Chapter 1

1.0 INTRODUCTION

1.1 Background of the Study.

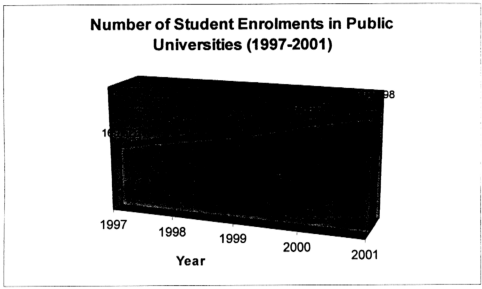
The Malaysian higher educational sector has undergone tremendous structural changes with the rapid growth of Institutions of Higher Learning (IHLs) over the last decade. The structure of this education sector can be categorized mainly into two major groups, the public and private IHLs. Public IHLs are defined as higher educational institutions established by the Government under the Universities and Universities College Act 1971, while private IHLs are the privately funded institutions including branch campuses, which have been approved and registered under the Private Higher Education Institutions Act (PHEIA). Nevertheless, there also a handful of private IHLs which are partially funded by the government[1] Under the Ministry of Education, the public IHLs takes the form of public universities, polytechnics, and colleges[2]. The privately -funded IHLs, of which all have to be licensed by the Ministry of Education are put into the sub-categories of Non-universities status (private colleges and private institutions), and University Status (private universities, Universities Colleges and Foreign University Branch Campuses)[3]. The public IHLs were established under the governance of a series of legislation enactments, i.e. the University and University Colleges Act 1971, the Companies Act 1965; and MARA Institute of Technology Act 1976 (superceded by the Amendment Act 1996, Amendments Act 2000). Only six public universities were established in the period 1960 through to 1980. During the 1990s, five public universities and two university colleges were set up, followed by another four university colleges established in the new millennium. Until 2003, there were 17 public universities as listed in the Department of Higher Education Statistics (MOE, 2003). Appendix 1.1 lists the details of the public IHLs with their respective year of establishment.

The growth and establishment of private IHLs, was much more rapid following the passing of the PHEIA in 1996. As identified by Tan (2002) in a study of Malaysian Private Higher Education, there were three specific generations of private IHLs. Two generations of the pre-legislation period with the third generation emerging in the 1996 legislation period. The former two were marked, firstly, during and before the 1980s; and secondly, when the country was experiencing economic boom and was undergoing some structural changes in the economic sector. Some examples of the three generations of private IHLs are shown in Appendix 1.2. In her study, Tan indicated that there was more than a two-fold increase in the number of private colleges in Malaysia itself from 280 in 1995 to 511 in 1999. The reason behind this lay in the preamble of PHEIA which confirmed that apart from private universities, university colleges, and private colleges; other institutions such as tuition centers, training centers, language centers (for instance the British Council) and professional organizations like Malaysian Institute of Management (MIM) are all private higher educations.

Two major catalysts to the mushrooming of private IHLs are, firstly, the rapid increase in the demand for high-level manpower at the peak of the economic boom. It was impossible for the public sector to meet this demand. Secondly, the global rapid growth of information technology (IT) geared the objective of Malaysian education towards an emphasis on science and technology and greater usage of IT (Noran & Abdullah, 1997). The other catalyst was the drastic fall in value of the Malaysian Ringgit in July 1997. This currency crisis precipitated an almost 70% reduction in the number of sponsored students sent abroad during this six year period from 1996 to 2001 (MOEa, 2001). This factor coupled with immense demand for intellectual manpower from the business sector resulted in a

huge increase in the demand for places in the IHLs. Figure 1.2 illustrates the increasing number of student enrolments in the public IHLs for the period of 1997-2001.

Figure 2.1



Source: Department of Higher Education, Ministry of Higher Education, 2001

The significant increase in the number of student enrolment in the private IHLs relative to the public IHLs was also marked with 232,069 student enrolled in private IHLs as at 31 May 2001 (Lee, 2002). With this rapid emergence of private IHLs and the increase in the number of programmes offered, there was increasing concern about the accountability, value, integrity and quality of these programmes. These led to the enactment of the National Accreditation Board Act in 1996. The National Accreditation Board (NAB) was formed to undertake the quality control issues of private IHLs through a system of accreditation and compliance to minimum standards. Soon, the need for public IHLs to start working on academic quality improvement took center stage.

