

BENCHMARKING FOR PERFORMANCE IMPROVEMENT

- A CASE STUDY IN RAILWAY BUSINESS

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ABSTRACT

Since the successful experience of Xerox in 1989, Benchmarking has gained its increasing popularity and prominence in the commercial world as a tool of business performance improvement. A major driving force for that is growing competition and rising customer expectations. Most leading companies have done Benchmarking. Moreover, a number of Benchmarking models have been developed by various professional bodies and companies. The benefits realised from such kinds of exercises were both at strategic and operational level. In fact, Benchmarking can contribute its value to both process improvement and strategic planning. Moreover, Benchmarking should be used together with other modern management practices like Business Process Re-engineering, Total Quality Management, Learning Organisations and so on, to generate the maximum benefits to the practising organisation.

Even the public sector like railway companies have recognised the need to perform Benchmarking, particularly under the increasing public pressure for improved service quality and cost-effectiveness. MTRC in Hong Kong is faced with a similar situation to that in the 1990s. In response to threats from the external environment, the MTRC management has taken a proactive step to form a Benchmarking consortium with metro companies from over the worldwide. An agreed set of key performance indicators were developed among the participants of the exercise. Data were collected and then compared, analysed. Encouraging results were generated as valuable insights were gained in the ways to achieve superior performance. Special Process Benchmarking case studies were also triggered. Even though MTRC was found to be the best in most of the areas, it did identified two areas of weaknesses that were worth further investigation. Special Process Benchmarking case studies were also triggered. One of them was conducted by a participant with MTRC, to learn the way that MTRC attain its good service quality. The findings of the studies revealed detailed operational practices, cultural factors that contributed to MTRC's success. Other than that, the establishment of a performance measurement system for metros has been invaluable to the participants.

The successful experience has lead the participants to make it a long-term exercise. Moreover, new participants may be introduced. A number of factors have contributed to its success, examples are reciprocity of participants, analogy of business nature, well-defined performance measurement and validity of information. However, a carefully selected implementation approach is required to realise the benefits of the exercise to business performance. The typical critical factors are composition of implementation team, top management enforcement and middle management support.

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CHAPTER I

INTRODUCTION

Corporate Profile

Company Background

The Mass Transit Railway Corporation (MTRC) was established in 1975 for the principal purpose of constructing and operating, on prudent commercial principles, a mass transit railway system, having regard to the reasonable requirements of the public transport system of Hong Kong.

In conjunction with railway construction, the Corporation has led in joint venture developments of key residential and commercial properties above stations and depots, manages completed estates, retains commercial property for investment and seeks commercial development from available assets and liabilities.

It also involved in studies, involving engineering evaluation, financial appraisal and transport planning, on the possible provision of new railway lines to meet the future public transport requirements of Hong Kong.

A chairman and seven executive directors, who report to a Board made up of leading local business personalities and Government representatives, oversee the day-to-day operation of the railway. The Corporation employs a total of more than 7,000 staff. They are guided in their daily activities by three Core Values aimed at ensuring excellent performance and motivation, namely “Customer Service”, “Respect for Individual”, and “On Time and Within Budget”.

System Information

The system operated by the Corporation was constructed at a cost of HK\$26 billion, and consists of three lines, the Kwun Tong Line, Tsuen Wan Line and the Island Line. Each was built at separate times with the first passenger trains starting operation in late 1979.

The overall route length of the system is 43.2 kilometres, and there are 38 stations. Three depots for train stabling and maintenance support the system.

The system has been designed to provide a safe, reliable and efficient service to passengers. The stations and trains are air-conditioned to provide an acceptable underground environment in Hong Kong’s high temperature and oppressive humidity during the summer.

Free movement of boarding and alighting passengers is aided by five sets of automatically operated double-leaf sliding doors, on either side of each rail car. At the busier stations in peak periods, Platform Assistants are employed to aid station staff and passengers in ensuring the prompt dispatching of trains to timetable.

An automatic fare collection system helps speed passengers through the system. A majority of passengers uses Octopus – a stored value contactless smart card as opposed to single journey tickets. Octopus can also be used for other transportation devices e.g. Kowloon-Canton Railway, Kowloon Motor Bus.

Banking and shopping facilities have been provided throughout the system for additional passenger convenience.

Performance-related indices and targets for all operational and maintenance activities are systematically used to measure achievement and encourage improvements in providing customer service throughout the railway.

Operating Information

Passenger numbers per weekday currently total over 2.3 million, making the railway one of the most densely utilised per track kilometre in the world. This ridership, supported by efficient automatic train control and ticketing systems, the use of energy control devices

and attention to staff numbers and their deployment has enabled the railway to become one of very few underground mass transit railways in the world to make an operating profit.

The high daily passenger load of 53,200 per route kilometres of rail line making Hong Kong's MTR one of the most densely utilised railway in the world. The heavy daily passenger loading on Hong Kong's MTR results from the routing of the three lines through the densely populated residential and commercial areas of Hong Kong Island, Kowloon and the coastal corridor to Tsuen Wan.

During the peak periods, with each train loaded to its 2,500-passenger capacity, the interval between trains is less than 2 minutes and dwell times on stations are approximately 30 seconds.

Benchmarking – A Historical Overview

Benchmarking has developed to be one of the hottest topics of quality management in recent decades. It differentiates itself from traditional target setting methods of management by establishing operating targets and productivity programs based on industry best practices that led to superior performance. It has been proved to be a very powerful tool of gaining competitive advantages in the modern business world.

Watson¹ used a 5 Generation Model to describe the historical development of Benchmarking:

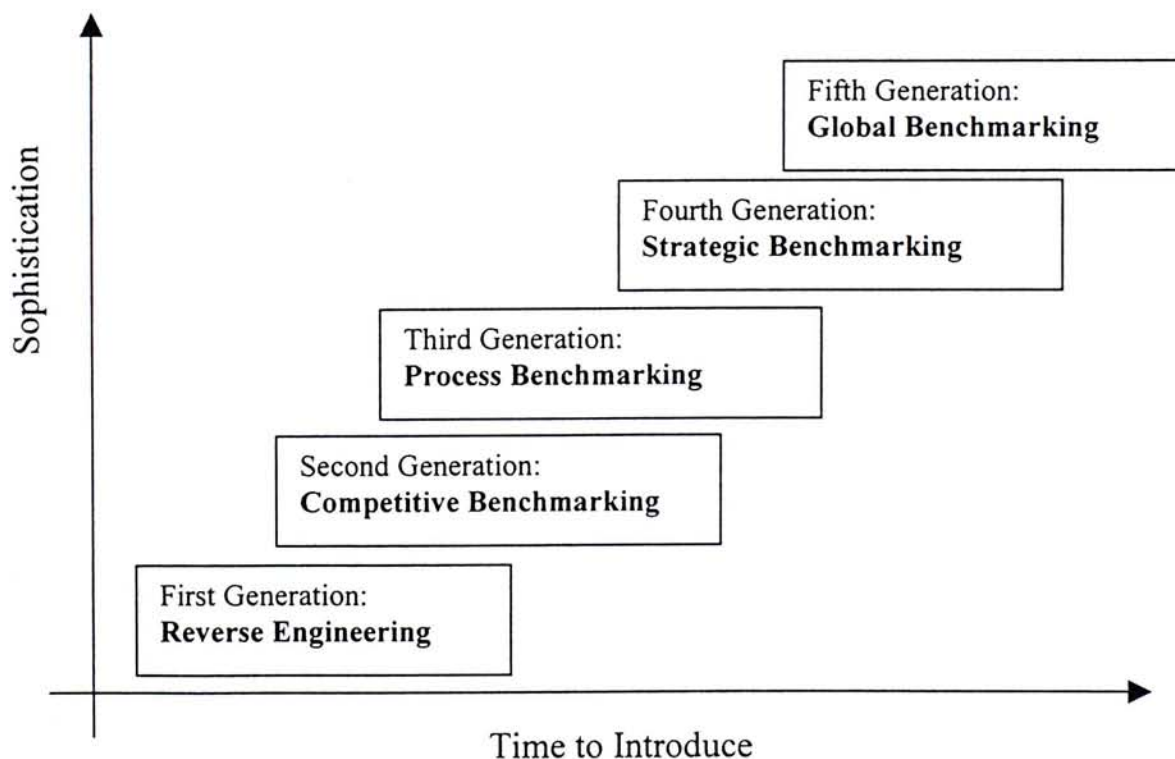


Figure 1 – A Historical Overview of Benchmarking

¹ "Strategic Benchmarking – How to Rate Your Company's Performance against the World's Best" of Gregory H. Watson pg 5-8

First Generation – Reverse Engineering

In the first generation, comparisons of product characteristics, functionality, and performance were made with similar products for services from competitors. Reverse Engineering, which tends to be a technical, engineering-based approach to product comparisons, includes teardown and evaluation of technical product characteristics. As an illustration of the emphasis in this area, 1990 had published about 800 articles in which Benchmarking was listed as a key word. These articles were almost entirely in the fields of civil engineering or product comparisons for performance of software or hardware.

Second Generation – Competitive Benchmarking

The experience of Xerox in 1979 marked the Second Generation of Benchmarking. A process called Competitive Benchmarking was initiated in Xerox Manufacturing Operations to examine its unit manufacturing costs. Competitive Benchmarking differs from Reverse Engineering in that it compares market-oriented features to evaluate the relative capabilities of the competitive product offerings. Selected product comparisons were made. Operating capabilities and features of competing copying machines were compared and mechanical components torn down for analysis. These early stages of Benchmarking were called quality and feature comparisons. Comprehensive Benchmarking was formalised with the analysis of copiers produced by the Xerox

Japanese affiliate, Fuji-Xerox, and later other Japanese manufactured machines. These investigations confirmed the substantially higher U.S. manufacturing costs. When the manufacturing cost was completely analysed it revealed that competitors were selling machines for what it cost Xerox to produce them. U.S. manufacturing quickly shifted to adopt these externally set benchmark targets to drive its business plan. Because of manufacturing's success in identifying competitor's new processes, new manufacturing components, and costs of manufacturing, senior management directed that Benchmarking be performed by all business units and cost centres. Benchmarking was visualised as the process of understanding customer requirements, and employee involvement was viewed as the process by which Benchmarking would be implemented. Prior to Benchmarking, most unit cost and other targets for asset management and customer satisfaction were set internally by using standard budgeting procedures with adjustments for some assumed level of productivity and judgements about what would satisfy customer needs. This process was essentially a projection of past practices into the future.

Third Generation – Process Benchmarking

The third generation of Benchmarking developed during 1982-1988, as more quality leaders recognised that they could learn more easily from companies outside their industry than from competitive studies. Companies that compete have natural boundaries beyond which they will not (and cannot, because of trade restrictions) share process information. These boundaries and restrictions do not apply for companies that are not

direct competitors. The absence of any information-sharing restriction has led to a shift that has broadened Benchmarking applications: instead of targeting only competitors, they target companies with recognised strong practices independent of the industry.

However, this shift also required more in-depth knowledge of the similarities among businesses that may appear greatly different on the surface, in order to understand how to apply lessons learned across these industry boundaries. Such Process Benchmarking is based on the development of analogies between the business processes at two or more companies. For example, Xerox formed an analogy for the shipment of copier products by using the L.L. Bean process for shipment of fishing boots and equipment, in order to have a useful result from its study of the order fulfilment process.

Fourth Generation – Strategic Benchmarking

The fourth generation of Benchmarking is defined by Watson as strategic Benchmarking: a systematic process for evaluating alternatives, implementing strategies, and improving performance by understanding and adapting successful strategies from external partners who participate in an on-going business alliance. Strategic Benchmarking differs from Process Benchmarking in terms of the scope and depth of commitment among the sharing companies. James Staker, director of the Strategic Planning Institute's Council on Benchmarking, observes that strategic Benchmarking is "using Benchmarking to fundamentally change the business, not just tweak processes. In this sense, strategic Benchmarking is a learning process that helps to feed process reengineering.

Fifth Generation – Global Benchmarking

The final generation of Benchmarking lies in a global application where international trade, cultural, and business process distinctions among companies are bridged and their implications for business process improvement are understood.

Development of Benchmarking in MTRC

Local Benchmarking

Since 1990s, the corporation has been engaged in a number Benchmarking exercises with local companies. Examples of areas covered included IT functions, Purchasing functions etc. Dedicated internal function or external consultancy conducted most of those exercises. Most of those exercises were competitive Benchmarking with firms from various industries. Moreover, MTRC has been one of the members of the Hongkong Benchmarking Clearinghouse, an independent body founded some large companies of Hong Kong to conduct and promote Benchmarking. Through such a channel, MTRC can regularly meet with other big companies to share knowledge and experience in Benchmarking.

International Benchmarking

In early 1995 five of the world's leading heavy metro railways, including MTRC, formed a Benchmarking consortium to compare each system's key performance indicators. A research unit of transport studies of a university was chosen to carry out the study. This marked the start of International Benchmarking of MTRC. The objectives of the Benchmarking consortium were:

- To build a system of measures which could be used to indicate standards of performance
- To provide information that could be used at the Board level and exchanged with stakeholders to measure performance against other similar metro systems
- To provide measurements of efficiency that could be used by managers to gauge performance and indicate areas for improvement on a priority basis

Core sets of indicators, which materially affect service quality, reliability, asset utilisation or profitability, were selected jointly by participants for evaluation of best business practices. By continuous comparison on those sets of core performance indicators among them, the participants identified best performer and investigated into the causal relationship with the business practice. Process Benchmarking projects on specific business areas were also initiated and conducted. The results of the exercise were found to be mutually beneficial to the participants.

The Benchmarking exercise has gone through Phases I, II and now proceeded into Phase III, with each phase focusing on different areas of the railway business.

Purposes of the Research

The purposes of the research project are outlined as follows:

- To investigate how Benchmarking can be applied as a tool to secure advantages in both a strategic and operational level
- To identify and summarise the critical factors of success for Benchmarking based on the MTRC experience
- To made constructive recommendations for the Benchmarking companies to sustain and optimise the effectiveness of Benchmarking

CHAPTER II

METHODOLOGY

The following methodology is undertaken by the project:

Literature review

Important references on the subject of Benchmarking were carefully reviewed to acquire an adequate theoretical and conceptual foundation. References include journal articles and publications by important experts or writers in the subject area. Such a step enabled the student to obtain a thorough understanding about the basic definition, objectives and types of Benchmarking, the standard approach of conducting a Benchmarking exercise, and areas that are crucial to successful results.

Information gathering

There are basically 2 main sources of information:

- Company publications and financial reports related to Benchmarking experience of MTRC

- Interviews with key management staff involved in the Benchmarking exercises.

Consultations will be made on their experience and opinions on applying the tool to improve performance of the company

Note: Owing to confidentiality concerns, the exact performance data of Benchmarking participants will not be shown on the project report.

Review and analysis

The Benchmarking processes and results of the company were described in a systematic manner. The International Benchmarking consortium process was viewed as a real-life illustration of Benchmarking. One of the real-life Process Benchmarking initiated by the consortium was also depicted. More importantly, it is critically reviewed to evaluate its accomplishments with reference to the theoretical and conceptual foundation.

Discussions and Conclusions

Based on the real-life experience acquired by the company, specific discussions and conclusions will be made on evaluating the success or failure of the exercise. Specific recommendations will also be made for optimising the benefit from Benchmarking.

CHAPTER III

LITERATURE REVIEW ON BENCHMARKING

Definition of Benchmarking

Robert C. Camp, who wrote the first book² on the subject based on the Xerox experience, provided a working definition of Benchmarking as:

Benchmarking is the search for industry best practices that lead to superior performance.

Since then, many definitions have been proposed for Benchmarking, but one developed at APQC by the International Benchmarking Clearinghouse (IBC) Design Steering Committee represents a consensus among some 100 companies (Watson 1993³):

Benchmarking is a systematic and continuous measurement process; a process of continuously measuring and comparing an organisation's business processes against business leaders anywhere in the world to gain information which will help the organisation take action to improve its performance.

² Robert C. Camp 1989. *Benchmarking – The search for industry best practices that lead to superior performance*. ASQC Quality Press pg 12

³ Gregory H. Watson 1993. *Strategic Benchmarking – How to Rate Your Company's Performance against the World's Best*. John Wiley and Sons, Inc. pg 3

This definition answers the typical questions of what Benchmarking is, how it is to be performed, with whom comparison is to be made, and of what use the information is to the organization. These qualities make it a more suitable working definition than one offered by Camp (1989). The business process, in this definition, is to be interpreted to incorporate products, processes and services.

Why Benchmarking?

According to Camp (1989), Benchmarking is a goal-setting process: it is a means by which the practices needed to reach new goals are discovered and understood.

Benchmarking legitimizes goals and targets by basing them on realistic and external orientation. The main benefits engendered by Benchmarking are:

- ❑ More adequately meeting end user customer requirements;
- ❑ Establishing goals based on a concerted view of external conditions;
- ❑ Determining true measures of productivity;
- ❑ Attaining a competitive position;
- ❑ Becoming aware of and searching for industry best practices.

