functions are benchmarked.</td>
</tr>
<tr>
<td>Author/s</td>
<td>Types of Benchmarking</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------------------</td>
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</tbody>
</table>
| McGonagle (1998)   | **Internal Benchmarking**  
|                    | A firm looks within, often to other divisions or even branches for ideas for improvements. Typically the focus is on operational matters |
|                    | **Competitive Benchmarking**  
|                    | Specific Competitor-to-competitor comparison, typically stressing a key product or process |
|                    | **Shadow Benchmarking**  
|                    | This involves making competitor-to-competitor comparisons without the benchmarking partner knowing about this. |
|                    | **Industry Benchmarking**  
|                    | This method compares the benchmark item with items produced by the world’s best organisations in a general industry category. |
|                    | **Transnational Benchmarking**  
|                    | Comparison of specific processes that are the same, regardless of industry. Comparisons are typically made outside of one’s industry. |
| Zairi and Pervaiz (1999) | **Internal Benchmarking**  
|                    | Performance comparison of units or departments within one organisation |
|                    | **Competitive Benchmarking**  
|                    | Comparing specific models or functions with competitors |
|                    | **Functional Benchmarking**  
|                    | Comparison of specific function with best in industry and best in class |
|                    | **Generic Benchmarking**  
|                    | Comparison of all functions of business operations with those of best in class |
|                    | **Internal - External Benchmarking**  
|                    | Combined Internal and External Benchmarking. This is the most common used approach and is a combination of internal and external (competitive, industry and/or generic) benchmarking. |
|                    | **Process Benchmarking**  
|                    | Focus is on improving specific critical processes and operations. |
|                    | **Performance Benchmarking**  
|                    | Performance benchmarking is the collection of (generally numerical) performance information and making comparisons with other compatible organisations. |
|                    | **Strategic Benchmarking**  
|                    | Is used where organisations seek to improve their overall performance by examining the long-term strategies and general approaches that have enabled high-performers to succeed. |
Table showing different categorisations of benchmarking [Contd.]

<table>
<thead>
<tr>
<th>Author/s</th>
<th>Types of Benchmarking</th>
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<tbody>
<tr>
<td>Website*</td>
<td>Internal Benchmarking</td>
</tr>
<tr>
<td></td>
<td>Know yourself. Know your internal processes. Look within units and across units or divisions to benchmark. Looking from within ensures the easiest management of idea exchange and availability of partners, since all the information is “under the same roof”.</td>
</tr>
<tr>
<td></td>
<td>Competitive Benchmarking</td>
</tr>
<tr>
<td></td>
<td>Focuses on measuring performance against peer or competitor organizations. The goal of competitive benchmarking is to study the product designs, process capabilities, and/or administrative methods used by an organization’s competitors or peers.</td>
</tr>
<tr>
<td></td>
<td>Collaborative Benchmarking</td>
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<tr>
<td></td>
<td>This type of benchmarking involves a limited exchange of information from a consortium of organizations and usually focuses only on quantitative statistics rather than qualitative analysis.</td>
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<tr>
<td></td>
<td>Shadow Benchmarking</td>
</tr>
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<td></td>
<td>This involves making competitor-to-competitor comparisons without your benchmarking partner knowing you’re doing it.</td>
</tr>
<tr>
<td></td>
<td>Functional Benchmarking</td>
</tr>
<tr>
<td></td>
<td>This involves comparing your processes with similar, but not identical, processes within the same industry, often with industry leaders.</td>
</tr>
<tr>
<td></td>
<td>Best-in-Class Benchmarking</td>
</tr>
<tr>
<td></td>
<td>This benchmarking process involves comparing processes that are the same regardless of industry with the best-in-class organizations that are outside of your industry who have truly innovative and exemplary performance.</td>
</tr>
</tbody>
</table>

* http://spectrum.troyst.edu/~oirpe/benchmark0203042.html
In an interview to the journal ‘Management Review’ [Anonymous-1 (1994)], Juran used an interesting anecdote to describe functional benchmarking. Early in the century, some German generals decided to follow an American circus to learn about deployment. In those days, the circus performed under tents, moved from city to city in a short period of time transporting all kinds of people, animals, and gear, and were very efficient at it. The military had the same problem, moving large numbers of horses, tents, ammunition, and food. The generals conducted functional benchmarking with a circus, an operation not related to army.

