



PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA

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**Under Secretary
MASTIC**

Preface

Report on the Public Awareness of Science, Technology and Innovation Malaysia 2014, by the Ministry of Science, Technology and Innovation (MOSTI) represents a sustained and continuous effort by the Malaysian government to gauge the level of public awareness and interest in science, technology and innovation (STI) in Malaysia.

The Malaysian Science and Technology Information Centre (MASTIC) of MOSTI has been conducting national surveys of Malaysian public awareness of science and technology bi-annually from 1994 to 2004, and also in 2008. For the 2014 survey, the subject of innovation has been included as it represents an important facet of modern development.

The 2014 Public Awareness Survey of Science, Technology and Innovation (hereinafter 2014 STI Survey) was carried out between December 2013 and April 2014. It was undertaken with expert advice from the Department of Statistics Malaysia and close collaboration with other government agencies.

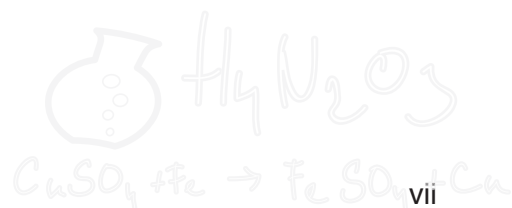
Personal visits were made to 1,500 households selected randomly across Malaysia's 13 states and three (3) Federal Territories. Face-to-face interviews were carried out. After deducting the non-valid and ineligible cases, a total of 1,103 households were considered as valid units and it yielded a sample of 2,653 respondents. This is a probability survey which has achieved a high level of accuracy, i.e., Relative Standard Error (RSE) of 2.71%. Details of the survey are contained in the technical sections of this report.

Understanding of the public's awareness and knowledge of science, technology and innovation (STI) helps in planning efforts to reach our development goal of becoming a high-income economy by 2020. Malaysia believes that STI is the basis on which our country can compete in an increasingly globalised and technology-driven world. Various programmes, policies and plans are being formulated to reach that goal which requires a combination of physical, economic and social components.

An important component of the development goal is of course a scientifically literate society. Scientific literacy would help raise the capacity of our people to make the best use of science and technology in the economic sphere of their lives, and enable an understanding of the world around them so that they can live more fulfilling lives. Those who are scientifically literate would be able to keep up with science news and debates, and participate in science related policy matters. They would be able to engage in continuous learning which is essential in a world that is becoming more competitive, globalised and challenging. Everyday new products hit the market with greater amounts of technology; and those who are scientifically literate would be able to use them effectively, adjust to this situation better, and with greater ease.

The progress of our nation can only be sustained insofar as its human capital can match its economic aspiration. For this goal, acculturation of scientific knowledge and innovative thinking as a way of life is the way forward for Malaysians, as we lay the foundations for a high-income and knowledge-based economy.

**Malaysian Science and Technology Information Centre (MASTIC),
Ministry of Science, Technology and Innovation (MOSTI)
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List of Acronyms

ACRONYM	DESCRIPTION
AIM	<i>Agensi Inovasi Malaysia</i> (Malaysia Innovation Agency)
APCTT	Asian and Pacific Centre for Transfer of Technology
BBVA	<i>Banco Bilbao Vizcaya Argentaria</i>
CEPA	Communication, Education, and Public Awareness
CETREE	Centre for Education and Training in Renewable Energy and Energy Efficiency
DOSM	Department of Statistics Malaysia
EB	Enumeration Block
EU	European Union
GM	Genetically Modified
GSS	General Social Survey
ICT	Information and Communications Technology
ISSP	International Social Survey Programme
KL	Kuala Lumpur
KLIF	Kuala Lumpur Innovation Forum
KOFAC	Korea Foundation for the Advancement of Science and Creativity
LQ	Living Quarter
MAHA	Malaysia Agriculture, Horticulture & Agrotourism Show
MASTIC	Malaysian Science and Technology Information Centre
MCMC	Malaysian Communications and Multimedia Commission
MI	<i>Malaysia Inovatif</i> (Innovative Malaysia)
MIMOS	Malaysian Institute of Microelectronic Systems
MOSTI	Ministry of Science, Technology and Innovation
MPC	Malaysia Productivity Corporation

List of Acronyms

MSC	Multimedia Super Corridor
NBP	National Biodiversity Policy
NGO	Non-governmental Organisation
NICE 2012	National Innovation Conference & Exhibition 2012
NORC	National Opinion Research Center, University of Chicago
NSB	National Science Board, USA
NSC	National Science Centre, USA
OECD	Organisation for Economic Co-operation and Development
OIP	Open Innovation Platform
OJT	On-the-Job Training
OKU	<i>Orang Kurang Upaya</i> (Persons with Disabilities)
RSE	Relative Standard Error
S&T	Science and Technology
SE	Standard Error
SGI2012	<i>Tahun Sains dan Gerakan Inovasi Nasional</i> 2012 (Year of Science and National Innovation Movement 2012)
SPM	<i>Sijil Pelajaran Malaysia</i> (Malaysian Certificate of Education)
SPSS	Statistical Package for the Social Sciences
STI	Science, Technology and Innovation
TOR	Term of Reference
TPSM	<i>Tahun Penggalakan Sains dan Matematik</i> (Science and Mathematics Year)
UK	United Kingdom
USA	United States of America
WIF	World Innovation Forum
YIM	<i>Yayasan Inovasi Malaysia</i> (Malaysian Foundation for Innovation)

Executive Summary

Interest in STI

Overall, Malaysians were interested in STI and only a small percentage were unsure or did not know much about STI.

- Most respondents (84% of them) stated that they were *interested* or *very interested* in “the use of new inventions and technologies”, followed by “new medical discoveries” (79%), “innovation” (78%) and “new scientific discoveries” (76%).
- In contrast, 25% of respondents were *not interested* in “environmental pollution”, followed by “renewable energy” (22%) and “new scientific discoveries” (21%).
- The level of interest in STI is positively related to the educational attainment of the respondents.
- Compared to 2008 findings, the percentage of *very interested* responses in selected STI related issues had more than doubled in 2014.
- In comparison to the USA and EU, Malaysian respondents showed the lowest level of interest in STI issues. On average, 78% of Malaysian respondents were *interested* STI compared to 89% in the USA and 83% in the EU.

Knowledge of STI

Less than half of all respondents (46%) were able to correctly answer the factual knowledge questions in the 2014 survey.

- The public’s average knowledge levels of STI hovered below 50% over the past 16 years (1998 till 2014).
- Most Malaysians correctly answered “the earth travel around the sun” (85%) and “the centre of the earth is very hot” (75%).
- In contrast, very few Malaysians correctly answered “antibiotics kill viruses as well as bacteria” (16%) and “all radioactivity is man-made” (20%).
- More urban respondents (48%) answered the factual knowledge questions correctly compared to rural respondents (39%).
- Male respondents (49%) had a higher percentage of correct answers than female respondents (43%).
- The youth group (51%) had a higher percentage of correct answers than adult (46%) and children’s group (36%).
- There is positive correlation (Pearson’s $R = 0.299$) between educational attainment and correct answers to the STI statements.
- Malaysia’s public knowledge of STI is lower than USA (as of year 2014), EU (as of year 2005), Japan (as of year 2011) and South Korea (as of year 2004).
- Nevertheless, Malaysia is on par with India (as of year 2004) and marginally better than China (as of year 2010).

Attitudes towards STI

Public attitudes towards STI were seen to be more positive in 2014 than in 2008. More than half of all respondents (53%) in the 2014 survey said that scientific research was more beneficial than harmful.

- About 33% said it was equally beneficial as well as harmful, 4% thought that scientific research did more harm than good, while 10% were not sure.
- Compared to year 2008, the percentage of respondents who agree that scientific research has done “more good than harm” declined from 74% to 53% while the response of “more harm than good” had always remained at below 10%. Most respondents have either become more sceptical or less sure that scientific research had generated more positive or more negative effects.
- The percentage of Malaysians who believe that scientific research had greater benefits was relatively lower than the percentage of respondents in USA and EU, but, it was about the same with the UK.
- Compared to USA (42%), more Malaysians (81%) agreed that “science caused our lifestyles to change too fast”. Similarly 95% of Malaysians agreed with the statement “STI are very important for the progress of our nation” while only 42% of USA respondents and 62% of EU respondents shared the same view.
- There are no notable differences between Malaysia (42%), USA (42%) and EU (39%) relating to the statement “we depend too much on science and not enough on faith”.
- Most of the respondents believed science have more positive effects over the negative effects for the issues of “public healthcare” (79%), “job creation” (78%), “working conditions”(70%), “lifestyle” (68%), “food security” (66%), “environment” (66%), “cost of living” (63%) and “world peace” (54%).

STI Information Sources

Television was the most popular media in Malaysia, and 89% of respondents also used it as the source of information for learning STI.

- The next most popular media for information related to STI was print newspapers (63%), followed by internet (53%), radio (43%), books (39%) and print magazines (24%).
- In terms of the most reliable source of information for STI, about half of the respondents (49%) picked television, followed by internet (19%), print newspapers (13%) and books (9%).
- Surveys in the EU, UK and Taiwan indicated television to be the primary source of STI information for the public, except for USA where the primary source of STI information was the internet.

Zoos (31%) and museums (23%) were the two most popular STI related places.

- About 13% of respondents had made at least one visit in last 12 months to aquariums, 10% of respondents had visited PETROSAINS, 7% had visited the National Science Centre, and 7% had visited planetariums.
- Malaysian public engagement with informal STI venues are comparable to countries like the UK and South Korea, but were lower than the USA, China and Taiwan.

Awareness of STI related Government Programs and Policies

At least one in four of respondents had heard of STI related government programmes.

- Most of the programmes had a low participation rate of below 2%.
- About one third of the respondents felt the government spend too little to support scientific research.

Key STI Indicators for Years 2008 and 2014

Public Interest (Very Interested) in Selected STI related Issues	2008	2014	Difference (2014 - 2008)
	Percent (%) answering <i>very interested</i>		
The use of new inventions and technologies	10.1	23.3	13.2
Innovation	9.4	17.5	8.1
New medical discoveries	5.9	16.6	10.7
Environmental pollution	7.2	15.7	8.5
New scientific discoveries	4.0	12.4	8.4
STI in Malaysia	6.7	12.0	5.3

Public Knowledge of Scientific Concepts and Statements	2008	2014	Difference (2014-2008)
	Percent (%) giving correct answer		
Antibiotics kill viruses as well as bacteria (False)	7.6	15.5	7.9
All radioactivity is man-made (False)	14.0	20.2	6.2
Lasers work by focusing sound waves (False)	15.5	30.3	14.8
Electrons are smaller than atoms (True)	33.0	35.0	2.0
It is the father's gene that determines the gender of the baby (True)	39.5	45.2	5.7
The continents have been moving their location for millions of years and will continue to move (True)	44.4	61.8	17.4
The centre of the earth is very hot (True)	66.0	74.7	8.7
The earth travels around the sun (True)	72.6	84.9	12.3
Average percent of questions answered correctly	36.6	46.0	9.4

Public Assessment of Scientific Research	Assessment of Scientific Research outcomes:		
	More good than harm	More harm than good	Equal/Not sure
	Percent (%)		
2008	73.8	8.0	18.2
2014	52.9	4.2	42.9
Difference (2014-2008)	-20.9	-3.8	24.7

Attitudes towards Science and Technology	2008	2014	Difference (2014-2008)
	Percent (%) answering <i>agree</i> and <i>strongly agree</i>		
Science, Technology and Innovation improve the quality of our lives.	84.3	91.8	7.6
We depend too much on science and not enough on faith.	39.2	41.8	2.6
Scientific research increases knowledge although it does not produce immediate benefits.	59.7	81.4	21.7
Science causes our lifestyles to change too fast.	66.1	80.8	14.6
Science, Technology and Innovation are very important for the progress of our nation.	79.8	94.5	14.7
We need scientific knowledge in order to manage our daily lives better.	68.7	88.1	19.4

Assessment of Science/STI Effects	2008	2014	Difference (2014-2008)
	Percent (%) answering <i>positive effect</i>		
Cost of living	56.0	62.6	6.6
Public health	71.1	78.5	7.4
Working conditions	67.3	70.3	3.0
The environment	54.1	66.4	12.3
Individual enjoyment of life	59.9	67.6	7.7
World peace	44.6	54.2	9.6

Source of Information for STI	2008	2014	Difference (2014-2008)
	Percent (%)		
Print Newspaper	62.1	63.1	1.0
Radio	32.1	42.8	10.7
Television	82.4	89.1	6.7
Print Magazines	22.1	24.2	2.1
Journals	6.3	9.3	3.0
Internet	24.8	53.3	28.5
Books	19.3	38.9	19.6
School	16.1	1.9	-14.2

STI related Places Visited	Museum	Zoo	Aquarium	National Science Centre	Planetarium	PETROSAINS
	Percent (%)					
2008	29.9	30.0	18.6	11.1	10.3	13.9
2014	22.7	31.0	13.4	6.7	7.4	10.3
Difference (2014-2008)	-7.2	1.0	-5.2	-4.4	-2.9	-3.6





01

Introduction

1.1 AIMS AND OBJECTIVES

Science, technology and innovation (STI) are an essential part of everyday life. The study of science expands our knowledge and understanding of the world. It gives us the basis to make better decisions and enables us to live a more fulfilled life. On a more practical basis, our knowledge of STI enables us to use the complex gadgets and things around us more effectively – computers, phones, televisions, radios, electricity, vehicles, robots and more. These consumer goods, machines, tall buildings and our ability to produce goods and services are made possible because of STI.

At a more intellectual level, a good understanding of STI enables Malaysians to understand complex issues that our society faces and so enables us to fully participate in making better decisions for ourselves as well as for the country. A good grounding of STI and rational thinking will ensure that Malaysians are less likely to be duped by pseudoscience.

Modern industry and commerce, which are essential parts of the economy, are also founded on STI. Malaysia's experience with industrialisation and trade is illustrative of the importance of STI. The country's largest manufacturing output and exports are from the electrical and electronics industries, oil and gas products, other manufactured goods, and downstream agricultural industries; all of these use STI in a major portion of their production processes. Even the human capital aspects of the economy require STI skills to be productive.



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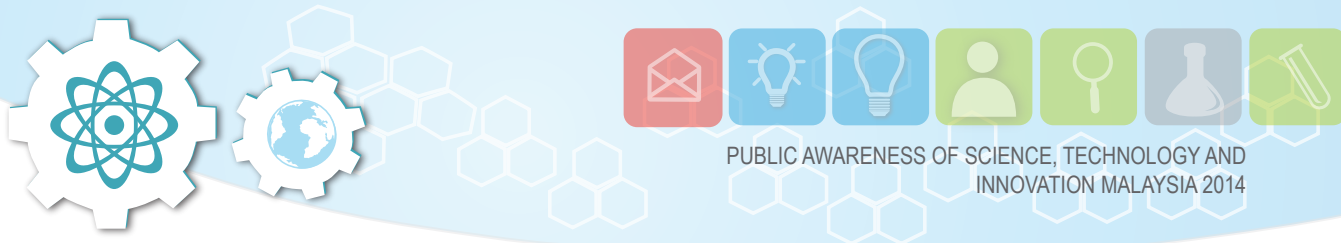
For Malaysia to keep pace with Organisation for Economic Co-operation and Development (OECD) and other high-income countries, our human capital must be further developed and enhanced. More Malaysians should become highly skilled by being engaged and involved in STI and STI related fields. Private investors, especially in technology-based industries, find Malaysia attractive because of the highly skilled labour and/or readily available STI infrastructure. With initiatives such as the Multimedia Super Corridor (MSC), Malaysia has succeeded in attracting foreign investment. However the Malaysian labour force must complement that initiative in order to build a high-income and prosperous economy.

STI is the basis for economic growth and for modern societies to pursue developmental objectives. The government's education policy specifically states that science and technology are an integral component of socio-economic planning and development. For Malaysia to become a fully developed high-income economy by 2020, it is crucial that people adopt STI as a way of life in the face of an increasingly globalised world. Scientific literacy is an important element in that process of development.

In line with efforts towards greater scientific literacy, the government through the Malaysian Science and Technology Information Centre (MASTIC) has closely monitored the public's awareness of science and technology over the last 20 years, and continues to do so. The 2014 Study of Public Awareness of Science, Technology and Innovation in Malaysia¹ is the latest in that series of studies started in 1994, when the first "Public Awareness of Science and Technology" study was undertaken. Subsequent studies were done in 1996, 1998, 2000, 2002, 2004, and 2008. These studies have provided the government with key indicators to assess the Malaysian public's engagement, attitudes and levels of exposure to STI issues. Information gathered from these studies have also gone a long way in helping the government plan programs and long term projects to increase the levels of STI knowledge and learning among Malaysians.

The 2014 STI Survey, the eighth survey in a series of studies on Public Awareness of Science, Technology and Innovation (formerly the 'S&T Survey'), was commissioned with the following objectives:

¹ Note that throughout this report the 2014 STI Survey and the 2014 Study of Public Awareness of Science, Technology and Innovation in Malaysia refers to the same survey. This survey was commissioned in mid-2013 and the TOR is referred to as 2013 TOR.



- To analyse levels of awareness, interest, attitudes, and understanding among Malaysians regarding STI;
- To analyse changes in levels of understanding, interest, and attitudes of STI among Malaysians since 1996;
- To identify efforts that can be implemented by the Government to raise the level of understanding, interest, and acceptance of STI among Malaysians; and
- To develop suitable STI indicators for international comparison.

1.2 RESEARCH METHODOLOGY

This 2014 study has undertaken a probability survey approach to estimate the public awareness levels of STI in Malaysia.

A scientific method was used to select a sample of respondents that is representative of the Malaysian population. The sample was drawn from the household frame that was maintained by the Department of Statistics Malaysia (DOSM). All Malaysians aged between 12 and 64 and permanent residents in Malaysia were eligible respondents. Foreigners were not eligible and neither were Malaysians above 64 years old or below 12 years old.

This sampling approach enables each selected respondent to have a known probability of selection. Using conventional statistical theory and practice, the optimum sample size that fits with the level of accuracy (RSE) and the required stratification was determined, and also resource (cost and time) considerations. It is a common practice to use 5% RSE but for this study, an RSE of 2.6% was the target.

The survey approach is a 3-stage stratified sample, i.e., a complex design. A theoretical sample size limit of 4,500 was determined using the RSE of 2.6% and an estimated oversample (35%). For this survey, the sample size was only 4,500. With an actual sample of 2,653, the achieved RSE was 2.71%, which is still very much lower than the conventional 5% RSE. Compared to the reports of other countries, this survey can be said to be within international best practices.

One of the objectives of this study included recommendations to increase the level of understanding and acceptance of Malaysians as regards STI.



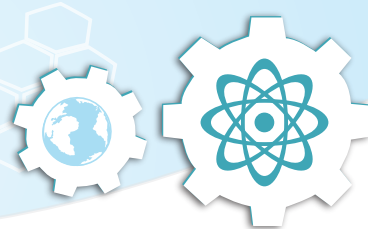
2.1 PUBLIC INTEREST IN STI

This chapter presents findings on the public's interest in STI and selected STI issues. Measuring public interest in STI is important because it indicates whether society wants to know or is concerned about STI in general.

Table 2-1 shows how questions were matched between the 2008 and the 2014 surveys. In 2008, “latest inventions in science” was rephrased as “new scientific discoveries”; “latest inventions in the field of medicine” was rephrased as “new medical discoveries”. The 2008 phrase “the use of computer technology” was made more general by rephrasing it as “the use of new inventions and technologies”. “Innovation in telecommunications technology” was made more general by using the word “innovation”. The question on “inventions and new technologies in Malaysia” in 2008 was rephrased to “Science, Technology and Innovation (STI) in Malaysia” in 2014. “Environmental pollution” remained the same in both the 2008 and the 2014 surveys.

Table 2-1: Matching of Questions Asked in 2008 and 2014

Questions asked in 2008	Questions asked in 2014
Latest inventions in science	New scientific discoveries
Latest inventions in the field of medicine	New medical discoveries
The use of computer technology	The use of new inventions and technologies
Innovations in telecommunications technology	Innovation
Environmental pollution	Environmental pollution
Inventions and new technologies in Malaysia	STI in Malaysia

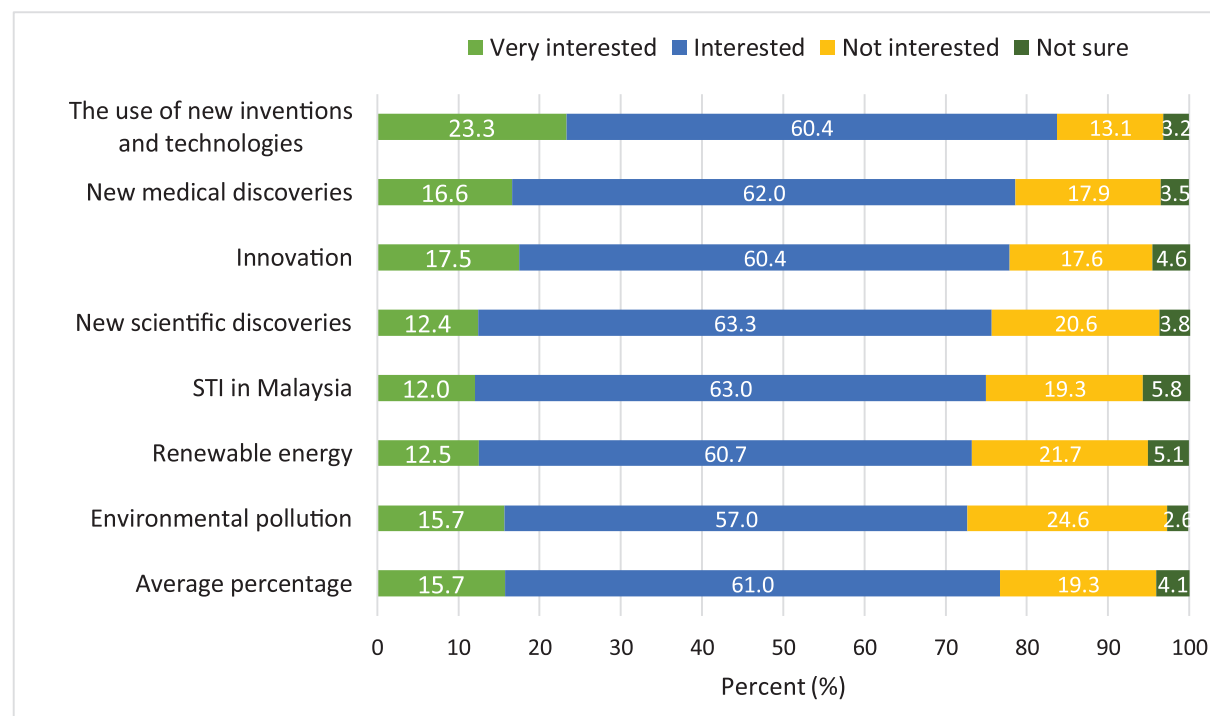


The interest in STI appeared to be quite high amongst Malaysians. On average, more than 75% of respondents indicated that they were interested or very interested in selected STI issues with 15.7% of them indicating that they were very interested in related STI issues. **Figure 2-1** has the details.

Overall, Malaysians were interested in STI and only a small percentage were unsure or did not know much about STI. Among the issues, “the use of new inventions and technologies” had the most respondents (83.7%) who stated that they were either *interested* (60.4%) or *very interested* (23.3%) in the subjects. In comparison, 78.6% of respondents were *interested* or *very interested* in “new medical discoveries”, 77.9% in “innovation” and 75.7% in “new scientific discoveries”.

In contrast, 24.6% of respondents were *not interested* in “environmental pollution”, 21.7% uninterested in “renewable energy” and 20.6% *not interested* in “new scientific discoveries”. These figures were relatively higher than for other selected STI issues.

Figure 2-1: Public Interest in Selected STI Issues



Notes: Responses to “How interested are you in the following issues? Please state whether you are “*not interested*, *interested*, or *very interested*”.



Male respondents (79.3%) were marginally more *interested* or *very interested* in STI issues than female respondents (74.5%). Both male (87.0%) and female (80.9%) had the highest percentage of respondents who were *interested* or *very interested* in “the use of new inventions and technologies” (**Appendix 1**).

Levels of interest in STI in rural and urban areas were, on average, only marginally different. On average, the “*very interested*” group in urban areas was 3.4 percentage points higher than in the rural areas, whilst in rural areas, the “*not sure*” group was 1.3 percentage points higher than the urban areas (**Appendix 2**).

The youth group had on average the highest interest (i.e., *interested* and *very interested*) in STI issues at 79.5%, followed by the adult group at 76.8% and children’s group at 63.7%. All three age groups had the highest percentage of respondents who were *interested* or *very interested* in the “the use of new inventions and technology”. Note that children’s group showed more interest in this issue (91.6%) than the youth (89.3%) and adult groups (82.1%) (**Appendix 3**).

It was evident that educational attainment influences the level of interest towards STI related issues. In relation to overall interest (*interested* or *very interested*) in STI, there appears an increasing degree of interest in STI by those with higher educational attainment. For example, on average, only 50.9% of respondents with no formal education showed interest, in contrast to respondents with primary education (56.4%), those with secondary education (78.3%) and those with tertiary education (86.5%) (**Appendix 4**).

For ethnicity, Other Bumiputera respondents showed the highest level of interest in STI related issues (83.2%), followed by Malay (82.7%), Indian (71.3%) and lastly Chinese respondents (65.1%). The highest level of disinterest (27.0%) and the highest percentage of “not sure” responses (7.8%) to STI issues came from Chinese respondents, generally (**Appendix 5**).

Compared to 2008 findings, the percentage of *very interested* responses in selected STI related issues had more than doubled in 2014 (**Figure 2-2**).

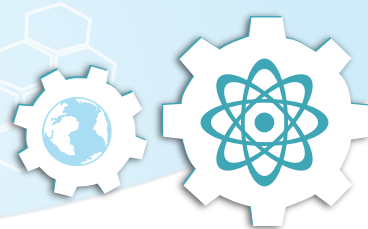
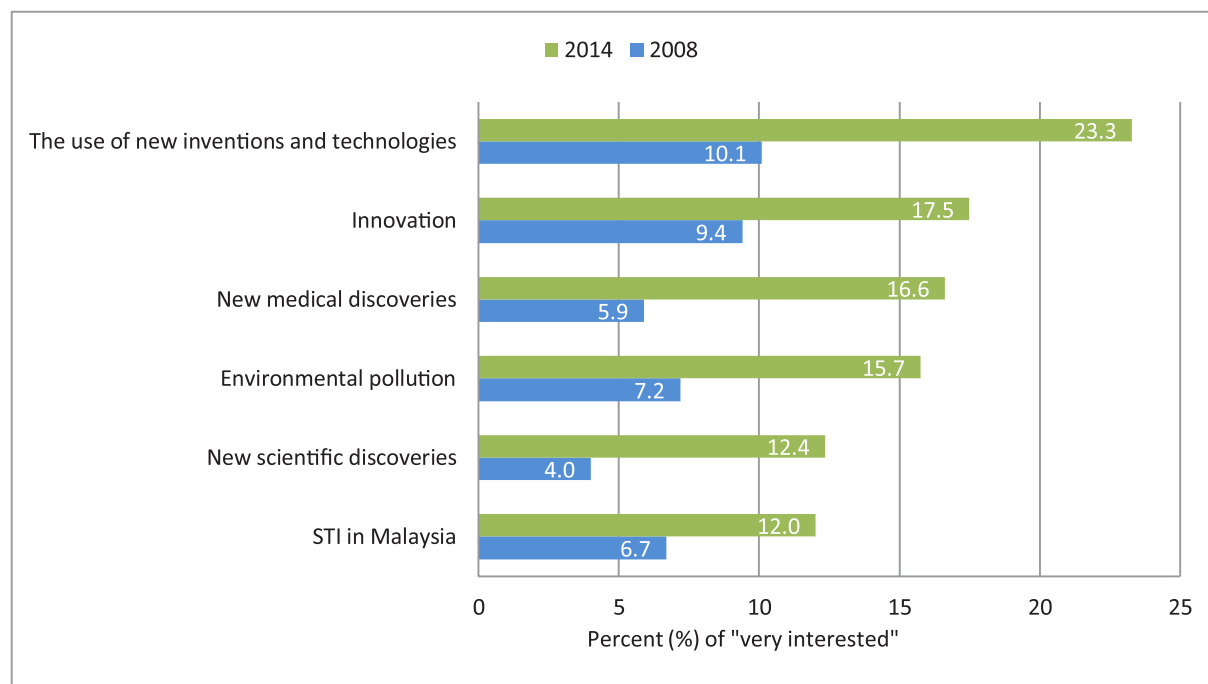


Figure 2-2: Public Interest in Selected STI Related Issues, 2008 and 2014

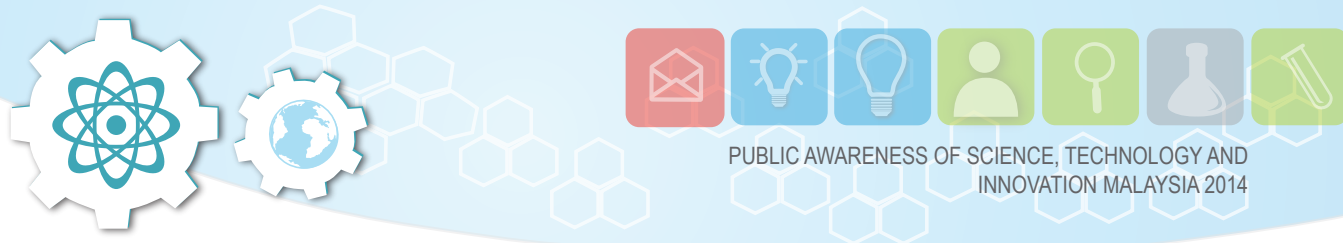


2.2 KNOWLEDGE OF STI

Public knowledge of STI is often associated with the understanding of scientific facts. In other words, it depicts how well society understands scientific concepts, facts, and methods. Two (2) questions in the survey questionnaire could “test” the respondents’ understanding of STI: the first is whether they could correctly answer questions on STI terms and concepts; the second is related to the public’s ability to differentiate science and pseudoscience. On the basis of both sets of questions, it is possible to gain an understanding of the public’s comprehension of STI.

