

# Chapter 9

## INTERNATIONAL COMPARISONS

### 9.0 INTRODUCTION

In order to determine the 'right' level of S&T awareness that the Malaysian public should achieve, a benchmark is needed. As Malaysia aspires to become a developed nation by the year 2020, it is imperative that the S&T awareness level of those from the developed nations be the benchmark for Malaysia in its endeavor to be equally developed.

The results of the research on the Malaysian public are compared with similar studies done in some of the developed countries, namely the United States, the European Community, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, the United Kingdom, Japan and South Africa where appropriate. Comparisons are made on informedness (knowledge), attitude, interest and understanding of basic terms and concepts of S&T. However due to insufficient information, these comparisons may incorporate the following constraints:

- The results from other countries were derived from studies conducted between 1989 and 2000.
- Most of the available results were for adults.
- Some of the questions were worded differently.
- Some of the possible responses provided were worded differently.
- The sample size varied between countries.

Even though these constraints may render most of the comparisons made in this chapter as not entirely conclusive, they will however provide useful indicators of how Malaysians fare in terms of their S&T interest, awareness and understanding in comparison with other communities.

### 9.1 INFORMEDNESS (KNOWLEDGE) ABOUT S&T

From the survey results, the Malaysian adults' perceived knowledge of S&T issues related to new medical discoveries; new scientific discoveries and environmental pollution are compared against findings from various countries. The 2000 study results should be of concern to the relevant authorities as Malaysian adults perceived knowledge of S&T issues pertaining to their knowledge of new medical discoveries, new scientific discoveries and environmental pollution is on the decline over the years (**Table 9.1**).

Since the 1996 study, a much smaller percentage of Malaysian adults (i.e. 5.7%) currently perceive themselves to be well informed or very knowledgeable on the issue of new medical discoveries. In comparison, the highest score is recorded by the United States (25%) and the lowest score is 5% recorded by the Japanese. The Malaysian adults knowledge score of 5.7% for the year 2000 represents 16th in ranking out of 17 regions/countries, a drop from its 13th ranking in 1998. The result also shows a decline over its previous scores of 8% in 1996 and 7% in 1998 for the said issue.

**Table 9.1: International Comparison of Public Informedness (Knowledge) on Scientific and Technological Issues**

Regions/Countries	Very Well Informed About			N
	New medical Discoveries	New scientific Discoveries	Environmental Pollution	
	Percent			
European Community	12	9	25	12,800
Belgium	14	9	24	1,000
Denmark	11	11	27	1,000
France	20	16	30	1,000
Germany	10	7	26	2,000
Greece	11	8	29	1,000
Ireland	8	7	14	1,000
Italy	11	9	28	1,000
Luxembourg	16	13	34	500
The Netherlands	15	10	31	1,000
Portugal	6	4	14	1,000
Spain	7	6	16	1,000
United Kingdom	13	10	23	1,000
Japan	5	2	8	1,457
United States	25	17	21	2,000
New Zealand	19.4	13.8	25.4	355
Malaysia - 1996	8	9	32	2,522
- 1998	7	5.8	34.7	3,317
- 2000	5.7	5.9	29.1	3,434
South Africa	-	-	38.4	2,163

*Sources:*

1. *Science and Engineering Indicators 2000*
2. *South Africa Science and Technology Indicators 1996, Foundation for Research Development, South Africa (Table 6.2, p. 388).*
3. *The Public Awareness of Science and Technology Malaysia 1996, Table 9.1.p.103*
4. *The Public Awareness of Science and Technology Malaysia 1998, Table 9.1.p.151*
5. *Science and Technology Interest, Understanding and Attitudes in the New Zealand Community, 1998*

As in the 1998 study, the current study also revealed that only a small percentage of Malaysian adults (ie. 5.9%) perceived themselves to be well informed on the issue of new scientific discoveries. Thus there is almost no change from the 1998 result for Malaysia (i.e. 5.8%). In terms of ranking, Malaysia is placed 15th out of 18 regions/countries (Table 9.1).

This study also revealed that a smaller percentage of Malaysian adults (29.1%) considered themselves to be well informed on environmental pollution issues. The score by the Malaysian adults thus places Malaysia in the 5<sup>th</sup> position in ranking among 18 regions/countries, a drop from its 2<sup>nd</sup> position in 1998. The score for Malaysia on this issue also shows a marked decline over its 1996 and 1998 scores (Table 9.1).