In addition to Camp, various writers have pointed out the advantages of Benchmarking. Lema & Price (1995)⁴ also mentioned that Benchmarking aims at ensuring that the best practices are followed in an ever-changing environment. It involves investigating practices inside and outside the industry for incorporation into a company's own operations. The philosophy of Benchmarking could be summarized as:

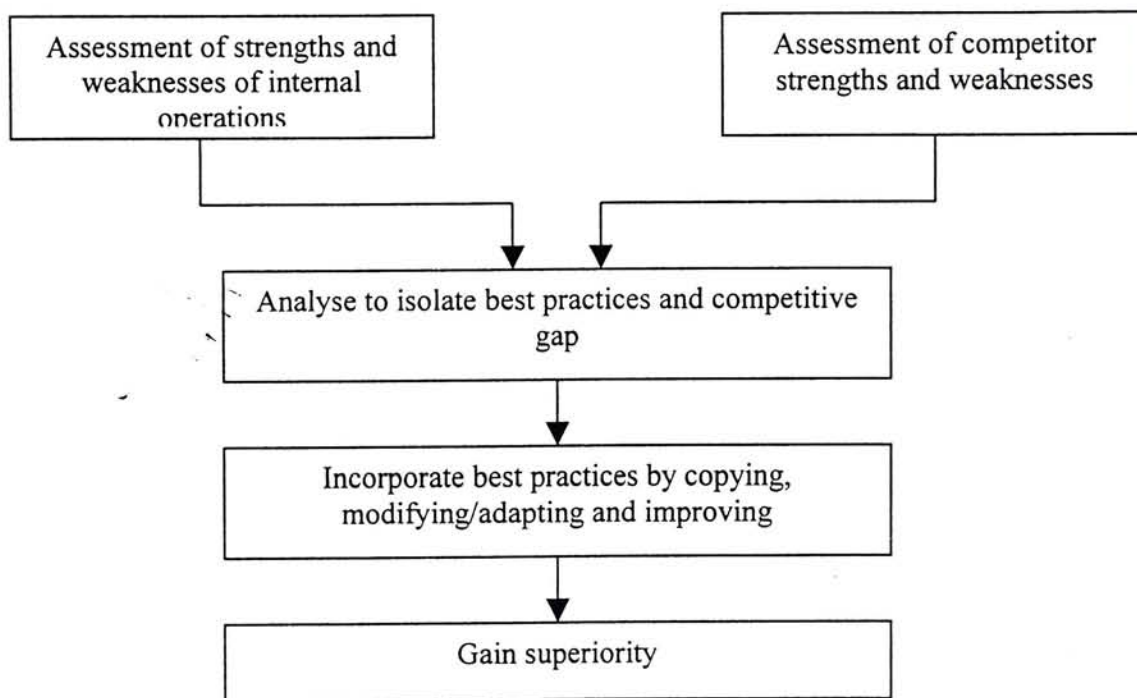


Figure 2 - Basic Philosophy of Benchmarking

This gave a good explanation to the philosophy of Benchmarking: to identify and learn the best practices. However, one thing they may have omitted is that competitors are not the only source of best practice. The real best practices may be from other industries. Usually, there are common processes among different industries e.g. customer service

⁴, N.M.Lema and A.D.F. Price(1995). *Benchmarking: Performance Improvement Towards Competitive Advantage*. Journal of Management in Engineering/January/February 1995

and the best practices may exist in one of the industry. Another advantage is that non-existence of competition may promote the willingness to share information. In fact, the successful Benchmarking experience of Xerox with L.L. Bean was a cross-industry exercise, which should fall into the category of Functional Benchmarking as discussed in subsequent paragraphs.

A conference⁵ held in 1990 by the National Institute of Standards and Technology, which administers the Malcolm Baldrige National Quality Award, recognised the following achievements of the Baldrige Award winners:

- Customer service response time has been reduced by an order of magnitude
- Defect levels have been reduced by an order of magnitude
- Productivity has been doubled
- Costs have been reduced by 50%

Juran attributed such achievements to the establishment of “stretch goals”, such as:

- Tenfold quality improvement in four years
- Fourfold improvement in reliability
- 12-month reduction in the product development

⁵ J.M. Juran(1991). *Strategies for World-Class Quality*. Quality Progress/March 1991.

Such quality goals could not be met using the pedestrian pace of the ordinary learning curve. One way to accomplish such “Stretch goals” was Benchmarking, which set goals based on results already achieved by world leaders in similar activities. The fact that companies have achieved such results proved that it could be done.

Karlof and Ostbolm(1993)⁶ also attempted to explain the success of Benchmarking by viewing it within the context of differences between a planned and free market economy: They viewed the existing market economy as being only partially exposed to market forces. The majority of organisations internal activities and operations in a free-market economy operate under conditions of a planned economy where they are not exposed to market pressures. The value of Benchmarking is that it provides an opportunity to open up these activities and operations to the pressures of market forces. When this concept is viewed within the context of the TQM philosophy, Benchmarking is seen as a perfect vehicle to ensure that the customer gets the best quality under competitive conditions that ensure lowest prices. Thus the three key roles that Benchmarking plays are to:

- Widen the competition base by exposing internal organisational processes to external market forces
- Accelerate the TQM process and therefore increase efficiency by providing the opportunity to learn from others, adopt, and improve
 - Act as a tool for co-operation to improve overall industry performance

Types of Benchmarking

Different authors have different suggestions on such a subject. For example, as mentioned by Lema & Price(1995)⁷, there are at least 5 different ways of classification.

The main stream of classification follows those suggested by Camp(1989)⁸:

Type of Benchmarking	Source of Best practice information	Type of partnership	Remarks
Internal Benchmarking	Internal operations within same company	Internal	Help focus on critical issues that may be referred to for external Benchmarking Help define scope of an external study
Competitive Benchmarking	Direct competitors within same industry	External and Competitive	Need to concern on comparability (e.g. similar company size) May encounter difficulties in obtaining proprietary and competitive information
Functional Benchmarking	Any leading firm in particular function/process(maybe in dissimilar industry)	External and Non-competitive	Need to concern on comparability (e.g. customer expectations, product characteristics) Easier to obtain interest for the investigation and share data More potential in uncovering innovative practice
Generic Benchmarking	Firms with same function/process but belong to different industry	External and Non-competitive	Potentially reveal the best of the best practices, hence highest long-term payoff Require broad conceptualisation but careful understanding of generic process

Table 1 – Different types of Benchmarking

⁶ Karlof, B. and Ostholm. S.(1993). *Benchmarking: A signpost to excellence in quality and productivity*. John Wiley & Sons.

⁷ N.M. Lema and A.D.F. Price(1995). *Benchmarking: Performance Improvement Toward Competitive Advantage*. Journal of Management in Engineering/January/February 1995.

The last 3 types of Benchmarking are all External Benchmarking: comparison with similar or identical organisations elsewhere. The potential level of payoff increases from top to bottom due to larger selection base of best practices.

Camp's definitions and illustrations seemed to focus on operational processes and business functions. This might be due to the successful experience of Xerox in such an area. In fact, function/processes are just one of the factors of success of a company. Other "soft" features like culture, policy, strategy issues, organisational structure and so on are also influential to a company's performance. The essence of Benchmarking is "learning the best practices", and hence should not be limited to the level of business operations. Watson(1993)⁹ gave a broader scope to Benchmarking by introducing another type of Benchmarking not mentioned by Camp: Strategic Benchmarking - where an organisation benchmarks its process for determining strategy and policy by comparing it with those of other organisation. Many companies make the mistake of failing to anticipate market trends and competitive moves from a strategic level that could continue to keep them active players in their industries. Watson also defined Strategic Benchmarking as the application of Process Benchmarking techniques and methods to the development of an increased understanding of strategic business issues, with the co-operation of companies that participate in long-term business alliances. In such a context, strategic issues like developing core competencies to sustain competitive

⁸ Robert C. Camp 1989. *Benchmarking – The search for industry best practices that lead to superior performance*. ASQC Quality Press pg 60-65

⁹ Gregory H. Watson 1993. *Strategic Benchmarking – How to Rate Your Company's Performance against the World's Best*. John Wiley and Sons, Inc. pg 3

advantages; creating a learning organization for better responsiveness to the external environment etc. will be dealt with.

In fact, other writers have other ways of categorising Benchmarking. For example, Karlof and Ostblom(1993)¹⁰ suggested three categories: Internal, External and Best Practice Benchmarking. As suggested by Lema & Price (1995)¹¹, Benchmarking has not been a widely recognised tool until the '90s. As a result, the current classifications of types of Benchmarking are inconsistent and confusing, implying room for standardisation.

Benchmarking and other modern management concepts

Benchmarking and Total Quality Management

According to Lema & Price (1995), Total Quality Management(TQM) has been one of hottest issues in North American management circles, and it is the process of gaining a firm foothold in Western Europe over the last decade. BS7850("Total" 1992) defines total quality management as management philosophy and company practices that aim to harness the human and material resources of an organisation in the most effective way to achieve the objective of the organisation. Lema & Price also mentioned that such an objective can only be achieved through management involvement at all levels, continuous

¹⁰ Karlof, B. and Ostblom. S.(1993). *Benchmarking: A signpost to excellence in quality and productivity*. John Wiley & Sons. pg 8-12

¹¹ N.M. Lema and A.D.F. Price(1995). *Benchmarking: Performance Improvement Toward Competitive Advantage*. Journal of Management in Engineering/January/February 1995.

improvement of products, services and processes, education and training of employees and participation of all employees in problem solving. The critical elements of TQM initiatives have been recognised as customer focus, employee involvement, continuous improvement and innovative leadership. According to Lema & Price, Benchmarking can accelerate the TQM journey by setting goals of performance, processes and products not only against the best in class among their competitors but also against the best in class for a particular function.

Balm(1996)¹² also mentioned that Benchmarking should become an integral part of an overall TQM system, as evidenced by its increasing prominence in the criteria for winning the Malcolm Baldrige National Quality Award. The TQM definition of vision, mission, critical success factors, etc., helps prioritise what to benchmark first and which gap analysis metrics are more important for comparison than others. The Benchmarking tool can then be used with other continuous improvement tools such as process analysis and project management to set strategic direction, set goals and efficiently achieve them.

Note: The Malcolm Baldrige National Quality Award is an annual award to recognise U.S. companies that excel in quality management and quality achievement. The award promotes an awareness of quality as an increasingly important element in competitiveness; an understanding of the requirements for quality excellence; sharing of information on successfully quality strategies; and the benefits derived from implementation of these strategies. The award is managed by the National Institute of Standards and Technology(NIST) and administered by the American Society of Quality Control(ASQC).

Benchmarking and Learning Organisations

Watson(1993)¹³ defined Learning Organisations as the type of organisation that learn to become adaptable to changing environments and be continuously monitoring and responding to changes in their environment. More importantly, learning has replaced control to become the axial principle of organisations in '90s. Benchmarking could, as he suggested, facilitate learning: a company that benchmarks will learn about improvements that can be applied to its own organisation. One important point about Benchmarking is that it is not just about conducting a study or making a measurement; it implies a bias for action, which is also fundamental to a learning organisation.

Karlof and Ostblom(1993)¹⁴ coined the term "Benchlearning", as a process of training and leadership development process which should run parallel to, and thus accompany, the process of Benchmarking. By that they mean:"...creating an environment which rewards constant learning with better performance and, in consequence, with greater success". According to Karlof and Ostblom, this can be achieved in six stages:

- Having the will and courage to gain insight.
- Finding out what is known about the subject and by whom.

¹² Gerald J. Balm(1996). *Benchmarking and gap analysis: what is the next milestone*. Benchmarking for Quality Management and Technology, 1996

¹³ Gregory H. Watson 1993. *Strategic Benchmarking – How to Rate Your Company's Performance against the World's Best*. John Wiley and Sons, Inc. pg 81

¹⁴ Karlof, B. and Ostbolm. S.(1993). *Benchmarking: A signpost to excellence in quality and productivity*. John Wiley & Sons. Pg 180-187

- Acquiring information and absorbing knowledge.
- Internalising and pooling experience to cement knowledge.
- Codifying successful behaviour and changing the work process.
- Training skills; apply knowledge and proficiency.

Karlof and Ostblom illustrated the mutual enhancement of the 2 processes as follows:

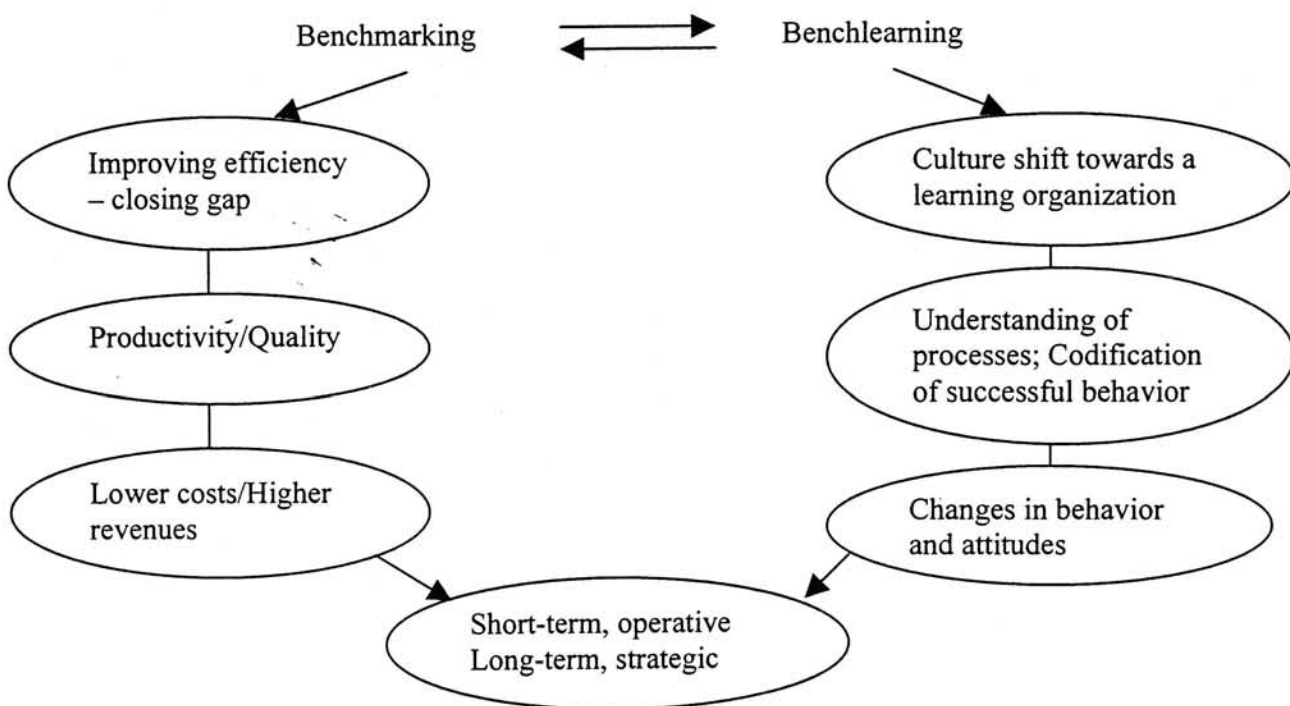


Figure 3 - Benchmarking and Benchlearning

Watson(1993) seemed to emphasize the role of Benchmarking in development of the learning organisation. However, his idea seemed to be incomplete: a learning organisation requires much more than Benchmarking. For example, employees also need to learn from other colleagues by information sharing. Employees also need to be motivated to learn. The internal environment is also a crucial factor to establishing a learning organisation. Karlof and Ostblom(1993) seemed to be better, as he also

mentioned the need of leadership development and behavioural change of staff. Pedler, Burgoyne and Boydell¹⁵ gave a most complete picture on that. They outlined a set of essential elements that model a learning organisation:

- *A learning approach to strategy*: policy and strategy formation process consciously structured for learning.
- *Participative policy making*: all members of the organisation together with key stakeholders have a chance to contribute and participate in policy making.
- *Informating*: information widely available to front-line staff in order to empower them to act on their own initiative.
- *Formative accounting and control*: systems of budgeting, reporting and accounting structured to assist learning for all members about how money works in the business.
- *Internal exchange*: all internal units see themselves as customers and suppliers in a supply chain to the end user or client, contracting with and learning from other units is normal.
- *Reward flexibility*: alternatives and both monetary and non-monetary rewards to cater for individual needs and performance.
- *Enabling structure*: roles, departments, organisation charts and even procedures and processes are seen as temporary structures that can easily be changed to meet job, user or innovation requirements.

¹⁵ Mike Pedler, John Burgoyne, Tom Boydell. *The Learning Company – A strategy for sustainable development*. The McGraw Hill Companies. pg 15-17

- *Boundary workers as environmental scanners*: environmental scanning is carried out by all people who have contacts with external parties e.g. customer, supplier etc.. Processes are in place in bringing back the information into the company.
- *Inter-company learning*: through joint ventures and other learning alliances, the organisation learns from other companies and meets with them for mutual exchange.
- *A learning climate*: all managers see their primary task as facilitating company members' experimentation and learning from experience.
- *Self-development opportunities for all*: resources and facilities for self-development are made available to all members.

Benchmarking was defined as a kind of Inter-company learning, which is only one of the characteristics of a learning company. Equally important, other elements like organisational structure, reward system, control processes are all needed to be designed to support a learning organisation. The mindset and behaviour of employees must be aligned with such an ideal, which will help to sustain long-term competitiveness of the company.