2.5. BENCHMARKING – A LITERATURE REVIEW

Many authors have contributed to the literature on benchmarking resulting in more than 350 publications as of June 2002. Considering the growth of publications, some attempts have been made in the past to review the literature. However, the present attempt as a part of the research work is different from the earlier reviews and more broad based in coverage. This review of literature, covers the following objectives:

- Arranging the publications in an orderly manner to enable easy and quick search
- Classification of literature
- Scrutiny of outcome of publications
- Identifying gaps and providing hints for further research.

The review process first starts by providing a comparison among the earlier reviews on benchmarking and highlights the outcome in each case. Next, a new methodology for classifying the literature is suggested. The growth and categorisation of publications are presented in a graphical form for easy understanding.

2.5.1. Earlier Reviews of Literature on Benchmarking

It was found out during the current research that at least six literature reviews have been made in the past and all but one were studied by the authors. The different reviews in chronological order are:


Out of the six publications cited here, the fourth one namely ‘A review of benchmarking literature’, by Czuchry, et.al. (1995) was not available to the authors at the time of literature survey and hence the authors could not use the valuable information of this publication for a comparative study.

Further, a comparison among the earlier attempts to review literature on benchmarking is made using certain attributes. Outcome of the different reviews are shown in Table – 2.3.

The attributes considered for comparisons are:

- Focus and Objectives: This refers to a brief coverage of the publications in terms of the content and the applicability.
- Number and Type of Publications covered: The number of publications listed and whether they are Text Books, Journal Papers, Conference Proceedings or Periodicals.
- Review methodology: It looks at the way in which the literature has been reviewed and classified.
Table 2.3. Summary of Previous Literature Surveys on Benchmarking

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Author(s)</td>
<td>Andrew E. Jackson, Robert R. Safford and William W. Swart</td>
<td>Mohamed Zairi, Mohamed A. Youssef</td>
<td>S.N. Vig</td>
<td>Jeffrey J. Dorsch Mahmoud M. Yasin</td>
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<td>Attribute</td>
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<tr>
<td>Focus and Objectives</td>
<td>The paper provides a summary matrix approach to current benchmarking topics with an objective to reduce the task of reviewing benchmarking literature for benchmarking opportunities or academic research. Summaries of textbooks, and journal and periodical articles are included in this review.</td>
<td>The authors have concentrated on a detailed review of some of the key books written by &quot;gurus&quot; of benchmarking, with a view to help educational and training processes in companies embarking on or launching a benchmarking project. Part I: Reviews the following books: A. Benchmarking: The search for Industry best practices that lead to superior performance - Robert C. Camp B. Strategic benchmarking: How to rate your Company’s performance against the World’s Best - Gregory H. Watson C. Benchmarking: A tool for Continuous Improvement - C.J.McNair and K.H.J Leibfried.</td>
<td>This article is a bibliographical compilation of the various textbooks and literature on benchmarking. Articles and books upto the year 1994 have been included.</td>
<td>The paper provides an insight to the examples of benchmarking from the literature while determining the extent to which benchmarking has been utilised in the private sector vis-à-vis the public sector. The authors have searched the published literature relating to benchmarking in the order of their appearance upto the year 1995 using electronic databases. The review of the publications has been classified as either practitioner type or academic type, depending upon the type of journal in which the article appeared.</td>
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<td>Attribute</td>
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<tr>
<td>5 Focus and Objectives [Contd.]</td>
<td></td>
<td>Part II: Reviews the following books: A. Best Practice Benchmarking: The Management Guide to Successful implementation – Sylvia Coding B. Competitive Benchmarking: An Executive guide – Mohamed Zairi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Number of Publications Covered</td>
<td>7 Benchmarking Books 116 Papers and Periodicals 6 Analytical References</td>
<td>5 Text Books</td>
<td>96 Papers and Text Books</td>
<td>121 Articles</td>
</tr>
<tr>
<td>Attribute</td>
<td>1</td>
<td>2</td>
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<tr>
<td>7 Methodology</td>
<td>In order to provide the reader with state-of-the-art view of benchmarking literature, a summary matrix developed by benchmarking subject matter experts at the John F. Kennedy Space Center (KSC) - National Aeronautics &amp; Space Administration (NASA) and the University of Central Florida (UCF), is used.</td>
<td>A chapterwise comprehensive review of each of the book’s is followed.</td>
<td>The bibliographical index to the articles and books is provided in alphabetical order.</td>
<td></td>
</tr>
<tr>
<td>8 Conclusion</td>
<td>The paper gives a guideline for the classification of literature on benchmarking, based on the types of benchmarking and Associated issues and comments on each article in terms of these criteria.</td>
<td>The papers spell out in detail about the contents of the books reviewed in terms of the practicability and applicability of the resource material.</td>
<td>The utility of this paper is more for personnel in Libraries, for them to track on the classification of articles on benchmarking, authorwise.</td>
<td>The authors have identified, based on the review that the academic community is lagging in terms of providing and advancing models and frameworks that integrate the many facets of organisational benchmarking. The authors also spell out that most of the benchmarking know-how available is the results of practitioners’ efforts.</td>
</tr>
</tbody>
</table>
Apart from these distinguishing attributes, certain common parameters like, the Name of Publication, Author(s), Year of publication, Journal of publication are also used.

