The Academy of Sciences Malaysia as A Role Model for Scientific, Engineering and Technology (S.E.T) Academies in Developing Countries

By Academician Dato’ Ir. Lee Yee-Cheong, F.A.Sc., FTSE, Vice President, Academy of Sciences Malaysia/ Director, Inter-Academy Council

1. Introduction

The Inter-Academy Panel (IAP) and The Third World Academy of Sciences (TWAS) held an international workshop on Capacity Building for African Science Academies in Trieste, May 2001.

I presented a paper on the development of the Academy of Sciences Malaysia (ASM). The paper was well received by delegates from Africa. Surprisingly, it was regarded as a good model for developing countries by several speakers and delegates from academies of developed countries, particularly the Royal Society and the Royal Swedish Academy of Sciences. They felt that their own academies were developed over several centuries and are too well established as models for the struggling and emerging academies of Africa and other developing countries.

After the Trieste Workshop, ASM sent the Annual Report and the Membership Handbook to all African participants. The Handbook contains the Academy of Sciences Malaysia Act, the Academy of Sciences Malaysia Regulations and the Academy of Sciences Malaysia Procedures. We understand that the Nigerian Academy received an endowment of US$ 5.0 Million from Government as per ASM model. In Tunisia, the proposed Academy of Sciences has become the Academy of Science and Technology, integrating scientists and engineers in one academy as per ASM model.

The Inter-Academy Council (IAC) of the Scientific Academies of the world is conducting a global study on S&T Capacity Building. A “Human Resource Capacity Building in Asian Developing Countries” workshop was held in Beijing April 2002 under the auspices of IAC and the Chinese Academy of Sciences (CAS). In the workshop, it was emphasized that S.E.T academies have a vital role in science advice and governance in developing countries. They are also crucial S.E.T capacity building institutions. CAS highlighted the important role in conceptualizing the innovations needed by China in facing the challenges of the global knowledge economy. CAS also discussed its own modernization process and held it up as a case study for the IAC S&T Capacity Building Study.

This Scientific Community Forum of the Indonesian Institute of Sciences during the WSSD PrepCom IV in Bali provides me with the opportunity to update my Trieste paper and offer ASM as another case study in S.E.T institutional capacity building in developing countries.
In country papers for international forums, it is customary to mention only the achievements. This often leaves the audience to wonder what then are the problems. I will attempt to be more forthcoming so that our experience will be of more use to colleagues from the developing world who are attempting to establish new academies or strengthen existing academies. As such, the opinions expressed herein are my own and not those of ASM.

2. History of Establishment of ASM

ASM is one of the youngest Academies in the world, being only seven years old this coming September.

In the early Eighties, the first attempt was made to establish the Academy of Science Malaysia by the Science Advisor, Prime Minister’s Department, Tan Sri Dato Dr. Omar Abdul Rahman and the President of the Malaysia Science Association, Dr M. K. Rajakumar. The initiative was unfortunately not supported by Government and was unsuccessful. Nevertheless, a recommendation to establish the Academy of Science Malaysia was included in the first National Science and Technology Policy, 1986.

In 1991, I was encouraged by the U.K. Fellowship of Engineering (now the Royal Academy of Engineering) to establish the Academy of Engineering in Malaysia. After obtaining the support in writing of about 40 elders of the Malaysian engineering community, I went ahead to visit and obtain advice and reference material from the U.K. Royal Academy of Engineering, the Australian Academy of Technological Sciences and Engineering, the US National Academy of Engineering, and the Royal Swedish Academy of Engineering Sciences. I began preparatory work in earnest to form the proposed Academy of Engineering. Through the above-mentioned Academies, I was invited to the 1992 Convocation of the Council of Academies of Engineering and Technological Sciences (CAETS) in Copenhagen. As a matter of fact, I have since attended every CAETS Convocation, Zurich 93, Kiruna 95, Edinburgh 97, Sophia Antipolis 99 and Helsinki 2001. During my early association with member Academies of CAETS, I learned much from all of them, especially from two young Academies, the totally Government sponsored Chinese Academy of Engineering and the totally privately funded Engineering Academy of Japan.

