

Malaysian Research Universities and their Performance Indicators

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Introduction

Research universities worldwide have become more central to their societies primarily because they represent the central knowledge resources in the societies (Fieldman, 1994; Singh and Allen, 2006; Walshok, 1996). As new knowledge and its application and commercialisation increase in significance throughout the economy, the competency and performance of research universities increase in significance. This article looks at the expanding roles of Malaysian research universities, the research development goals and performance indicators.

Many national governments have launched numerous policies aimed at anticipating the development of the knowledge generation and global economy through their research capacity. In Malaysia, the government has advanced the notion that knowledge plays a dominant role in the economic competitiveness of our country in terms of our social, cultural and political position in Asia and the world. The government through its Ministry of Higher Education (MoHE) has recently established four research universities with their main functions to generate intellectual capital, new knowledge and advance technology. The newly established research universities are being called upon to participate more effectively in Malaysian knowledge-based economic development activities. The research universities are expected to contribute to economic development by developing knowledge-linking activities that enhance science and technology transfer, commercialisation and the competencies of workers and professionals.

Malaysian Research Universities in Context

Malaysia has expanded the public university systems while encouraging private higher education to meet the nation's growing demand. There are presently 20 public universities and 11 private universities. The public universities are funded primarily by the governments. Private universities are funded by non-government sources and tend to be independent with their own private governing boards. The government through the designated ministry is placing significant pressures on the public universities to reorganise their activities and priorities with the explicit aims of increasing access and participation, increasing research output and quality, achieving critical mass in selected areas (notably, in science and technology) and to improve the international ranking and reputation of Malaysian universities.

Consequently, the public university system has recently undergone restructuring whereby the universities are allocated a role within a total system. In other words, the

new university system makes a clear distinction between research universities, comprehensive universities, specialised universities and vocational universities, allowing each to pursue clear objectives and avoid the duplication of effort. The new stratified system caters well to the varied nature of students' abilities and interests, and also allow for faculty with different skills to be best used. They are economical in terms of satisfying social needs, producing graduates who are able to fulfil a variety of roles and a generally educated citizenry. In addition, as specialised knowledge like medicine, biodiversity and ICT becomes increasingly important to Malaysian economic performance, this system enables universities to produce a mix of specialised and broadly trained graduates.

Roles of Research Universities

The establishment of the four research universities is a natural evolution in the overall Malaysian university system which has been shaped by many different influences. The main goals of the research universities are:

1. to be a leader in innovation,
2. to set up and enhance centres of excellence in prioritised areas of the nation,
3. to produce world class research outputs,
4. to generate high impact research publications,
5. to attract graduate students of high standards and
6. to provide a conducive environment for research.

(MoHE, 2004)

In the new hierarchical university model, the research universities stand to gain additional funding for research activities, research management, quality assurance, RU incentive grants and specialised research services such as patenting, IPR and repository (MoHE, 2004).

Thus, to promote economic, scientific and technological innovations, a mix of fundamental and applied research as well as a variety of technical activities aimed at the diffusion and commercialisation of new knowledge will be carried out by the research universities. In addition, the universities must practice integrative and collaborative research which involves multidisciplinary teams, knowledge sharing and networking at national and international levels (MoHE, 2004). Internationalisation of research has become a strategic high priority for the newly established research universities. Malaysian research universities need to become more integrally linked to international research networks as full partners in research and innovation.

For these reasons, research universities must expand their roles and commitment to basic research and the development of experts and authorities in fields of study.

In addition, the universities must also expand programmes and develop staff whose primary function is leading or facilitating knowledge linkages across the boundaries. The challenge for Malaysian research universities at present can be summed up quite simply. The organisational forms and institutional expertise and identity have resulted in fragmented academic disciplines, each with distinct techniques and methodologies for developing and communicating about knowledge. Thus, overcoming this lack of difficulty in communicating and collaborating across knowledge boundaries separating faculties, expertise and authority is what needs to be addressed by the research universities if they are to be truly valuable contributors to our society's economic development needs.

Research Universities Performance Indicators

Research universities are framed by the teaching-research nexus which integrate their research missions and shape their institutional culture (Marginson, 2006). High research performing universities attract bright students and stand out staff. These institutions will then naturally accumulate prestige. They also attract cross-border faculty and enhance the universities' capacity in collaborative projects, competition for grants and drawing foreign students. An effective research infrastructure allows universities to

deploy their best performing faculty or institute so as to concentrate on their niche areas and areas of strength as well as to mould and develop intellectual leadership at both national and global levels. Research universities must therefore aim to maximise their status and research performance. Research universities performance indicator is a means of rationalising the status of research universities, the concentration of research resources and of maximising research output. It is also considered necessary to ascertain and maintain the quality of university research (Henkel, 1999).

