Dis-endangering Research and Knowledge Creation Inertia amidst Constraints in a Teaching University: The Experience of Universiti Sains Malaysia

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DIS-ENDANGERING RESEARCH AND KNOWLEDGE CREATION
INERTIA AMIDST CONSTRAINTS IN A TEACHING UNIVERSITY:
THE EXPERIENCE OF UNIVERSITI SAINS MALAYSIA

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ABSTRACT

The general thrust of Third world universities in general and in Malaysia in particular, are often geared toward producing human capital to support and sustain national development goals. This is especially true in countries where, ever since their independence, the required skills are still inadequate particularly in science and technology, medicine and, to a lesser extent, social sciences. Hence the general focus would be to emphasise on teaching of the undergraduate programmes, at the expense of postgraduate supervision and scholarly research. This anomaly is not necessarily due to financial constraints (as in the case of Malaysia, the income from tuition fees do not often exceed 10 percent of total revenue of the universities) but on the need to expand human capacity for national development.

Given this trend and difficulties, it is, however, still possible to promote and inculcate research culture within the university and it is still possible to avoid this “endangered species” syndrome. Based on the experience of Universiti Sains Malaysia (USM), research can be given equal impetus and weightage as teaching, and research culture can be assimilated in many dimensions of academic endeavour, including key performance indicators, institutional goals, external relations and promotion exercises.

Since 2000, USM was able to escalate and forge R&D culture into its day-to-day activities through:

- an extensive audit of R&D activities and promotion of new modes of operations and out-of-the-box thinking;
- the realignment of R&D governance, management and organisational structure;
- the creation of parallel units and approaches to ensure the equal standing of research and teaching as well as promoting greater synergy between research and teaching;
- the creation of a holistic platform which can take research through the stages of development, commercialisation, entrepreneurship and research park vis-à-vis the creation of the one-stop research management centre and an innovation system;
- the establishment of a commercialisation arm to handle marketing and sales of R&D products and processes;
- the development of a research agenda which promotes a borderless interdisciplinary ideas powerhouse and knowledge enterprise through (i) creation of new collaborative research frontiers, (ii) de-compartmentalising research disciplines, (iii) "co-collaboratories" (sharing of research facilities), (iv) optimising the usage of financial resources through research endowment, (v) developing dynamic research programmes through clustering, and (vi) ‘brand name’ research training programmes.

The paper discusses USM’s attempt at promoting research as a way of life, as an institutional norm and behaviour amongst its academic staff thereby enhancing its global competitiveness and move up the value chain of tertiary education. The paper will also share the positive outcomes and accomplishments recorded and accrued since the past six years, including:

- the establishment of new research areas and the consolidation and strengthening of the existing niche areas;
- the increase in the number of contract research and external grants, the increase in the number of publications in citation-indexed journals including high impact factor journals (ISI Serials);
- the proliferation of recognition/awards/stewardship conferred by national and international learned and professional bodies;
- the qualitative and quantitative increase in the in-take of postgraduate candidates through the provision of opportunities and choice for research in a high quality training environment; and
- the continuous improvement of research capacity of the university as a whole, including human capital, infrastructure and resources.

INTRODUCTION

The thrust of this paper is to share the experience of Universiti Sains Malaysia (USM) to promote research among its academic staff, in particular to forge the formation of research clusters and programmes in order to bring R&D at par with teaching and learning activities. As a public funded university, USM therefore has to adhere to the higher education policy of
the federal government of Malaysia, that is to fulfil the manpower needs and develop social
capital for national development. In other words, higher education in Malaysia is often
equated with capacity building for the public and private sectors, the two engines of
economic growth for the country. In the words of the Minister of Higher Education,
“Universities are well positioned to grow as drivers of Malaysian human capital development”
(The Star, 7 Oct 2006). The allocation of annual operational funds by the government is
based on the per capita enrolment of undergraduate students, therefore it is incumbent on
the part of the university management to ensure the production of as many undergraduate
students as possible. Up to today, operational allocations is not provided for postgraduate
programmes.