2.2.1 Understanding of STI Terms and Concept

The public’s knowledge and understanding of STI terms and concept are indicated by the percentage of True/False statements that were correctly answered.



Overall, less than half of all respondents (46%) were able to correctly answer the factual knowledge questions in the 2014 survey.

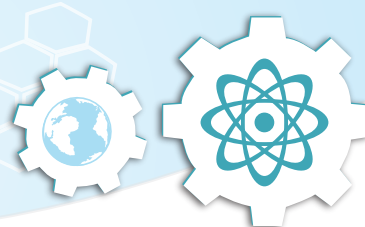
Findings in this section showed that respondents could answer some statements more correctly than others. In this survey, most Malaysians correctly answered “the earth travels around the sun” (84.9%) and “the centre of the earth is very hot” (74.7%) statements. In contrast, very few Malaysians answered correctly the statements “antibiotics kill viruses as well as bacteria” (15.5%) and “all radioactivity is man-made” (20.2%); both of them are in fact, false (**Figure 2-3**).

It is interesting to note the gap in general knowledge of antibiotics. Given that antibiotics is widely prescribed in Malaysia, it is an important issue. The survey findings indicate that very few respondents knew what antibiotics were and what they were meant to do. This lack of knowledge may prove to be dangerous especially when antibiotic prescriptions are not strictly controlled. This is because there is growing evidence worldwide that antibiotic resistance of bacteria had increased to alarming levels for all categories of antibiotics. It implies that there would be fewer effective antibiotic treatments in the future, for diseases and even common infections.

Male respondents (49.4%) had a higher percentage of correct answers than female respondents (42.9%) (**Appendix 6**). Male respondents also had higher percentages of correct responses for all the statements.

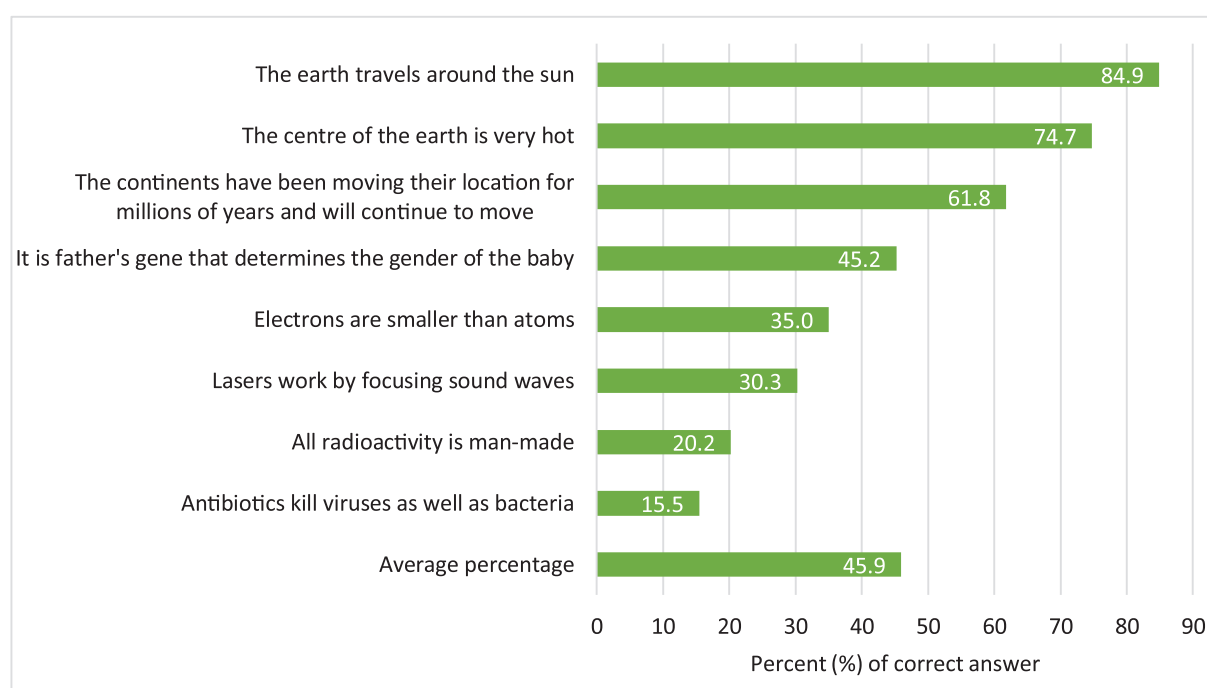
More urban respondents (48.3%) answered the factual knowledge questions correctly compared to rural respondents (39.0%) (**Appendix 7**). This pattern is similarly reflected for each statement, i.e., there were more urban respondents who answered correctly compared to those in rural areas.

The youth group (51.0%) had a higher percentage of correct answers than adult (45.7%) and children’s group (35.6%) (**Appendix 8**). There is positive correlation (Pearson’s $R = 0.299$) between educational attainment and correct answers to the STI statements. More than half of the respondents with tertiary education answered the True/False statements correctly (53.0%). This was followed by respondents with secondary education where 45.4% answered correctly (**Appendix 9**). These patterns were reflected in the individual statements, although it was observed that there were substantially higher percentages of correct responses from those who had tertiary education.



Malaysians of Indian origin had the highest percentage of correct responses to the True/False statements with 50.7% answering correctly. This was followed by Malays (45.5%), Chinese (44.5%) and Other Bumiputera (43.1%). These patterns were also largely reflected in individual statements (**Appendix 10**).

Figure 2-3: Correct Answers to Questions on Scientific Concepts and Statements



While there was a 9 percentage point improvement over 2008, public knowledge levels in 2014 were surprisingly lower than those in the 1998 and the 2000 surveys. In fact, the public's average knowledge level of STI hovered below 50.0% for the past 16 years. The highest public knowledge levels being in the year 2000 when a larger percentage of respondents answered correctly (49.0%) and the lowest in 2004 (36.0%) and 2008 (37.0%). **Table 2-2** has the details.

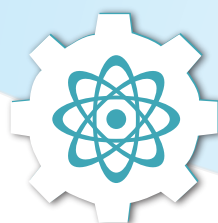


Table 2-2: Correct Answers to Questions on Scientific Concepts and Statements, 1998-2014

Scientific Concepts and Statements	Percentage Answering Correctly (%)					
	1998	2000	2002	2004	2008	2014
Physical Science						
The earth travels around the sun (True)	83	81	76	71	73	85
The centre of the earth is very hot (True)	72	74	63	58	66	75
The continents have been moving their location for millions of years and will continue to move (True)	64	62	44	45	44	62
Electrons are smaller than atoms (True)	41	42	37	26	33	35
Lasers work by focusing sound waves (False)	31	34	13	19	16	30
All radioactivity is man-made (False)	31	33	15	13	14	20
Biological Science						
It is the father's gene that determines the gender of the baby (True)	46	46	47	38	40	45
Antibiotics kill viruses as well as bacteria (False)	20	21	16	16	8	16
Average percentage of respondents who answered correctly (regardless of statement)	48	49	39	36	37	46

2.2.2 Pseudoscience

The public appears to have varied perceptions of horoscopes, faith healing and fortune telling, although they were all pseudoscience.

A segment of respondents believed that horoscopes were *scientific* (36.4%) or *sort of scientific* (18.1%). About 54.5% of total respondents believed this was so, while a significant 25.1% was not sure. Only 20.4% of respondents stated that horoscopes were not scientific. **Figure 2-4** shows the details.

There is apparently very little difference in beliefs in both gender groups. There were also no big differences between urban and rural respondents by locality. The findings by age group remained largely the same overall. Nonetheless, it was apparent that the Children group had the highest percentage who thought fortune telling was *scientific* (23.1%) and/or *'sort of scientific'* (7.7%) compared to the youth group (*scientific*: 2.1%, *sort of scientific* 2.7%) and adult group (*scientific*: 3.5%, *sort of scientific* 6.8%) (**Appendix 11-13**).

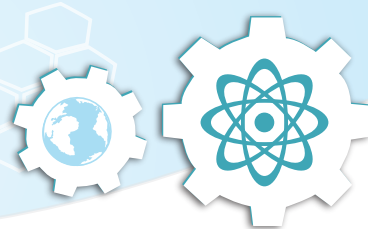
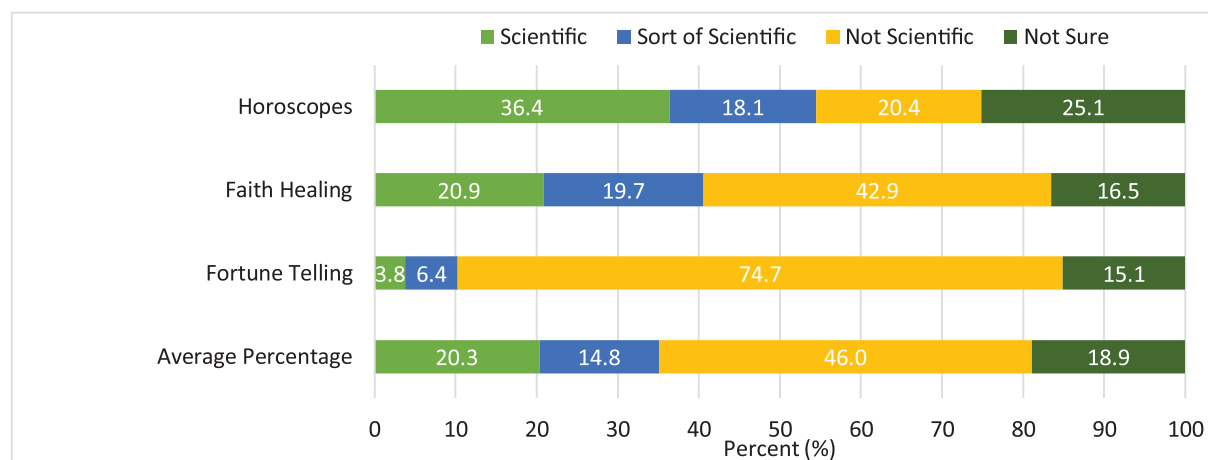


Figure 2-4: Public Assessment of Selected Pseudoscience Topics



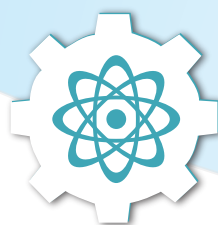
A similar finding emerged in the survey based on educational achievement. Most respondents felt that horoscopes were *scientific* or *sort of scientific*, while faith healing and fortune telling were not. It is apparent that having tertiary education does improve the recognition of pseudoscience, particularly for faith healing and horoscopes as shown by the changes in percentage point differences. The survey by ethnicity revealed a similar overall pattern where most respondents felt that horoscopes were *scientific* or *sort of scientific* while faith healing and fortune telling were not (**Appendix 14-15**).

2.3 PUBLIC ATTITUDES TOWARDS STI

Public attitudes towards STI is important because it predicts public reaction to various STI issues based on their understanding of STI. If the public has a high level of understanding of STI, their reaction to issues is likely to be more critical, rational and balanced. Progressive ideas and plans would be better received and publicly supported. The public would also be less likely to accept pseudo-scientific arguments or reasoning.

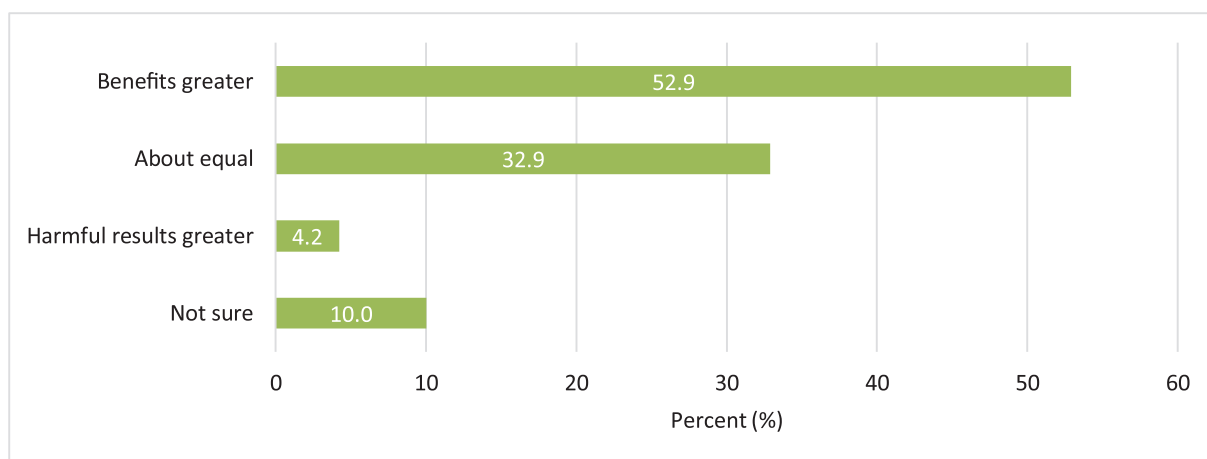
2.3.1 Attitudes towards Scientific Research

More than half of all respondents (52.9%) thought scientific research did *more good than harm*, about 4.2% thought that scientific research did *more harm than good*, 32.9% said it was *equally*



beneficial as well as harmful, and 10.0% were *not sure* (**Figure 2-5**). Putting aside the *not sure* and *about equal* responses for the moment, Malaysians viewed scientific research as *more beneficial*, with a minority seeing it as more harmful.

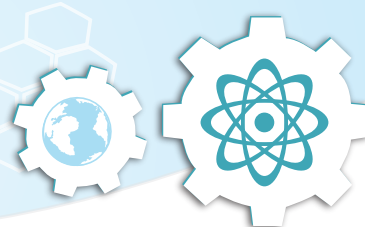
Figure 2-5: Public Assessment of Scientific Research



Gender-wise, male respondents were more positive than female respondents that scientific research brought *more benefits than harm*. The percentage of rural respondents (54.6%) stating that scientific research did *more good than harm* was slightly higher than that of urban respondents (52.3%) (**Appendix 16-17**).

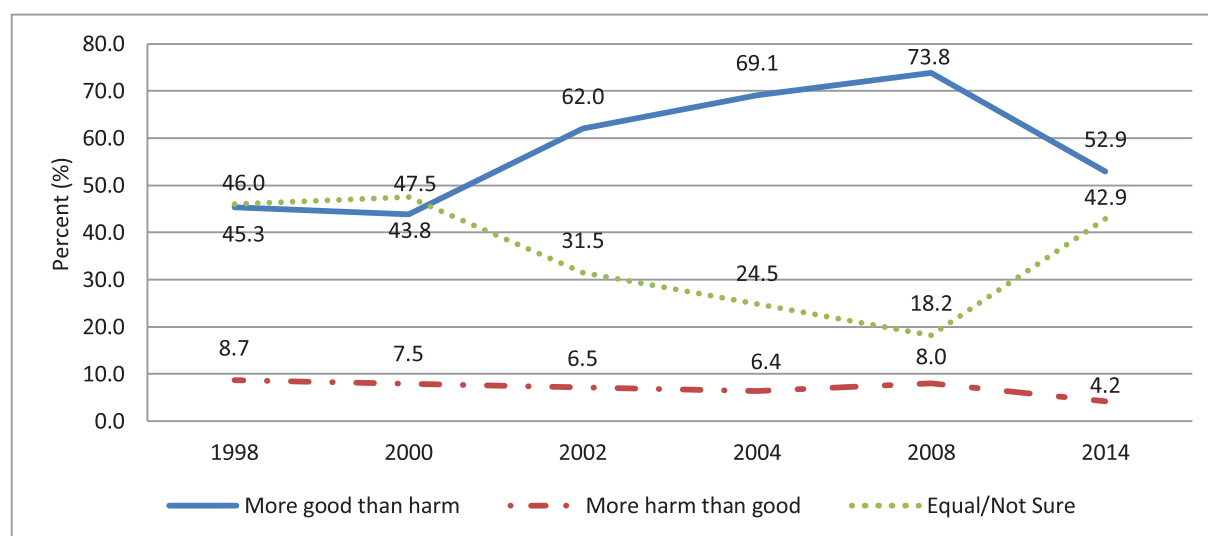
For age group, youth group, 56.5% viewed scientific research as *more beneficial than harmful* compared to 51.7% of adult respondents and 47.1% of the children's group. Educational attainment was a significant factor influencing people's attitude towards STI. The percentage of respondents with tertiary education who agreed that scientific research did *more good than harm* was higher than the percentage of respondents with lower educational backgrounds. About 61.3% of those with tertiary education said that scientific research did *more good than harm*, and only 42.5% of those without formal education shared this opinion (**Appendix 18-19**).

Chinese respondents were more sceptical about scientific research than other ethnic groups. Less than half of Chinese respondents (41.1%) thought that scientific research did *more good than harm*, compared to 58.2% of Malay respondents, 43.0% of Other Bumiputera, and 47.9% of Indian respondents (**Appendix 20**).



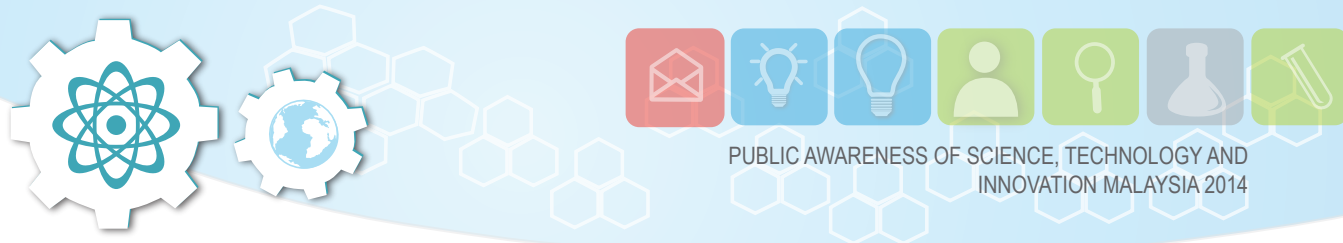
Compared to 6 years ago the percentage of respondents who felt that scientific research did *more good than harm* declined from 74.0% to 54.0%, while the percentage who viewed it as doing *more harm than good* remained constant at below 10.0% (**Figure 2-6**). Most respondents have either become more sceptical or less sure if scientific research generated more positive or more negative effects.

Figure 2-6: Public Assessment of Scientific Research, 1998–2014



2.3.2 Public Attitudes towards STI, Scientific Research and Science

This section of the study examines the public's view of STI and scientific research using various statements, and to which they may *strongly agree*, *agree*, *disagree* or *strongly disagree*. Note that for this set of statements, only a 4-point scale is offered, which means there was no neutral answer category; this forces the respondent to choose whether they agree or disagree with the statement.



In the 2014 survey, five of the six questions had an overwhelmingly positive response rate, i.e., 80.0% and above. Only one (1) question differed from the rest (**Figure 2-7**).

The five questions which elicited positive responses were:

- “STI are very important for the progress of our nation” to which 94.5% agreed;
- “STI improves the quality of our lives” to which 91.8% of respondents agreed;
- “Scientific research increases knowledge, although it does not produce immediate benefits” to which 81.4% agreed;
- “Science causes our lifestyles to change too fast” to which 80.8% agreed; and
- “We need scientific knowledge in order to manage our daily lives better,” to which 88.1% agreed.

Most respondents *disagreed* with the statement, “we depend too much on science and not enough on faith”. About 58.2% of the respondents either *disagreed* or *strongly disagreed* with this statement. About 6.1% of the respondents *strongly disagreed* with the statement, with 6.0% who *strongly agreed* with it. It is important to note that this is a complex statement as the respondent was asked to weigh between science and faith (the statement suggested that science had a stronger influence than faith on the respondent). As a result, 6.0% of respondents strongly felt that there was too much dependence on science and not enough on faith.

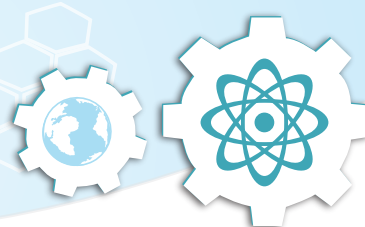
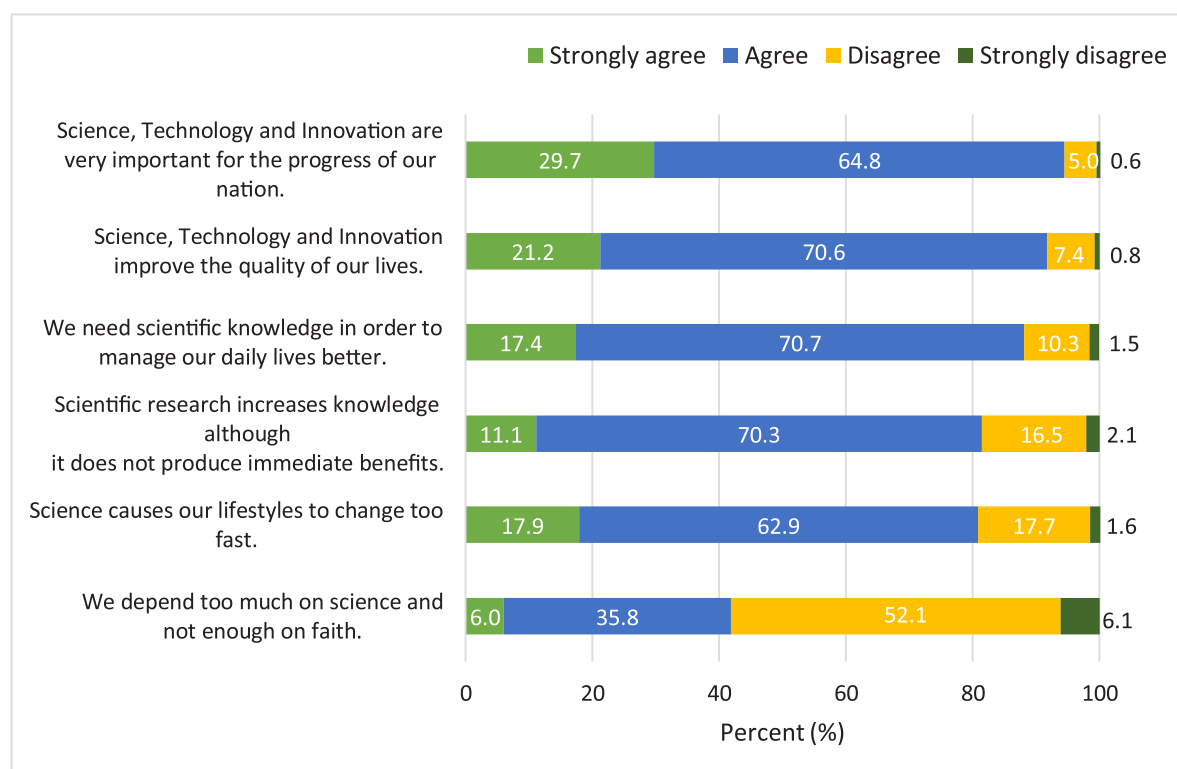


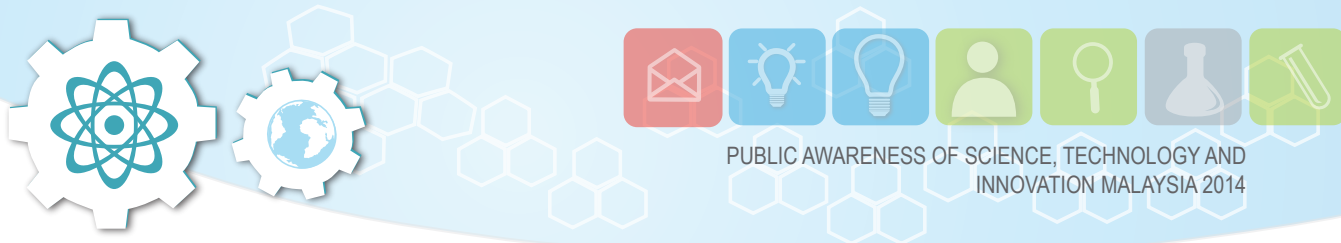
Figure 2-7: Public Attitudes towards Science and Technology



Gender comparisons showed no statistical difference for the STI attitude statements. There was also no statistical difference between percentages of “*strongly agree*” and “*agree*” for urban and rural respondents relating to the said the statements (**Appendix 21-22**).

More than 85.0% in the youth and the adult groups *agreed* that, “we need scientific knowledge in order to manage our daily lives better”, but only about 68.9% in children’s group *agreed* with this (**Appendix 23**).

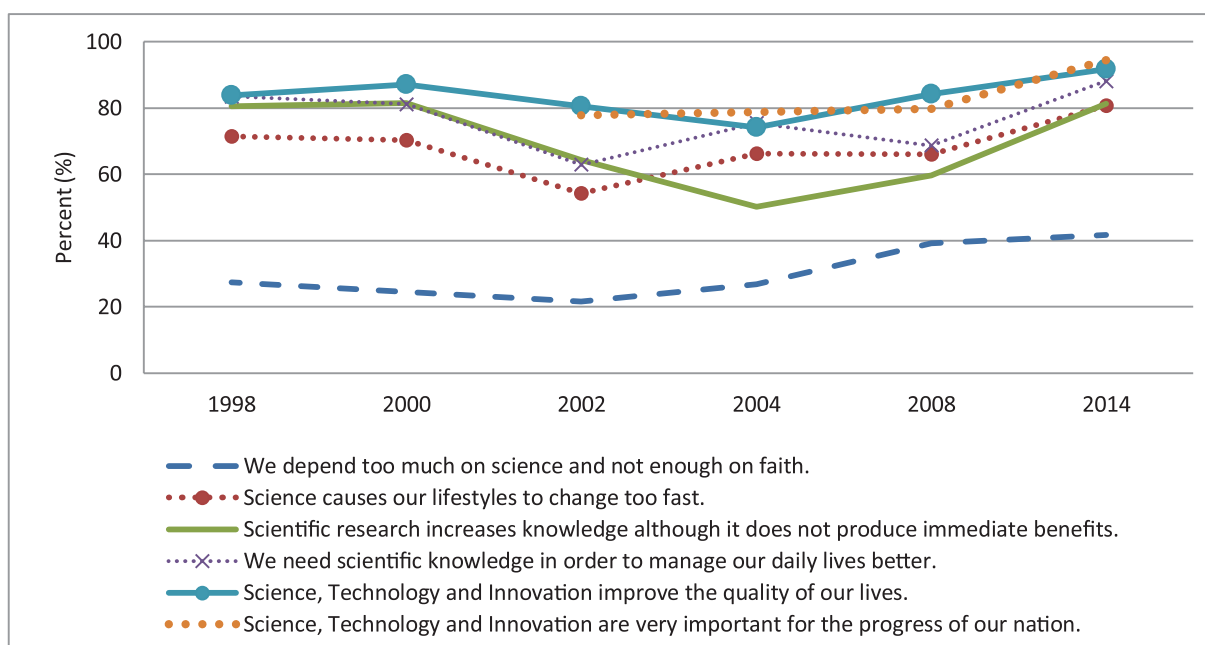
Respondents with more education consistently tended to be more positive towards STI, scientific research, and science, than respondents with less education. The percentage differences between those with tertiary education and those with no formal education was about 11 percentage points (**Appendix 24**). Interestingly, the percentage of those with primary education who *agreed* with the statement was slightly higher than those with secondary education.



