



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

OCTOBER 2016, VOLUME 4, ISSUE 4, 17 - 36

E-ISSN NO: 2289 – 4489

HIGHER EDUCATION VOLUME AND VALUE OF OUTPUT: EXPERIMENTAL CALCULATIONS FOR MALAYSIA

Haniza Khalid (PhD)

Faculty of Economics and
Management Sciences,
International Islamic University
Malaysia, MALAYSIA

Corresponding Author:
International Islamic University
Malaysia, MALAYSIA
Email: hanizamv@iium.edu.my

ABSTRACT

The valuation of higher education's contribution to the national economy in the past has typically been based upon costs of inputs. However, such an approach neglects any productivity or quality variations in the outputs of higher education, mainly from teaching services and research. An increasing number of countries are now using output-based measures of the volume of higher education services. This paper describes a quantitative approach for output-based measurements using publicly available data in order to attempt a preliminary application for Malaysia. Government's development and operational budget on education and training increased significantly after 2007 with the implementation of the National Higher Education Strategic Plan (NHESP). Using the output approach, we find that value of teaching services by the public HE sector rose by 5.2 per cent that from RM13.77 billion to RM14.48 billion in 2010 although aggregate enrolment grew by 9.9 per cent; as compared to 5.1 per cent increase in operational budget for the same period. The result is justified given that higher percentage of the new enrolments are often found in advanced levels of study (postgraduate courses) which cost less per unit of quantity – as there is less coursework involved. The finding sheds light on the nature of NHESP's impact on national income and provides helpful inputs to future refinements of the national strategic plan.

Keywords: Structure and Scope of Government, Expenditures Analysis, Higher Education, Malaysia



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

INTRODUCTION

Governments have an extensive role in providing and financing education services, such that the cost of playing that role often accounts for a significant portion of the country's Gross Domestic Product. For any given policy involving fiscal burden to government and taxpayers, the public is keen to see that benefits of that policy are made known both in terms of quantity as well as quality. While this desire is well-justified, the scope is very general and extremely ambitious. Hence in national income accounting, public sector services are traditionally valued by simply adding all expenditure on inputs, hence the term 'output-input' approach. The approach focuses only on inputs or activities of the unit producing the services and does not require outputs to be comprehensively identified, measured and valued. Smith and Street (2007) argued that there are three main drawbacks to this convention:

- i. It is circular and self-justifying. The value of output is assumed to be reflected by the costs of producing the public service, whereas it is widely known that this is seldom true.
- ii. It assumes that there is no variation in productivity as outputs are not measured directly.
- iii. Reductions in expenditure can be brought about by technological improvements; and this does not entail reduction in output.

The United Nation's 2008 System of National Accounts (SNA) 2008 document states explicitly that inputs are not appropriate for valuing non-market services; and while activities may often be the only indicator available to statisticians, one must remember that it is also an intermediate variable. Instead, the document recommends an 'output-volume' method for compiling indicators of volume change of non-market services. The method is based on quantity indicators which are adequately quality-adjusted and totally independent of expenditure on inputs. SNA 2008's stance is preceded by Eurostat's 2001 *Handbook on Price and Volume Measures in the National Accounts*, in which it is stated that inputs are not considered a good proxy measure of the service sector's output and indeed these "grade C" measures were eventually made invalid under EU regulations beginning 2006.

What the 'output-volume' or Direct Volume Measurement (DVM) approach, as it is commonly known, implies for the higher education sector is that instead of reporting expenditure on academics' salaries for instance, the accounts will measure say, how many students were taught by these academics, assuming that by completing the study programs taught by the academics, the students would have acquired a certain knowledge and skill set that can benefit the society at large. Academicians' services are essentially inputs to the teaching process, the number of students is the output that can be quantified and the improvement to society is the outcome desired from the whole higher education sector.

To find the economic value of the output, the volume of output should be multiplied by the price of the output in an efficient market. Market prices should provide an indication of their true marginal benefit to consumers and marginal cost to the taxpayers. Because public Higher Education Institutions (HEIs) are normally heavily subsidized by the government, their tuition fees cannot be assumed to reflect market realities or more specifically, buyers' willingness to pay for services provided. However, where both subsidized and non-subsidized higher educational services are available and the market for the latter is relatively free, it is possible to use price measures from the latter. For this imputation to be valid, the argument has to be made that both educational services and their variations over time are at least roughly comparable (Schreyer, 2010).

Using this DVM viewpoint, higher education is simply one sub-sector of the economy comprising of industries that use resources to produce economic output. The primary goal of this paper is to track and measure economic outputs generated by higher education activities using Malaysia as a case study. As far as higher education is concerned, this method can be considered an alternative or a complement to using university ranking tables and international awards as the sector's performance measure. For economists, the method can directly show the value-added created by the public higher education sector at market prices in the country's Gross Domestic Product (GDP) calculations.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

The purpose of this paper is to describe some experimental calculations of the DVM method as it is applied to data from Malaysia's public higher education sector. Given our constraints in data collection, particularly in terms of consistency in data categorization and availability, we are only able to calculate the value of output for two periods of accounting (i.e., 2009 and 2010). Data from other years were too difficult to reconcile and collect separately from all twenty public universities which fall under our scope of study. Nonetheless, having data for two continuous years allows us to calculate and compare the yearly growth rate of each output component. In addition, the two years were coincidentally in the last phase of the Malaysian National Higher Education Strategic Plan (2007-2010). The public is interested in knowing the extent of the policy's accomplishment and benefit to the economy and society at large especially in light of ever increasing government expenditure and physical expansion of the higher education sector. While the method is already well-established in Organisation for Economic Cooperation and Development (OECD) countries, it is relatively new for Malaysia to establish empirical evidence valuable in understanding the impact of resource allocations via specific policy initiatives and to help guide future policy directions.

The paper is organized as follows: The next section provides clarification of pivotal terminology and concepts used in the DVM task; followed by specific descriptions of the methodological approach and data sources for Malaysia. We then present our findings on a number of important aspects of HEIs' contribution to the economy from both the input and output perspectives and subsequently use them to suggest areas for future research in the accounting methods for Higher Education impact on the country.