2.5.2. Preamble to Literature review

There is a proliferation of literature on the topic of benchmarking in the last 15 years, as revealed in this literature review. Considering the gamut of publications it can be said that the benchmarking technique has seen a steady growth and appears to be heading towards maturity level.

As a part of the research it was decided to classify and analyze the literature in detail. The course of action included the following steps:

- Updating the database to ensure that literature is as current as possible. The collection of literature has been reviewed till June 2002.
- For literature search, both hardcopy search in established libraries in India and electronic search in World Wide Web were made. The well-known search engines available at www.goto.com, www.altavista.com and www.google.com were specifically used to ferret the literature pertaining to benchmarking from a wide variety of sources on the internet. An honest attempt has been made to include as many publications as possible, without claiming that the listing is complete or exhaustive in nature.
- Developing a classification scheme was the next step. First a bibliographical list of all publications was developed and a file was created in Excel spreadsheet.
- The review process in a different way and is illustrated in the subsequent sections.

2.5.3. Methodology and Scheme of Review

The classification scheme proposed includes a simultaneous parallel categorization that highlights the growth of literature from time to time and also the coverage of benchmarking specific to different groups like:

1. Benchmarking: General aspects or Fundamentals

All publications under this category deal with very general and fundamental concepts of benchmarking, essentially for first time readers. Fundamentals are usually covered to a large extent particularly when the discipline is in the introduction and growth stage. This can be
confirmed by the number of publications, which appeared in the early time period of the time scale considered.

2. Benchmarking - Specific Applications and Case Studies
People are more interested to know about applications and success stories. Therefore this should be a useful group. Under this categorisation, all literature dealing with applications specific to manufacturing and non-manufacturing sectors are shown.

3. Benchmarking – Innovations / Extensions / New Approaches
When the technique reaches a saturation stage in terms of its popularity, novel approaches and innovations start appearing in the literature. This category is considered to recognise and appreciate the novel approaches or paradigm shifts in benchmarking techniques or its applications.

4. Benchmarking – Applicable to education sector
This category is specially included here for the benefit of academicians and also forms a major aspect of the present research.

It is understandable that a very strict demarcation in the categorisation is not possible since there may be certain overlaps in the publications analysed.

A Pareto diagram of the number of publications in different categories is given in Figure – 2.1.