Tan Sri Dato Dr. Omar learned of my initiative through mutual friends from the Australian Academy of Technological Sciences and Engineering and contacted me for discussion. He convinced me that due to the small Science, Engineering and Technology (S.E.T) base in Malaysia, Government would be in favour of one all-embracing Academy of Science, Engineering and Technology (ASET). We were in total agreement that the Academy should serve first and foremost national development objectives. As such, it must have Government approval and support so that it becomes an accepted part of the Science Advice system of Malaysia. A pro-tem Committee of ASET was set up under his chairmanship with Dr. M.K. Rajakumar as deputy chair and myself as Secretary. The Committee guided the proposal to form ASET through the National Council for Scientific Research and Development (NCSRD). In fact, I made the presentation to NCSRD as if the proposal came from the Institution of Engineers Malaysia. NCSRD agreed to submit a Cabinet paper recommending the establishment of ASET.
Meanwhile, due to the enlarged scope of ASET membership, I made arrangements to visit the Royal Society of London, The Australian Academy of Science and the Chinese Academy of Sciences to study their charters and constitutions and learn about the modus operandi of Science Academies. The Secretariat of CAETS in Washington DC supplied me with the Constitutions of the US National Academy of Sciences, the US National Academy of Engineering and the US Institute of Medicine.

Cabinet in late 1993 approved the establishment of the Academy but shortened its name from ASET to the Academy of Sciences Malaysia (ASM). The draft Academy of Sciences Malaysia Bill was submitted in early 1994 to Cabinet after obtaining the approval of the Ministry of Science, Technology and the Environment and the Attorney General’s Chamber. The draft Bill was largely modeled on the Memorandum of Association and Articles of Association of the Australian Academy of Technological Sciences and Engineering, The Bill was tabled in Parliament July 1994. All Members of Parliament and Senators who participated in the debate in both Houses supported the Bill, which passed both Houses unanimously. ASM was thus legally established under the Academy of Sciences Malaysia Act 1994 that came into force on 1\textsuperscript{st} February 1995.

ASM was inaugurated by the Prime Minister of Malaysia, Dato Seri Dr. Mahathir Mohamad on 8\textsuperscript{th} September 1995.

3. Government Support for ASM

For a S.E.T academy in a developing country to succeed, it has to possess the three essential prerequisites of Mandate, Money and Manpower.

The first prerequisite of Mandate is the Government. The academy has to be strongly supported by and linked to Government if it were to aspire to be the core of the national S.E.T advice system. ASM was established by an Act of Parliament and its president is appointed by the King after being nominated by the ASM Council.

The second prerequisite of Money is adequate and sustaining funding. Again in a developing country, the source has to be Government. ASM obtained a one-time launching grant of RM 12.4 million (then US$ 5.0 million) from the Government. From investment income supplemented by consultancy fees and project funding and sponsorship, ASM has been able to meet its annual operating and administrative expenditure to-date without eating into its capital. This is far superior to submitting an annual request to Government for funding that is hostage to the vagary of national economic circumstance as well as national bureaucracy. Government further granted ASM tax-exempt status and tax exemption for donation to ASM for the donor.

Government also endowed ASM in kind by giving a Government bungalow in Kuala Lumpur as ASM Head Office. Government has allocated RM 12.0 million in the Eight Malaysia Plan (2001-2005) for a new National Science and Technology Resource Centre (NSTRC) to house ASM and other national S.E.T associations. NSTRC will be administered by ASM. NSTRC is being built on land donated by University Putra Malaysia and is expected to be ready in 2003.
4. ASM Membership

The third prerequisite of Manpower is the quality of ASM membership that is drawn from the top strata of the Malaysian S.E.T community. Upon this foundation rest the confidence and trust of Government, the Malaysian S.E.T community and the Malaysian society at large.

