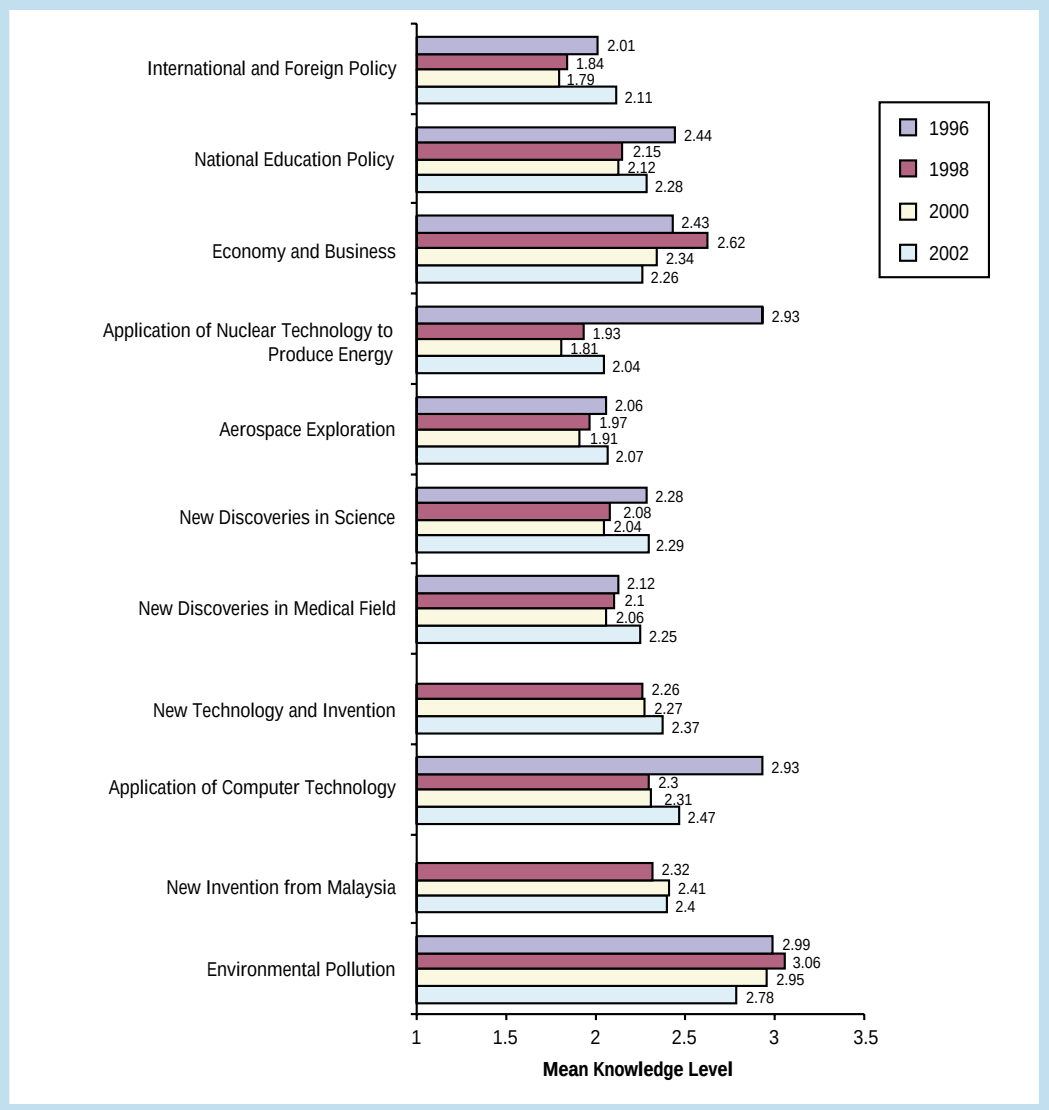
The findings of the study on Public Awareness of Science and Technology in Malaysia for year 2002 are as follows:

Perceived Knowledge of General and S&T Issues

There were altogether 11 items under this section. Three items were on general issues and eight items were on S&T issues. These items were the same as those used in the study for the year 2000.

Figure 3: Public Perceived Knowledge on Various General and S&T Issues – Series Data



Knowledge Level: 4 = Excellent, 3 = Average, 2 = Poor, 1 = None
Note: Some items for 1996 data are not available.

The mean level of public perceived knowledge of general and S&T issues for year 2002 showed that the level of perceived knowledge on the environment is still the highest, the lowest being application of nuclear technology to produce energy and international foreign policy (**Figure 3**). Apparently, the perceived knowledge level on the environment has

continuously slipped since 1998, meaning that the public in year 2002 is less bothered about the environment than in previous years. Likewise the issues of economy and business continue to slip from a score of 2.62 to 2.26 indicating that the after effect of the economic slowdown may still be lingering among Malaysians. More than 22% of the public seems to be ignorant about both issues. Note that the general trend for all the years studied remains similar.

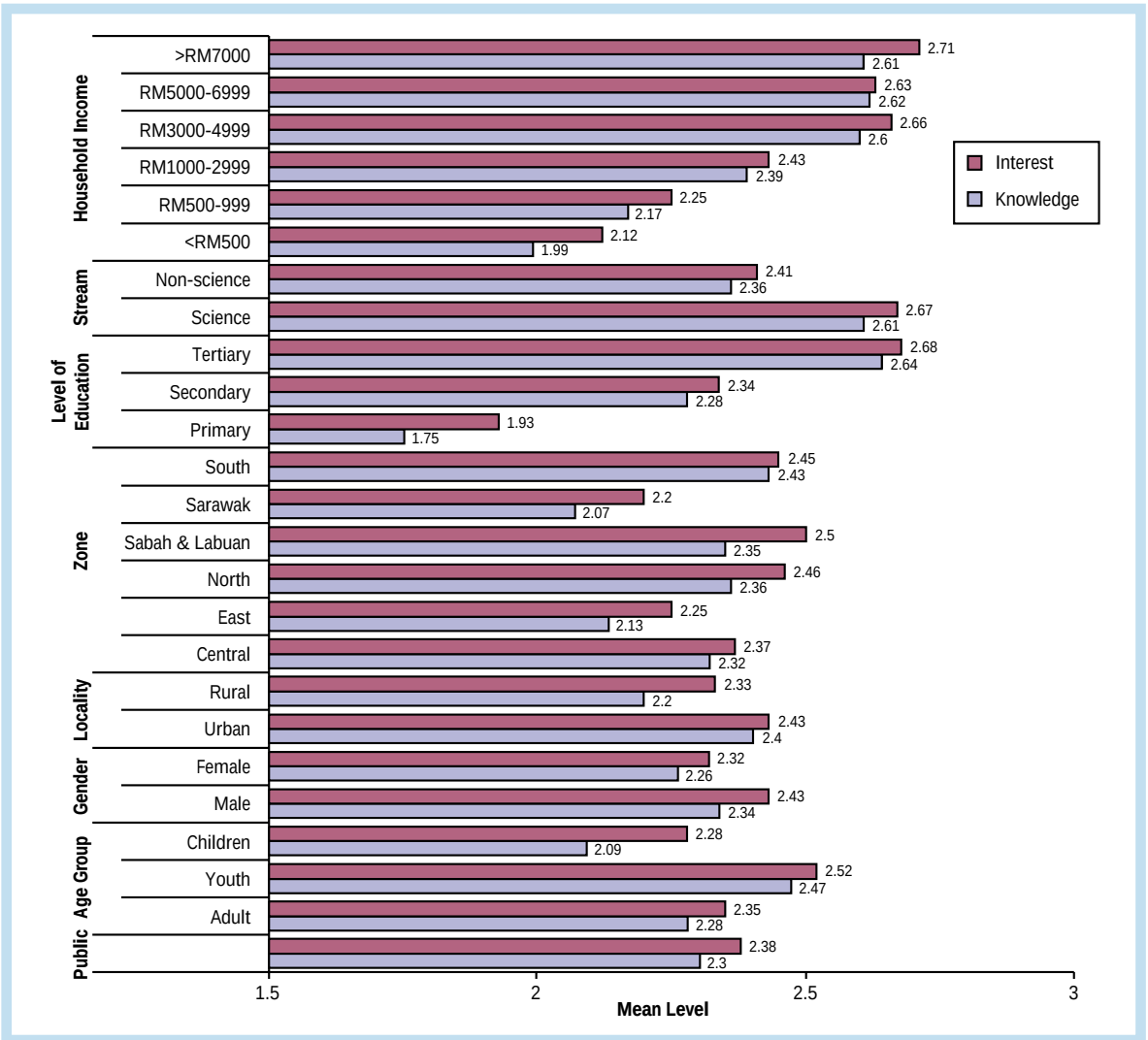
General issues (including international and foreign policies) and five S&T issues are getting wider public attention after being at a much lower level in 1998 and 2000. The five S&T issues are (**Figure 3**):

- Application of computer technology
- Application of nuclear technology to produce energy
- Aerospace exploration
- New discoveries in medical field
- New technologies and inventions

These are positive signs that the public is slightly more knowledgeable and better informed in S&T in 2002 than in previous years.

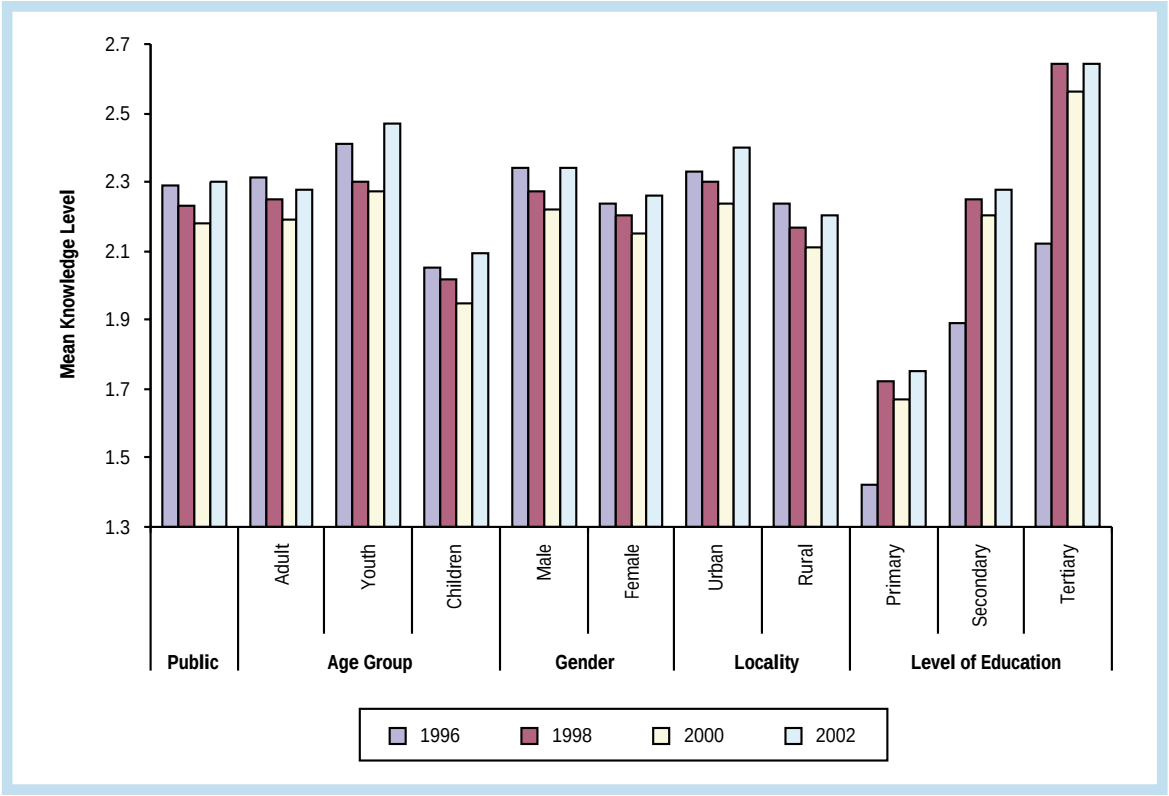
Perceived knowledge appears to be highest among youths, those in urban areas, those with tertiary level education, those in the science stream and those with high household income who

Figure 4: Level of Public Perceived Knowledge and Interest – 2002



Knowledge Level: 4 = Excellent, 3 = Average, 2 = Poor, 1 = None
Interest Level : 4=Interested, 3=Moderately Interested, 2=Slightly Interested, 1=Not Interested

Figure 5: Public Perceived Knowledge on General and S&T Issues by Selected Groups – Series Data



Knowledge Level: 4 = Excellent, 3 = Average, 2 = Poor, 1 = None

appear to be definitely superior in their perceived level of knowledge. East of Peninsular Malaysia and Sarawak zones were trailing behind in the mean perceived knowledge in all issues studied. This finding corresponds with the trend that rural respondents are less knowledgeable in all issues as compared to urban respondents and East of Peninsular Malaysia and Sarawak zones have more rural respondents than urban respondents. Respondents from primary school level of education showed a significantly low level of perceived knowledge (**Figure 4**).

Further analysis of the temporal trend is shown in **Figure 5**. It shows the following:

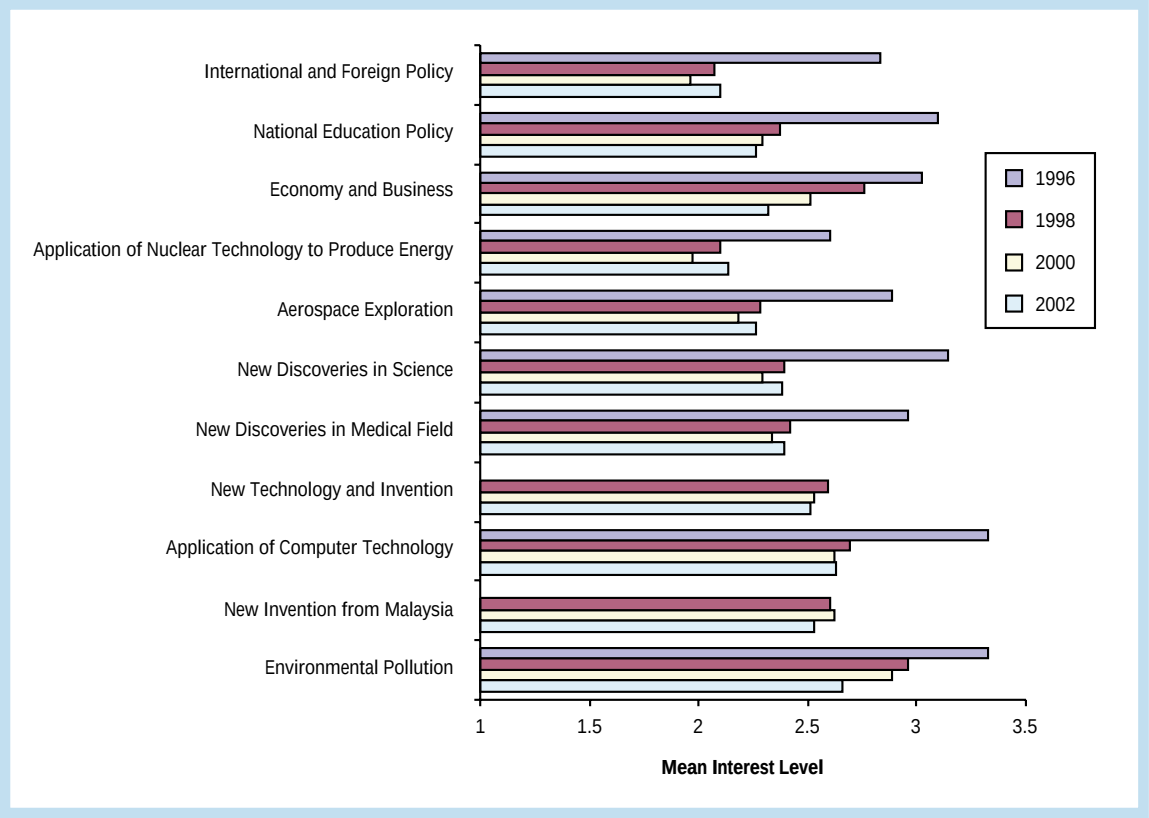
- Overall mean for perceived knowledge among Malaysians had been slipping since year 1996 to year 2000 to be at 2.18 from 2.29, but improved to 2.30 in year 2002
- The latest increase in perceived knowledge was observed to be true in all categories, namely age, gender, level of education and urban locality
- The rural level of perceived knowledge shows a slight decline in year 2002
- The youths showed the most positive improvement at 2.47, the children at 2.09 and adults at 2.28
- There was a slightly higher score for the males over the females, and urban over rural

The level of perceived knowledge strongly correlated with the level of education – the higher the level, the higher is the level of perceived knowledge. This suggests two important possibilities:

- S&T is beginning to gain acceptance among the public
- The overall level of public S&T knowledge has improved over the years

In terms of percentage, Malaysians consider themselves as average in knowledge. However, this is an improvement from about 20% in year 2000 to more than 40% of the population studied in year 2002, making up the number of Malaysians knowledgeable about S&T (both in average plus excellent categories).

Figure 6: Public Level of Perceived Interest in General and S&T Issues – Series Data



Interest Level: 4 = Interested, 3 = Moderately Interested, 2 = Slightly Interested,1 = Not Interested
Note: Some items for 1996 data are not available

Perceived Interest in General and S&T Issues

The level of public perceived interest in general and S&T issues lies in the range of between slightly to moderately interested. The highest level of interest is still in environmental pollution while the lowest is in international and foreign policies. However, the highest level of interest had only attained a score of 2.66. The low level of interest in international and foreign policies has increased slightly from 1.9 to about 2.1. The public was most interested in issues concerning environmental pollution followed by computer technology, new inventions from Malaysia and new technologies and inventions (**Figure 6**). Such interests reflected the inquisitive nature of Malaysians and its readiness to move forward in modern technology and to meet the challenges of Malaysian global inspiration. Malaysian public has the lowest interest in the application of new technologies and international foreign policies.

About four or more out of every 10 Malaysians perceived themselves to be moderately interested in general and S&T issues. In terms of age (**Figure 4**), the youths showed the most interest in S&T followed by adults then children. Just like for perceived knowledge, the level of interest in general and S&T issues directly correlated with:

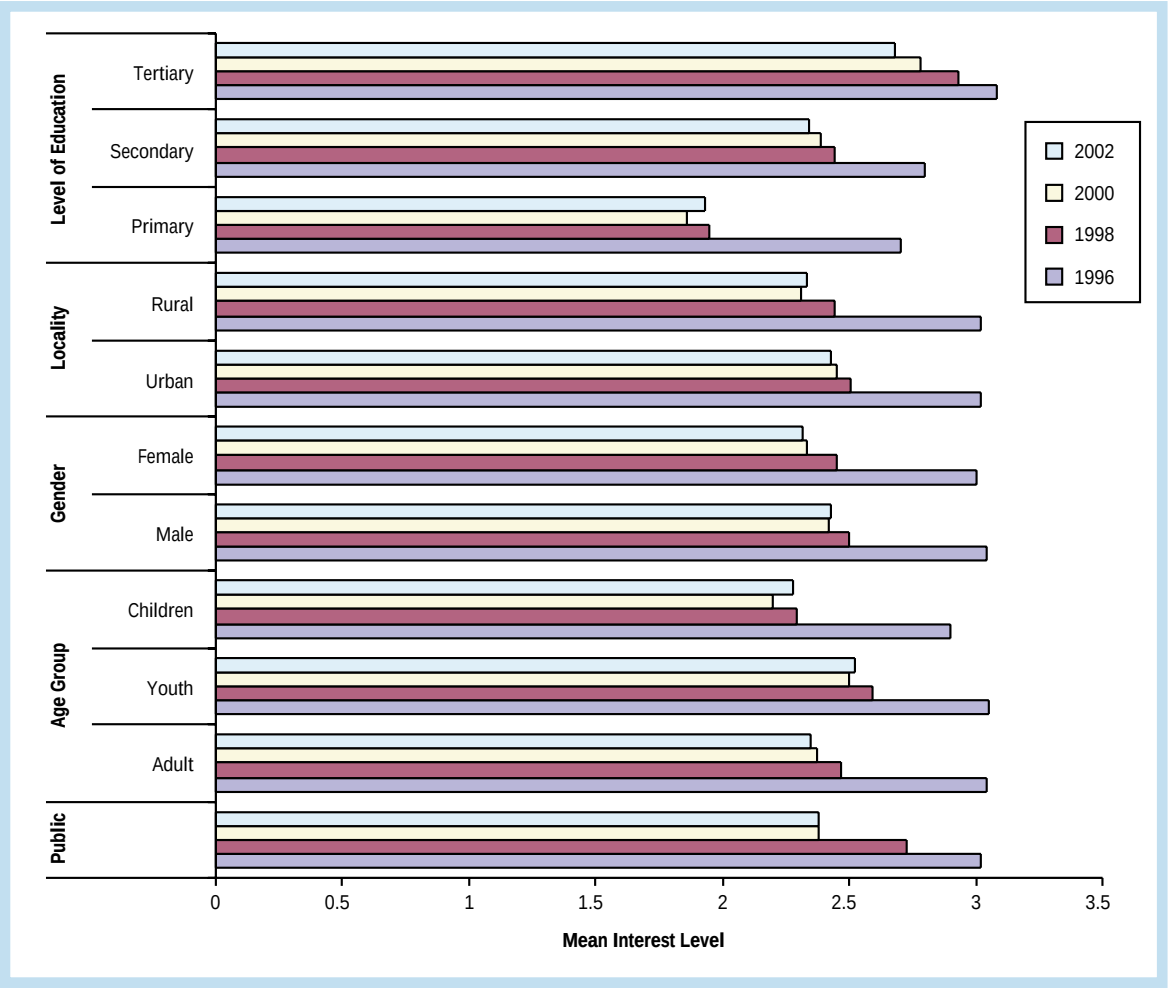
- level of education
- stream that respondents came from
- household income

There is some correlation with locality but rather marginal with gender.

In terms of the level of interest, it is highest among:

- Those at tertiary level
- Those in science stream
- Those with higher household income

Figure 7: Level of Public Interest in General and S&T Issues by Selected Groups – Series Data



Interest Level: 4 = Interested, 3 = Moderately Interested, 2 = Slightly Interested, 1 = Not Interested
Note: Data for 1996 is limited to gender and locality only

The level of interest is lowest among:

- Primary school children
- Those with very low income

The level of education in science and financial status therefore are the primary factors that affect interest and knowledge in S&T issues.

On the whole, the interest of Malaysians in general and S&T issues continued to be low and on a decline over the years though not deteriorating. The mean interest level has gone down from 3.02 (1996) to 2.73 (1998) to 2.38 for year 2000 and 2002 (**Figure 7**). However, in all issues except on environmental pollution, the year 2002 managed to reduce the "not interested group" significantly as compared to previous years although the level of interest is still low. Interest in economy and business also had been progressively declining from 3.02 in 1996 through 1998, 2000 and finally to 2.32 in 2002.

Throughout all the studies, the tertiary educated respondents perceived themselves as the most interested group in all S&T issues, followed by the secondary educated group and lastly the primary level educated group (**Figure 7**). However, there was a reduction in the mean level of interest overall. Only the primary educated group maintained the same level of interest as that of year 1998.

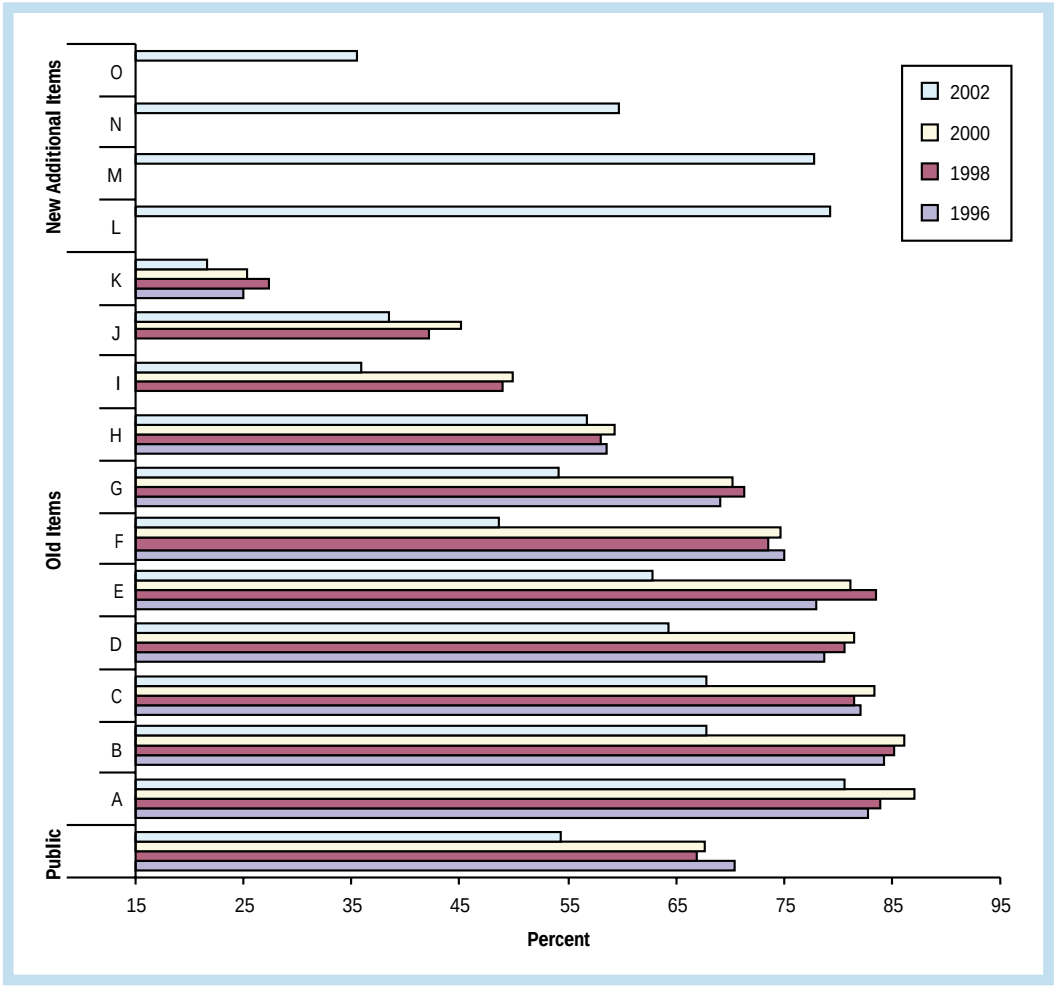
Comparing between level of knowledge and interest, the knowledge level is always lower (2.30) than the interest level (2.38).

Attitudes Towards S&T

There were four additional items in the survey on public attitude towards S&T (impact of S&T on our lives) for year 2002. They were:

- The government should support S&T research
- S&T is very important for societal advancement
- Without S&T human cannot progress
- Civilisations had been created without the help of S&T

Figure 8: Public Agreement Towards Impact of S&T – Series Data



Note: Some items for 1996, 1998 and 2000 data are not available.

A S&T make our life healthier, easier and more comfortable
B Daily chores are more interesting with the application of S&T
C Most scientists work towards improving life
D Scientific research is necessary even though it does not bring immediate benefits
E I need to know about science in my daily life
F New inventions will counteract harmful consequences of technological development
G Science makes life change too fast
H Computers create more jobs than they eliminate
I Scientists should conduct research on health even if it causes pain to animals
J Quality of science and mathematics education in schools is not satisfactory
K People depend too much on science, less on faith
L Government should support S&T research
M S&T is very important for societal advancement
N Civilisations had been created without the help of S&T
O Without S&T, humans cannot progress

The attitude was determined from the respondents' answers to questions on the impact of S&T on living (**Figure 8**):

- 80% agreed "S&T makes our life healthier, easier and more comfortable"
- 79.3% agreed the government should support S&T research
- 77.9% agreed S&T is very important for societal advancement
- 59.8% agreed human progress would be hampered without S&T
- Less than 40% agreed scientists should conduct research on health even if it causes pain to animals
- Less than 25%, which is the lowest percentage of positive response received, agreed with the statement "people depended too much on science and less on faith"

The overall findings of the study show that 56.8% of the respondents acknowledged the positive contribution of S&T. When using the same set of items as used in the study of 2000, the overall percentage score is 54.4. This shows that the level of interest is only slightly affected by the types of survey items that are included in the questionnaire.