Legend:
Category-1 → Benchmarking; General/Fundamentals/Models
Category-2 → Benchmarking; Specific Applications / Case Studies
Category-3 → Benchmarking – Innovations and Extensions / New Approaches
Category-4 → Benchmarking – Education

Figure – 2.1. A Pareto diagram of the number of publications in different categories
All the publications in the categories described earlier have further been coded based on the chronological appearance of the article, for the convenience of the readers. The first code in the form a number from 1 to 4, refers to the categories 1 to 4 illustrated above. Coding has been done from 1980 onwards, since the concept of benchmarking emerged during the 1980s. Also, the time interval for the first category is taken as 10 years.

This is adopted, since the number of publications during the first ten years are not many. Publications after 1990 have been categorised on a time interval of two years. Thus, the time periods are represented as “a” (ten years: January, 1980 – December, 1989), “b” to “h” (two years each; January, 1990 to January, 2002). This time based coding is displayed in Table – 2.4.

Table – 2.4. The coding pattern for classification based on time of publication

<table>
<thead>
<tr>
<th>Category</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-a</td>
</tr>
<tr>
<td>2</td>
<td>2-a</td>
</tr>
<tr>
<td>3</td>
<td>3-a</td>
</tr>
<tr>
<td>4</td>
<td>4-a</td>
</tr>
</tbody>
</table>

As an example, the article, ‘Measuring the Unmeasurable’ by Brisley (1983) is coded under 1-a. This means the publication was made during January 1980-December 1989 and it deals with Category – 1, namely “Fundamentals of Benchmarking”. Similarly, a publication coded under 4-c means the publication came out during January 1992-December 1993 and is related to Category – 4, “Benchmarking Education Sector”.

Similarly, all the publications, based on this coding pattern, are identified in Table – 2.5, by their serial number as given in the bibliographical list.
<table>
<thead>
<tr>
<th>CODE</th>
<th>ORDER IN THE BIBLIOGRAPHICAL INDEX</th>
</tr>
</thead>
</table>
### Categorisation of all publications [Contd.]

<table>
<thead>
<tr>
<th>Category 2 ➔ Benchmarking: Specific applications/case studies</th>
</tr>
</thead>
</table>
Categorisation of all publications [Contd.]

<table>
<thead>
<tr>
<th>Category 2</th>
<th>Benchmarking: Specific applications/case studies [Contd.]</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Category 3</th>
<th>Benchmarking: innovations and extensions/new approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-a</td>
<td>Lewis et al. (1985)</td>
</tr>
<tr>
<td>3-b</td>
<td>-</td>
</tr>
<tr>
<td>3-f</td>
<td>Anderson and Moen (1999), Bhattacharjee (1999), Kumar et al. (1999), Madu and Hua (1998), McNamee and Greenan (1999), O’Dell et al. (1999)</td>
</tr>
<tr>
<td>3-h</td>
<td>Jeffcoate et al. (2002), Sharif (2002)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 4</th>
<th>Benchmarking: Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-a</td>
<td>-</td>
</tr>
<tr>
<td>4-b</td>
<td>-</td>
</tr>
<tr>
<td>4-c</td>
<td>Shafer and Coate (1992)</td>
</tr>
<tr>
<td>4-g</td>
<td>Fiekers et al. (2000), Jackson (2001), Wan Endut et al. (2000)</td>
</tr>
<tr>
<td>4-h</td>
<td>Laugharne (2002), Shaw and Green (2002)</td>
</tr>
</tbody>
</table>

2.5.4. Observations and Comments

In this review, 384 publications in total are analysed for the purpose of providing insights to the growth and development of benchmarking concept. These publications include specific papers in national/international journals, and conferences. Other articles such as exclusive reports in newsmagazines, newsletters, special columns and editorials are left out as the authors feel that they deal with general information in a limited manner.
Similarly books written on benchmarking are also omitted from the review. Further, 170 publications belong to general aspects or fundamentals of benchmarking, 166 papers pertain to specific applications/case studies in benchmarking, 27 publications come under innovations/extensions/new approaches in benchmarking and finally, 21 publications fall under the category of benchmarking applicable to education sector.