Benchmarking, Total Quality Management and Learning Organisations

Mohamed (1997)¹⁶ stated that bridging the gap against competitors requires not only imitating or copying the best in class, but also doing it better than they do. Learning, therefore, is an essential ingredient of the Benchmarking process. He envisioned a relationship among 3 main variables in order for the Benchmarking process to mature and advance a “science”. The 3 variables are “learning, quality and Benchmarking. This relationship is depicted as follows:

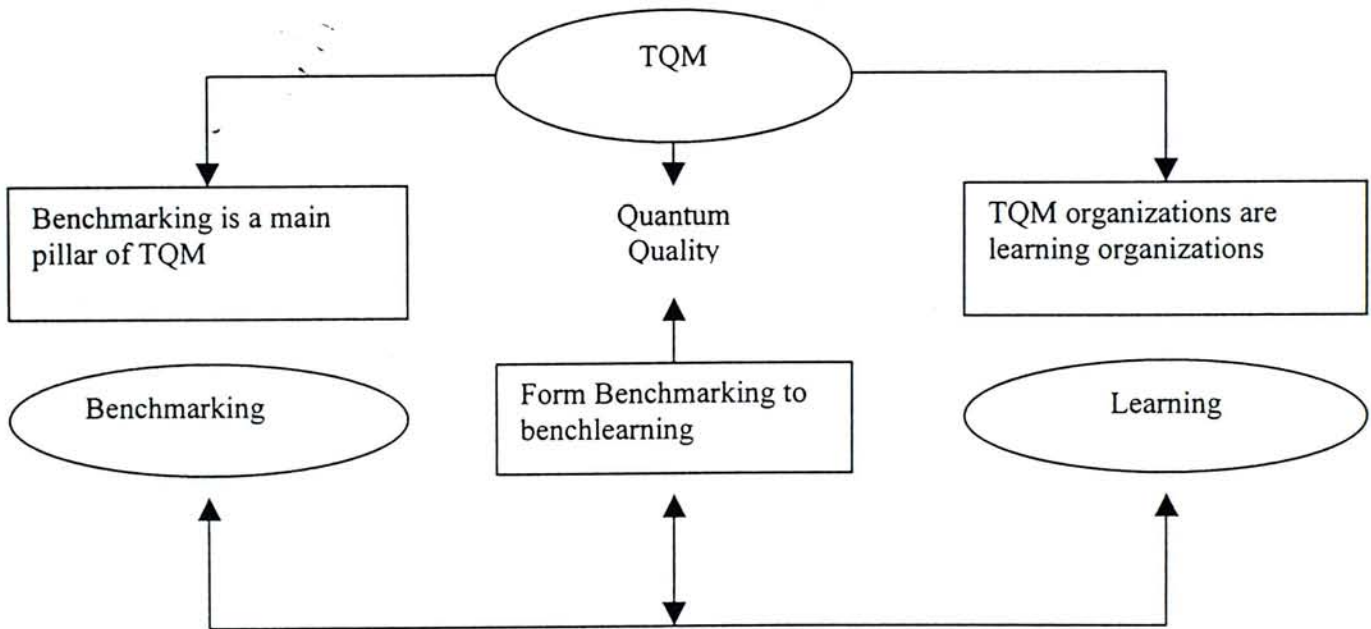


Figure 4 – Relationship between Benchmarking, Quality and Learning

¹⁶ Mohamed A. Youssef(1997). *Editorial*. Benchmarking for Quality Management & Technology Vol.4 No.1 1997.

Benchmarking and Business Process Re-engineering

Business Process Re-engineering, as defined by Hammer and Champy¹⁷ as “The fundamental re-thinking and radical redesign of processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service and speed.” Re-engineering usually entails challenging and re-designing the existing business processes, organisational structures, management systems, and values of an organisation to breakthrough business performance.

Various writers seemed to suggest that Benchmarking and Business Process Re-engineering may work together to achieve organisational change. As suggested by Goldsmith, Grinyer and Brokers(1995)¹⁸, Benchmarking can contribute to Business Process Re-engineering in 2 areas:

- Setting objectives and priorities: Benchmarking may help to identify areas where the company is inferior to its Benchmarking partner, allowing it to home in on the priorities for radical change in its own process. Moreover, as the benchmarks are based on performance of existing companies, it helps to set realistic and believable, but stretched goals for the re-engineering team to attain.

¹⁷ Michael Hammer & James Champy(1994). *Reengineering the Corporation – A Manifesto for Business Revolution*. Harper Business. Pg 32

¹⁸ Hilary Goldsmith and Madeleine Grinyer. Knowledge Brokers(1995). “A joint effort”. Best Practice November 1995

- Re-designing the process: Benchmarking may act as an important source of creative input for the re-engineering team to re-design the process. Most importantly, such input comes from organisations with different histories, market or industry imperatives compared to the company. This helps to generate breakthrough ideas of re-designing the existing business processes.

In fact, Adam and VandeWater(1995)¹⁹ even viewed Benchmarking as a tool to accelerate Business Process Re-engineering by setting “world-class” performance targets while also identifying breakthrough opportunities for achieving these targets. Moreover, quantum performance improving may be achieved through adapting best practices of recognised excellent organisations.

Vice-versa, Business Process Re-engineering is also viewed as an important tool of accomplishing the new Benchmarking goals²⁰. For example Hammer proposed a set of rules of Re-engineering:

- Organise around outcomes, not tasks
- Have those who use the output of the process perform the process
- Subsume information-processing work into the real work that produces the information

¹⁹ Paul Adam and Richard VandeWater of the Westinghouse Productivity and Quality Center(1995). “*Benchmarking and the Bottom Line: Translating Business Re-engineering into Bottom-Line Results*”. Industrial Engineering/February 1995.

²⁰ “*The Benchmarking Management Guide*”. American Productivity & Quality Center. Pg 143

- Treat geographically dispersed resources as though they were centralised
- Link parallel activities instead of integrating their results
- Put the decision point where the work is performed, and build control into the process
- Capture information once and at the source.

These may help in removing the remnants of the old process that are no longer required, thus facilitating the implementation of action plans for breakthrough improvements to meet new Benchmarking goals.

Benchmarking and Strategic Planning

Since the 1960s, there has been a dramatic increase in the attention paid to strategy formulation concepts among academics and practitioners. Although there are minor differences in the definitions, there is general agreement that “strategies” describe the general direction in which an organisation plans to go to attain its goals. Strategic Planning process takes these goals and strategies as given and seeks to develop programs that will implement the strategies efficiently and effectively. Every well-managed organisation has strategies, although they may not be stated explicitly.

In the strategic planning process, the role of senior management is to develop a long-range perspective of the organisation’s direction and guide the organisation in that direction by negotiating the goals of the organisation with middle management and reviewing the performance of the implementation teams. While management sets the

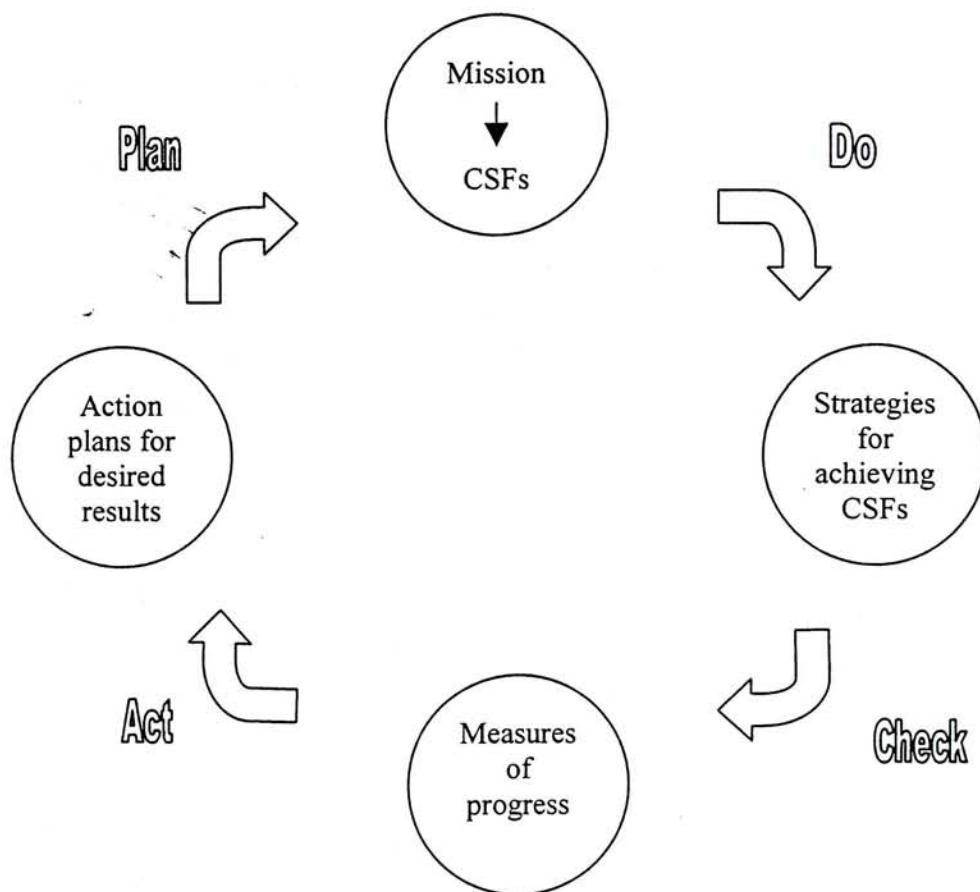
objectives, each level of the organisation participates in the execution. Through the review process the teams provide input for the next level of objective setting.

Strategic Benchmarking was described by Watson(1993)²¹ as the way Benchmarking can be used to contribute to the strategic planning process. Watson mentioned that Strategic Benchmarking follows a similar approach to Benchmarking of operational processes except that the scope is different. The issues addressed by Strategic Benchmarking are: building core competencies that will help to sustain competitive advantage; targeting a specific shift in strategy, such as entering new markets or developing new products; developing a new line of business or making an acquisition; and creating an organization that is more capable of learning how to respond in an uncertain future because it has increased its acceptance of change. Companies are selected for Benchmarking because of their key business process knowledge and performance indexes can serve as a basis for establishing challenging, yet realistic and achievable goals. It can be observed that Strategic Benchmarking places more emphasis on knowledge and learning as the major source of competitive advantage, rather than on conventional means such as new technology, range of products and services. In other words, the impact of the application is more for changing attitudes, behaviors and raising commitment through better education, awareness and inspiration from model companies.

²¹ Gregory H. Watson 1993. *Strategic Benchmarking – How to Rate Your Company's Performance against the World's Best*. John Wiley and Sons, Inc. pg 33-37

Zairi(1995)²² also suggested that Strategic Benchmarking contribute to Strategic Planning in the following ways:

Linking goal development to continuous improvement: Strategic Benchmarking ensures that , but following the Benchmarking process, goal development and deployment is dynamically managed through a closed loop process:



Note: CSFs = Critical Success Factors

Figure 5 – Model of Strategic Benchmarking

²² Mohamed Zairi 1995, "Driven by strategy". The Best Practice/July 1995.

Linking goal deployment to process management: By measuring the internal strengths and performance outcomes against other standards in order to develop stretch goals and achieve bigger leaps in competitiveness. Strategic Benchmarking ensures that:

- Goals are not deployed in isolation from the process
- Capability of the process is raised at the strategic level
- Performance measurement becomes a corporate-wide activity
- The focus is on the dynamics of the processes(practices) and not just the outcomes(absolute measures)

To ascertain that, measurement activity on a continuous basis is required to ensure that processes are improved to the expected level as well as; targets and objectives are achieved.

Besides, Zairi also proposed a prioritisation methodology to ensure that the focus of Benchmarking activity is on the core aspects of the business, the impact from benefits derived is closely linked to strategic intentions, and by focusing on the “vital few” resources will not become an issue:

- Determine the order of criticality of business processes through a series of set questions and very much linked to the Critical Success Factors(CSFs), and an appropriate rating for each process. Examples of such areas are System, product and service delivery, People satisfaction, Supplier partnerships, etc.

- Determine the ease of Benchmarking each process, once again through a set number of questions and an appropriate rating.
- Relate the strategic importance of each process to the ease with which they can be benchmarked.

The best projects for strategic Benchmarking are those which are high on strategic impact but also easy to carry out.

Regarding the application of Benchmarking in the area of strategic planning, some writers, however, seemed to have other opinions. For example, Edwin Artzt, the chairman of P&G expressed his view on the limitation of TQM tools including Benchmarking in 1992²³:

“.....I realised that there is a limitation to what total quality can do for a company and that there are differences in the way artists practice, regardless of whether a company is a prize winner or not. The limitation is in the area of strategy: total quality does not guarantee that companies will produce winning strategies. Winning strategies have to come from the minds of the leaders and be augmented by input from the troops. Total quality ensures the success of a winning strategy and sustains the success, but it doesn't automatically solve strategic problems.....”

²³ Karen Bernowski 1992. *“Carry on the P&G Tradition”*. Quality Progress/May 1992

“.....The reason why very successful total quality companies were successful is that they had good management vision and good strategies in addition to their commitment to quality.....”

Porter(1996)²⁴ explored such an issue in a more in-depth way. He distinguished Operational Effectiveness(OE) from Strategy. According to him, OE means performing similar activities better than rivals perform them. It refers to any number of practices that allow a company to better utilise its inputs by, for example, improving efficiency, reducing defects in products or developing products faster, etc..

Strategic positioning, in contrast, means performing similar activities in different ways. Difference in OE is an important source of differences in profitability among competitors because they directly affect relative cost positions and levels of differentiation.

Porter used *Productivity Frontier* to illustrate the concept:

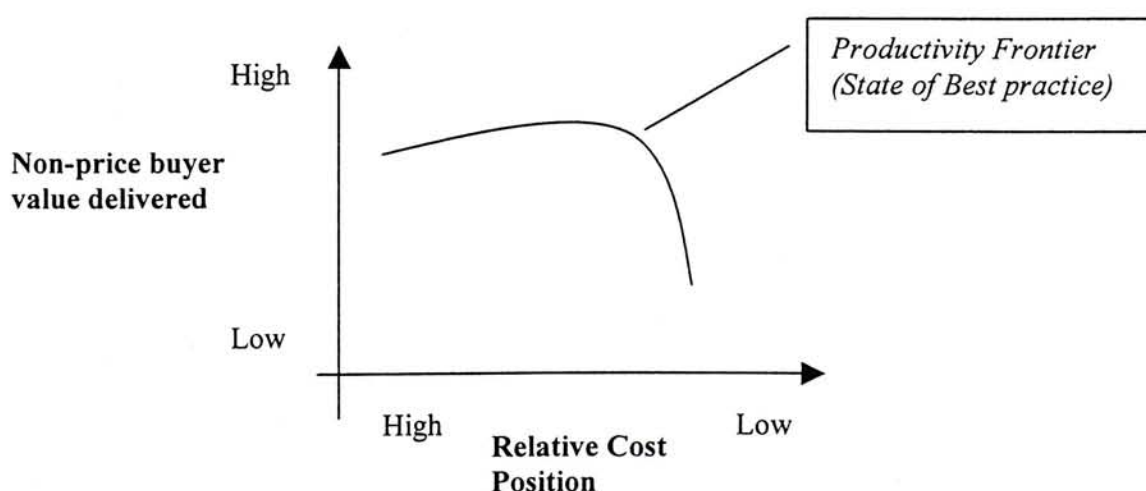


Figure 6 - The Productivity Frontier

²⁴ Michael E. Porter 1996. "What is Strategy". Harvard Business Review/November-December 1996

Productivity Frontier constitutes the maximum values that a company can deliver at a given cost, using the best available technologies, skills, management techniques, and purchased inputs. The concept may apply to individual activities, to groups of linked activities such as order processing and manufacturing, and to an entire company's activities. Through programs such as TQM, time-based competition, and Benchmarking, companies may improve their OE and shift towards the productivity frontier. However, constant improvement in OE is not sufficient due to rapid diffusion of best practices: competitors can quickly imitate management techniques, new technologies, input improvements, and superior ways of meeting customer needs. This implies that the companies become more and more homogeneous and alike, implying ultimately a diminishing return by continuous improvement in OE. If managers let OE supplant strategy, the result is zero-sum competition, static or declining prices, and pressures on costs that compromise companies' ability to invest in the business for the long term. Porter viewed that OE and Strategic Positioning are both essential to superior performance, which, after all, is the primary goal of any enterprise. But the 2 work in very different ways. Competitive strategy is about deliberately choosing a different set of activities to deliver a unique mix of value.

Strategic Positioning may be achieved by the following ways:

Variety-based positioning:- producing a subset of an industry's products or services. It makes economic sense when a company can best produce particular products or services using distinctive set of activities;

Needs-based positioning:- serving most or all the needs of a particular group of customers. It arises when there are groups of customers with differing needs, and when a tailored set of activities can serve those needs best;

Access-based positioning:- segmenting customers who are accessible in different ways. Access can be a function of customer geography or customer scale – or of anything that requires a different set of activities to reach customers in the best way.