LITERATURE REVIEW

This section seeks to provide a clearer understanding of concepts and terminology employed in this study as a background to the method of measurement and valuation used. For higher education, which is basically a service-based sector, how can its performance be satisfactorily measured, at least through the market and social perspectives? It is well-known that gains from higher education extend beyond the tangible concepts of personal income enhancement (Becker, 2009) to extensively more abstract concepts of nation-building and effective global citizenry. Hence our approach is explicitly rooted in the principles of welfare and production economics. Essentially, we consider the public higher education sector as a set of production units including the academic faculties, research centers, institutes and so forth. Each unit is supposed to use a number of resources within a particular institutional and geographical setting and to produce a number of outputs, both quantitative and qualitative. Those outputs are related to the objectives that have been assigned to the production unit by the principal authority in charge (i.e., the government). Since the higher education sector involves a massive amount of administrative inputs, and also because of its importance in the country's growth agenda, the performance analysis of the entire sector should not be restricted to inputs alone. Instead, it should ideally be extended to the outcomes arising from the activities within the sector (Pastieau, 2009). We next discuss the complexity of accomplishing this, the difference between outcomes and outputs, as well as the role of prices in the approach undertaken in this study.

Outcomes

Outcomes are results or consequences from a certain intervention, policy or program. They can be broken down into direct and indirect outcomes, the distinction being that direct outcomes are closer to the act of service provision than indirect outcomes.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

To illustrate,

- i. One direct outcome of HE is the state of knowledge of a population of students, estimated by the students' degree attainment.
- ii. Indirect outcomes associated with HE are employment possibilities and enhanced real earnings due to better education, or GDP growth as a consequence of enhanced human capital quality and availability.

It is quite clear that for higher education there is a long way between the outcome indicators available and what we call the ideal indicators. Too many important variables are not quantifiable particularly those pertaining to individual development and contribution to society and the world upon completion of tertiary education. Even if there are, there would be predictably massive debates about the legitimacy of those measures as what we witness with the global university ranking tables and economic competitiveness ranking tables.

Outputs

On the other hand, the level of complexity is relatively reduced if we are to focus on what the public HEIs are commissioned by governments to do, which is to deliver outputs that can contribute toward the above said desired outcomes. Furthermore, not everything about the outcomes is under direct control of the HEIs. Even if the HEIs' budget ceilings are lifted and HEIs are given financial and academic autonomy to achieve their target outputs, no one can guarantee the full realization of the desired outcomes. This is because there are obviously a number of factors outside the HEIs framework and powers which undermine the success of HEIs efforts (including student's own willingness to engage in the learning process, industries' willingness to interact with universities for knowledge transfer or other forms of joint activities and so forth). On a broader scale, political, cultural and social changes can influence achievements of the outcomes desired from the higher education sector. Hence, according to Kelley, McNicoll, and Council (2009), it is very important that the output must only relate to variables over which the HEI has control and is able to manipulate. Otherwise, one might risk penalizing HEIs for things they cannot help or rewarding them for things they did not contribute to in any way. Compared to outcomes, which are generally more abstract in nature, outputs are relatively easier and more objective to measure. National Income Accounting (NIA) statisticians can focus on counting the volume of education delivered, and even make adjustments for educational quality for reasonably sound comparison across countries and over time periods. Table 1 describes the basic differences between outcomes and outputs in the context of higher education.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Table 1

Differences between Inputs, Outputs and Outcomes for Higher Education

<u>Inputs</u>	<u>Outputs</u>	<u>Direct Outcomes</u>	<u>Indirect Outcomes (apply to all)</u>
Lecturers, classrooms, audio-visual facilities	Number of Full-Time Equivalent (FTE) students enrolled in programs	Learning, Awareness, Knowledge, Attitude	<ul style="list-style-type: none"> • Better social conditions
Instructors, classrooms, audio-visual facilities, materials and manuals	Number of participants who have benefitted from Workshops, meetings, seminars, training sessions	Knowledge, Decision-making, Practice, Action plans	<ul style="list-style-type: none"> • Improved economic performance
Researchers, Financial grants, laboratories, research premises, lab technicians	Number of papers or manuscripts published as a result of research activities	Knowledge, Awareness, Opinions, Policy recommendations	<ul style="list-style-type: none"> • Increased civic awareness and social participation
Academic administrators, lecturers, Board of Studies members	Number of curriculum development and review projects undertaken	Learning, Skills, Attitudes, Awareness	<ul style="list-style-type: none"> • Greater environmental protection and preservation

Outputs themselves are broken down into two components: (i) activities or processes and (ii) quality adjustment applied to them. We look at both in greater detail.

i. Processes

Processes are observable actions by which HE services are delivered, although their characteristics may change over time. These actions lead to the creation of outputs. The processes represent the production functions by which inputs are transformed into outputs. For instance, NHESP has brought about massive adjustments to the HE system of Malaysia in the form of detailed curriculum review and development, better accreditation and compliance monitoring processes, hiring and training of more qualified lecturers, provision of more conducive environment for research and innovation (R&I) activities and so forth. These processes must be taking place in order to bring about the targeted (enhanced) level or quality of outputs; whereas the output themselves can be the number of students enrolled in the university, the number of research publications and so forth.

ii. Quality Adjustments

Adjusting for quality of services essentially means that correct stratification (i.e., the comparison of products with the same or at least similar characteristics) is achieved (Schreyer, 2010). This way, quality differences are automatically controlled for. However, matching of HEIs' courses and research outputs has its limits given the heterogeneity of institutions and their differing curricular objectives.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Theoretical depth and learning outcomes of a given subject matter may vary if taught at the undergraduate level as opposed to postgraduate level; or in a research university as opposed to a technical university. In addition, the Eurostat (2001) handbook recommends a stratification that breaks university education services down by broad but distinct fields such as arts, engineering, medicine and so forth.

Additional stratifications can include ways to account for different extent of (i) administrative and academic autonomies of the HEI (e.g., HEIs with Research University status, niche universities), if they affect teaching process or intensity as well as (ii) engagement with the community (e.g., programs for schoolchildren or general public) and industry and so forth. Other sub-stratifications can be used to distinguish vocational and technical courses or special classes for the disabled relative to mainstream ones. Stratification of research is naturally more challenging and tedious, not to mention contentious. A good guide would be the 2008 OECD's System of National Accounts treatment of private R&D activities (i.e., as production of an investment good). Work is still underway to develop practical guidance to help HEIs measure their flows and stocks of knowledge. At the moment, in practice, the most widely used measurement for HEIs is the number of publications in indexed journals. The following Table 2 provides an overview of OECD country practices in the volume measurement of HE education services. An overwhelming majority of the countries adopted number of Full Time Equivalent (FTE) students as output indicator (for teaching services), but with various complementary stratifications. On the other hand, very few countries include measurement of research output when valuing HE services. This is testament to the enormous complexity of aggregating, indexing and pricing R&I outputs to allow straightforward inclusion in the overall value measurement of the sector.

