CHAPTER II

LITERATURE REVIEW

Currently, Benchmarking is widely-used in many competitive organizations in the U.S. and innovative companies that wish to achieve business advantages and world-class operations.

Benchmarking can be used as a competitive tool for continuous performance improvement and can be applied for improving Aerothai's ATC services. As a new approach,benchmarking can facilitate the continuous measurement of Aerothai's services against the benchmarked company recognized as the world leader in order that Aerothai gain the information that will assist in improving the services.

The research study aims at improving Aerothai's ATC services by using benchmarking as a competitive tool. The research study cannot reach the objective and be completed without the background of benchmarking.

Below is the literature review related to benchmarking and air traffic control.

2.1 Literature Review related to Benchmarking

Xerox Corporation

The Xerox corporation is recognized as the leader in the development of benchmarking. Xerox first started to conduct benchmarking in 1979 due to high competitive pressure from Japanises companies. Xerox focuses on competitive benchmarking. Xerox benchmarked with Japanese companies such as Canon, and Minolta. This benchmarking focuses on the unit manufacturing costs. In 1982 , Xerox benchmarked the logistic and distribution process with L.L. Bean. In 1990,

Robert C. Camp and his colleagues at Xerox developed the benchmarking process into a ten-step process.

The Xerox's Ten-Step Process

Planning Phase

Step 1 Identify benchmark output

Step 2 Identify best competitors

Step 3 Determine data collection method

Analyzing Phase

Step 4 Determine current competitive gap

Step 5 Project future competitive performance level

Integration Phase

Step 6 Communication of data, acceptance of analysis

Step 7 Develop new goals and functional action plans

Action Phase

Step 8 Implement specific actions

Step 9 Monitor results and report progress

Step 10 Re-calibrate benchmarks

(Finnigan. 1996)

AT&T

In 1987, AT&T started to conduct benchmarking the software development process capability for twenty-five products against the standard industry. AT&T used benchmarking to learn best practices from many companies in order to motivate the performance improvement across diverse organization (Finnigan ,1996).

The AT&T Bell Laboratories conducted benchmarking to search for the best practices in R&D process by focusing on process innovation and improvement. AT&T established R&D process team to define the benchmarking area of focus as 1) R&D performance 2) R&D technology and process capabilities and 3) R&D management system.

The AT&T's R&D process team focuses on process benchmarking. The R&D process team lists the activities of process benchmarking as follows:

1) Facilitate discussions to establish the scope of effort and develop a project plan.

2) Perform preliminary research to identify important area of focus and potential organizations to benchmark.

3) Assist team members to develop a baseline view of AT&T's R&D process characteristics and performance regarding the focus area.

4) Establish criteria for and assisting team member in the final selection of organizations to benchmark.

5) Perform additional research and arrange direct benchmarking exchanges with the organization selected.

(Bean and Gros , 1992)

Shell Oil Company

In 1989 – 1990, the SRI international conducted the benchmarking for Shell Oil Company's operations for searching the best practices in terms of the effectiveness of technical support delivery.

- The SRT's benchmarking focuses on internal benchmarking for Shell Oil's internal operations and benchmarked with other companies both in the same industry and other industries in terms of technical support delivery.
- The benchmarking selected 17 companies in technical support delivery and developed eight key factors for success and set them as the baseline for comparison and measurement.

- The benchmarking developed the measurement for each key factor for success. The companies were rated for each measurement and ranked on composite scores for each key factor for success.
- Ratings were based on SRT interviews at each participating company. The Score rating for each key factor for success rated from 1 to 5.
- SRT profiled the companies and compared the overall averages by using the score rating for each key factor for success.
- Deviations from the norm, strengths and improvement opportunities were identified. (Coleman,1993)

Motorola

In 1980, the Motorola stared to conduct benchmarking at the Motorola's Bandit plant, fort Baynton Beach, Florida. The benchmarking team at Motorola's Bandit benchmarked with other companies such as Honda's just-in-time manufacturing process and Sieko's robotics techniques, including other Motorola operations computer integrated Manufacturing (CIM) techniques. The results of benchmarking best practices in terms of competitive techniques such as design for manufacture ability, design for assemble. The Motorola is recognized for quality improvement effort because its benchmarking was a powerful tool in its improvement process.

(Finnigan ,1996)

General Electric (GE)

GE first conducted benchmarking at GE's appliances plant in Louisville, Kentucky. The study focused on benchmarking input and the plant's own process mapping. The benchmarking results can assist GE's appliances plant at Louisville speed up its manufacturing rate and cut cost.

(Finnigan , 1996)

IBM

In 1960, IBM conducted internal benchmarking because a great deal of variation in performance among location had occurred.

