

Chapter 8 - CONCLUSIONS AND RECOMMENDATIONS

8.1 What has changed since 1994 with regard to R&D activities in Malaysia?

In general, the growth in total Malaysian R&D expenditures has not experienced a significant change. What is quite surprising is the decline in the R&D expenditure for both the Government & Research Institutes and Institutes of Higher learning. The most encouraging scenario, however, is the significant increase in the commitment to R&D activities by the private sector.

For the GRI and IHL sectors serious efforts are needed to encourage more participation in R&D activities by researchers and academic staff. Based on the information from the survey, the most common reason cited by the researchers which may have caused the decline is the delay in giving approvals to research application (e.g., for IRPA projects). A more effective mechanism that can speed up the approval of applications may need to be devised.

8.2 Recommendations for Improvements of R&D activities in Malaysia

The strengths of R&D activities in Malaysia can be viewed from the continued growth in private sector's support for R&D and the increased focus in strategic areas such as electronic, telecommunication and computers, which are related to high-tech industries. However, there is still room for improvement in R&D activities, which can contribute to the enhancement of R&D productivity and competitiveness. Some of the areas that need to be addressed are

- a. *Specific goals and targets* with regard to the performance of R&D activities, in particular, with respect to financial and human resources.
- b. *Remedial actions* needed to tackle some, if not all, of the problems that have been cited as limiting R&D activities.
- c. *Measurement on the impact* of R&D outputs. This is important as it relates to cost-effectiveness of a particular R&D activity.

Some of the steps that can be taken to rectify these areas and the related ones are;

- i. *Strategic planning* for R&D by all the sectors. This would include the setting up of vision, mission, organisational values, specific targets (e.g., target for R&D Expenditure/GDP ratio, number of researcher per 10,000 labour force), objectives, planning and strategies in the pursuit of R&D programmes.

There is a need to draw a 5-year R&D plan, which sets out the main targets to be achieved; for example,

R&D
Component

5:year Target

- | | | |
|-------|------------------------------|----------------------------|
| (i) | GERD/GDP ratio | 2% |
| (ii) | Number of researchers | 30 per 10,000 labour force |
| (iii) | Private sectors contribution | 80% of Total National GRDE |

- ii. *Cost-effective* analysis of R&D activities across sectors needs to be carried out.
- iii. There is a need to focus on *R&D differentiation* by each sector which may lead to optimised financial as well as human resources. This may be possible with a higher level of collaboration among researchers from different sectors and also a greater accessibility of information on R&D activities.
- iv. *Physical Infrastructure for (academic) R&D in IHLs* – Creative and innovative ideas may remain unexplored if the physical infrastructure necessary for their pursuit is not available. A thorough examination on the need to gather information on the following aspects, both at the aggregate and the field of science level;
 - the quantity of research space
 - the levels of investment
 - the sources of funds
 - the condition and adequacy of research space
 - a measure of unmet needs with regard to research space
- v. *Academic liaison with industry* : One of the major factors that limit R&D activities in private sector is the shortage of R&D personnel. One way to overcome this problem is to attract R&D personnel from outside the private sector. This can be done if collaboration between university and private sector can be established. There is a need for a mechanism that will promote such a link between private sector and academia.
- vi. *Incentives for the GRIs and IHLs* : The slow growth in the performance of R&D in both the GRIs and IHLs need to be properly addressed. Among the many factors cited as limiting R&D activities, the lack of incentives for individual researchers in the public sector may play a part in contributing to the decline in R&D activities . In the absence of clear incentives, many individual researchers in the IHLs, for instance, may look for other

activities that lead to financial gains, such as consultancy and other professional services. There is a need to devise effective mechanisms that take into consideration incentives for researchers carrying out R&D in the public sector.