## 9.2 ATTITUDE TOWARDS S&T

A number of researches have been carried out to compare public attitudes towards S&T internationally. For example, Science & Engineering Indicators 1998 compare the structure of public attitudes toward a variety of subjects in science and technology at the international level.

Two independent dimensions supporting the view that most individuals hold two primary schemes toward science and technology were compared. These schemes represent psychological structures that humans use to integrate information and experiences into coherent clusters. The first dimension represents belief in the promise that science and technology would provide positive assessment of the likelihood of future benefits. This dimension is represented by statements A, C, D, E at the end of **Table 9.3**. The other dimension represents personal reservations about science and technology which may cause conflicts with the respondents' traditional values and beliefs. This dimension is represented by statements B, F, G at the end of **Table 9.3**.

Based on the international comparison of the public attitudes towards science and technology against the 17 industrialized and developing nations (**Table 9.2**), Malaysia's ratio of 1.58 (**Table A9.1**) for the two dimensions shows a slight improvement over the 1998 result. Thus Malaysia continue to be in second place after the United States. It can be inferred then that most Malaysian adults hold very strong beliefs in the promise and benefits of science and technology to improve the quality of life. Consequently Malaysian adults have relatively low levels of reservation about possible harm that science and technology may bring. In comparison to Malaysia, South Africa is ranked 10th, i.e. tying with The Netherlands and Germany.

**Table 9.2: General Attitudes Towards S&T in 17 Industrialized and Developing Nations (Mean Index Scores)**

Country (year)	Index of Scientific Promise	Index of Scientific Reservation	Ratio of indices
United States	70	37	1.89
Malaysia	76	48	1.58
Canada	72	56	1.29
Italy	69	54	1.28
Ireland	69	55	1.26
Great Britain	68	56	1.21
France	68	56	1.21
Belgium	64	54	1.19
Denmark	72	61	1.18
The Netherlands	69	59	1.17
Germany	70	60	1.17
South Africa	55	47	1.17
Spain	71	62	1.15
Portugal	71	67	1.06
Greece	75	74	1.01
Japan	55	56	0.98
New Zealand	50	55	0.91

*Note: The ratio between the two indices may show the relative strength of positive and negative attitudes toward science and technology. (Refer Table A9.1)*

*Source: 1. Science and Engineering Indicators 1998  
2. Science and Engineering Indicators 2000  
3. Science and Technology Interest, Understanding and Attitudes in the New Zealand Community, 1998 (Figures quoted in these reports are from studies done between 1989 to 1997).*

To further analyse the attitude of Malaysian adults towards S&T, data of the study is compared against the data for South African adults (South Africa being another developing country). It is observed that 87% of the Malaysian adults believe that S&T has made their lives healthier, easier and more comfortable while only 66% of the South African adults subscribe to the same notion (**Table 9.3**). Furthermore, 83% of the Malaysian adults (as opposed to only 44% of South Africans) agree that even if scientific research would not bring immediate benefits, it is necessary and should be supported by the government. The answer to another question shows that 72% of Malaysians support the notion that science and technology accelerates their pace of life. However only 53% of the South African adults agree with the same statement.

**Table 9.3: Comparison of Attitudes Toward S&T Between Malaysia and South Africa**

Country	Percentage Agreeing							
	A	B	C	D	E	F	G	N
Malaysia								
- 1996	82	25	56	81	75	38	72	2,501
- 1998	85	28	58	82	74	46	73	3,317
- 2000	87	26	60	83	76	46	72	3,434
South Africa	66	46	NA	44	NA	42	53	2,163

*Key:*

*A: Science and technology are making our lives healthier, easier and more comfortable.*

*B: We depend too much on science and not enough on faith.*

*C: Computers and automation would create more jobs than they would eliminate.*

*D: Even if it brings no immediate benefits, scientific research is necessary and should be supported by the government.*

*E: New inventions will always be found to counteract harmful consequences of technological advancements.*

*F: The benefits of science exceed the harmful effects.*

*G: Science and technology makes our way of life change too fast.*

*NA: Not available*

*Sources: 1. The Public Awareness of Science and Technology Malaysia 1996*

*2. The Public Awareness of Science and Technology Malaysia 1998*

*3. South Africa Science and Technology Indicators 1996, Appendix Table 6-3, p. 389.*

### 9.3 INTEREST IN S&T

Interest in S&T goes in tandem with knowledge about S&T. For the purpose of comparison, the level of interest in three selected S&T issues of 'new medical discoveries', 'new scientific discoveries' and 'environmental pollution' is examined (**Table 9.4**). The figures quoted are the percentages of adult respondents who have chosen the category 'Interested' from the range of possible answers: 'Interested', 'Moderately Interested', 'Slightly Interested' and 'Not Interested'. Note that these figures are restricted only to adults who had earlier indicated that they had knowledge on the issues in the study.