As seen in Figure-2.1., almost half of the publications speak about the general aspects of benchmarking. Often it is mentioned in literature that the benchmarking concepts were initiated during 1989, after Xerox publicized it. At this point, it is worthwhile to note that attempts to use this concept were made first, in the year 1983-1984 as indicated by Brisley, (1983). In terms of its application in the industry, Guilmette and Carlene (1984), explore the utility of benchmarking in employee training whereas Lowis, et. Al. (1985), illustrate this concept as a viable tool for computer performance evaluation during the year 1985. It is also interesting to note that, as publicized by Subramanian (1984) certain interfirm comparisons were made in the Asian region as early as in the year 1984.

Regarding the application of benchmarking concepts to industry and service sectors, published literature started appearing in a noticeable way only after the 1980’s. The contributions in the form of technical papers on general aspects of benchmarking are maximum in number during the period 1992 – 95. This is probably due to the initial curiosity and interest generated on the topic. Thereafter there has been a decline, as seen in the chronological listing of publications number-wise in the line graph in Figure – 2.2.

In the sample of literature collected it is seen that there are 166 papers, specific to the category “Benchmarking – Specific application / Case studies”. Regarding Case Studies group, it is observed that one of the first applications, namely benchmarking of purchasing activities was done in the year 1983 as reported by Drozdowski, (1983). Subsequently many case studies have been conducted in the manufacturing sector and also in the service sector. Even here, the number of publications during 1993 –99 are maximum and there after there is a decline.
This suggests that the concept has been applied successfully to almost all functional areas. Table – 2.6, shows the application of benchmarking to different functional areas.

**Table – 2.6. Different functional areas covered by various authors**

<table>
<thead>
<tr>
<th>Specific Areas of Application of Benchmarking</th>
<th>Order in the Bibliographical Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banks</td>
<td>Mukherjee et al. (2002), Wendel (1993)</td>
</tr>
<tr>
<td>Career Management</td>
<td>Epperheimer (1997)</td>
</tr>
<tr>
<td>Change Management</td>
<td>Clarke and Manton (1997)</td>
</tr>
<tr>
<td>Different functional areas covered by various authors [Contd..] :</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Specific Areas of Application of Benchmarking</td>
<td>Order in the Bibliographical Index</td>
</tr>
<tr>
<td>Core Competencies</td>
<td>Per and Hollensen (2001)</td>
</tr>
<tr>
<td>Credit Function</td>
<td>Chung (1993c), Gamble (1993)</td>
</tr>
<tr>
<td>Employee Attitudes</td>
<td>Bracken (1992)</td>
</tr>
<tr>
<td>Facility Management</td>
<td>Johnson (1992)</td>
</tr>
<tr>
<td>Food and Drinks Industry</td>
<td>Mann (1998)</td>
</tr>
<tr>
<td>Hotel Services</td>
<td>Min and Min (1996, 1997), Morey and Dittman (1995)</td>
</tr>
<tr>
<td>Law Courts</td>
<td>Buscaglia (1997)</td>
</tr>
<tr>
<td>Library</td>
<td>Shaughnessy (1993)</td>
</tr>
<tr>
<td>Logistics</td>
<td>Cavento (1988)</td>
</tr>
<tr>
<td>Marketing</td>
<td>Gable <em>et al.</em> (1993)</td>
</tr>
<tr>
<td>Operational Performance</td>
<td>Voss and Blackmon (1997)</td>
</tr>
<tr>
<td>Pre-project Planning</td>
<td>Hamilton and Gibson (1996)</td>
</tr>
<tr>
<td>Purchasing</td>
<td>Drozdowski (1983)</td>
</tr>
</tbody>
</table>
Different functional areas covered by various authors [Contd..] :

<table>
<thead>
<tr>
<th>Specific Areas of Application of Benchmarking</th>
<th>Order in the Bibliographical Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Performance</td>
<td>Mann <em>et al.</em> (1998)</td>
</tr>
<tr>
<td>Safety Management</td>
<td>Relihan (1997)</td>
</tr>
<tr>
<td>Sales Forecasting</td>
<td>Mentzer <em>et al.</em> (1999)</td>
</tr>
<tr>
<td>Spare Parts Logistics</td>
<td>Le Sueur and Dale (1997), Pfohl and Ester (1999)</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>Nacker (1997)</td>
</tr>
<tr>
<td>Travel Management</td>
<td>Bell and Morey (1994)</td>
</tr>
<tr>
<td>World Class Manufacturing</td>
<td>Owen (1992)</td>
</tr>
</tbody>
</table>

It can be seen in Figure – 2.2 that under the category of “Benchmarking Innovations and New Approaches”, the number of publications increased from 4 in 1990-91 to 38 in 1992-93. However, 1999 onwards there appears to be a drop in the number of publications.