As befitting a developing country, ASM Mission as stated in the Act is “the pursuit, encouragement and enhancement of excellence in the field of science, engineering and technology for the development of the nation and the benefit of mankind.” It emphasizes national development as ASM prime mission.

National development in a developing country has a large engineering, infrastructural and industrial development content. It is most important that engineers, architects, surveyors and town planners, and technologists in industries are involved in ASM as much as scientists.

Thus, ASM membership is classified under 7 disciplines:

Medical Sciences,
Engineering Sciences,
Biological Sciences,
Mathematics and Physical Sciences,
Chemical Sciences,
Information Technology,
Science and Technology Development and Industry

Prior to ASM inauguration, a Committee, chaired by the Chief Secretary to the Government, was appointed by the Minister of Science, Technology and the Environment to recommend to the Minister the appointment of fifty Foundation Fellows. Nominations were first obtained from all the science, engineering and technological institutions and societies.

The Act provides for the appointment of Honorary Fellows and Senior Fellows, the latter being appointed from amongst ASM fellows for outstanding contribution to S.E.T in Malaysia and to the Academy. A senior fellow is entitled to be designated “Academician” and receives a life-long annual allowance from the Government.

Currently ASM membership comprises one honorary fellow, namely Dato Seri Dr. Mahathir Mohamad, and 104 fellows, of which six are senior fellows.

New fellows are elected at the Annual General Meeting by two-thirds affirmative votes of fellows present, after being nominated by fellows and being subject to peer review first within the Discipline and then the ASM Membership Committee.

ASM is governed by a Council of 16 fellows. The administration is by full time staff of about twelve, headed by the Executive Director.
5. Important Functions of ASM

Amongst the functions listed in the Act, the most important are:

a. To provide advice to government on aspects of S.E.T that are important for national development.
b. To foster and promote the development of S.E.T in Malaysia.
c. To promote national awareness, understanding and appreciation of the role of S.E.T in human progress.
d. To promote the application of S.E.T in Malaysian industries.
e. To establish and maintain relations with overseas bodies having the same objectives in S.E.T as ASM.

6. Major Focus of ASM Activities

In line with the above priority functions, the following five major areas of focus have guided the activities of ASM to date:

a. Advice to Government,
b. Fostering a Culture of Excellence in S.E.T,
c. Upgrading S.E.T in Industry,
d. Promoting Public Awareness in S.E.T,
e. Enhancing International Linkages in S.E.T.

ASM activities are carried out by working committees. Working committees draw their members from ASM fellows and from the S.E.T base of the nation.

6.1 National Activities

ASM has been very active nationally. Without doubt, it has achieved the standing as the top S.E.T “Think Tank” in Malaysia.

Amongst the more notable activities to-date are the following:

a. Consultancy Study in 2000 for Government “Review of National Science and Technology Policy”. This eighteen-month study is the most ambitious and important study by ASM to date. Its objective was to make recommendations to Government how Malaysia can face the challenges of the global knowledge economy through innovations in S.E.T. Extensive consultations with experts from sister academies and agencies in Australia, China, Korea, Japan, India, the United Kingdom etc were made through discussion meetings in Malaysia and abroad. The National S&T Policy Review provided valuable and timely input to the nation’s strategic and development plans like the Eight Malaysia Plan (2001-2005) and the third Outline Perspective Plan (2001-2010).
b. ASM has made recommendations to Government to set up national science education standards - This is currently in the final stage of development by the Curriculum Development Centre, Ministry of Education.

c. ASM has made recommendations to Government to enhance Malaysia’s Agriculture-Food Development through S.E.T.-this is being incorporated into the policy of the Ministry of Agriculture.

d. ASM has made recommendations to Government to establish the National Botanic Garden- Malaysia is without a national R&D botanic garden. ASM has been at the forefront of its advocacy. This is now under the purview of the Ministry of Agriculture.