Prices

Since outputs are measured in real quantities, the next step would be to present the output in monetary terms to avoid problems from mismatching units of measurement for heterogeneous outputs. True economic value of HEI outputs is obtainable when prices applied to outputs are economic efficiency prices. Kelly, McNicoll, and Brooks (2008) give a wider application of other measures of value, particularly social value. In theory, economic efficiency prices are approximated by 'free market' prices or estimated from a perfectly competitive market environment. The First Fundamental Theorem of Welfare Economics (Sen, 1993; Stiglitz, 1991, 2015) proves that every perfectly competitive economy is also a Pareto efficient one. But what constitutes a "perfectly competitive environment"? Ideally HEIs would behave as profit-maximizing enterprises able to buy and sell what they wish in product and factor markets, but unable to influence market prices (i.e., as "price takers"). In reality, none is operating in a perfectly competitive environment. However, in certain markets the private HEIs have sufficiently competitive setting, such as in the market for degree programs, so observed market prices may be a close approximation of economically efficient prices. Ideally, moderating effects must be taken into account such as differences in size of private HEIs, and niche programs or mode of studies, all of which can give market power to certain HEIs; in addition to weights reflecting social values of the output. Our preliminary study focuses only on teaching and research outputs for Malaysian public HEIs, using secondary data from the Ministry of Education only. This aligns with OECD practice whereby most countries employing the output approach focus only on Teaching and Research (Table 2). The following section describes in detail the methodological procedures undertaken and data sources.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Table 2
Overview of Country Practices in the Volume Measurement of Education Services

<u>Country</u>	<u>Apply Output methods?</u>	<u>Main Sources</u>	<u>Complementary Stratification</u>	<u>Quality Indicator</u>	<u>Weights</u>	<u>Additional Quality Adjustments?</u>
Luxembourg	Data since 2000	Administrative data	University and technical superior education	Number of students	costs	No
Australia	Data since 1989	Administrative data	HE Contribution Scheme bands	No. of students and publications	costs	No
Belgium	Data since 1995	Administrative data	Institutions, regional stratification	No. of students	costs	No
Finland	Data since 2000	Administrative data	Polytechnic education/levels of study	No. of students	costs	No
France	Data since 1981	Administrative data & survey	Short technical superior/ long superior	No. of students, basic degrees, credit hours	costs	No
Germany	Data since 1991	Administrative data & survey	Institutions and fields	No. of students	costs	No
Italy	Data since 2001	Administrative data & survey	Groups of 18 homogenous faculties	No. of students	costs	1) ratio of students within regular deadline to total students; 2) time distance from the regular length of the university courses
Netherlands	Data since 1995	Administrative data & survey	-	-	Costs	Expected course duration
New Zealand	Data since 1978	Administrative data & survey	-	No. of students	Value-added	No
Norway	Implemented	Administrative data	Groups of faculties having different unit costs	No. of students	Costs	on the agenda
Sweden	Data since 2002	Administrative data & survey	No	No. of students	Costs	Number of students with grades
United Kingdom	Data since 1996	Administrative data	Publicly funded further education for under 19s; initial Teacher and health professional training)	No of students	Costs	No

Note: Adapted from Schreyer (2010).

METHODOLOGY AND DATA

The methodological approach adopted in this study is guided by principles found in the OECD handbook on measurement of volume and value of output produced by health and education sectors (Lequiller & Blades, 2007). Hence, the approach adopted is consistent with national and international best practices as exemplified in the 2008 UN System of National Accounts (SNA) and the 1995 European System of Accounts (ESA) for productivity measurements of non-marketed services (see Atkinson 2005; Jorgenson & Schreyer, 2013; Schreyer, 2010). The section also benefitted greatly from the Scottish and UK studies led by Kelly and McNicoll (Kelly, McNicoll, & Brooks, 2008; Kelly, McNicoll, & Council, 2009; Kelly, McNicoll & McLellan, 2005). Basically the three key procedural steps involved are:

1. Identifying the outputs of HEIs (what HEIs actually produce). These should include all meaningfully separable outputs of the HEIs, based on the stratification methods desired.
2. Quantifying the volume of HEI outputs (how much they produce). This involves defining one or more natural units of volume measurement applicable to each of the outputs.
3. Pricing the outputs to impute value. This involves identifying appropriate prices or unit values to be applied to each of the volume measures above.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

The application of (1) and (2) would provide volume measures of HEI outputs. Upon identification and quantification of output from the “teaching” function of public HEIs (with possible stratifications), the value measures for these outputs can be computed. Value is simply quantity of output produced x price per unit of output. What constitute prices? In principle, the observed prices must be those charged for providing “one year full-time equivalent” tuition fees, and are not dependent on the achievement of desired teaching outcomes, neither the ability of the students to pay (social weights considerations) or the length of time required to for students to complete their studies.

Before private tuition fee rates can be “borrowed” to impute value of public HEI services, it is necessary to determine whether the Malaysian HE private market can be considered open and relatively competitive. As of end of 2013, there are 35 private HEIs with full university status, 25 university colleges, 7 international branch campuses and 418 colleges offering degree programs at baccalaureate, graduate or postgraduate levels. Moreover, Malaysian students can also choose to study abroad or earn their qualifications via distance learning modes – these options represent additional competition to local private HE providers. Based on them, it is reasonable to argue that the private market for HE products in Malaysia is to a high degree competitive and open, at least where teaching is concerned.

Data with respect to teaching outputs were obtained from various issues of the Higher Education Statistical Yearbook, published by the Ministry of Higher Education. Basic stratifications possible are fields of study and levels of study. However, because of the differences in reporting system, in the Yearbooks, both stratification levels are not possible for subsequent years except for 2009 and 2010. Research output data were harvested from the NHESP database (to which every Programme Management Office (PMO) at the respective universities are required to submit all statistics regarding key performance indicators at regular intervals).

Unless stated otherwise, most of the private HEI tuition fee data are based on University of Nottingham Malaysia. The university is one of the leading private HEIs in Malaysia and has an extensive range of study fields and program levels that lend themselves well to the public HEIs’ data structure, compared to other private HEIs in the country. Although it is an international branch campus, we find that the tuition fees are relatively competitive with other similar institutions, even if slightly on the high side. Therefore, if anything, the final computed values can be considered the upper bound values for the services measured.