Though largely positive, this is a significant downward trend of attitudes towards S&T among Malaysians from what was found in previous studies. The mean percentage score dropped from 70.4% in 1996 to 66.9% in 1998, then up to 67.7% in 2000 and down again in 2002 (**Figure 8**). An increasing number of the Malaysian public has been found to become more sceptical about the impact of S&T particularly regarding the idea that new inventions will counteract harmful consequences of technological development and scientists should research about health even if it causes pain to animals. This is a significant drop from previous years. The lowest percentage (21.7%) was obtained for the statement 'people depend too much on science and less on faith'.

The attitudes of the public towards S&T had declined for year 2002, cutting across all sectors. The largest drop was among respondents with primary level education and the least drop among those with tertiary level education. The youths and those with secondary level education are more positive in attitude compared to children and those with primary level education respectively.

IMPACT OF S&T ON THE QUALITY OF LIFE

Figure 9 shows the percentages of those who agreed on the positive impact of S&T on the quality of life.

- 82.1% agreed S&T improved the working conditions and standard of living, which are the material aspects of life
- 74.4% agreed on impact of S&T on public health
- 65% agreed on impact of S&T on enjoyment of life
- Less than 50% agreed S&T affect the cost of living, world peace and the environment positively

Youths and adults demonstrated a more positive opinion of the effects of S&T on the quality of life compared to children. The type of response appears to be independent of ethnicity but is affected by locality, level of education, background in science, type of occupation and household income (**Figure 10**).

Focusing on year 2002, the findings are:

- About 30-40% did not agree with the positive impact of S&T on the quality of life
- About 30-40% was not sure about it
- About 50-60% was still positive towards S&T

The lowest of those who disagreed came from those with:

- Primary level education
- Household income of less than RM500

Figure 9: Percentage who Agreed with the Positive Impact of S&T on the Quality of Life - 2002

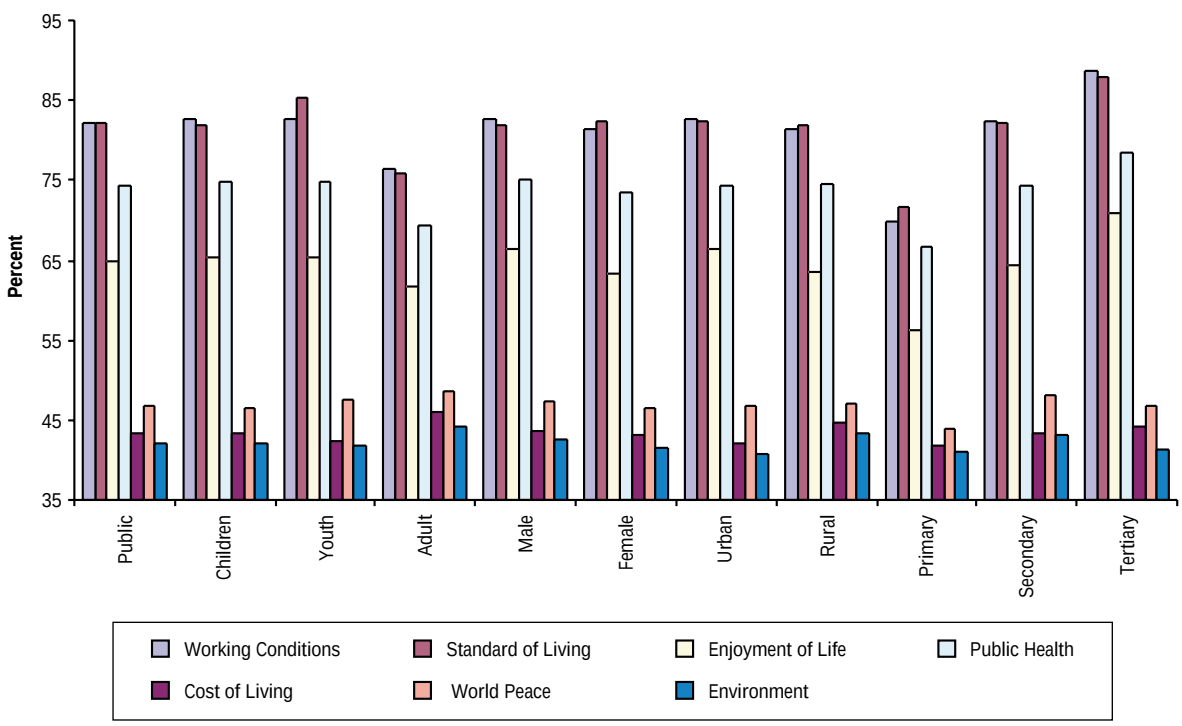
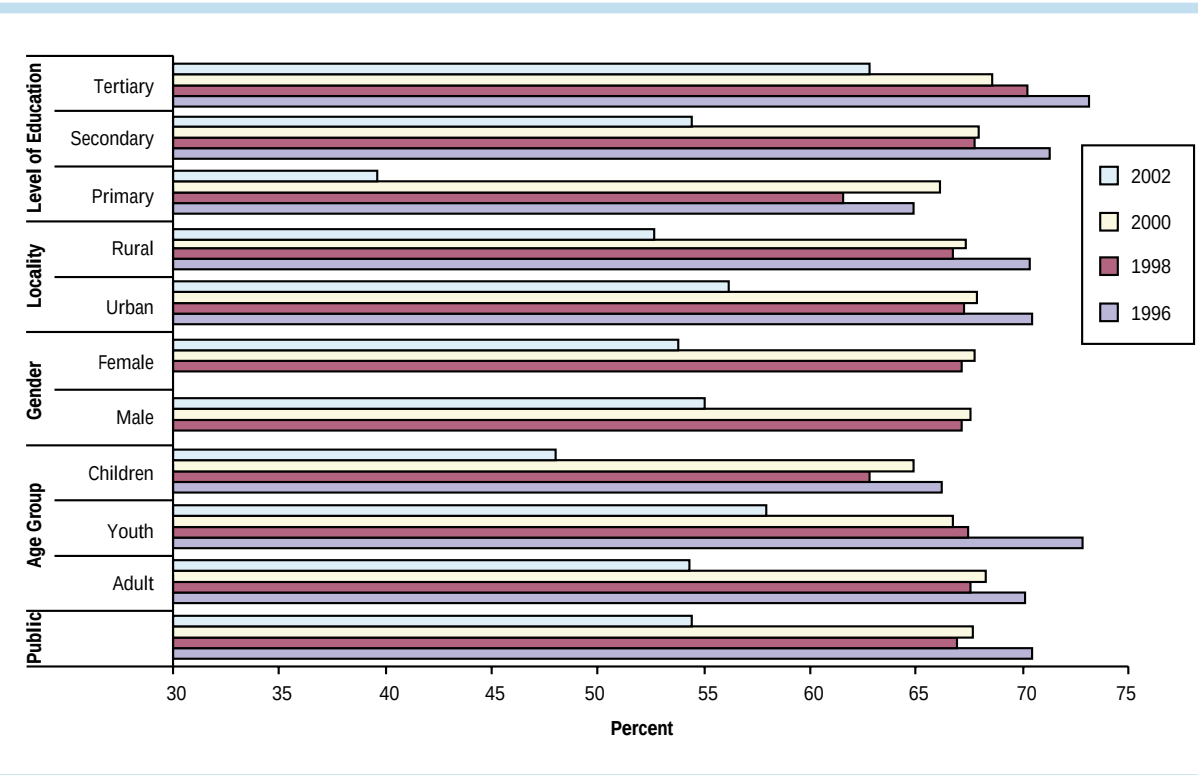


Figure 10: Respondents who Agreed with the Impact of S&T on Quality of Life – Series Data



Note: Data for some items for 1996 are not available

Figure 11: Level of Agreement on Impact of S&T on Quality of Life - 2002

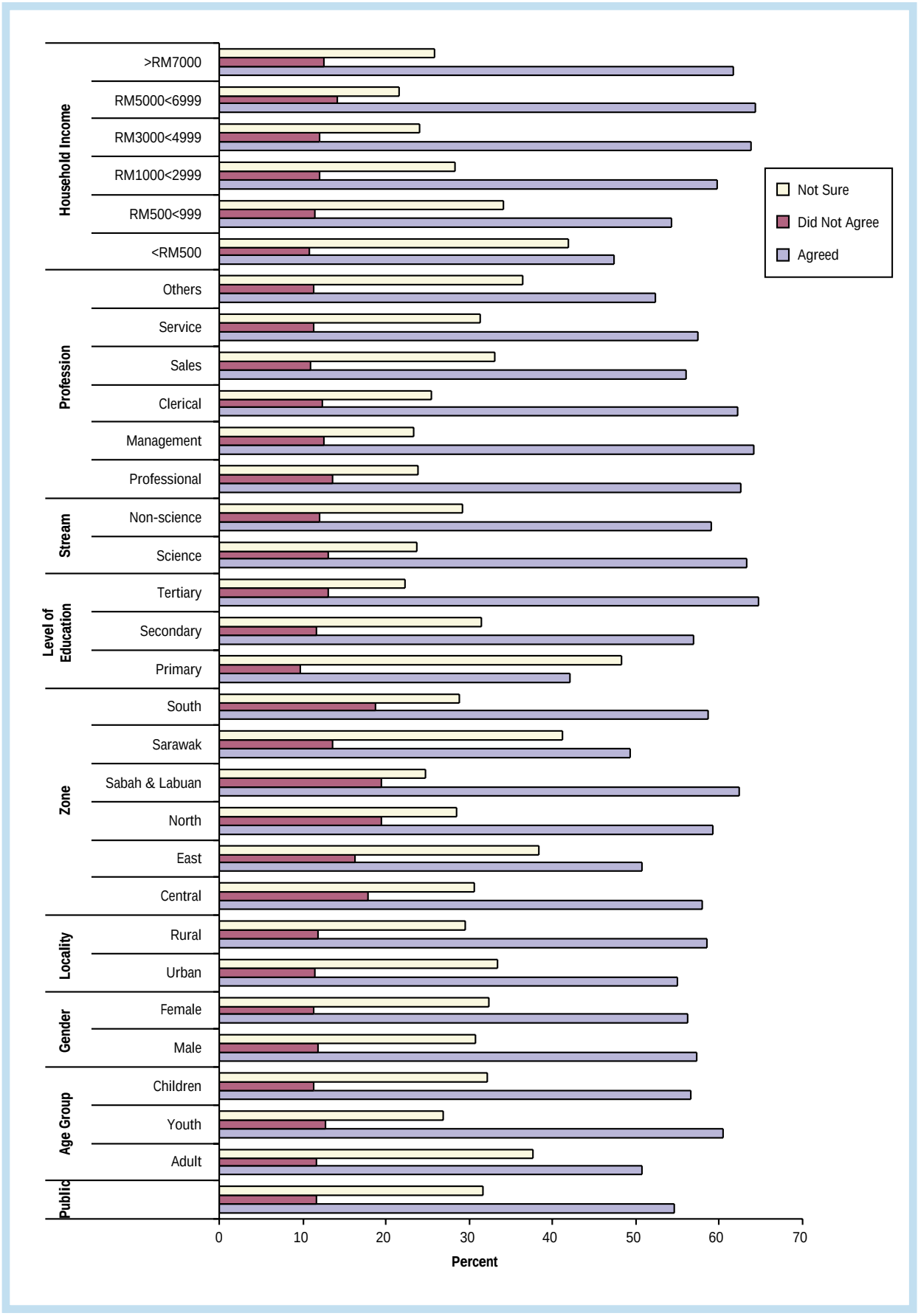
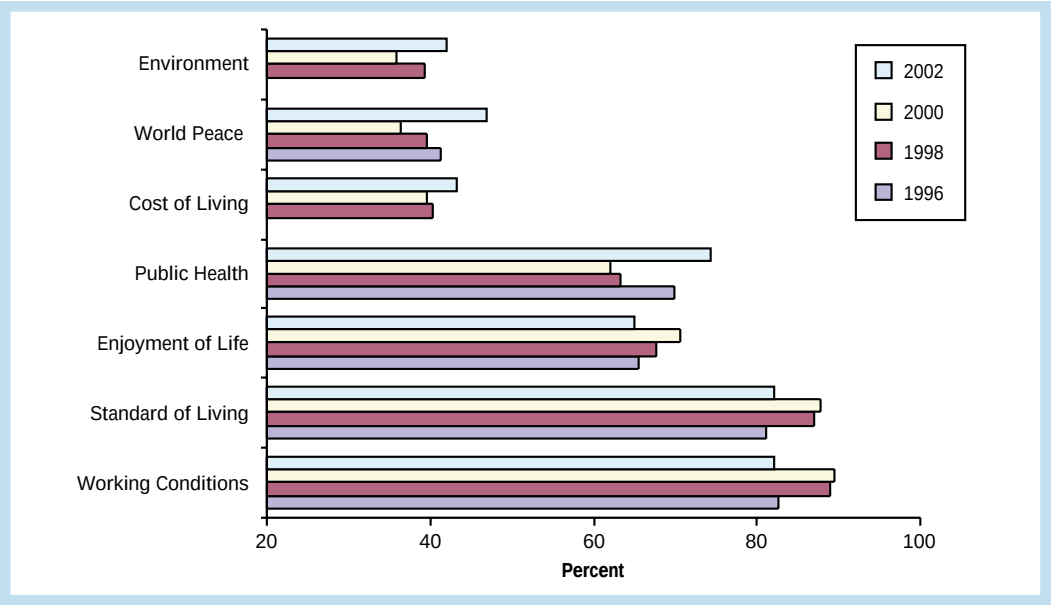


Figure 12: Percentage who Agreed on Positive Impact of S&T on Quality of Life – Series Data



Note: 1996 data for some items are not available

Attitude tended to be independent of gender, ethnicity, and locality but was affected by age, stream, level of education and income (**Figure 11**).

Comparing the findings of all the studies done previously, it is found that the pattern of response for 2002 is not at all different from previous years. However, the percentages of those who agreed had decreased for working conditions, standard of living and enjoyment of life, but had increased for public health (significantly), cost of living, world peace (significantly) and environment although the actual percentages are low. This is a marginal increase in percentage compared to 68% in 1996, 60.9% in 1998 and 60.3% in 2000 (**Figure 12**).

SELECTED ISSUES

Scientific Research and Economic Growth

The findings are (**Figure 13**):

- About 75% agreed scientific research can improve the growth of Malaysian economics
- 22% were not sure
- A meagre 2.6% disagreed

Regarding the impact of S&T research, 62% agreed that it causes more positive than negative effects. This is a continuous increase in percentage from 38% in year 1996 to 45.3% in 1998, a slight decrease of 43.8% in year 2000 and a very significant jump to the present value. There is therefore a crossover of respondents' perception of not sure to certainty (**Figure 14**).

Genetic Engineering and Cloning

Malaysians are getting more familiar with the concepts of genetic engineering and cloning. The present study showed an improvement from 17.0% (1996) to 33.8% (1998), 42.7% (2000) and 56.5% (2002) in their awareness of these concepts.

The overall findings are:

- 56.5% have heard or were aware of genetic engineering and cloning (**Figure 15**)
- 16% agreed genetic engineering should be practised (**Figure 13**)
- 36.3% disagreed (**Figure 13**)
- 46.4% were unsure (**Figures 13 & 16**)

Figure 13: Perception on Selected Issues – 2002

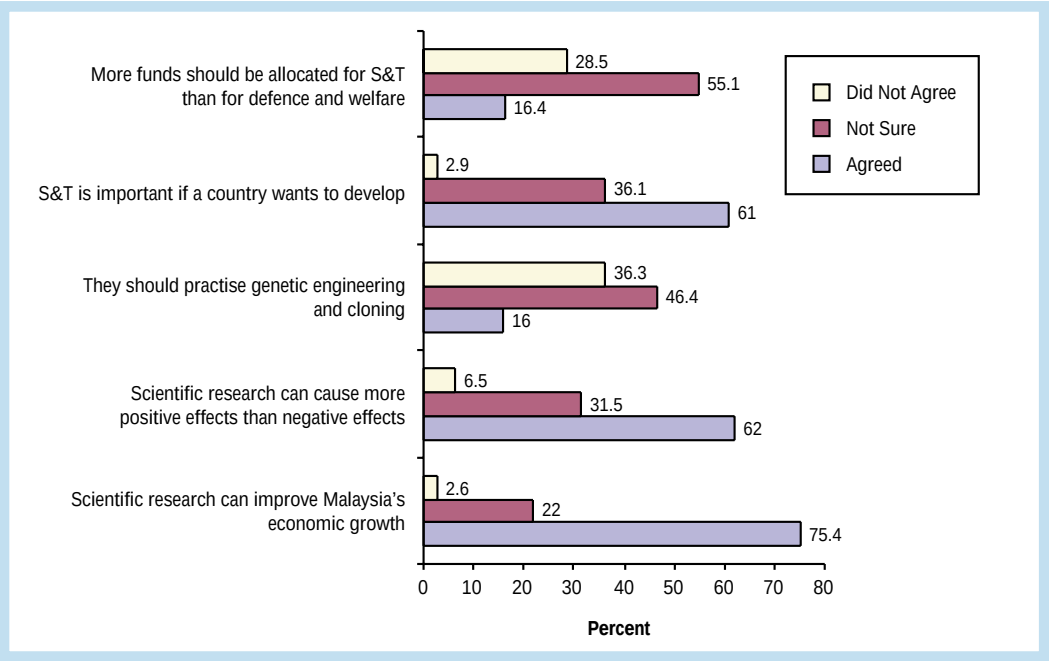
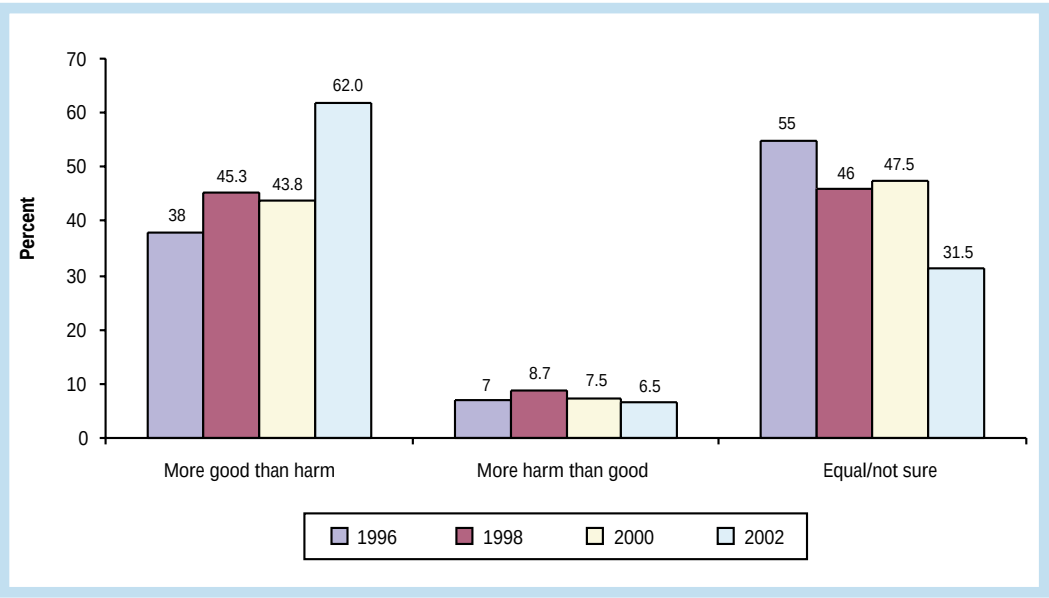


Figure 14: Perception on Benefits and Harm of Scientific Research to Society – Series Data



The reasons given for the agreement or disagreement were related to religious beliefs, ethics and the possible discovery of new knowledge from research and the risk of negative impact of genetic engineering (**Figure 17**). The findings reflected that majority of the public were in the dark about genetic engineering and therefore could not decide to what extent genetic engineering activities should be allowed against their strong religious beliefs. In terms of groupings, those who agreed that genetic engineering and cloning should be practised were (**Figure 16**):

- Youths
- Those from the east zone
- Those with tertiary level education
- Professionals or those at management level
- Those with high household income level

Figure 15: Awareness of Genetic Engineering and Cloning - 2002

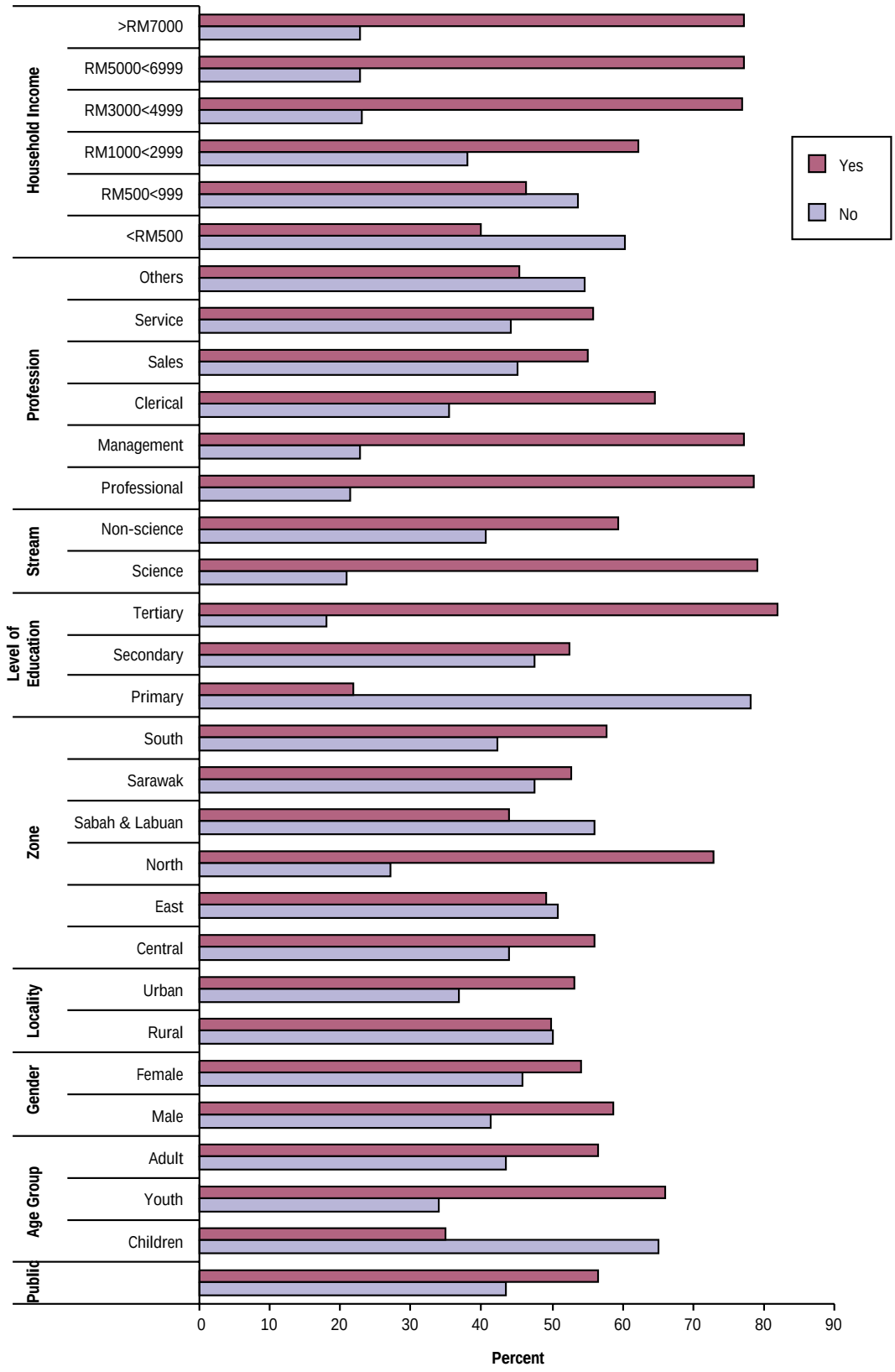


Figure 16: Agreement that Genetic Engineering and Cloning should be Practised - 2002

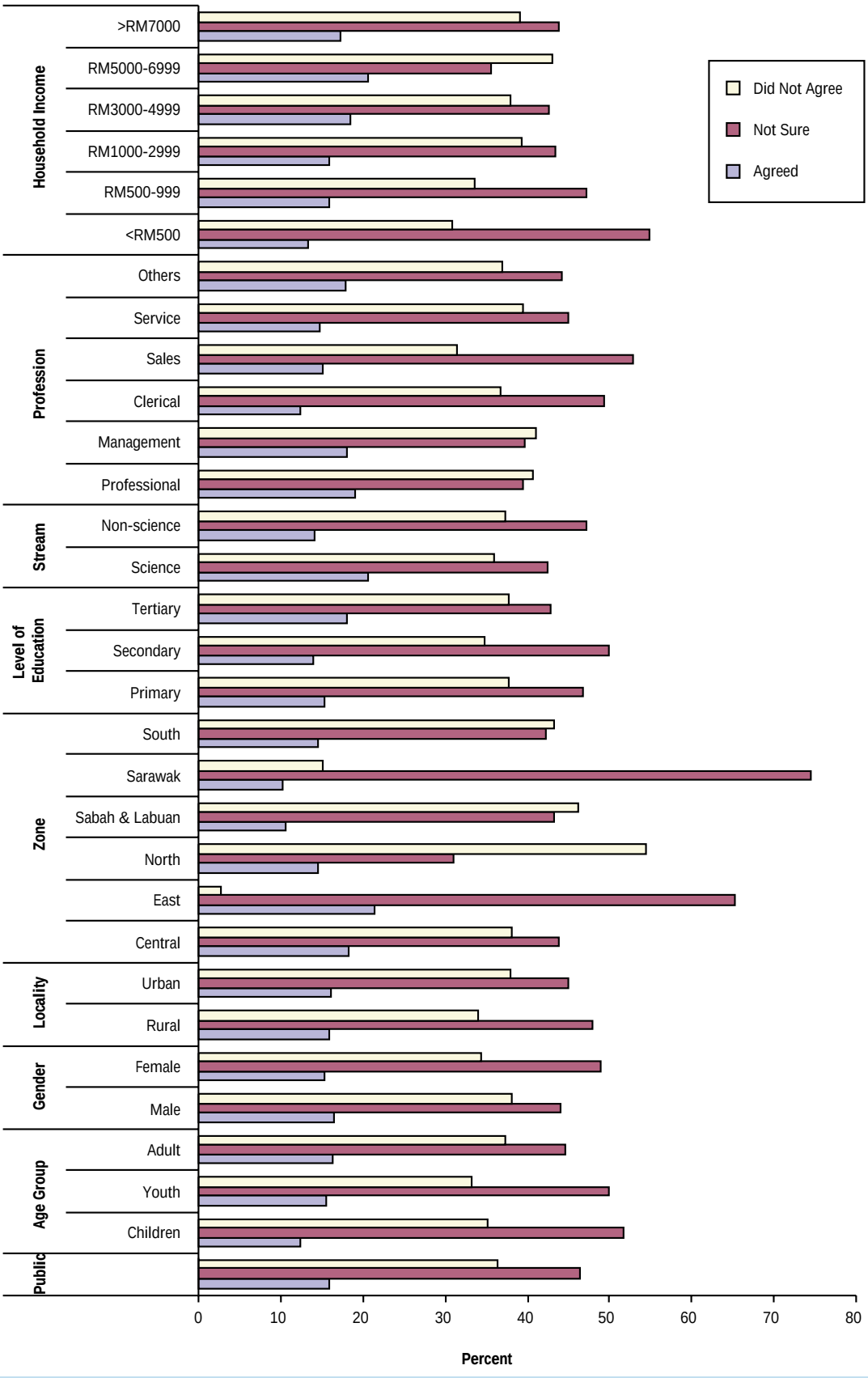
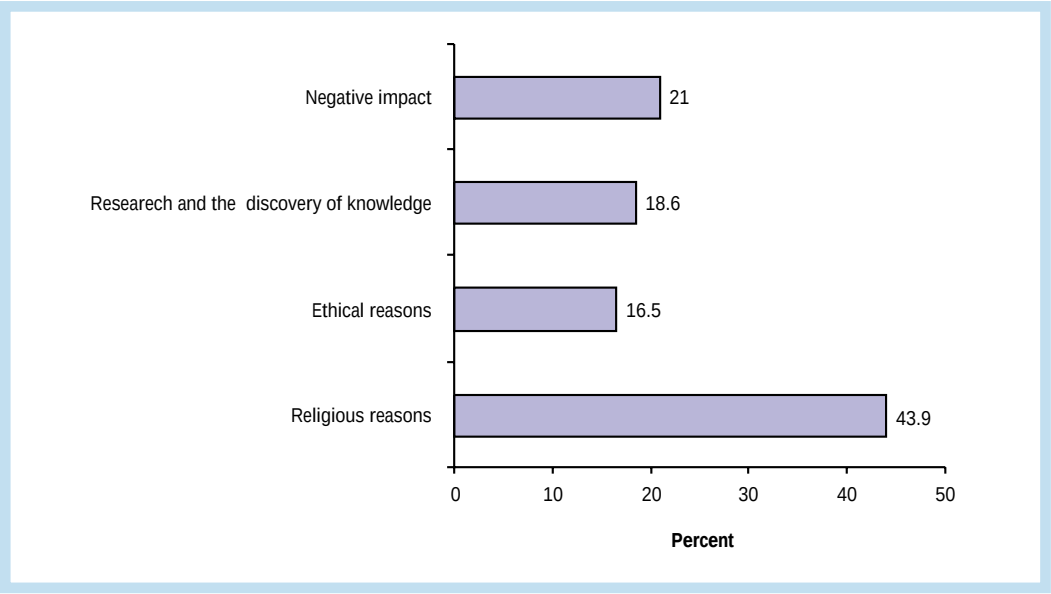


Figure 17: Reasons Why Genetic Engineering and Cloning should or should not be Practised - 2002



Importance of S&T for Development

The overall findings are (**Figure 13**):

- 61% agreed S&T is important for the development of the country
- 36.1% was not sure
- 2.9% disagreed

The agreement tended to be affected more by (**Figure 18**):

- age
- level of education
- occupation
- household income

S&T Development Compared to Defence and Welfare

Opinions regarding the allocation of more funds for S&T compared to those for defence and welfare are (**Figure 13**):

- 55.1% was not sure
- 28.5% disagreed
- 16.4% agreed

The reasons given for the agreement or disagreement are:

- 51% agreed there should be a balance between S&T, defence and welfare
- 22% agreed S&T was needed for competitiveness

Those who agreed tended to be (**Figure 19**):

- Youths or adults
- Those with tertiary education
- Professionals or those at management level
- Those with higher household income

The findings therefore show that in general, Malaysians would not like to see either defence or the welfare of the people to be neglected at the expense of S&T growth and development.

