

## **METHODOLOGY AND DEFINITIONS**

### **2.1 Purpose of the survey**

This census survey will provide information on the status of R&D resources and activities in Malaysia. It is used in the formulation of science and technology policy in areas such as R&D incentive schemes, setting of R&D priority areas, reviewing science and technology education, etc.

### **2.2 Definition of R&D**

MASTIC adopted the R&D definitions, its inclusions and exclusions, used by the OECD for purposes of international comparison. It is important to note at this point that many of the ASEAN and East Asian countries, including Japan, are also adopting the following OECD standard definition.

“Creative work undertaken on a systematic basis in order to increase the stock of knowledge, and the use of this stock of knowledge to devise new applications.

R&D covers :

- (a) any activity characterised by originality; it should have investigation as a primary objective, the outcome of which is new knowledge, with or without a specific practical application or new or improved materials, products, devices, processes or services; and
- (b) pure and basic research, applied research and developmental research in the natural and applied sciences and social sciences and humanities.

R&D includes :

- (a) design, construction and operation of prototypes where the main objective is technical testing or to make further improvements;
- (b) construction and operation of pilot plants not operated or intended to be operated as commercial units;
- (c) research into and original development (or substantial modification) of computer software such as new programming languages and new operating systems;
- (d) ‘feedback R&D’ directed at solving problem occurring beyond the R&D phase, for example technical problems arising during initial production runs;
- (e) research work in the biological, physical and social sciences, and the humanities; and
- (f) social science research includes economic, cultural, educational and sociological research.

R&D excludes :

- (a) scientific and technical information services;
- (b) policy related studies, management studies and efficiency studies;
- (c) consumer surveys, advertising, market research
- (d) routine quality control and testing;
- (e) pre-production activities such as demonstration of commercial viability, tooling up and trial production runs;
- (f) prospecting, exploring or drilling for minerals, petroleum or natural gas;
- (g) cosmetic modifications or style changes to existing products;
- (h) general purpose or routine data collection;
- (i) routine computer programming, systems maintenance or software application;
- (j) operations research and mathematical or statistical analysis;
- (k) commercial, legal and administrative aspects of patenting, copyrighting or licensing activities;
- (l) activities associated with standards compliance; and
- (m) specialised routine medical care, for example routine pathology services.

R&D ends :

- (a) when the work is no longer experimental and pre-production begins;
- (b) if the primary objective is to make further improvements; and
- (c) if there is a need to do pre-production planning or to get production or control systems working smoothly for materials, products, etc., that is substantially developed and the primary objective now is to develop markets.”

### **2.3 The Malaysian R&D Classification Systems**

The R&D classification system was first introduced in the “*1992 National Survey of Research and Development*”. It was an attempt to analyse the R&D resources and activities in terms of the fields of research (FOR) and the socio-economic objective (SEO) classifications.

Based on the mixed response and good feedbacks received from respondents in the former survey, MASTIC revised the classification system to suit the Malaysian environment and used the revised version in this second survey.

### **2.4 Development of the Questionnaires**

Three sets of questionnaires were developed for the survey, namely :

- (a) for the private sector;
- (b) for the government agencies, public research institutions and the non-profit organisations, and
- (c) for the higher learning institutions.

The questionnaires were adapted from those used in the “1992 National Survey of R&D”. Modifications were made based on analysis of questionnaire designs used in South Korea, Germany and Singapore.

To ensure maximum response to the survey and also to cater for the needs of other agencies on R&D information, a special task group was formed, with MASTIC being the secretariat, consisting of representatives from the following agencies :

- (a) Malaysian Industrial Development Authority (MIDA);
- (b) Industrial Policy Division, Ministry of International Trade and Industry (MITI);
- (c) Intellectual Property Division, Ministry of Domestic Trade and Consumers Affairs;
- (d) Federation of Malaysian Manufacturers (FMM); and
- (e) Science and Technology Division, Ministry of Science, Technology and the Environment.