In a nutshell, we can assume that USM is a teaching university in every sense of the word.
Established academic positions are based on the recruitment of people to teach. The
qualifications of recruited staff are often assessed according to the courses they can teach.
Very seldom are new recruits assessed and taken in on the merit of their research
experience and research specialisations. There is no established positions beyond
undergraduate qualification to hire capable staff to fulfil specified research needs of the
university. For the undergraduate qualifications, the only position available is that of Science
Officer and it is very limited in number.

Against this backdrop of information, it is therefore daunting how a university such as USM
can promote and resuscitate R&D to stand on an equal footing with teaching and learning, if
not a bit taller. This paper discusses how R&D is given a prominent boost by the
management of the university beginning in late 2000 and early 2001. A major portion of this
exercise and its outcome has been documented elsewhere (USM, 2002; and Lee, M.N.N.,
2004).

The underlying philosophy of this exercise is that the university has to adopt a vision where
academic staff will be encouraged to undertake reputable research activities not only to
produce new products, services and knowledge discoveries and hence become more
innovative and creative, but also to translate the discoveries into new knowledge, teaching
contents and the curriculum as a whole. Once new knowledge is translated into teaching
activities, it will spur the enforcement of quality teaching and the promotion of USM as a
centre of academic excellence.

This vision takes cognisant that new knowledge discoveries through research alone do not
make an institution great. Indeed, the core business of USM is to teach the most promising
of the nation’s youth. They must be equipped with the latest information, skill and knowledge.
They must have access to the latest and most sophisticated technological equipment. To
fulfil this mission, USM must ensure that its academic staff can excel and are involved in R&D activities that allow them to update themselves by being creative in acquiring new knowledge and techniques for imparting to the students and, also generate ideas that can change or influence knowledge.

Concomitantly, a creative and innovative blend and mix of teaching and research have to be harnessed in order to move up the ladder of quality and excellence. This can be achieved through nurturing and acculturation of selected research programmes which can be used to create new knowledge frontier to be assimilated into the core teaching programmes. In a similar vein, research programmes which have the potential of becoming world-class programmes and which can help build USM’s reputation in the global academic arena should be identified, nurtured and acculturated.

Given the philosophy and vision of this exercise, it is clear that research and research excellence in a public university can be promoted without sacrificing the core business of teaching and learning as well as remaining faithful to the government’s higher education policy. In fact, the thrust of this exercise is to synergise research with teaching because new knowledge that emerges from the former has to be transferred and this can only be done through the latter. In sum, the exercise is to produce new research products, services and knowledge as well as to produce knowledge workers with new innovative ideas.

CURRENT TRENDS OF HIGHER EDUCATION

In recent years, several pertinent issues have been expressed and discussed with regard to the role and responsibility of institutions of higher learning in general and the function of the universities in the society in particular. First, the issue of quality of education provided by these institutions. This is related to the marketability of the graduates to obtain gainful and appropriate employment. Quality of education is raised and remains in vogue because of the trend toward greater globalisation of the economy. This trend, says Schugurensky (1999), has significantly transformed the value of higher education because of the commodification of knowledge and greater emphasis on knowledge economy.

According to Lee (2004), globalisation of the economy commensurate with the decline of the welfare state and public subsidies which “means less money for social welfare and education which has profound implications on higher education”. Subsequently there is an upward demand for quality education but the question remains, are the universities meeting this demand? Are the universities able to live up to the expectations of the consumers to offer the best core programmes and produce the best graduates? Are the universities
moving forward to do self-appraisals of its core programmes and activities so that they can make informed judgement to move up the value chain of higher education that has become increasingly competitive?

The response of the universities to globalisation and to the growing demand for quality education should be simple: strive to be the best because only the best will survive. This leads us to the current discussion and debate about the formulation and attainment of a world-class university. Although its term and definition is still unclear, and at best fuzzy, it is without doubt that a university has to restructure and transform its programmes to be competitive and demonstrate its worth in terms of its teaching programmes, research and development, consultancy projects and contribution to the society at large.