To evaluate the contribution of Benchmarking to strategy planning, we should make a more in-depth inquiry into the strategic planning process, which consists of 2 stages: External Analysis and Internal Analysis²⁵. External Analysis is the analysis of external environment by the company, enabling them to identify opportunities and threats. It was believed that, for a company to succeed, either its strategy must fit the environment in which the company operates or the company must be able to reshape this environment to its advantage through its choice of strategy. The main technique used to analyse the industry environment is the Five Forces Model by Michael E. Porter. The five forces are:

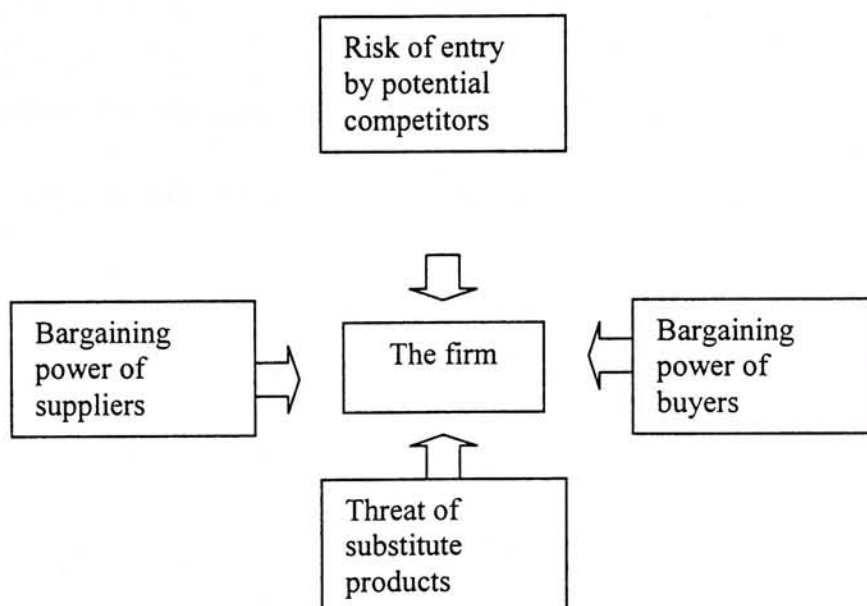


Figure 7 – Porter's Five Forces Model

The stronger each force, the more competitive the industry and the lower the rate of return that can be earned. The next part of strategic planning is Internal Analysis: where a company try to achieve competitive advantage, the building blocks of which are efficiency, quality, innovation and customer responsiveness. In such a stage, a company needs to pursue strategies that build on the existing resources and capabilities of an organisation and it needs to formulate strategies that build additional resources and capabilities. It is such a stage that Benchmarking can make most contribution to. It can through such an exercise that a company may learn the best practice in achieving competitive advantages: efficiency, quality, innovation and customer responsiveness. The technique of Strategic Benchmarking can be applied on the processes that are key to such performance areas. For example, the process of maintaining updated understanding about customer expectations and satisfaction should be a key process to customer

²⁵ Charles W.L. Hill and Gareth R. Jones. *Strategic Management – An Integrated Approach*. Houghton Mifflin Company. pg 69-140

responsiveness. Moreover, Benchmarking should aim at codifying and learning the practices that help it exceed the best performer eventually.

However, writers like Porter did have correctly pointed out that Benchmarking is not the complete solution to strategic problems. For example, we still need to perform External Analysis to understand the external market structure. A successful strategy should help a company to change the market structure to a position favourable to it: to reduce competition and monopolise specific market segment by proper positioning. As mentioned by Porter, this involves trade-off and doing something not easily imitated by others. This should also requires creativity and vision that are not bounded by existing practices.

The Benchmarking Code of Conduct

The American Productivity & Quality Centre's International Benchmarking Clearinghouse (APQC IBC) and the Strategic Planning Institute (SPI) Council on Benchmarking has jointly developed a Benchmarking Code of Conduct²⁶, which summarises the protocol of Benchmarking – the set of conventions prescribing correct etiquette and procedures to be used in conducting Benchmarking studies. It defines the collaborative efforts that mark the behavioural interactions between Benchmarking partners. Basically, it encompasses the following 9 principles:

- Principle of Legality:* Never conduct any discussion or actions that may imply a restraint of trade, market and customer allocation schemes, price-fixing, dealing arrangements, bid rigging or bribery, acquisition of trade secrets, or disclosure of proprietary information.
- Principle of Exchange:* Never ask for any type of information or data that your own company would be reluctant to share with another.
- Principle of Confidentiality:* Never disclose anything learned about a Benchmarking partner to another company without the Benchmarking partner's expressed permission.
- Principle of Use:* Never use Benchmarking as a means of advertising, marketing or selling.
- Principle of First-Party Contact:* Never initiate Benchmarking contacts with the partner's process owners through channel other than the designated Benchmarking contact at the specific company.
- Principle of Third-Party contact:* Never share the names of company's Benchmarking participants with other companies requesting contacts, without first gaining permission to do so

²⁶ Gregory H. Watson 1993. *Strategic Benchmarking – How to Rate Your Company's Performance against*

from those persons as well as from the
Benchmarking contact person.

Principle of Preparation:

Never contact a prospective Benchmarking partner
without performing sufficient preparatory work.

Principle of Completion:

Never make any commitment to a Benchmarking
partner if you are not certain you will be able to
follow through in a timely and propitious manner.

Principle of Understanding and Action:

Never start a Benchmarking study without
gaining explicit understanding and
agreement as to how both your company and
your partner company would like to have
information treated and handled.

A sample of Benchmarking Code of Conduct is shown in Appendix 1. The principles were intended to serve as a complete, structured guidelines for appropriate behaviour in Benchmarking. It needs to be understood that advice of legal counsel should still be sought whenever there is doubt existing as to the propriety of sharing information among companies. Indeed, different industries, because of their historical development, are much more susceptible to concern about information sharing and antitrust violations than others may be.

Such a Code of Conduct codifies a set of standard behaviour that, well properly followed, may protect the interests of companies involved in Benchmarking. It helps to ensure that Benchmarking exercises were done for the pure purpose of comparing performance and importing best practices.

The Benchmarking Process

Different companies have adopted different models to benchmark. For example, the model adopted by Xerox, the pioneer of Benchmarking was:

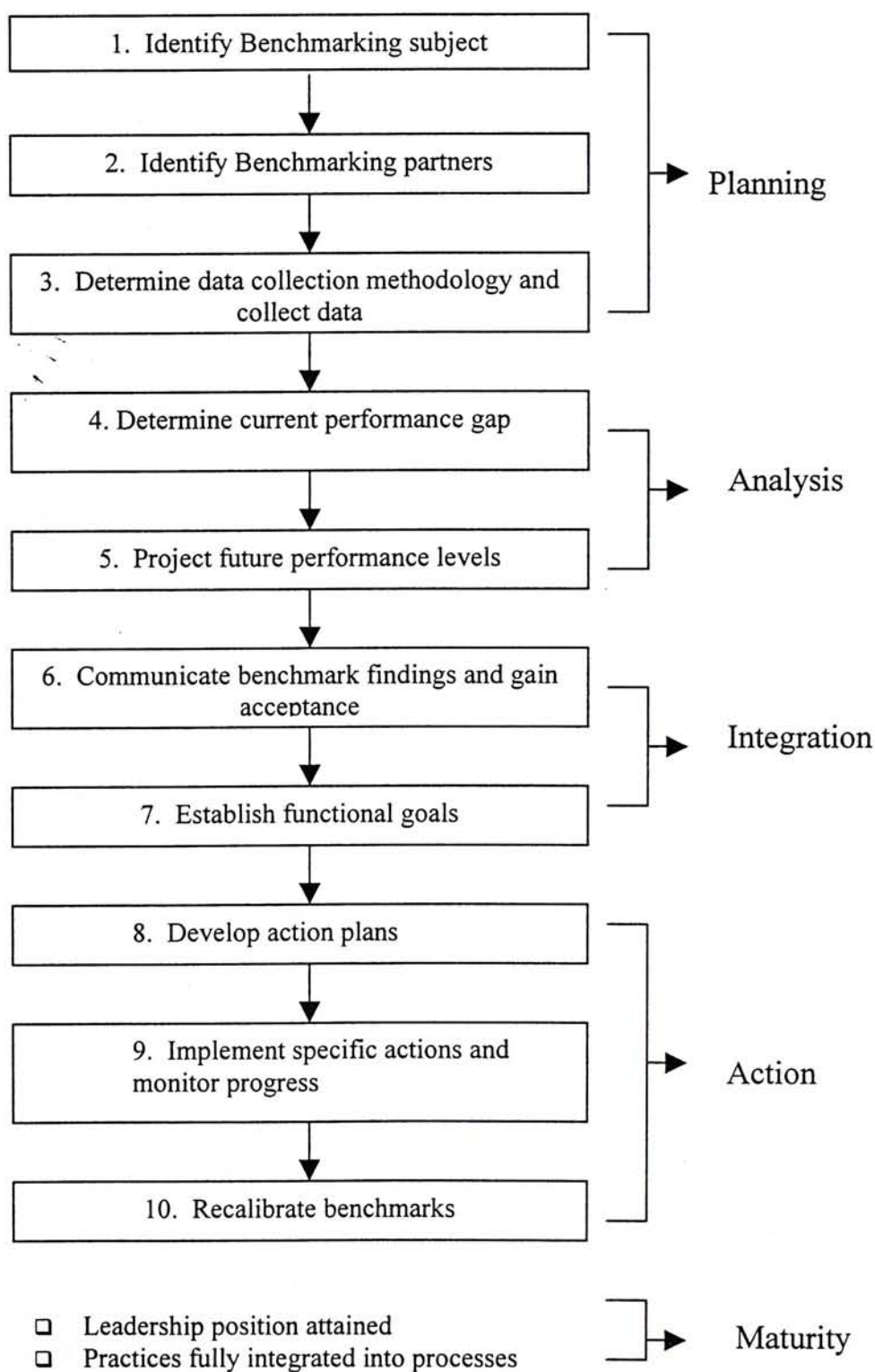


Figure 8 – Xerox's Benchmarking Process

On the other hand, Watson (1993)²⁷ used the Shewhart or Deming cycle: Plan, Do, Check, Act to describe the Benchmarking process:

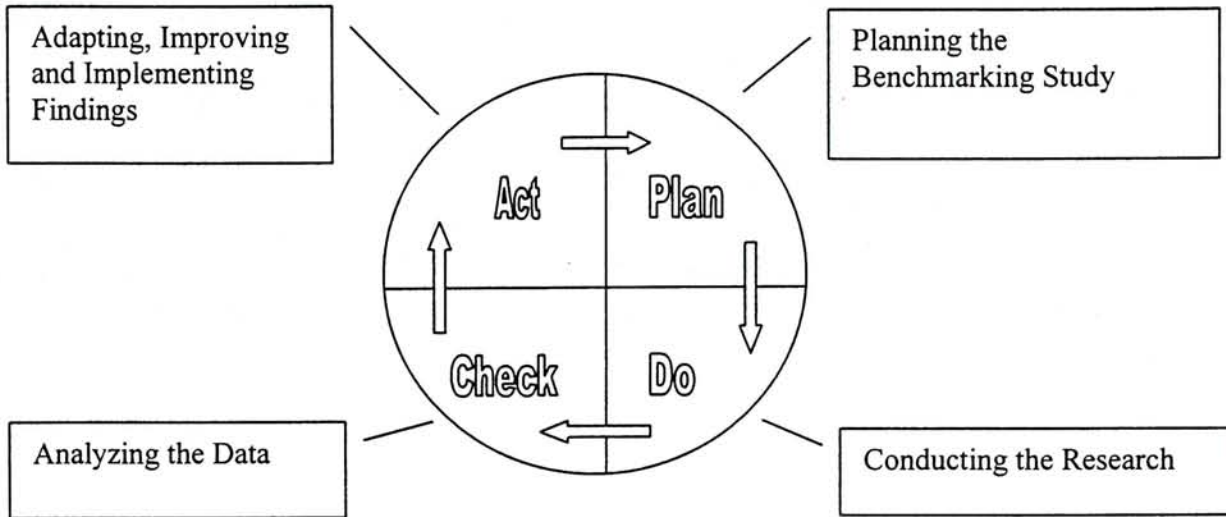


Figure 9 – The PDCA Benchmarking Model

The model gives a good illustration of how Benchmarking can contribute to the concept of Continuous Improvement. By continuous Benchmarking, targets and goals could be re-calibrated to cope with ever-changing competitive and industry practices.

In fact, the model was based on a study of American Productivity & Quality Center(APQC)²⁸ on 42 different models used by various companies, which is shown in Appendix 2.

²⁷ Gregory H. Watson 1993. *Strategic Benchmarking – How to Rate Your Company's Performance against the World's Best*. John Wiley and Sons, Inc. pg 65-79

²⁸ "The Benchmarking Management Guide". American Productivity & Quality Center. pg 141

The conclusion of the study is that a Benchmarking project needs to follow a rigorous process model in order to provide an integrated, systematic, measured approach to completing a Benchmarking study. Moreover, it is important to understand that each study does not have to complete the entire sequence of steps proposed in the process models. The model should be viewed as a guide to learning, which in itself is a guide to the discovery process.

Zairi²⁹ has made a comparison among the Benchmarking models used by different companies. He concluded that the common main criteria of them were, in descending order of importance, as follows:

- Process based,
- Strategic/operational focus,
- Learning organization,
- Customer focus,
- Linked to TQM,
- Continuous(PDCA).

A detailed result of comparison is shown in Appendix 3.

Benchmarking in the Public Sector

As mentioned by Chase(1995)³⁰, the public sector is now faced with growing demands for cost-effective, results-driven services in a period of stagnant, even shrinking funding. Following the path trail-blazed by manufacturing and for-profit services, the public sector has been turning to total quality as it seeks ways to effectively deliver services within a team-based culture focusing on customers, continuous improvement and the quality of working life. For organisations to understand their critical business processes and then radically improve them within a holistic Total Quality environment requires an objective method to analyse current performance and seek out best practice external comparisons – it requires Benchmarking.

Keehley and MacBride(1997)³¹ made a good discussion on that: In U.S., the improvements in quality and efficiency obtained by private industry through best practices and Benchmarking have been so profound and widespread that public sector agencies – organisations traditionally perceived as slow to plan and implement change – are walking up to the benefits of this powerful analytical tool. The mass adoption of best practices through Benchmarking by government institutions at all levels may dispel 3 myths that have attached themselves to public agencies:-

²⁹ Mohamed Zairi 1997. *“Benchmarking for Best Practice – Continuous learning through sustainable innovation”*. Butterworth Heinemann. Pg 37

³⁰ Rory L. Chase, editor(1995). *“An improved public role”*. Best Practice July 1995.

- There is never any real improvement in service delivery
- The only way to improve service delivery is to spend more money
- Delivery performance actually deteriorates with increased spending.

According to a survey of Benchmarking authorities, moreover, the common reasons for using Benchmarking practices by public agencies could be summarised as follows:

- To determine the criteria that measure performance:

Without the criteria, an organisation has no basis and no foundation for making comparisons. Comparisons made without criteria will lack validity; as will performance improvements goals based on those comparisons.

- To recognise problematic aspects of particular services:

Benchmarking lowest-rated services is only logical. Benchmarking top-rated services will not move the entire agency and may leave second-rate services to atrophy even further. Conduct process triage to prioritise which services need action first and which can wait.

- To improve service delivery:

³¹ Patricia Keehley and Sue A. MacBride. *“Can Benchmarking for Best Practices Work for*

Just knowing where an organisation stands in comparison to others and why will feel like a significant accomplishment in itself, but do not stop there. Precious money and time will be wasted if the new knowledge and insight are not acted upon and used to bring improvement.

One of the success stories was about New York City Transit Authority(NYCTA), which conducted a detailed study of inventory management. NYCTA examined practices of leading multimodal transit authorities in Houston, TX and Detroit, MI; foreign transit authorities in Montréal, QB; Stockholm, Sweden; and Tokyo, Japan; and private-sector companies such as Federal Express, UPS, and Delta Airlines. Like the NYCTA, many of these firms were operating under severe budgetary constraints. NYCTA's most significant insights came from analysing companies and organisations that were not directly comparable to the public transportation industry. To their surprise, NYCTA managers discovered best practices readily applicable to their situation, despite the profound differences of the operating environments of origin. Had NYCTA not benchmarked its performance in inventory control against similar service providers, continuing poor resource management should have led to high costs and low quality that would have eventually driven NYCTA's patrons to competing transportation providers such as private bus lines, taxis, and automobiles. Because of the lessons NYCTA learned

through Benchmarking, the agency has probably saved itself from bankruptcy and dissolution.

On the other hand, Keehley and McBride also raised some potential concerns for Benchmarking in the public sector:

- Public sector is an inherently political process. To take politics out of the equation is impossible as administrator or political discretion and subjectivity will always play a small part. Any function a committee or individual administrator chooses to benchmark may still be politically motivated.
- Agency leaders and managers will be tempted to manipulate the Benchmarking results to save their department and their jobs.
- When choosing performance measures, establishing cause and effect can be very tricky. The Benchmarking team must be sensitive to causal relationships and drawing erroneous conclusions.
- In some instances, measuring outcomes can be nearly impossible. Some government activities defy gauging and may be of a long-term nature, making data gathering an expensive operation.