Research and consultancy outputs proved to be the most difficult to measure. One may argue that certain research outputs (e.g., seminar papers, newspaper articles, working paper series) are intermediate rather than final outputs, hence do not make for suitable indicators of research. For the Malaysian application, we extract from the PMO database information about number of journals published by public HEIs and number of articles written by academics of the HEIs published in indexed journals. Citation statistics are not taken into account for pricing since, in general, the Malaysian levels remain poor especially in many non-science sub-disciplines.

For consultancy projects, the awarded values are used, under the assumption that costs of conducting the research including payments for subject matter experts and other physical inputs commensurate with the output quality desired. Given the existing data structure, this approach is unavoidable. The characteristics of consultancy projects are different from academic research in that the former are (i) typically very industry-centric and need-specific, (ii) has a very short project length; and (iii) involves a different costing system, making it rather difficult to place a ‘representative’ or shadow economic price for them.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

FINDINGS REGARDING NHESP'S IMPACT

This section attempts to explore various dimensions of the impact that Malaysia's NHESP policy has on the volume of HE output, and how they lead to the computation of economic value of HEI services in the end.

NHESP Impact on Expenditure

Over the past decade, there has been substantial growth both in volume and proportion of Federal Government development and operational budget on education and training (see Figures 1 and 2), more so after NHESP commenced in 2007. Development expenditure on education and training topped at RM12.04 billion in 2010. This is equivalent to approximately 22 per cent of the country's total development budget for the year. Operational budget too increased significantly after 2007, although percentage as total operational expenditure of the Federal government remained relatively stable.

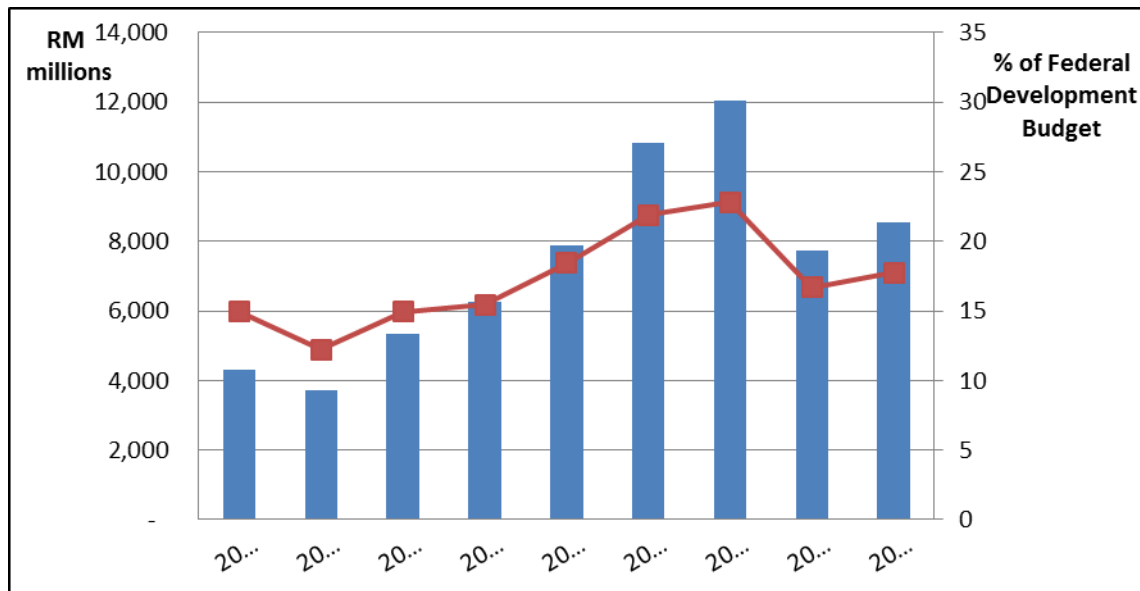


Figure 1. Federal Government's Development Expenditure on Education and Training in Volume (RM millions) and percentage of total budget. Data is from Federal Government Annual Financial Statement, various issues.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

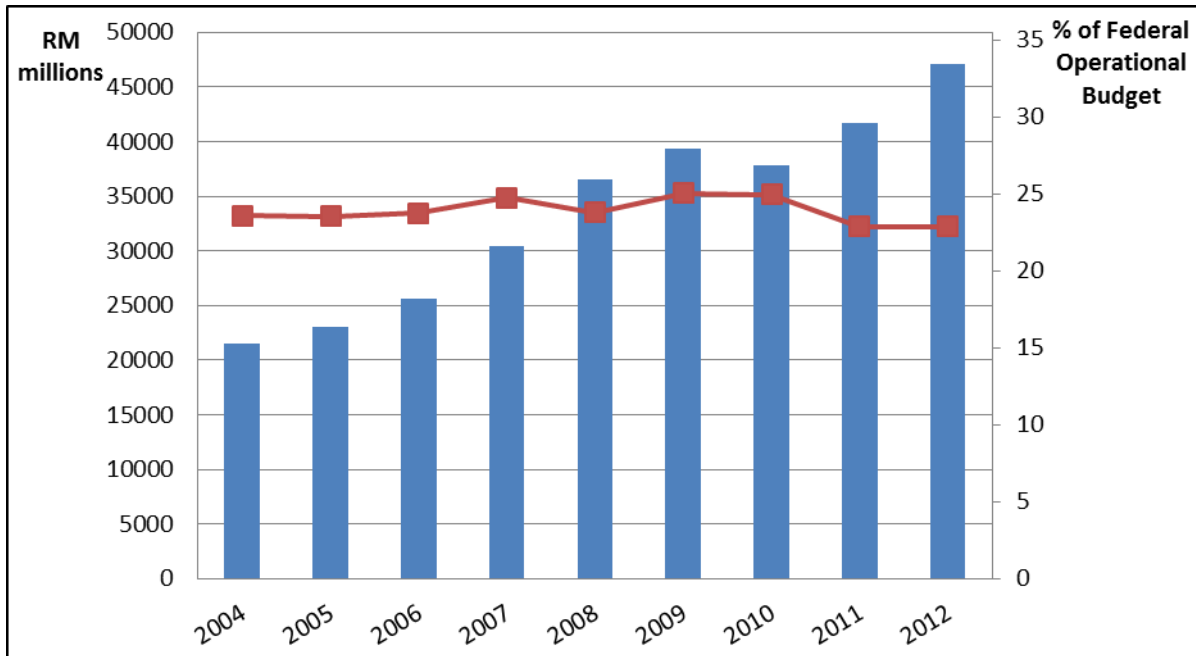


Figure 2. Federal Government's Operational Expenditure on Education and Training in Volume (RM millions) and percentage of total operational budget. Data is from Federal Government Annual Financial Statement, various issues.