At a recent conference on “Globalising Higher Education in Malaysia”, Professor Wang Gang Wu emphasised that a university should evaluate its worth in order to survive as an institution of excellence. According to Wang, “Already, around the world we can distinguish universities that are alert to the needs and opportunities outside their campus from those which do not know how to do that.” (The Sunday Star, 27 August 2006)

Such awareness and knowledge of what is going on can only be attained by knowing what we already have and what gaps need to be filled. This calls for an internal assessment of every facet of academic endeavour in which the universities are working toward, including measuring and auditing R&D activities. Since R&D activities will become the cogs that link the institution to world-class stature, or at best a research university, it is imperative for such institution to do soul searching and a thorough audit of its R&D activities.

The problem with the notion of world-class university is that no one seems to know what it is and no one has figured out how to get one. Notwithstanding that, Altbach (2004) suggested world-class university to mean the best in the world with global standards of excellence. He proposed that excellence in research is the crowning glory of a world-class university; such standards must be recognised by peers as well as pushing the frontiers of knowledge.

He however cautioned that to attain research excellence, the university must have the following:

- top-quality professors;
- favourable working conditions (including job security and appropriate salaries and benefits);
- academic freedom and intellectual excitement, including freedom to pursue knowledge and to publish freely;
• conducive internal self-governance and an entrenched tradition which ensures the academic community controls the central elements of academic life, such as students admission, criteria for the conferment of the degree, and selection of new academic;
• adequate facilities; and
• adequate funding for research.

Similar criteria is offered by Niland (1998). He said,

“A world-class university will be widely recognised as an eminent institution, as a place where top staff will wish to congregate. Given the chance, staff from other universities will migrate to the world-class university, and top faculty attract top students. The process is auto-catalytic. This means such a university will almost certainly be a research-intensive university. It also must teach well. But first and foremost it is a place where people will want to spend time for the experience, and to associate with the fame and respect that goes with this. Absolutely fundamental to building such a climate is the quality of the staff, especially the academic faculty members.”

Besides top-rated staff and research intensiveness, Niland (1998) suggested that world-class universities should also have strong research reputation, talented postgraduate and undergraduate bodies, international presence, global networks, good governance and management, technologically savvy, and provide many disciplines teaching programmes.

In sum, although the essence of a world-class university remains vague, it is without doubt that the journey toward attaining this status should begin with a close examination and self-appraising of the R&D activities.

THE INITIATIVES

The initiative to reinvigorate R&D activities at USM started at the onset of the appointment of the current Vice-Chancellor in December 2000. Upon assumption of the office, he immediately conducted an extensive and comprehensive exercise to produce the best practices to enhance the image and reputation of the university and its global competitiveness. He subsequently wrote to all Deans and Directors of the Schools and Centres of Research Excellence requesting them to name projects, programmes, courses and structures which they considered to possess ‘world-class’ standing. Specific justifications for each listed project as well as the names of prominent individuals outside the university community who could vouch this standing had to be provided. Its objective is to formulate a strategy to acculturate and nurture programmes which have the potential to become world-class programmes and incubate those which show the potential to reach this level. Programmes which have this potential will become the subject in all branding and marketing activities of USM.
Twenty-one schools and eight centres of excellence responded and in total 123 activities, including 91 research and 23 teaching programmes. Subsequently the Vice-Chancellor appointed five senior professors to form the Advisory Committee to the Vice-Chancellor the assess and audit the claims made by the Schools and Centres. After some lengthy deliberations, the Committee created a methodology of assessment to audit the standing of each of the programme. For this purpose, two broad categories are used and these are sustainability and the impact of the programmes. As for sustainability, the assessment were made on human resource, funding, physical facilities and networking. As for impact, the measures were on publications, technology transfer, patents/marketable products and copyright, impact on consultancy, impact on government policy and regulations and honours and awards accrued.

The Committee was able to complete a report within 15 months of its formation and its findings were published in the Technical Report in 2002 and subsequently extended into a publication edited by Professor Molly N.N. Lee in 2004. The Committee identified five research programmes of the university to have the potential to be of world-class standing, i.e. Medical Biotechnology, Ecological Drainage, Vector Control, Anti-Infective Drugs and Aquaculture.