The situation in MTRC is very much similar to those encountered by other public sectors. There has been increasing public concerns and awareness on the service performance of MTRC. It is high time for MTRC management to justify the value of services provided

by MTRC, and substantiating its excellence in performance. Moreover, there are rising criticisms from public and pressure groups about the fare policy of MTRC, demanding for governmental fare control. MTRC management believes that this will damage the long-term development of the company.

World-wide Trend of Benchmarking

The book of Camp (1989)³² set the stage for the rapid adoption of business Process Benchmarking by American companies. Within 3 years of publication, the American Productivity & Quality Centre had established the International Benchmarking Clearinghouse (IBC), and the US Strategic Planning Institute(SPI) had formed a Council on Benchmarking. These organisations, and their hundreds of members, are now dedicated to promoting, facilitating and improving Benchmarking in the pursuit of organisational excellence.

Development in North America

According to Chase(1995)³³, North American organisations are at the forefront of Business Process Benchmarking. A survey conducted by the International Benchmarking Clearinghouse on 87 major international companies³⁴ confirmed that:

³² Robert C. Camp 1989. *Benchmarking – The search for industry best practices that lead to superior performance*. ASQC Quality Press

³³ Rory L. Chase. *Worldwide trends*. The Best Practice/November 1995.

³⁴ *The Benchmarking Management Guide*. American Productivity & Quality Center. pg 75-89

- Benchmarking activity has increased dramatically since 1990.
- Many of leading organisations in U.S. are doing it.
- A large percentage of firms believe that Benchmarking is a necessary tool for survival.

Besides competitive pressure, a number of factors have facilitated the development of Benchmarking in the region as follows:

- Support by National Standards - The criteria of US Malcolm Baldrige National Quality Award, established in 1987, has supported and encouraged Benchmarking. In addition to national organisations, such as the IBC and the SPI's Council on Benchmarking, there are a host of sectorial, regional and even local associations created for the identification and exchange of best practices.
- Existence of Independent agents - As the provision of Benchmarking information has become a business in its own right, North American organisations have had ever greater access through consultants, academics and dedicated not-for-profit organisations.
- Acceptance by the public sector - More recently, American and Canadian public sector organisations, especially at the federal and state/provincial levels, have rapidly embraced Benchmarking as part of their strategy for providing effective and efficient services. Today, these governmental agencies, including defence, health, education

and the post office, are pioneers in adapting Process Benchmarking methodologies in the non-profit service sector.

- Emerging new methodologies - New Benchmarking approaches, tools and techniques have also been developed by American companies. For example, it formerly required anywhere from 3 to 4 months to develop a Benchmarking survey questionnaire, gain agreement from organisations to participate in a study and then analyse the results. AT&T and other mature Benchmarking organisations have developed rapid Benchmarking methodologies which allow the practitioner to obtain the required information in a very short time-frames – sometimes in less than 1 day!

Development in Europe

The followings have been major drivers to Benchmarking in Europe

- Promotion by subsidiaries of American firms in Europe - The European Foundation for Quality Management's (EFQM) Business Excellence Model and criteria, the European Quality Award have major catalysts, spurring European organisations to investigate and adopt both internal and external Benchmarking practices.

- Support by National networks and clubs - Examples include the Finnish Benchmarking Associations, the Benchmarking Club in Italy, Information Zentrum Benchmarking(IZB) in Germany etc..
- Facilitation by Universities and Business Schools

Development in the Pacific Rim

The followings have been a major driving forces of development in the Pacific Rim:

- Cultural and Historical trading links with Europe and North America - This is especially true for Australia, which sets the Benchmarking pace in the Pacific Rim.
- Support by National Awards - An example is Australia Quality Award, which was established in 1988 and broadly based on the US Malcolm Baldrige Award criteria.
- Advocating by bodies such as Australian Manufacturing Council - networks, consultants and universities.
- Intensified competition - for example, in telecommunications, electronics, computer and financial service sectors. This has forced companies to adopt Benchmarking to remain world-class contenders.

The subsidiaries of American firms and European companies with businesses in the US have led the way in promoting Benchmarking throughout Europe. Early total quality

management practitioners, including BP Chemicals, British Airways, British Telecom and Rank Xerox etc.. have been actively Benchmarking since the 1980s.

Japan has been a very special case. Since the Meiji Restoration in the 1860s, Japan has constantly sought “foreign” best practices in business, education and government. The “Benchmarking” has been adapted into the Japanese culture. However, the idea of actually sharing business process best practices with company’s from other nations that is new to the Japanese. However, they are still importing modern Benchmarking methodologies.

In Hong Kong, Benchmarking has been an increasingly popular management practice in both the public and private sectors. There are independent bodies like Hongkong Benchmarking Clearinghouse founded jointly by large corporations to conduct and promote Benchmarking, share experience on Benchmarking, as well as update each others about latest best practices in the market. Other than that, there are management consultancy firms that provide Benchmarking services to clients. Those bodies can play an independent role in conducting Benchmarking exercises among a pool of clients. They consolidate the information gathered from respective clients, then identify and report the best practice profile among all those participating firms. The confidentiality concerns of company information can be protected by keeping data sources anonymous. Such kind of approach could help to facilitate Benchmarking, even between competing

firms. Moreover, publications on latest best practices in the market have emerged as a channel for knowledge and experience sharing.

The Future

Chase(1995)³⁵ anticipated the following improvement areas, which are mainly driven by development of computer and telecommunication technology:

- Benchmarking can now be conducted at home or in a hotel room through access to the Internet and the expanding number of on-line information services.
- Access to multiple types of knowledge found in the public domain is allowing practitioners to rapidly improve processes, which has added effect of accelerating innovation. Organisations can import new ideas from companies around the world to achieve drastic improvements in product/service performance.
- New technologies, including E-mail, groupware, video-conferencing will allow “Benchmarking” practitioners to directly access people, information and new ideas.

It was also anticipated that “knowledge sharing” or “knowledge transfer” will replace the term “Business Process Benchmarking” in the 21st century.

³⁵ Rory L. Chase. “*Worldwide trends*”. The Best Practice/November 1995.

Summary

Benchmarking is a quality management tool that improve a company performance continuously by helping it to measure, compare its performance with business leaders, and then learn the best practices from them. Benchmarking may work with other management practices such as Total Quality Management, Business Process Re-engineering to improve the performance of an organisation. A diagrammatic illustration is as shown below:

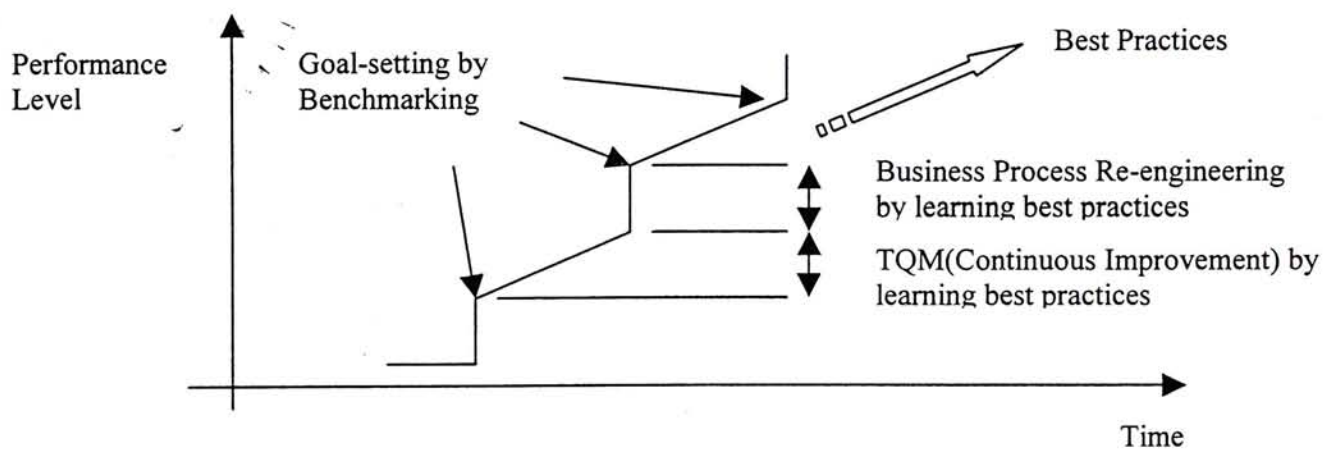


Figure 10 – Benchmarking and Performance Improvement

The performance improvement ideas generated by Benchmarking may be at both operational level and strategic level. In fact, Strategic Benchmarking is a valuable tool in providing input to the strategic planning process. However, other than Benchmarking, successful strategies also require proper market positioning.

Other than bringing about performance improvement, Benchmarking may lead to cultural change as it helps to create a company environment of continuous learning. Together with Benchlearning, the organisational development process, Benchmarking help to change the behaviour of employee to pursue the ideal of Learning Organisation. Other than Benchmarking, other factors like the reward system, policy setting method etc. are also crucial to establishing a learning organisation.

To summarise, Benchmarking can work together with those modern management practices to bring about beneficial change to a company:

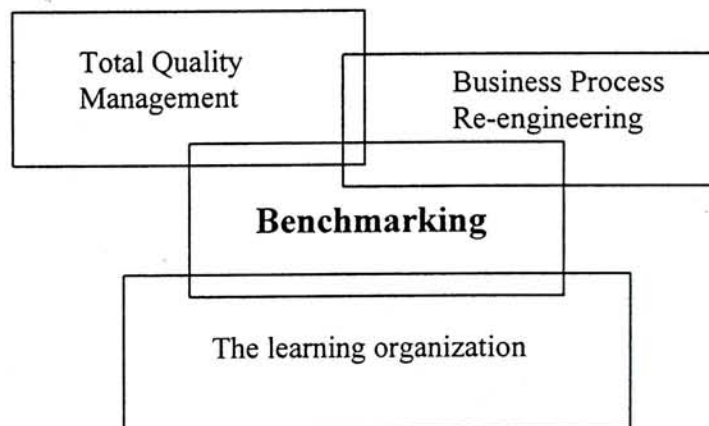


Figure 11 – The relationship between Benchmarking and other modern management practices

There are different kinds of Benchmarking, differing in the types of Benchmarking partnerships. From Internal Benchmarking to Generic Benchmarking, there is both increasing degrees of difficulties and potential benefit.

There are a large variety of models that have been developed for Benchmarking by different companies and practitioners. However, they commonly fall into the framework of PDCA:

- Planning – Planning the study
- Do – Do the research
- Check – Compare and Analyse the Gap
- Act – Implementing best practices

Moreover, to enable a successful Benchmarking and prevent potential subsequent problems, the Benchmarking companies may follow standard Code of Conduct developed by professional bodies like APQC IBC. Generally, such behavioural guidance aims at ensuring that the exercises are conducted in a legal, fair and beneficial manner.

In the 1990s Benchmarking has been increasingly popular management practices. Starting from U.S., due to promotional effort by professional bodies and practising firms, Benchmarking has also received its prominence in other parts of the world like Europe and Pacific Rim. Larger companies in Hong Kong are also practising Benchmarking. Moreover, as a tool originated in the business world, it has been recognised and used by the public sector under growing pressure for performance improvement. Under rising customer expectations and political pressures, MTRC management has turned to Benchmarking as a solution.

With the rapid development of computer and telecommunication technology, the mutual learning and information exchange between organisations will be much facilitated. It is expected that the term "Benchmarking" will be eventually replaced by "knowledge sharing" or "knowledge transfer".

CHAPTER IV

THE INTERNATIONAL BENCHMARKING EXPERIENCE IN MTRC

The Threats faced by MTRC

The MTRC has won a good reputation of providing reliable and efficient urban transportation system in Hong Kong since its establishment in 1975. However, the Chairman in 1990s identified 2 potential threats to the continuous success of the business³⁶:

- “Internally we must guard against any tendency to drift into complacency, relax our strict cost control system, or permit any element of bureaucracy to infiltrate into our business”,
- “The other potential threats arises from the changing political times we live in and the threats to the autonomy of the Corporation which may be posed by interest groups who care more about short term political gains than the long term interests of the Corporation”.

Besides, it could be observed that efficiency was becoming increasingly a concern due to the big size of the growing organisation. Moreover, the Corporation was under

³⁶ Foreward by Chairman, “*Long-term strategies and Objectives of MTRC*”, March 1996

increasing pressure for governmental intervention on fare control from various political parties.

Objectives

In response to the Chairman's concern, an International Railway Benchmarking was performed by a consortium of world's leading heavy metro railways (including MTRC), to fulfil the following objectives:

- To build a system of measures which could be used to indicate standards of performance
- To provide information that could be used at the Board level and exchanged with stakeholders to measure performance against other similar metro systems
- To provide measurements that could be used by managers to gauge performance and identify areas for improvement on a priority basis
- To provide data which could be used; in public or potential arenas, to demonstrate the value of the services MTRC is providing to passengers.

The participants aimed at Benchmarking on a group basis, to identify the best performer in specific business areas (e.g. service quality, utilisation etc.), to explore the best practice and learn from it. The mutual sharing and learning exercise was intended to be on a long-term basis so that continuous improvement can be achieved.

The findings of the exercise identified critical areas of MTRC business that have potential room for improvement and help MTRC management to devise according strategic direction. Moreover, the exercise did triggered follow-up Process Benchmarking project to investigate the cause (process)-and-effect (performance) of the discrepancy in business performance.

Besides, MTRC management expected the exercise to enable the participating metros to capture and implement the best practices throughout the organisations. It was believed that continuous breakthrough improvements could be greatly accelerated if the process motivates the whole organisation in actively share and utilise its best practices. On the other hand, the role of staff commitment and their dedication coupled with the important recognition by the senior management would be crucial for attainment and implementation of best practices.

The Process

An independent outside agency, a university was appointed to be responsible for information administration and upkeep of the study. It served as the single source of coordination and supported the gathering, registering and distribution of information. It was believed that commissioning by third party would have the following advantages:

- To ensure continuity of such an exercise in future years within an office with all the skills and resources needed to collate and tabulate the necessary data,
- To ensure credibility and equity between the participants and that their recommendations would be adopted as the standard for comparison.

The following process was adopted for the exercise:

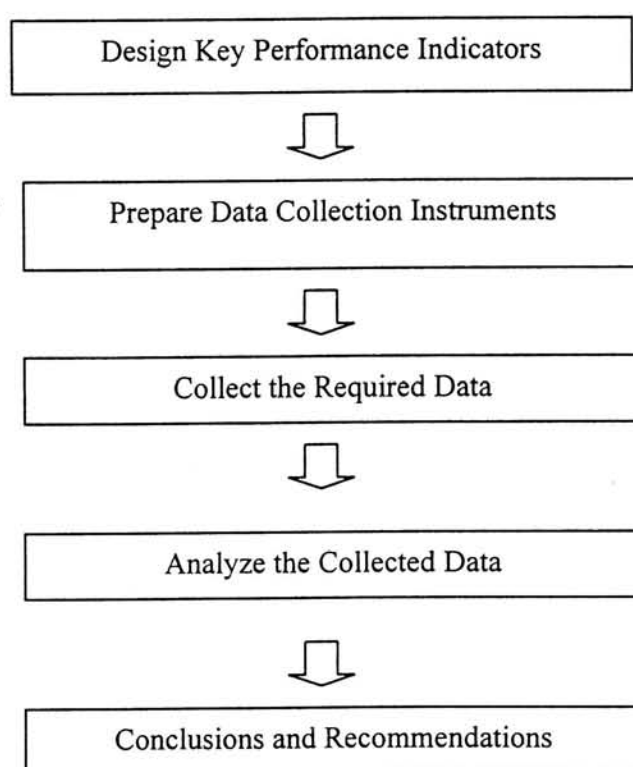


Figure 12 – The Process of MTRC International Benchmarking

Design Key Performance Indicators

This is the most critical step of the process. The objective of building a comparative system of indicators is to enable each participating organisation to continuously assess effectiveness in the utilisation of assets and resources under this control. This could be done through the examination of a limited number of key indicators which, taken together, can represent the important and measurable aspects of passenger train service provision.

In fact, based on previous experience of Benchmarking of MTRC, a number of criteria must be fulfilled to make the comparison exercise beneficial to the participants:

- Encompassing various aspects of business which drive service quality and cost, both from investment and recurrent aspects of an operating railway
- Relevant to all contributors
- Not inducing tremendous effort for collection. For example, those performance indicators being used by participants for internal reporting purposes.
- Understandable to non-railway entities
- Placing emphasis on controllable aspects of the business
- Achieving an understanding of the social, economic and legislative environment within which each railway operates.

The selection process entailed discussions with each of the participating metros coordinators. A core number of dimensions were first identified for designing the system of key performance indicators:

- Asset Utilisation e.g. Car Operating Hour/Total Car Hour
- Reliability e.g. Car Kilometre between incidents
- Service Quality e.g. Percentage of successful passenger journeys of total journeys
- Efficiency e.g. Car Operating hour/staff hour
- Financial Performance e.g. Car Km/Total Operating Cost

The set of performance indicators were either commonly accepted in the industry/business world (e.g. financial measures) or based on MTRC past experience of customer survey (e.g. train reliability). The set of performance indicators were continuously evaluated and refined as experience accumulated along different phases of the exercise. Some indicators were removed along the project process, some new were introduced considering the value in measuring business performance. Finally, a standard set of key performance indicators were agreed among the participants.