IBM developed the key measurement indicator for such functions as development engineering, product engineering , quality assurance and personnel. The key measurement indicators are such as new product cycle time, R&D cost per patent, span of control, etc.

The results of benchmarking assisted IBM in determining the best production processes and adopting the processes as the corporate standard and gained IBM an internal competitive advantage.

(Harrington and Harrington , 1996)

Digital Equipment Corporation (DEC)

In 1980, Digital Equipment conducted benchmarking that assisted DEC to become one of the best-in-class operations in electronic fund direct deposit and standization. Many payroll departments throughout the world used the Digital Equipment as the benchmarking partner to benchmarked in terms of payroll and deposit processes.

Many other companies in the US. conduct benchmarking. Most of those companies received Malcolm Baldrige Quality Award. Those companies involved in the benchmarking process are such as Hewlett Packard, IBM, Xerox, Alcoa, AT&T, Boeing, Florida Power & light, 3M , NCR, Milliken, L.L. Bean, Digital Equipment Corporation, Eastman Kodak , Hughes Aircraft, Ritz-Carton Hotel, etc.

(Harrington and Harrington, 1996)

Gallwey et al. (1995)

Presented a technical research paper that described the important role of benchmarking as a part of total quality improvement that gained benefits for the company.

Crom and Napier (1995)

Presented a technical research paper that described the important role of benchmarking for creating customer value and delivering its value to a marketplace.

Moseng (1995)

Presented a technical research paper that described the essential four methods : self audit, external audit, self assessment, and benchmarking are tools for measurement of the company productivity and competitiveness.

Pettersen (1995)

Presented a technical research paper that explained and gave the example of how benchmarking can be used as a tool for problem solving in addition to being a tool for comparison or evaluation. This paper explained that benchmarking can be used as a tool for identifying and analyzing different ways for implementing the chosen product strategy by learning from other organizations in the same situation.

Lucertini et al. (1995)

Presented a technical research paper that presented a modeling approach to benchmarking. This paper produced a structured methodology for benchmarking. The four types of benchmarking were addressed : goal benchmarking, organizational benchmarking, integration benchmarking and implementation benchmarking.

Child and Smart (1995)

Presented a technical research paper that presented the modeling technique such as IDEF0 that can help the company to establish a baseline for comparison.

Gertsen et al. (1995)

Presented a technical research that proposed to use the results of an international survey as a basis for reference points and to use the questionnaires as a tool for assessing the company's goal , performance and practices.

Andersen (1995)

Presented a technical research paper that introduced TOPP program, a Norwegian-made program aimed at improving the productivity of Norwegian Technology Industries by introducing benchmarking into the companies as a tool for attacking a specific problem of current situation.

2.2 Literature Review related to Air Traffic Control

Japan International Cooperation Agency (JICA) (1998)

Presented the study on airport development master plan in the Kingdom of Thailand. The study addressed the policies for the development and operation of the air transportation system of Thailand. Some of the policies are associated with Aerothai for the development of Thailand's air transportation system.

Rehmann and Tuttle (1998)

Presented a technical paper that explained the role of FAA in the development and improvement of air traffic control system in the year 2000. The paper addressed the key development such as infrastructures and air traffic control technology.

Jeanniot (1998)

Published a technical paper that explained the role of European air traffic control system in the development and improvement of air traffic control system in the year 2000.

Raftery (1998)

Presented a technical research paper that explained the role of professional services in air traffic services such as EUROCONTROL in the development of air traffic control in Europe.

Tuttle (1998)

Presented a technical research paper that explained the role of professional services such as FAA in the development of air traffic control system. The paper addressed the key practices and operational concept associated with flight 2000.

Castles (1997)

Published a technical paper that explained the nature and structure of air traffic control services organization and its business. This paper discussed the relationship between the services charges and the investment of ATC technology.

Strande (1995)

Publisheded a technical paper that explained a business view of air traffic control technology view including the key problems affecting air traffic control.

Au (1998)

Presented a technical paper that presented the development of air traffic control system in Hong Kong. This paper addressed the problems affecting ATC and seek a way to improve its air traffic control system.

Matsumoto (1998)

Presented a technical paper that described the next generation aviation system and aviation safety. He explained the role of new technology and system in improving aviation safety.

Stoner (1995)

Published a technical paper that described the role of automation and decision support tool for carried out the tasks of air traffic control.

White (1997)

Published a technical paper that represented the EUROCONTROL's program in which to increase system capacity in Europe including technology and tool associated with system capacity enhancement.

Hume (1997)

Published a technical paper that described the development of air traffic management in which to address the systems , technologies and operating concept that support the development of air traffic management in Europe.

Dickhaut (1996)

Published a technical paper that provided the overview of the development of DFS, Germany's air traffic control organization, in terms of infrastructure development.