Attitudes, by ethnicity, towards the statements were largely similar, although some differences were noticed among ethnic groups (**Appendix 25**).

The Malaysian public attitudes towards STI was more positive in the 2014 survey than for the 2008 survey. Over 90.0% of respondents *agreed* that “STI improves the quality of our lives” and that “we need scientific knowledge in order to manage our daily lives better” (**Figure 2-8**).

Figure 2-8: Public Attitudes towards Science and Technology, 1998-2014



Note: The percentages refer to the percentage of respondents who agree with the statements.

2.3.3 Public Attitudes towards the Impact of STI

Most respondents believed science had more positive effects than negative effects on “cost of living”, “public healthcare”, “working conditions”, “environment”, “lifestyle”, “world peace”, “job creation” and “food security”. Among all issues, “public healthcare” had the highest percentage where 78.5% of the respondents said science had more positive effects on “public healthcare” rather than negative ones. This was followed by “job creation”, where 77.6% of the respondents said science had more positive than negative effect on “job creation” (**Figure 2-9**).

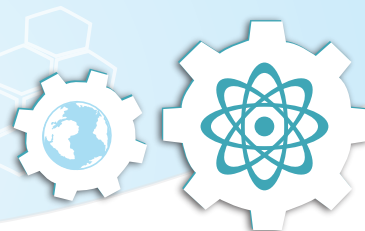
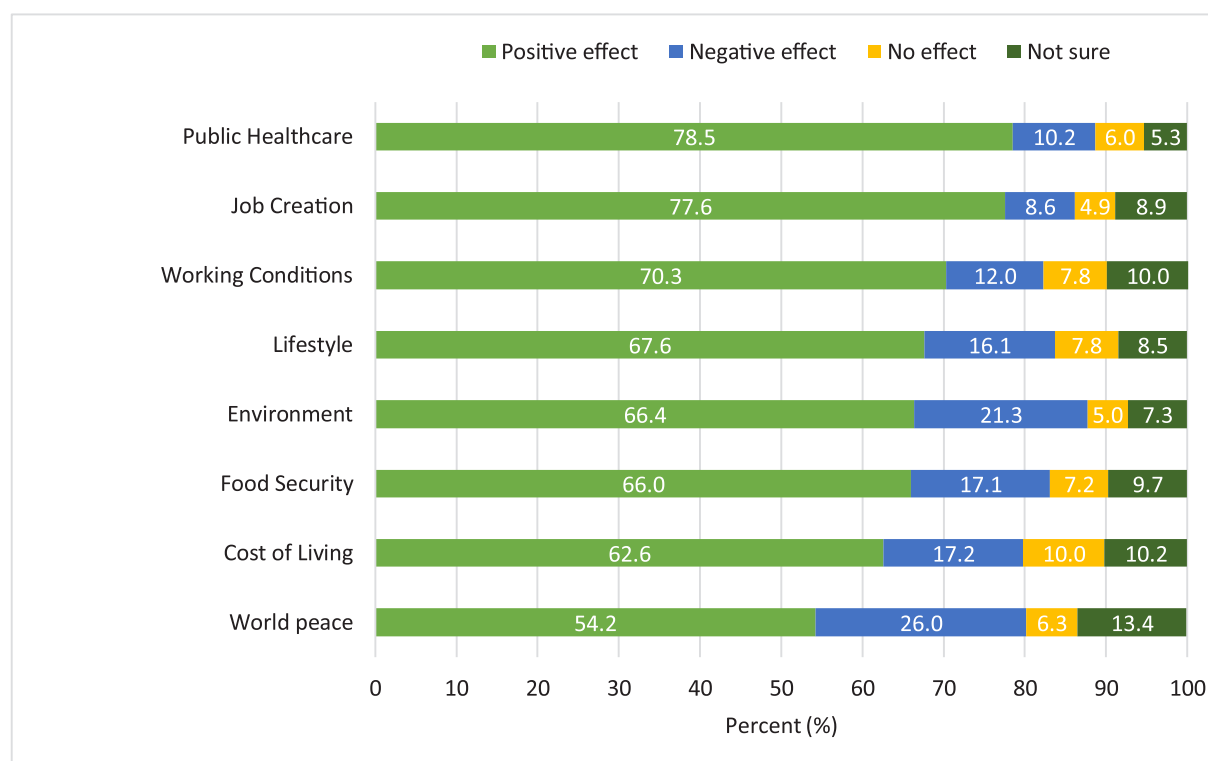
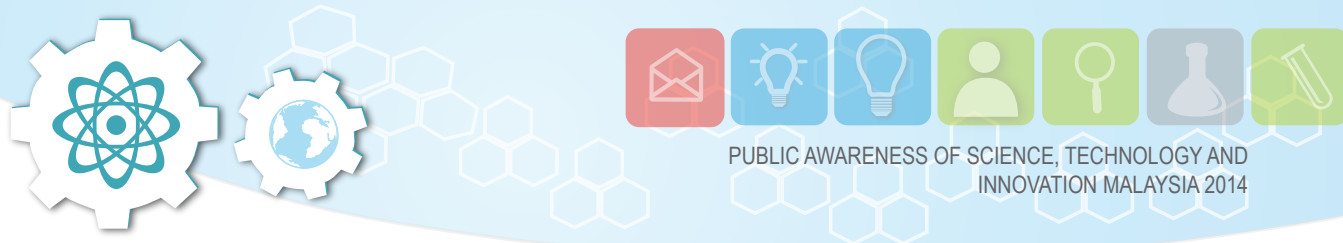


Figure 2-9: Assessment of STI Effects on Various Aspects



On average, male respondents had more positive attitudes than female respondents regarding the impact of STI on various aspects of social living. The difference between urban and rural respondents on the selected issues that was affected by STI was not very large: the mean percentage of rural respondents who viewed science as having more positive effects was 2.2% higher than for urban respondents (**Appendix 26-27**).



In general, perceptions of positive STI effects increased with age and probably experience. The responses from the children's group (12-15 years old) on "job creation" was relatively lower than the youth and adult groups. Possibly this is due to children being too young to understand the effects of STI, especially on complex issues like "job creation" of which most of them have no knowledge (**Appendix 28**).

The higher the educational level, the greater the respondents' tendency to agree that STI has a positive rather than negative effect on the aspects of social life listed in this survey (**Appendix 29**).

Respondents with no formal education had different results from the pattern mentioned above. The biggest percentage of "*not sure*" responses came from this group. It is an honest response from this group of respondents. They also had slightly more negative views on various issues compared to respondents with education in aspects such as "lifestyle", "cost of living", "food security", "environment", and "world peace".

On average, Malay respondents had the largest percentage of positive responses towards STI, followed by Indian respondents, and Other Bumiputera respondents. Chinese respondents had the lowest mean percentage of positive effects towards selected STI issues. In general, Chinese respondents were more sceptical of STI impacts on social and economic issues than the other ethnic groups, judging by the percentage of negative responses regarding the selected issues. The tabulated results by ethnicity are shown in **Appendix 30**.

In previous surveys, the public attitude was focused on science whereas in the 2014 survey it had broadened to STI. In earlier surveys, working conditions took first place, where scientific development was seen to have a more positive effect. In 2014, public health was a priority, and working conditions took second place. More respondents in 2014 thought STI had a positive impact on the "environment", "lifestyle", "cost of living" and "world peace", than in previous years (**Figure 2-10**).

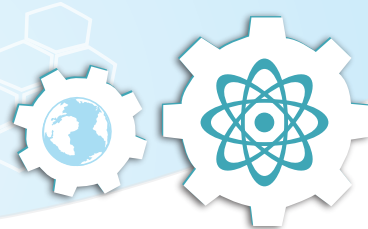
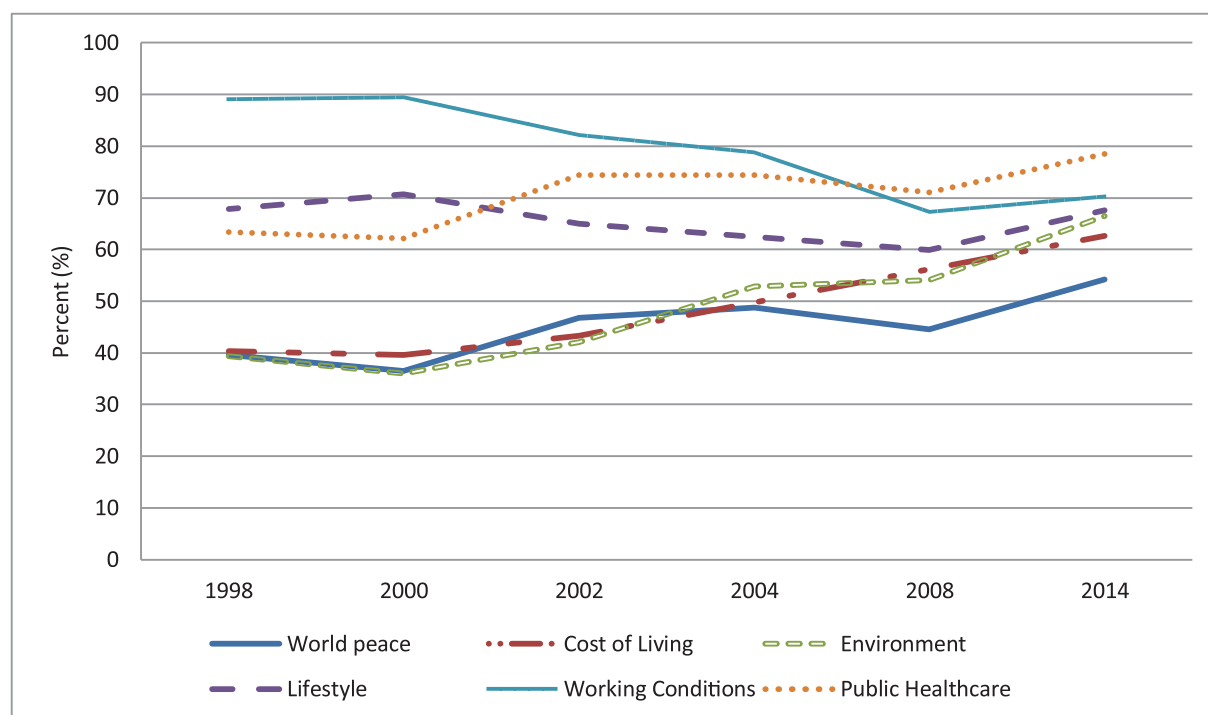


Figure 2-10: Response of Positive Effects on Various Aspects, 1998-2014



Notes: “individual enjoyment of life” was rephrased as “lifestyle” in 2014 STI survey.

2.3.4 Reasons for Low Science Stream Enrolment

More than half of the respondents agreed that the reason for low science stream education enrolment was, in descending order, (the) “lack of information about job opportunities in science” (62.2%), “it is more difficult to enrol for tertiary education in science” (60.3%), “the teaching of science is too theoretical” (56.9%), and “science subjects are difficult” (53.1%). At the same time, the majority of respondents (81.9%) disagreed that the low enrolment in science studies was due to social pressure, i.e., “peer or parents do not favour science education” (**Figure 2-11**). In this regard, the lack of career information was most important, followed by the difficulty of pursuing science education.

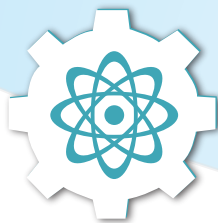
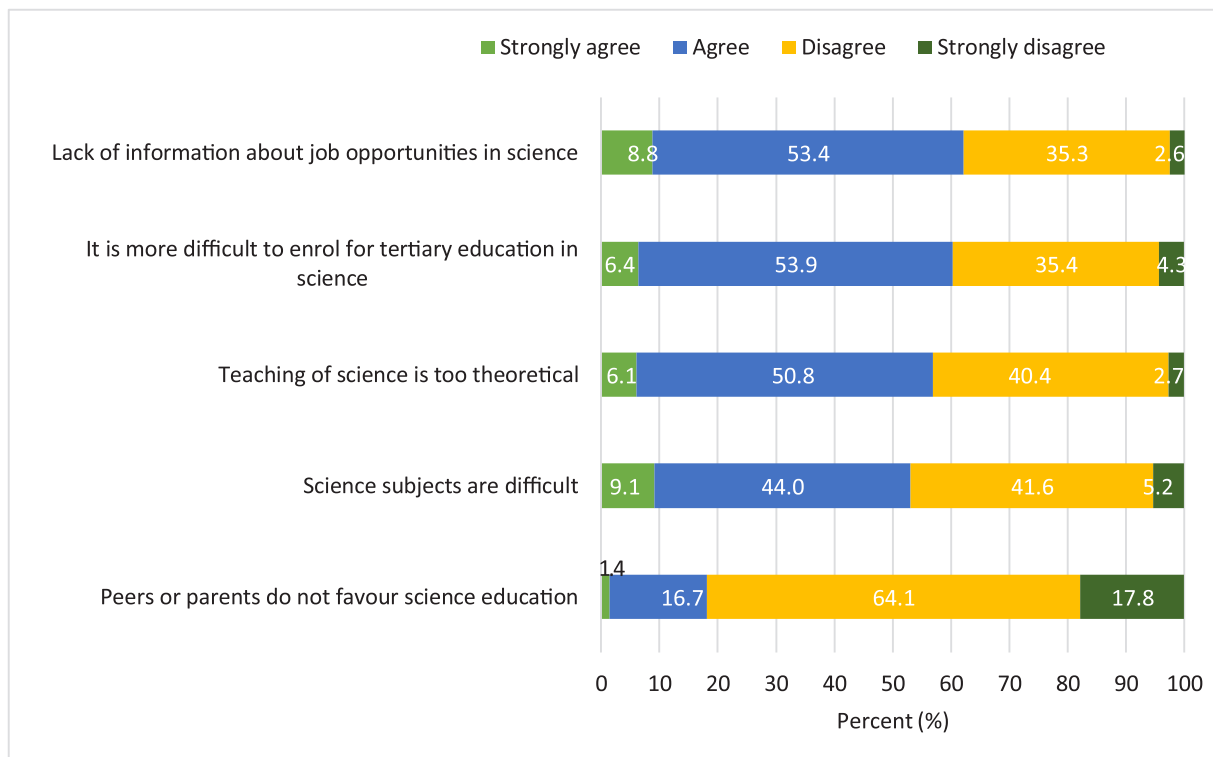


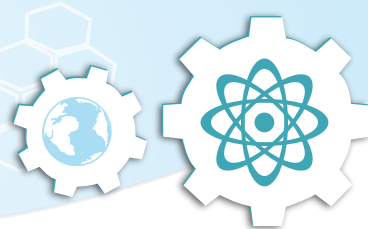
Figure 2-11: Reasons for Low Science Stream Enrolment



On average, more female respondents agreed that “science subjects are difficult”. Survey results show that the percentage of female respondents (59.2%) who agreed that “science subjects are difficult” was significantly higher than for male respondents (46.8%) (**Appendix 31**).

There was almost a 10% point difference between rural and urban respondents on the reasons for low science stream education enrolment attributable to the issue that “science subjects are difficult” (**Appendix 32**). It likely reflects the disadvantage of rural schools with regards to an environment for overcoming learning difficulties in science subjects.

The view in the children’s group was different from the youth group and adult group. The percentage of the children’s group (71.6%) that agreed to the statement that “It is more difficult



to enrol for tertiary education in science” was much higher than for the youth group (60.6%) and adult group (59.8%). The children’s group (69.2%) also felt that “teaching of science is too theoretical”, but fewer respondents from the youth group (47.7%) and the adult group (58.1%) held the same opinion (**Appendix 33**). Although it is difficult to judge the nature of the science curriculum it would appear that over time there has been some improvement in attitude towards science, especially as difficulty seems less of a problem and it was less theoretical.

The percentage of respondents with tertiary education (42.2%) who agreed that “science subjects are difficult” was lower than the percentages for the other education groups (No formal education: 60.0%; Primary: 59.5%; Secondary: 53.4%). A similar pattern was seen in the issue of “Teaching of Science Subjects are too theoretical” (**Appendix 34**).

The percentage of Malay respondents (50.4%) agreeing that “science subjects are difficult” was lower than that of Chinese respondents (53.8%), Other Bumiputera respondents (56.8%) and Indian respondents (62.0%) (**Appendix 35**).

2.3.5 Public Attitudes about Specific STI related Issues

Two questions, regarding climate change, the issue was whether they would change their lifestyle in order to contribute to reducing the impact of climate change. In relation to nuclear power - if they favoured (or not), the use of nuclear power for electricity generation in Malaysia.

On climate change, 89.7% of the respondents had either read or heard about it (**Table 2-3** has the details). The views did not vary significantly when categorised by gender or locality. The percentage of youth (93.2%) who had read or heard about climate change was relatively higher than for the other age groups. The higher the respondent’s educational level the more likely he/she would have read or heard about climate change (95.8% with tertiary education). Still, 82.9% of those with no formal education had heard about climate change, as with 74.5% with primary education, and 90.9% with secondary education.

Malay respondents had the highest percentage (92.5%), followed by the Chinese (87.8%) of those who had read or heard about climate change. (**Table 2-3**).

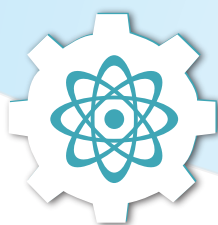


Table 2-3: Climate Change Awareness

Characteristics	Percentage of Respondents Read or Heard of Climate Change
All Respondents	89.7
Locality	
Urban	90.0
Rural	89.6
Gender	
Male	89.6
Female	89.8
Age Group	
Children	85.2
Youth	93.2
Adult	89.8
Education	
Tertiary	95.8
Secondary	90.9
Primary	74.5
No Formal Education	82.9
Ethnicity	
Malay	92.5
Chinese	87.8
Indian	80.3
Other Bumiputera	87.1

Respondents would change their lifestyle in order to help to reduce emissions and climate change impacts, 28.1% were strongly in favour, 60.6% were in favour, 9.7% were opposed to the idea and 1.7% strongly opposed changes to their present lifestyle (**Figure 2-12**).

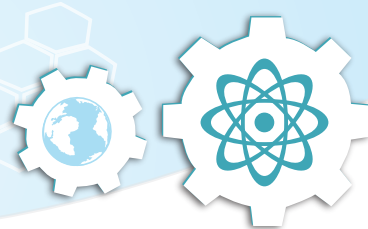
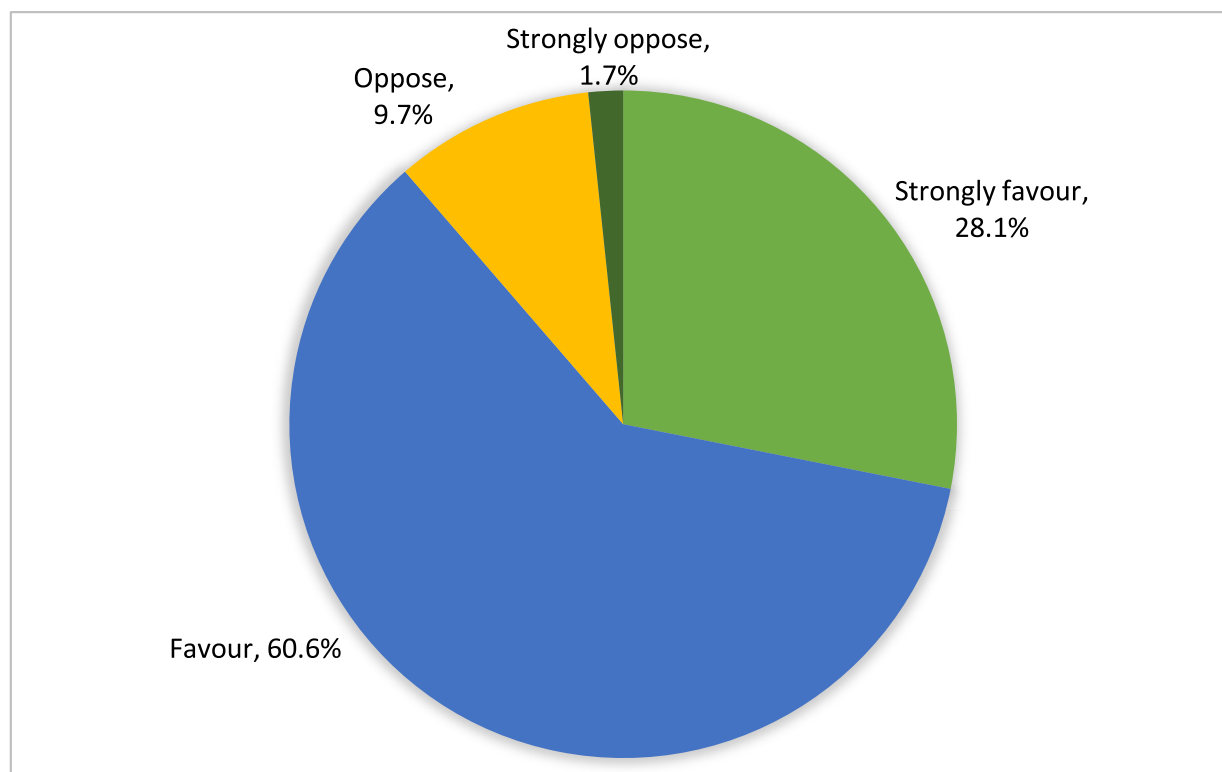
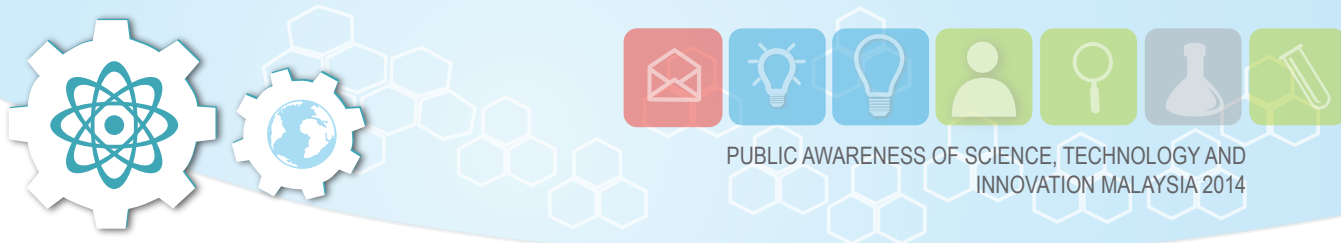


Figure 2-12: Willingness to Change Lifestyle for Reducing Emissions and Climate Change Impacts



A majority of female and male respondents were willing to contribute to reducing the impact of climate change, with no gender difference in contributing to reducing emissions and their impact. However, more male respondents (30.1%) appeared to “strongly favour” this attitude than female respondents (26.3%).

A majority of urban and rural respondents were willing to do their part to reduce the impact of climate change. The percentage of urban respondents (29.5%) who “strongly favour” contributing to reducing emissions and their impact was higher than rural respondents (23.9%).



In terms of willingness to change lifestyle in order to reduce emissions and thus climate change impacts, adults were more willing than the youth and children's groups.

The higher the educational level, the more likely the respondent would strongly support changes in their lifestyle to reduce emissions and climate change impacts.

Findings by ethnicity revealed minor differences: Chinese respondents (89.4%) and Malay respondents (88.8%) were almost as likely to support changes in their lifestyle to reduce emissions and climate change impacts as compared to Indians (86.5%) and Other Bumiputera respondents (82.9%).

Regarding nuclear power, four in every five Malaysian respondents had either read or heard about it. The survey showed that more male and urban respondents were likely to have heard about nuclear power, than female and rural respondents, although there is no great variation in percentages (i.e., between 4.0%-6.0%, **Table 2-4**). Fewer 12-15 year old respondents had heard about nuclear power than older respondents.

Respondents with higher education levels were more likely to have heard of nuclear power: 59.6% with no formal education, 53.1% with primary education, 84.5% of respondents with secondary education and 95.2% of respondents with tertiary education (**Table 2-4**).

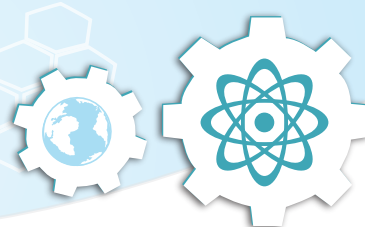
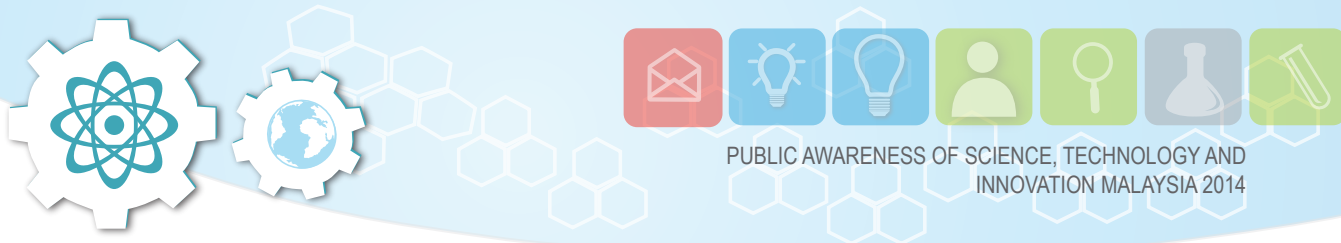


Table 2-4: Awareness of Nuclear Power

Characteristics	Percentage of Respondents read or heard of nuclear power
All Respondents	82.4
Locality	
Urban	83.8
Rural	79.7
Gender	
Male	85.6
Female	80.0
Age Group	
Children	58.6
Youth	87.9
Adult	83.0
Education	
Tertiary	95.2
Secondary	84.5
Primary	53.1
No Formal Education	59.6
Ethnicity	
Malay	87.9
Chinese	76.3
Indian	71.0
Other Bumiputera	85.3

When asked if they would favour or oppose the use of nuclear power to generate electricity in Malaysia, 4.7% were strongly in favour, 34.9% in favour, 41.7% opposed it and 18.8% strongly opposed it (**Figure 2-13**). It may be important to note that the 11 March 2011 Fukushima incident where a tsunami destroyed the nuclear power plant (now known as “The Fukushima Nuclear Disaster”) was still fresh in the public memory.



Fewer female respondents (34.1%) than male respondents (45.4%) favoured the use of nuclear power to generate electricity in Malaysia. Conversely, about 65.8% of female respondents opposed the use of nuclear power whilst only 54.6% of male respondents opposed its use.