Prepare Data Collection Instrument

A structured questionnaire was prepared for the project. A glossary of definitions of all key terms, categories and references were also provided. The questionnaire and glossary were prepared in English as it was agreed that the working language of the project was English.

A sample format of questionnaire is shown in Appendix 4.

Each participant had to decide on their own detailed definitions of each measures and identify the data source (e.g. particular department) within the company. Some indicators were disregarded due to unavailability of information from possible information sources.

Problem of data comparability did arise due to variety in exact definition for specific performance indicator under different business practices and environment. An example was about maintenance manpower resources: some participants did contract-out part of their maintenance activities while the others did not. As a result, maintenance staff hours can reflect the total manpower resource used for maintenance for some participants but not for the others. This would affect the comparison of maintenance efficiency. The problem was solved by requiring the participants to provide contractor cost, if any.

Other problem areas lie in the variety in depreciation measures and practices, which are different from country and even from company to company. To standardise the measurement in such an area, costly collection of investment figures for a long period of the past (e.g. ten years) may be required. However, it was considered that the problem of depreciation should be negligible considering the big size of existing investment.

Problem also existed due to different level of cost living, purchasing power among various countries. An agreed set of adjustment factors for individual countries were then used.

Other problem areas include:

- Difficulties in locating and obtaining performance data,
- Changes of definitions from year to year, department to department within a particular company,
- Inconsistencies in tolerance levels and methodologies of measurement and
- Late submission of data by participants.

The co-ordinator and administrator thus had to perform a lot of steps to refine the data. For example, logical cross-checks between different data elements, different participants and different years, reconciliation against published financial accounts, reviewing all

definitions and liaising with all participants to arrive at the most logical data source selection and a consistent set of procedures for capturing and reporting information.

Conclusions and Recommendations

It was found that:

⇒ MTRC was “best-in-class” in most categories

⇒ Other than that, 2 main areas of potential improvement were identified:

“Staffing levels and maintenance contracting” is a weak area for MTRC. For example, it do have relatively high staffing level in respect of car kilometre

“Incident management” is also another area for MTRC that warrant management attention. Despite very low frequency of incidents, MTRC still experienced a bit longer average initial delay per incident.

As a result, MTRC management has decided to undertake studies to seek improvement in these 2 areas.

Based on the results of comparative analysis, 2 approaches were used to analyse the cause-effect relationship of best practices:

- Nested ratio analysis: a kind of analysis techniques that promote more in-depth understanding about determining factors on particular Key Performance Indicators.

This normal entails breakdown of particular measure into more detailed elements and investigating the relations between each of them. For examples:

$$\text{Total cost/car km} = \text{Operating cost/car km} + \text{Maintenance cost/car km} + \\ \text{Admin. \& other cost/car km} + \text{Investment cost/car km}$$

By examining data of each detailed elements, we can identify the real cost contributor of the high cost of particular participant.

- Case studies: to explore the cause-effect relationship for differences in performance among different participants. Specific case studies were initiated to identify best practice elements and define the potential for applying it to other metros and for deriving short term benefits from it. These entailed sharing of company processes and experience that are relevant to particular performance area. The best practice elements fell into 2 categories:
 - ⇒ The key cause-effect areas (e.g. business process design, company strategy and policy, technology advancement) pointing to best practices, considering the environment differences between participants
 - ⇒ The implementation experience of best practice, considering lessons from the participants, as well as external (i.e. railway and non-railway) best practices.

Certain Process Benchmarking exercises were also conducted to investigate in-depth the difference in process that had led to gap in particular performance areas. This will be discussed further in Chapter V.

Confidential and Security Issues

Confidentiality was another essential element that needed to be considered in data gathering. Therefore, a well-defined agreement should be agreed by all partners hence to control the disclosure of information (e.g. company data) to any outside parties.

Confidentiality and Security Statement

1. The principle which will apply is "complete openness within the Benchmarking group, complete confidentiality to the outside".
2. This means that any reports issued by MTRC to all participants will not be either numbered or encoded in any way.
3. Information communicated as part of the project process will be freely shared with all of the other participants.
4. Other than information applying to the issuing metro, all participants agree to use only encoded data in information issued to shareholders, government or the press, or published in academic papers. The only exception will be graphics containing data already published and freely available. Otherwise, all information applying to other metros must be designated merely as numbers or letters to disguise the identities of the participants. In any release which uses a significant number of graphs, a series of codes should be used rather than just one, so that it will not be easy for outsiders to identify which metro is which.
5. Information may be disseminated as widely as participants wish within their own organisations, but it is the responsibility of each metro railway to ensure that there is no leak to the outside - including to any of the metro's own associate companies or consulting partners - of data or findings pertaining to any of the other metros.

Figure 13 – Confidentiality and Security Statement

Summary

Based on the results of cause-effect analysis of the previous step, participants shared and explored the contributing factors to outstanding performance. Both external environmental factors and internal methods adopted by the participants were examined and conclusions were made based on that. The findings covered a broad range of issues e.g. equipment design, staff training, investment strategy, relationship with developers and town planners, interfaces with external contractors. Most of them were high level and strategic issues. It was agreed that beneficial insights were gained in the areas of investment, maintenance and line capacity. Moreover, MTRC incorporated the Key Performance Indicators in its internal reporting procedures and drove it down the organisation. As a result, we may summarise the main conclusions as:

- Through the project, a set of standard performance indicators were successfully developed which were agreed among all participating metro companies. The Key Performance Indicators covered all performance areas that were agreed to be critical to metro business, which could be used to set high-level business objectives. Such a system will be used on a continual basis, to sustain continuous improvement by Benchmarking. This has fulfilled the objectives of building a system of measures to indicate standards of performance; as well as to provide

information for use at the Board level of participating companies to measure and compare performance.

- The study revealed that MTRC is the best performer among the participants in most of the performance areas studied e.g. Asset utilisation, Reliability and Service quality, so it demonstrated the value of the services, which MTRC was providing to the passengers. The result also provided a strong support to retain MTRC's autonomy.
- However, the study also identified 2 weak areas that deserved attention of MTRC management: "Staff level" and "Incident management". Therefore, the study has fulfilled the objective of providing an opportunity for MTRC managers to gauge performance and identify potential improvement areas.
- The successful experience has encouraged the participants to decide to make it an on-going exercise. Moreover, expansion of the pool of participants were considered.

CHAPTER V

A PROCESS BENCHMARKING CASE STUDY AMONG TWO METROS

Background

The results of the Strategic Benchmarking exercise as mentioned in Chapter IV did identify a number of best performers in respective performance areas. MTRC was found to be excellent in a number of areas, including Asset Utilisation, Reliability and Service Quality etc.. The Line capacity at peak hours was understood to be a major factor of service quality for a railway business. This triggered a bilateral Process Benchmarking Exercise was conducted by one of the participant with MTRC to learn the best practices in those areas.

Objectives

The objective of the Benchmarking exercise was to improve the line capacity at peak hours of the train operations cope with ever-increasing customer demand.

The Process

The process followed by the Process Benchmarking Study was as follows:

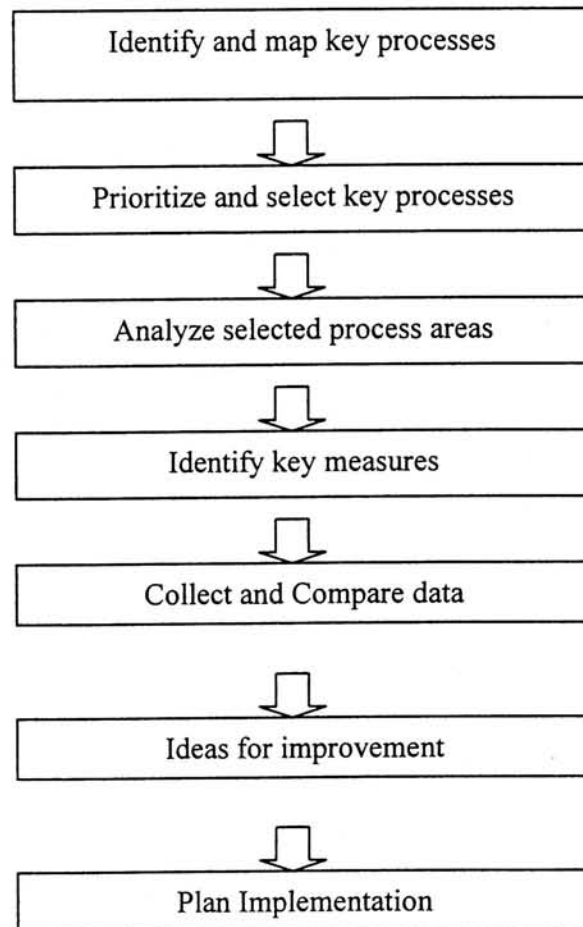


Figure 14 – MTRC Process Benchmarking Steps

Brief explanations of particular steps are as follows:

Identify and map key processes

This entailed producing a high level process model or process map of the processes that can affect peak time passenger capacity. This model allowed an agreed picture of the relevant processes, and how they inter-relate, to be developed.

Furthermore, a hierarchical breakdown of the high level process mapping into more detailed, lower level processes were established. For example,



Figure 15 – High Level Process Mapping

All the processes under the category of operations were believed to be critical to the effective capacity of the railway. The processes need to be further prioritised for in-depth investigation.

Prioritize and select key processes

2 criteria have been used to select key processes. 3 main factors were considered:

- ⇒ Importance to peak time capacity
- ⇒ Potential for improvement
- ⇒ Ease of implementation

Each process was scored based on the 3 criteria. High priorities were given to those with high overall score. To make the selection, opinions of experts in railway business or academic were sought. Operational statistics available were also examined. This step helped to determine the focus of the subsequent steps and enable the project to generate short-term benefits to the company. For example, the priority processes were determined to be:

- Station entry to depart(run in to run out)
- Passenger flows off/on platform
- Terminus process

- Train regulation
- Eliminating Incident

Analyse selected process areas

The existing set-up of high priority processes of the company was modelled in greater detail. Basically, a process model consists of the following basic elements:

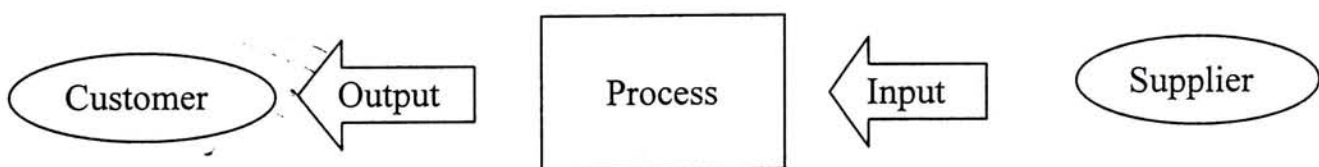


Figure 16 – Process model

The principal aim of the process should be to fulfil the customer needs. Business processes may be viewed as a series of internal customers, each with needs to be met.

The internal customers should co-operate along the process to pursue the common goal – to fulfil the needs of the ultimate customer. If the ultimate customer is to be satisfied this complete flow of needs must be addressed effectively. Successfully addressing the flow of needs, relevant to peak time capacity, is necessary if improvements are to be obtained.

For example, in resolving incidents to resume train services:

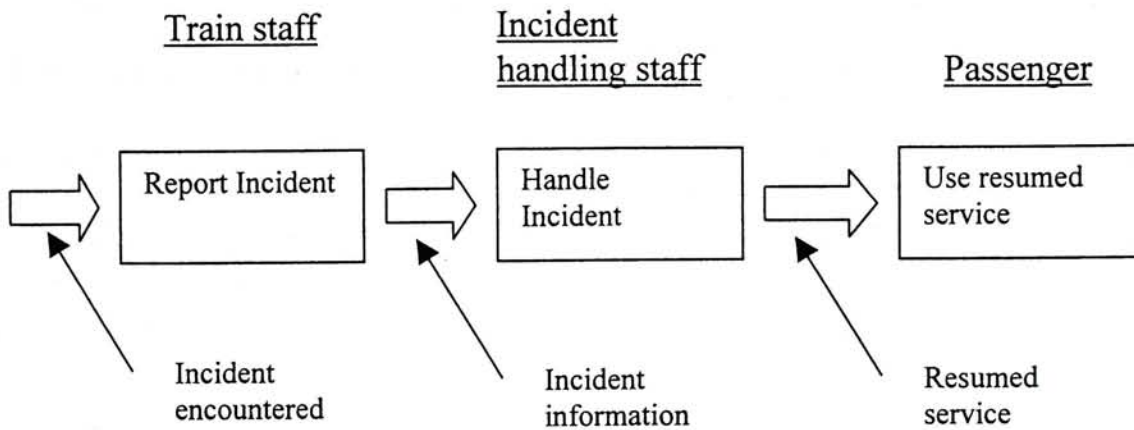


Figure 17 – Process map for resolving incident

There are 2 customers within the process:

Customer	Need	Deliverable
Incident handling staff	To obtain cause of incident and provide solutions	Incident information
Passenger	To have service resumed as soon as possible	Rapid resumption of train service

Table 3 – Analysis of Incident resolving process

Identify key measures

Based on the constructed process models, critical measurements could be derived to assess the performance of the performance in fulfilling certain customer needs in an effective and efficient way. The following areas are typical ones that the measures should focus on:

- ⇒ Customer satisfaction level
- ⇒ Quality and timeliness of Output
- ⇒ The impact of inadequate performance

Using the above-mentioned example in handling incident:

Customer	Measures
Incident handling staff	<ul style="list-style-type: none"> □ Content of information provided □ Lead time required for incident information to reach the staff
Passenger	<ul style="list-style-type: none"> □ Speed of resolving an incident, by incident type □ Cumulative delay by incident type – average and distribution

Table 4 – Performance measures for Incident handling process

By examining those questions, the critical measures were developed and agreed. This required in-depth understanding about the existing operational processes of the company. Information was then collected for each measure to enable current performance to be developed. It was found that MTRC did not have data for all those measures identified. However, they did help to identify process areas that affect the line capacity. They were the ones to focus on during further investigation such as Benchmarking visits (e.g. practices that would affect those areas where observed).

Collect and compare data

Based on the measures identified above a questionnaire was produced describing the information needed. This questionnaire was developed in consultation with MTRC, and was completed by both the Benchmarking company and MTRC. Other than operational data, more general information like organisational structure, management philosophy, training policy, financial management policy, rewarding scheme and other management practices were also requested. Such factors should affect some important non-quantifiable aspects of the company (e.g. staff morale, attitudes to customers and other behavioural aspects) that may contribute the excellence of it. This allowed the Benchmarking company to conduct a more thorough and complete analysis on MTRC management. In fact, the final result of the study did identified a significant number of improvement initiatives belonging to such non-quantitative areas. However, some information were not available and some needed conversion.

The performance of respective measures for both the Benchmarking company and those of MTRC were then compared. The differences were the performance gaps. The higher the performance gap for a particular measurement, the higher the room for improvement. These were the areas that should be able to generate most ideas of improvement. This can also help to identify focus of attention for the subsequent Benchmarking visit.

Moreover, the priority of those processes identified in the previous step may be taken into considerations.

Combining the 2 dimensions, those high priority processes where there is the greatest room for improvement, will be the top priority to address. Those areas should also be the focus of subsequent Benchmarking visit. For areas with high priority but low room for improvement, radically new approaches will be required for improvement. For areas with high room for improvement but low priority, consideration solely from a cost reduction perspective.

Ideas for improvement

Benchmarking visit was the most important step in generating ideas for improvement. This entailed representatives from different parties of the Benchmarking company paying site visit to MTRC operating environment. The key to the visit – which lasted for 1 week – was to learn how MTRC managed to achieve better performance than the Benchmarking company. Focus was on the top priority areas identified in the previous step.

A list of specific questions was prepared to target the effort during the visit. This list of question was sent to MTRC before the visit to give them time for preparation. Moreover, a detailed itinerary of visit was agreed which depicted the detailed schedule of meetings

on particular topics and with particular key person of MTRC. Those preparatory efforts could save the time of Benchmarking visit and allow it to focus on observing best practices.

The Benchmarking visit team composed of staff experienced in various business areas and Benchmarking specialists. They were selected to conduct the visit because they were those most capable to appreciate usefulness, benefits and transferability of the ideas to the Benchmarking company.

The Benchmarking visit was a crucial step of the exercise. It helped to examine the best practices of MTRC in a real-life environment. In fact, a lot of observations were made on areas like company culture, station design, equipment and technology, which could not be fully described on paper. A Benchmarking visit also allowed the team to directly interact with MTRC employees and understand their mind-set, knowledge and capability.

A number of ideas of improvement was identified, which covered the following areas of the operational process design such as:

- Train stopping dwell time control
- Measures like platform design, special staff support to facilitate more efficient flow of passenger

And etc..

Other than the operational process, a number of factors were identified that have led to the success of MTRC:

- MTRC's customer oriented culture
- Technological advancement
- People management
- Information flow and measurement etc.