Figure 18: Level of Agreement that S&T is Important for Development - 2002

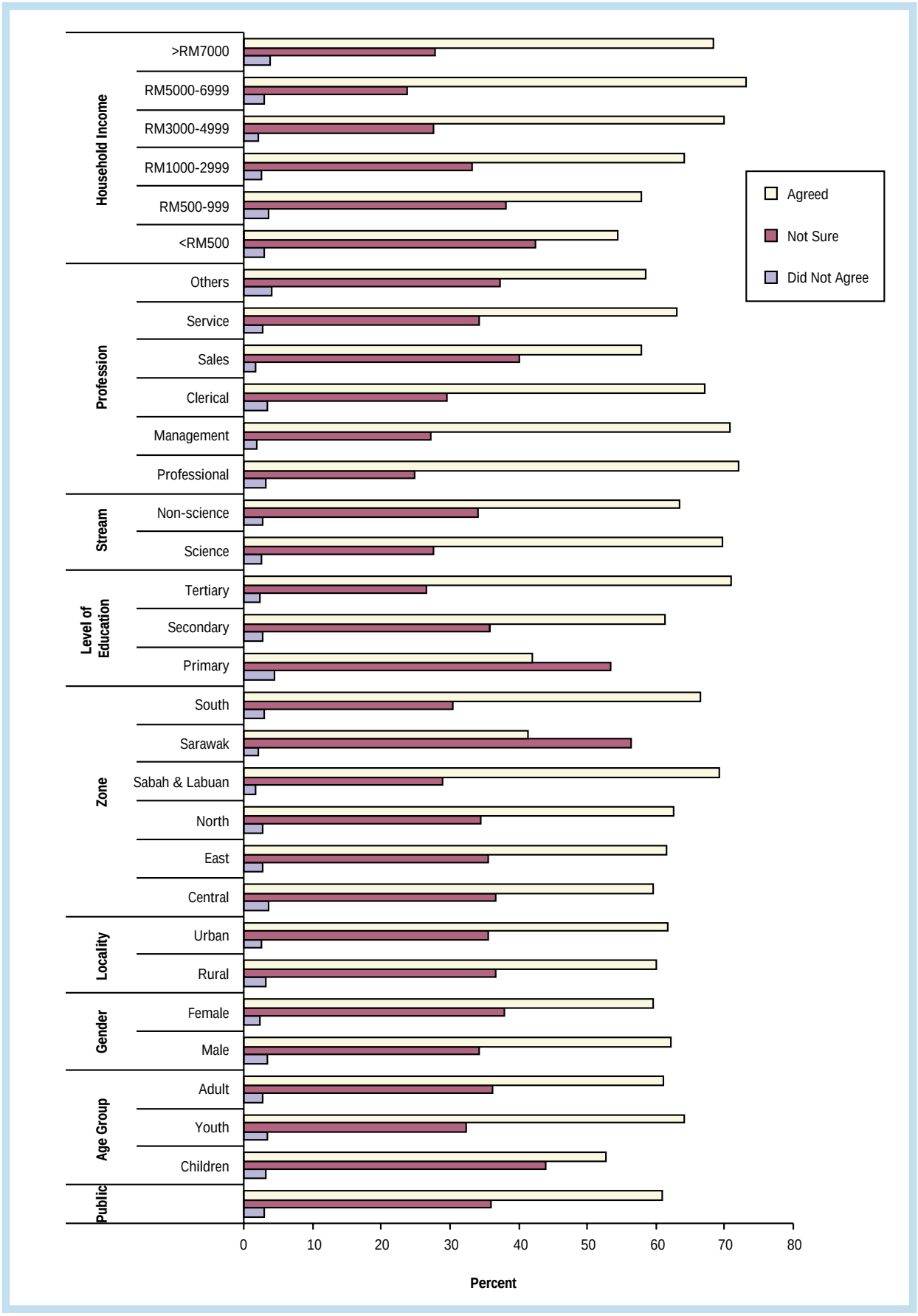
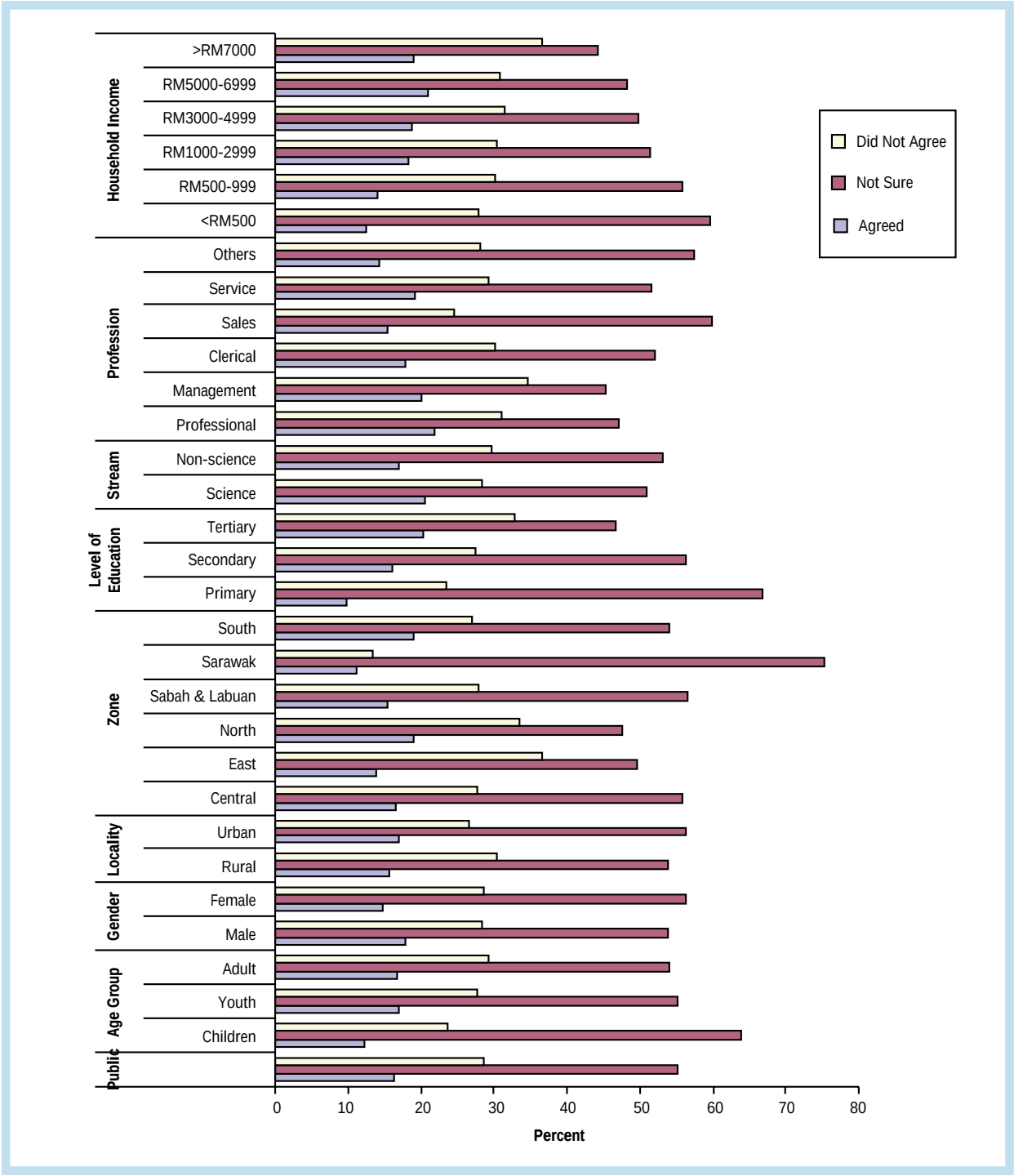


Figure 19: Level of Agreement that More Funds be Allocated for S&T rather than for Defence and Welfare - 2002



Multimedia Super Corridor (MSC) Flagships

When asked about MSC flagships, 54% of the respondents agreed that they had heard about it (**Figure 20**) compared to 27% in year 2000 and 33% in year 1998.

The quoted examples are (**Figure 21**):

- Smart school (50.2%)
- Multipurpose card (44.1%)
- E-government (42.6%)
- E-commerce (40.1%)
- Telemedicine (26.6%)
- Research and development cluster (24.1%)

Figure 20: Percentage of Respondents who Have Heard about MSC Projects - 2002

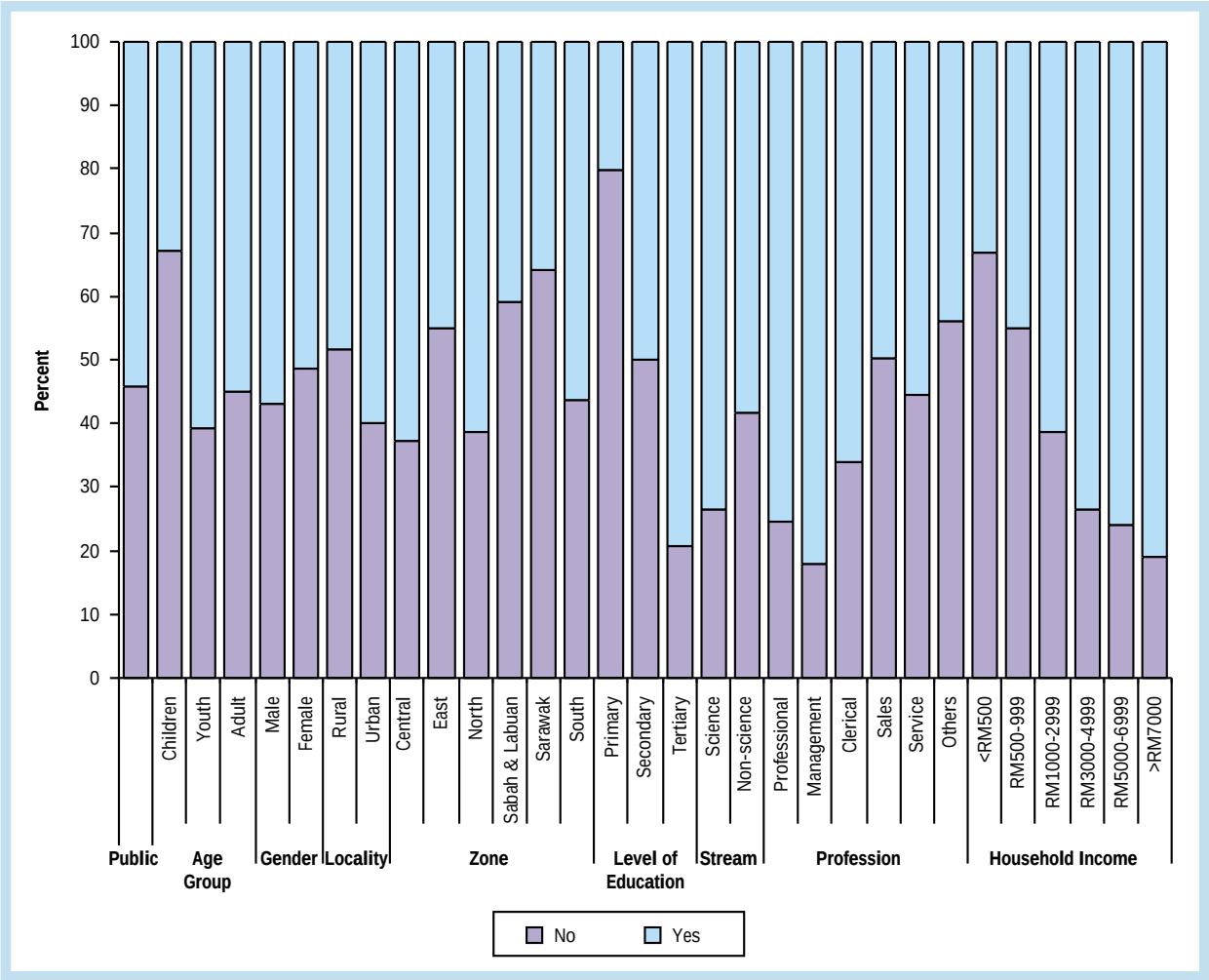
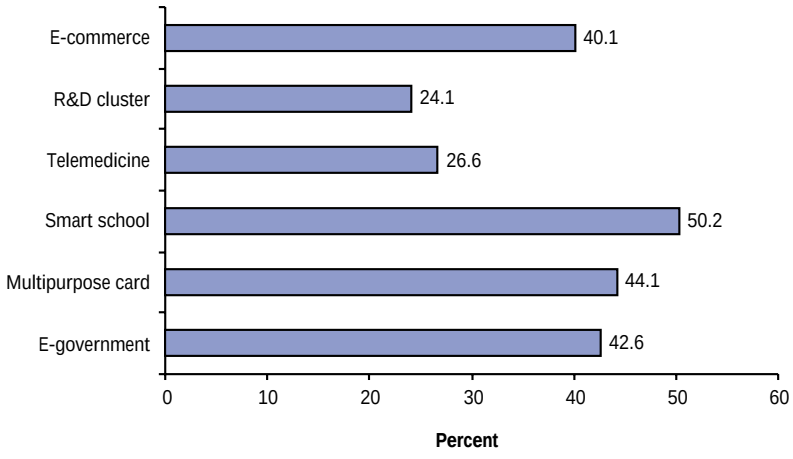


Figure 21: Percentage of Respondents who Can Name the Flagships of the MSC - 2002



MSC projects are better known among (**Figure 20**):

- Those with tertiary level education
- Those from science stream
- Professionals and those at management level
- Those from high household income

The findings show that to go "high tech", technical and scientific knowledge are the prerequisites to becoming aware of high technologies.

Figure 22: Respondents who Agreed on the Contribution of Progress and Development in S&T Towards Various Sectors - 2002

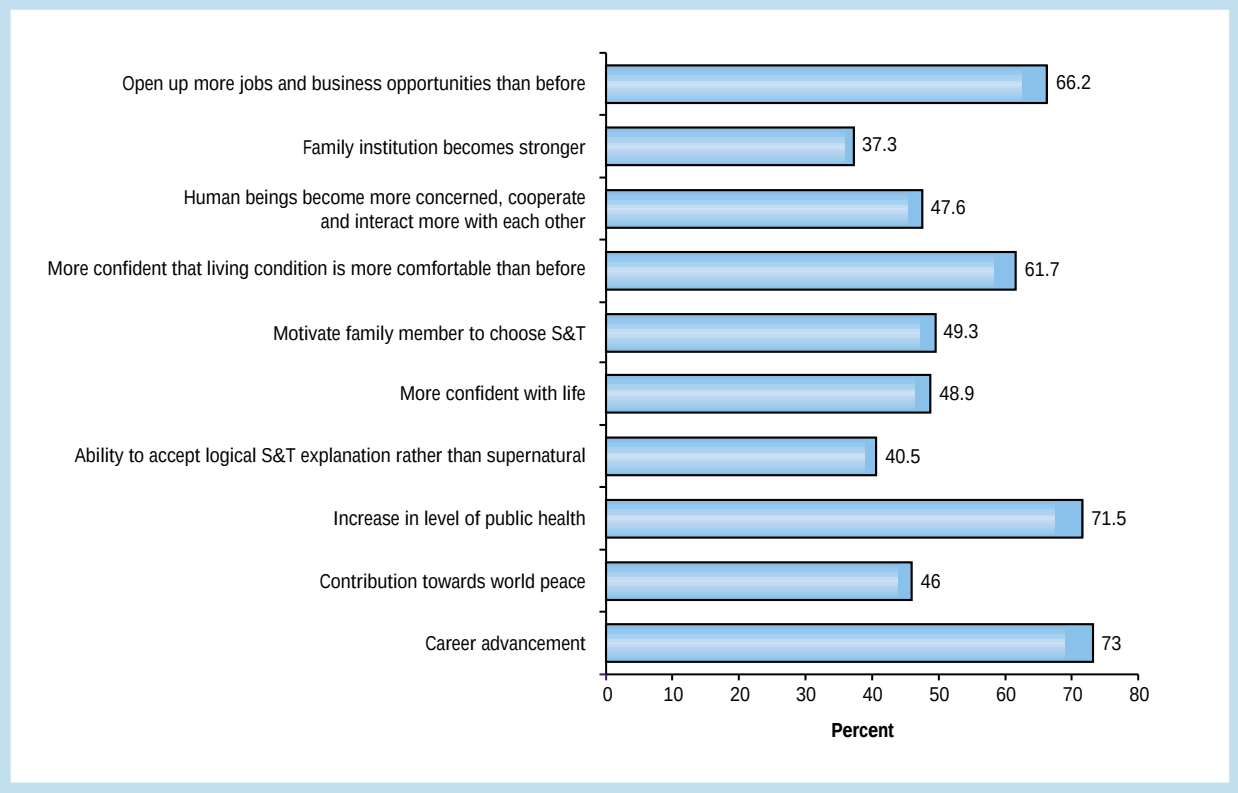
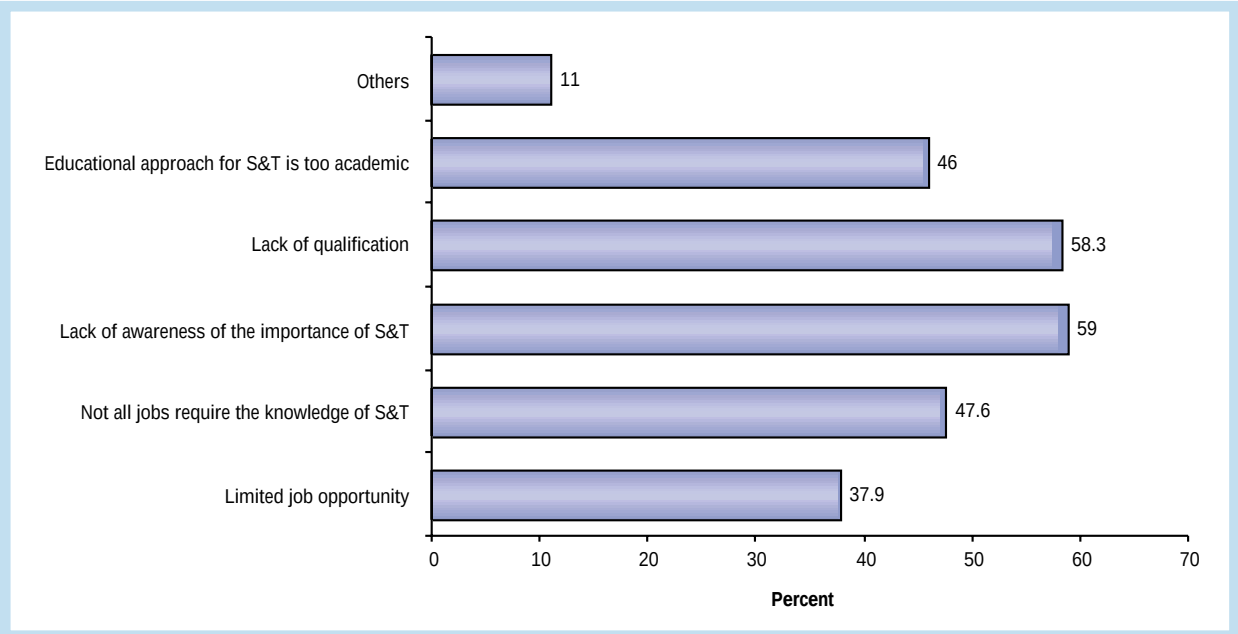


Figure 23: Reasons for Decrease in Interest to Venture in the Field of S&T - 2002



CONTRIBUTION OF ADVANCEMENT IN S&T

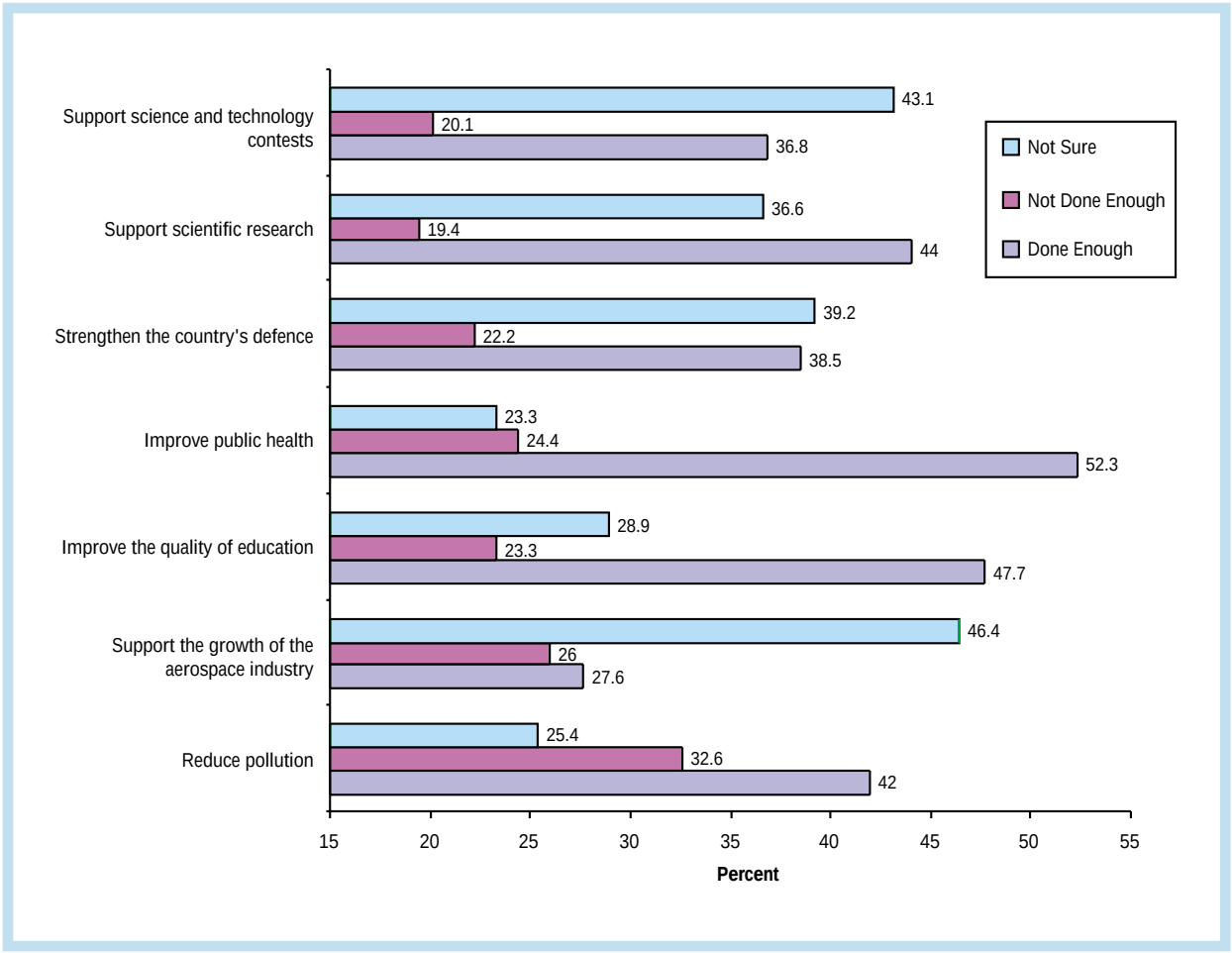
The findings are (**Figure 22**):

- 73% agreed S&T contributes towards career advancement
- 71.5% agreed on the resulting increase in the level of public health
- 66.2% agreed on the opening up of more jobs and business opportunities than before
- 61% agreed S&T make living conditions more comfortable

There were about equal percentages in the 40% range of those who believed and those who were not sure that advancement in S&T contributes towards world peace, ability to accept S&T for logical explanation rather than supernatural, enhancing confidence in living, motivating family members to choose S&T, making human being more concerned, cooperative and interactive, and making family institution stronger (**Figure 22**).

This finding shows that a majority of the public believed in the positive contribution of S&T towards the material physical dimension of life but not so on the human-social dimension of life.

Figure 24: Perception on Government's Efforts Towards Selected S&T and General Issues - 2002



DECLINING INTEREST IN S&T

When asked about possible reasons for the declining interest in science, respondents cited the following (**Figure 23**):

- Lack of awareness about the importance of S&T (59%)
- Lack of qualification (58%)
- Not all jobs require the knowledge of S&T (48%)
- Educational approach of S&T is too academic 46%)
- Limited job opportunity (38%)

However, the proportion of those who were not sure about these as reasons was in the range of 30-45%. This divided stand among the public is to be expected as the sample consisted of only 28% respondents with a background in science.

Perception on Government Policies

EFFORTS TOWARDS S&T RELATED PROGRAMMES

For every of the seven projects cited, there are more of those who said that the government had done enough compared to those who said that the government had not done enough (**Figure 24**).