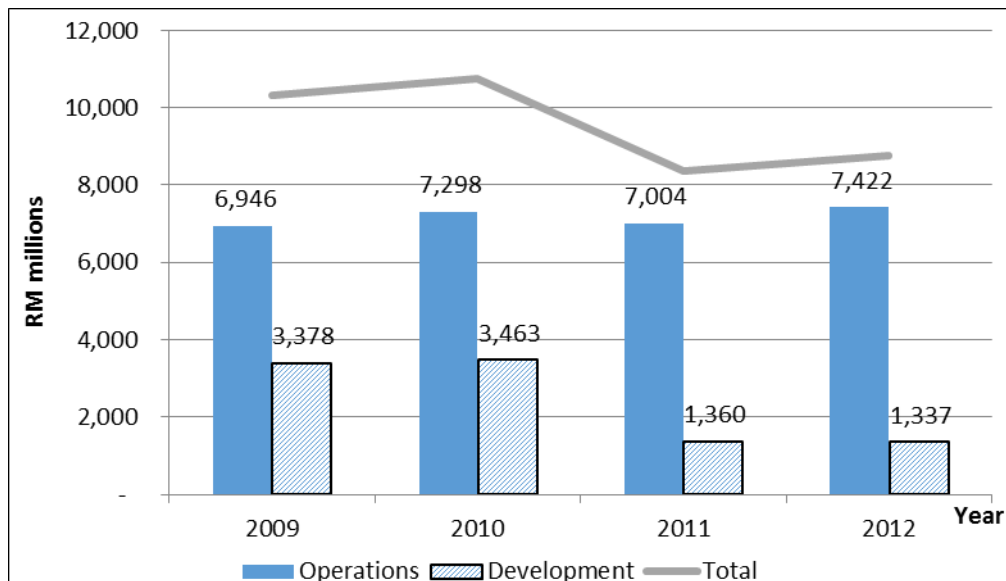


Figure 3. Operational and Development Expenditure for public HEIs (RM millions). Expenditure on university hospitals are included in the universities total amount (applicable only to University of Malaya, Universiti Kebangsaan Malaysia and Universiti Sains Malaysia). Data is from the Federal Government Financial Statement, various issues.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Impact on Fields of Study Chosen

Stratification of enrolment by fields of study and the resulting indexation demonstrates equally interesting patterns. The distinction between broad fields of study such education, arts and humanities, social sciences, sciences and computing, engineering, health, agriculture and services are made on the basis that these fields constitute distinct products and may be valued differently from each other. It can be easily seen that the most significant growth trends between 2008 and 2012 are observed in the traditionally highly demanded programs (i.e., Business and Administration, Social Services, Engineering, Medicine, Dentistry) and in programs related to the services industry, such as tourism and hospitality, sports, transportation and security). Slowest or declining trends are seen for History and Philosophy, pharmacy, law, architecture and building, environmental protection, fishery and forestry.

Table 4
Public HEIs enrolment by Fields of Study

<u>Field of Study</u>	<u>Sub-fields</u>	<u>Enrolment of Students</u>				
		<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>Education</u>	Education	39,764	40,915	32,908	42,824	48,626
	Art, Design and Music	9,277	11,739	13,145	na	na
<u>Arts and Humanities</u>	History and Philosophy	na	6,344	6,041	5,629	5,349
	Religious Studies	4,802	9,351	10,059	11,005	11,189
	Languages and Linguistics	2,751	12,196	11,763	12,903	12,578
	Economics	10,202	7,753	7,502	7,748	8,262
	Business and Administration	73,064	87,003	99,319	109,120	112,562
<u>Social Sciences,</u>	Accountancy	22,717	22,777	25,310	26,608	26,307
<u>Business & Law</u>	Law	8,350	10,563	11,045	10,860	9,736
	Other Social Sciences	46,787	23,203	24,650	25,736	27,352
<u>Science, Mathematics & Computer</u>	Sciences and Mathematics	24,297	37,163	40,137	43,992	43,900
	ICT	23,675	21,592	22,824	24,711	25,743
	Engineering	60,696	68,742	74,187	82,348	83,786
<u>Engineering, Manufacturing & Construction</u>	Manufacturing, Processing and Construction	na	12,470	13,007	13,528	13,717
	Architecture and Building	20,611	19,218	21,234	19,172	18,633



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

	Medicine	8,025	9,687	10,272	11,118	11,259
	Dentistry	1,498	1,667	1,848	2,050	2,012
<u>Health & Welfare</u>	Pharmacy	3,028	3,176	3,234	3,504	3,463
	Health Sciences and Welfare	11,299	9,668	9,967	10,545	9,808
	Social Services	na	2,519	2,873	3,099	3,304
	Tourism and Hospitality	6,676	7,155	7,982	8,923	9,143
	Sports	na	2,779	3,044	3,260	3,682
<u>Services</u>	Transportation	na	458	470	526	698
	Environmental Protection	na	1,309	1,351	1,238	1,204
	Security	na	912	1,016	1,353	1,436
	Agriculture	3,546	3,968	4,396	8,484	8,875
<u>Agriculture & Veterinary</u>	Fishery	na	1,120	1,174	925	871
	Forestry	na	1,407	1,375	1,372	1,392
	Veterinary	na	566	647	708	758

Note: From Malaysian Higher Education Yearbook, various issues.

EXPERIMENTAL CALCULATIONS FOR MALAYSIA

Economic Value of Teaching Services

Next, we compute the economic value of HEI service using tuition fees charged by private HEIs for the respective fields AND levels of study. Table 5 shows the breakdown of economic values of teaching by both fields and levels of study (where data permits). To provide a gist of the results, Figure 5 shows the direction and magnitude of change between 2009 and 2010 of the enrolment numbers (representing volume) and value of teaching services.