The setting up of the Quality Assurance Division in 2001 in the Department of Higher Education is to enhance and safeguard the quality provision and standards in higher education. The Quality Assurance Code of Practice was compiled later in March 2002 providing the proper guidelines for the public IHLs. The ISO certification, particularly the ISO 9001:2000 framework was used by the universities as the base to develop their own Quality Management Unit. In the University of Malaya, for example, the Quality Assurance Management System (QAMU) aims to continually improve organizational performance by focusing on customers as well as addressing the needs of other stakeholders (Ghaffar, Ghazali, Nik & Muhamad, 2004). Students, parents, the government itself, future employers are all stakeholders of the public IHLs.

At one end of the spectrum, IHLs in Malaysia appear to be on the right track. Measures have been taken in attempt to ensure the product and services they provide fulfill customer's requirement and satisfaction. This includes the emphasis on quality assurance with constant monitoring and attention towards continual improvement. At the other end of the spectrum, doubt arises as to whether the resources allocated and funds provided have been spent efficiently by the IHLs .Whether funds and resources allotted to IHLs have been efficiently utilized should be of paramount consideration. Yet this issue is unfortunately dimly addressed, particularly, where the public IHLs are concerned.

During the last decade, many government–owned higher education institutions in the USA, the UK and Australia were suddenly confronted with the issues of accountability and cost effectiveness (Research Notes, 2002). The upcoming trend amongst public educational institutions worldwide is performance measurement reporting. Performance measurement, apart from providing useful information to the stakeholders (for example, to students who have to select which institutions to enroll into and to "value for money conscious parents" who cough up the cost of putting their children through higher education.), can also add rationality to ways in which funding decisions are made (Schmidt, 1998).

In recent years, the issues concerning higher education performance measurement have also become a pressing concern in Malaysia. One of the major concerns of planning higher education is the issue of public interest. There must be efficient use of the limited public funds available in view of the fact that there are competing public demands for better health facilities, welfare services and others.

The public funding figure for Malaysian public higher education is close to 90% of its running cost (Ahmed, 2000). However, these universities were also made to understand that in the future, government funding would not be more than 70% of their running cost (Ahmed, 2000).

More recently, recommendations have been made on the need for a ranking or rating system for IHLs in Malaysia[4]. Such an announcement was personally made by our honorable PM, Dato' Seri Abdullah Hj. Ahmad Badawi in 2004, in the hope to foster healthy competition between the institutions, thereby providing a catalyst for motivating improvement in the quality of teaching and learning (Abdullah, 2004). The fact that quality of higher education in Malaysia has been raised as a matter of public concern was highlighted by the Malaysian Institute of Economic Research (Wong, 2001). Of late, even the question on the effectiveness of quality assurance implementation within IHLs has also been raised (Ling, 2004). Hence, it is apparent that public institutions are subject to great scrutiny from policy-makers, experts and practitioners.

This study is an attempt to gauge the efficiency of public higher education. For the purposes of this research the scope of this efficiency study is limited to the Malaysian public universities only.

1.2. Significance of the Study

The current situation of an ever-increasing number of student enrolment in the Malaysian public IHLs coupled with the emergence of new public as well as private IHLs (Education Guide MALAYSIA, 2004) could further deplete the resource pool of public funding. Hence performance based funding must be given paramount consideration in the planning of higher educations in Malaysia. The measurement of performance would give an insight into aid funding decisions. It will lead to a more efficient allocation of educational resources to the public IHL. It would also act as the catalyst which will further develop the research capacity of higher education. Inevitably, the performance measurement and ranking will spur greater efficiency and quality. It is actually an essential part of the implementation, monitoring and evaluation of the higher education sector reforms.