The overall findings on S&T related programmes are:

- Improve public health (52.3%)
- Improve quality of education (47.7%)
- Support scientific research (44%)
- The government had done enough to strengthen the country's defence and to support science and technology contests (37%)
- The government had done enough to support the growth of aerospace industry (27.6% which is the highest level of uncertainty recorded)

There were more youths than adults and children who thought that the government had done enough to promote S&T. Relatively, there was not much difference in opinion between the rural and urban respondents except that there were more from the rural who thought that the government had done enough to reduce pollution and supported the growth of aerospace industry. More respondents with tertiary education felt that the government had done enough to promote S&T via all the programmes cited compared to those with secondary and primary level education.

The government has taken several steps to increase the public's level of awareness on S&T. The study in 2002 showed that 31.3% of the respondents were aware of the government's programmes. This was an improvement over the percentage of 23.6% in the study conducted in 2000 (**Figure 25**).

EDUCATION POLICIES

The findings are:

- Less than 10% know about the government's S&T education policies
- More than 40% either did not know or was uncertain

Compared to previous years, there was no change whatsoever in the percentage of those who knew about education policies. There were almost an equal percentage of the respondents who either did not agree or was unsure of the government's policies (**Figure 26**).

Figure 25: Public Opinion on Government Support of Several S&T Activities – Series Data

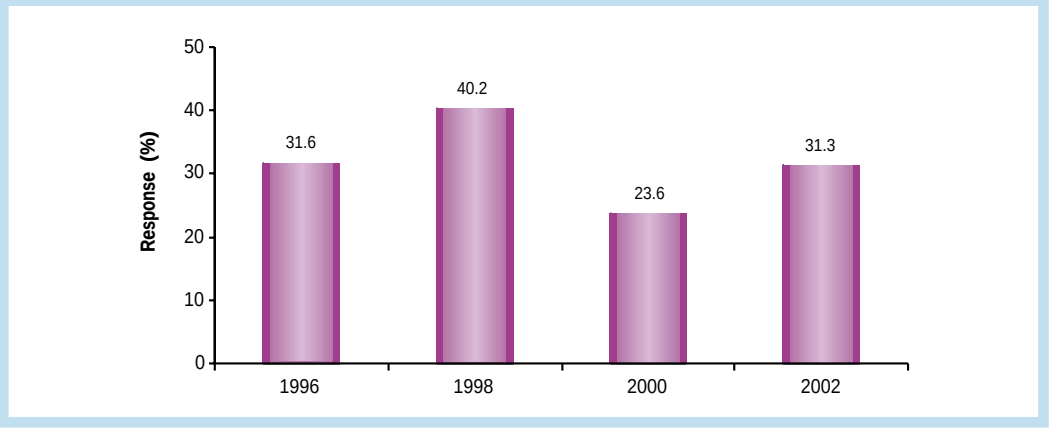
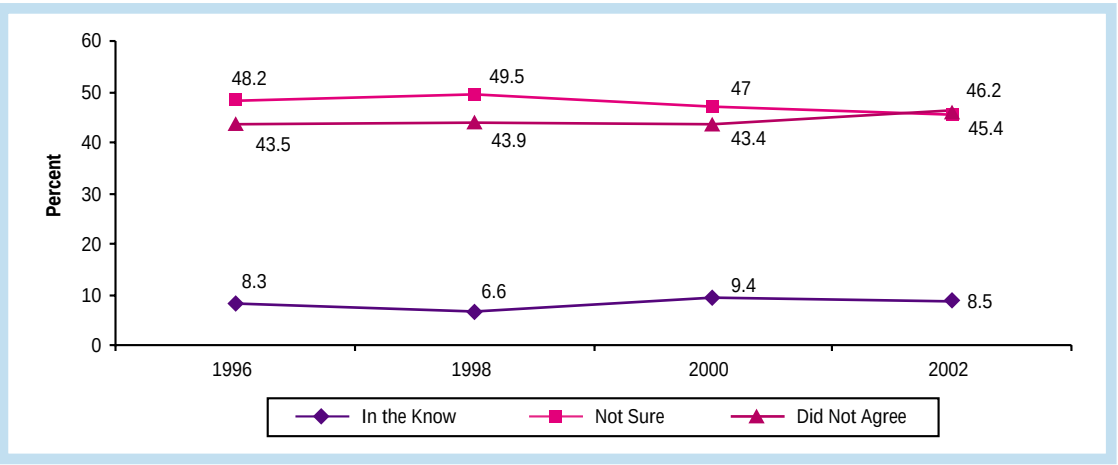


Figure 26: Perception of Knowledge on Government's S&T Education Policies – Series Data



Understanding Terms and Concepts

UNDERSTANDING S&T TERMS AND CONCEPTS

Overall, the percentage of correct answers for the knowledge of S&T terms and concepts is 48% in the year 2002 (**Figure 27**). For the same year, there were:

- Only three items with percentages of correct answers above 70%
- Three items with 50-69%
- Six items with 20-49%
- Three items with less than 20%
- The highest percentage of correct answer was for the item "smoking causes lung cancer"

The overall percentage of all these items had been increasing from 53.4% in 1996 to 57.4% in 1998 and to 58.8% in 2000 but dropped to 48% in 2002. The percentage of correct answers was significantly less than those obtained in the last three studies which were all more than 50%. The item with the highest percentage score had an increase in percentage correct answer from 61.4% in 2000 to 68.2% in 2002. The highest drop in correct answer was from 63.8% in 2000 to 34.7% in 2002 for the statement 'milk that is contaminated by radioactivity will be safe to drink after boiling (false)'.

The items had been reclassified into subheadings of the earth, health, man and physics (**Table 1**). For the year 2002, the percentage score for these items are:

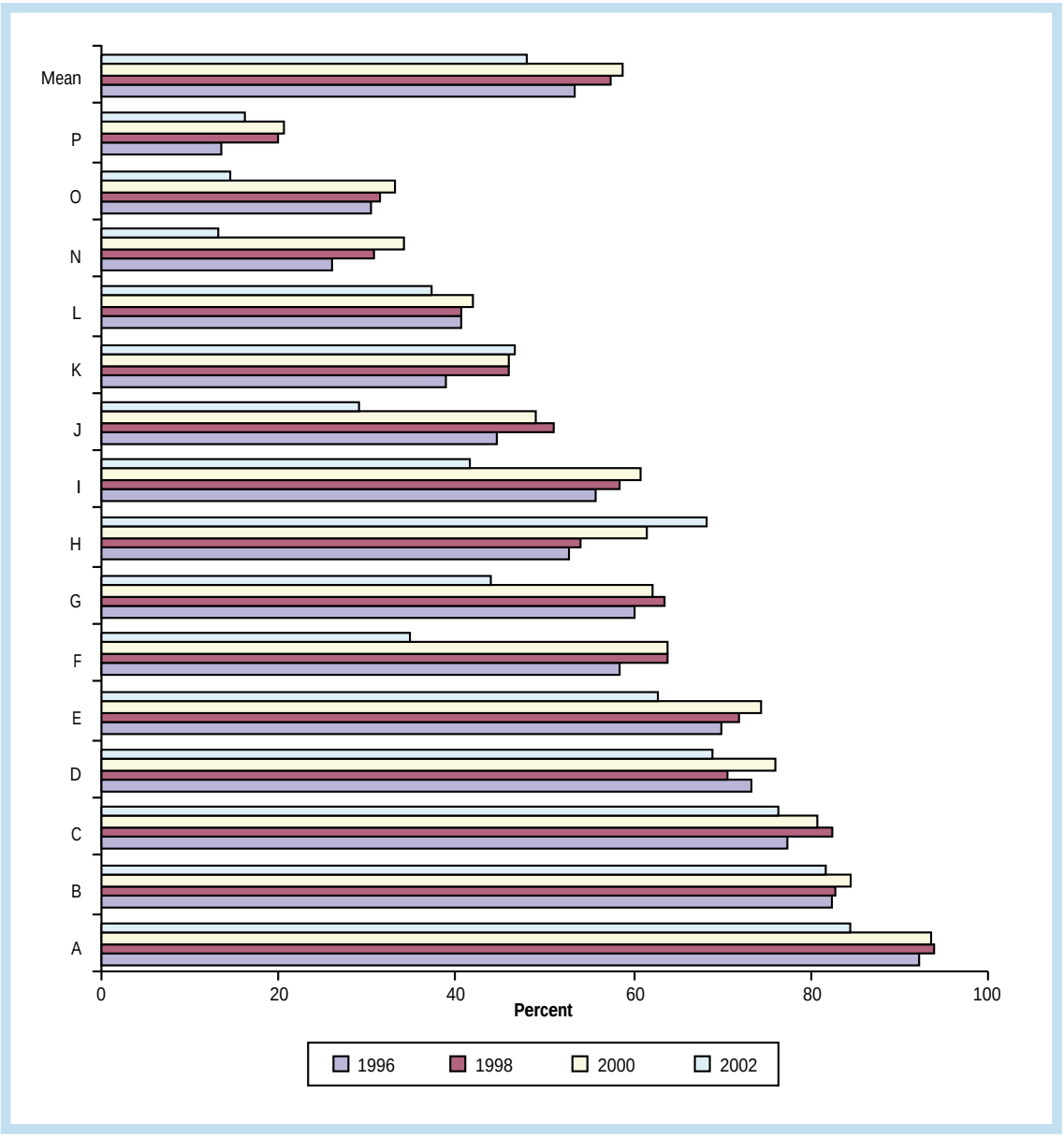
- Earth (highest score of 57.3%)
- Health (50.3%)
- Man (35.1%)
- Physics (29.6%)

This order of marks by percentage was found to be similar to that of the last three studies. Take note that public knowledge on S&T concepts and terms in 2002 had apparently declined by about 22-56% compared to 2000 (**Table 1**).

TABLE 1: Mean Public Percentage of Correct Answers to S&T Terms and Concepts

Category	1996	1998	2000	2002	Difference (2000-2002)	Percentage Decline (2002-2000)
Earth	65	68.1	69.7	57.3	-12.4	-21.6
Health	61.7	65.1	65.6	50.3	-15.3	-30.4
Man	46.3	51.8	52.0	35.1	-16.9	-48.1
Physics	42.6	43.3	46.3	29.6	-16.7	-56.4

Figure 27: Percentage of Correct Answers to S&T Terms and Concepts – Series Data

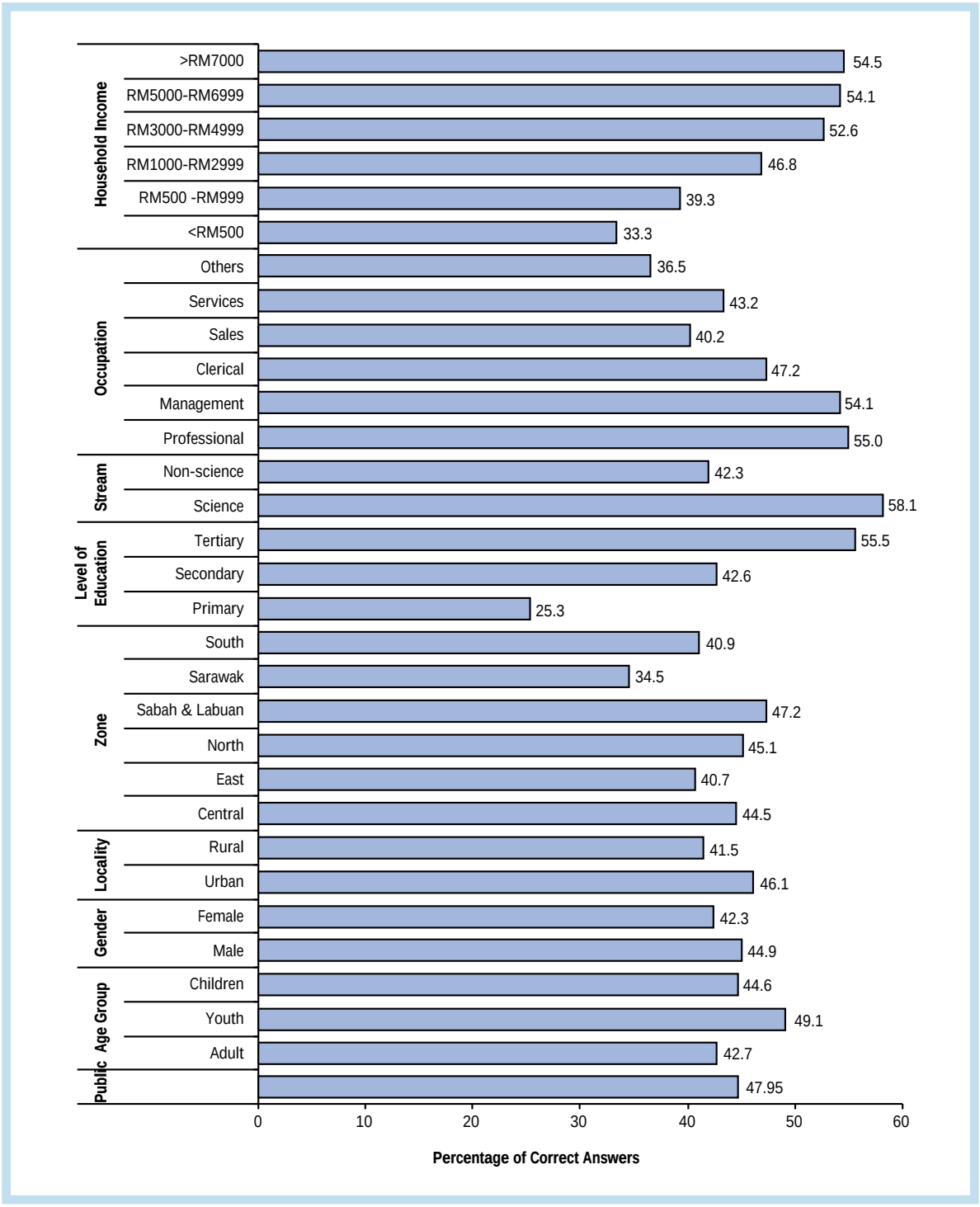


A. Smoking causes lung cancer (true)
B. The oxygen we use for breathing is produced by plants (true)
C. The earth goes round the sun (true)
D. Light travels faster than sound (true)
E. The centre of the earth is very hot (true)
F. Milk that is contaminated by radioactivity will be safe to drink after boiling (false)
G. The continents we are on have changed their locations in the past few million years and will continue to move in the future (true)
H. The earth takes one year to revolve round the sun (true)
I. Man as we know him today originated from an earlier animal species (false)
J. The first men lived at the same time as the dinosaurs (false)
K. The father's gene determines whether a foetus will be born a girl or a boy (true)
L. Electrons are smaller than atoms (true)
N. Lasers function by combining sound wave (false)
O. All radioactivities are man-made (false)
P. Antibiotics kill not only viruses, but also bacteria (false)

Note: Alphabets correspond with those used in the study questionnaire.

Correlation analysis shows the level of knowledge of S&T terms and concepts for the age group category for year 2002 was highest for the youths (49.1%), followed by children (44.6%) and then adults (42.7%). Note that children had for the first time overtaken adults.

Figure 28: Public Understanding of S&T Terms and Concepts - 2002



For the other categories, the S&T knowledge of males however had consistently been better than females in all the studies. Similarly, the percentage for urban respondents had also been consistently higher than the rural. The correlation between S&T knowledge and level of education is strong, that is the higher the educational level the higher the percentage of correct answers. Incidentally, respondents with primary level of education had the highest decline in percentage.

The marks were also high for those from the science stream (highest for all categories), management personnel and the professionals, and for those with high household income (**Figure 28 & Figure 29**).

Figure 29: Public Understanding of S&T Terms and Concepts by Selected Variables – Series Data

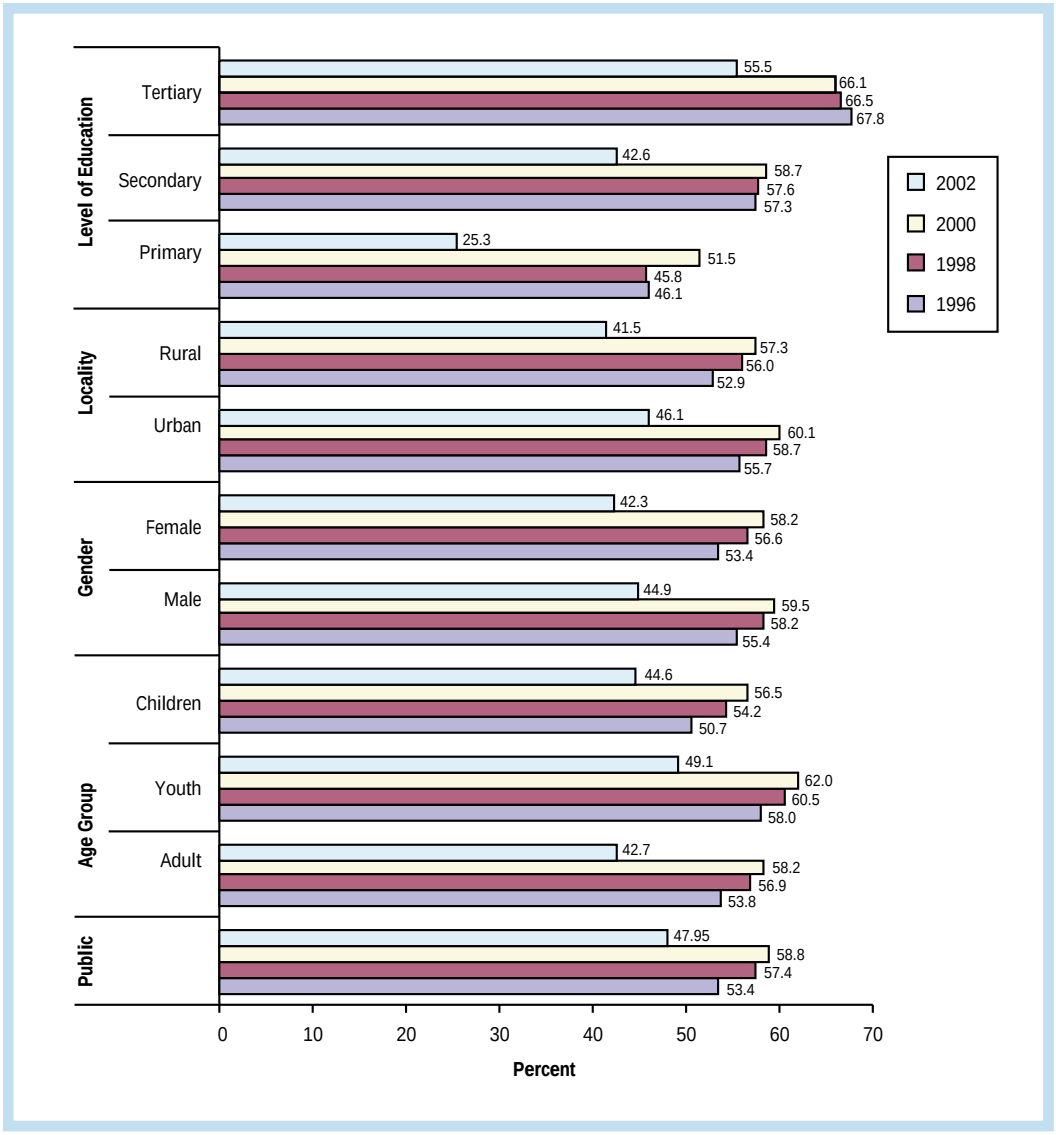


Figure 30: Awareness, Subjective and Objective Understanding of Environmental Terms and Concepts by Items - 2002

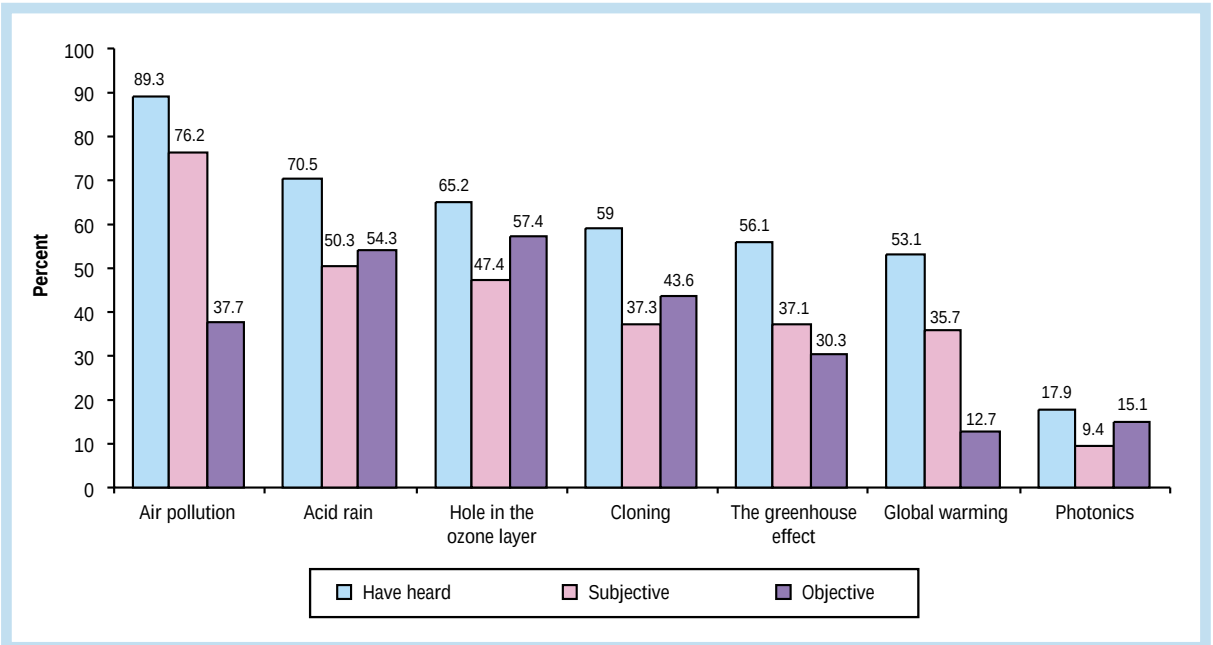
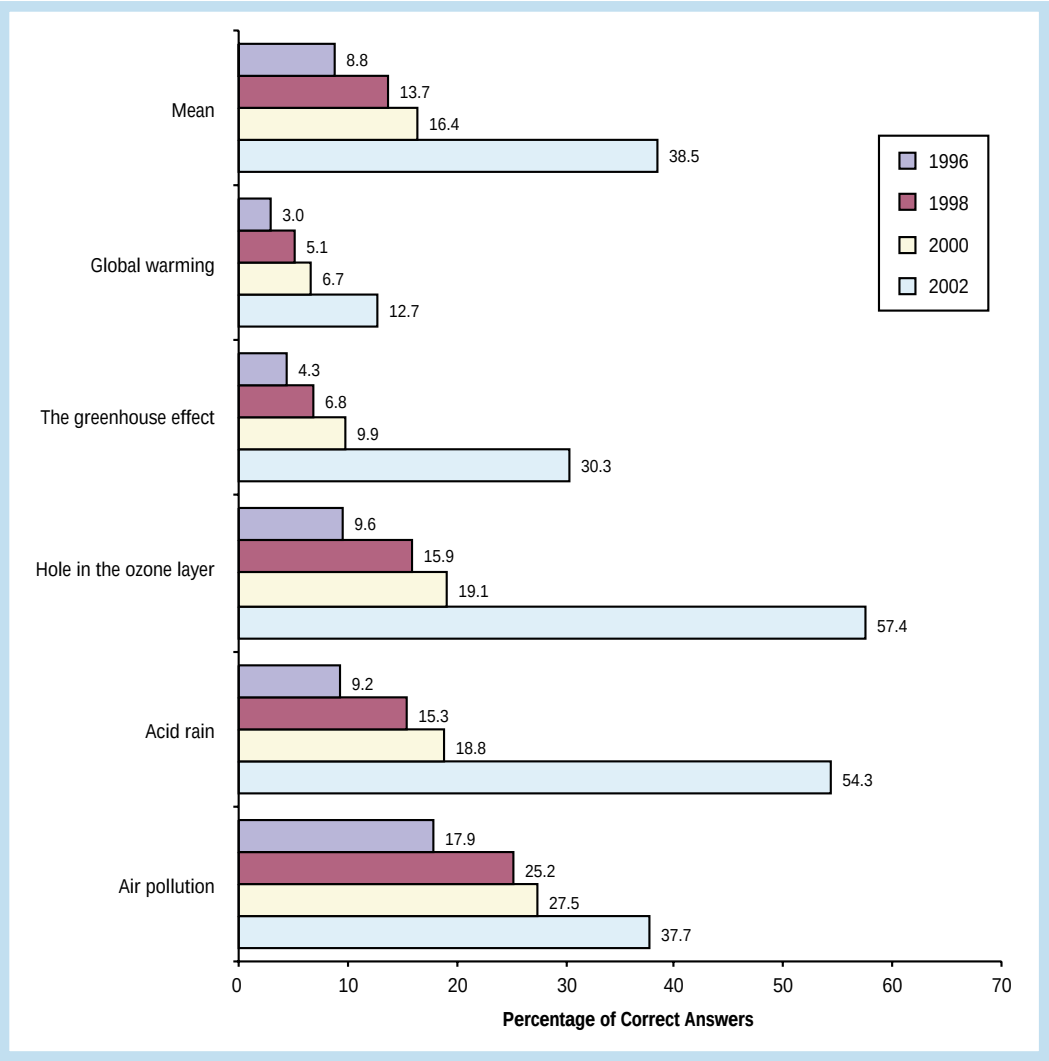


Figure 31: Understanding Environmental Terms and Concepts – Series Data



UNDERSTANDING ENVIRONMENTAL TERMS AND CONCEPTS

Under this part, the meaning of understanding is taken at two levels: subjective when respondents perceive or estimate that they know or understand the subject matter and objective when they are able to give factual answers to given questions.

This study found that the environmental terms and concepts the public were most aware or have heard of and well understood subjectively were (**Figure 30**):

- Air pollution (89.3% and 76.2% respectively)
- Acid rain (70.5% and 50.3% respectively)

However, the terms and concepts the public objectively understood most were:

- Ozone layer (57.4%)
- Acid rain (54.3%)

The findings show that it is air pollution rather than acid rain that the public perceived to understand better but it is actually the ozone layer and the acid rain that the public had better knowledge of.

The findings in previous years of 1996, 1998, 2000 and 2002 showed the environmental terms and concepts most understood by the public were ozone layer and acid rain. The level of understanding had improved significantly in the study conducted in 2002 (**Figure 31**).