## **2.5 Survey Administration**

The survey was a mail out survey. It was administered following a standard survey procedure, documented in the procedures manual . The survey procedures enforced strict survey conduct and high quality outputs.

Several critical procedures were added onto the survey methodology to ensure high quality outputs :

- (a) A special workshop was organised for the private sector to ensure that they understand the main objectives of the survey, and also to obtain a very high response rate taking into consideration that there is no provision in the Statistics Act for MASTIC to impose compulsory returns;
- (b) the “*Malaysian R&D Classification System*” was revised and improved to be used together with the survey forms. This ensures a more accurate portray of Malaysia’s strength in its R&D activities;
- (c) telephone and facsimile hot-line services were made available for the respondents to seek any queries pertaining to the survey; and
- (d) a strict quality assurance program was implemented throughout the data analysis.

## **2.6 Scope of the Survey and the Response**

The survey covered the following groups of participants namely:

- (a) all government agencies and public research institutions (see Appendix 2);
- (b) 1,776 companies across all industry in the private sector;

- (c) all higher learning institutions (see Appendix 3); and
- (d) all non-profit organisations (see Appendix 4).

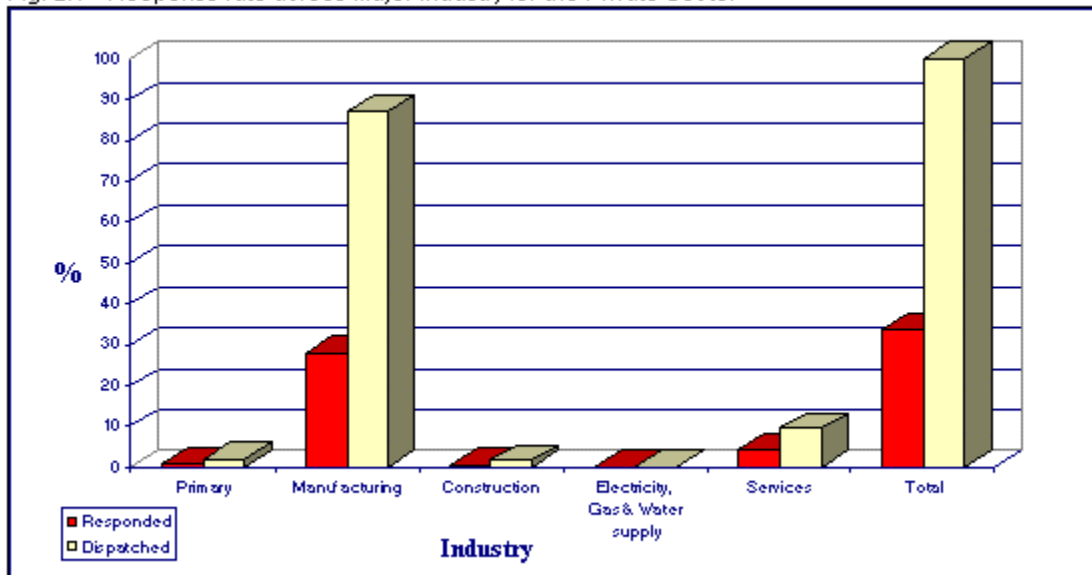
The survey therefore covers four types of sectors : government agencies and public research institutions (Govt & RIs), private sector, institutes of higher learning (IHL), and non-profit organisations (NPO).

Table 2.1 below illustrates the response rate of survey participants from various sectors.

Sector	No. institutions covered	No. institutions responded	% responded	Institutions with R&D	Institutions without R&D
Govt & RIs	56	54	96.4	37	17
Private sector	1,776	720	40.5	140	580
IHL	10	10	100.0	9	1
NPO	54	19	35.2	3	15

For the private sector, the response rate was 40.5%, an increase of 12.5% from the 1992 survey. The breakdown of private sector respondents across the Malaysian industry is illustrated in Fig. 2.1.

Fig. 2.1 - Response rate across Major Industry for the Private Sector



Source: Table 2.2