The most significant contribution of this Committee is the list of recommendations made on the ways and means to improve R&D programmes and activities of the university. The management of the university carefully considered these suggestions and had taken great stride to implement each and everyone of them. The outcome is discussed in the next section of this paper (see The Results). The recommendations of the Committee were as follows:

1. R&D Organisation and Management

Pursuant to the submission of the report, a substantive effort was made to improve the organisation and management of R&D in USM. In the first instance, the university created a special unit known as the Research Creativity and Management Office (RCMO) to act as a one-stop centre for R&D; to provide management, administration and implementation needs as well as support, liaise and sustain R&D activities of the university. Creativity would be the operational word for this office as it attempts to forge a new research paradigm moving toward the creation of research excellence.

2. Research Clusters and Collaborative Research

The Committee also recommended the creation of borderless platforms which can promote and encourage multi-disciplinary research and to remove all impediments in order to increase collaboration/cooperation among researchers. This would compel
researchers to not only work together but also share laboratories and other facilities. In turn, there are spin-offs in multi-disciplinary post-graduate research and innovative research outputs.

3. Establishment of the Office of the Deans of Research
   To support the formation of research clusters and the promotion of collaborative research, the university created seven Research Dean positions for the following research platforms: social transformation, engineering and technology, information technology and communication, life sciences, health and biomedicine, clinical sciences, and fundamental sciences.

4. Research Endowment Fund
   The Committee also suggested the creation of a Research Endowment Fund to supplement the inadequacy of the grant provided by the federal government, especially for basic or fundamental research.

5. Postgraduate Admission and Financial Support
   It was also recommended that the university put in place a strategy to improve the quality of postgraduate student intake as well as to create fellowships and financial assistance to support the in-take of excellent students who need the assistance.

6. Research Incentives
   Travel grants, larger quantum of research grants, honorarium to researchers, waiver of teaching duties, attendance at conferences, organisation of international conferences are some of the incentives identified by the Committee for implementation by the university. In a similar vein, it was also recommended that the university formally recognise staff who have brought fame to the institution. In order to promote higher publications by the staff, it was also proposed that Science Editors be appointed for the clusters and payment of page charges, time-out to write and clerical assistance should be provided.

7. Networking
   In order to promote greater collaboration with external agencies, both local and abroad, the Committee recommended that specific units should be established, especially to forge greater collaboration and networking between the university and industry. A specific target to collaborate with identified reputable universities have also been made.
8. **Provision of Databases and Network for International Access**
   In order to ensure rapid access to reputable journals, citation index and international databases, it was also recommended that the university improve the databases and networks available in the various libraries located in the three campuses.

9. **Centres of Research Excellence**
   In order to ensure only qualified research programmes are upgraded into centres of research excellence, the Committee devised a set of criteria to be met by any requests for the establishments of such centres. The criteria include human resources, generational cohorts, physical facilities, networking, research grants, publications, postgraduate students and honours and awards received.

10. **Establishment of Research Chairs**
    In order to create a pool of ‘towering personality’ (i.e. persons who are eminent and whose performance and achievement could and should be emulated by others) in the campus, it was also recommended that more professorial chairs and other established positions be created. These positions should be used to not only allow the university to explore into uncharted research destinies but also to provide the direction and guidance to young staff to conduct value-added and knowledge discovery research.

11. **Promotion and Marketing of Research Products and Services**
    It was also recommended that the university undertake a more aggressive promotion and marketing of its research products and services. This effort should entail in greater awareness among the general public and decision makers of what transpire at the university and to attract venture capitalists and private investors to undertake commercialisation of these products and services on a joint partnership basis. These promotions and marketing can be done through greater participation in R&D Expositions and Exhibitions, production of dedicated newsletters for R&D activities, websites and face-to-face meetings.

12. **Patents and Commercialisation**
    The Committee also suggested the university examines the mechanisms of patenting and commercialising its research products and services. The mechanisms include the financial outlay that is required as well as its management, including the need to protect the intellectual property of the university.
THE RESULTS

Ever since this initiative started in late 2000 and early 2001, the university obtained outstanding results in its effort to resuscitate and to bring up R&D programmes and activities among its academic staff. The climax of this achievement is when USM was adjudged as the top Research University in Malaysia. By the same token, the university was able to undertake a multi-dimensional approach to improve R&D in many spheres, including increasing human resource capacity, in S&T in particular; an increase in the amount and sources of research grants, the promotion of more cluster and collaborative research programmes and projects, and a more efficient and accountable research management and administration.