Figure 32: Awareness, Subjective and Objective Understanding of Environmental Terms and Concepts - 2002

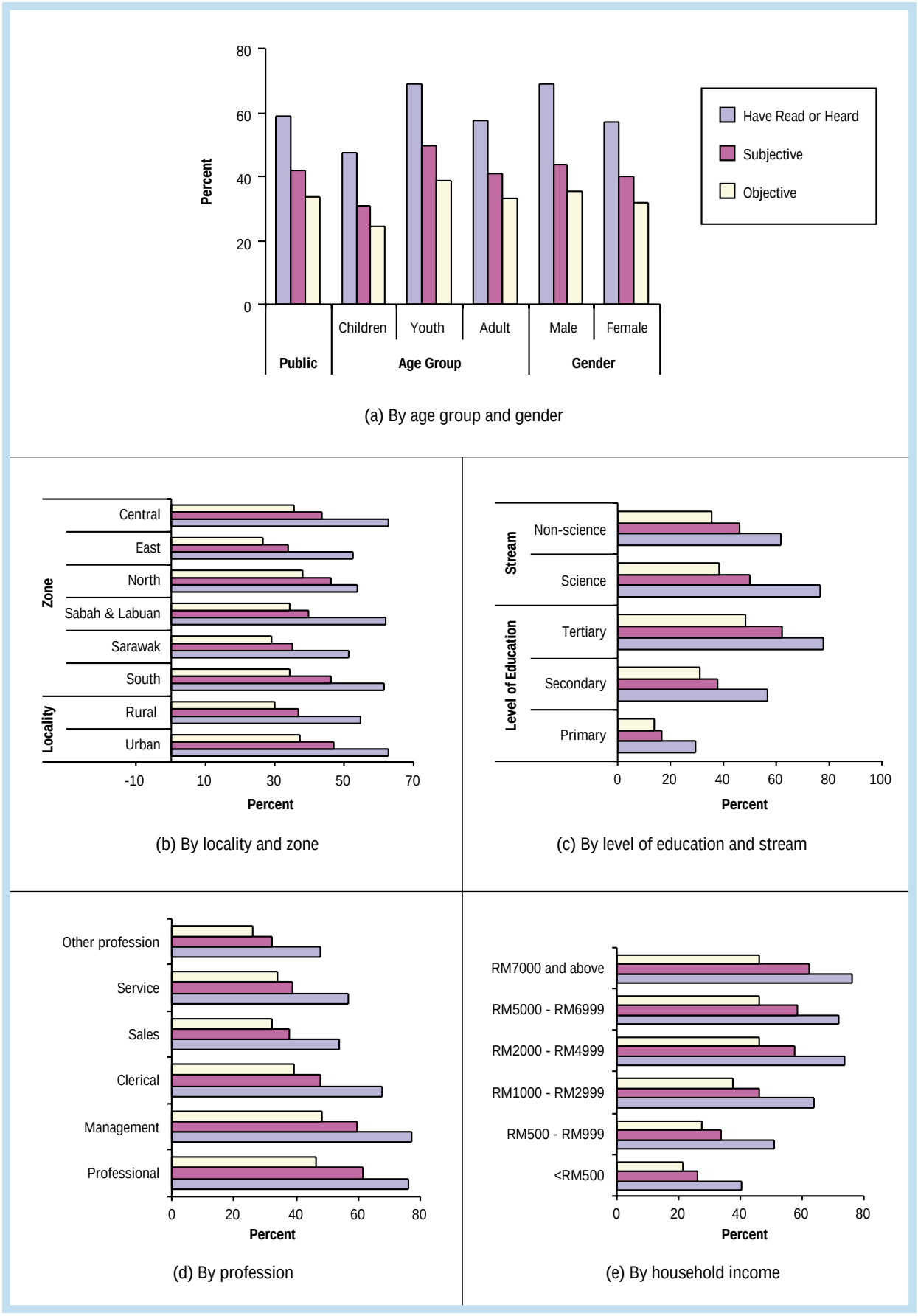
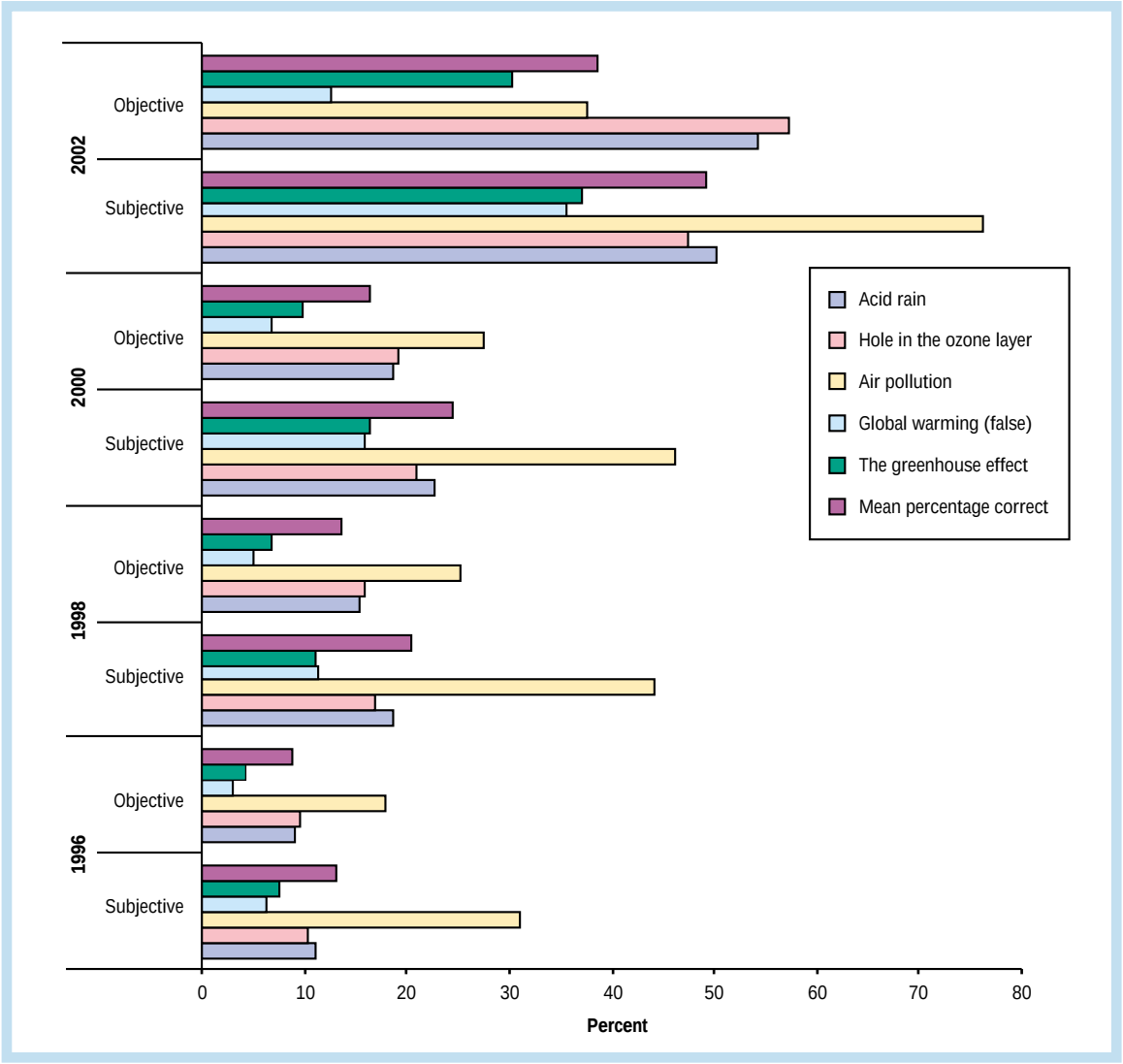


Figure 33: Subjective Vs. Objective Understanding of Environmental Terms and Concepts – Series Data

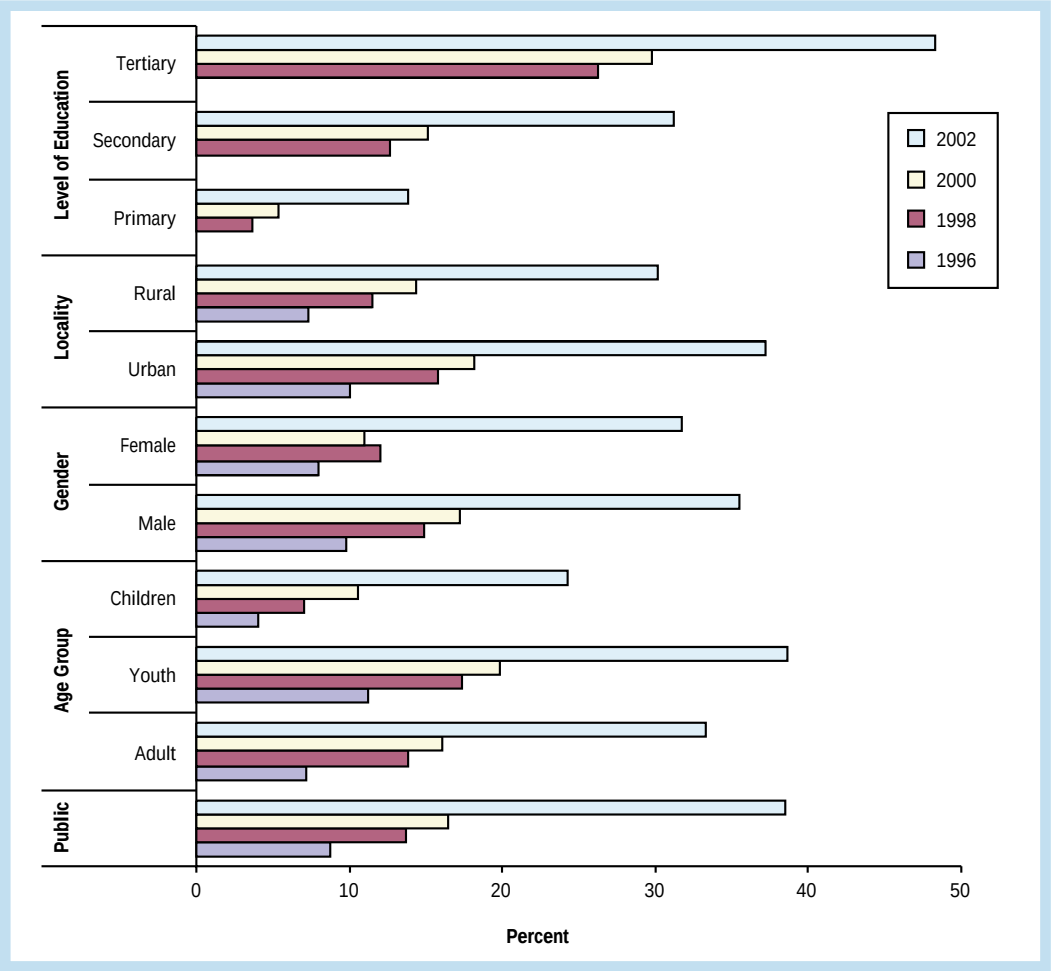


Not surprisingly, those with tertiary education and from the science stream had also been surpassing the other groups (**Figure 32**). The study also found that those working as either professionals or at the management level and within the higher household income group had higher percentage scores in both subjective and objective understanding compared to the other subgroups.

Overall, the perceived level of subjective understanding was (41.9%) which was higher than objective understanding (35.9%). This pattern of subjective understanding being always higher than that for objective understanding was consistent in the last three studies. Furthermore, both types of understanding, subjectively and objectively had improved significantly compared to previous years of 1996, 1998, and 2000, which had all been below 24.5% and 16.4% respectively (**Figure 33**). The finding shows the public is apparently better in understanding environmental terms and concepts rather than understanding S&T terms and concepts.

In terms of demographic variables, **Figure 34** clearly shows the knowledge level implicated by the objective understanding of youths had consistently surpassed the adults and the children. So was the case for the males over the females, the urban over the rural and the tertiary level over the secondary and primary.

Figure 34: Percentage of Correct Answers to Environmental Terms and Concepts by Age Group, Gender, Locality and Level of Education – Series Data



Note: 1996 data for some items are not available

The significant increase in percentages of public subjective and objective understanding of environmental terms and concepts can be attributed to the media. These topics related to the environment, particularly those with high percentage scores have been regularly promoted in the media. Assuming that this is true, then this finding provides us with the evidence that communication on S&T information by the media is an important method of educating the public informally.

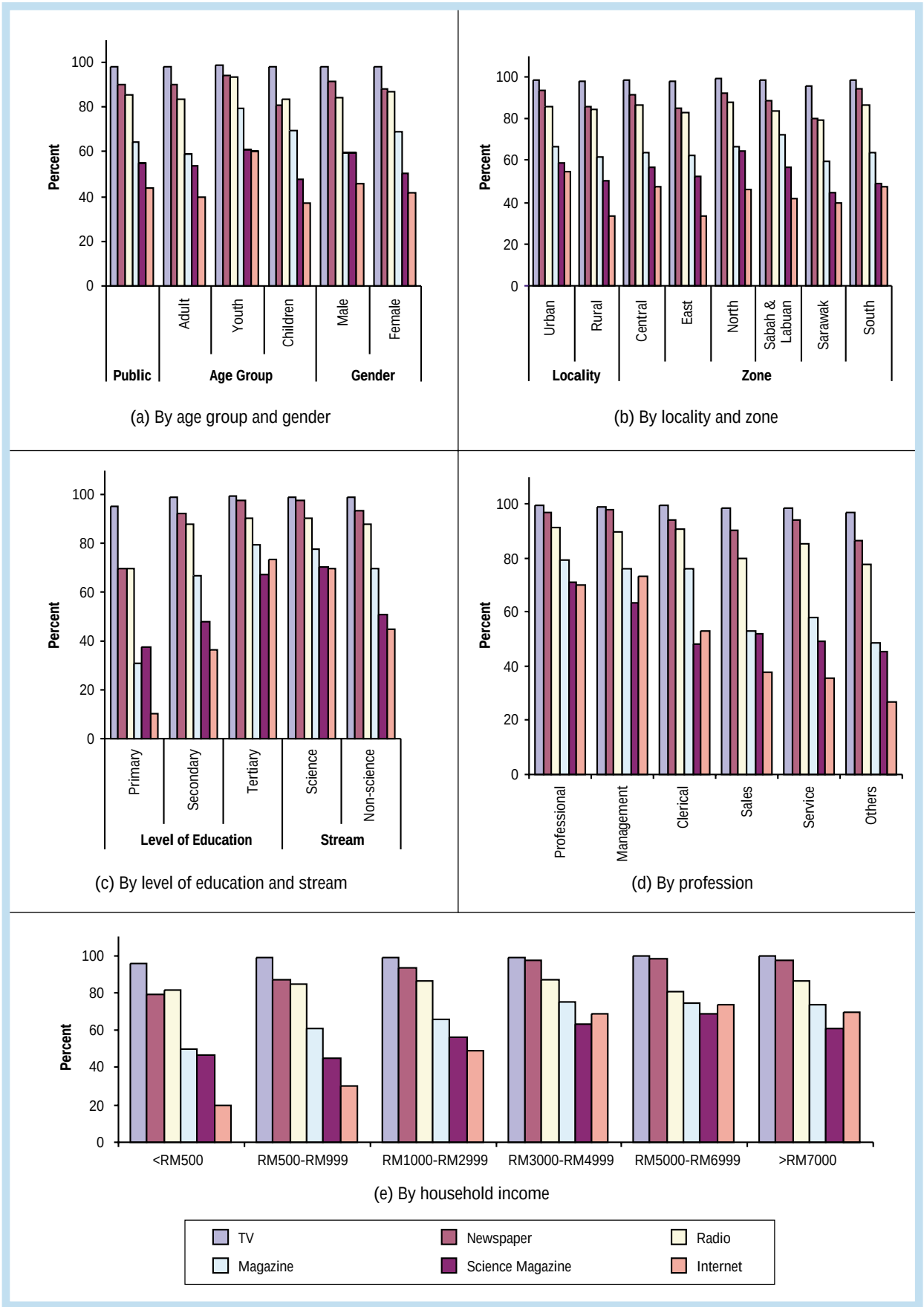
The level of the public understanding of environmental terms and concepts was derived from the respondents' answers to five environmental phenomena. The study found that the trend of percentage score for the public's level of understanding in this category has increased as the following shows:

- 8.8% in 1996
- 13.7% in 1998
- 16.4% in 2000
- 38.5% in 2002

The study in 2002 showed an increase in the number of correct answers regarding environmental pollution as compared to the study in previous years. It also showed this sector continued to record the highest score. The percentage increase is as follows:

- 17.9% in 1996
- 25.2% in 1998
- 27.5% in 2000
- 37.7% in 2002

Figure 35: Sources of General Information - 2002



The respondents' level of understanding of environmental issues showed that the percentage of them giving correct answers to the statement "holes in the ozone layer will cause skin cancer" was the highest at 57.4%.

Sources of Information

Two types of information were considered: general and S&T information.

GENERAL INFORMATION

Figure 35 clearly shows that television (TV) continues to be the most popular source of general information. More than 98% of the respondents, irrespective of who they were, watched TV. The next most popular sources of information were the newspapers and the radio. However, the highest percentage of newspaper readers were the youths, those in the urban, those with either secondary or tertiary level education, the professionals and management personnel and those with high household income.

The next source of general information for approximately 64.2% of the respondents were magazines. Youths, those with tertiary level education and those from the science stream, professionals, management personnel, clerks and those with high household income mainly read magazines.

Science magazines were read mainly by those with tertiary level education, from the science stream and from the higher household income. However, the group of people who least read science magazines were professionals and management personnel. Youths were the largest consumers of the media whether it was radio, science and non-science magazines and also the Internet.

Previous studies showed a constant marginally increasing trend of TV watching at 97.3% in 1996 compared to the other sources of information, which were not as consistent across the various categories of respondents (**Figure 36**).

However, the percentages for newspapers as the next most popular sources of information had relatively decreased from 93.2% in 2000 to 89.9% in 2002. Next, the decrease in radio listeners from 88.1% in 2000 to 85.3% in 2002. The trend in percentages was irregular in past studies with 88.1% in 1996 and 82.5% in 1998.

Figure 36: Sources of General Information – Series Data

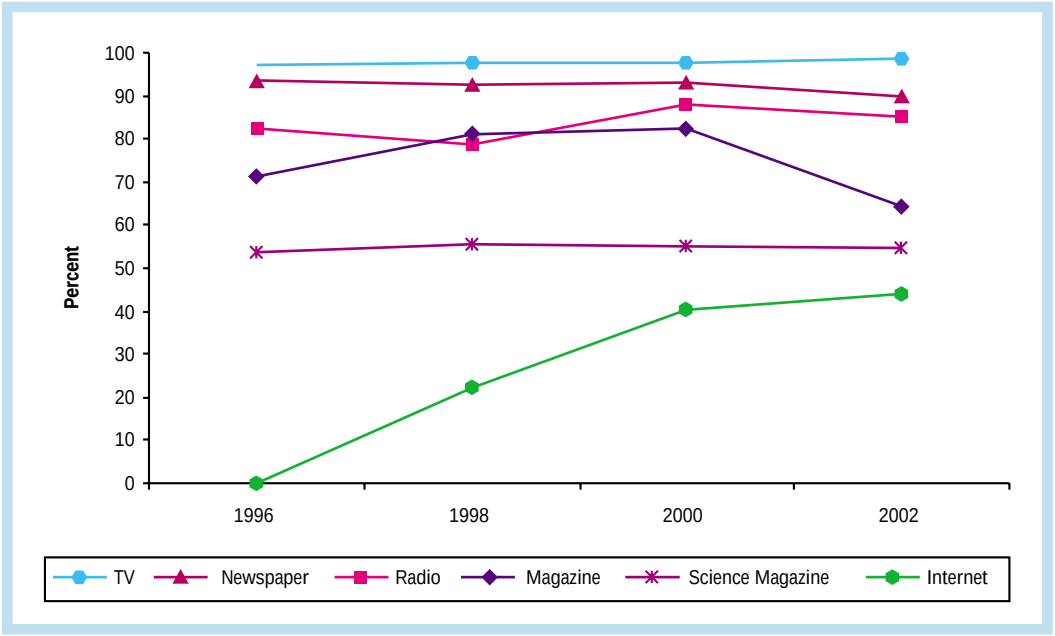
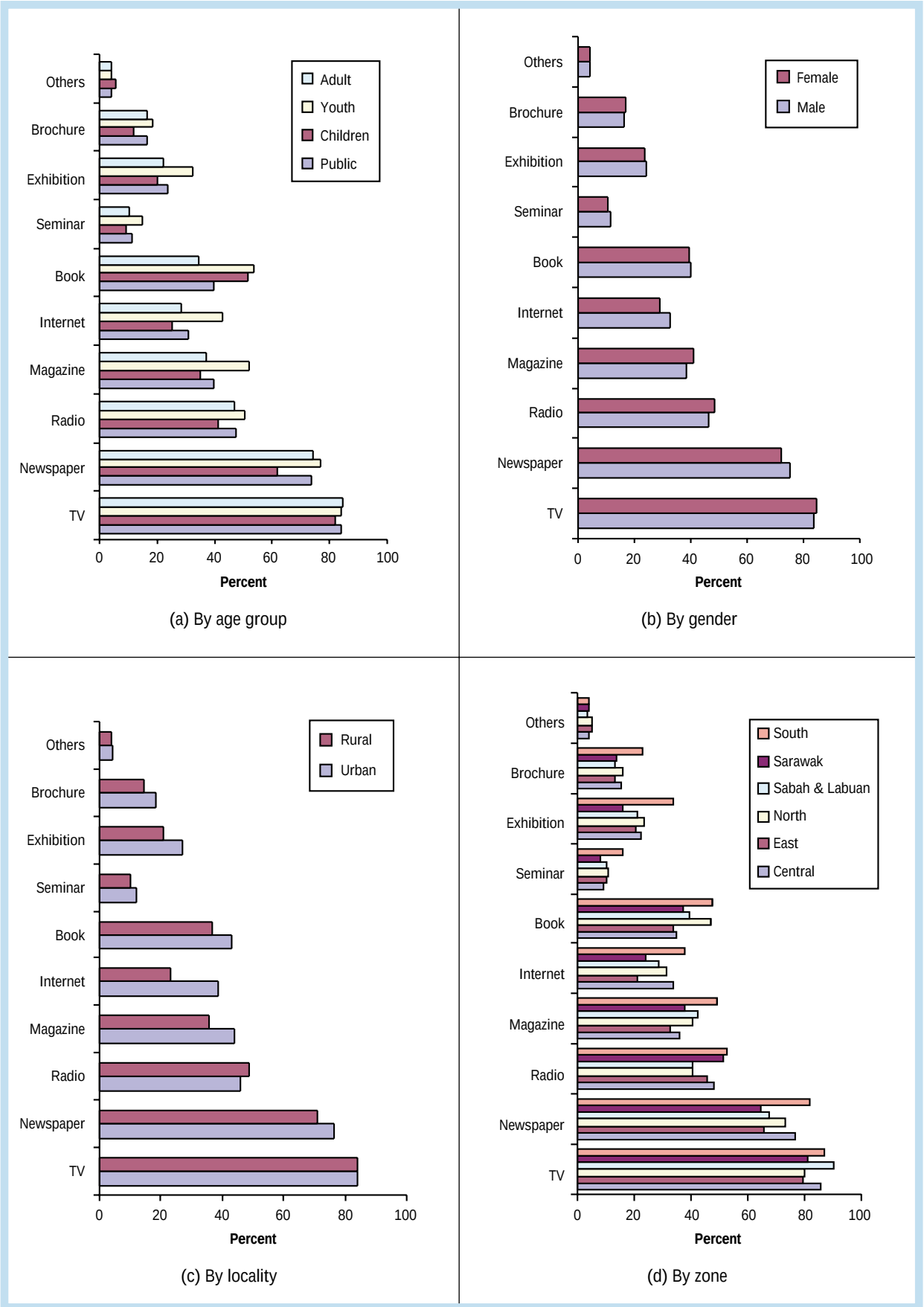
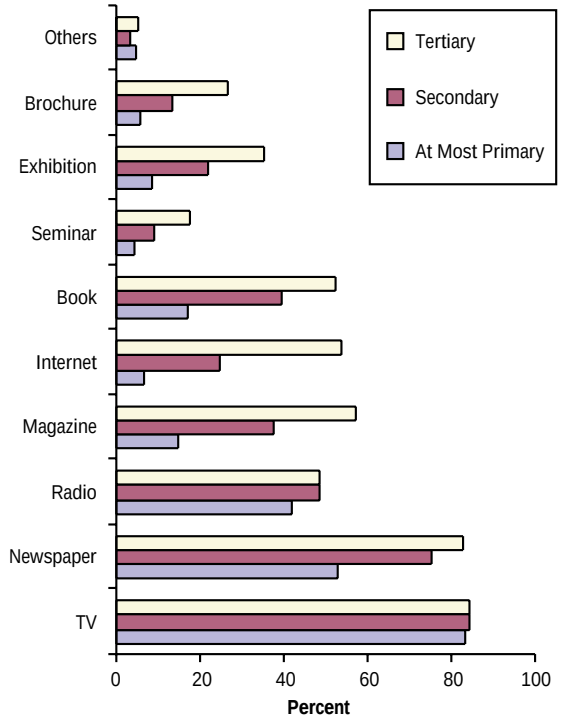
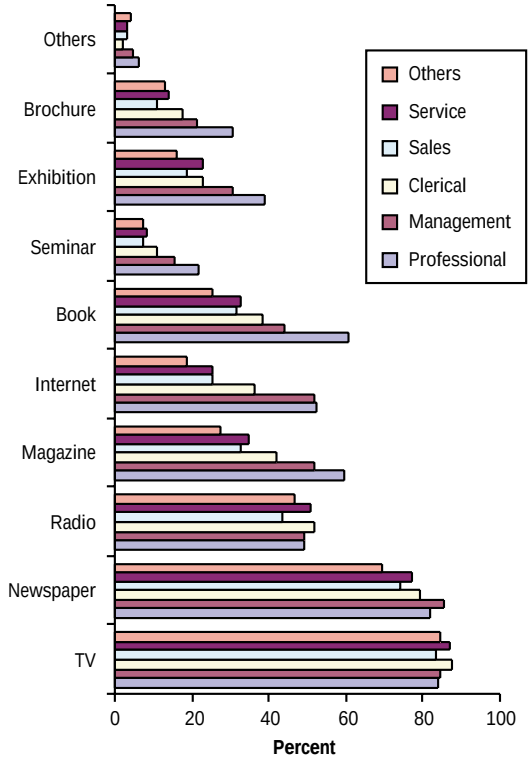


Figure 37: Sources of S&T Information - 2002

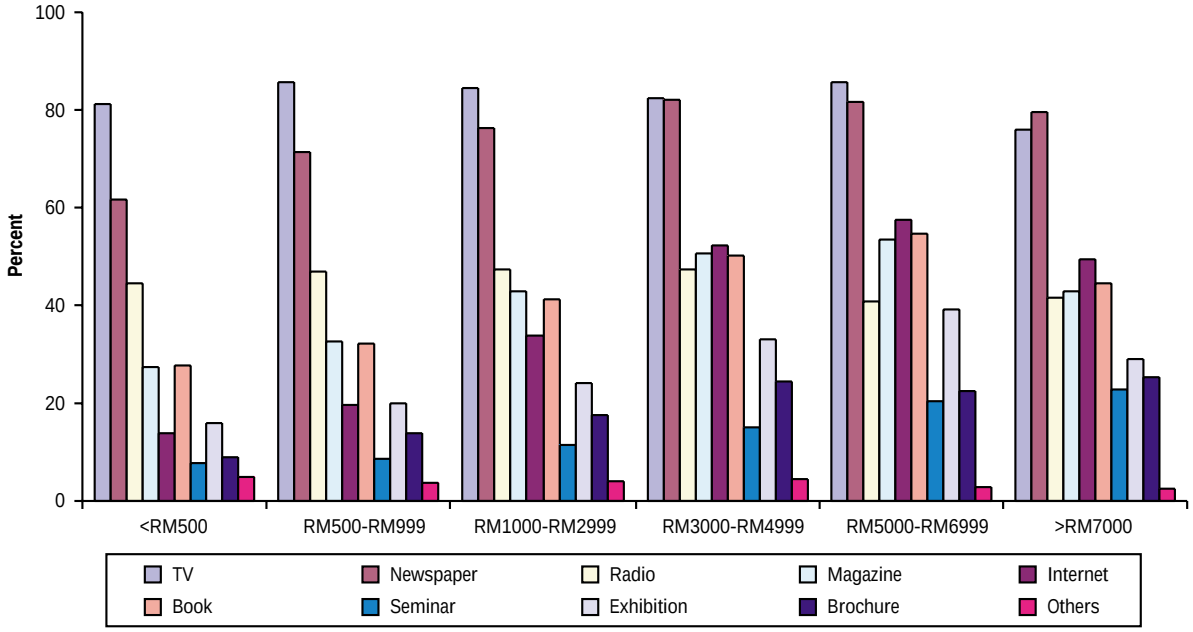




(e) By level of education



(f) By profession



(g) By household income

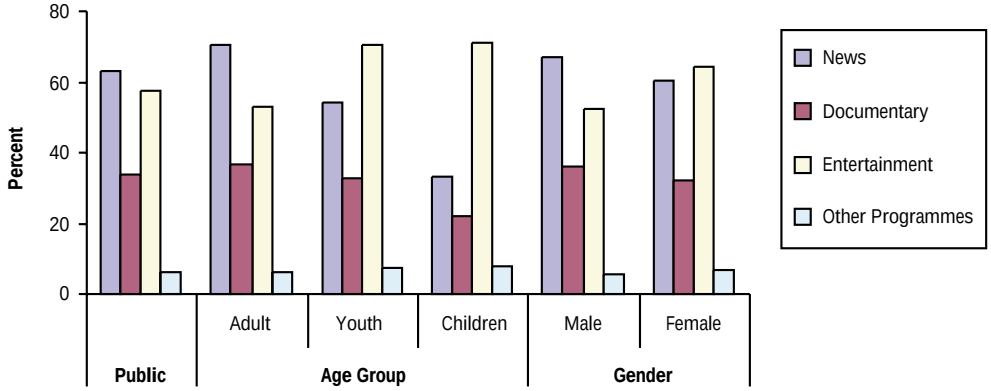
For magazines, the percentage in year 2002 showed a significant drop from three previous studies, which had been recording a continuous rising trend:

