Paper 6

by Handaru Jati

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EVALUATION OF THE EFFICIENCY OF TEACHER TRAINING INSTITUTION IN INDONESIA BY USING DATA ENVELOPMENT ANALYSIS DURING YEAR OF 2011

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Abstract

The work presented aims to analyze the efficiency of Indonesia *Teacher Training Institutions* in Indonesia in 2011. The study is based on field research and documents executed in four (4) phases: data collection, choice of variables under study, calculations and analysis of results. Data Envelopment Analysis (DEA), which estimates the optimal production frontier is used. The data are processed using the tool OSDEA. As a result the Indonesia *Teacher Training Institutions* efficiency ranking is obtained. It is concluded that there are four (4) *Teacher Training Institutions* efficient and the least efficient of all the analyzed institutions should increase its output to improve its performance.

Keywords: Efficiency, Data Envelopment Analysis, *Teacher Training Institutions*.

1 INTRODUCTION

In the field of *Teacher Training Institutions* is important to conduct ongoing assessments to measure how efficient are the processes that take place there. Comparisons between *Teacher Training Institutions* in terms of their institutional process helps determine how efficient actors are relative to each other, which serves for academic managers to make decisions based on quantitative data. The *Teacher Training Institution* is an institution of higher education in Indonesia that has been established in twelve cities: Jakarta, Yogyakarta, Semarang, Surabaya, Malang, Bandung, Padang, Medan, Manado, Gorontalo, Makassar, and Singaraja. Institutions of higher education, and nonprofit organizations need to make changes in their organizational structures that lend their decision centers of modern and innovative management techniques that improve resource allocation and effectively contribute to the process of making decisions; able to provide profitability measures with which resources are invested, considering that in those entities, the objectives are not merely economic and profitability concept differs from that used in the business world [1]. Efficiency is one of the important aspects that need to be considered when assessing the management processes university. In this regard academic managers require indicators that allow them to establish relationships or comparisons between the various actors that make up each of the academic units. For this process to be effective, it is important to have a system of evaluation to measure the efficiency of the units. Efficiency is the capacity to produce maximum results with minimum resources [2]. Data Envelopment Analysis (DEA) is also used to assess the efficiency of the 25 best U.S. universities [3] and showed that DEA is the correct method for measuring the efficiency of higher education. DEA method is also used in the calculation of the efficiency of several universities in Norway in 1994, 1995 and 1996 [4]. As such, it is a relative term: to be established by comparing dependencies or a pattern. A method to quantify the efficiency is data envelopment analysis (Data Envelopment Analysis or DEA). This technique has its origins in the article Charnes, Cooper and Rhodes in 1978 [5] and is based on the notion of relative efficiency introduced by Farrell [6]. By virtue of the above, in this work the efficiency of Indonesia *Teacher Training Institutions year* 2011 is analyzed, using the DEA.

2 OBJECTIVE

Analyze the efficiency of Indonesia *Teacher Training Institutions i*n 2011, using the Data Envelopment Analysis.

3 METHODOLOGY

The methodology consists of four phases: In Phase I field research and documentation is performed to obtain the input data and concepts, theories, and background relating to the measurement of efficiency through Data Envelopment Analysis. In phase-II are chosen in response to the data

obtained-the objects of study variables. In phase III the OSDEA computational software tool is used for processing the data. Subsequently, in step IV, the analysis of the results is performed. The input data for the software used in this work are: (1) undergraduate student body, (2) the number of academic staff, (3) the number of administrative staff, (4) university budget, and the output for this work are (5) the number of research funded by university (6) the number of book and journal published by academic staff, (7) the number of publication cited in scopus database journal, (8) the number of granted patent, and (9) the number of social services conducted by academic staff in 2011. All of the data were taken from the Indonesian Accreditation Institutional report prepared by the each university. Efficiency values are calculated using the CCR model developed by oriented Input.

4 ANALYSIS OF RESULT

Table 1 below are the data that were obtained from official sources about the input and output variables needed in the assessment of the efficiency of a university.

Table 1. Data from University Accreditation conducted by National Board Accreditation in the year of 2011

Universitas	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Universitas Pendidikan GANESHA	10318	434	247	4342540000	144	30	0	1	81
universitas Negeri YOGYAKARTA	29908	1038	454	13511960000	428	43	89	8	228
Universitas Negeri Semarang	26800	1003	767	14912360000	592	105	4	1	378
Universitas NEGERI makassar	22064	891	548	11087330000	271	73	9	1	236
Universitas Negeri Surabaya	23965	860	456	10870540000	306	22	16	12	25
Universitas Negeri Gorontalo	16201	634	414	3371540000	41	85	6	25	264
Universitas Negeri Medan	15473	965	398	4558480000	206	69	18	4	29

Table 1 shows an example of the information obtained in field research and documentary data entry software OS DEA in the columns headed -Variables of input and Variables of output. Calculation to obtain the level of efficiency of the University Education in Indonesia performed using OSDEA software and this software capables in calculating several types of DEA method. Fig 1. is the initial view of the OSDEA software.