On the issue of 'new medical discoveries', the United States' score is the highest at 66%. Only 17% of Malaysian adults record interest in such an issue i.e. the lowest percentage when a comparison is carried out with the other countries.

On the issue of 'new scientific discoveries', Malaysian adults' score of 16% places Malaysia at 16th position among 17 regions/countries compared, a drop from 14th position in 1998. This shows a sharp decline in ranking for Malaysia as compared to its fourth ranking among the 16 regions/countries in 1996.

On the issue of 'environmental pollution', Malaysian adults' score of 33% also shows a decline in comparison to the 1996 and 1998 result. The drop is from 13th ranking to 17th out of the 17 regions/countries.

A comparison cannot however be made against South Africa as the country's measurement is on literacy and not on the public interest in natural and environmental sciences.

**Table 9.4: International Comparison of Public Interest in Scientific and Technological Issues**

Regions/Countries	Public Interest In			N
	New medical Discoveries	New scientific Discoveries	Environmental Pollution	
	Percent			
European Community	45	38	56	12,800
Belgium	36	29	42	1,000
Denmark	39	39	61	1,000
France	58	46	59	1,000
Germany	35	26	55	2,000
Greece	55	46	74	1,000
Ireland	37	29	79	1,000
Italy	45	45	65	1,000
Luxembourg	46	37	63	500
The Netherlands	57	41	63	1,000
Portugal	29	22	37	1,000
Spain	39	37	50	1,000
United Kingdom	51	41	50	1,000
Japan	31	13	36	1,457
United States	66	36	59	2,000
New Zealand	60	45	58	355
Malaysia - 1996	31	42	50	2,522
- 1998	24	24	42	3,317
- 2000	17	16	33	3,434

Source: 1. *The Public Awareness of Science and Technology Malaysia 1996*  
 2. *The Public Awareness of Science and Technology Malaysia 1998*  
 3. *Science and Technology Interest, Understanding and Attitudes in the New Zealand Community, 1998*

Thus it can be seen from Table 9.4 that the scores of Malaysian adults for 2000 on the three issues have further declined in comparison to those of 1996 and 1998. Furthermore Malaysians have not fared too well compared to other countries.

#### 9.4 UNDERSTANDING OF BASIC S&T TERMS AND CONCEPTS

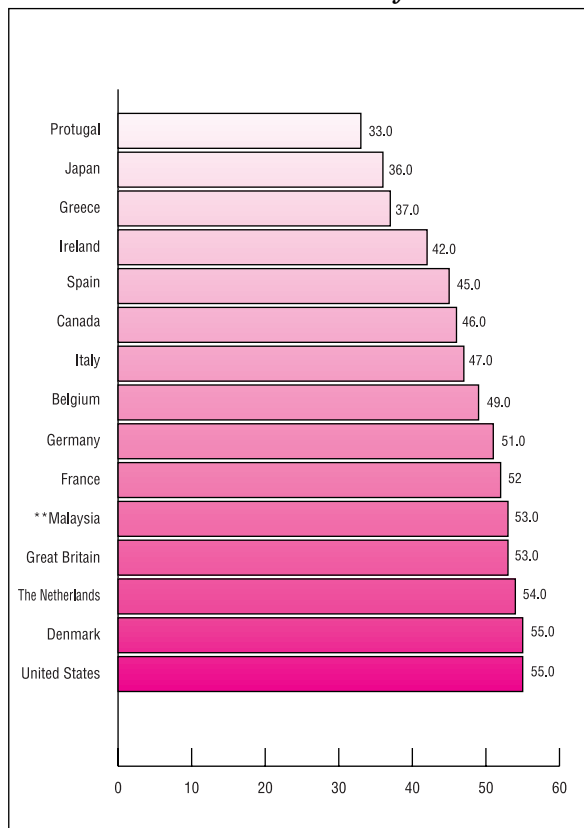
Comparisons with data from other countries are also carried out on the understanding of basic S&T terms and concepts. Nine selected questions (refer end of **Figure 9.1**) which concern the composition of matter, the nature of the universe, the basic processes that have shaped the planet, and the basic biology that supports life are used for this purpose. The results from these nine questions are used to estimate the level of scientific understanding of the Malaysian adults against their counterparts from the European countries, the United States and Japan.