- 71.1% in 1996
- 81% in 1998
- 82.3% in 2000

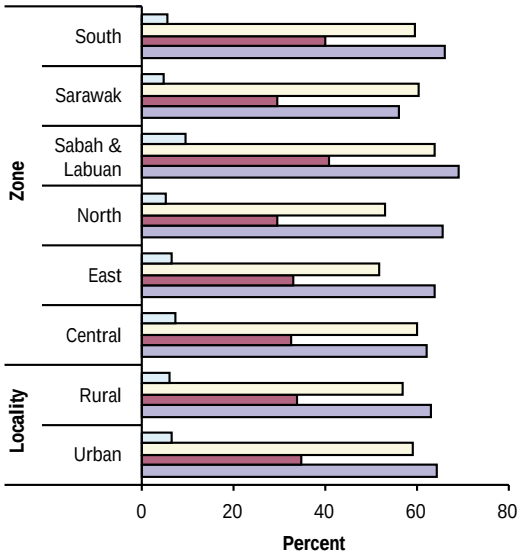
The percentage of those who read S&T related magazines had more or less stabilised at:

- 54.8% in 2002
- 53.8% in 1996
- 55.6% in 1998
- 55% in 2000

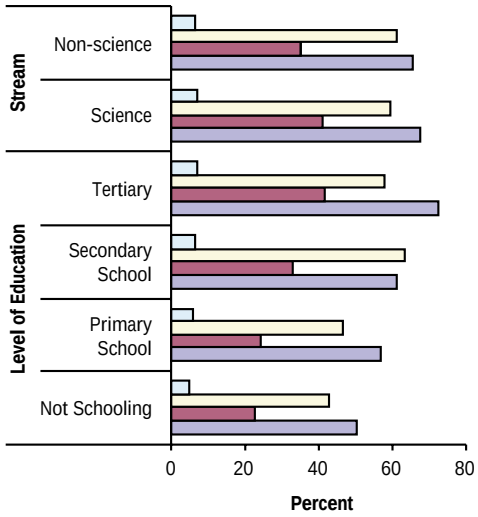
Figure 38: Most Watched Local TV Programmes - 2002



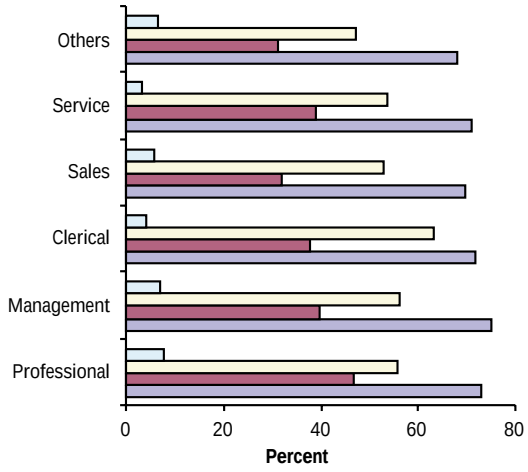
(a) By age group and gender



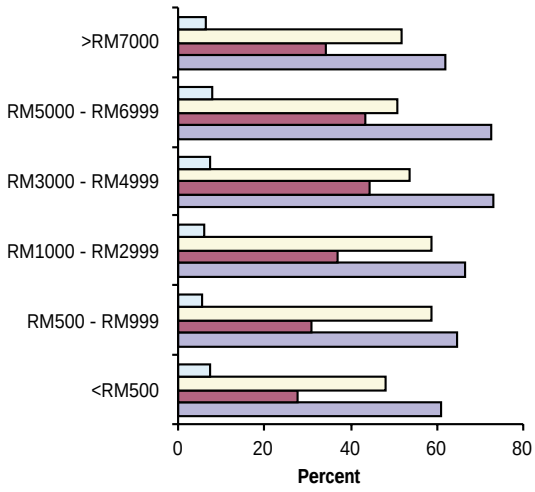
(b) By zone and locality



(c) By level of education and stream

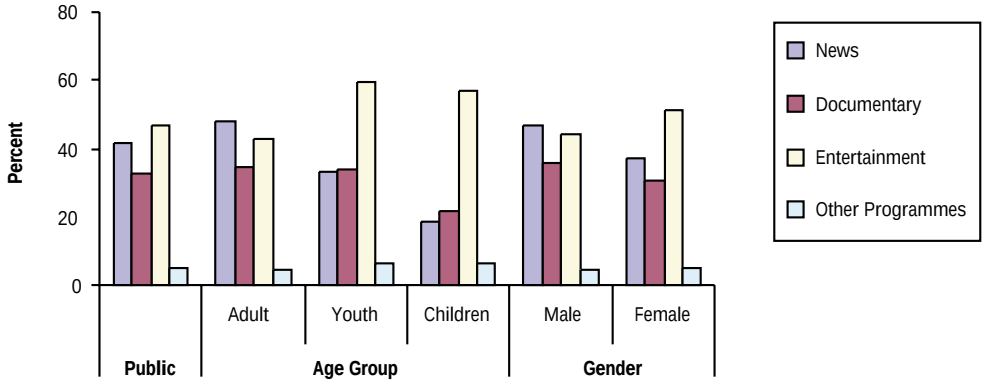


(d) By profession

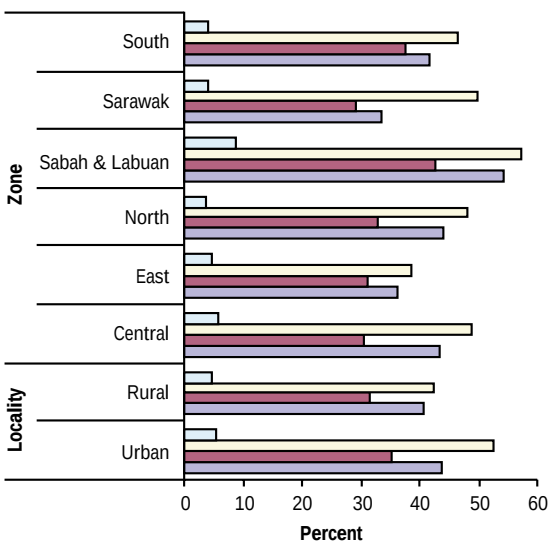


(e) By household income

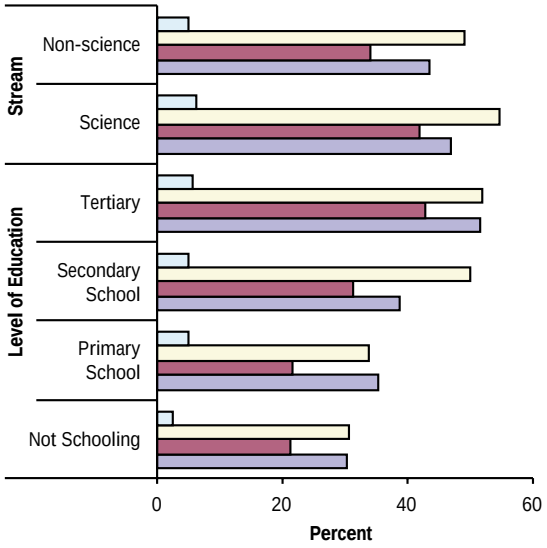
Figure 39: Most Watched International TV Programmes - 2002



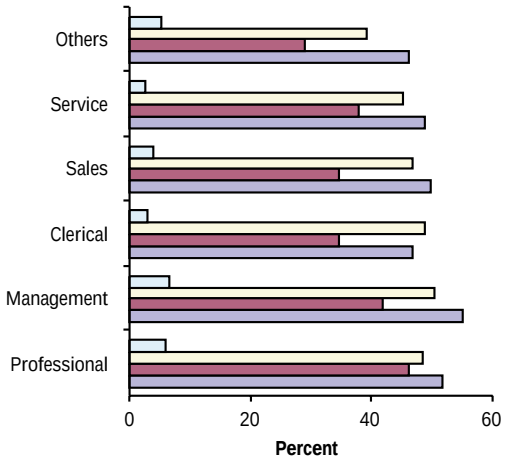
(a) By age group and gender



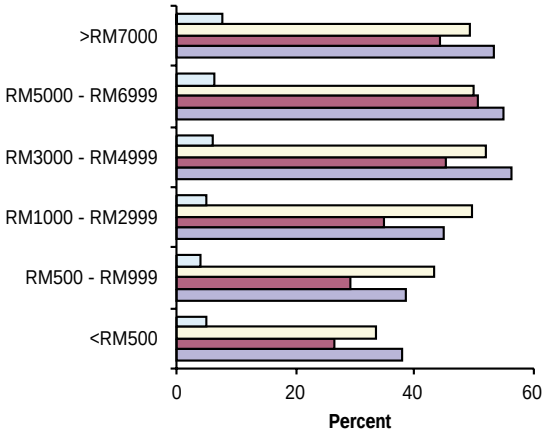
(b) By zone and locality



(c) By level of education and stream

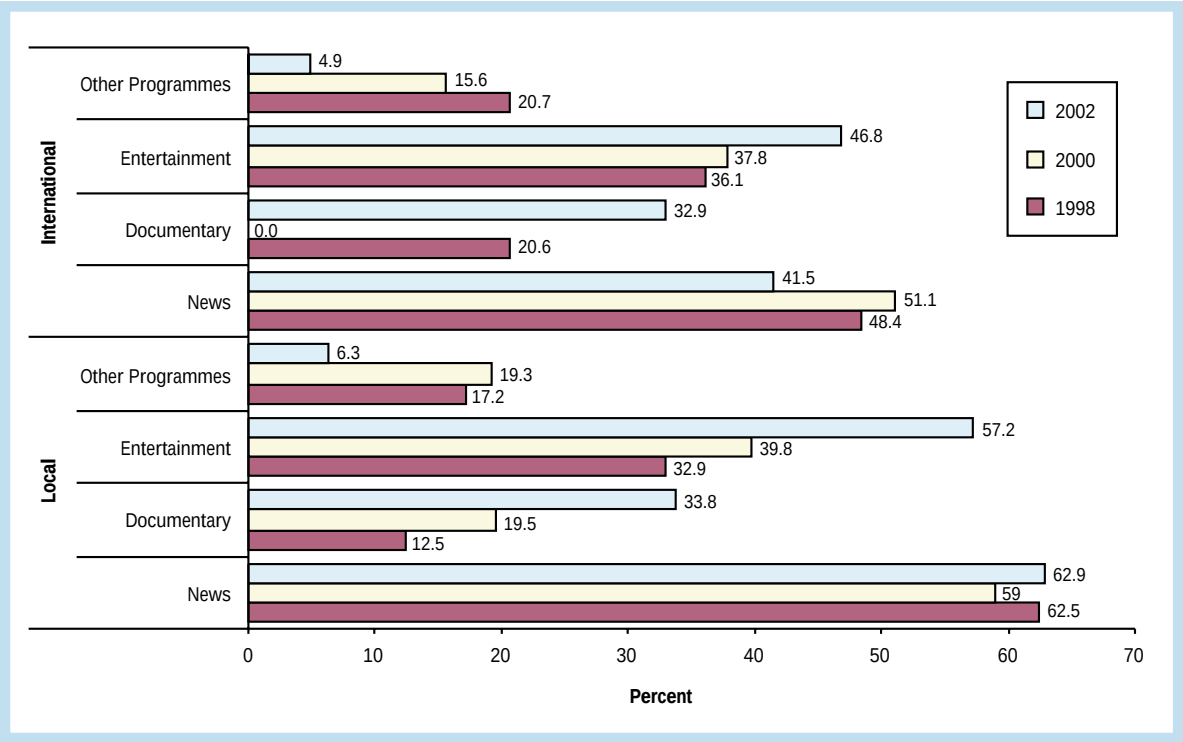


(d) By profession



(e) By household income

Figure 40: Most Watched Local and International TV Programmes – Series Data



The Internet however was apparently fast becoming an important alternative popular source of general information as indicated by the increase in percentage of Internet users (**Figure 36**):

- 22.1% in 1998
- 40.2% in 2000
- 43.9% in 2002

SOURCES OF S&T INFORMATION

The order of the popularity of the various sources of information is as follows:

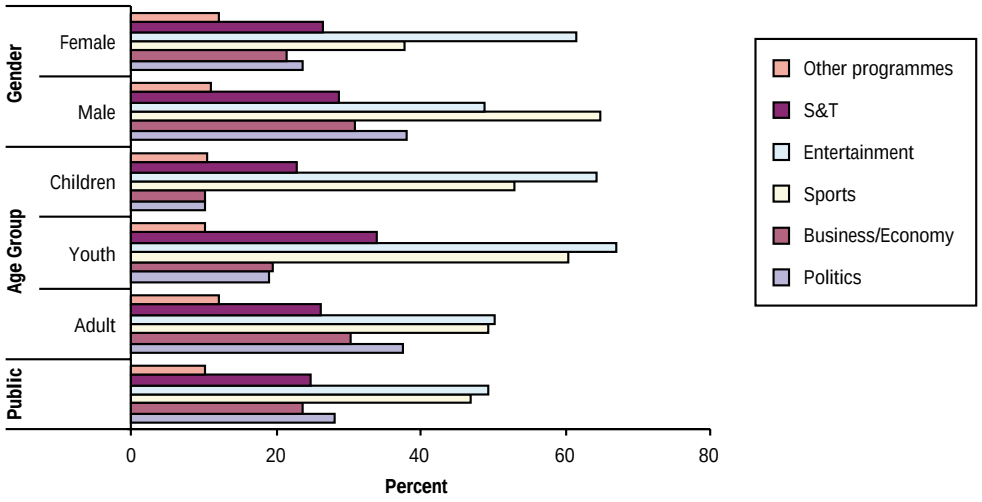
- TV (84.2%)
- Newspapers (72.8%)
- Radio (47.3%)
- Books and magazines (both at about 40%)
- Exhibitions (24%)
- Brochures (16.4%)
- Seminars (11.1%)

For year 2002, TV and newspapers were the two most popular sources of S&T information while magazines and the Internet were among the least popular although they were a popular alternative source of general information (**Figure 37**).

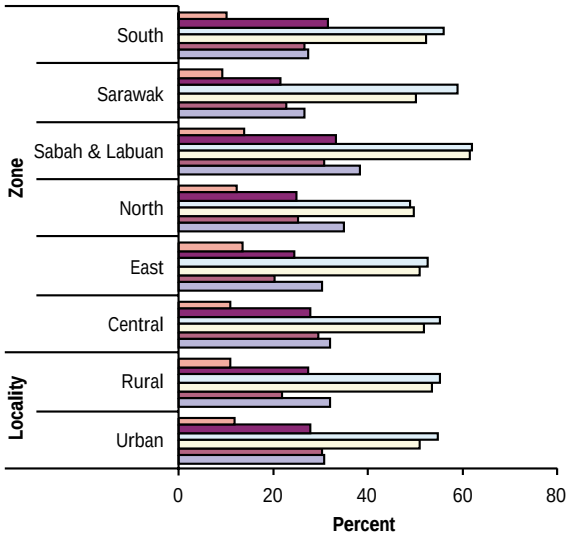
MOST WATCHED TV PROGRAMMES

Figure 38 shows news was the most watched local programme for almost everyone except for youths and children. The percentages of news consumption were higher among adults, those with tertiary education, professionals and management personnel and those with high household income. The next most watched programme was entertainment with youths and children having the highest percentage score. Thus our youths and children are entertainment seekers rather than information seekers. Less watched programmes were documentaries. A majority of documentary viewers were those from Sabah and Labuan, professionals and those with high household income.

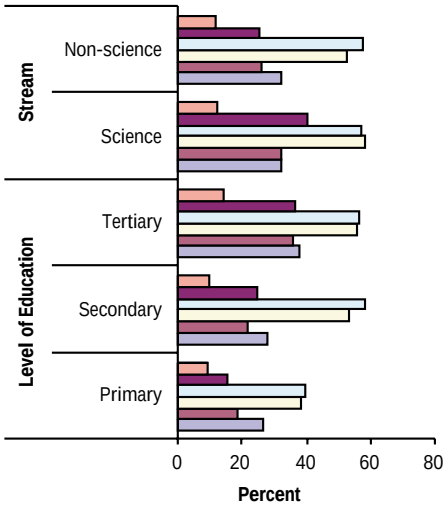
Figure 41: Most Read Local Items in Newspapers - 2002



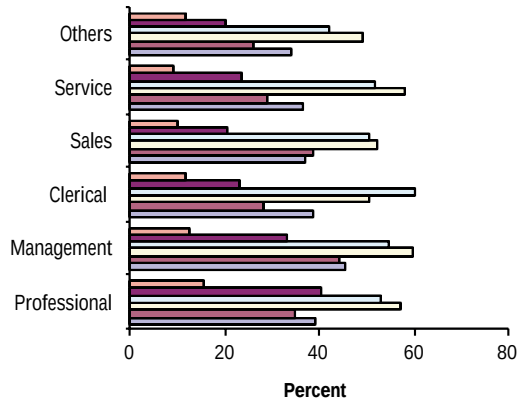
(a) By age group and gender



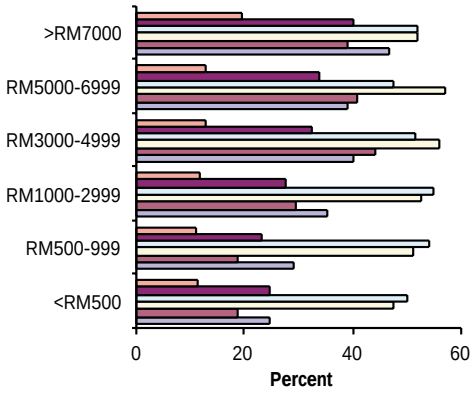
(b) By zone and locality



(c) By level of education and stream



(d) By profession



(e) By household income

The pattern for most watched local TV programmes was almost similar to that of international programmes (**Figure 39**). However, the most watched TV programme is entertainment-based rather than news. News are mostly watched by adults, professionals and management personnel as well as those with high household income.

The percentages of those who watched local news had remained constant to about 60% since 1998 to present. This is not so with foreign news where not only was the percentage lower, it had also significantly declined since 2000 (**Figure 40**). The viewing of local entertainment programmes had however significantly increased from 39.8% (2000) to 51.2% (2002). This was also true for international entertainment programmes. Documentary viewers for both local and international had been lower in percentage but they also increased at a significant rate since 1998. In year 2002, the percentages of local and international documentary viewers were about the same.

MOST READ ITEMS IN NEWSPAPERS

Figure 41 shows that entertainment and sport were the two most favourite newspaper items. Readers of these items that were high on the list were again children and youths. Sport was not so much a favourite item among females and those with primary education. Males preferred sport to entertainment while females preferred entertainment to sport. The choice of reading politics, business, economy or S&T related news items were very much dependent on the background of the respondents. The percentage for business was high among the high household income, those in management and sales categories. Those who read about politics were adult males, those in management and those with very high household income. Very low percentage score for politics and business/economy-oriented items were found among youths and children.

From year 1998 to 2002, the trend in readership showed that the percentages had all increased for all types of news items, with sport and entertainment gaining about 20-30% readership, becoming the highest significant increase in percentage (**Figure 42**). However, S&T news item in newspapers was read by only about 24.5% of the respondents. Very similar patterns of readership and selection of news items are seen for international news items (**Figures 43 and 44**).

Figure 42: Most Read Local Items in Newspapers – Series Data

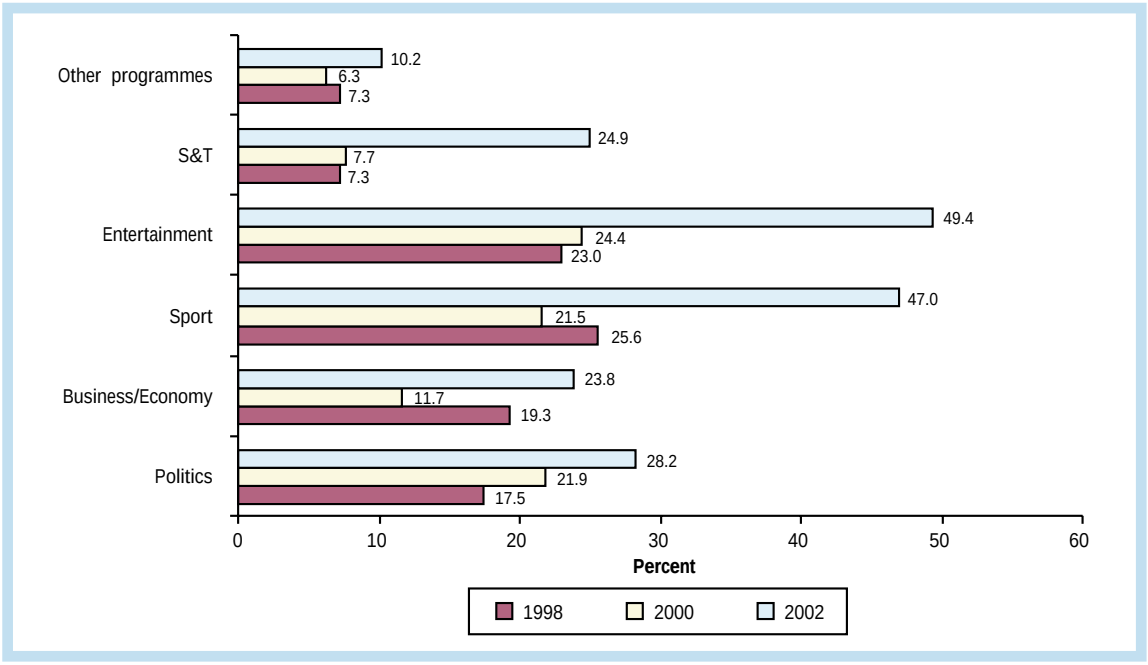


Figure 43: Most Read International Items in Newspapers - 2002

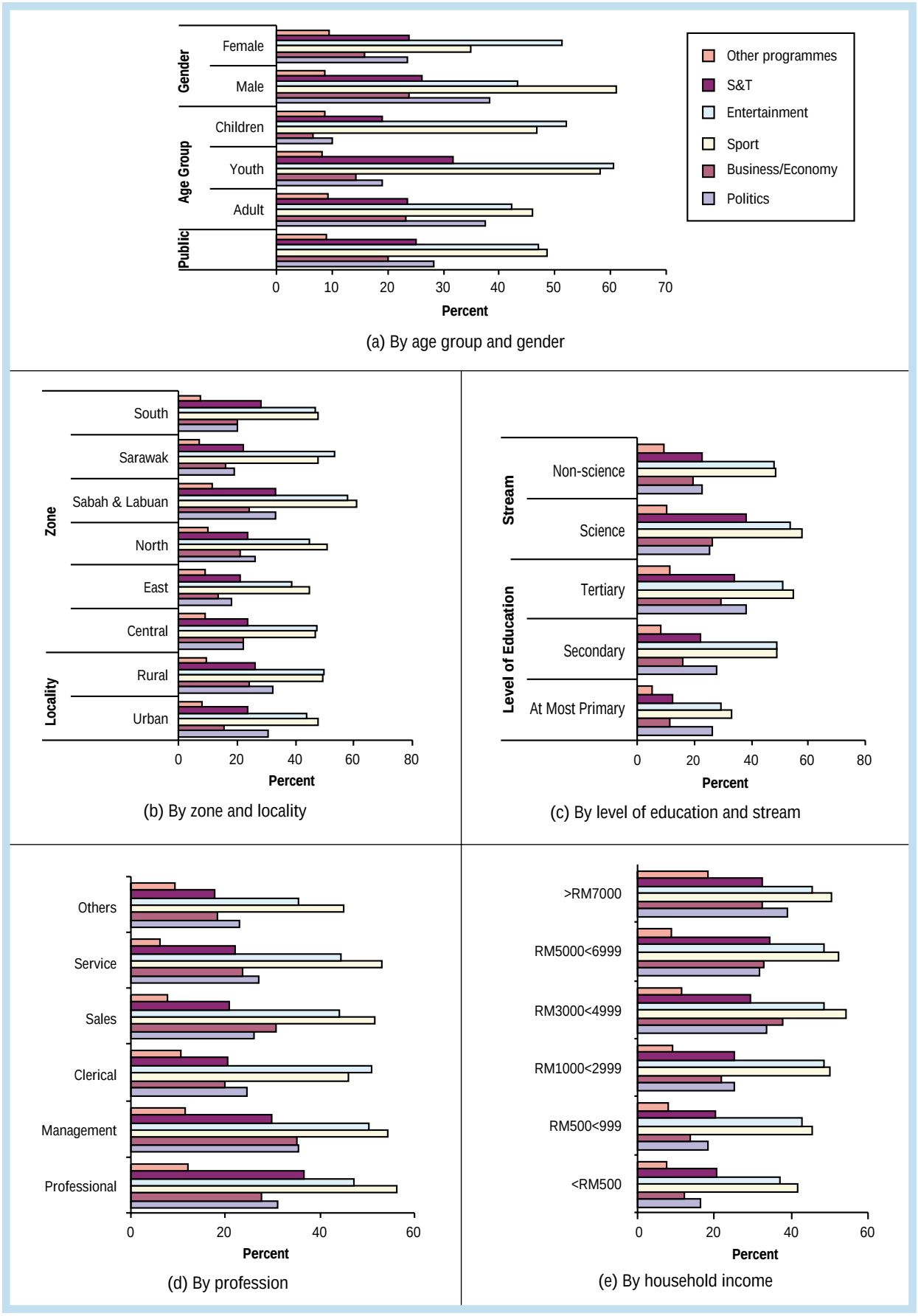
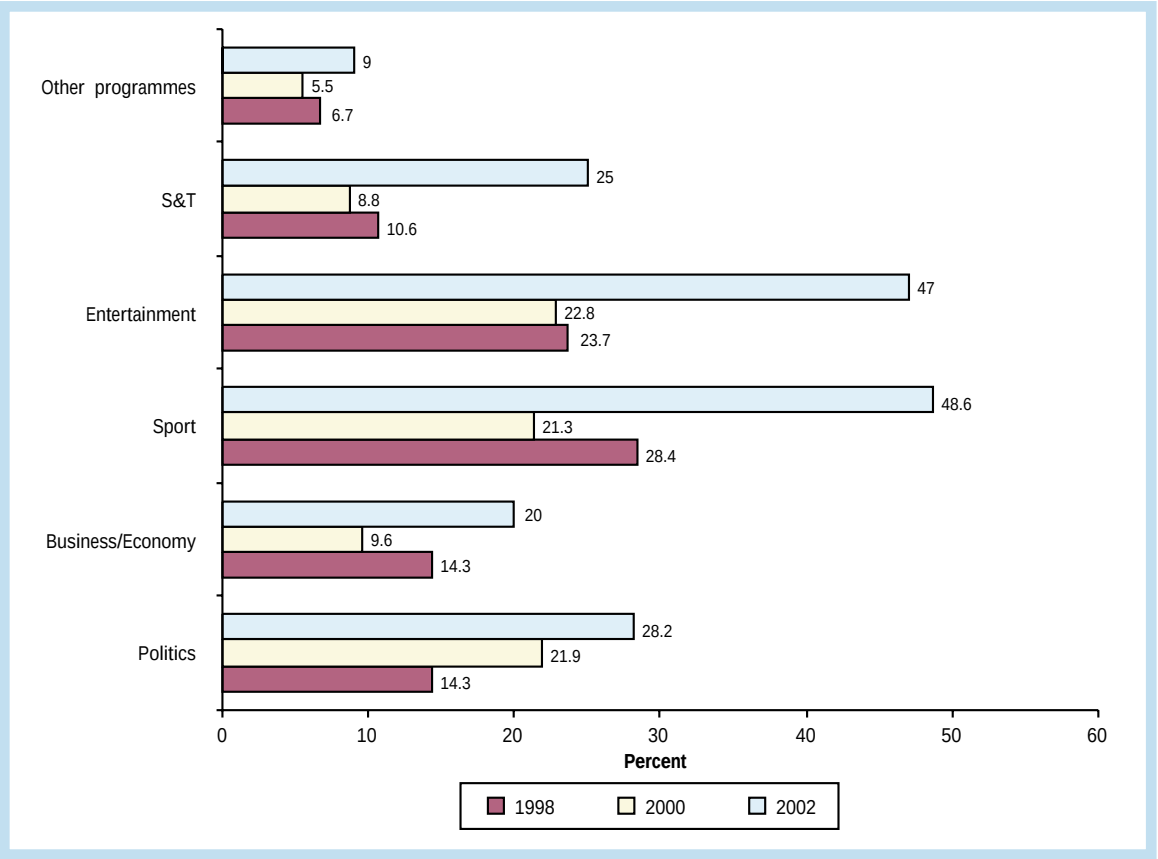


Figure 44: Most Read International Items in Newspapers – Series Data



MOST LISTENED RADIO PROGRAMMES

Radio was used mainly for entertainment and news as the following shows:

- About 85% for entertainment
- About 50.3% for news
- Less than 30% for religious and sports programmes

The radio was least used as a source of general knowledge. The use of radio as a source of entertainment had always been high since 1998 and the percentage had been continuously increasing. Back in 1998 and 2000, the respondents had not been using the radio to listen to news. In 2002, the scenario had changed drastically when this study recorded an increase by about 40% of radio listeners listening to news. Similar pattern of increment in percentage, but by a smaller scale of listeners, was seen for religious and sports programmes (**Figure 45**).