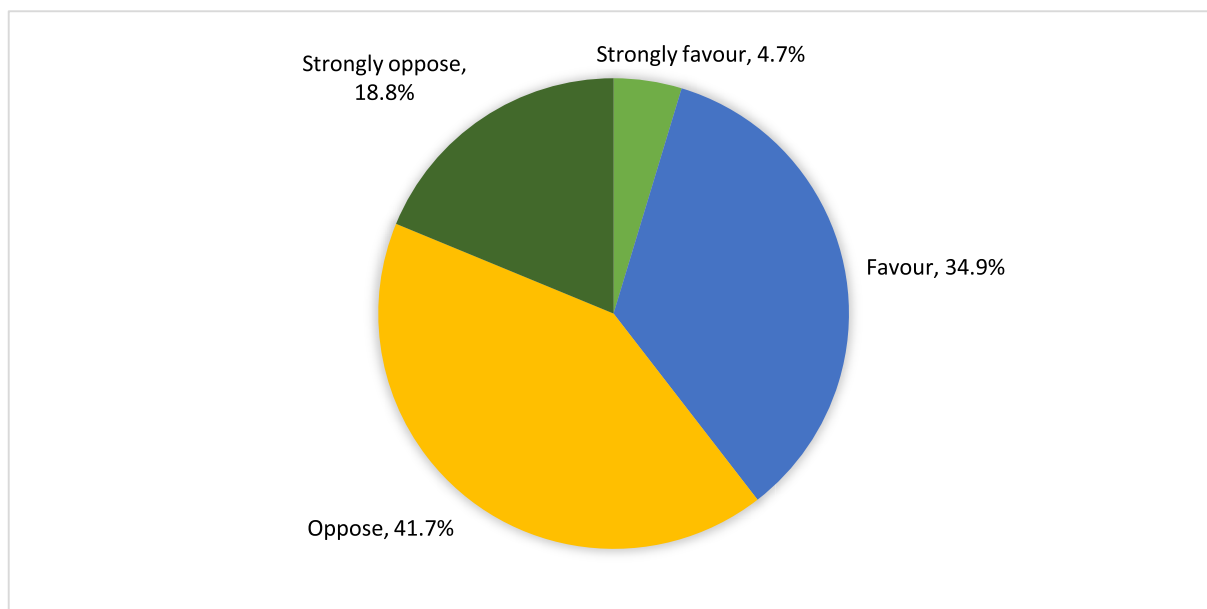
The percentage of urban respondents (61.9%) who opposed nuclear power generation of electricity was more than for rural respondents (56.3%).

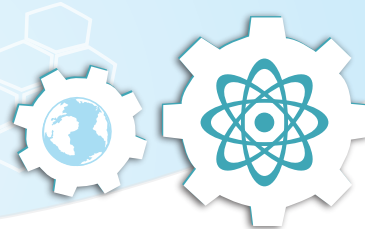
Findings from the present survey indicate that younger respondents were more likely to favour the use of nuclear energy. In contrast respondents in the older age groups were more likely to oppose its usage.

Respondents with higher education levels were inclined to be strongly opposed to the usage of nuclear power to generate electricity in Malaysia.

A higher percentage of Chinese respondents (72.7%) was opposed to the use of nuclear power generation of electricity than those from other ethnic groups.

Figure 2-13: Use of Nuclear Power to Generate Electricity



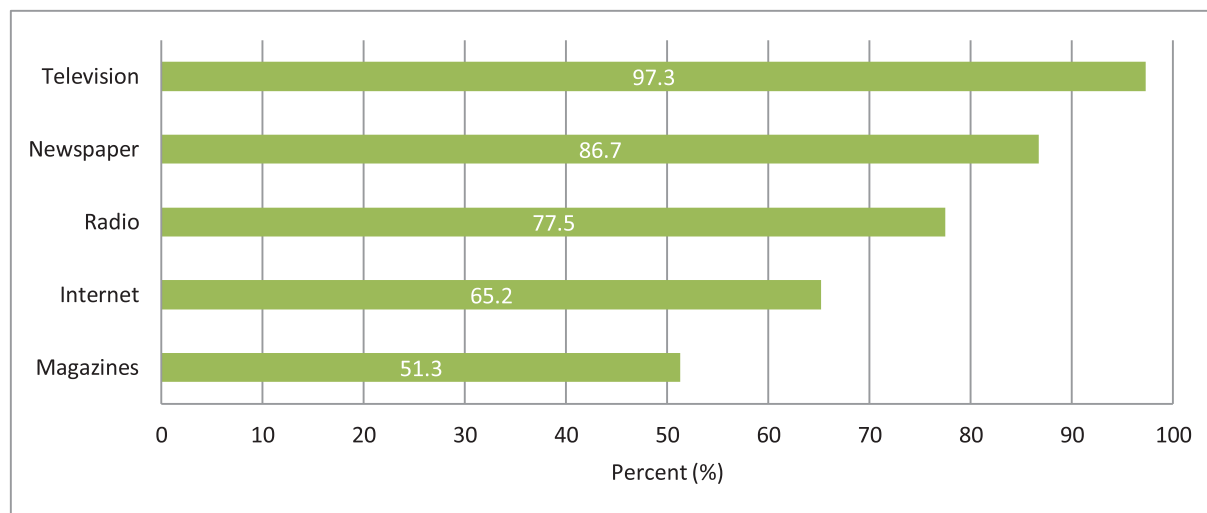


2.4 INFORMATION SOURCES AND INVOLVEMENT

2.4.1 Sources of Information through Media

The most popular media used by respondents was the television, with 97.3% of them indicating that they watch television at least once a week (**Figure 2-14**).

Figure 2-14: Source of Information through Media

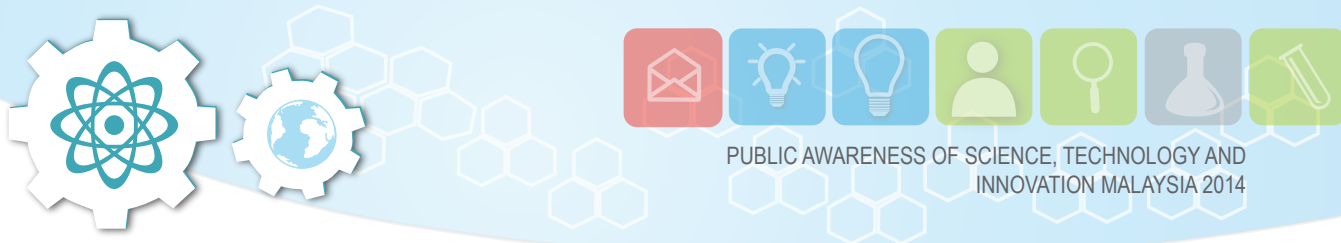


When compared by gender, media usage levels of all sources were generally higher for male respondents, except for magazines, where 2.1% more female respondents read magazines for general information compared to male respondents (**Appendix 36**).

Media usage was similar across urban and rural areas for both radio and television, with only marginal percentage point differences between them (**Appendix 37**).

Both newspaper and television usage levels were top two for all age groups. Usage rates for the children, youth and adult groups, were 81.7%, 88.2% and 86.9%, respectively for newspapers, and 98.6%, 98.1% and 97.0% for television (**Appendix 38**).

Regardless of the educational level, television was still a primary source of information in 2014, with more than 95% of respondents getting general information from this media. For other media, usage levels increased with educational attainment. This is most obvious in internet use, with

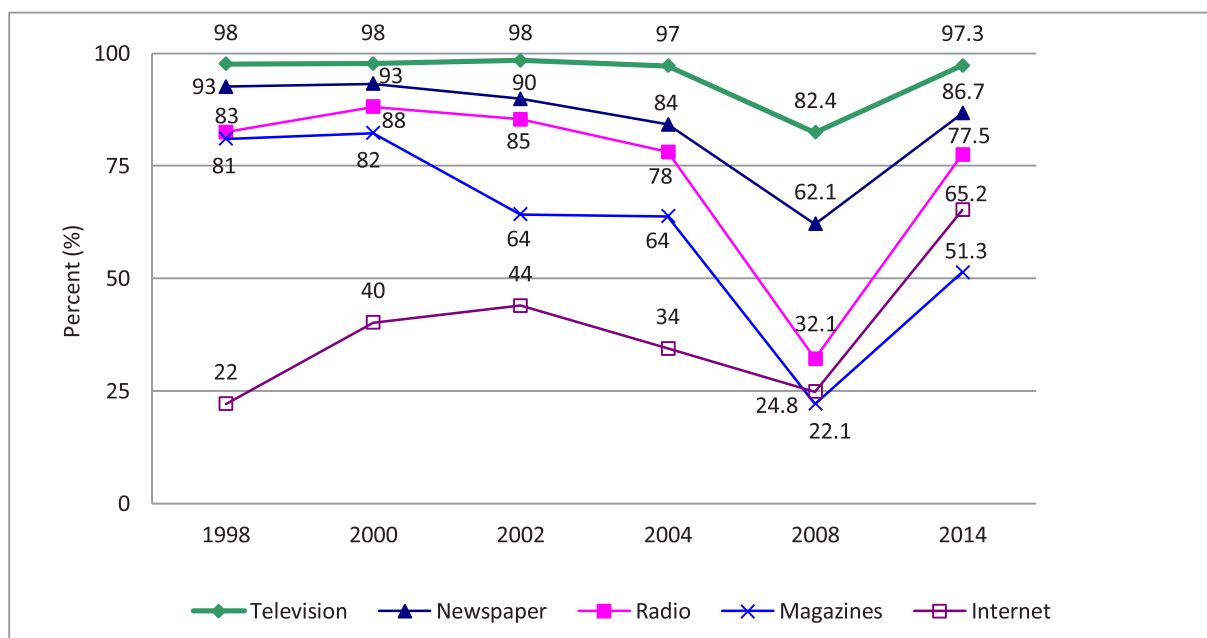


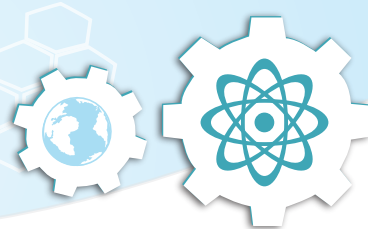
17.8% of respondents with no formal education going online, followed by 16.6% with primary education, 64.9% with secondary school education and 93.8% of respondents with tertiary education (**Appendix 39**).

There were notable differences in media use by ethnicity. Magazine readership was lower among Chinese respondents (39.5%), and internet use was lower among Indian respondents (49.1%). Malay respondents were inclined to read magazines and listen to the radio more than those of other ethnicities, at 60.2% and 79.8% respectively (**Appendix 40**).

Television has been a primary source of information through media for the Malaysian public since 1998, with more than 97.0% of respondents reported as watching it at least once a week except in 2008 (**Figure 2-15**). This was closely followed by newspaper readership, and lastly radio. From 1998 to 2014, subscriber numbers for the latter two types of media have been slowly decreasing. In comparison to 1998, newspaper readership has declined by 6 percentage points, while radio has declined by 4 percentage points. Interestingly, as internet usage grew over the years, radio and magazine usage levels also started to decline.

Figure 2-15: Source of Information through Media, 1998-2014

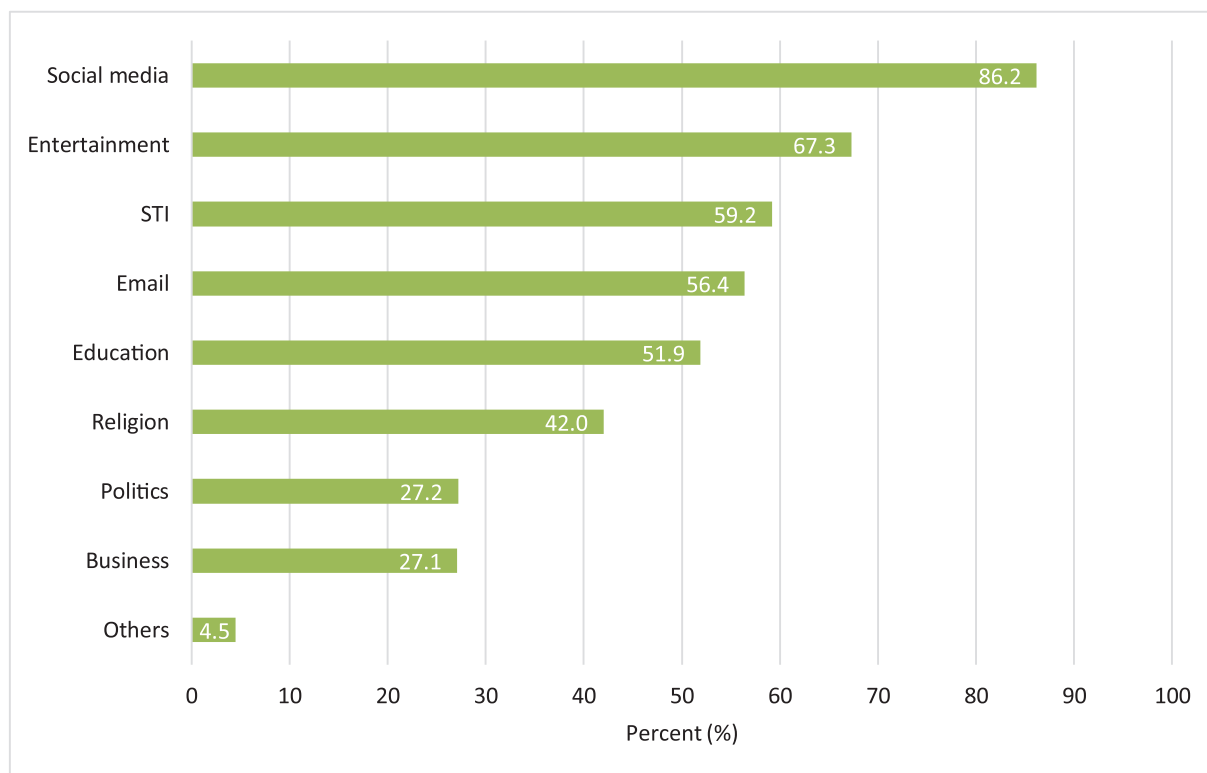




2.4.2 Internet Usage

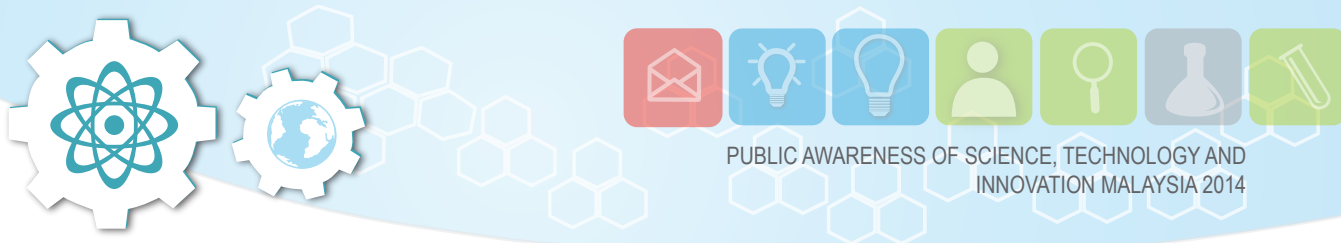
The two top uses of the internet among respondents were communicating via social media and entertainment, at 86.2% and 67.3%, respectively. STI was ranked third with 59.2%, followed by email (56.4%) and education (51.9%). Religion was also a common topic for internet users at 42.0%. The least popular topics were politics and business, with only one in four Malaysians using the internet (**Figure 2-16**).

Figure 2-16: Internet Usage



2.4.3 STI related Places

In the survey, respondents were asked if they had visited various STI related places in the last 12 months. Besides the zoo, visited by 31.0% of respondents and museum visited by 22.7% of respondents, there were fewer than 20.0% of respondents who had visited all other facilities mentioned (**Figure 2-17**).



By gender, differences in percentages were small for most online topics of interest to internet users, except for education. 60.5% of female respondents use the internet for education related searches, compared to one in two male respondents.

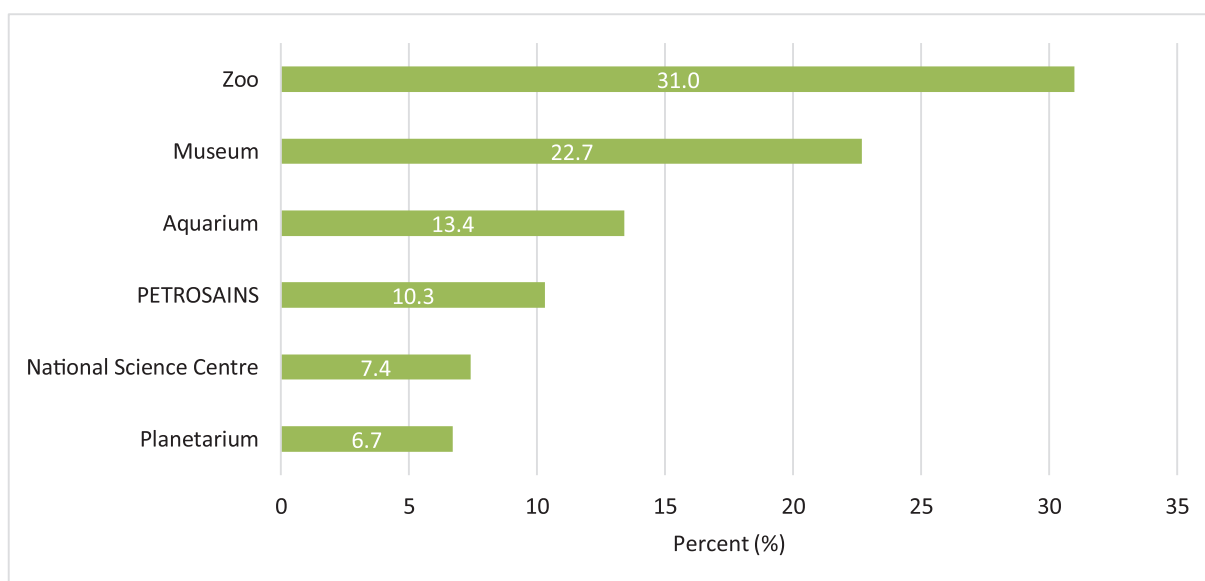
With reference to locality, a higher percentage of urban respondents used the internet for politics, email and business topics than in rural areas.

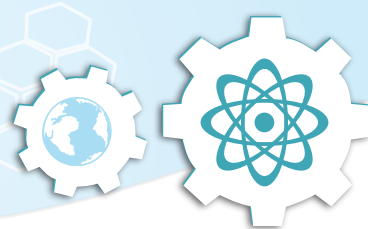
Social media was very popular with respondents in the children and youth groups, with nine out of ten respondents owning such accounts. For respondents in the youth group, four in every five respondents (79.9%) use the internet for entertainment, compared to 79.3% of respondents in the children's group, and 62.9% of the adult group. Moreover, older respondents were more likely to use the internet for the following: email, religion, business and politics.

Generally, respondents with higher education levels were more likely to use the internet for more purposes than respondents with lower education levels. For respondents with no formal education, the internet was mainly used for two activities viz. entertainment (45.9%) and social media (44.7%).

For all ethnic groups, the two most common internet activities that the respondents engaged in were social media and entertainment.

Figure 2-17: Visit to STI related Places in Last 12 Months





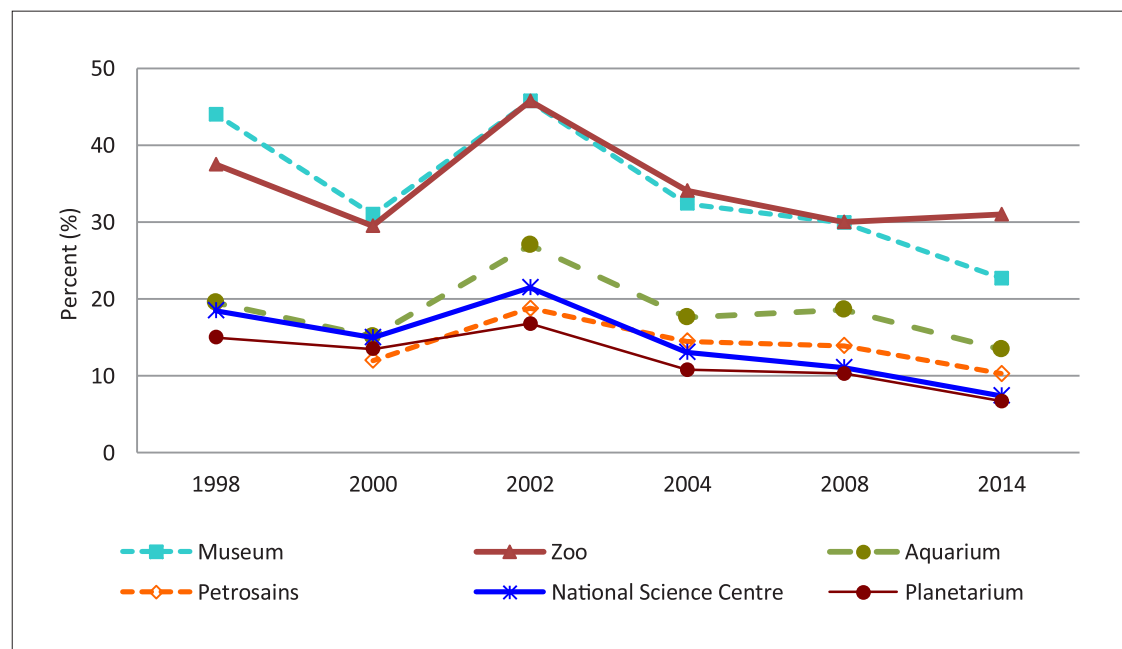
There was little gender variation in visits to STI facilities. Overall for locality, more urban respondents had visited a STI related place within the last 12 months than rural respondents. 33.3% of urban respondents had visited a zoo compared to 24% of rural respondents.

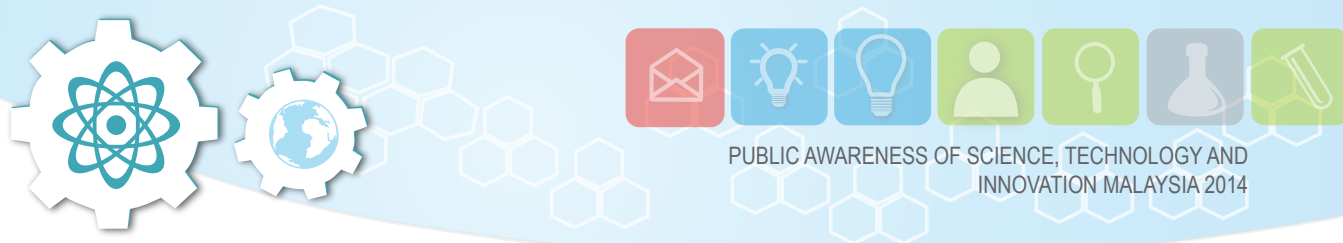
When examined by age group, it was clear that the younger age groups had higher likelihoods of visiting STI related places in the last 12 months. The children's group visited planetariums and PETROSAINS, almost 3 times more than the adult group.

In general, better educated respondents were more likely to have visited an STI related facility within the last 12 months. For example, only 15.0% of respondents with no formal education had visited a zoo compared to 37.9% for tertiary educated respondents. For ethnicity, more Malay and Indian respondents appeared to have visited at least one of the STI facilities compared to the Chinese and Other Bumiputera.

Compared to S&T surveys of previous years, museums and zoos were the more visited STI facilities amongst others. However, there has been a decrease in the number of visits to all STI facilities between 1998 and 2014. In previous years at least about 30.0% of respondents had visited the museum (**Figure 2-18**).

Figure 2-18: STI related Places Visited across 1998-2014





On further analysis it was found that the percentage of respondents who said they visited these STI facilities in the last 12 months has dropped. However, the reader must note that Malaysia's Average Annual Population Growth Rate (AAPG) was about 1.5% since year 2000. Thus, the number of visitors for each facility may have increased in previous years to 2014, but, the growth rate of these visits for each of the facilities may be different from the population growth rate.

For instance the number of visitors recorded by the National Science Centre was 605,130 persons in year 2008 and 628,281 in 2013; the average growth rate was about 3.7%. However, the total population growth between 2008 and 2013 was about 7.5% (AAPG 1.5% x 5 years). This means that although the visitors to the National Science Centre had increased, the visitor growth rate was still lower than the population growth rate. Therefore, on average, the proportion of the population who visited the facility has dropped.

2.5 PUBLIC AWARENESS OF STI RELATED GOVERNMENT PROGRAMMES AND POLICIES

2.5.1 Awareness of Government STI Programmes

Respondents were asked about their awareness and participation in various government run programmes such as BioMalaysia, World Innovation Forum (WIF), Malaysian Agriculture, Horticulture & Agrotourism International Show (MAHA), Centre for Education and Training in Renewable Energy and Energy Efficiency (CETREE), Year of Science and National Innovation Movement 2012 (SGI2012), 2011 Science and Mathematics Promotion Programme and Malaysia Innovative 2010. At least one in four to two in five of all respondents had heard of each programme. For the MAHA, about 3 in every 5 respondents were aware of it (**Figure 2-19**). With the exception of the Malaysian Agriculture, Horticulture & Agrotourism International Show (MAHA) which had a 13.7% participation rate, all other programmes had a low participation rate of below 2.0% (**Figure 2-20**).

Adult group respondents with higher education levels were generally more aware of these programmes than younger respondents with lower education levels. Malay and Other Bumiputera respondents were more aware of these programmes and how to participate in them, than those from other ethnic groups. Gender and locality did not seem to be a relevant factor in measuring the awareness of and participation in these programmes.

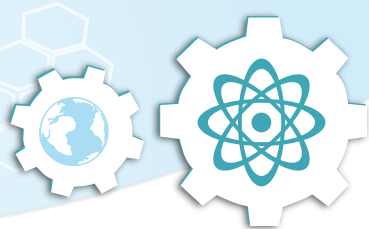


Figure 2-19: Awareness of STI related Government Programme

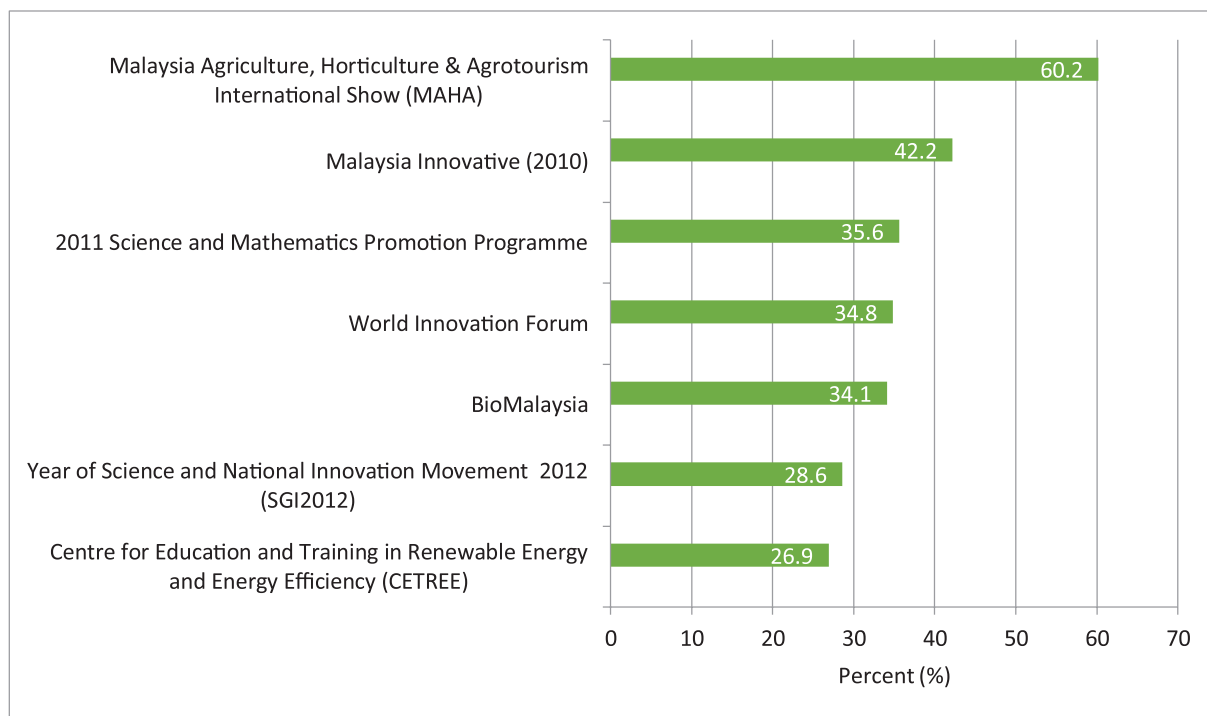
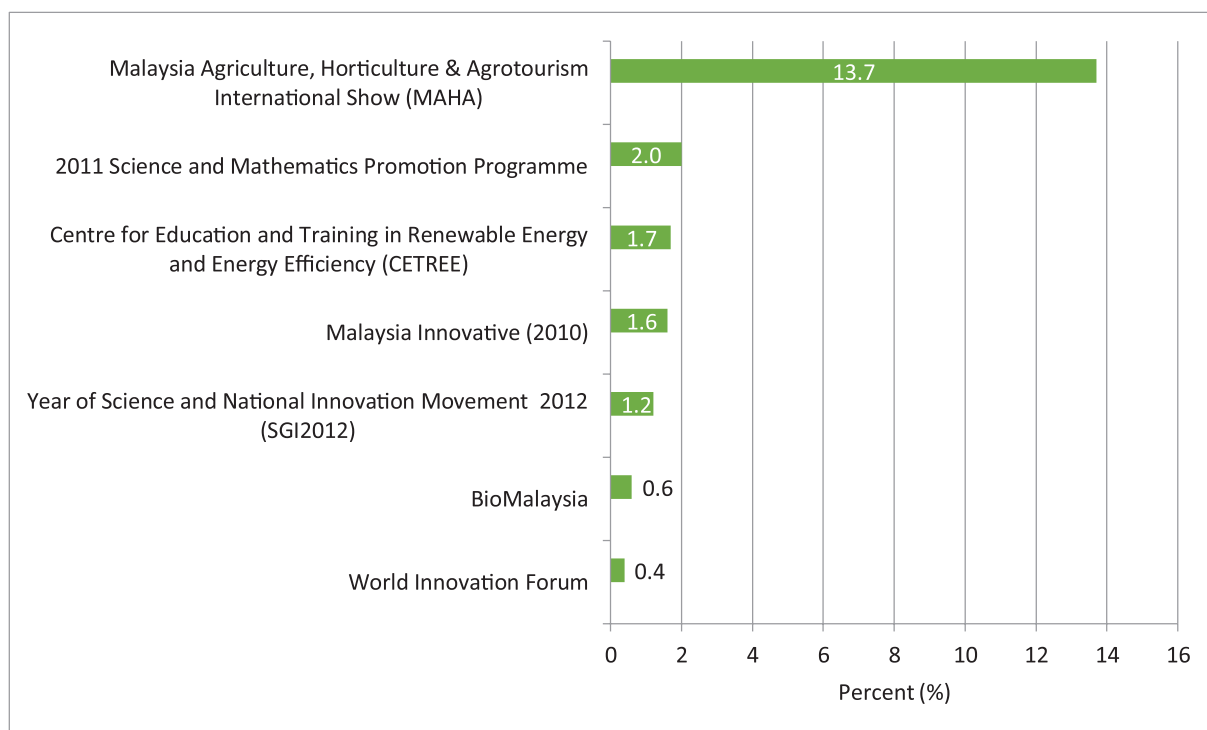




Figure 2-20: Participation in STI related Government Programme





Box 2-1: World Innovation Forum

World Innovation Forum-Kuala Lumpur, or WIF-KL, an annual symposium on global and grassroots innovation was held from 3-7 November 2012 at the Kuala Lumpur Convention Centre. Three major conferences and forums were held simultaneously at this event with the aim of building sustainable innovation and community-based learning:

Kuala Lumpur Innovation Forum 2012 (KLIF 2012). The KLIF was a premier *Thought Leadership Forum* discussing innovation. High level speakers and participants representing the public, private and civil sectors, and academicians shared their successful experiences and deliberated on related issues that promote innovation at the global, regional and national levels.