Here, the paper by O'Dell, *et.al.* (1999) is worth mentioning since the paper details the applicability of benchmarking in analysing how organisations seek to incorporate various knowledge management approaches into their business. Also, the paper by Guimaraes, *et. al.* (1994) speaks about the relationship between overall company innovativeness and company performance. They also point out that benchmarking innovation involves developing a plan, which include dimensions of innovation success: seeking, evaluating, using and fostering innovation.

Another new approach to benchmarking has been highlighted by Fuller, (2000), where the use of benefit curves for benchmarking processes has been extensively discussed. Similarly, the paper by Featherman, (2000) uses uncertainty modeling as a component of benchmarking, which is a new approach towards benchmarking.

Among the 8 papers reviewed under the "Benchmarking-New Approaches" category, it is worthwhile to mention the coverage of two papers. First one by McNamee, *et.al.* (1999) reports about the Competitive Analysis Model, a new approach to strategic benchmarking of small firms. The second one by Talluri, *et.al.*, (2001) describes some geometrical equations that will help analyse benchmarking data.
Finally, in the category dealing with “Benchmarking in Education”, 21 papers have been reviewed. These papers deal with benchmarking of management education, engineering education, schools and student relations.

2.5.5. Critical View on Review of Literature

A scrutiny of the publications show that several aspects of benchmarking along with many interesting and diversified applications, have been covered in sufficient detail. These publications can serve a great deal towards quality improvement. Thus academicians, practitioners and researchers have a good number of sources in the form of more than 300 articles to study, discuss and debate over many aspects of benchmarking.

The present review of literature on benchmarking, carried out as a part of on-going research, has identified certain issues which have not been satisfactorily addressed or not been addressed at all. These issues can be regarded as inadequacies and they offer scope for further research and exploration. The issues identified are as follows:

a. Cost aspects of benchmarking

The overall cost incurred in carrying out a benchmarking exercise needs to be established, say in terms of cost models or cost equations. This would enable the decision-makers to decide upon financial commitment before embarking on the benchmarking exercise. Further it would allow to estimate the return on investment, and to convince the top management. While a precise model is difficult, because of variability of factors involved, an approximate method would be quite useful.

b. Duration of benchmarking exercise

Guidelines regarding setting up of a timeframe for conducting benchmarking are not available. If a method can be described to decide upon the total time involved in benchmarking exercise, it would prove very helpful in setting targets and deadlines.
c. Human Resources in benchmarking activities
Rationale behind formation of cross-functional benchmarking teams, identification of tasks of benchmarking teams, and responsibility sharing among benchmarking teams, have not been discussed in sufficient detail. The human role in benchmarking activities needs to be clarified in complete depth to ensure better teamwork in a benchmarking project.

d. Selecting benchmarking partner
Selection of partner or superior performer, their duties and responsibilities, legal and business aspects are to be further elaborated. Sometimes, the superior performer as recognised in terms of market leadership or achievements/success rate, may not be willing to disclose the business practices. This could be a major deterrent in the benchmarking process. Further best practices followed in a certain successful organisation may not necessarily be the best when adopted by other organisations. Eventually, success rate may also significantly differ across organisations.
References - Exclusive to literature survey
(Not a part of main references which appear at the end)

30. Biesada, A., (1991), “Benchmarking: as competition is heating up, so is the search for world class performers”, Financial World, September, 17, pp. 28-32
164. HRFocus, (1993), “The benchmarking boom”, HRFocus, Vol.70, No.4, pp.5-7


314. Sillyman, S., (1992), “Guide to benchmarking resources - Benchmarking is a tool to help improve processes and thus improve end products and services”, *Quality*, March, pp. 17-18