This study will also enlighten stakeholders, not only the Ministry of Higher Education but the university, the students and parents, the employers, the funding agencies as to how decisions and policy making are implemented. The main significance, however, for this research study is the fact that it fills the lacuna in Malaysian literature on public higher education efficiency using DEA, in particular. This study is the first of its kind undertaken in the country in the higher education sector.

1.3. Research Problem.

The Higher Education Ministry is attempting to rank the various universities and to identify the best practice university. Currently, the quality assurance adopted in the public IHLs contains multiple dimensions of performance[5]. The problem of using multiple dimensions in assessing these universities is that it cannot be easily aggregated into a single index of performance. Whereas, an integrated single index of performance will provide a well rounded view of overall performance (The OR Society, 2001).

Therefore, the ranking must be based on a single comprehensive measure or index performance that is based on multiple performance indicators such as resource use, the quality and quantity of teaching and research performance. In this report, the two issues arise for consideration are what are the relevant indicators of performance and how do we devise a comprehensive measure of efficiency in order to rank the universities.

1.4. Objectives of the Research.

This study aims to measure the relative efficiency of public universities in Malaysia in 2001 by employing Data Envelopment Analysis (DEA).

The specific objectives of the study are as follows:

1.4.1. To define a set of indicators for measuring the efficiency of public universities based on Data Envelopment Analysis.

1.4.2. To measure the teaching and research efficiency of Malaysian public universities using DEA

1.4.3. To explore potential areas of improvements

1.4.4. To identify potential policy implications

1.5. Research Design

1.5.1. Data

The data on the public universities was primarily gathered from the Ministry of Higher Education (MOE), in particular, the Higher Education Department. The rest of data variables were made available from the Ministry of Science, Technology and Environment (MOSTE), in particular the Malaysian Science and Technology Information Centre (MASTIC). Since there are two different organizations which provide the data, the choice for the sample of Malaysian public universities as well as the year of assessment for this study has to made, based on the availability of the complete data set from both ministries. The Higher Education Department of MOE can only make available the statistics for the year 2001/2002 and 2003/2004. On the other hand, MASTIC of MOSTE can only provide research and publication data, the latest up, to the year 2001-2002. This is not to mention our seamless effort to gather the necessary data from the original source of data, which is from the universities themselves. Regrettably this whole research was still plagued with problems pertaining to lack of reliable and complete data.

Thus, taking those constraints into consideration, the year of assessment for the efficiency study was chosen to be the year 2001/2002. We, consequently, took a sample of 15 public universities which includes universities established in the year 2000 and before. This sample includes all eleven existing public universities and four college universities operating in that year of assessment. From the list of public universities as shown in Appendix 1.1, the two excluded from the sample study are *Kolej Universiti Kejuruteraan Utara Malaysia (KUKUM)* and *Kolej Universiti Kejuruteraan & Teknologi Malaysia (KUKTEM)*. Although *Kolej Universiti Tun Hussein Onn (KUiTTHO)* and *Kolej Universiti*

Teknikal Kebangsaan Malaysia (KUKTM) were also in their infancy stage of development (established in 2000) as a public university in Malaysia , they were selected based on their nature of operation as public universities. They were also included to give a slight but meaningful increment to the size of the study sample.

The Department of Higher Education publishes the statistical information of the Malaysian public higher education institutions. The two sets of data from the 2001 statistics utilized for this study are the number of undergraduate and graduate student enrolments and the number of academic staff (MOEa, 2001). The 2001 Statistics was kindly made available to us by the Senior Officer of the Policy Division of the Department. We also managed to collect the primary data on universities expenditures from the Development and Finance Division of the same Department (MOEb, 2001).

The data of publication counts was actually extracted from the findings of Malaysian Papers in International Journals included in the Science & Technology Knowledge productivity in Malaysia, Bibliometric Study 2003, made available at MASTIC of MOSTE MASTIC, 2004). MASTIC helped us to extract the data on publication counts from an extensive database MASTICLink[6]. These publications counts are actually the number of public universities' contributions to International Journals like AGRICOLA, Biological Abstracts, CAB Abstracts, Chemical Abstracts, IEEE, Medline, Science Citation Index, etc. (MASTIC, 2004).