Using the output approach, value of teaching services by the public HE sector rose by 5.2 per cent, from RM13.77 billion in 2009 to RM14.48 billion in 2010 despite the smaller aggregate enrolment growth which is 9.9 per cent. This is hardly surprising given that higher percentage of the new enrolments are often found in advanced levels of study (post-graduate courses) which costs less per unit of output i.e. student – as there is less coursework involved and not all post-graduate courses involve expensive lab time and apparatus. Only in the Art and Humanities field of study can we find enrolment growth being smaller than value growth.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Table 5
Value of Teaching Services (Stratification by Fields and Level of Study)

<u>Field of Study</u>	<u>enrolment</u>		<u>Tuition fee per year</u> <u>*(RM)</u>	<u>Value of Teaching Services (RM)</u>	
	<u>2009</u>	<u>2010</u>		<u>2009</u>	<u>2010</u>
Education					
Ph.D	1,949	2,413	33,990	66,246,510	82,017,870
Masters	6,826	7,719	43,780	298,842,280	337,937,820
PG Diploma	4,870	1,883	29,190	142,155,300	54,964,770
Bachelor	26,391	20,240	26,270	693,291,570	531,704,800
Diploma	593	586	15,000	8,895,000	8,790,000
Pre-University	153	66	14,760	2,258,280	974,160
Professional	-	-	-na-		
Others	133	1	-na-		
Total	40,915	32,908		1,211,688,940	1,016,389,420
Arts & Humanities					
Ph.D	923	1,622	33,990	31,372,770	55,131,780
Masters	4,076	4,892	43,780	178,447,280	214,171,760
PG Diploma	319	368	29,190	9,311,610	10,741,920
Bachelor	23,794	23,325	26,270	625,068,380	612,747,750
Table 5(Continued)					
Diploma	6,714	7,230	15,000	100,710,000	108,450,000
Pre-University	2,193	2,308	14,760	32,368,680	34,066,080
Professional	-	-	-na-		
Others	1,611	1,263	-na-		
Total	39,630	41,008		977,278,720	1,035,309,290
Social Sciences, Business & Law					
Ph.D	4,689	5,143	33,990	159,379,110	174,810,570
Masters	11,220	12,689	43,780	491,211,600	555,524,420
PG Diploma	922	829	29,190	26,913,180	24,198,510
Bachelor	92,178	98,086	33,990	3,133,130,220	3,333,943,140
Diploma	36,853	41,789	15,000	552,795,000	626,835,000
Pre-University	2,868	7,634	14,760	42,331,680	112,677,840
Professional	1,354	1,655	-na-		
Others	1,215	1	-na-		
Total	151,299	167,826		4,405,760,790	4,827,989,480
Science, Mathematics & Computer					
Ph.D	2,513	3,417	39,750	99,891,750	135,825,750
Masters	6,460	7,154	45,420	293,413,200	324,934,680
PG Diploma	20	20	30,280	605,600	605,600
Bachelor	36,331	35,828	35,770	1,299,559,870	1,281,567,560
Diploma	10,210	11,983	15,500	158,255,000	185,736,500
Pre-University	3,042	4,438	17,040	51,835,680	75,623,520
Professional	-	-	-na-		



Others	179	121	-na-	
Total	58,755	62,961		1,903,561,100 2,004,293,610

Note:*The private HEI tuition fees are based on the following programs of different levels of study offered by University of Nottingham Malaysia (according to the order above): TESL, Language, Business and ICT. Data is from Malaysian Higher Education Yearbook, various issues.

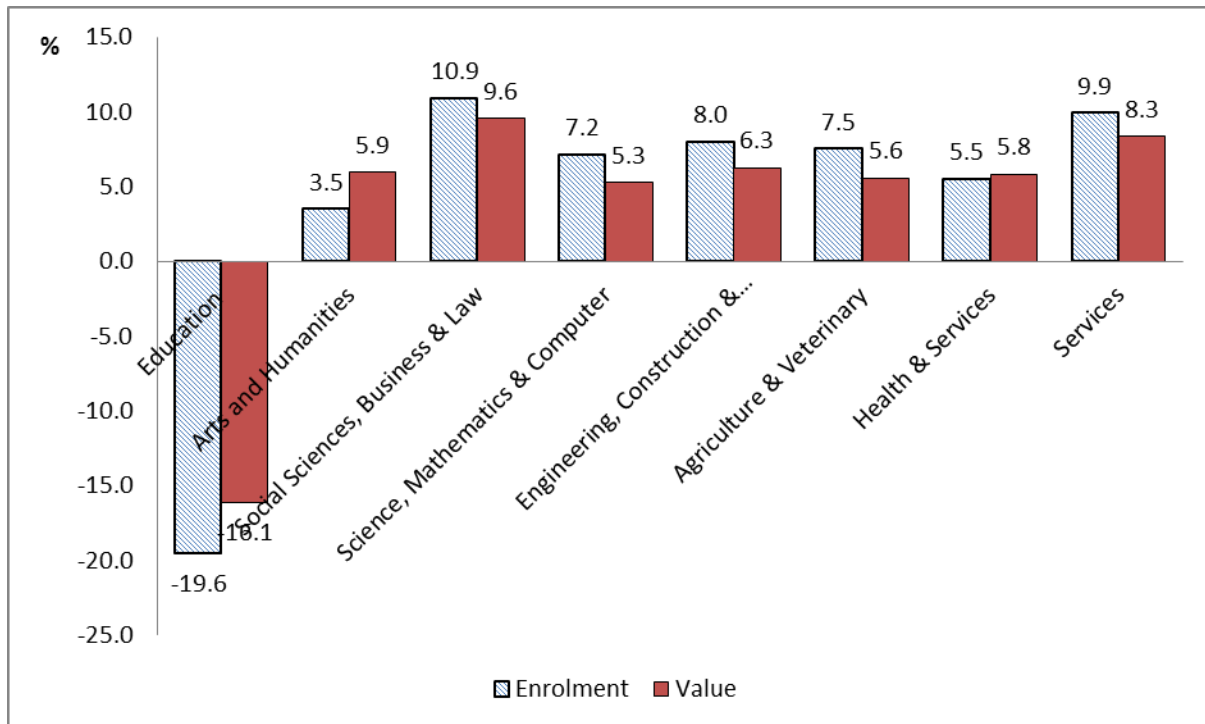


Figure 4. Growth Rates (%) of Enrolment vs Value from 2009 to 2010.

Economic Value of Research and Consultancy

Table 6 shows the value of research funds secured in 2011 and 2012 by types of grant providers: private entities, international bodies and the Malaysian government agencies. The largest contributor of research grants for public HEIs is the government; for instance more than 64 per cent of the total amount of grant secured in 2012 (see Figure 5). As part of the initiatives to boost research capacity of public HEIs, the Ministry of Higher Education has allocated RM741 million for 2011-2012 alone. Of all the research grants approved in 2012, approximately 53 per cent are awarded to Research Universities (see Figure 6).