MAGAZINES READERSHIP

Comparison of the various age groups shows more youths read magazines compared to children and adults as the following shows:

- Youths (79.8%)
- Children (69.3%)
- Adults (59.2%)

In terms of educational levels, more respondents with tertiary education read magazines compared to respondents with secondary education and primary education:

- With Tertiary education (79.5%)
- With Secondary education (66.7%)
- With Primary education (31%)

Figure 45: Most Listened Radio Programmes – Series Data

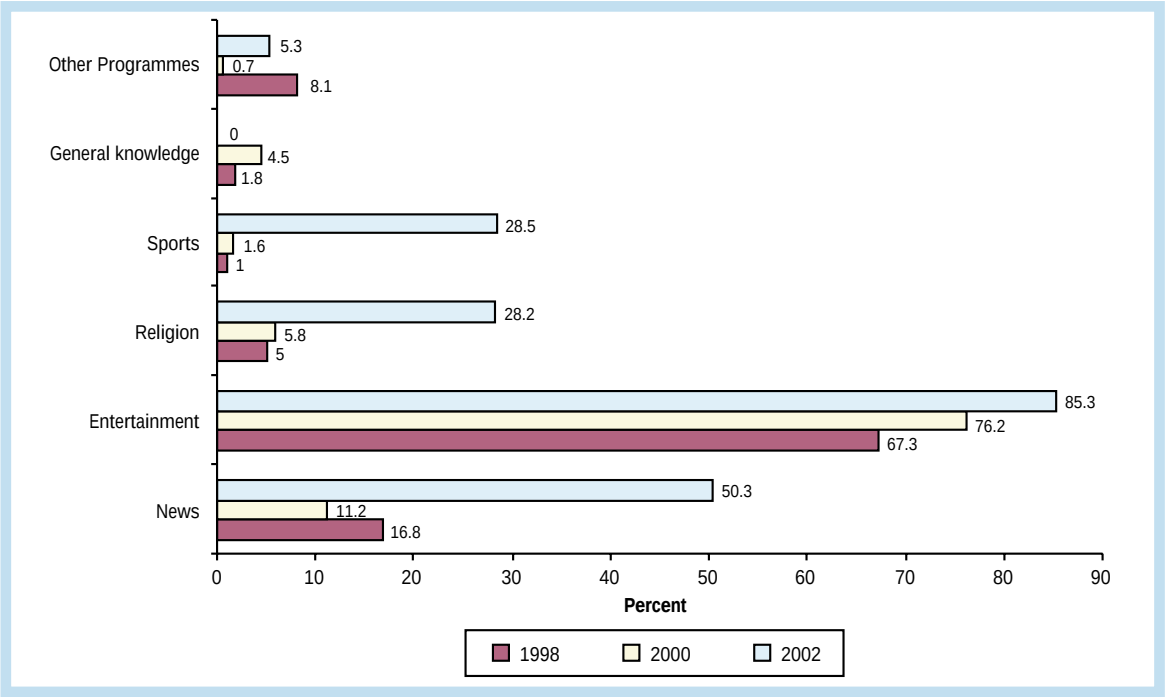
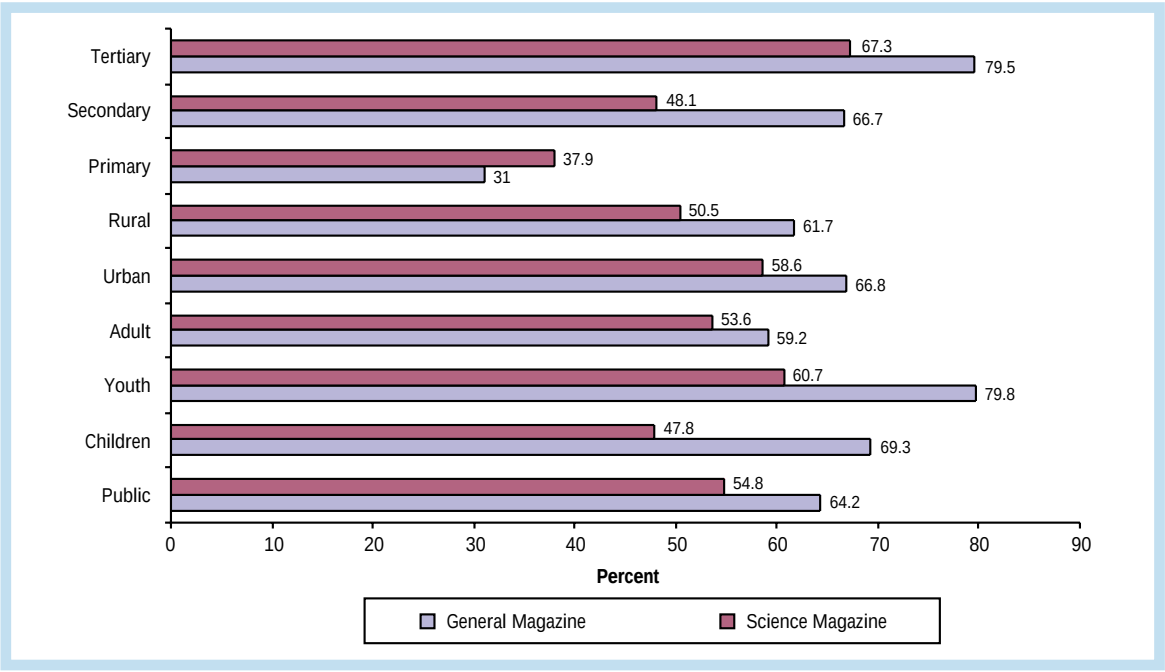


Figure 46: Magazines Readership by Selected Groups - 2002



As for locality, more urban respondents read magazines compared to rural respondents:

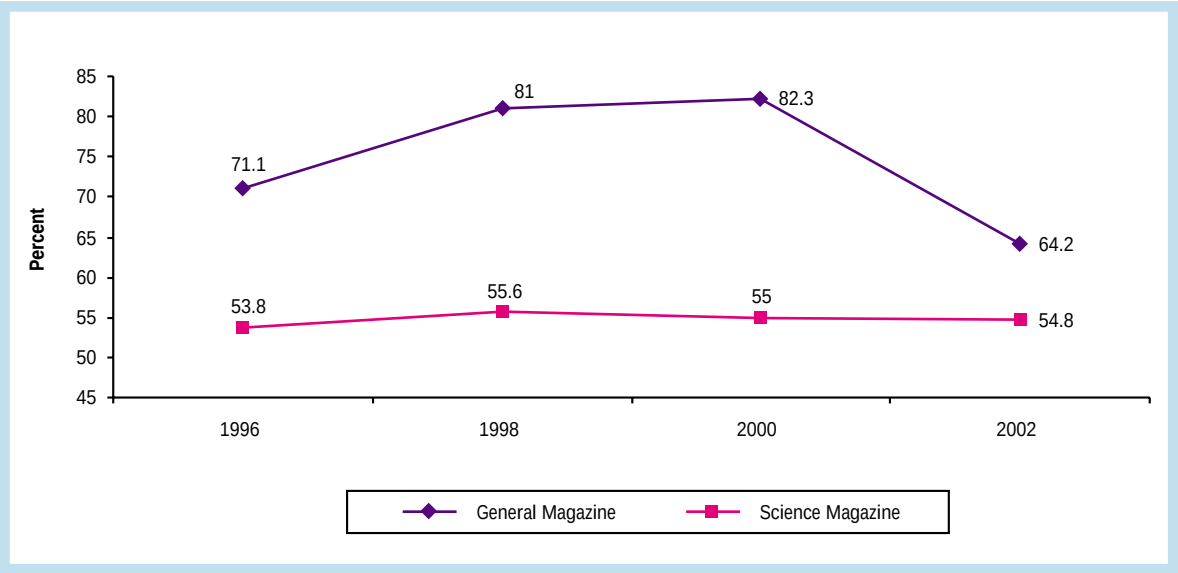
- Urban respondents (66.8%) read magazines including science magazines (58.6%)
- Rural respondents (61.7%) with 50.5% reading science magazines

Figure 46 illustrates the above in greater detail.

In addition to 83% of those with tertiary education and 75% of those with secondary education reading newspapers for S&T related information, about half of those with tertiary education also refer to:

- Magazines (57.3%)
- Internet (53.6%)
- Books (52.6%)

Figure 47: Magazines Readership by the Public – Series Data



Magazines readership has very much declined in the year 2002 after it was steadily increasing in year 1998 and 2000. The science magazine readership has however remained stabilised throughout the years since 1996 (**Figure 47**).

INTERNET USERS

In the year 2002, Internet users were mainly (**Figures 35, 36 and 37**):

- Those with tertiary level education
- Those in science stream
- Professionals or those at management level
- Those with high household income
- Youths
- Those staying in urban locality

In general, the Malaysian public accessed the Internet mainly from (**Figure 48**):

- Home (44.8%)
- Cyber Cafes (41.2%)
- Offices (25.8%)
- Institutions of higher learning (12%)
- Schools (11.6%)

Overall, the current study showed an increase in the percentage of respondents using the Internet i.e. from 40.2% (2000) to 43.9% (2002) (**Figure 36**).

TRUST LEVEL OF INFORMATION SOURCES

TV, followed by newspapers were the most trusted sources of S&T information. More than 70% of the respondents indicated their agreement. However, the trust level for TV and newspapers had been somewhat irregular over the years since 1996. The level of trust for TV was increasing in 1996 to 1998 but had markedly decreased in 2000 after which it went up again in 2002. A similar pattern was seen with newspapers. This pattern was in complete contrast to S&T publications, which were highly trusted in year 1998 and 2000 but not in 2002. Meanwhile, the trust level for radio had relatively stabilised somewhat at a lower percentage of about 50%. As for magazines and the Internet, the trust level appeared to have declined from one study to the other (**Figure 49**).

Figure 48: Locations where the Internet is Accessed From - 2002

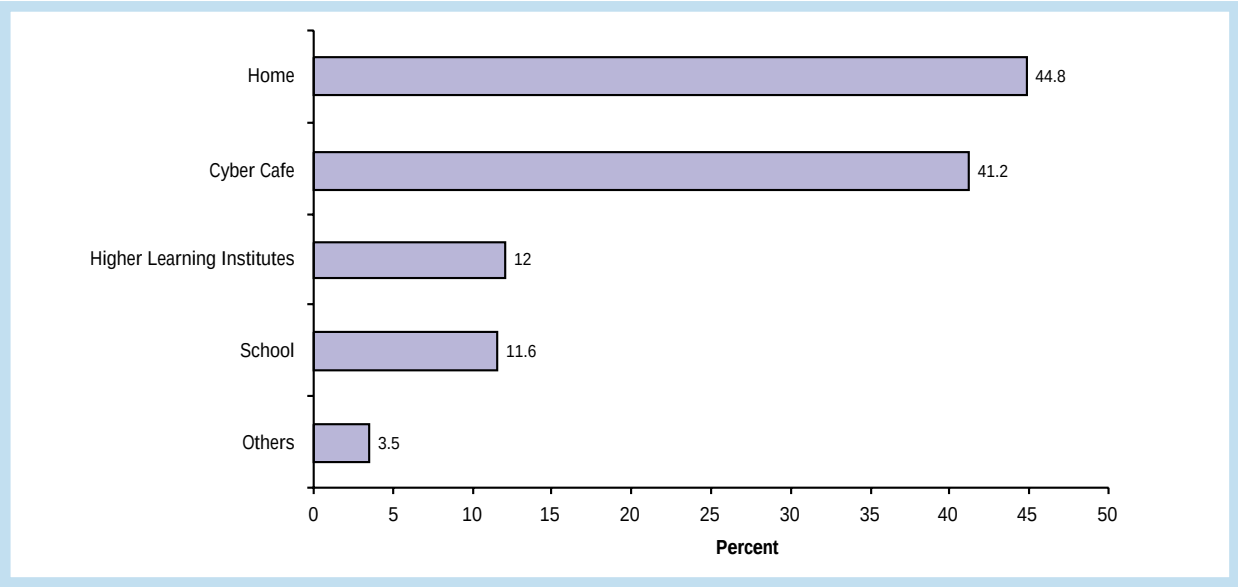
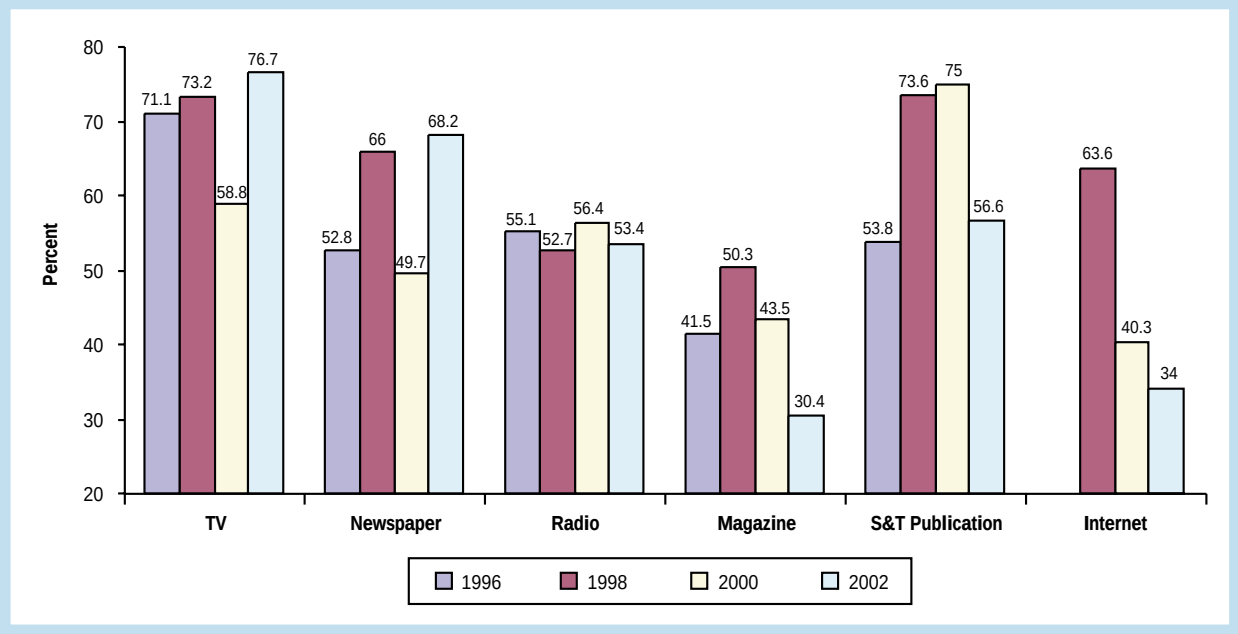


Figure 49: Level of Trust on Sources of Information on S&T – Series Data



VISITS TO PLACES OF INTEREST IN S&T

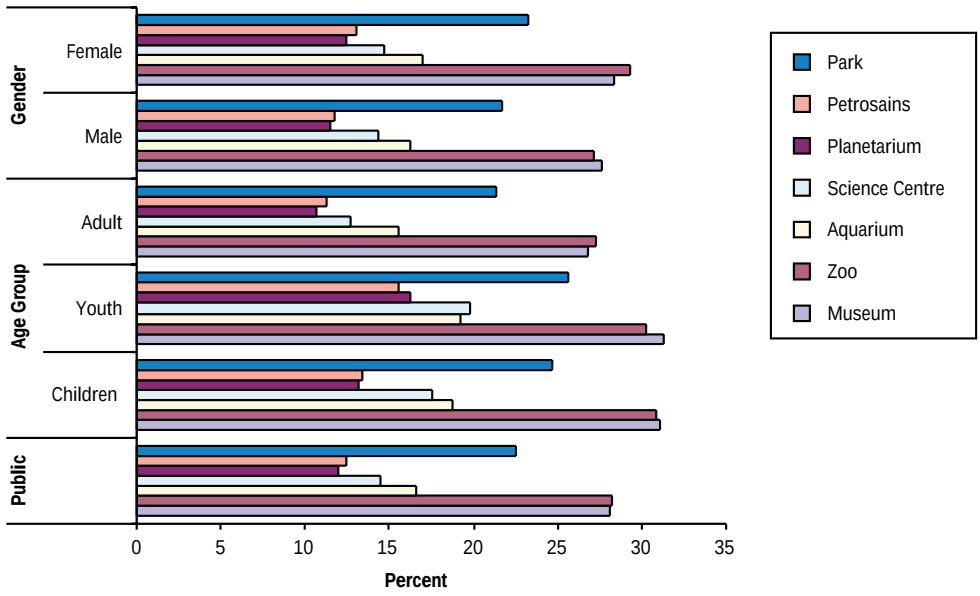
The most popular places visited were museums and zoos. However, the overall percentage of respondents who had visited these places were only around 30% (**Figure 50**). The order of popularity of the other places were science centre, followed by aquariums, parks, the Planetarium and Petrosains, as the following shows:

- Museums and zoos (30%)
- Science centre (about 20%
- Aquariums, parks, the Planetarium and Petrosains (about 15%)

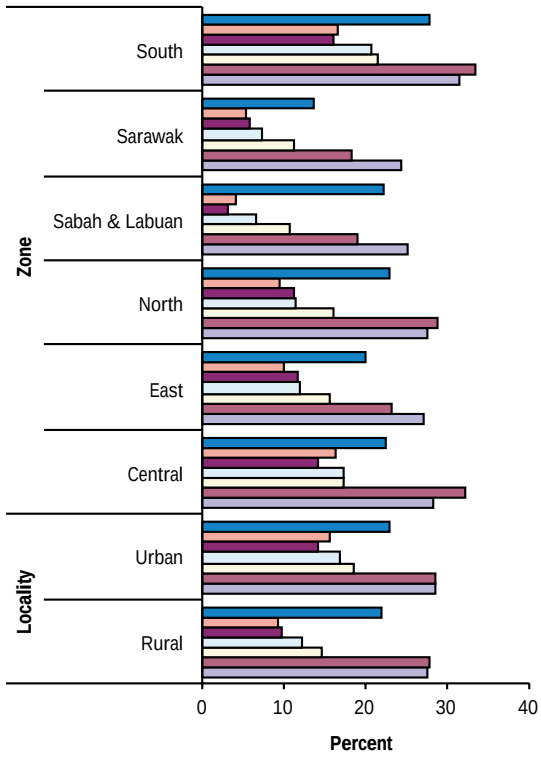
Factors that influenced the visits to these places were:

- age (highest being youths)
- level of education (highest being those with tertiary level education)
- type of occupation (highest among professionals and those at management level)
- household income (highest among those from the higher income group)

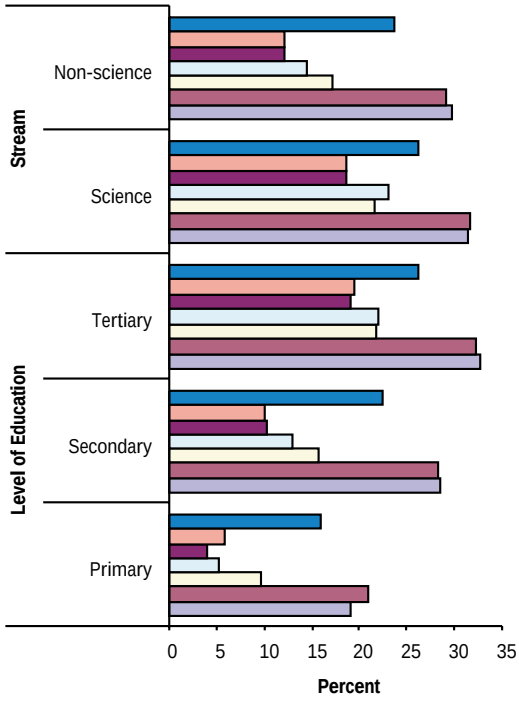
Figure 50: Percentage of Respondents who Have Visited Places of S&T Interest at Least Once - 2002



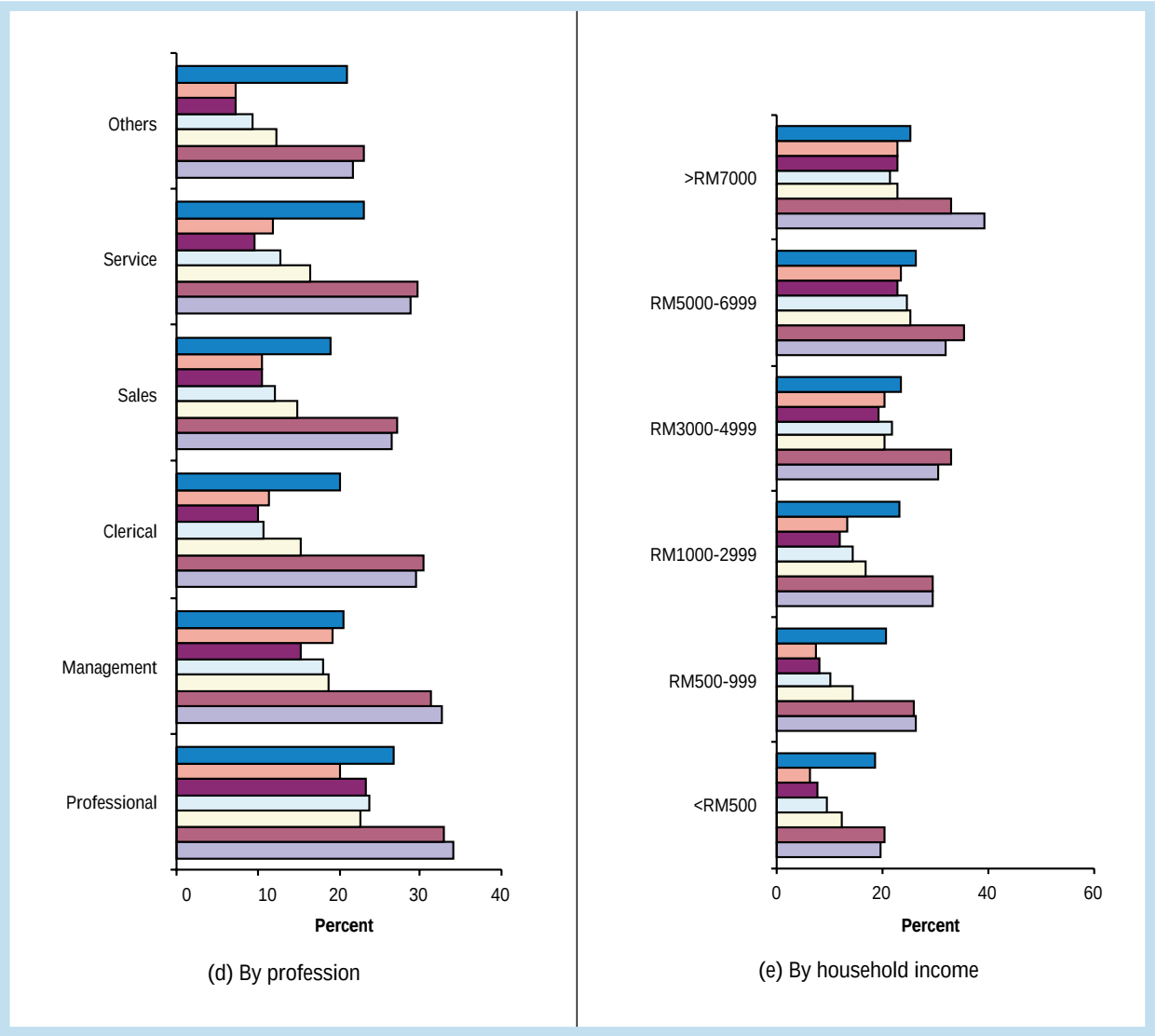
(a) By public, age group and gender



(b) By zone and locality



(c) By level of education and stream



The possible reason for the low visits to these places was the distance. More than 80% agreed that science centres and museums were far from the residential areas (**Figure 51**). Because of distance, it is understandable why visits to these places strongly correlated with household income.

Infrastructure and Facilities

Based on where S&T facilities were located, the most available S&T facilities at home were:

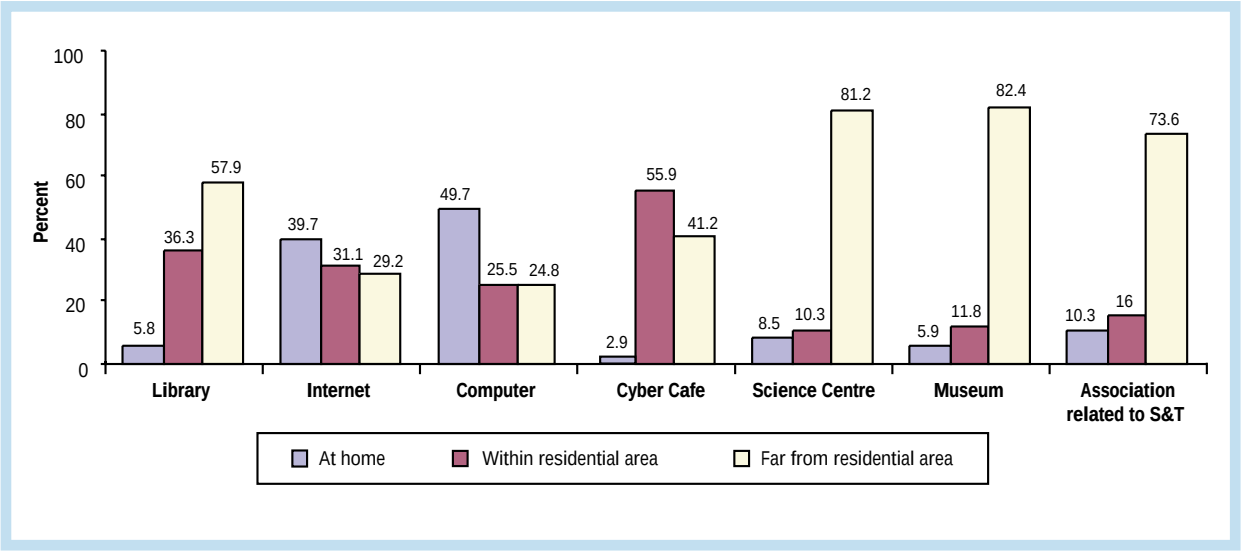
- Computers (49.7%)
- Internet (39.7%)

Facilities available within residential areas were:

- Cyber cafes (55.9%)
- Library (36.3%)
- Internet (31.1%)

Only about 5.8% of the respondents had libraries in their homes, an indication that book collection was not generally practised among Malaysians (**Figure 51**).