Specific accomplishments and outcomes are discussed briefly as follows (all figures and statistics are quoted from USM, 2006):

1. **Human Resource**

   The number of professors has continuously increased from 86 in 2001 to 109 in 2005 and the number of S&T staff increased from 646 in 2001 to 837 in 2005. The total number of academic staff with PhD qualifications had also increased over the years from 422 staff in 2001 to 840 staff in 2005. This is almost 70.0 percent of total academic staff of the university. In terms of generational cohorts, the situation has improved over the years as follows:

<table>
<thead>
<tr>
<th>Research Experience of Different Generations of Academic S&amp;T Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>More than 20 years of research experience</td>
</tr>
<tr>
<td>Between 10 to 20 years of research experience</td>
</tr>
<tr>
<td>Less than 10 years of experience</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

2. **Research Grants**

   As can be seen from the table below, both government and private sector research funding at the national and international levels have increased since 2001. A larger sum recorded in 2001 and 2002 reflected the budgeting period of the Government’s Eighth Malaysia Plan in which a larger outlay of the grant is given at the beginning of the Plan and taper off after that.
Research Grants for S&T Staff  
(in Million Malaysian Ringgit, RM)

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of public funding</td>
<td>8.3</td>
<td>86.0*</td>
<td>24.3</td>
<td>11.5</td>
<td>18.2</td>
<td>148.2</td>
</tr>
<tr>
<td>Total amount of private funding</td>
<td>0.52</td>
<td>3.0</td>
<td>6.3</td>
<td>2.3</td>
<td>1.8</td>
<td>14.0</td>
</tr>
<tr>
<td>Total amount of international funding</td>
<td>13.6*</td>
<td>4.2</td>
<td>3.4</td>
<td>2.3</td>
<td>1.8</td>
<td>25.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>22.4</td>
<td>93.2*</td>
<td>34.0</td>
<td>16.1</td>
<td>21.8</td>
<td>187.4</td>
</tr>
</tbody>
</table>

[US$1.00 = RM3.7]

3. **Centres of Excellence**

Based on the recommendations of the Committee, the university has adopted stringent measures in determining the creation of centres of research excellence. As a result, only two research programmes managed to meet this criteria and they are the Institute for Research in Molecular Medicine and River Engineering Research Centre. The university is convinced that these two centres will garner global recognition and will further propel the university to global eminence. In the mean time, other centres of research excellence which can fulfil the criteria are being nurtures.

4. **Postgraduate Programmes**

Since 2001, there have been significant improvements in the quality and quantity of postgraduate programmes. A brief summary of such improvement is as follows:

**Postgraduate Enrolment, Student/Staff Ratio**  
and Enrolment of International Students

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postgraduate Enrolment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Enrolment</td>
<td>4,633</td>
<td>5,281</td>
<td>5,966</td>
<td>6,465</td>
<td>6,523</td>
</tr>
<tr>
<td>Number of PhDs graduated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number per year</td>
<td>31</td>
<td>82</td>
<td>79</td>
<td>109</td>
<td>94</td>
</tr>
<tr>
<td>% of PhD in S&amp;T</td>
<td>48</td>
<td>73</td>
<td>42</td>
<td>51</td>
<td>39</td>
</tr>
<tr>
<td>Number of PhDs enrolled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number per year</td>
<td>773</td>
<td>900</td>
<td>1,047</td>
<td>1,215</td>
<td>1,379</td>
</tr>
<tr>
<td>% of PhD enrolled in S&amp;T</td>
<td>42</td>
<td>43</td>
<td>43</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>Ratio of Postgraduate Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio of postgraduates to one academic staff</td>
<td>4.7</td>
<td>4.8</td>
<td>5.2</td>
<td>5.4</td>
<td>5.4</td>
</tr>
<tr>
<td>Ratio of postgraduates to undergraduate</td>
<td>1.8</td>
<td>1.7</td>
<td>1.7</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>International PG Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No of International Postgraduate Students</td>
<td>467</td>
<td>557</td>
<td>679</td>
<td>850</td>
<td>1,007</td>
</tr>
</tbody>
</table>

With regard to fellowship and financial assistance, the university has introduced several financial incentives to attract quality postgraduate students, including the creation of the Vice-Chancellor Awards, Tuition Waiver Scheme and Research Awards.