The collection of data on sources of funds for research activities is conducted by MASTIC, once every two years. We did not manage to get the set of data for the year 2001. Nevertheless, we obtained extracts from the National Survey of Research & Development 2000 (MASTIC, 2000) and 2002 (MASTIC, 2002) and interpolated to derive the research income data for 2001.

Hence, data on number of student enrolments and operating expenditure were obtained from the MOE, while publication counts and research income were gathered from the MOSTE. In summary, the data gathered for this study are:

- Number of student enrolments
- Amount of Operating Expenditure
- Publication Counts
- Research Income

1.5.2. Methodology

The technique employed in this study is Data Envelopment Analysis (DEA). DEA is a very useful approach to measure the efficiency of the higher education as it can handle multiple inputs and outputs without the need to attach prior weights for aggregating inputs and aggregating outputs. In view of the fact that there are, at present, in Malaysia only a few public universities, this efficiency study will be based on a small sample size i.e. 15. Avkiran (2001) has highlighted the suitability of applying DEA based empirical studies to small sample size, which verifies the application of DEA approach to this present study.

The study will identify the benchmark universities and enable the inefficient universities to emulate the behavior of their efficient counterparts. The study will then identify areas in need of improvement.

1.6. Organization of Chapters

This report progresses as follows. Chapter 2 provides the general concepts and methods of efficiency measurement with a detailed explanation of the DEA approach for efficiency measurement. Two basic DEA models are introduced in this chapter, each specifying different aspect of efficiency. Some empirical studies applying DEA to higher education sector wraps up the chapter. Chapter 3 describes the data and develops DEA models for the evaluation of the efficiency of Malaysian public universities.

This is followed by a thorough discussion on the underlying issues concerning the selection of the appropriate input and output data. Chapter 4 presents the results of the DEA models developed and discusses them. The analysis of the DEA results reveals the levels of efficiency for each of the universities under study. Finally, Chapter 5 offers some potential areas of improvements, recommendations and policy implications together with some directions for the future research.

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[1] Examples of such universities are the Malaysian University of Science and Technology (MUST) and University of Tuanku Abdul Rahman (UTAR). (MOE, 2003)

[2] Three forms of government-funded IHLs are public universities, polytechnics and public colleges. Public universities comprises local universities namely, UM, USM, UKM, UPM, UTM, UUM,UNIMAS, UMS, UPSI, and UiTM; local college universities namely, KUIM, KUSTEM, KUiTTHO, KUTKM, KUKTEM, and KUKUM; and international university UIAM. Some examples of polytechnics are Sultan Abdul Aziz Shah Polytechnic, Ungku Omar Polytechnic, Sultan Ahmad Shah Polytechnic, to name a few. Public colleges comprises of Teacher Training Colleges, Community Colleges and Government Sponsored Colleges. (Study in Malaysia Handbook , 2004)

[3] Under the private IHLs; Department of Higher Education, Ministry of Higher Education, listed private universities comprises private universities and universities colleges, namely, IMU, UTP, MMU, UNITEN, UNITAR, UNITEM, UNISEL, AIMST, MUST, UTAR, UniKL, KUTPM, KUTKL, IUCTT, UCSI, and KLiUC; Foreign University Branch Campus, namely, Monash University Malaysia, Curtin University of Technology Sarawak Campus Malaysia, University of Nottingham in Malaysia, and FTMS-De Montfort University Campus (MOE, 2003)

[4] University Funding Mechanism was one area of higher education discussed in the conference.

[5] Among the dimensions assessed under the IHLs quality assurance are mission and vision, programs offered, students assessments and admissions, academic staffs, educational resources, and administration and governance (QAMU, 2002)

[6] MASTIC or the Malaysian Science and Technology Center under MOSTE has their own online database called MASTICLink. This database was designed for the National Malaysian Development and Survey (NMDS) to capture data and information on R&D activities in Malaysia (MASTIC, 2004)