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Table 6
Value of Research Funds secured in 2011 and 2012 by Public HEIs

<u>Name of University</u>	<u>2010*</u>		<u>2011*</u>		<u>Government</u>	<u>2012</u>	
	<u>Private</u>	<u>International</u>	<u>Private</u>	<u>International</u>		<u>Private</u>	<u>International</u>
RESEARCH UNIVERSITIES							
Uni. Malaya	634782	865410	821,167	1,147,848	5,422,114	452,379	706,700
Uni. Sains Malaysia	7476136	na	10,000,000	na	1,200,000	750,000	15,092,010
Uni. Kebangsaan Malaysia	2721565	1304204	6,553,341	2,557,294	14,686,876	981,543	4,061,576
Uni. Putra Malaysia	na	na	6,034,241	2,634,054	8,660,050	320,400	8,488,358
Uni. Teknologi Malaysia	na	na	900,512	358,027	na	5,826,381	212,139
COMPREHENSIVE UNIVERSITIES							
Uni. Islam Antarabangsa Malaysia	244,340	85,546	14,410,460	32,515,893	15,632,559	1,128,511	176,119
Uni. Malaysia Sarawak	35,000	754,932	595,000	223,635	3,597,320	815,000	1,300,000
Uni. Malaysia Sabah	31,910	na	518,663	na	2,509,142	55,180	122,140
Uni. Teknologi Mara Malaysia	3,856,722	824,325	2,759,119	1,222,262	4,800,000	1,963,300	281,348
FOCUSED UNIVERSITIES							
Uni. Pendidikan Sultan Idris	1,816,978	na	430,000	110,000	512,800	1,601,688	66,900
Uni. Utara Malaysia	175,000	125,906	16,000	147,940	1,489,050	206,120	40,787
Uni. Sultan Zainal Abidin	na	na	na	na	302	-	36,388
Uni. Sains Islam Malaysia	na	na	20,000	-	4,381,400	57,500	-
Uni. Malaysia Terengganu	42,150	2,890	70,000	33,000	7,599,864	na	na
Uni. Tun Hussein Onn	249,000	na	60,000	-	6,540,000	196,840	67,608
Uni. Teknikal Malaysia Melaka	434,130	434,130	300,000	-	1,048,740	175,000	3,240
Uni. Malaysia Pahang	3,550,000	0	64,000	na	na	742,000	23,061
Uni. Malaysia Perlis	305,000	489,000	20,000	468,492	na	70,000	232,606
Uni. Malaysia Kelantan	1,236,190	na	na	na	1,073,440	210,000	25,000
Uni. Pertahanan Nasional Malaysia	0	0	0	-	1,888,127	-	-
TOTAL			43,572,503	41,418,446	81,041,784	15,551,842	30,935,979



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Note: Data for government research funding for individual HEIs are not available in the database for 2010 and 2011.

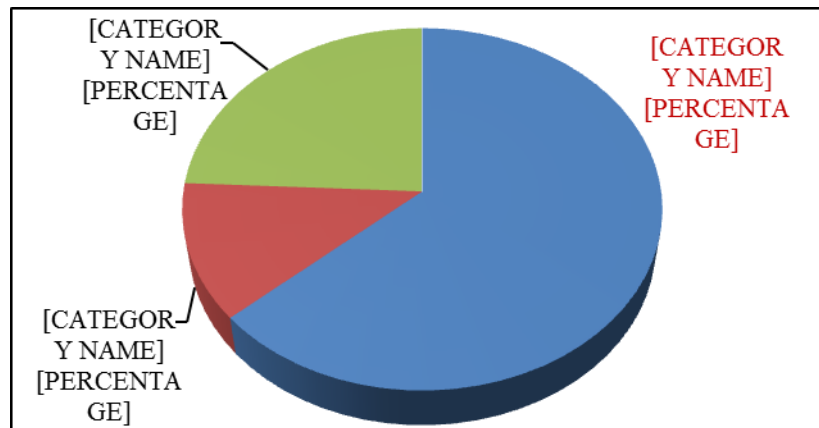


Figure 5. Percentage of Total Research Funding obtained in 2012 by types of Grant Provider

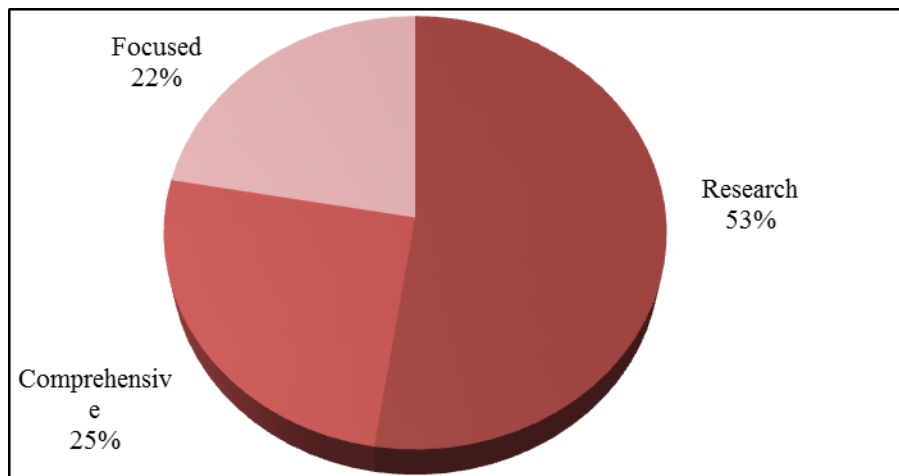


Figure 6. Percentage of Total Research Funding obtained in 2012 by types of Public HEIs.

Number of indexed journals published by Malaysian public HEIs had almost doubled from 23 to 42 in the span of just three years. During the same period, articles written or co-written by academicians in the universities grew from 11,189 in 2009 to 13,159 in 2011, which translates into an average of 12.3 per cent annual increase (Table 7).