It is found that the United States, Denmark, The Netherlands and Great Britain are in the top group with mean scores of between 55 and 53. When the result based on the understanding of the nine-item test is compared, the mean score of 53 for Malaysian adults (Figure 9.1 and Table A9.2) which equals that of Great Britain's showed an improvement over the score for 1998. The Malaysian's score thus placed Malaysia in a respectable 4th position (6th position in 1998) to be in the same league as the United States, Denmark, The Netherlands and Great Britain if a comparison is made with the 14 industrialized nations. As can be seen from Figure 9.1, the scores of 8 out of the 15 countries compared are less than 50.

### 9.5 UNDERSTANDING OF SELECTED ENVIRONMENTAL TERMS

The Malaysian adults' understanding of environmental terms and concepts are also compared against the understanding of their counterparts from the European Community and the United States. The comparison is only based on the mean percentage of correct answers for

**Figure 9.1: Mean Score on Index of Scientific Construct Understanding in Malaysia and 14 Industrialized nations: Most recent year**



\*\* The 9 questions for the Malaysia sample are:

1. The centre of the earth is very hot (True).
2. The oxygen we breathe comes from plants (True).
3. Electrons are smaller than atoms (True).
4. The continents on which we live have been moving their location for millions of years and will continue to move in the future (True).
5. It is the father's genes which determine whether the baby is a boy or a girl (True).
6. Antibiotics kill viruses as well as bacteria (False).
7. Lasers work by focusing sound waves (False).
8. All radioactivity is manmade (False).
9. The earth goes around the sun (True).

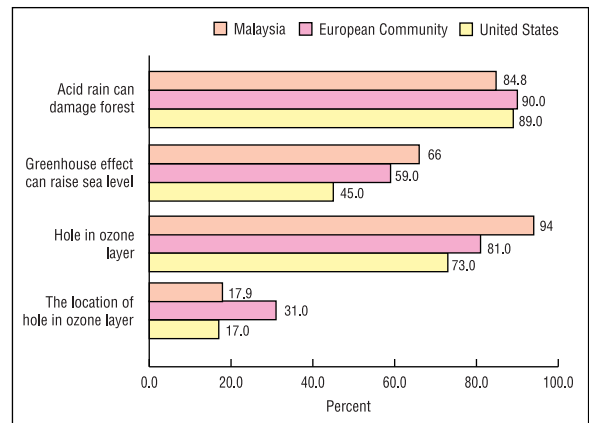
Source: Science and Engineering Indicators 1998, appendix Table 7-12. Figures quoted in this report are from studies done between 1991 to 1998

similar questions since statistics for other countries and other groups are not available. The results, which are shown in **Figure 9.2**, indicate that on the whole, the level of knowledge of the environment among Malaysian adults is slightly better than that of their European and US counterparts.

9.6 SUMMARY

- When comparison is made against the scores of adults from the industrialized countries, the sense of informedness (knowledge) of the Malaysian adults on three S&T issues measured, i.e., ‘new medical discoveries’, ‘new scientific discoveries’ and ‘environmental pollution’, continues to be poor and is on a declining trend over the years.

**Figure 9.2: International Comparison for Objective Environmental Knowledge**



Source: 1. *The Public Awareness of Science and Technology Malaysia 1996*  
 2. *The Public Awareness of Science and Technology Malaysia 1998*

- The attitude of Malaysian adults towards S&T on the whole has strengthened and continued to be very positive over the years in comparison to that of their counterparts from the industrialized countries and South Africa. Malaysia has maintained its 2nd position in ranking after the United States on this aspect. Thus Malaysian adults continue to hold very strong beliefs in the promise and benefits of S&T and have relatively low levels of reservation about its possible harm.
- When a comparison is made on the Malaysian adults interest in the same three S&T issues measured against the scores of their counterparts from the industrialized countries, the result also shows that the Malaysians’ scores (which are also declining over the years) are among the lowest.
- Malaysian adults occupy a markedly improved 4th position (from 6th position in 1998) in the understanding of basic S&T terms and concepts when a comparison is made internationally with the industrialized nations.