Thus, for immediate identification and recognition of Malaysian research universities, a set of criteria and standards were formulated to monitor and audit the performance of the research universities. The proposed criteria and standards for Malaysian RUs were developed by taking into consideration the needs of the stakeholders, these being the government, industry and society at large and the measures set are to be benchmarked against global standards. Thus, the set criteria and standards are hoped to afford Malaysian research universities with the opportunity to attain international best practice in assessing research quality, impact and capability. The research performance indicators are provided in table 1.

TABLE 1: Performance indicators for Malaysian research universities

Indicator	Criteria	Research University
1. Quantity and quality of researchers	Critical mass	60 per cent of academic staff will be involved as Principal Investigator
	Percentage of academic staff with PhD or equivalent	60 per cent
	Research experience (3 cohorts)	With balanced distribution of staff with > 20 years experience, 10-20 years and < 10 years experience
	Number of recognitions/awards/stewardship conferred by national and international learned and professional bodies	100
2. Quantity and quality of research	Publications	Two papers in national/international refereed and cited journals per staff/year or cumulative impact factor for the institution of not less than 5,000
	Research grants for S&T academic staff a. Public b. Private (including contract research) c. International	At RM50,000/staff/year of which at least 20 per cent is from international sources and 20 per cent from private sector
	Research expenditure	Not less than 60 per cent of grants attained/year
	Post-docs appointed	10/year
3. Quantity of postgraduates	Ratio of PhDs graduated to academic staff	1 : 18 academic staff of which 60 per cent will be from S&T
	Ratio of postgraduates to academic staff (enrolment)	3 postgraduates : 1 staff
	Ratio of postgraduates (based on research and mixed mode*) to undergraduates	1 postgraduate : 4 undergraduates
	Percentage of international postgraduates	10 per cent

TABLE 1:Continue

Indicator	Criteria	Research University
4. Quality of postgraduates	Percentage of postgraduate intake	50 per cent of postgraduates with CGPA \geq 3.0
	Percentage of postgraduate fellowships/grants from prestigious bodies awarded to postgraduates via research mode	Not less than 10 per cent
5. Innovation	Number of patents attained/number of products commercialised/number of technology know-how licensing/number of IPR/copyrights (including original writings)	30/year
6. Professional services and gift	Income generated from training courses/services/consultancy/postgraduate student fees/endowment/gift	Not less than RM20 million/year
7. Networking and linkages	Inter-institution (national) participation	70 per cent
	Inter-institution (international) participant	30 per cent
8. Support facilities	Equipment fully operational and calibrated or physical facilities that meet safety and quality standards (accreditation to GLP/ISO17025) or library facilities including networking and shared facilities of service centres or recreational or access to high end research facilities	On site auditing 75 per cent compliance attained

Source: MoHE, 2004

Research performance indicators must be visible and measurable in ways that are generally understood (publications, grants, postgraduate students, etc.). In the Malaysian case, the criteria and standards were formulated by Department of Higher Education and a steering committee. The criteria and standard of other research universities and world-class research universities were used as guidelines. In essence, the criteria and standards would require the research universities to place a heavy emphasis on research and innovation.

The assessment uses self-evaluation and a review by an expert panel every three years. The standard measures allow for comparison and ranking based on the selected quality indicators. The performance will determine the research funding allocation. The funding allocation on a competitive basis will give quality assessment stature as government and private funding agencies will use it to guide their spending. Based on the first review exercise, the assessment was seen as having increased the quality of research more so due to the component of self reflection which forced the universities to identify and develop their research strengths. The improvement was mainly seen on the establishment of new research centres, concentration of research niche and clusters, and coordination of research collaborations and networks. This exercise has also required the universities to coordinate effective management structures and mechanisms of a research environment capable of producing measurable research outcomes. Other significant changes in research policy include increased competition for research findings, intensified competition for high quality local and international students, initiatives to generate and facilitate technology transfer and commercial application of research, development and retention of skilled researchers (professors) and an emphasis on moving from individual scholarship to institutional research activities.

To conclude, Malaysian research university environment is in a period of rapid change given the introduction of new funding avenues and the pressure being brought to bear on the universities to undertake. The research performance quality assessment is a formal part of the system and it is largely restricted to the evaluation of research output (publication, research income, post graduate student numbers, etc.). Since the focus of the exercise is research excellence, the assessment also serves a general stimulus for continuous improvement in the quality of research undertaken and disseminated by Malaysian research universities, as well as a quality assurance mechanism.

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