5. **Awards and Honours**

Over the years, the university has aggressively undertake to showcase research products and services invented by the academic staff at both the national and
international levels. The recognition obtained from this exercise showed an upward trend as follows:

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awards by national bodies</td>
<td>27</td>
<td>40</td>
<td>75</td>
<td>66</td>
<td>44</td>
<td>252</td>
</tr>
<tr>
<td>Awards by international bodies</td>
<td>12</td>
<td>42</td>
<td>49</td>
<td>49</td>
<td>54</td>
<td>296</td>
</tr>
<tr>
<td>TOTAL</td>
<td>39</td>
<td>82</td>
<td>124</td>
<td>115</td>
<td>98</td>
<td>458</td>
</tr>
</tbody>
</table>

USM also created a scheme known as Anugerah Sanggar Sanjung (literary Hall of Fame Award) which provides incentives to staff who have won awards and honours at the national and international academic arenas, either in the areas of research, publications, creativity or creativity. For this, the university hosted the Malam Anugerah Sanggar Sanjung (literary Hall of Fame Award Evening) annually for the past five consecutive years.

6. Publications

In a separate move, the university has also undertaken a revision to its promotion criteria to the positions of Associate Professor and Professor whereby research and publications are now given higher percentage (35%) over teaching (30%), academic leadership (10%), consultancy (10%), service to the university (10%) and service to the community (5%). As a result the Cumulative Impact Factor has continuously increased annually, from 306 to 402 in 2005. The number of publications in citation-indexed journals have also increased from 265 in 2001 to 329 in 2005.

7. Patent and Commercialised Products

The cumulative number of patents increased from 57 in 2001 to 64 in 2006. In a similar vein, USM created the Innovation Office to be responsible for the patent and commercialisation of its research products and services, including the protection of its intellectual properties. Through the work of this office, the university has devised its own unique version of innovation system for adoption by its community.

As a result of these activities, USM was able to commercialise its products through its commercial arm, USAINS Holding which was established in 1998. USAINS Holding today is able to reap larger returns and reported increased profit over the years.

8. Networking

In order to promote and market its research products and services, the university created several units for this purpose, including to network and collaborate with the industry and reputable universities. For the industry, USM established the University-Industry Liaison Office to promote cooperation, collaborations and partnerships between
the two entities. To enhance better research relations, the university created the Engineering Innovation Technology Development and Medical Innovation and Technology Development units to spearhead innovations in the fields of engineering and medicine.

9. Branding of USM

According to marketing principles, an institution has to create an image of perception of its worth and contribution to the society by building on an identification or a brand which the society can relate to. Since 2001, R&D has become the central core of USM's activities and this is reflected in its new logotype as an easily identifiable “brand”, synonymous to quality products and services of the university.

CONCLUSION

It has been an unstinting effort on the part of USM's management to turn the university into a global centre of research excellence. It all started with the process of identifying, evaluating and implementing of the world-class research programme which today has become the milestone towards realising this goal. As part of the process, there is a need to understand the dynamics and synergy that are involved and the effort that it requires. The university is committed to the highest standards in teaching as well as research and has created institutional reward structures that validate this commitment. A creative and innovative blend of research and teaching will allow the core teaching programmes to excel and move up the ladder of quality and excellence. Its academic community has to update itself by being creative in acquiring new knowledge and techniques and imparting them to the students.

Based on the effort started in 2000, the experience of USM shows that it is possible to turn around and synergise R&D in a teaching university. Since that period, USM is well on its way to become a research university and the recognition accorded by the Government of Malaysia to USM as the top Research University in the country is worthy of the planning and effort that has gone into the exercise.

REFERENCES


*The Sunday Star*, 27 August 2006 (Education page), p.2