Plan implementation

The final stage was to determine what actions to be taken. 2 steps were taken. First to identify ideas for improvement – both from MTRC and any other source. The second was to assess these ideas in terms of their practicality and ease of implementation. This needed to consider costs, risks, the human issues and the technical difficulties. Each idea was scored based on both priority and ease to implementation. Eventually, priority of implementation was given to processes with the following characteristics:

- High priority and easy to implement(Top priority)
- Low priority but easy to implement(Quick fixes)

The priority of the ideas was based on the results of previous step “Collect and Compare Data”.

High priority areas that were relatively difficult to implement should be considered carefully, and few of these projects were undertaken. Lower priority issues that were easy to address could be implemented to provide the quick wins that were necessary to maintain the momentum in any change programme.

A key point to note was that both the relevant ideas and their practicality were assessed by the people that would be responsible for implementing the change. This approach greatly increased the chances of successful implementation.

Summary

Based on the Process Benchmarking experience, the following conclusions could be drawn:

- To generate real benefit (tangible or intangible) from Benchmarking, the exercise should not end at just comparison of performance data. In-depth investigation into process flow can help to identify best practices that lead to superior performance.
- A detailed process mapping of the existing process may be used to analyse the existing process and identify problem areas for focus of investigation.

- A Benchmarking visit is an effective tool in analysing performance gap. Other than operational process flow, it may identify other factors like company culture, people management etc. through direct interaction with staff of the company, or direct observations and so on.
- A successful Benchmarking visit is much more than a tourism. Carefully planning is required to ensure that the Benchmarking team can make the most out of the visit of limited time span. For example,
 - ⇒ Critical process areas (e.g. bottlenecks) should be identified for the visit to focus on. One possible way is to measure the performance gap between the Benchmarking company and MTRC. Criteria that may be used for prioritisation may include importance to project objective, room for improvement and ease of improvement etc..
 - ⇒ It would be best to collect as much as possible any documented and relevant data (e.g. process performance measures) or information before the visit so that it may focus on observation. Questionnaire may be used to accomplish that.
 - ⇒ The composition of team is also of vital concern. For example, presence of operation people may help to spot and identify ideas of improvement from an operational point of view. The involvement of process owner should also help to facilitate the implementation phase of ideas for improvement. Last but not the least, Benchmarking expert who can make use of his/her professional knowledge to facilitate and lead the Benchmarking process.

And etc.

CHAPTER VI

GENERAL DISCUSSIONS

The Benchmarking consortium as mentioned before had successfully generate benefit to the participants from both a strategic and operational level, by identifying best practices that should lead to superior performance. The following is an overall evaluation on that:

Identifying strength and weaknesses

The Benchmarking exercise exposed the internal operations of the participants to external environment. This allowed each participant to identify its strength and weaknesses. This is important to public sector companies like urban metros, even though they are not subject to direct and severe competition from the commercial world.

MTRC was established for the principal purpose of constructing and operating, on prudent commercial principles, a mass transit railway system, having regard to reasonable requirements of the public transport system of Hong Kong. However, it was confronted with threats from both internal and external environments (Referred to the Chairman's concerns as mentioned in Chapter V) in the 1990s. There were growing voices from public interest groups to demand for better services, and more fare control authority from the public. This would severely affect the autonomy of the Corporation.

On the other hand, the big size of the company (rapidly growing due to continual expansion) did make it bureaucratic and low in responsiveness to the external environment. It was a proactive decision of MTRC management to conduct Benchmarking, which should change the environment from internally focused to externally focused and import business practice breakthrough. Even though the result of the exercise proved that MTRC ranked the best in most of the areas, it was still valuable to the company: it did help to demonstrate the value of the services which MTRC was providing to the passengers, thus provide a strong support to retain the Corporation's autonomy. Moreover, the exercise did have identified 2 areas of potential areas: Staff efficiency and Incident management for MTRC management to focus on for future improvement. This should provide valuable reference information for MTRC management to establish strategic goals and objectives for continuous improvement in efficiency and effectiveness.

Learning from best practices

The Process Benchmarking exercise conducted by one of the participating metro with MTRC was a good example to demonstrate how Benchmarking can help a company to learn and adopt the best practices. The project was an important continuation of the comparison of key performance indicators of the participating metros: Benchmarking should not just stop at that, it requires investigating the best practices that lead to the superior performances. On the other hand, MTRC, having identified its 2 areas of

weaknesses, should adopt a similar Process Benchmarking exercise to identify best practices in improving those areas.

Zairi(1995)³⁷ categorised best practices into: processes, organisational structures, management systems, human factors and strategic approaches. These all need to be investigated. Through steps such as process mapping of the exercise, the company could undertake a systematic understanding and analysis of its process, identify problem areas and bottlenecks. By analysing the performance gap in critical process measures, the process enablers(e.g. dwell time control method, measures to support efficient passenger flow etc.) that lead to superior performance. Other factors like company culture were also observed during the Benchmarking visit. It is through learning and adopting those practices that led to improvement in performance.

Better performance measurement

The international Benchmarking consortium successfully established an agreed set of key performance indicators for measuring performance of participating urban metros. They were even accepted and recognised as some international associations of metro business as a set of standards. Many of those indicators were important performance attributes based on previous customer survey by MTRC. With such a foundation on customer

needs, they may help the participating company to focus on areas that are critical to customer satisfaction. Moreover, based on such a measurement system, they may set aggressive but realistic goals to continuously improve customer satisfaction.

An effective performance measurement system is vital to success of nowadays companies. As mentioned by Eccles(1991)³⁸, companies in the 1990s have realised that the traditional performance system based on financial measures were inadequate. In fact, the traditional system was criticised to have the following shortcomings:

- It reinforces the investment community's short-term perspective and expectations. It induced the behaviours that managers tend to sacrifice long-term opportunities for short-term quarterly earnings. The numbers these systems generate often fail to support the investments in new technologies and markets that are essential for successful performance in global markets;
- Income-based financial figures are better at measuring the consequences of yesterday's decisions than they are at indicating tomorrow's performance.
- Under increasing pressure of competition plus the wave of Total Quality Movement, companies were forced to devise strategies driving at customer satisfaction.

³⁷ Mohamed Zairi 1995. *Benchmarking for Best Practice – Continuous learning through sustainable innovation*. Butterworth Heinemann.

³⁸ Robert G. Eccles 1991. *The Performance Measurement Manifesto*. Harvard Business Review Jan-Feb 1991.

In response to the above-mentioned problems, new performance measures were introduced to support the customer-oriented strategies. Examples of new performance measures were customer satisfaction, quality, market share, and human resources, which were mostly non-financial. There are some practical steps that companies need to go through in implementing and benefiting from such a performance measurement system. This usually involves work on the company's information system and human resources. Moreover, Eccles suggested the following steps:

- Developing an information architecture;
- Putting the technology in place to support this architecture;
- Aligning incentives with the new system;
- Drawing on outside resources and
- Designing a process to ensure that the other four activities occur.

Establishing such a performance measurement system is also crucial to Benchmarking, as it allows the required information can be captured and reported in an efficient manner for on-going comparison of performances. A well-structured system of capturing, analysing and reporting performance information is then required. An example can be:

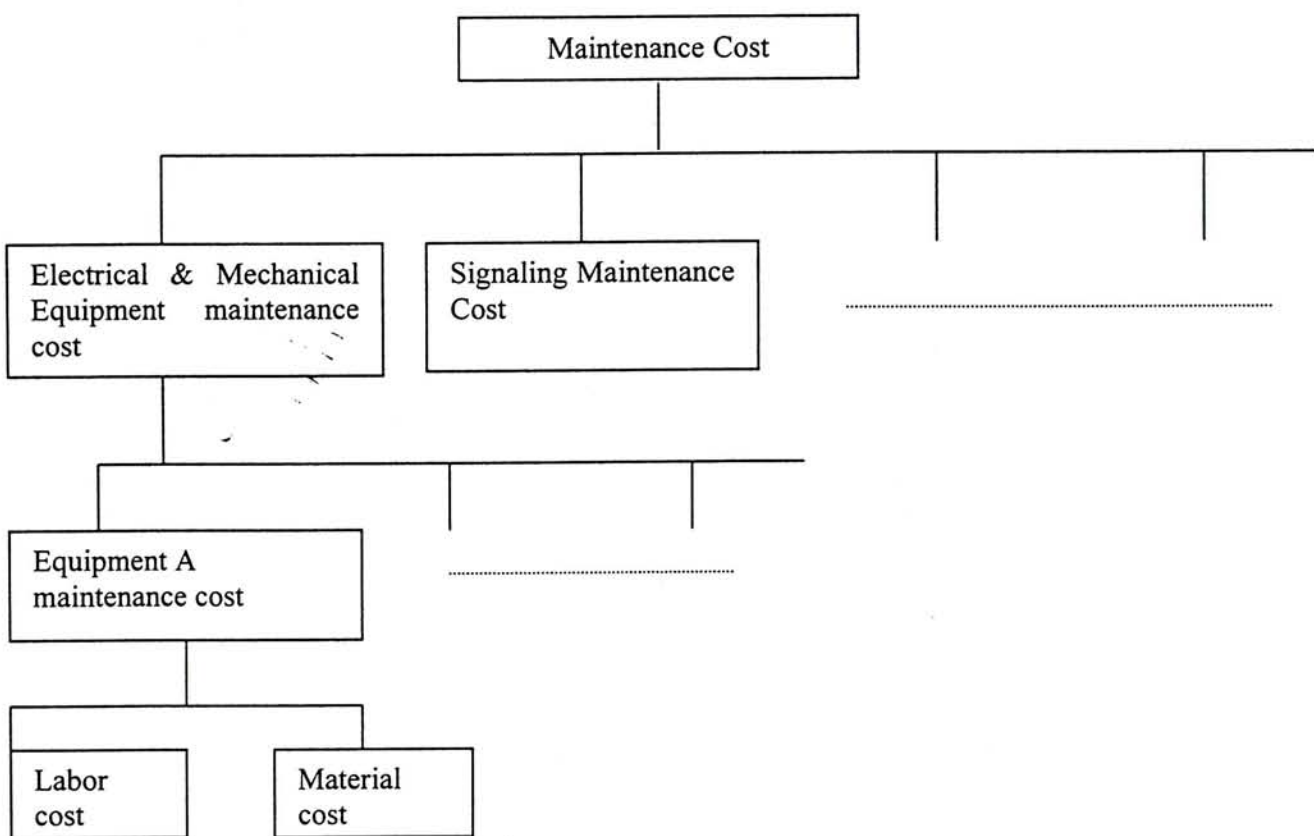


Figure 18 – Hierarchical structure of Performance measures

Moreover, companies like MTRC do regularly publishes both internally and externally the results of selected key performance areas, helping to gain recognition and attention from various organisational levels on them.

On the other hand, the established set of key performance indicators should not be exhaustive. In fact, each participating companies should more or less fine tune the set based on further understanding about the needs of their local customers, which may be different from those of MTRC. As suggested by Balm(1996)³⁹, the next milestone beyond Benchmarking should be *total customer satisfaction*: setting goals and objectives based on expectations of customers:

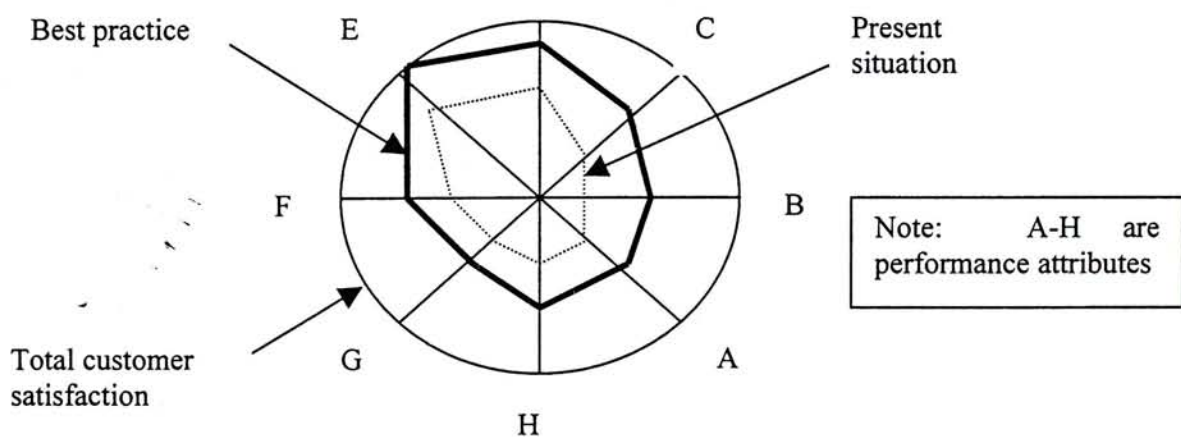


Figure 19 – The next goal beyond Gap analysis

This requires direct interaction with customers e.g. via survey to understand what business areas they are concerned and what level of performance will they feel satisfied. Goals and objectives should then be based such results. Balm even recommended that companies should aim at delighted customers, whose expectations have been exceeded by their performance.

³⁹ Gerald J. Balm 1996. *Benchmarking and gap analysis: what is the next milestone*. Benchmarking for Quality Management and Technology, 1996

Valuable relationship for continuous improvement

After the successful Benchmarking experience, the participating metros have agreed to maintain a long-term relationship in on-going exchange of performance information for Benchmarking. This is based on the established set of performance indicators. Other than that, sharing of information about technology advancement, best practices should be beneficial to each participant in the long run. A major factor contributing to successful establishment of such a relationship is the non-existence of any competition among all participants, thus leading to a willingness of exchange of company information with each other's. This will provide a way for the participants to sustain continuous improvement.

Implementation issues

After the Benchmarking experience has generated valuable ideas of best practices, the remaining step is implementation to realize the benefits to the business. Camp(1989)⁴⁰ suggested a number of steps for implementation:

- Strategic resource redirection: This requires bringing the competitiveness of the market place as incorporated by the industry best practices into the budgeting process. In other words, this entails setting correct goals and objectives assuming the business process is under external marketplace supply and demand conditions. In the case of

international Benchmarking, this may require goal-setting on key performance measures assuming adoption of identified best practices.

- Planning and execution by functional management. There are a number of alternatives on that:

Method of implementation	Strength	Weaknesses	Specially Applicable circumstances
Line management implementation	Line management understand operational details; thus increasing the probability of success & timely implementation	Lack of time and time taken away from supervising the daily operation.	Best practice ideas entirely within control of a function
Dedicated project team	Line management can concentrate on daily operations; Better handling of important inter-project or inter-functional considerations and dependencies	Lack of understanding of operational details; still need Line managers to possess expertise in the new practices nearby to carry out the actual changes	Upstream and downstream effects that need special expertise and time to resolve
Use of Process Czar	Process Czar can acquire and direct cross-functional resources to implement the best practices; he can also inspect and monitor the implementation process		Cross-functional business processes affected
Performance teams (Quality Circle)	Implementers involved in work process directly		

Table 5 – Alternatives for Implementation

⁴⁰ Robert C. Camp 1989. *Benchmarking – The search for industry best practices that lead to superior performance*. ASQC Quality Press

In the case of International Benchmarking, since the key performance areas are very high level global measures and cover a broad range of business attributes (e.g. covering finance , engineering and operations). It is expected that the best practice ideas will affect cross-functional business processes. Hence, a Process Czar, who should be a senior manager that possess authority in changing the process, need to be appointed to ensure the identified best practices can be implemented effectively.

- Monitoring and reporting progress: This requires monitoring and reporting of high visibility metrics that indicate the progress towards efficiency. They should also be reviewed at appropriate intervals along with a view of specific benchmark project milestones. For the case of international Benchmarking of MTRC, management did have published the results of the exercise through internal publications widely within the Corporation. Other than reporting progress of the project, this could help to promote the recognition of Benchmarking within the organization.

- Middle management support: It is anticipated that resistance to change when implementing the findings of Benchmarking may be encountered. One underlying reason being that incumbent middle management may be defensive against the conclusions that their performance were inferior. They may attempt to explain the performance gap by excuses that are beyond their control(e.g. difference in political environment). It is crucial to gain the support of middle management to realize measurable benefits by Benchmarking.

Some writers have investigated the critical successful factors of gaining measurable benefits through implementing improvement initiatives such as TQM.

Martin(1995)⁴¹ reported that in a survey of more than 100 businesses operating within the UK, 80% of them were unable to provide information relating the measurable business improvement at all. Moreover, gaining middle management commitment to the change process was identified as one of the major challenges to successful implementation of improvement initiatives. The reason being that they are the people who can make change happen swiftly or prevent the success of initiatives. This same body of managers also exercise considerable influence over the development of the culture of the organization. Some of the reason of reluctance by middle management to change were:

- ⇒ fear that a previous inability to recognize problems and effect appropriate solutions will expose individual weaknesses.
- ⇒ a shared concern about individual ability to manage within the new environment and a perception that the change process will involve solutions which are more painful than living through present day problems.

He pointed out that management played a role of transforming leadership: through their own actions in establishing leadership in supporting central quality and improvement theme, they can set examples to be emulated by others. The

⁴¹ Steve Martin 1995. *Focus on the middle*. Best Practice November 1995.

transforming leadership will have a great impact upon effecting the organizational culture change by influencing attitudes and norms, and sharing values within the company. Moreover, middle managers are the ones to convert an organization's strategy and policy into operational objectives.