Figure 1 . Open Source DEA (OSDEA)

The nine variables are the base of the calculations, and those are undergraduate student body, the number of academic staff and university budget as an input, and the output for this work are the number of research funded by university, the number of book and journal published by academic staff, the number of publication cited in Scopus database journal, the number of granted patent, and the number of social services conducted by academic staff in 2011. Fig 2 displays the process of DEA calculation by using OSDEA.

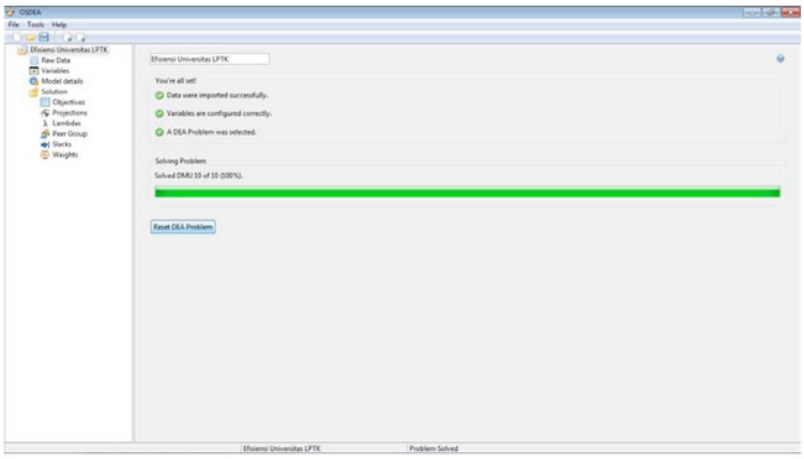

Figure 2 . Process with the DEA calculation OSDEA

All university that do not have the level 1 of efficiency should strive to be efficient in a way : reducing inputs while maintaining a constant output (this is an input-oriented approach), increase output while maintaining a constant input. This is an output-oriented approach, or a third model which seeks to reduce input and increase output.

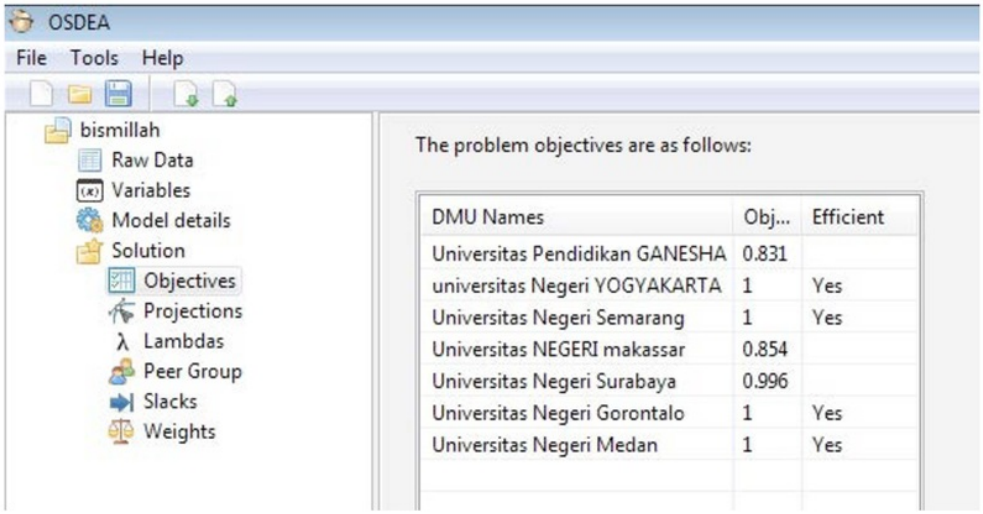

Figure 3 . Results of efficiency calculation Process with the DEA

From the calculation results in fig 3. shows that Universitas Negerri Yogyakarta, Universitas Negeri Semarang, Universitas Negeri Gorontalo, and Universitas Negeri Medan are the universities with the highest efficiency rating in Indonesia, by consecutive followed by Universitas Negeri Surabaya, Universitas Negeri Makassar, and Universitas Pendidikan Ganesha.

5 CONCLUSIONS

This paper presents an analysis of efficiency in Indonesia Teacher Training Institutions or universities in the year of 2011, using the Data Envelopment Analysis. The database used contains input variables (undergraduate student body, the number of academic staff, the number of administrative staff, and university budget as an input, and the output for this work) and output variables (the number of research funded by university, the number of book and journal published by academic staff, the number of publication cited in scopus database journal, the number of granted patent, and the number of social services conducted by academic staff) viewed as an output. Using the computational tool OSDEA, a ranking of departments based on efficiency is obtained. In this article the data entered to the software and the results it yields for 2011 are illustrated Five departments are efficient independently of the model used DEA. The most inefficient department with CCR model should increase the level of its output variables to improve its efficiency, since the input variables considered can hardly be controlled in practice. It is concluded that majority of teacher training institutions in Indonesia are already in efficient academic process. It is suggested that further research to quantify the effect of these variables influence the output in increased efficiency.

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