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Table 7
Number of Indexed Journals and Publications in Indexed Journals

<u>Name of University</u>	<u>Indexed Journals</u>			<u>Publications in Indexed Journals</u>		
	<u>2012</u>	<u>2011</u>	<u>2012</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
RESEARCH UNIVERSITIES						
Universiti Malaya	6	8	12	2188	2279	2590
Universiti Sains Malaysia		1	1	2633	1800	1800
Universiti Kebangsaan Malaysia	4	5	6	1920	2611	2884
Universiti Putra Malaysia		9	9	1600	2734	2466
Universiti Teknologi Malaysia		1	1		765	661
COMPREHENSIVE UNIVERSITIES						
Universiti Teknologi Mara Malaysia	0	1	1	1117	916	916
Universiti Islam Antarabangsa Malaysia	0	3	3	470	671	764
Universiti Malaysia Sarawak	1	1	1	186	67	110
Universiti Malaysia Sabah	0	1	1	172	51	118
FOCUSED UNIVERSITIES						
Universiti Pendidikan Sultan Idris		0	0		5	53
Universiti Utara Malaysia	2	1	2	80	160	36
Universiti Sultan Zainal Abidin	1	0	0	18	18	73
Universiti Sains Islam Malaysia	0	0	0	10	13	55
Universiti Malaysia Terengganu	1	1	1	116	201	190
Universiti Tun Hussein Onn Malaysia	0	0	1	250	201	193
Universiti Teknikal Malaysia Melaka	8	3	2	63	31	203
Universiti Malaysia Pahang	0	0	0	96	166	204
Universiti Malaysia Perlis	0	0	1	250	232	400
Universiti Malaysia Kelantan	0	0	0	4	9	8
Universiti Pertahanan Nasional Malaysia	0	0	0	16	13	227
TOTAL	23	35	42	11189	12943	13951

Note. From E-PMO database.

CONCLUDING REMARKS

Higher education's impact on the economy can be, and has been, estimated by observing the trends of input expenditure (e.g., operational and development expenditures of universities); or in terms of jobs and output generated through the operation of the HEIs as businesses, both directly and in terms of 'knock-on' multiplier effects as in the conventional input-output method. However, in measuring the economic impact of a university in these methods, no explicit economic value is placed on the actual services HEIs produce (in particular from teaching and research). Economists can support policymakers to compare levels of HE outputs at regular intervals, and therefore help inform efforts in analyzing, monitoring, forecasting, discussing and planning national HE initiatives or their reviews.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

The approach of directly measuring the volume of HE outputs for use in National Accounts reporting has received a lot of support from many developing countries, despite the well-known challenges in applying it; namely difficulty in measuring the quality of output, and applying weights where different goods and services are to be aggregated into a single output index. Efforts are on-going to overcome these challenges and ultimately produce a set of comprehensive quantitative measures of inputs and outputs that can allow reasonably comprehensive assessment of the 'size' of the HEI sector contribution to the overall economy in terms comparable with those of other industries.

For Malaysia, the approach is particularly appealing for assessing specific policy packages such as the NHESP. However, our experimental effort to calculate the economic value of HE outputs revealed some substantial challenges, namely access to reliable and consistent data that allow comparison of before and after effect of a given policy implementation. In many instances, the statistics are either unavailable (na) or not plausible. In other tables, the same figures are reported in subsequent years, raising suspicion that either there was no submission of data, or that there is no recording of data in the first place. Ideally, the research team can prepare a comprehensive survey questionnaire to capture all relevant indicators of output. However, this might limit the study's time horizon as old data can be difficult to retrieve.

Nonetheless, moving forward, future studies may include a benchmark survey specifically to measure volumes of pre-identified outputs, in particular those not listed in the existing HEI database. Subsequent surveys or updated database will be useful in showing size and growth measures of HEIs output with respect to other macroeconomic variables and government input expenditures on the sector. It is recommended that these volume indicators be tested for a substantial period with the aid of experts in the domain prior to their incorporation in the national accounts.

ACKNOWLEDGMENT

This work was supported by the National Higher Education Research Institute (IPPTN), Malaysia as part of the "A Critical Assessment of NHESP's Contributions to the Malaysian Economy" project (2014).

REFERENCES

- Atkinson, A. B. (2005). *The Atkinson review: Final Report. Measurement of government output and productivity for the national accounts*. London, UK: Palgrave Macmillan.
- Becker, G. S. (2009). *Human capital: A theoretical and empirical analysis, with special reference to education*. Chicago, IL: University of Chicago Press.
- Eurostat. (2001). *Handbook on price and volume measures in national accounts*. Luxembourg: Office for Official Publications of the European Communities.
- Jorgenson, D. W., & Schreyer, P. (2013). Industry-Level Productivity Measurement and the 2008 System of National Accounts. *Review of Income and Wealth*, 59(2), 185-211.
- Kelly, U., McNicoll, I., & Brooks, R. (2008). *Towards the estimation of the economic value of the outputs of Scottish Higher Education Institutions: Next Steps Summary Report*. University of Strathclyde.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

- Kelly, U., McNicoll, I., & Council, S. F. (2009). Measuring the volume and value of the outputs of higher education institutions. *Fraser of Allander Institute Commentary*, 33(1), 55-59.
- Kelly, U., McNicoll, I., & McLellan, D. (2005). *Towards the estimation of the economic value of the outputs of Scottish Higher Education Institutions*. University of Strathclyde.
- Lequiller, F., & Blades, D. (2007). *Understanding National Accounts*. OECD Publishing Statistical publications. doi: 10.1787/9789264027657-en
- Malaysia, Ministry of Higher Education. (2007). *National Higher Education Strategic Plan*. Malaysian Government Printing Office.
- Malaysia, Ministry of Higher Education. (various issues). *Higher Education Statistics*. Kuala Lumpur. Malaysian Government Printing Office.
- Organisation for Economic Co-operation and Development. (2005). *Oslo manual: Guidelines for collecting and interpreting innovation data*. OECD publishing.
- Pestieau, P. (2009). Assessing the performance of the public sector. *Annals of Public and Cooperative Economics*, 80(1), 133-161.
- UNSTATS. (2008). System of National Accounts 2008. Retrieved from <http://unstats.un.org/unsd/nationalaccount/SNA2008.pdf>
- Schreyer, P. (2010), "Towards Measuring the Volume Output of Education and Health Services: A Handbook", OECD Statistics Working Papers, 2010/02, OECD Publishing. <http://dx.doi.org/10.1787/5kmd34g1zk9x-en>
- Sen, A. (1993). Markets and freedom: Achievements and limitations of the market mechanism in promoting individual freedoms. *Oxford Economic Papers*, 45(4), 519-541
- Smith, P. C., & Street, A. (2007). *Measurement of non-market output in education and health* (No. 023cherp). Centre for Health Economics, University of York.
- Stiglitz, J. E. (1991, March). The invisible hand and modern welfare Economics. *NBER Working Paper No. W3641*. Cambridge, MA: National Bureau of Economic Research. Retrieved from <http://www.nber.org/papers/w3641.pdf>
- Stiglitz, J. E., & Rosengard, J. K. (2015). *Economics of the public sector*. New York, NY: WW Norton.