e. ASM has made recommendations to Government to strengthen the S.E.T content in Rakan Muda, the national youth development programme-ASM has offered to help the Ministry of Youth and Sports to promote S.E.T competency amongst Malaysian youth. First joint activity is likely to be a science camp.

f. ASM has been by Government to spearhead the programme of First Malaysian Nobel Laureate by 2020- the ASM study report is being finalized.

g. ASM has been entrusted by Government to coordinate Malaysian Antarctica research-Malaysian scientists have gone to Antarctica with the assistance of Australia and New Zealand. The Antarctica Research Centre has been established in the University of Malaya. Government has also requested ASM to study the feasibility of a Malaysian Research Station in Antarctica.

h. ASM has made recommendations to Government for the integrated and sustainable management of Malaysia’s natural resources- This is being undertaken by the Prime Minister’s Department.

i. ASM has been requested by Government to make recommendations on raising the retiring age of scientists-Details are being worked out with the Public Services Department.

j. ASM has taken over the management of the Annual National Science Quiz for high school students- Through the kindness of the Royal Swedish Academy of Sciences, the winners are invited to Stockholm for the Nobel Prize Award Ceremony and associated activities.

k. ASM has launched on behalf of the Ministry of Science, Technology and the Environment the annual Dr. Ranjit Bhagwan Singh Memorial Lecture and Medical Research Grant Programme- This is the only programme in Malaysia due to the bequeath of a Malaysian scientist.

l. ASM has become a strategic partner of the Ministry of Education in science education-Activities include biennial national science education conference and exhibition,
revitalizing science teachers’ associations for career development and uplift, science camps for primary and secondary school students, back to school lectures by ASM fellows and the possible re-launch of the ASM/Petrosains Lecture (modeled on the I.E.E Faraday Lecture of U.K) for secondary school students throughout Malaysia.

m. ASM has organized many S.E.T conferences, seminars and workshops.

6.2. International Activities

ASM realizes that international S.E.T linkages are a most valuable resource. ASM has cultivated this resource assiduously. ASM has the set policy that in international networking, ASM should contribute as much as it receives.

International activities are under the purview of ASM International Affairs Committee which I have been chairing since ASM inception. ASM has focused on active participation in the following international and regional organizations:


e. ASEAN Council of Academies of Science and Engineering and Similar National Organizations (ASEAN-CASE)--- ASM is the founding Secretariat with myself as Pro-Tem Chair of the Board of Management and ASM Executive Director as Pro-Tem Executive Director. ASEAN-CASE is affiliated with the ASEAN Secretariat and is gaining recognition by the ASEAN Committee on Science and Technology (ASEAN COST).

f. Science Council of Asia (SCA)--- ASM Past President Tan Sri Dato Dr Omar Abdul Rahman is the President of SCA. ASM will host the Annual General Meeting and Conference in Kuala Lumpur, May 2002.
ASM has invited many distinguished scientists to lecture in Malaysia. Amongst the most distinguished are the following:

a. Sir Aaron Klug, Nobel Laureate and then President of Royal Society,
b. Professor Werner Arber, Nobel Laureate and then President of ICSU,
c. Professor David Baltimore, Nobel Laureate and President of Caltech, USA,
d. Professor Lee Y.S., Nobel Laureate and President of Academy Sinica of Taiwan, China,
e. Professor Douglas Osheroff, Nobel Laureate, USA,
f. Professor P.N. Tandon, then IAP Co-Chair, India,
g. Sir Gustav Nossal, then President of the Australian Academy of Science,
h. Professor Erling Norrby, Foreign Secretary of the Royal Swedish Academy of Sciences,
i. Professor David Ho, Aaron Diamond Research Center, USA,
j. Professor M. S. Swaminathan, M.S. Swaminathan Foundation, India,
k. Professor Janne Carlsson, President, Royal Swedish Academy of Sciences,
l. Professor Lu Yong-Xiang, President, Chinese Academy of Sciences,
m. Professor Peter Doherty, Nobel Laureate, Australia,
n. Professor Yves Quere, IAP Co-Chair and Foreign Secretary, French Academy of Sciences.