BioMalaysia Conference & Exhibition 2012. The annual BioMalaysia Conference and Exhibition 2012 is the largest regional biotechnology event. The theme for 2012 was '*Driving Innovation and Wealth Creation through Bioeconomy*', and the latest biotechnologies from the local, regional and international markets were showcased and presented.

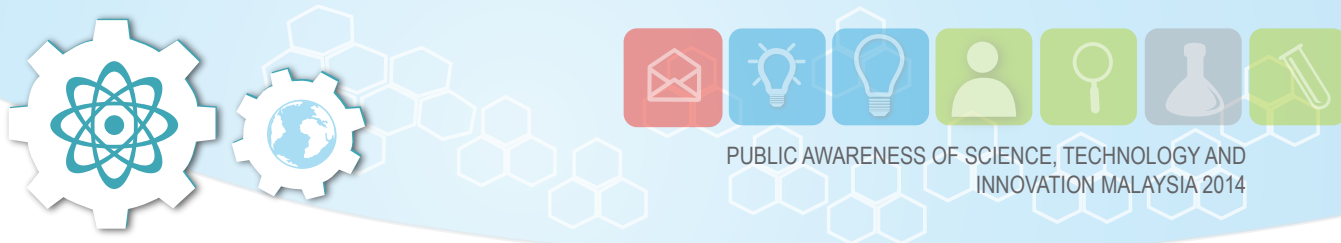
NanoMalaysia Summit and Expo 2012. The National Nanotechnology Directorate organised the NanoMalaysia Summit and Expo 2012 as a platform for exploring business opportunities and networking between public, corporate sectors, investors, small and medium industries and researchers in the field of nanoscience and nanotechnology.

Nine other satellite events held at WIF-KL 2012 which included *Jejak Inovasi* (Innovation Walk) an open day investment forum, YIM Kids Invent!, TEDxMerdekaSquare, Asia Grassroots Innovation Design Competition and Forum and WIF-KL Innovation Awards Night. The WIF-KL 2012 Exposition also included The National Innovation Conference & Exhibition (NiCE 2012) and Grassroots Innovation Exhibition 2012.

The World Innovation Forum-Kuala Lumpur 2013 (WIF-KL 2013) was a continuation from previous programmes, including WIF-KL 2012 and the Kuala Lumpur International Forums (KLIF). Made possible through the joint efforts of the Ministry of Science, Technology and Innovation (MOSTI) and the Malaysian Innovation Foundation (YIM), WIF-KL 2013 aspired to build a new culture of innovation, with Malaysia as its centre.

Various satellite events were held at WIF-KL. These include *Bengkel Jejak Perdana* 2013, YIM Ideation School Club Innovation Toolkit 2013, South East Asia Knowledge Transfer Dialogue on Innovation by AIM, Towards an Innovation-Driven Malaysia by MPC, Asian and Pacific Centre for Transfer of Technology (APCTT) Technical Committee Meeting by MOSTI, and Open Innovation Platform (OIP) Workshop by MOSTI and MIMOS, among others.

For the first time, WIF-KL 2013 also featured Innovation Labs (iLABS) talks covering a range of topics from housing, infrastructure, transportation, environment, government, education and technology, with both international and local speakers.



Box 2-2: Year of Science and National Innovation Movement 2012

As a continuation of the nation's efforts to inculcate scientific knowledge and innovation among the Malaysian public, 2012 was declared the Year of Science and National Innovation Movement or SGI2012 (Tahun Sains dan Gerakan Inovasi Nasional 2012). The theme for the calendar filled year is 'Science and Innovation Drive Transformation', with a total of 554 science, technology and innovation related activities and programmes scheduled across country, targeted at Malaysia's youth.

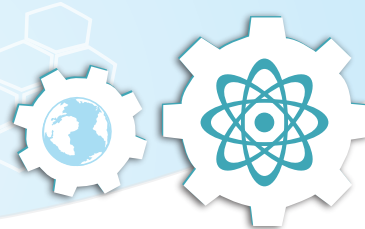
The Science and Innovation Carnivals are pillar programmes under SGI 2012, held in six zones throughout the country. Attractions to these carnivals include Science and Angkasawan Space Camps, the Amphibious Electrical Vehicle Competition, Water Rocket Competition and Nano Fest, among others. These Science and Innovation Carnivals are expected to attract more than 10,000 visitors in a single weekend.

In addition to its usual programmes, The National Science Centre (NSC) also organised a host of events in conjunction with SGI2012 which include Science Kids, Special Science Day, the Science Festival, the World Robotic Olympiad, Lego League and Paper Air Plane competitions. Not limited to just its facility in the Klang Valley, the Science on Wheels Programme is a travelling exhibition to schools and communities across Malaysia.

Other programmes organised during SGI2012 include Makeweekend, *Dengan Inovasi*, Yo! and Kreatif X-Press.



PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND
INNOVATION MALAYSIA 2014



Box 2-3: 2011 Science and Mathematics Promotion Programme

Promotion of Science and Mathematics Year or TPSM 2011 is a national programme to foster interest and participation of Malaysians, namely students, members of the community, NGOs and private businesses in mathematics and the sciences. This programme was spearheaded by the Ministry of Science, Technology and Innovation (MOSTI) as a continuation of previous programmes such as Innovative Malaysia 2010, to increase awareness and acculturation of science and mathematics among the Malaysian public. Fittingly, the theme for TPSM 2011 is 'Go Science, Love Maths'.

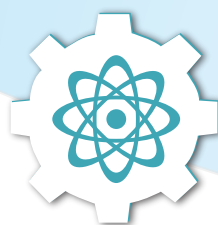
Various science and mathematics-based activities and programmes were organised in 2011 through a collaborative efforts between various government ministries, which including the Ministry of Education, the Ministry of Youth and Sports, Ministry of Women, Family and Community Development, government agencies, NGOs and private organisations. Among these programmes was the Go Science, Love Maths Carnivals in six zones across the country: Northern Zone, Eastern Zone, Central Zone, Southern Zone, Sarawak Zone and Sabah Zone.

TPSM 2011 was officially launched on 27 May 2011 at the National Science Centre by Y.B. Datuk Seri Dr. Maximus Johnnity Ongkili, Minister of Science, Technology and Innovation.

Box 2-4: Malaysia Innovative 2010

Innovative Malaysia or MI 2010 is a national programme initiated by the government in 2010 to foster creativity and innovation in the Malaysian mainstream. The Ministry of Science, Technology and Innovation (MOSTI) was tasked with coordinating this national initiative with parties which included other government ministries and agencies, and private companies. Themed Celebrating Creativity (*Meraikan Kreativiti*), the programme targets audiences from all sectors and personal backgrounds, in particular students, OKU citizens, community members, female researchers, scientists, representatives from the government, NGOs and private companies.

The Prime Minister, YAB Datuk Seri Najib Tun Razak launched the MI 2010 on 17 January 2010 at the Putrajaya International Convention Centre in front of more than 4,000 members in attendance, which included representatives from the state governments, academics, NGOs, grassroot organisations, private bodies, students and youth representatives. Among the 202 programmes identified and organised throughout the year, were the Innovative Malaysia Carnivals at 6 zones across Malaysia - Northern Zone, Eastern Zone, Central Zone, Southern Zone, Sarawak Zone and Sabah Zone.

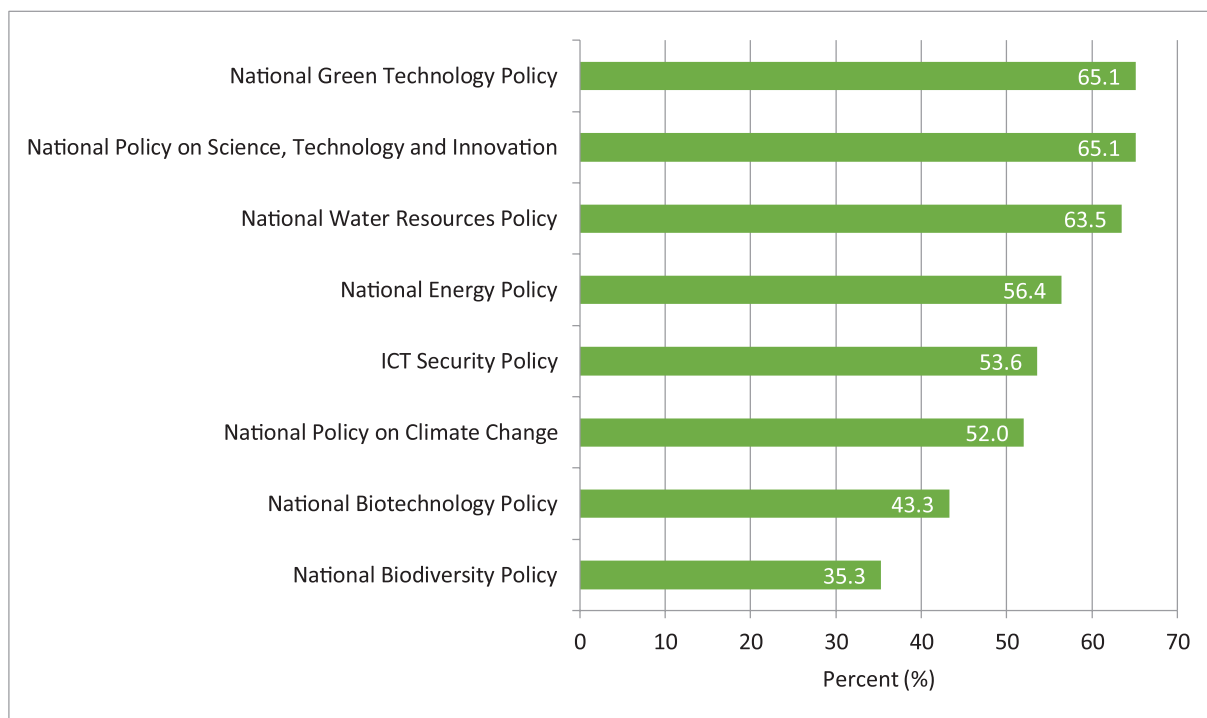


2.5.2 Awareness of National STI related Policies

About two in three respondents were aware of the National Policy on Science, Technology and Innovation, the National Water Resources Policy and the National Green Technology Policy. More than half of all respondents were aware of the ICT, Security Policy, the National Policy on Climate Change and the National Energy Policy. For the National Biotechnology Policy and the National Biodiversity Policy, 43.3% and 35.3% respectively were aware of these policies (**Figure 2-21**).

Of all age groups, the youth group was the most aware of the stated policies. Respondents with higher education levels were also more likely to hear of these policies than those with less education. Malay and Other Bumiputera respondents were more aware of the policies than Chinese or Indian respondents. Gender and locality did not seem to affect the respondents' awareness of these policies.

Figure 2-21: Awareness of Government STI related Policies





2.5.3 Views on Government Spending

About one in every four respondents thought that government spending on developing renewable energy, poverty eradication, quality health care, environmental protection, roads and bridges, mass transportation, supporting scientific research, reducing crime and national security, was too little. Others felt that the government spends too little particularly on reducing crime (42.3%), poverty eradication (40.1%), and environmental protection (36.3%) (**Figure 2-22**). In addition, one in every four respondents thought the government spends too little on education.

While opinion on government spending are similar by gender, urban respondents generally thought the government was spending too little on reducing crime (45.0%), poverty eradication (40.2%), environmental protection (38.2%), roads and bridges (38.2%), developing alternative energy (33.8%), and supporting scientific research (34.2%). About two in five rural respondents also believed that the government was spending too little on poverty eradication (39.8%), while one in three believed that the government was spending too much on education (34.6%) and national security (32.1%) (**Appendix 41-42**).

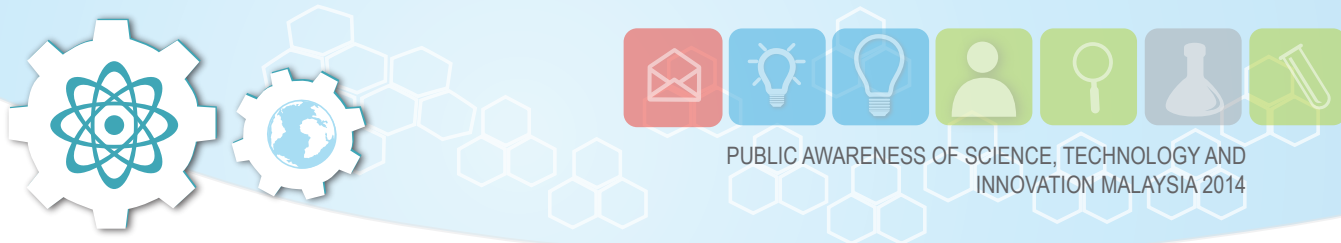
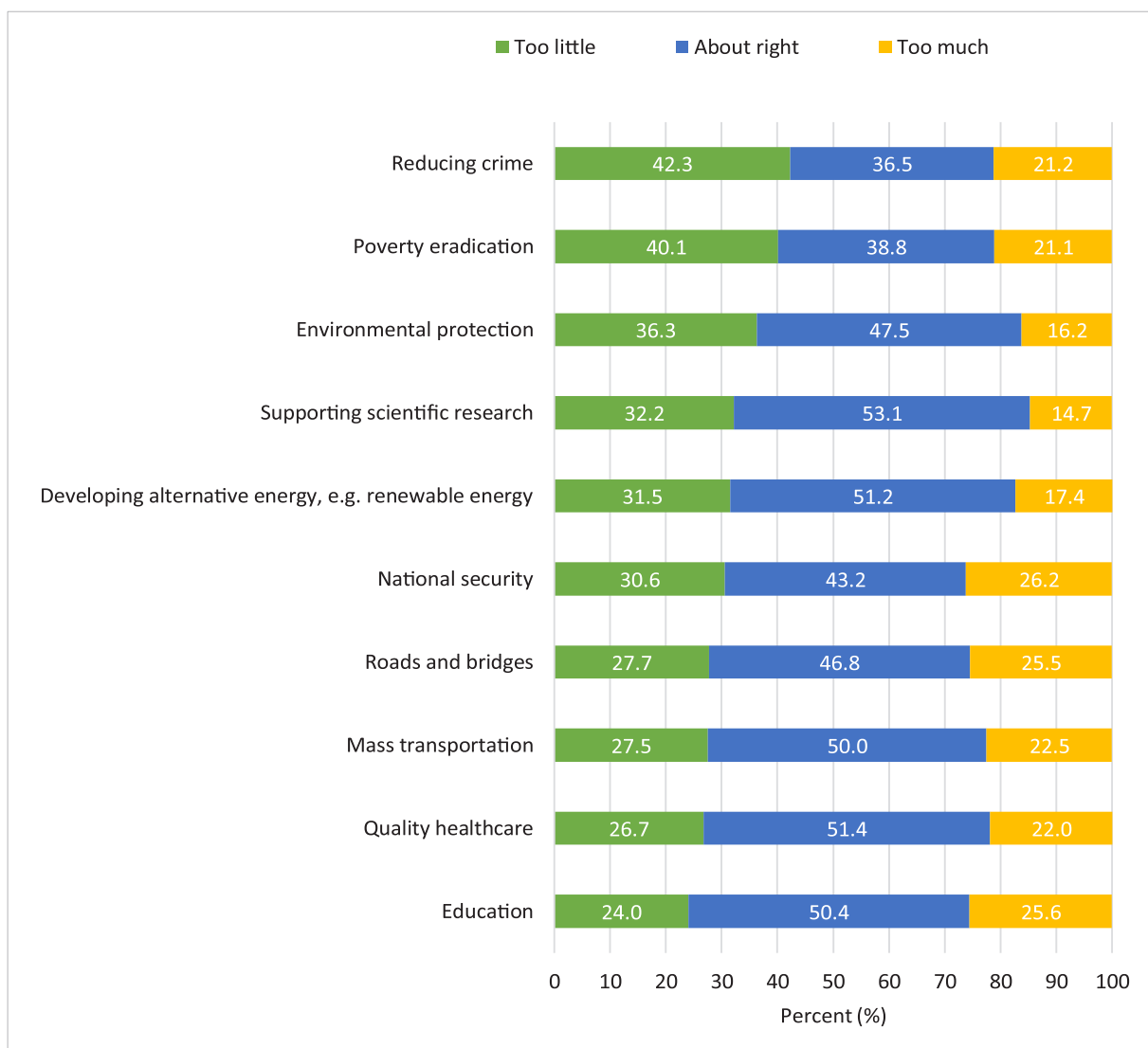
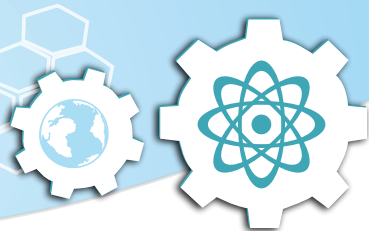


Figure 2-22: Assessment of Government Spending





Respondents in the children and youth age groups generally held the view that the government spends too much on education, quality health care, roads and bridges, mass transportation and national security. Respondents in the adult age group generally believe that the government spends too little on reducing crime (44.1%), poverty eradication (42.0%), environmental protection (38.1%) and supporting scientific research (34.0%) (**Appendix 43**).

Respondents with no formal education held the general opinion that the government spends too little on reducing crime (49.4%), poverty eradication (46.7%), environmental protection (41.6%) and mass transportation (41.1%). Respondents with primary education were of the opinion that the government spends too much on education (33.5%), national security (32.2%), roads and bridges (31.0%) and reducing crime (27.3%) (**Appendix 44**).

About 28.3% of respondents with secondary education thought that the government spends too much on national security. The government is under-spending instead on poverty eradication (41.1%), reducing crime (39.9%), environmental protection (32.8%) and supporting scientific research (29.6%). Respondents with tertiary education generally believed that the government is spending too little on developing alternative energy, poverty eradication, quality healthcare, environmental protection, roads and bridges, mass transportation, supporting scientific research, reducing crime and national security (**Appendix 44**).

By ethnicity, about three in ten Malay respondents generally thought that the government spends too much on education (32.2%), national security (27.9%), quality healthcare (27.4%) and roads & bridges (27.2%). For Chinese respondents, at least two in five were generally of the opinion that the government under spends on all areas mentioned. For Indian respondents, almost one in every two believe that the government is spending too little on poverty eradication (49.4%) and reducing crime (48.1%). About one in every three Indian respondents were also of the opinion that the government spends too much on roads and bridges (26.6%). For Other Bumiputera respondents, more than two in every five respondents believe the government is spending too much on national security (45.9%) (**Appendix 45**).

3.1 PUBLIC INTEREST IN STI

In comparison to other countries like the United States of America (USA) and the European Union (EU), Malaysian respondents showed the lowest level of interest in STI issues. On average, 78% of Malaysian respondents were *interested* STI, compared to 89% in the USA and 83% in the EU. In terms of those who were *not interested* in STI, Malaysia reported the highest percentage of *not interested* responses in selected STI issues (19%) compared to the USA (10%) and EU (16%).

Table 3-1: Public Interest in Selected STI Related Issues, by Country

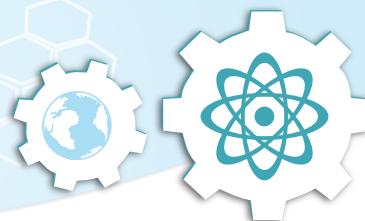
Selected Issues	Malaysia 2014			USA 2014			EU 2010		
	Very interested	Interested	Not interested	Very interested	Interested	Not interested	Very interested	Interested	Not interested
	Percent (%)								
The use of new inventions and technologies	23	61	13	42	46	11	n.a.	n.a.	n.a.
New medical discoveries	17	62	18	58	36	5	32	50	17
Environmental pollution	16	57	25	45	45	9	37	51	11
New scientific discoveries	12	63	21	40	45	14	30	49	20
Average percentage	17	61	19	46	43	10	33	50	16

Notes: For the “Environmental pollution”, the European Commission asked “Environmental problems”, and for the “New scientific discoveries”, the European Commission asked “New scientific discoveries and technological developments”.

Sources:

1. National Science Board (2014) *Science and Engineering Indicators 2014*.

2. European Commission (2010) *Special Eurobarometer 340: Science and Technology*.



3.2 PUBLIC KNOWLEDGE OF STI ISSUES

3.2.1 Understanding of STI Terms and Concept

Public knowledge of STI in Malaysia is much lower than in the USA (as of year 2014) and EU (as of year 2005) with nearly a 20 percentage point difference, respectively. Amongst Asian countries, Malaysia is still behind first tier countries such as Japan (as of year 2011) and South Korea (as of year 2004) by 6 and 13 percentage points respectively.

Table 3-2: Correct Answers to Questions on Scientific Concepts and Statements, International Comparison

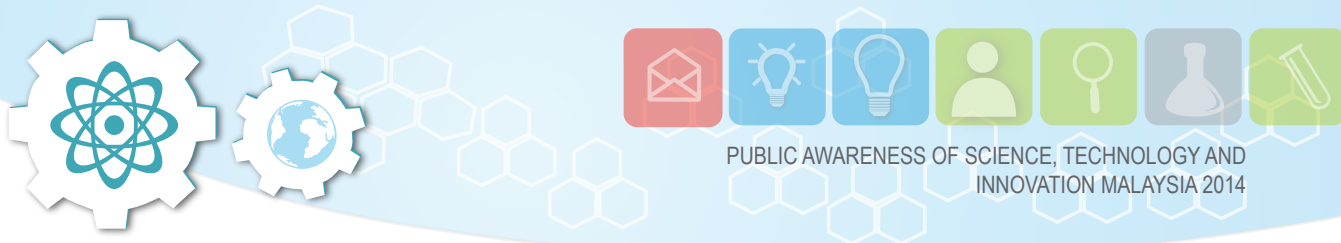
Scientific Terms and Concept	Malaysia 2014	USA 2014	China 2010	EU 2005	India 2004	Japan 2011	Russia 2003	South Korea 2004
The earth travels around the sun	85	74	n.a.	66	70	n.a.	n.a.	86
The centre of the earth is very hot	75	84	56	86	57	84	n.a.	87
The continents have been moving their location for millions of years and will continue to move	62	83	50	87	32	88	40	87
It is father's gene that determines the gender of the baby	45	63	58	64	38	29	22	59
Electrons are smaller than atoms	35	53	27	46	30	32	44	46
Lasers work by focusing sound waves	30	47	23	47	n.a.	32	24	31
All radioactivity is man-made	20	72	48	59	n.a.	69	35	48
Antibiotics kill viruses as well as bacteria	16	51	28	46	39	33	18	30
Average percentage of questions answered correctly	46	66	41	63	44	52	31	59

Source: National Science Board (2014) *Science and Engineering Indicators 2014*.

3.2.2 Pseudoscience

More Malaysian respondents seemed to think that horoscopes were scientific (38%), whereas, only 10% of USA respondents and 13% of EU respondents thought so. However, taking the sort of scientific group of respondents into consideration, Malaysia is not so different from the USA and EU (about 10 and 11 percentage points respectively).

In view of the above, very few Malaysians were certain that horoscopes are not scientific (19%). In the USA and the EU, more than half of total respondents clearly chose the "not scientific" response to the issue. This confirms that most Malaysian respondents, compared to those in the USA and the EU, could not differentiate between pseudoscience and true science, in so far as horoscopes were concerned.

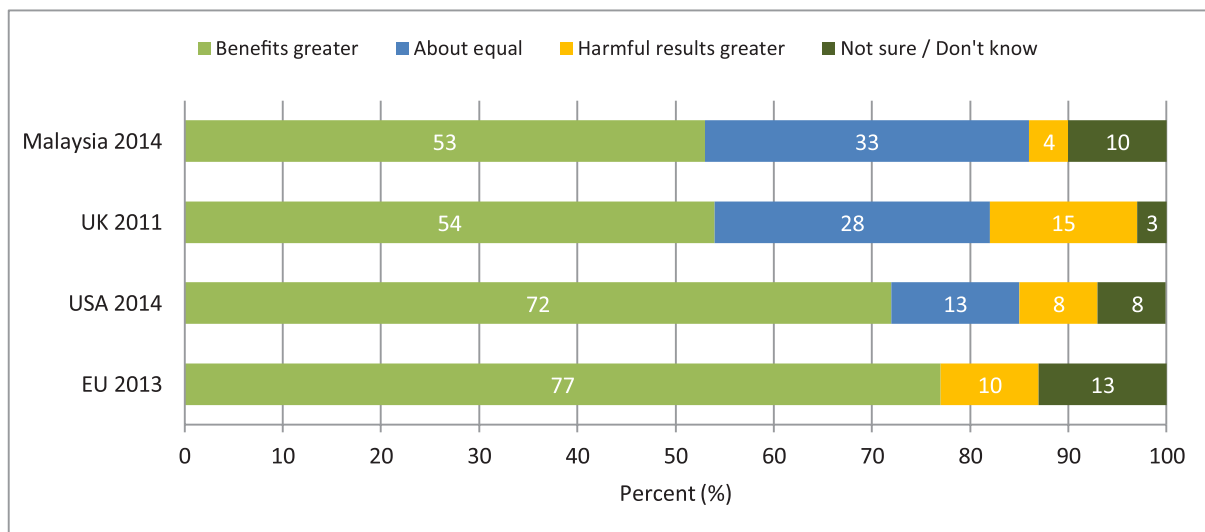


3.3 PUBLIC ATTITUDES TOWARDS STI

3.3.1 Scientific Research

The majority of the public interviewed in S&T Surveys held the opinion that scientific research brought greater benefit than harm. However, the percentage of Malaysians who held this opinion was relatively lower than the percentage of respondents in the US and Europe (**Figure 3-1**). The proportion of Malaysians believing scientific research brought greater benefit than harm was on par with that of the United Kingdom.