Figure 51: Location of S&T Facilities – 2002



The least available facilities were:

- Associations related to S&T (32.9%)
- Science centres (35.6%)
- Museums (44%

Facilities considered by respondents to be far from their homes were:

- Museum (82.4%) Science centre (81.2%)
- Related S&T association (73.6%)
- Library (57.9%)
- Cyber cafes (41.2%)

S&T Programmes

Overall, there are only four out of 18 government S&T sponsored programmes with percentage awareness that lies within the 40% range. These programmes were:

- Exhibition on invention and research findings (42.7%)
- S&T publicity (42.5%)
- S &T awareness seminar for students (43%)
- S&T quiz (41.6%)

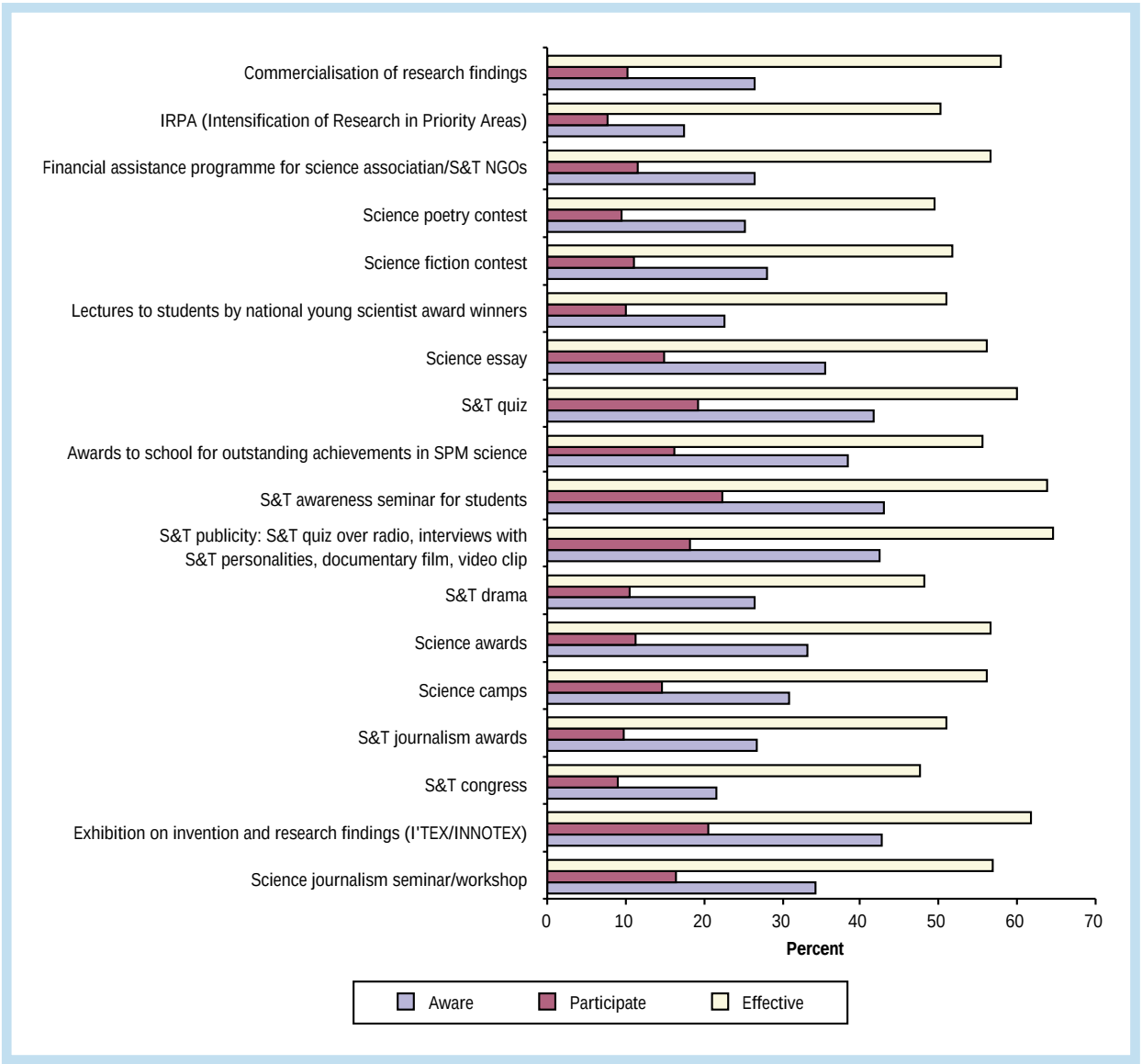
The least percentage of awareness was for IRPA programme at only 17.4%. The percentages of people who were aware of all these programmes were in the range of 15 to less than 45% (**Figure 52**).

Out of those who were aware of S&T programmes, less than 20% participated in them. The programmes with the highest percentage of participation were exhibition on invention and research findings and S&T awareness seminar for students.

Programmes that were least known to the respondents were:

- IRPA
- Lectures to students by national science award winners
- Science fiction and science poetry contest
- S&T congress
- Commercialisation of research findings

Figure 52: Percentage of Awareness, Participation, Effectiveness of S&T Programmes - 2002



However, among those who participated in these programmes, between 50-65% of them agreed that these programmes were indeed effective in making them more aware of S&T.

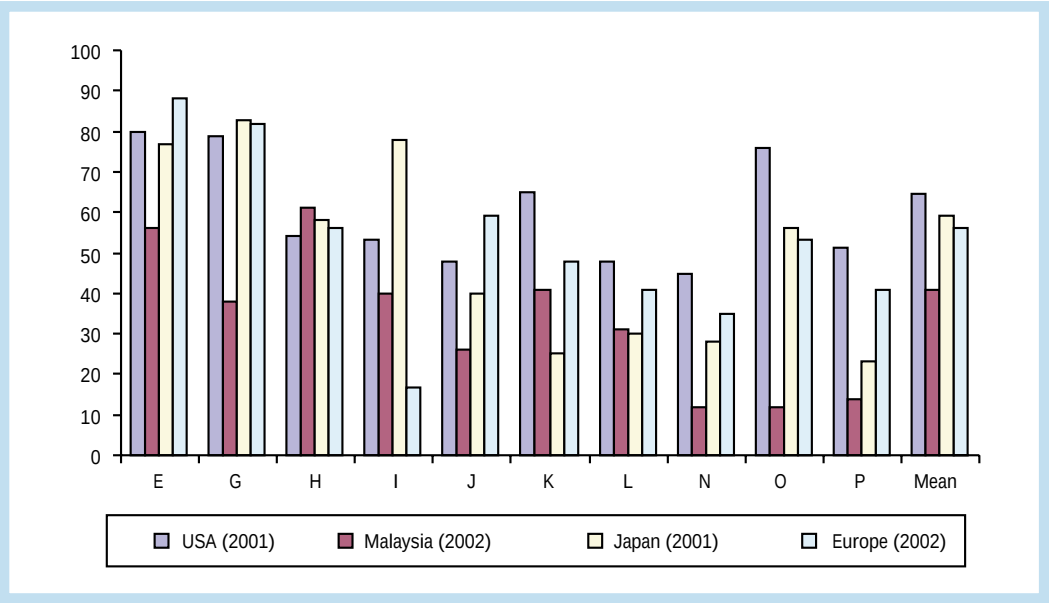
International Comparisons

An international comparison is made between Malaysia and selected countries or continents like USA, Europe, Japan and South Africa. Comparisons are made on the following broad items:

- S&T concepts and terms at content level
- Knowledge level which leads to the determination of knowledge index
- Perception of interest and knowledge regarding S&T issues
- Main sources of information
- Most watched programmes

Current data for these selected countries were obtained from the Science Engineering Indicators 2002 of USA, the Euro barometer 55.2, the Japanese Report of Public Understanding of Science and Technology (year 2001) and similar article on Public Understanding of Science and Technology in South Africa (year 1999).

Figure 53: Percentage of Correct Answers to Selected S&T Terms and Concepts for Selected Countries



E. The centre of the earth is very hot (true)
G. The continents we are on have changed their locations in the past few million years and will continue to move in the future (true)
H. The earth takes one year to revolve round the sun (true)
I. Man as we know him today originated from an earlier animal species (false)
J. The first men lived at the same time as the dinosaurs (false)
K. The father's gene determines whether a foetus will be born a girl or a boy (true)
L. Electrons are smaller than atoms (true)
N. Lasers function by combining sound wave (false)
O. All radioactivities are man-made (false)
P. Antibiotics kill not only viruses but also bacteria (false)

Note: Alphabets correspond with those used in the study questionnaire.

To make the comparison meaningful, analysis is based on the same test items that are being used by the countries concerned. As such, the results of the analysis give some indication of S&T awareness in Malaysia compared to these countries. A point to note is that the countries used for this study represent the developed West (USA and Europe), the developed East (Japan) and the developing country of South Africa. As the studies were carried out independently in each of the countries, the set of questions are therefore not the same and thus comparison is only based on selected items that are thought to be common. Furthermore, the data used for analysis is restricted to materials for adults only.

S&T TERMS AND CONCEPTS

Of the 15 test items on S&T used for the Malaysian study, only 10 of them can be used for international comparison. The percentages of correct answers for these items are as illustrated in **Figure 53**.

The figure shows that the mean percentages of correct answers for adults are:

- 64.4% for USA
- 58.9% for Japan
- 53% for Europe
- 40.8% for Malaysia

Overall, Malaysia scored comparatively low in the understanding of S&T terms and concepts. The Americans scored more than 60% in five items, Japanese in three items, Europeans in two and Malaysians in only one item. Thus the understanding of S&T among people of these developed countries can be said to be comparable between one another.

Figure 54: Comparative Distribution of S&T Total Marks for Malaysia and Europe - 2002

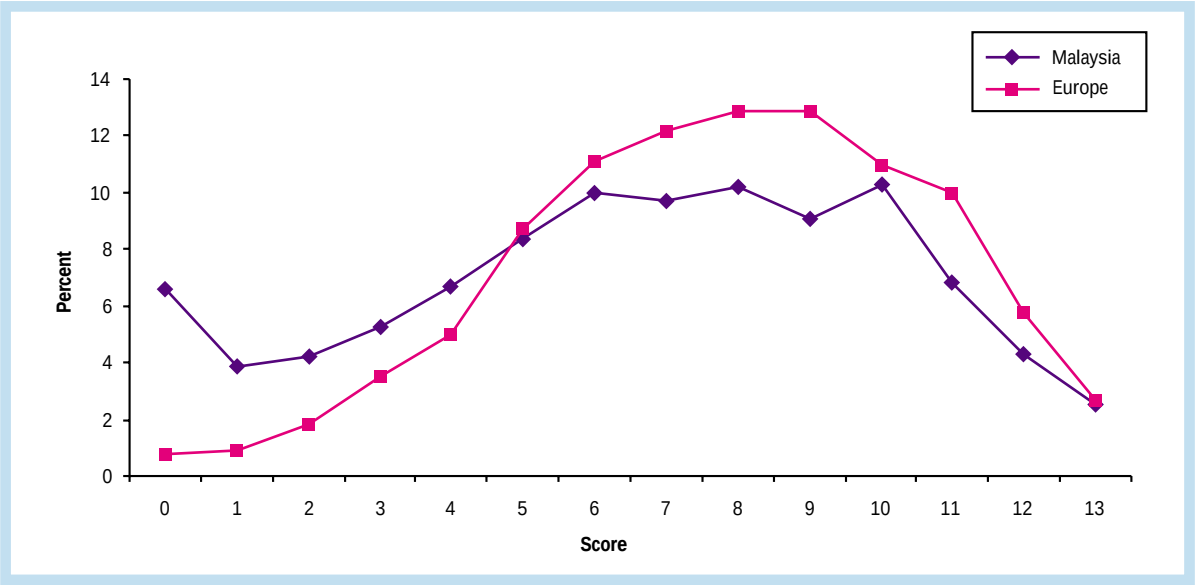
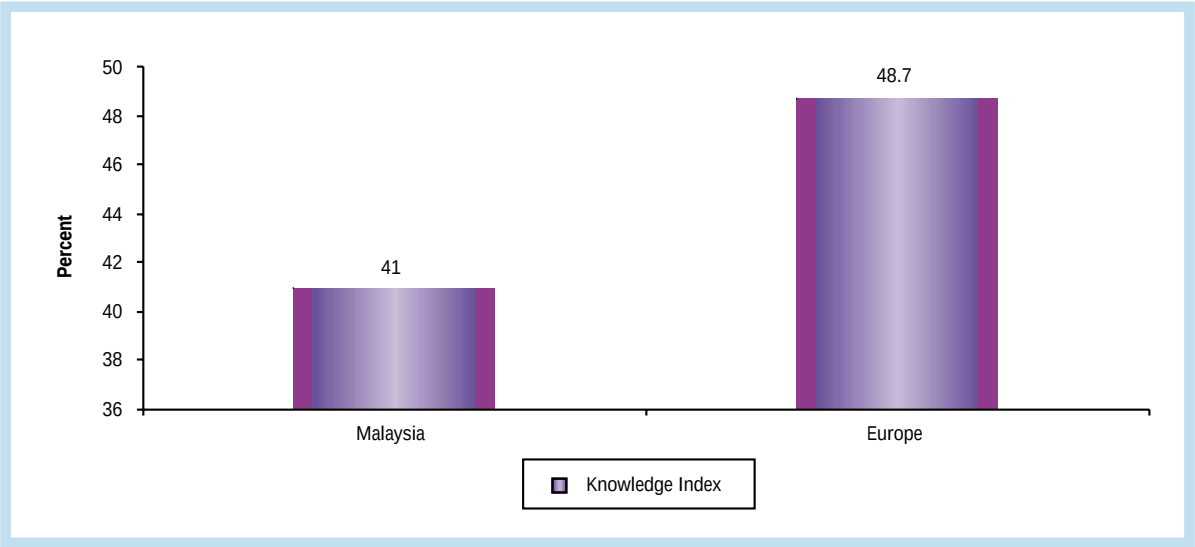


Figure 55: S&T Knowledge Index for Europe and Malaysia - 2002



COMPARATIVE DISTRIBUTION OF S&T TOTAL MARKS

The scores individuals in Malaysia and Europe obtained in comparative frequency distribution of S&T is summarised in **Figure 54**. The maximum score is 13. The scores by Malaysians are mostly lower than those scored by Europeans. Based on these figures, the knowledge index is found to be 41 for Malaysia and 48.7 for Europe (**Figure 55**).

MEAN PERCENTAGE OF S&T CORRECT ANSWERS

For the temporal trend of public understanding of S&T terms and concepts, data is available only for USA and Malaysia. The overall percentages of correct answers remain within the 60-65% range for the Americans. It was initially high in 1995 but dropped to about 61% in 1997 after which it continued to improve gently and progressively over the years (**Figure 56**). For the Malaysian public, it seemed to increase from year 1996 to year 2000 until it dropped to 48% in 2002. Thus the gap in knowledge about S&T terms and concepts between Malaysians and Americans was apparently decreasing in 1996 through 2000, but widened greatly in 2002.

Figure 56: Mean Percentage of S&T Correct Marks for USA & Malaysia

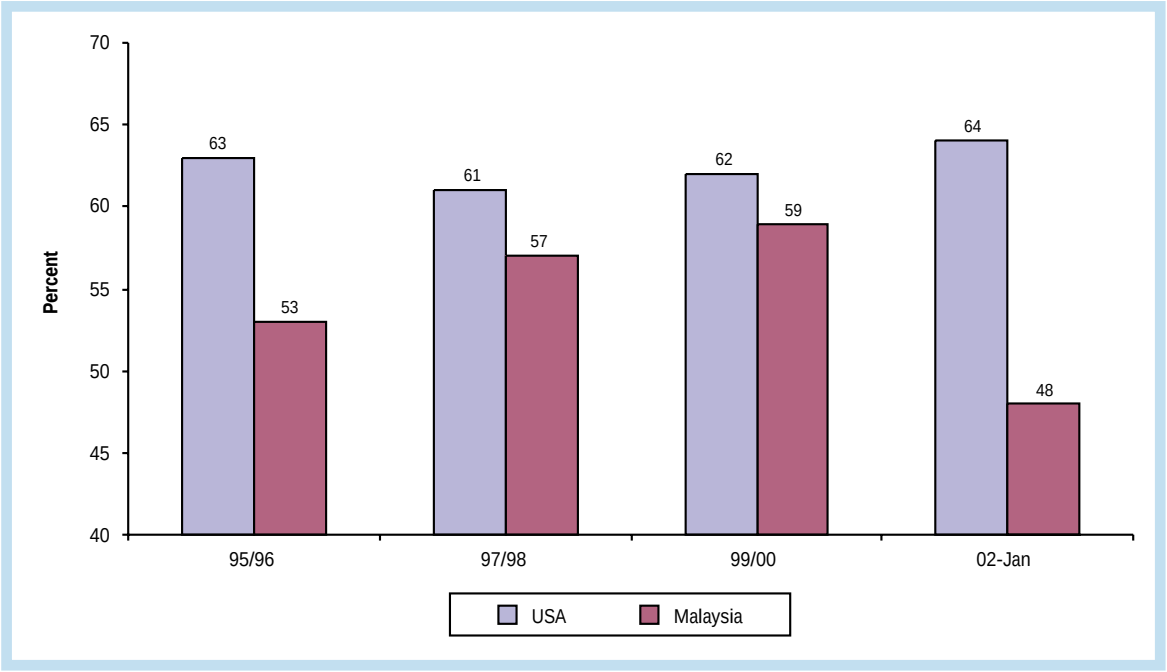
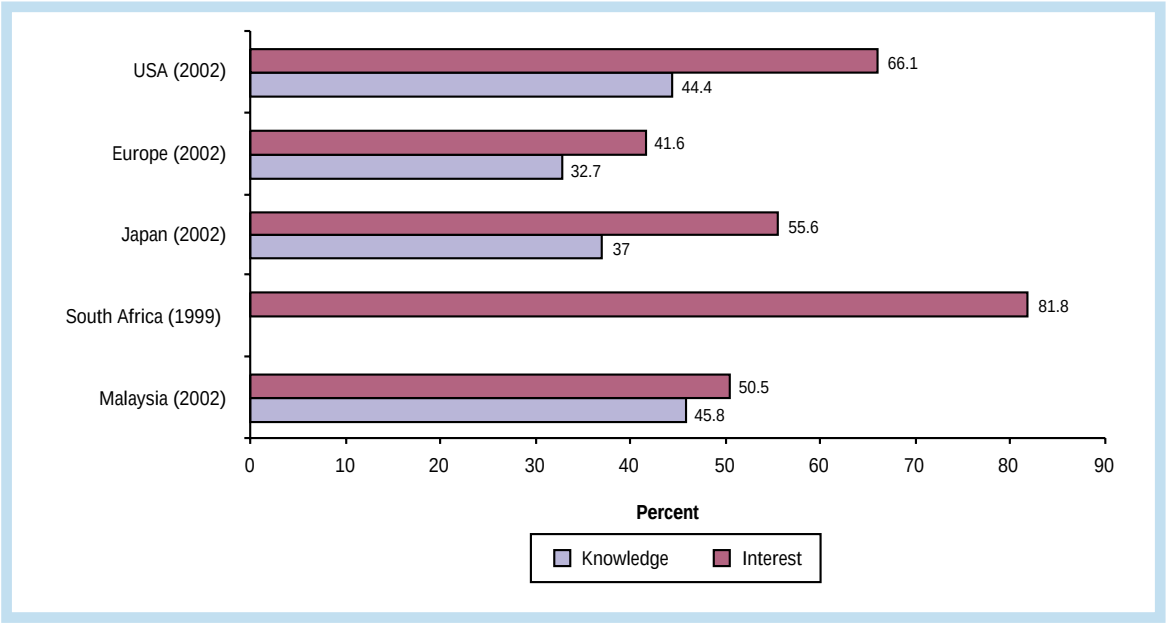


Figure 57: Perception on Knowledge and Interest for Selected Countries



Data on the interest for South Africa is not available

PERCEPTION ON S&T KNOWLEDGE AND INTEREST

Another parameter that can be used to describe public understanding towards S&T is the perception on knowledge and interest. Items regarding knowledge and interest of general and S&T issues which have been considered for international comparison are:

- Education policy
- Discovery of science and medicine
- Economy and business
- Aerospace exploration
- Pollution
- Invention of new technology

Figure 57 summarises the perception towards knowledge and interest in Malaysia, South Africa, Japan, Europe and USA.

It was clear from the figure that there were fewer Malaysians than Americans and Japanese who were interested in the selected issues. Compared to Europe, there were more Malaysians than Europeans who were interested in the selected issues. However, when it comes to perception on knowledge, the percentage for Malaysia appeared relatively higher than that for the other countries. The percentages of Malaysians who were perceived to be knowledgeable and interested were about the same but this is not the case in USA, Europe and Japan where the interest level is significantly higher than the knowledge level. This is an interesting point to note. It looks as though people from countries that are advanced in S&T tend to know less about the subject matter while their interests in S&T are high. What can be questioned is why the difference between the level of S&T perceived knowledge and interest among Malaysians appear to be relatively smaller than the differences experienced by the other countries. Is it the difference in the two values rather than the absolute values of perceived knowledge and interest that characterise development in a given country?

The level of perceived interest is always higher than the level of perceived knowledge. The level of both perceived interest and knowledge in Malaysia appears to be relatively close and is slightly higher than the level in Japan and Europe.

MAIN SOURCES OF S&T INFORMATION

Regarding sources of information, **Figure 58** shows that Malaysia, Europe and USA have the same pattern of popularity for the three major sources of information: TV, newspapers and radio. It is interesting to note that the pattern reverses for South Africa. This may be attributed to TV not being easily available to South African society and that the South Africans rely a lot more on the radio for their primary source of information. Another

Figure 58: Main Sources of S&T Information for Selected Countries

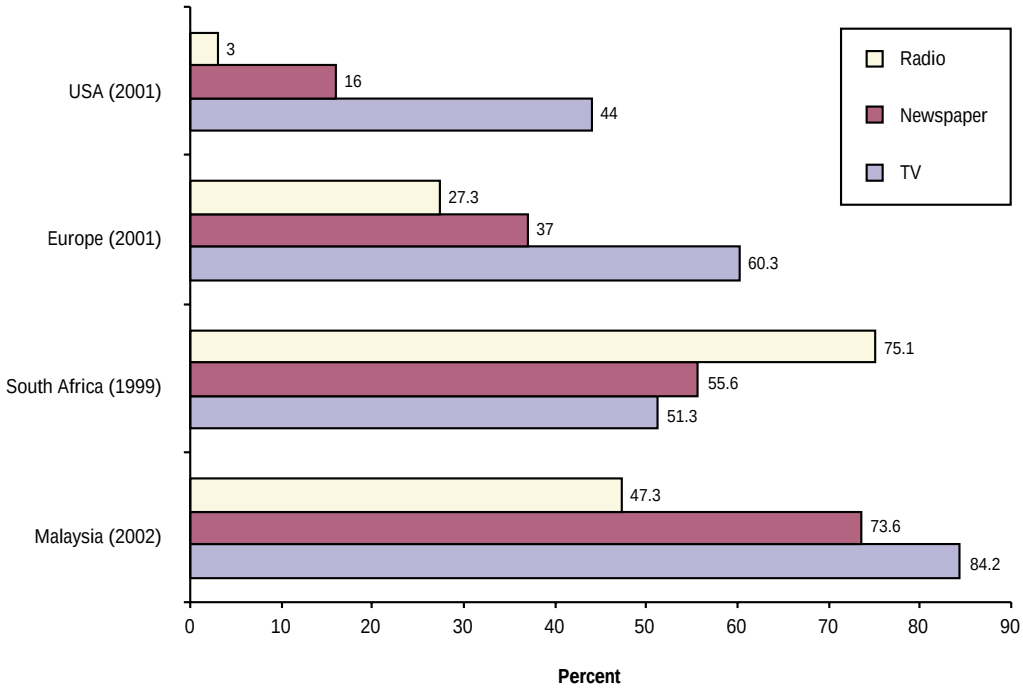
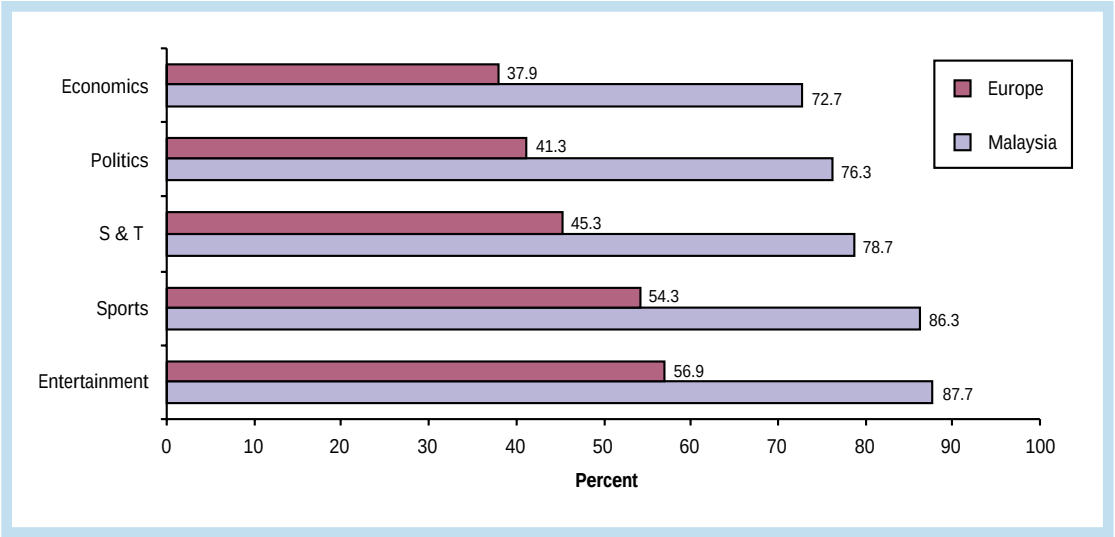


Figure 59: Most Watched Programmes in Malaysia and Europe - 2002



noticeable feature is that the percentage of viewers and listeners are higher on the Malaysian side compared to Europe and USA. The figure also shows that Americans similarly watched TV more often than listening to radio or reading newspapers.

MOST WATCHED PROGRAMMES

As for the most watched programmes, **Figure 59** summarises the choice of programmes that Europeans and Malaysians prefer. On the whole, the pattern of programme selection is the same for both Europe and Malaysia. It is in the following order:

- Entertainment
- Sports
- S&T
- Politics
- Economics.

A clear difference is the percentage of people who watch these programmes with Malaysia (72.7 to 87.7%) having a larger percentage of people watching TV compared to Europe (37.9 to 56.9%). It looks as though that Malaysians are more visually oriented compared to Europeans.