ASM has sent delegations to visit academies in the following countries: Australia, Indonesia, Philippines, Singapore, South Korea, Japan, China, Jordan, Saudi Arabia, Iran, Egypt, Uzbekistan, Kyrgyzstan and Russia. ASM has also received many incoming reciprocal delegations to Malaysia.

7. Publications

Publication is one of the most important activities of an Academy. However it is also most difficult in a developing country due to the shortage of quality indigenous material for publication and lack of contact with the medium on S.E.T development.

Besides participating in the IAP “Science and the Medium” workshop in Tobago with a Malaysian science journalist, ASM has started to take part in the series of workshops for S&T journalists. ASM has also begun joint publication of a monthly S.E.T supplement to interest youth in S.E.T in the Bahasa Malaysia daily newspaper Utusan Malaysia.

ASM has also published the following:

a. Mahathir: Leadership and Vision in Science and Technology (Book);
b. Mosquito and Mosquito-Borne Diseases (Book);
c. Soils of Malaysia (Book);
d. Role of Academies in National Development (Conference Proceedings);
e. Harnessing Science and Technology for the Seventh Malaysia Plan (Conference Proceedings);

8. My Views on ASM Development To Date

I have of course been very pleased with the achievements of ASM. I would like to give some views on aspects that need attention and improvement.

a. Only about 25% of the membership is active in ASM. I understand this is about par for an Academy. What is even more disappointing is the relative lack of commitment by younger and newer fellows, some of whom regard ASM fellowship as an honour rather than as an opportunity to serve the nation. ASM membership development process must be paid greater attention by fellows. I would recommend greater weight to be given to the community and voluntary service record of a candidate.

b. Communications between the ASM Secretariat and fellows leave much to be desired. Fellows are not kept informed of development by regular news bulletins. The ASM website has not been updated for months. Surprisingly, very few fellows complain. Whilst the ASM annual report is available in CD-ROM, other publications are not in electronic format and therefore not accessible from the ASM website.

c. Of the five major areas of focus, the least successful has been the linkage with industry, particularly small and medium enterprises (SME). In my opinion, most scientists are convinced that enhancement of S.E.T will prosper the enterprises. Most have little or no first hand experience as investors or executives of such enterprises and cannot understand the deep concern of the industrialists about profitability. Such concern, that is fundamental to enterprises, is frequently regarded as scientists as backward conservatism.

d. The membership development process favours the election of new fellows from academia even in engineering and IT disciplines. This has adverse implications on ASM role in national development. In Malaysia, this has still to focus much on industrialization that is based on engineering and technology and the commercialization of science. For less developed countries than Malaysia, time-bound sustainable development depends critically on affordable and accessible solutions in poverty alleviation, food security, energy and water availability, health care and education etc. These would involve the widespread and small-scale applications of existing technology through re-engineering rather than front-edge scientific research. S.E.T academies in such developing countries need more engineers and technologists in their membership in addressing such urgent national development issues.
e. On the international front, ASM has offered to help Government activate the Government-to-Government memoranda of agreement on S & T collaboration with many countries. ASM has not been able to convince Government that ASM’s international network would ensure more successful and enduring collaborative initiatives.

9. Conclusion

S.E.T academies in developing countries must have their prime mission in national development. As such, they are a pivotal part of the national S.E.T advice and governance system. The success of S.E.T academies in developing countries depends on the three prerequisites of Mandate, Money and Manpower. For the first two, the support of the Government is essential; and for the last, the trust and confidence of the national S.E.T base must be won.

Finally, I would like to offer the experience of ASM and myself to colleagues in other developing countries in their endeavour to establish new S.E.T academies or strengthen existing academies.

10. References


2) 2001 Annual Report of the Academy of Sciences Malaysia

I May 2002
Kuala Lumpur