Figure 3-1: Public Assessment of Scientific Research, by Country



Source: National Science Board (2014) *Science and Engineering Indicators 2014*.

3.3.2 STI, Scientific Research and Science

More Malaysians (92%) agreed with the statement “STI improves the quality of our lives” compared to the percentage of Europeans (66%) and UK respondents (79%) who were asked the same question.

There was no significant difference between Malaysia (42%), the USA (42%) and the EU (39%) on the statement “we depend too much on science and not enough on faith”.

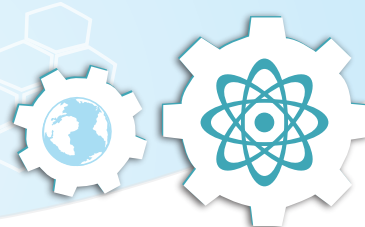


Table 3-3: Public Attitudes toward Science and Technology, by Country

Statements	Malaysia 2014		USA 2014		EU 2013		UK 2011	
	Agree	Disagree	Agree	Disagree	Agree	Disagree	Agree	Disagree
	Percent (%)							
We depend too much on science and not enough on faith	42	58	42	30	39	32	n.a.	n.a.
Science causes our lifestyles to change too fast	81	19	42	56	62	18	n.a.	n.a.
STI improves the quality of our lives	92	8	n.a.	n.a.	66	9	79	5
STI are very important for the progress of our nation	95	5	87	10	75	7	n.a.	n.a.

Source: National Science Board (2014) *Science and Engineering Indicators 2014*.

3.4 SPECIFIC STI ISSUES: CLIMATE CHANGE

The International Social Survey Programme² (ISSP), Environment Module (2010) study showed that more than 70% of respondents from the countries surveyed considered climate change to be extremely/very dangerous or somewhat dangerous (**Figure 3-2**). A noticeable proportion of respondents felt that climate change was not very or not dangerous at all: the United States (20%) and New Zealand (18%).

A majority of Malaysians (89%) were concerned about the impact of climate change. They were willing to change their lifestyles to help reduce emissions and climate change impacts. As the ISSP and Malaysian STI survey questions on climate change were different, it would be inappropriate to make direct comparisons between them.

² The 2010 ISSP was a survey conducted in 31 countries, including United States and its member countries.

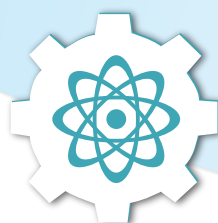
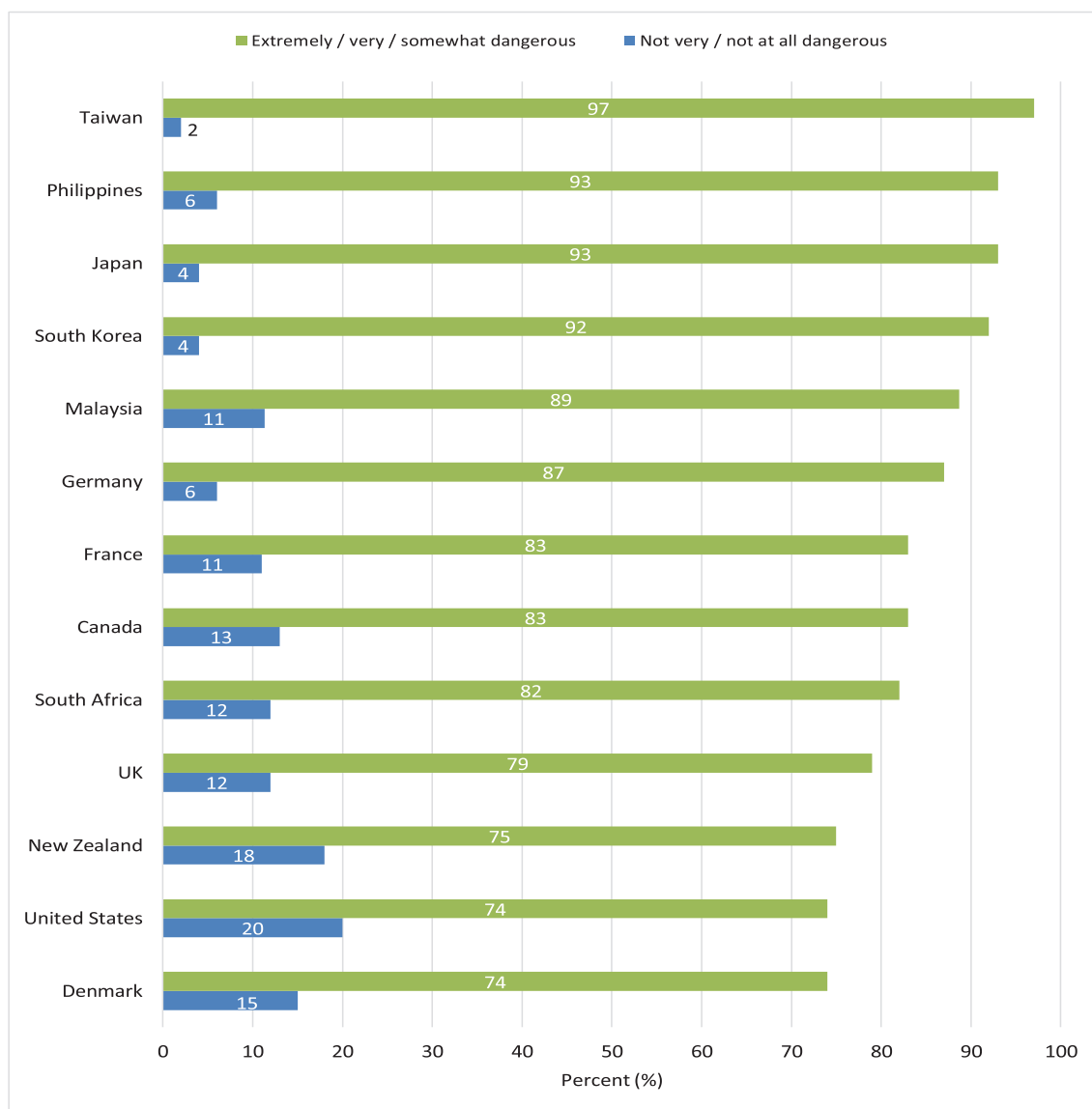


Figure 3-2: Assessment of Climate Change Impact, by Countries



Notes:

1. Malaysia responses to "Do you strongly favour, favour, oppose or strong oppose any change to your lifestyle in order to contribute emissions and climate change impacts?"
2. Other countries responses to ISSP question "Do you think that a rise in the world's temperature caused by climate change is extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, or not dangerous at all for the environment?"
3. Malaysia responses were re-coded for comparison purposes. "Strongly favour" and "favour" were re-coded as "extremely/very/somewhat dangerous"; "oppose" and "strongly oppose" were re-coded as "not very/not at all dangerous".

Source: National Science Board (2014) *Science and Engineering Indicators 2014*.



3.5 SPECIFIC STI ISSUES: NUCLEAR POWER

A study by the 2010 International Social Survey Programme (ISSP), Environment Module showed that the opinions of countries vary on the issue of nuclear power.

The highest opposition came from the Philippines, where 92% of its public considered nuclear power plants to be extremely/very/somewhat dangerous, while 58% of respondents in Denmark considered nuclear power plants to be highly or extremely dangerous. In Malaysia, 61% of Malaysians were opposed nuclear power (**Figure 3-3**).

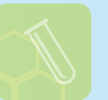
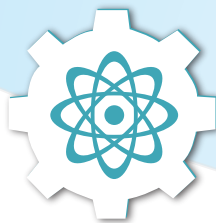
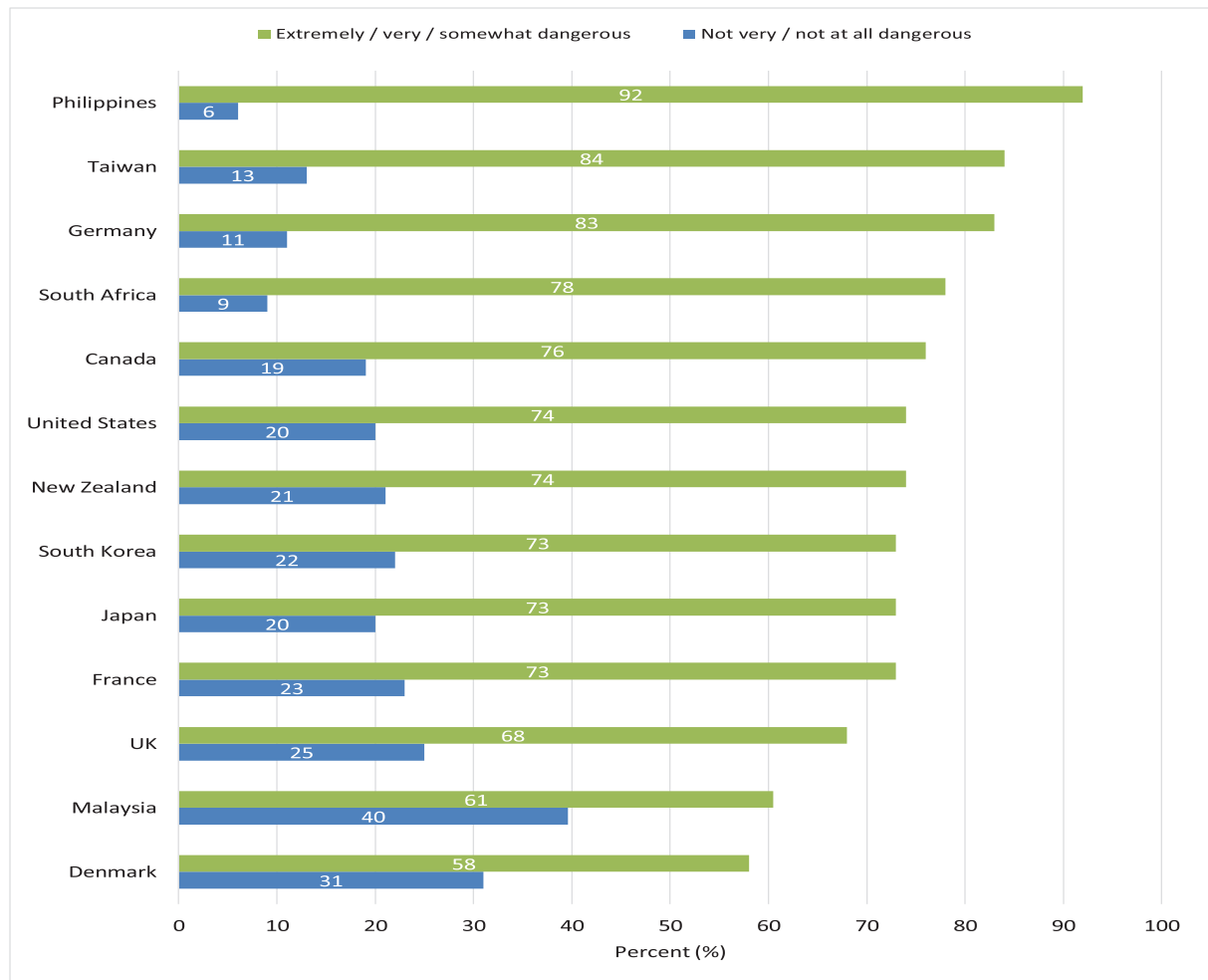


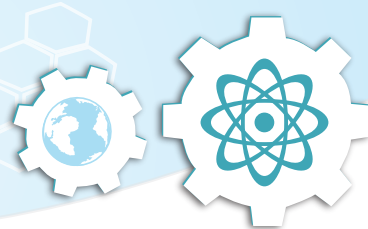
Figure 3-3: Assessment of Nuclear Power Station



Notes:

1. Malaysia responses to "Do you strongly favour, favour, oppose or strong oppose the use of nuclear power to generate electricity in Malaysia?"
2. Other countries responses to ISSP question "Do you think that nuclear power stations are extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, or not dangerous at all for the environment?"
3. Malaysia responses were re-coded for comparison purposes. "Strongly favour" and "favour" were re-coded as "not very/not at all dangerous, whereas "oppose" and "strongly oppose" were re-coded as "extremely/very/somewhat dangerous".

Source: National Science Board (2014) *Science and Engineering Indicators 2014*.



3.6 INFORMATION SOURCES AND INVOLVEMENT

In the USA, television was the most important source of information and current news, similar to Malaysia. However, the internet was the second most important source of information in USA, but only the fourth most commonly used media for information in Malaysia, after television, newspapers and radio.

According to a 2012 Survey of Scientific Literacy in Taiwan, television was the primary source of public information, with 96% of respondents watching television at least once a week. Two in every three read the newspapers, at least once a week, while only 36% of respondents listened to the radio in the same time period.

Table 3-4: International Comparison for Source of Information through Media

Primary Source of Information	Malaysia 2014 (multiple answers)	Taiwan 2012 (multiple answers)	USA 2014 (single answer)
Newspapers	87	66	13
Magazines	51	n.a.	1
TV	97	96	43
Radio	78	36	5
Internet	65	n.a.	33

Sources:

1. National Science Board (2014) *Science and Engineering Indicators 2014*.
2. National University of Sun Yat-Sen, Centre of General Education (2012) *Survey of Scientific Literacy Taiwan 2012*.

3.6.1 Source of Information for STI

For STI information, 89.0% of respondents use the television as the main source of information. The next most used source for STI information was print newspapers at 63.1%, followed by the internet at 53.3%, radio at 42.8% and books at 38.9%. Besides print magazines at 24.2%, all other information sources were used by less than 20.0% of respondents for STI related information (**Figure 3-4**).

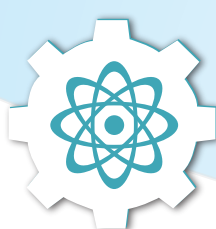
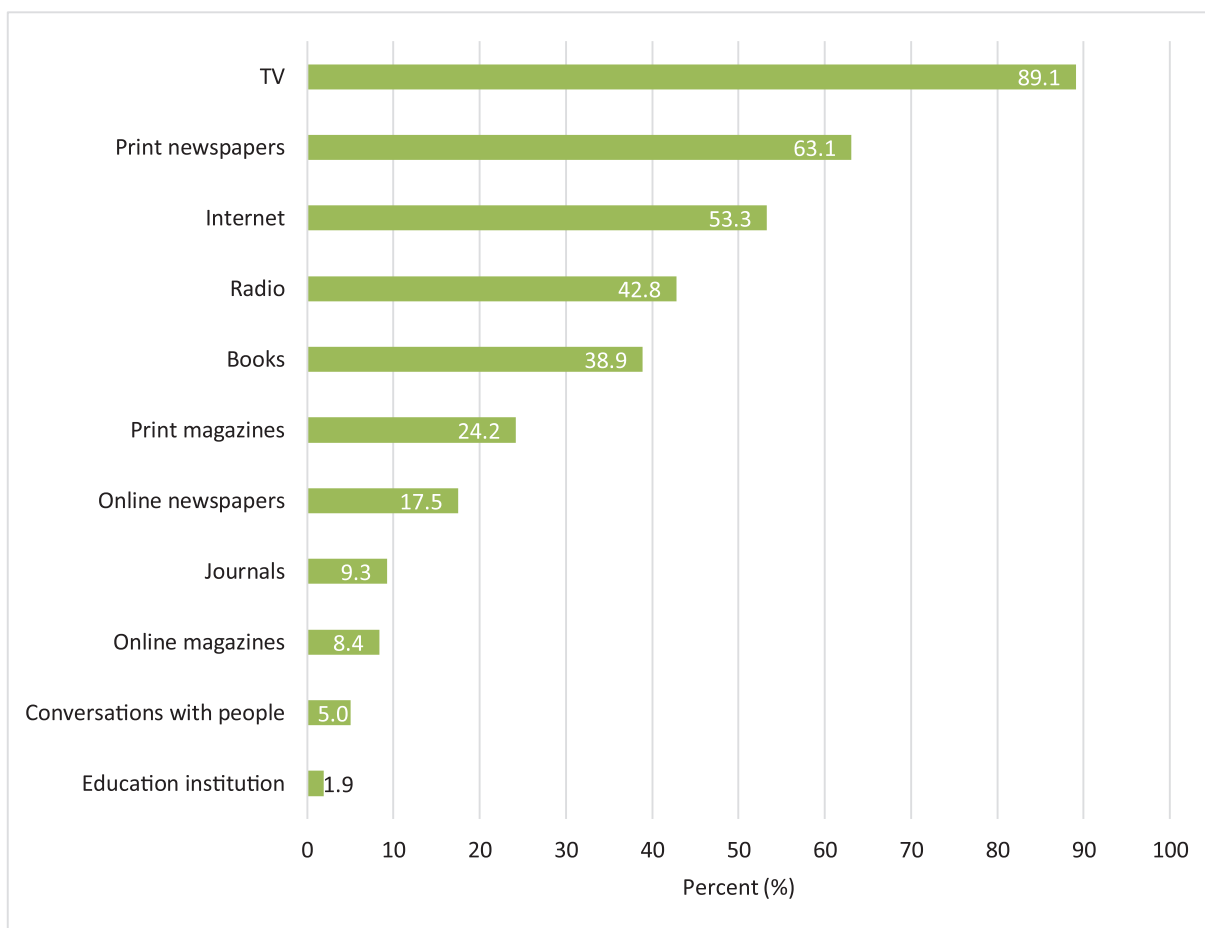


Figure 3-4: Source of Information for STI



Surveys in the European Union, the United Kingdom and Taiwan indicate television as the primary source of STI information for the public, except for the USA. In the USA, the primary source of STI information is the Internet. Other media such as newspapers were also important sources of information on STI.

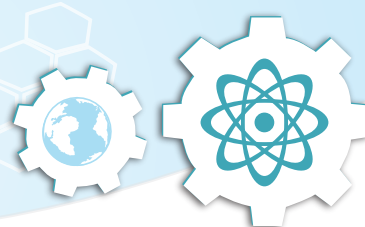


Table 3-5: International Comparison for Source of STI Information

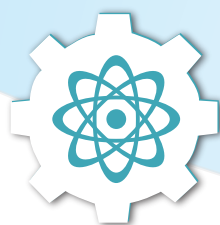
Information Source for STI	Malaysia 2014	EU 2013	UK 2011 (maximum 2 answers)	Taiwan 2012	USA 2014 (single answer)
Newspapers	63	33	33	58	7
Magazines	24	n.a.	9	49	8
Internet	53	35	19	53	42
TV	89	65	54	95	32
Radio	43	17	14	15	2
Books	39	14	8	31	3

Sources:

1. European Commission (2013) *Special Eurobarometer 401: Responsible Research and Innovation*.
2. Ipsos MORI (2011) *Public Attitudes towards Science 2011*.
3. National University of Sun Yat-Sen, Centre of General Education (2012) *Survey of Scientific Literacy Taiwan 2012*.
4. National Science Board (2014) *Science and Engineering Indicators 2014*.

3.6.2 STI related Places

Available data from countries, including the US, the United Kingdom, Brazil, China, India, Japan, South Korea, Taiwan and the European Union, show that the Malaysian public's engagement with informal STI venues by comparison was significantly lower than in more advanced/developed countries, with the exception of Brazil. **Table 3-6** shows the comparison of the visitations to STI-related facilities.



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Table 3-6: International Comparison for STI related Facilities

STI related Places	Malaysia 2014	USA 2014	EU 2005	UK 2011	Brazil 2010	China 2010	India 2005	Japan 2001	South Korea 2010	Taiwan 2012
Museum / Art museum	23	33	23	31	14	27	22	34	27	30
Zoo / Aquarium	31	47	27	26	22	58	35	43	28	46
Planetarium	7	n.a.	n.a.	6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
National Science Centre / Science and technology museum	7	25	16	22	8	27	12	12	9	13

Sources:

1. National Science Board (2014) *Science and Engineering Indicators 2014*.
2. European Commission (2005) *Special Eurobarometer 224: European, Science and Technology*.
3. National University of Sun Yat-Sen, Centre of General Education (2012) *Survey of Scientific Literacy Taiwan 2012*.



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3.7 PUBLIC AWARENESS OF STI RELATED GOVERNMENT PROGRAMMES AND POLICIES

In the General Social Survey 2010, the American public was asked to express its opinion on government spending. Three in every four (4) Americans were of the opinion that the American government spends too little on education. Three in every five respondents were also of the opinion that the government spends too little on developing alternative energy, poverty eradication, quality health care and environmental protection. One in every two (2) Americans also believed that the government spends too little on reducing crime.

In the 2012 Survey of Scientific Literacy, Taiwan, respondents held the view that the government was spending too little on education, slightly too little on developing alternative energy, and slightly too much on poverty eradication. However, about one-fifth of Taiwanese respondents believed the government spent too much on national security. Refer to **Table 3-7**.

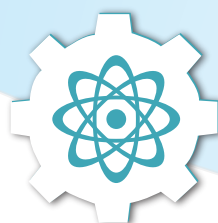


Table 3-7: International Comparison for Assessment on Government Spending

Question	Malaysia 2014			USA 2014			Taiwan 2012		
	Too little	About right	Too much	Too little	About right	Too much	Too little	Slightly too little / slightly too much	Too much
	Percent (%)								
Education	24	50	26	75	18	7	41	41	2
Developing alternative energy, e.g., renewable energy	32	51	17	60	28	7	44	38	1
Poverty eradication	40	39	21	61	26	10	40	46	1
Quality health care	27	51	22	61	23	14	34	50	3
Environmental protection	36	48	16	58	30	10	n.a.	n.a.	n.a.
Roads and bridges	28	47	26	43	43	12	n.a.	n.a.	n.a.
Mass transportation	28	50	23	38	46	10	n.a.	n.a.	n.a.
Supporting scientific research	32	53	15	38	45	12	22	38	2
Reduce crime	42	37	21	52	36	9	n.a.	n.a.	n.a.
National security	31	43	26	24	40	32	15	39	20

Note: Taiwan's data does not add to 100% as the "don't know" responses were excluded.

Sources:

1. National Science Board (2014) *Science and Engineering Indicators 2014*.
2. National University of Sun Yat-Sen, Centre of General Education (2012) *Survey of Scientific Literacy Taiwan 2012*.



RECOMMENDATIONS

This 2014 study has undertaken a probability survey approach to estimate the public awareness levels of STI in Malaysia.

A scientific method was used to select a sample of respondents that is representative of the Malaysian population. The sample was drawn from the household frame that was maintained by the DOSM. All Malaysians aged between 12 and 64 and permanent residents in Malaysia were eligible respondents. Foreigners were not eligible and neither were Malaysians above 64 years old or below 12 years old.

This sampling approach enables each selected respondent to have a known probability of selection. Using conventional statistical theory and practice, the optimum sample size that fits with the level of accuracy (RSE) and the required stratification was determined, and also resource (cost and time) considerations. It is a common practice to use 5% RSE but for this study, an RSE of 2.6% was the target.

The survey approach is a 3-stage stratified sample, i.e., a complex design. A theoretical sample size limit of 4,500 was determined using the RSE of 2.6% and an estimated oversample (35%). For this survey, the sample size was only 4,500. With an actual sample of 2,653, the achieved RSE was 2.71%, which is still very much lower than the conventional 5% RSE. Compared to the reports of other countries, this survey can be said to be within international best practices.

One of the objectives of this study included recommendations to increase the level of understanding and acceptance of Malaysians as regards STI.



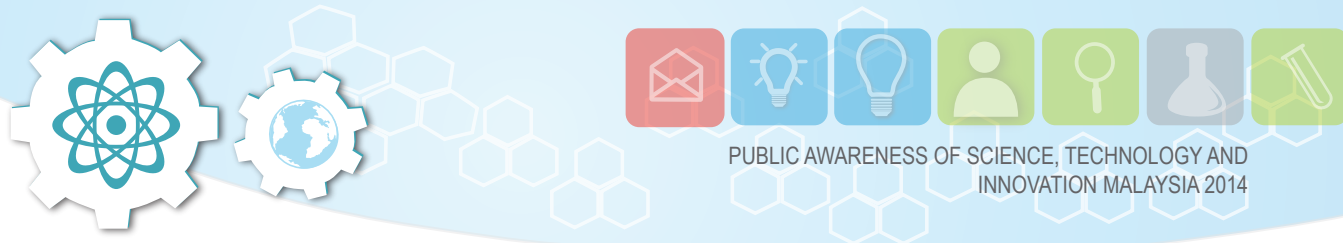
4.1 CHANNELS AND SOURCES FOR DISSEMINATING STI KNOWLEDGE

Television was the key source of STI information for all Malaysians, irrespective of the level of schooling they have attained. To reach those who have secondary education, TV, newspapers and radio were the key sources.

To reach out to the Malaysian public, the key channels were: TV, newspapers, radio and also the internet. But schools are also the key channels for raising the literacy of the public on STI. Raising the educational level of Malaysians would concomitantly raise the level of STI awareness.

Recommendation No. 1: Use the TV as the main channel to disseminate any STI news or information. Radio and newspapers should also be used as they reach out to slightly different audiences. The rise of the web and internet in recent years has been explosive and STI information should also be disseminated through the web/internet. Examples of using the web to develop scientific culture are already widespread locally, e.g., the Penang Science Cluster (<http://www.pscpen.com>), the Young Scientist Network (<http://www.ysn-asm.org.my>), and the National Science Fair for young children (<http://nsfyc.org/>).

In addition to the usual sources of information, various places also help to stimulate interest in STI, and they include museums, zoos, science centres, planetariums, etc. However, visits to these places (museums, zoos, etc.) were still very low. As the study did not collect specific information about the effectiveness of their public outreach, it is difficult to make concrete suggestions on how to raise or stimulate interest in STI. Nonetheless these institutions should conduct evaluations and assessments of the visitors' experience and review how they can contribute further to raising the level of public awareness of STI.



Recommendation No. 2: Undertake specific evaluation of the visits to the places and institutions that stimulate interest in STI. There are good examples STI institutions which have opened up various avenues to increase visits, and reach out to the public. Singapore's National Science Centre (<http://www.science.edu.sg>) has many temporary and permanent exhibits, different types of tours, and even memberships to increase usage. The Penang Science Cluster project intends to set up science cafes in various locations throughout the state to reach out to the public. Another interesting feature of the Penang Science Cluster is that several of their foundation programmes are headed by local industrialists and technologists from the factories. Some of these examples could give some inspiration to the STI institutions to review their programmes.

Recommendation No. 3: In view of the explosive rise of the internet, it is proposed that some of the programmes be codified so that the experience can be web-enabled and it would be even better if it could be downloadable via the web and internet. This approach would really make full use of the power of the internet to reach out to those who cannot or are unable to travel to these institutions. More and more institutions are using the internet to organise STI events, which are turning out to be cost-effective, time efficient, and flexible in terms of logistics and arrangements. On the other hand, web-based programmes are more interactive and appeal more to the young and educated people.

Recommendation No. 4: It is recommended that institutional and financial support be given to non-profit initiatives in science fairs, competitions and other forms of outside classroom science learning, especially in East Coast of Peninsular Malaysia³ and rural areas which have less opportunities or exposure to science. It seems that the change in attitude among rural students is much greater than compared to the change in urban students⁴. The use of non-formal approaches to develop scientific culture, learning and build the base for scientific literacy should be explored further. In this regard, there are opportunities for further collaboration with the private sector to fund some of these initiatives with the NGOs and the government organising such activities.

³ On average, the percentage of interest in selecting STI issues for East Coast of Peninsular Malaysia was relatively lower than the other region. See Appendix Table 3.