For successful implementation, Martin suggested to redefine the role of middle management, which should no longer be one of the supervision of their subordinates, but will concentrate on continually improving the processes under their control. A number of measures was proposed to effect such a cultural change e.g. training, education and development. Moreover, forming cross-functional teamwork for problem definition and resolution can encourage the ownership and commitment of employees.

CHAPTER VII

CONCLUSIONS

It has been concluded that the International Benchmarking exercises have successfully generated beneficial results to the participants. The benefits included:

- Identifying the strengths and weaknesses of the participants
- Learning the best practices by comparing the key performance indicators and conducting Process Benchmarking case studies
- Introducing better and customer-oriented performance measurement
- Establishing a long-term relationship for sharing of information for particular problem

The experience also provided a good illustration of a successful Benchmarking process: to identify the best performer based on comparison of performance data, then investigate and learn the best practices that contribute to the superior performance. The resulting impact was **both at the strategic and operational level.**

To summarise the success factors of such a Benchmarking study, one may base on the principles of successful Benchmarking as mentioned by Watson 1993⁴²:

□ **Reciprocity**

Benchmarking is a practice based on reciprocal relationships, as reflected in the popular phrase “creating a win-win relationship”. The Benchmarking consortium successfully applied such a principle due to non-existence of any competition among the participants. Equally important is the establishment of agreed information boundaries and data exchanges method by negotiation among the participants. Moreover, a principle of confidentiality in information sharing has been drawn up to protect the interests of the participants.

□ **Analogy**

Operational processes must be comparative or analogous if the highest degree of knowledge transfer between Benchmarking partners is to be achieved. Any work process from any company may be evaluated, as long as the team conducting the study is able to translate the other organisation’s cultural, structural, and business context into its own. This condition was satisfied by proper selection of Benchmarking participants: all of them are urban metros whose business nature were

very much similar. Moreover, a comprehensive understanding about the company has been gained by survey and Benchmarking visit, to identify any differences in culture, structure and business context of the organisation. The performance data(e.g. financial indexes) were also adjusted considering the variety in local living standard.

□ **Measurement**

Benchmarking is a measured performance comparison between two companies; the objective is to understand why the varying degrees of performance exist and how the higher degree of performance was obtained. Careful measurement and observation of analogous processes ultimately enable companies to adapt identified process enablers to their own processes (Process enablers are the why and how of process performance).

⁴² Gregory H. Watson 1993. *Strategic Benchmarking – How to Rate Your Company's Performance against the World's Best*. John Wiley and Sons, Inc. pg 47-50

The principle has been followed by the Benchmarking experience. For example, the Process Benchmarking study approach adopted by one of the participants with MTRC gave a good illustration. The key business processes were mapped out in detailed, in which process performance measures in critical areas were identified and compared with those of MTRC. Though MTRC did not have data for all identified measures, the comparison did generate a good insight into how MTRC attained its superior performance.

□ **Validity**

In order to observe and correlate process enablers (the specific practices that caused increased performance) with the process performance measures, valid facts and data must be collected and used for process comparisons. This has been one of the difficult areas encountered along the exercise. In fact, in the early phases of the study, many participants found it difficult to obtain and locate particular data for their own. Also there were inconsistencies in tolerance levels and methodology of capturing data for particular measures.

The consortium did spent a lot of effort in establishing an agreed set of performance measures which could effectively measure the business performance of participants; but also could be provided by them reliably without much difficulties. The co-ordinator and administrator thus had to perform a lot of steps to refine the data. For example, logical

cross-checks between different data elements, different participants and different years, reconciliation against published financial accounts, reviewing all definitions and liaising with all participants to arrive at the most logical data source selection and a consistent set of procedures for capturing and reporting information.

The set of performance indicators finally agreed were limited to those that could be provided by participants but still could provide a comprehensive overview on a metro business. The set of measures were also set up for long-term comparison and monitoring.

On the other hand, the decision of the consortium to make it an on-going Benchmarking exercise has provide it with a way to sustain **Continuous Improvement**.

Implementation is the next important stage of Benchmarking after the previous stages of performance comparison and identifying the best practices. Regarding such a step, standard approaches have been proposed by various writers e.g. Camp(1989)⁴³ on Benchmarking. It aimed at implementing the best practices to the existing business processes. It is expected that steps like strategic resource redirection, planning and execution by functional management, monitoring and reporting progress are critical steps to follow. The appointment of a Process Czar was recommended due to the Corporate-wide nature of the Benchmarking exercise. However, the road of implementation should not be one totally free from difficulties. For example, it is anticipated that

resistance of change may be encountered at middle management level who may be reluctant to I) admit that their performance need improvement and II) adapt to the new and improved practices. A long-term solution to such a problem is for top management to change the role of middle management from only supervision of routine operations to continuously looking for the opportunities of improvement.

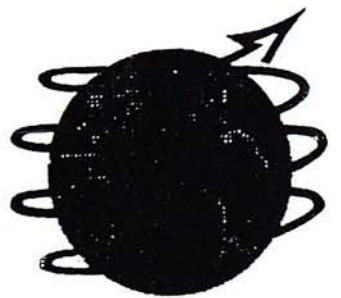
⁴³ Robert C. Camp 1989. *Benchmarking – The search for industry best practices that lead to superior performance*. ASQC Quality Press pg 206-210

APPENDIX



The Benchmarking Code of Conduct

REFERENCE



INTERNATIONAL
BENCHMARKING
CLEARINGHOUSE



Preamble

Benchmarking—the process of identifying and learning from best practices anywhere in the world—is a powerful tool in the quest for continuous improvement and breakthroughs.

To guide benchmarking encounters, to advance the professionalism and effectiveness of benchmarking, and to help protect its members from harm, the International Benchmarking Clearinghouse, a service of the American Productivity & Quality Center, has adopted this Code of Conduct. Adherence to this Code will contribute to efficient, effective and ethical benchmarking.



Benchmarking Code of Conduct

1.0 Principle of Legality

- 1.1 If there is any potential question on the legality of an activity, consult with your corporate counsel.
- 1.2 Avoid discussions or actions that could lead to or imply an interest in restraint of trade, market and/or customer allocation schemes, price fixing, dealing arrangements, bid rigging, or bribery. Don't discuss costs with competitors if costs are an element of pricing.
- 1.3 Refrain from the acquisition of trade secrets from another by any means that could be interpreted as improper including the breach or inducement of a breach of any duty to maintain secrecy. Do not disclose or use any trade secret that may have been obtained through improper means or that was disclosed by another in violation of duty to maintain its secrecy or limit its use.
- 1.4 Do not, as a consultant or client, extend benchmarking study findings to another company without first ensuring that the data is appropriately blinded and anonymous so that the participants' identities are protected.

2.0 Principle of Exchange

- 2.1 Be willing to provide the same type and level of information that you request from your benchmarking partner to your benchmarking partner.
- 2.2 Communicate fully and early in the relationship to clarify expectations, avoid misunderstanding, and establish mutual interest in the benchmarking exchange.
- 2.3 Be honest and complete.

3.0 Principle of Confidentiality

- 3.1 Treat benchmarking interchange as confidential to the individuals and companies involved. Information must not be communicated outside the partnering organizations without the prior consent of the benchmarking partner who shared the information.
- 3.2 A company's participation in a study is confidential and should not be communicated externally without their prior permission.

4.0 Principle of Use

- 4.1 Use information obtained through benchmarking only for purposes stated to the benchmarking partner.
- 4.2 The use or communication of a benchmarking partner's name with the data obtained or practices observed requires the prior permission of that partner.
- 4.3 Contact lists or other contact information provided by the International Benchmarking Clearinghouse in any form may not be used for purposes other than benchmarking and networking.

BENCHMARKING PROTOCOL

Benchmarkers:

Benchmarking visit guidelines

- ◆ Know and abide by the Benchmarking Code of Conduct.
- ◆ Have basic knowledge of benchmarking and follow a benchmarking process.
- ◆ Prior to initiating contact with potential benchmarking partners, have determined what to benchmark, identified key performance variables to study, recognized superior performing companies, and completed a rigorous self-assessment.
- ◆ Have a questionnaire and interview guide developed, and share these in advance if requested.
- ◆ Possess the authority to share and are willing to share information with benchmarking partners.
- ◆ Work through a specified host and mutually agreed upon scheduling and meeting arrangements.

When the benchmarking process proceeds to a face-to-face site visit, the following behaviors are encouraged:

- ◆ Provide meeting agenda in advance.
- ◆ Be professional, honest, courteous, and prompt.
- ◆ Introduce all attendees and explain why they are present.
- ◆ Adhere to the agenda.
- ◆ Use language that is universal, not one's own jargon.
- ◆ Be sure that neither party is sharing proprietary information unless prior approval has been obtained by both parties, from the proper authority.
- ◆ Share information about your own process, and, if asked, consider sharing study results.
- ◆ Offer to facilitate a future reciprocal visit.
- ◆ Conclude meetings and visits on schedule.
- ◆ Thank your benchmarking partner for sharing their process.

5.0 Principle of Contact

- 5.1 Respect the corporate culture of partner companies and work within mutually agreed procedures.
- 5.2 Use benchmarking contacts, designated by the partner company if that is their preferred procedure.
- 5.3 Obtain mutual agreement with the designated benchmarking contact on any hand-off of communication or responsibility to other parties.
- 5.4 Obtain an individual's permission before providing his or her name in response to a contact request.
- 5.5 Avoid communicating a contact's name in an open forum without the contact's prior permission.

6.0 Principle of Preparation

- 6.1 Demonstrate commitment to the efficiency and effectiveness of benchmarking by being prepared prior to making an initial benchmarking contact.
- 6.2 Make the most of your benchmarking partner's time by being fully prepared for each exchange.
- 6.3 Help your benchmarking partners prepare by providing them with a questionnaire and agenda prior to benchmarking visits.

7.0 **Principle of Completion**

- 7.1 Follow through with each commitment made to your benchmarking partner in a timely manner.
- 7.2 Complete each benchmarking study to the satisfaction of all benchmarking partners as mutually agreed.

8.0 **Principle of Understanding and Action**

- 8.1 Understand how your benchmarking partner would like to be treated.
- 8.2 Treat your benchmarking partner in the way that your benchmarking partner would want to be treated.
- 8.3 Understand how your benchmarking partner would like to have the information he or she provides handled and used, and handle and use it in that manner.

BENCHMARKING WITH COMPETITORS

The following guidelines apply to both partners in a benchmarking encounter with competitors or potential competitors:

- ◆ In benchmarking with competitors, establish specific ground rules up-front, e.g. "We don't want to talk about things that will give either of us a competitive advantage, but rather we want to see where we both can mutually improve or gain benefit."
- ◆ Benchmarkers should check with legal counsel if any information gathering procedure is in doubt, e.g., before contacting a direct competitor. If uncomfortable, do not proceed, or sign a security/non-disclosure agreement. Negotiated a specific non-disclosure agreement that will satisfy the attorneys from both companies.
- ◆ Do not ask competitors for sensitive data or cause the benchmarking partner to feel they must provide data to keep the process going.
- ◆ Use an ethical third party to assemble and "blind" competitive data, with inputs from legal counsel in direct competitor sharing. (Note: When cost is closely linked to price, sharing cost data can be considered to be the same as price sharing.)
- ◆ Any information obtained from a benchmarking partner should be treated as internal, privileged communications. If "confidential" or proprietary material is to be exchanged, then a specific agreement should be executed to indicate the content of the material that needs to be protected, the duration of the period of protection, the conditions for permitting access to the material, and the specific handling requirements that are necessary for that material.

FOR MORE INFORMATION, CALL OR WRITE:
International Benchmarking Clearinghouse
American Productivity & Quality Center
123 North Post Oak Lane, 3rd Floor
Houston, Texas 77024-7797
800-776-9676 or **713-685-4666**
Fax: **713-681-5321**



Appendix 2: Meta-Model for Benchmarking

Planning a Benchmarking Project
<ul style="list-style-type: none"><input type="checkbox"/> Select the processes to benchmark<input type="checkbox"/> Gain participation of the process owner<input type="checkbox"/> Select the leader for the Benchmarking team and identify the team for Benchmarking<input type="checkbox"/> Identify the process customer's profile and set of expectations<input type="checkbox"/> Analyse process flow and process performance measures<input type="checkbox"/> Document and flow diagram the process<input type="checkbox"/> Identify generic versions of the process-performance measures<input type="checkbox"/> Select the critical success factors to benchmark<input type="checkbox"/> Establish the data-collection method
Collecting Data
<ul style="list-style-type: none"><input type="checkbox"/> Collect internal process data<input type="checkbox"/> Research similar processes through secondary sources<input type="checkbox"/> Identify best-in-class<input type="checkbox"/> Plan data collection<input type="checkbox"/> Develop survey or interview guide<input type="checkbox"/> Select the processes to benchmark<input type="checkbox"/> Gain participation of the process owner<input type="checkbox"/> Select the leader for the Benchmarking team and identify the team for Benchmarking<input type="checkbox"/> Identify the process customer profile and their set of expectations<input type="checkbox"/> Analyse process flow and process-performance measures<input type="checkbox"/> Contact Benchmarking partners and gain participation<input type="checkbox"/> Collect preliminary data<input type="checkbox"/> Make on-site observations
Analysing Data for Performance Gaps and Enablers
<ul style="list-style-type: none"><input type="checkbox"/> Organise and reformat the data to permit identification of performance gaps<input type="checkbox"/> Normalise performance to a common base<input type="checkbox"/> Compare current performance against the benchmark<input type="checkbox"/> Identify gaps and their causes, and highlight the reason that the gap exists<input type="checkbox"/> Project the performance three to five years into the future<input type="checkbox"/> Develop "best practice" case studies<input type="checkbox"/> Isolate process enablers that correlate to process improvements<input type="checkbox"/> Evaluate the nature of the process enablers and best practices to determine their adaptability to company's culture

Improving by Adapting Process Enablers and Best Practices

- ❑ Set goals to reduce, meet and then exceed the performance gap
- ❑ Modify process enablers and best practices to meet the company culture and organisational structure
- ❑ Gain acceptance, support, commitment, and ownership for changes required
- ❑ Develop an action plan
- ❑ Commit the resources required for implementation
- ❑ Implement the plan
- ❑ Monitor and report progress toward the goal
- ❑ Identify opportunities for future Benchmarking and recalibrate the measure regularly

Appendix 3: Comparison of different Benchmarking models by Zairi

Methodology	Strategic Focus	Operational Focus	Customer Focus	Process Based	Linked to TQM	Continuous (PDCA)	Learning Organisation	Aggregate
Xerox(Camp)	2	2	3	2	2	3	3	17
PO Counters Ltd	1	3	1	3		2		10
Royal Mail			1	3	2	2		8
IBC	2	2	3	3	3	3	2	18
Vaziri	3		3	3	3	2		14
Price Waterhouse	2	2	2		1	3		10
McKinsey	3		1	3	1			8
Codling	3	2	2	3	2	3	2	17
McNair & Leibfried	3	2	2	2	2	3		14
AT&T	3		1	3	3	3		13
Alcoa	3		3	1	3			10
NCR								0
TNT				3		2		5
Schmidt	3		3					6
Aggregate	28	13	25	29	22	26	7	

Scoring scale:

- 1 = A strong link between the methodology and particular attribute.
- 2 = A moderate link between methodology and attribute.
- 3 = A weak link between the methodology and the attribute.

Appendix 4: Sample questionnaire for International Benchmarking

Seq	Data title	Values for 1994	Data sources	Critical assumptions	Error margin/ Tolerance	Potential causes	Remarks
<i>Background information</i>							
1	Company Profile						
	Railway name						
	Legal status						
	Address of railway benchmarking representative						
	Year of establishment						
	Commercial service commencement date						
	Average network age by length						
	Network guages						
2	Railway background						
	Route length by line						
	Number of lines						
	Number of depots						
	Number of stations						
	Number of rail cars						
	Number of cars per train						
	Minimum network headway						
	Maximum line speed						
	Operating hours per weekday						
	Duration of morning peak per weekday						
	Duration of evening peak per weekday						
3	Passenger information						
	Passenger kilometers travelled						
	Design standard for seated passengers per car						
	Other information						
	Description on organisational structure						
	Description of fare system						
	Description of traffic management system						
<i>Operational data</i>							
4	Revenue car operating km or car operating km						
5	Total staff hours or personnel hours						
	operating staff hours						
	maintenance staff hours						
	administrative/other staff hours						
6	Total contractor hours						
7	Passenger journeys						
8	Revenue capacity operating km or Operated capacity km						
9	Operated capacity utilisation rate						
10	Service operating costs or Operating cost						
11	Maintenance cost						
12	Total costs						
	Administration and other						
	Mean annual capital investment costs over past 10 years						
	Interest charges						
	Depreciation						
13	Fare revenue						
14	Average fare level						
15	Other commercial revenue						
16	Passenger km						
17	Track km						
18	Revenue car operating hours or Car operating hours						
19	Total hours train delay						
20	Total number of incidents						
21	Number of trains on time						
22	Total number of trains operated						
23	Total passenger hours daily						
24	Passenger journeys on time						

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