⁴ Pers comms with Dr Yunus Yassin, director of National Science Fair for Young Children, 7 August 2014



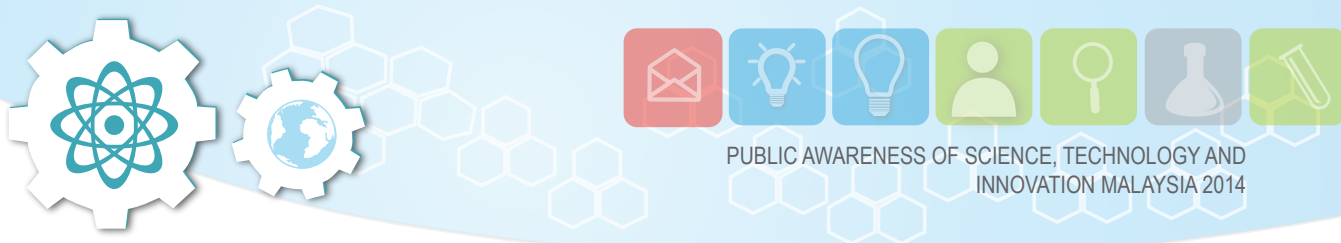
4.2 INTEREST AND KNOWLEDGE IN STI

About 80% of Malaysians were interested in STI issues and the two most important areas were **inventions and discoveries**, and **the environment** (pollution), i.e., based on survey choices. It is true that in Malaysia today the news media (TV, newspapers, etc.) has STI related programmes, such as on National Geographic, Discovery Science on Astro and also on the national television channels. But it seems that the availability on public channels is limited and has to compete with other kinds of programmes.

Recommendation No. 5: It is thus recommended that the government initiate a review of such STI initiatives with a view towards creating and developing public interest in the STI programmes. CEPA programmes should be well designed that can generate interest among the public.

With respect to pseudoscience, it is quite surprising to note that a sizeable part of the population is still unable to separate truth from fiction. More than 50% of all respondents believe that horoscopes are either scientific or somewhat scientific and a smaller percentage believes the same for faith healing. The questions on pseudoscience indicate that Malaysians do not have good scientific knowledge. This may not be surprising as only a quarter of all respondents had science stream education. Nonetheless, it indicates that there is a less inquiring mind that can easily be swayed by non-scientific argument.

Recommendation No 6: Promote programs that dispel pseudoscience through the government's media channels, such as, TV, newspapers, websites and also sponsor more writing to correct all misconceptions about pseudoscience.



4.3 STI ATTITUDES

In general, Malaysians perceived that scientific research had more benefits than harmful effects. This perception increases with education. With respect to their perception of STI impacts on everyday life (cost of living, healthcare, working conditions, environment, lifestyle, job creation and food security), two-thirds of Malaysians believed positive impacts prevail.

Recommendation No. 7: In the medium term, fostering institutional building that is able to command public confidence on scientific matters. The proposed long term goal is to build a scientific culture in the Malaysian public. There are several institutions that have the potential, such as the Academy of Sciences Malaysia, universities, and scientific research institutes.

The view that science education is difficult and that parents and peers do not favour it was rejected by most Malaysians. The steps which could help promote more students in science include: (1) provide more information on job opportunities and (2) make the teaching of science less theoretical. This would point to a deficiency in career information regarding availability of jobs, positions that scientific training could have, and wages that such people could earn. Such information should be made available at secondary school level when students are deciding on which stream to enter.

Recommendation No. 8: Improve career guidance at the school and tertiary education institutions. Some schools have initiated career fairs which are extremely useful but these should be expanded to involve the private sector in a more collaborative manner.



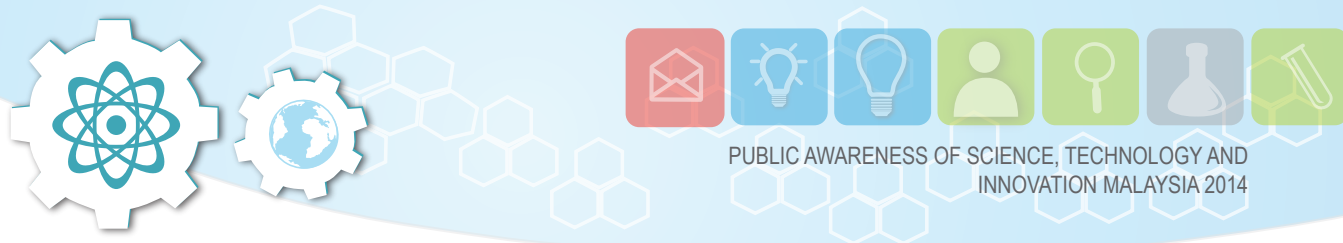
4.4 STI PROGRAMMES AND POLICIES

Public awareness of STI programmes seem relatively low, generally between 1% and 2%, with one exception, i.e., MAHA, the Malaysian International Agriculture, Horticulture and Agro-tourism Show. As there is no other information about the promotion of these policies, the only recommendation is that they must be properly reviewed and evaluated to find out why the awareness levels are at that level.

Recommendation No. 9: Conduct proper evaluation of all STI programmes to measure the levels of awareness and effectiveness of the outreach, and correlate with the inputs and level of effort to account for the intended impact. These can be used to design CEPA programmes that are targeted to reach out to the public.

Public awareness of policies appears to be much higher, with an average of around 55%. However, there seems to be an anomaly at least with regard to the National Biodiversity Policy (NBP). As this is the year of biodiversity, the government has been promoting biodiversity by airing the NBP on television (all main channels) since the start of 2014. However, the awareness level of the NBP was still at the lowest (35%). The National Water Resources Policy, the National Policy on STI, and the National Green Technology Policy all scored much higher (average 65%). If read together with the level of awareness of STI programmes, it would appear that the awareness levels are artificially high. This is related to a commonly known phenomenon where respondents want to appear knowledgeable and answer that they know even when they don't.

Recommendation No. 10: Conduct proper evaluation of all STI related policies. It should be designed to help institutions understand the effectiveness of their programmes, the impact that they have made with respect to their inputs and level of effort, and also measure the level of achievement of the desired outcomes.



4.5 RECOMMENDATIONS FOR FUTURE STI SURVEYS

The 2014 STI survey has achieved high levels of accuracy as shown by the response rates and RSE that are comparable to those of other countries. It is recommended that this approach of using a scientific basis to undertake STI surveys should be continued for future studies.

Recommendation No. 11: For future STI surveys, a scientific approach to conduct and assess the results should be used. This 2014 survey could be the benchmark for future surveys.

There is a rich database of public opinion on STI in this 2014 survey. This report has provided only a preliminary analysis of that database. More analysis should be done to enhance an understanding of the public's attitudes, preferences and their understanding of such issues, e.g., the relationship between culture and learning. An important area would be to try to understand the relationship between knowledge and values, between "fact" and "values". Such analyses can be undertaken to assess the level of cognitive deficit, ways to improve scientific literacy, focus areas of STI programmes, etc. Such analyses would definitely help in developing more targeted CEPA programmes to achieve the noble objectives of creating a more knowledgeable public with greater scientific literacy.

Recommendation No. 12: Initiate further analyses of the 2014 STI survey with the collaboration of MASTIC and other MOSTI Division, especially their Planning Division and Innovation & Commercialisation Division in areas such as commercialisation, innovation, technology diffusion and even more effective CEPA programmes.

The 2014 STI survey was based on the USA National Science Board report on Public Attitudes and Understanding of Science and Technology and past year's questionnaires. Most of the questions were related to science and technology. Thus it is suggested future surveys include more questions on the topic of innovation.

Recommendation No. 13: For future surveys, the number of issues and questions related to innovation should be increased, e.g., how interested are you in "new or significantly improved methods of manufacturing or producing goods or services", "new or significantly improved logistics, delivery or distribution methods for goods or services", and "new or significantly improved supporting activities for manufacturing processes, such as maintenance systems or operations for purchasing, accounting, or computing". And for the question related to government programs, *International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM 2014)* should be included.

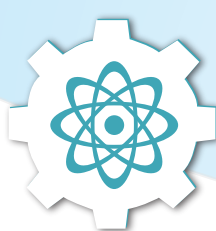


4.6 OTHER RECOMMENDATIONS

Compared with the 2008 study, the trends that were highlighted then have become clearer in this study, particularly the rising influence of the internet, the importance of TV, the importance of education and also the role of women as they are the primary sources of information for the young. The 2008 recommendations that should be taken on board in this study include:

- The science education curriculum should be made more scientifically relevant, environmentally conscious and technologically up to date. Its purpose should be both education as well as pre-professional training for a career in science. Science should be taught as a matter of inquiry and higher order of learning. In this regard, improvements in the teaching of science should be undertaken (Note: a holistic approach was made in the Education Blueprint).
- Materials should be web-accessible where possible. The experiences of other countries should also be highlighted. MASTIC used to provide access to STI Knowledge Base which could serve as an example.
- In terms of public awareness programmes, the 2008 recommendation to have a diversified suite of programmes suitable for different segments of society still seems relevant. It is important to emphasize the need for different approaches as there is no one size fits all in the serious business of promoting STI to the public.

A special case for women, as mothers, seems especially relevant as they have primary influence over their children. The creation of a scientific literate society should rightfully begin at this level. This survey revealed that many parents are not properly informed about the risks associated with antibiotic resistance. Hence programmes should be designed especially for this target group of parents, especially mothers.



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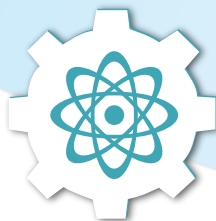
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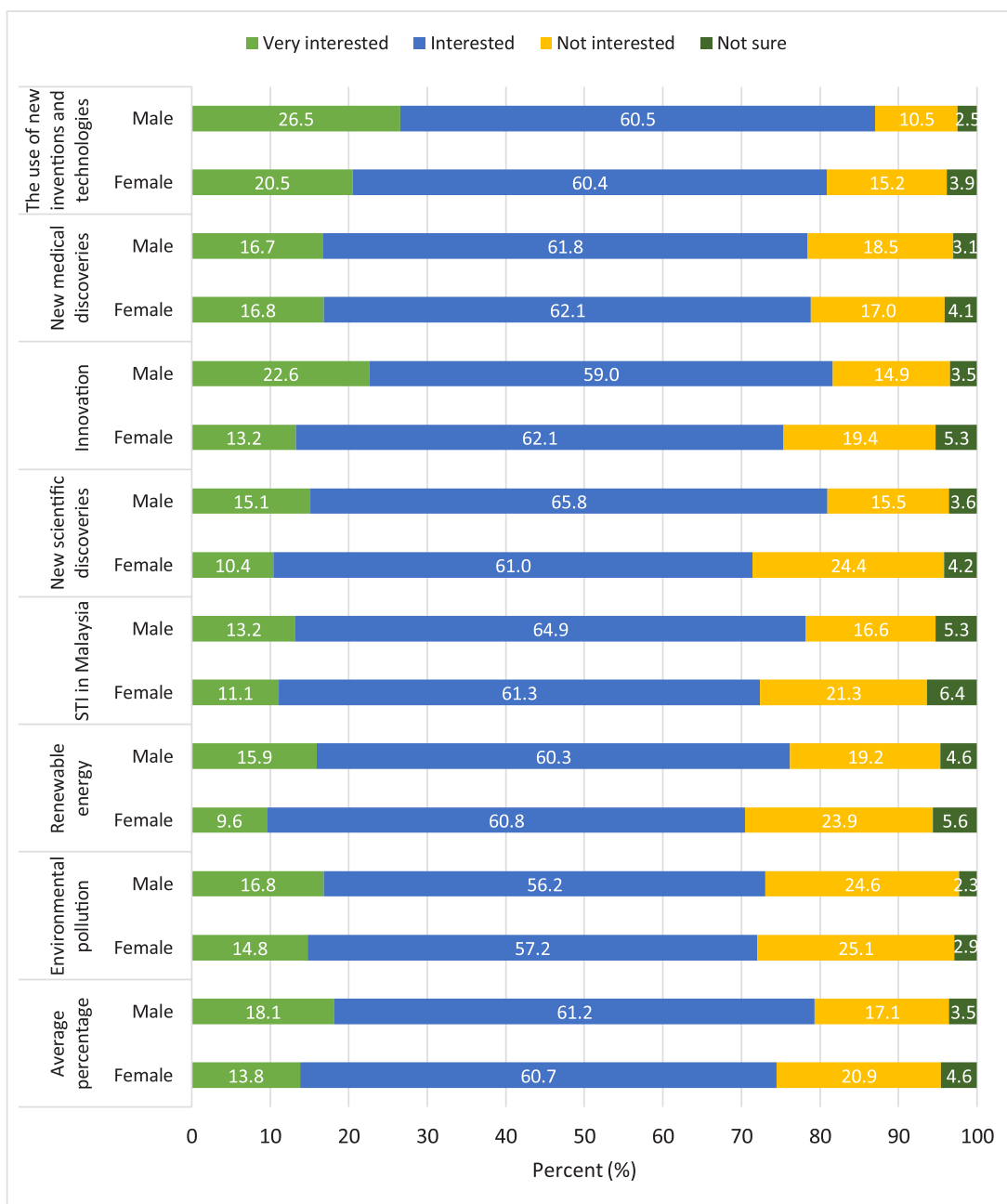
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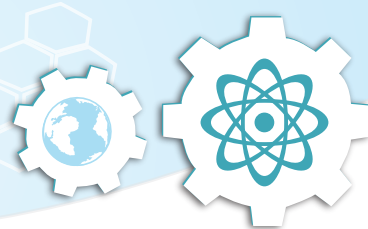


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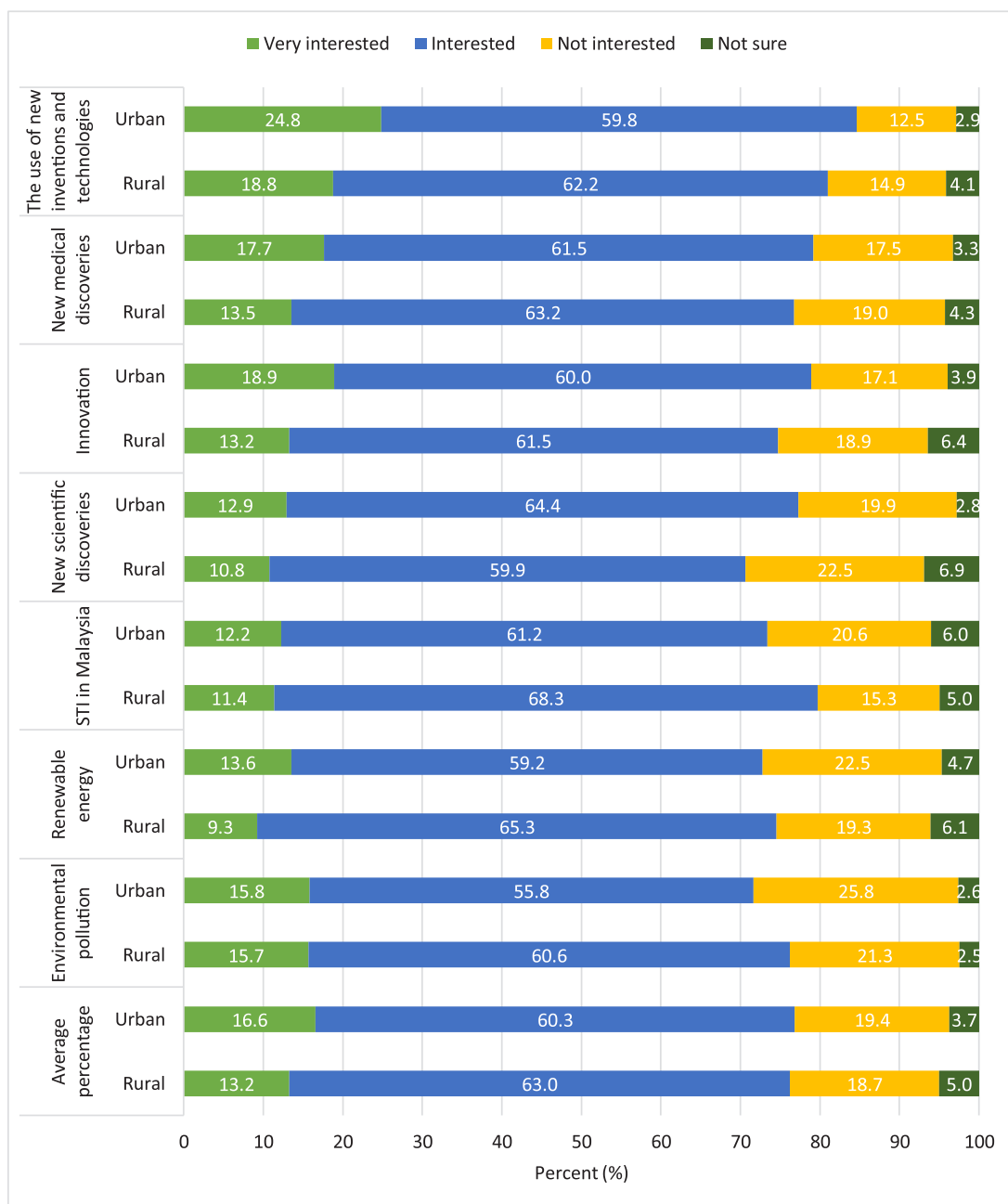
APPENDICES

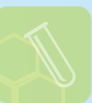
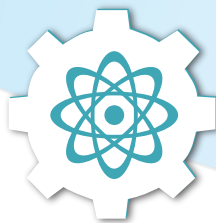
Appendix 1: Public Interest in Selected STI Issues, by Gender





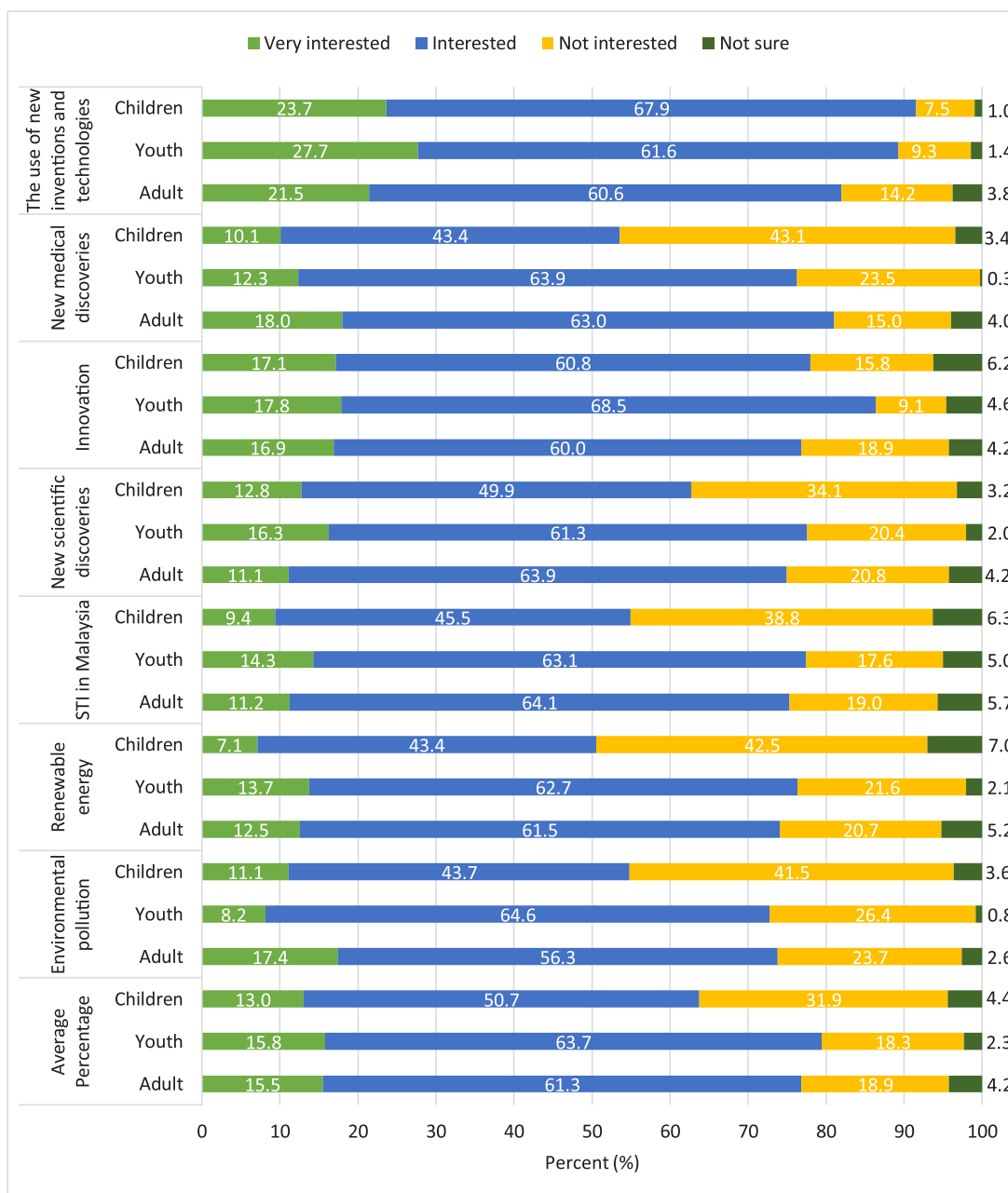
Appendix 2: Public Interest in Selected STI Issues, by Locality

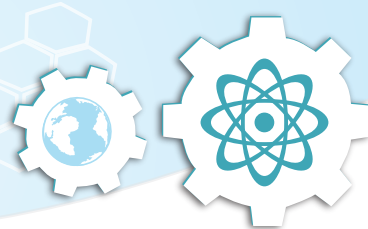




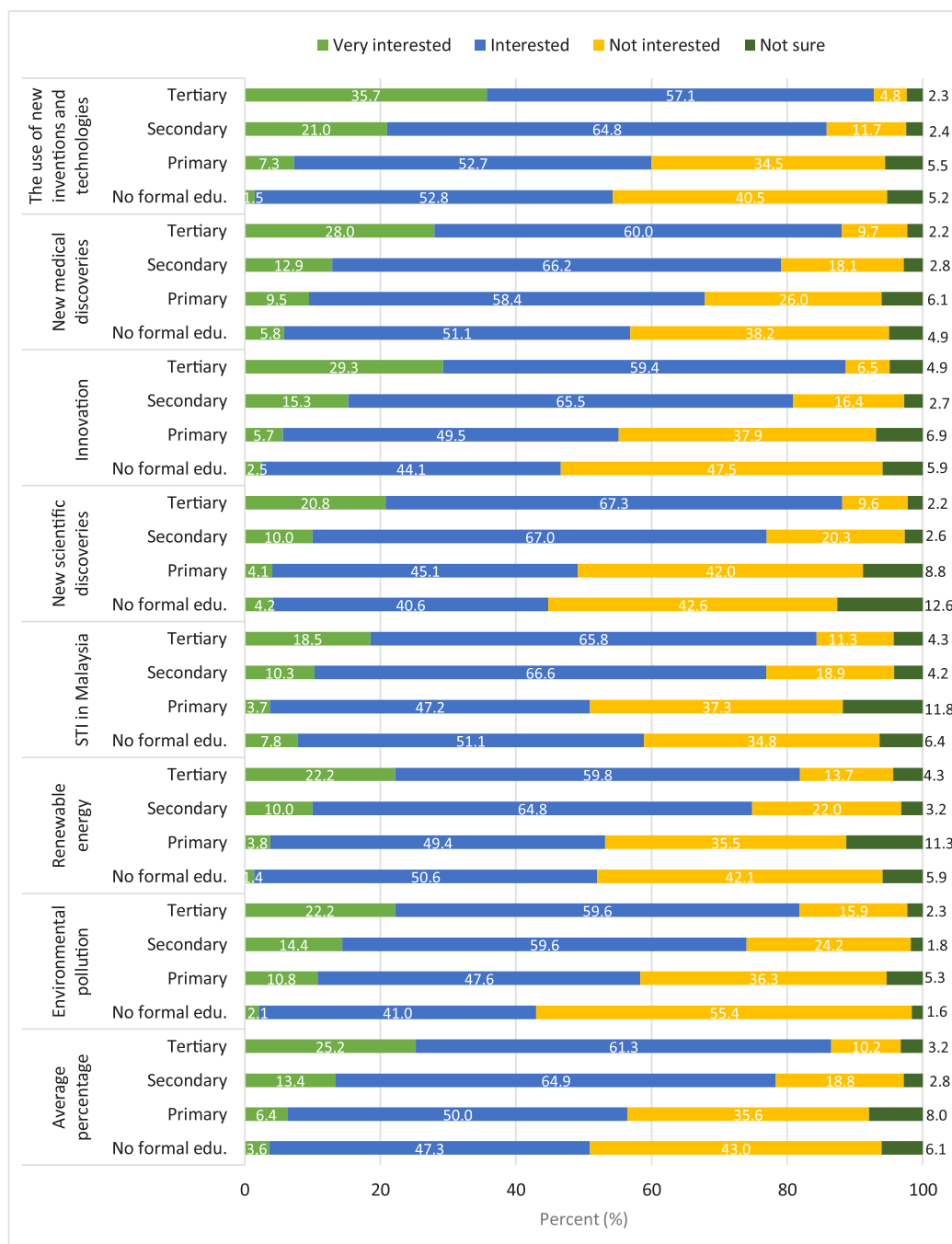
PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

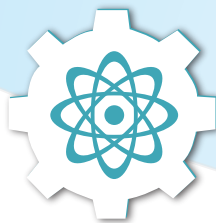
Appendix 3: Public Interest in Selected STI Issues, by Age Group





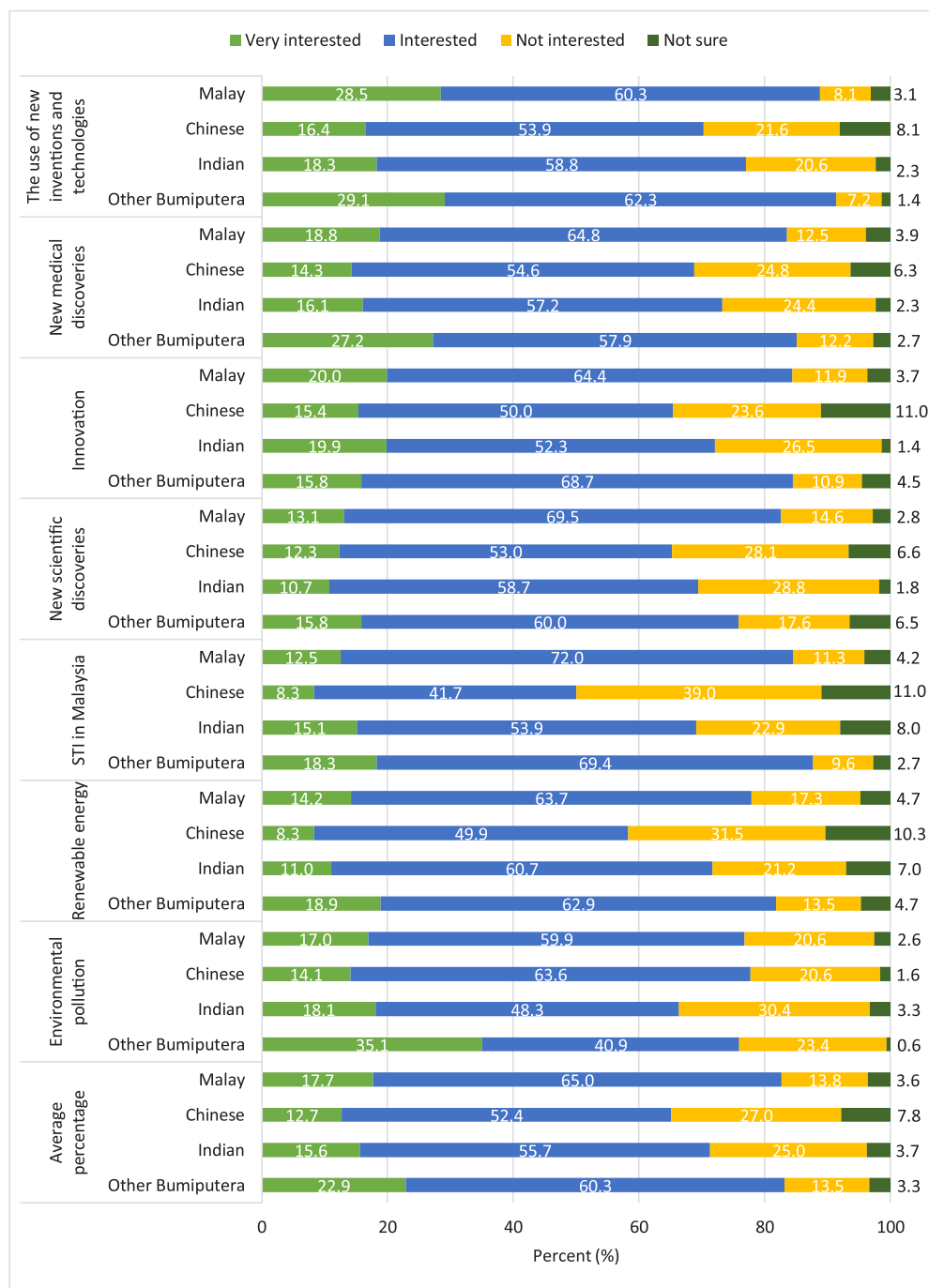
Appendix 4: Public Interest in Selected STI Issues, by Educational Attainment

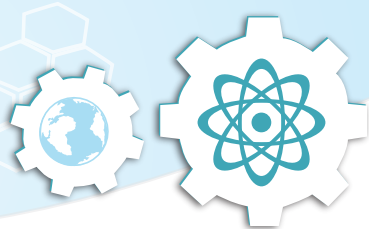




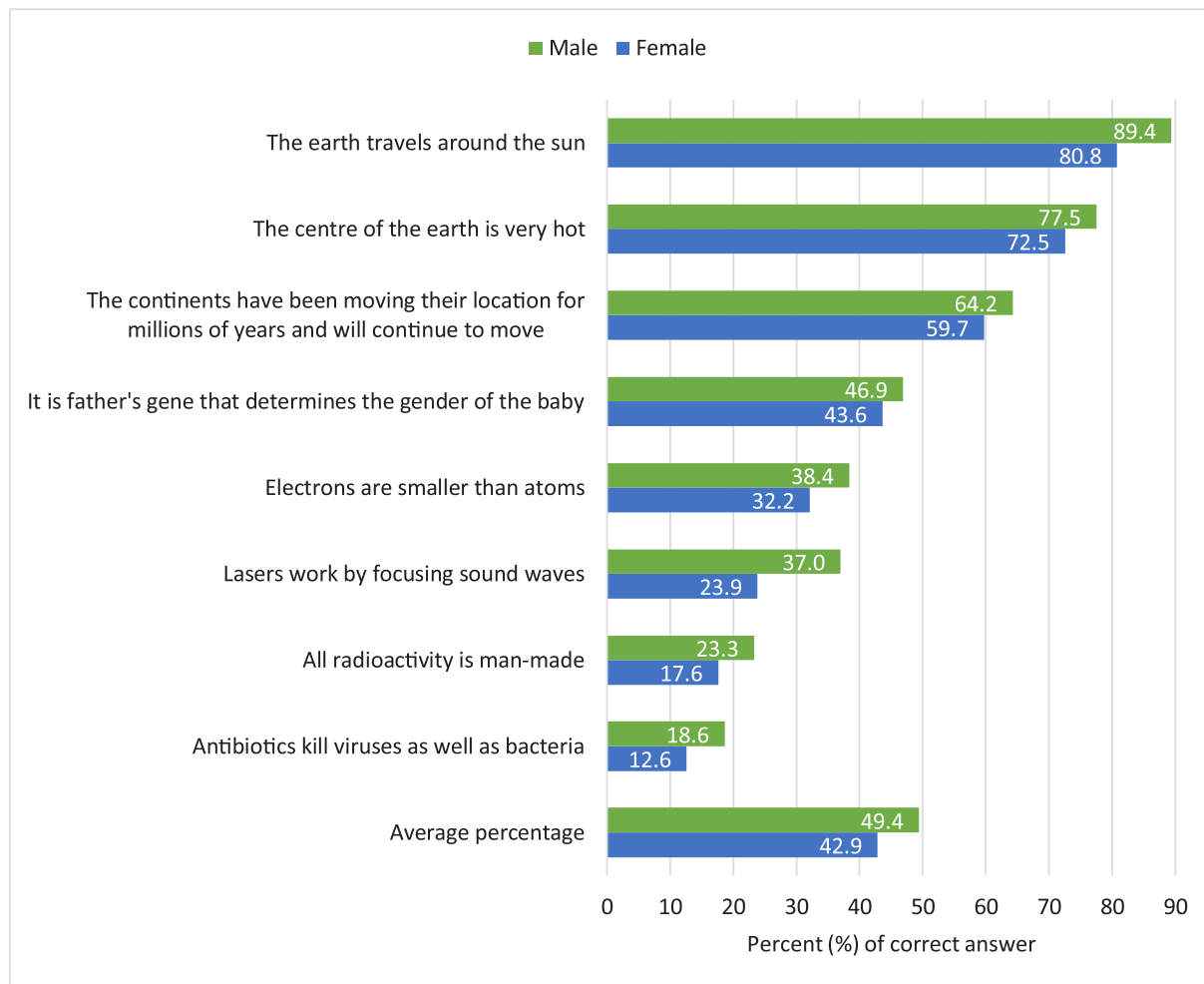
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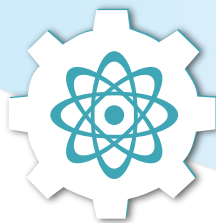
Appendix 5: Public Interest in Selected STI Issues, by Ethnicity



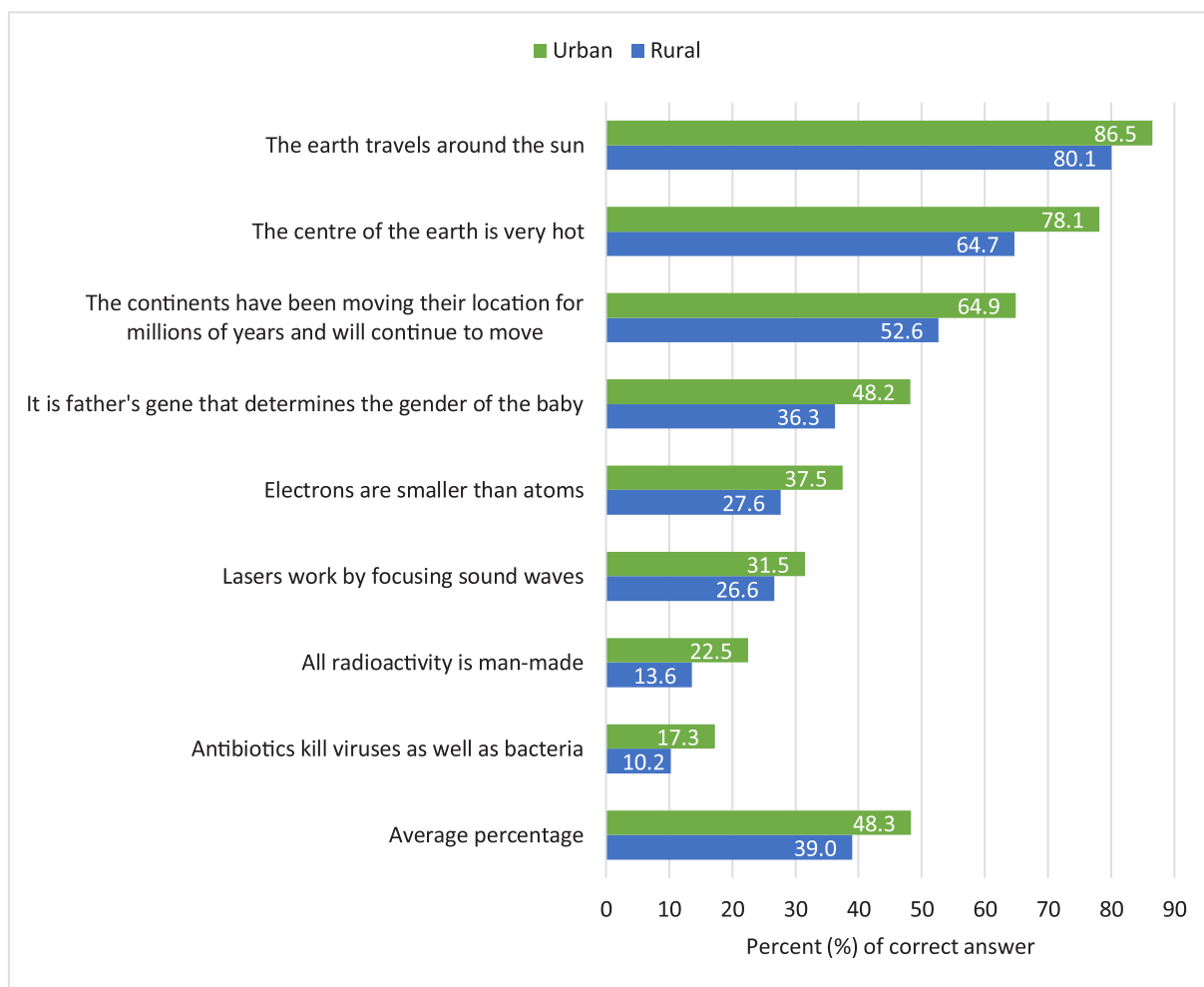


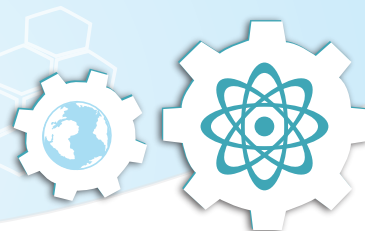
Appendix 6: Correct Answers to Questions on Scientific Concepts and Statements, by Gender



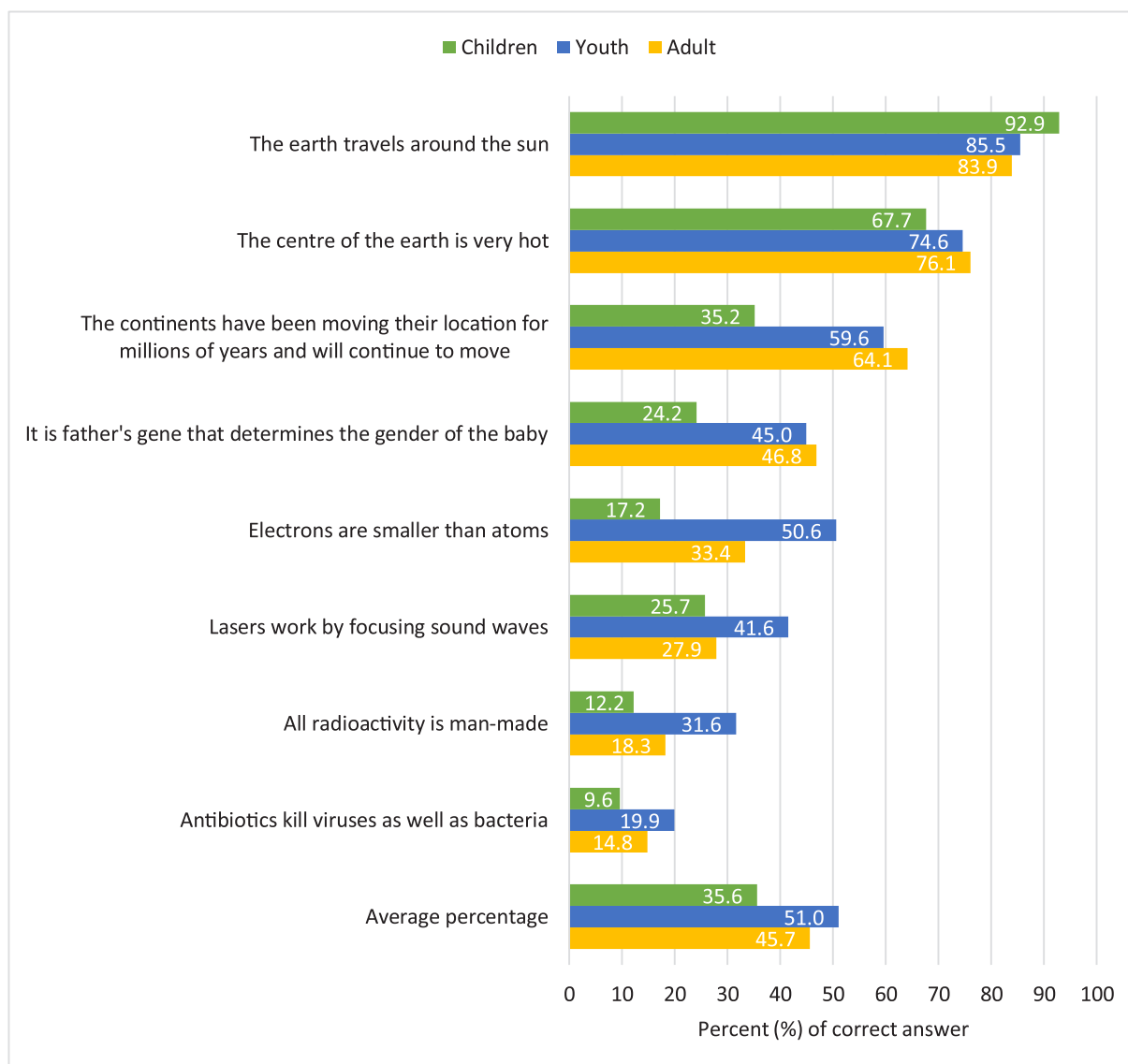


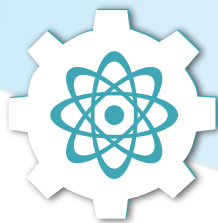
Appendix 7: Correct Answers to Questions on Scientific Concepts and Statements, by Locality





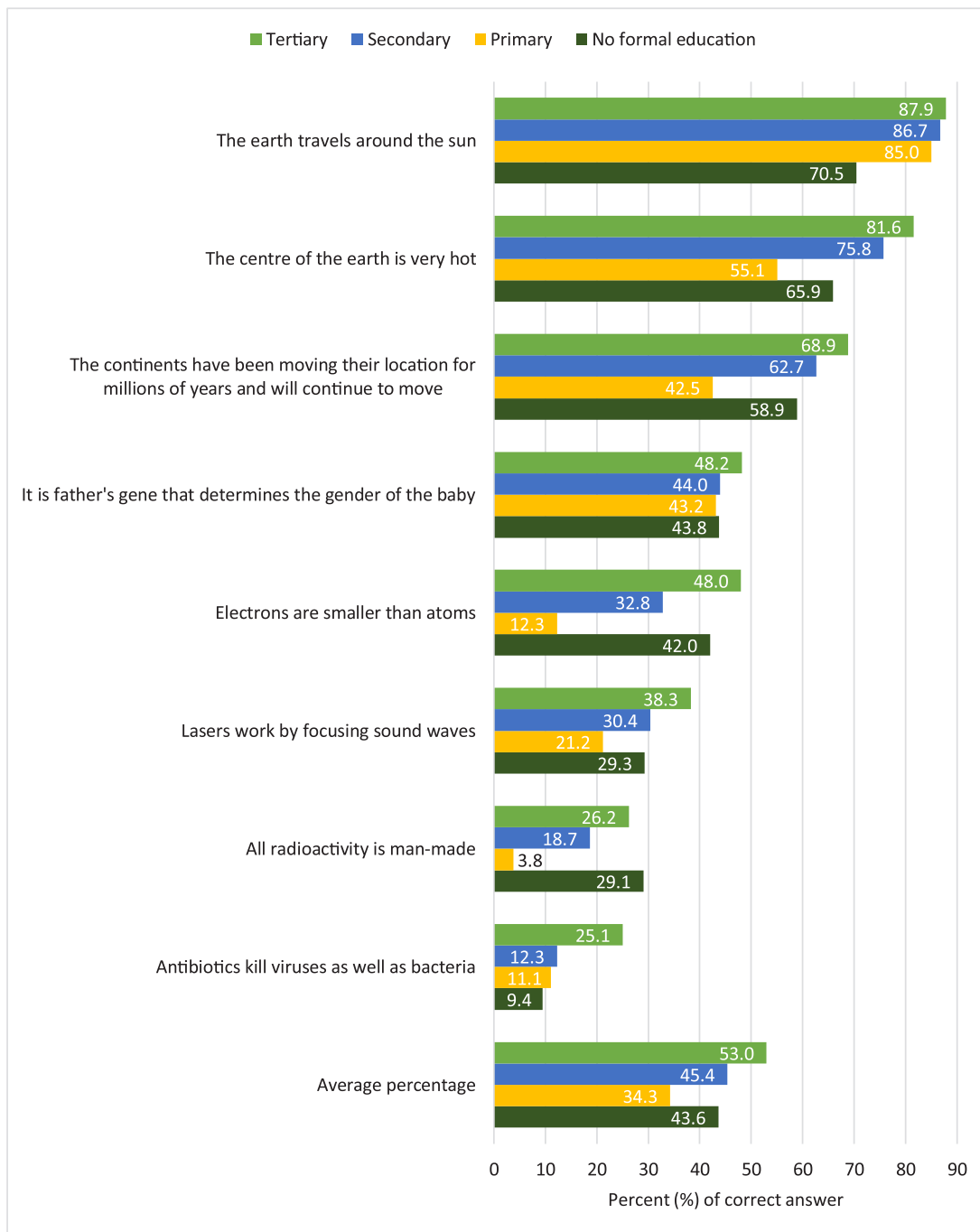
Appendix 8: Correct Answers to Questions on Scientific Concepts and Statements, by Age Group





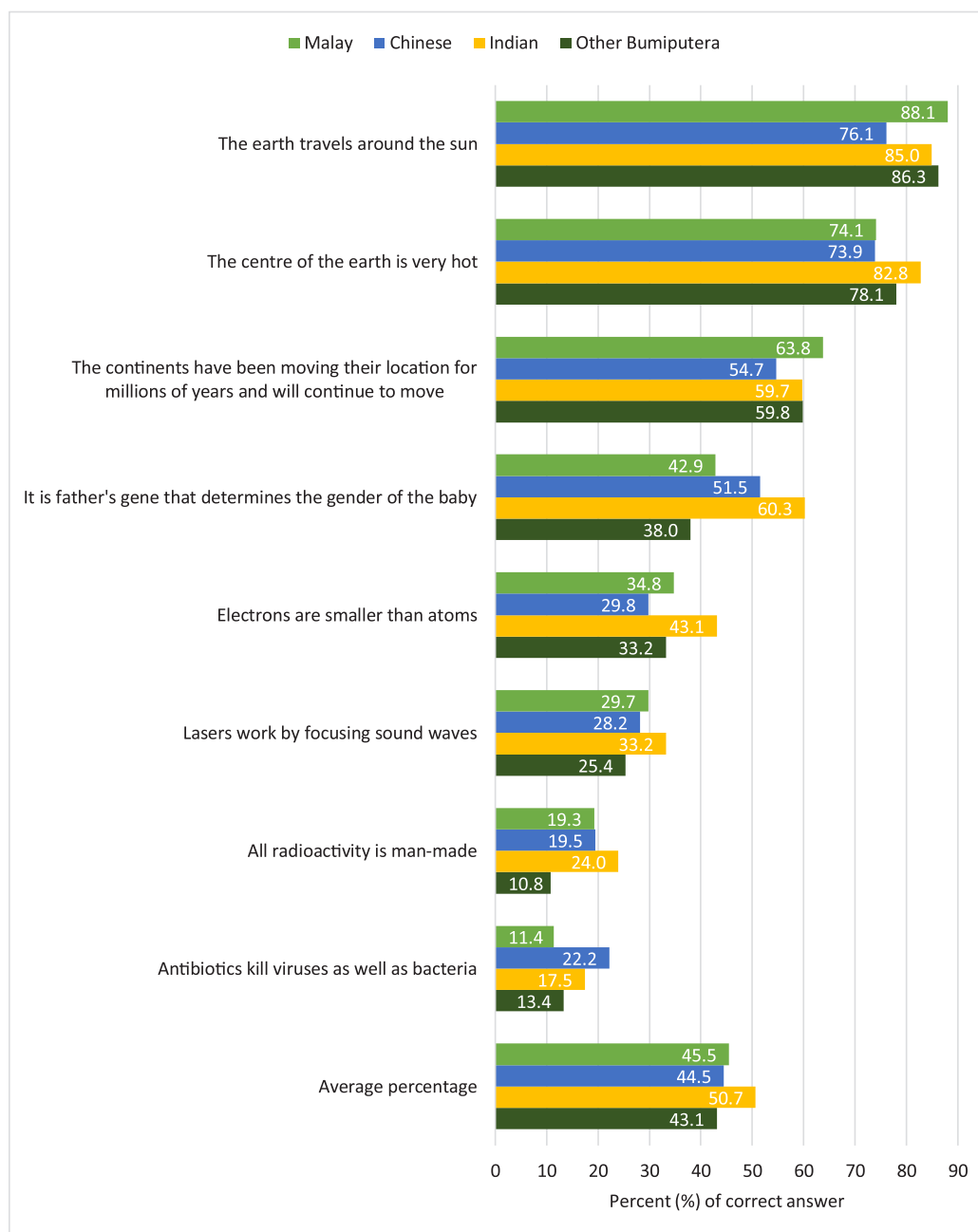
PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

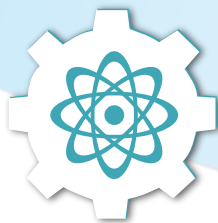
Appendix 9 : Correct Answers to Questions on Scientific Concepts and Statements, by Educational Attainment



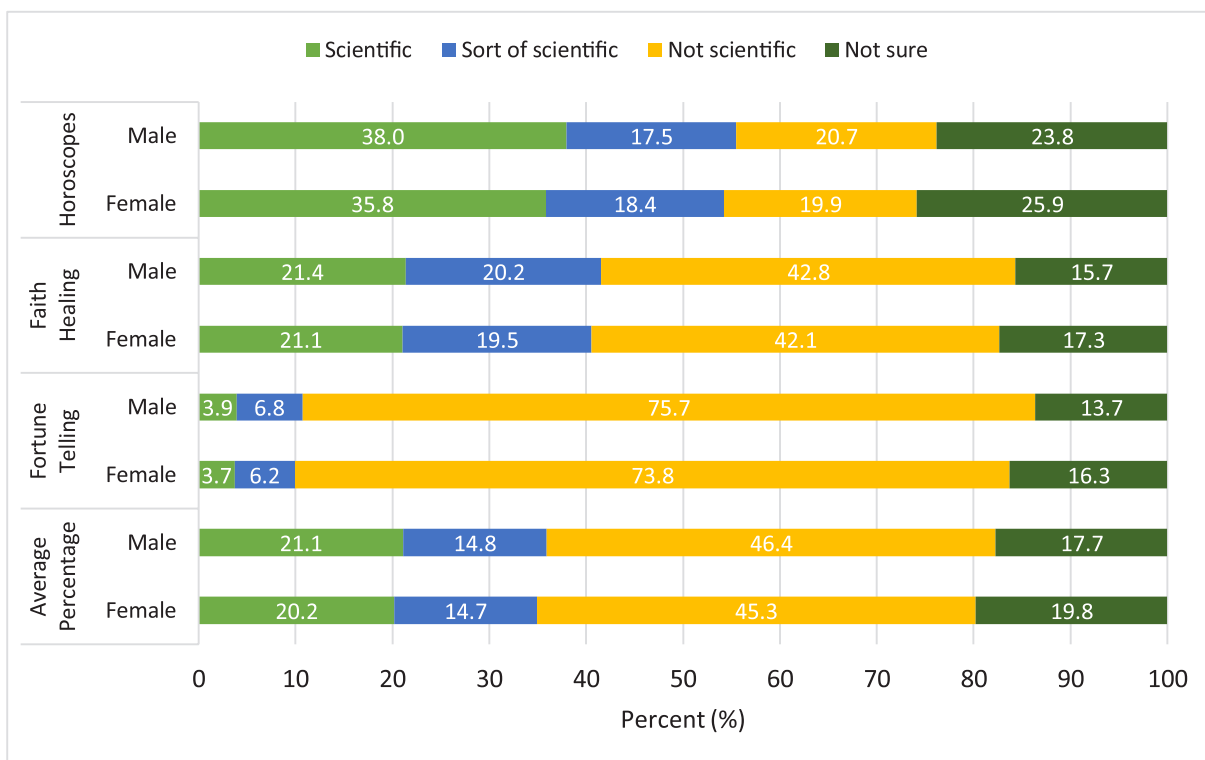


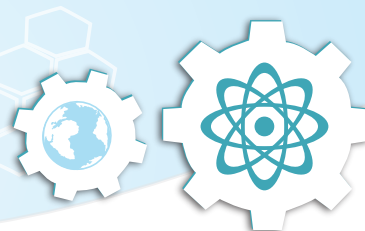
Appendix 10: Correct Answers to Questions on Scientific Concepts and Statements, by Ethnicity



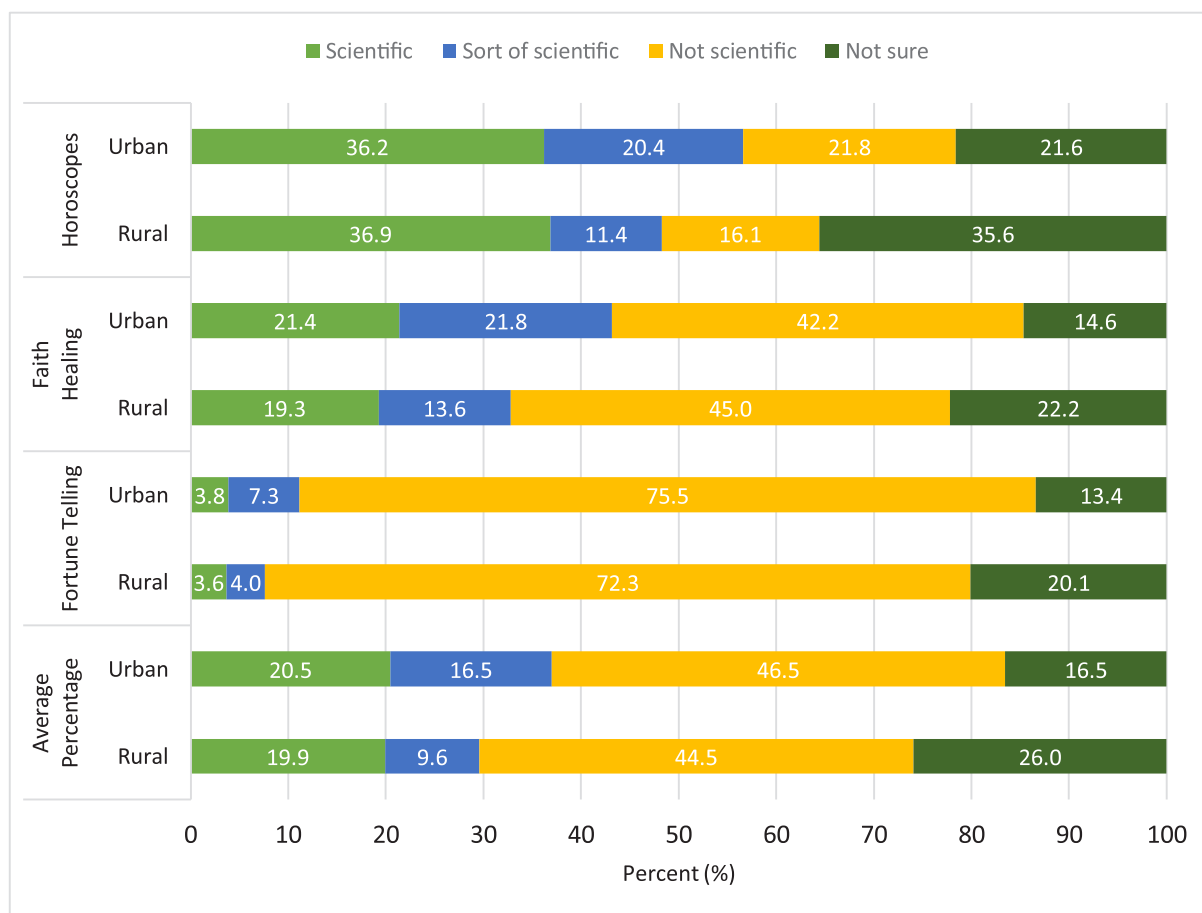


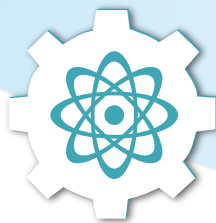
Appendix 11: Public Assessment of Selected Pseudoscience Topics, by Gender



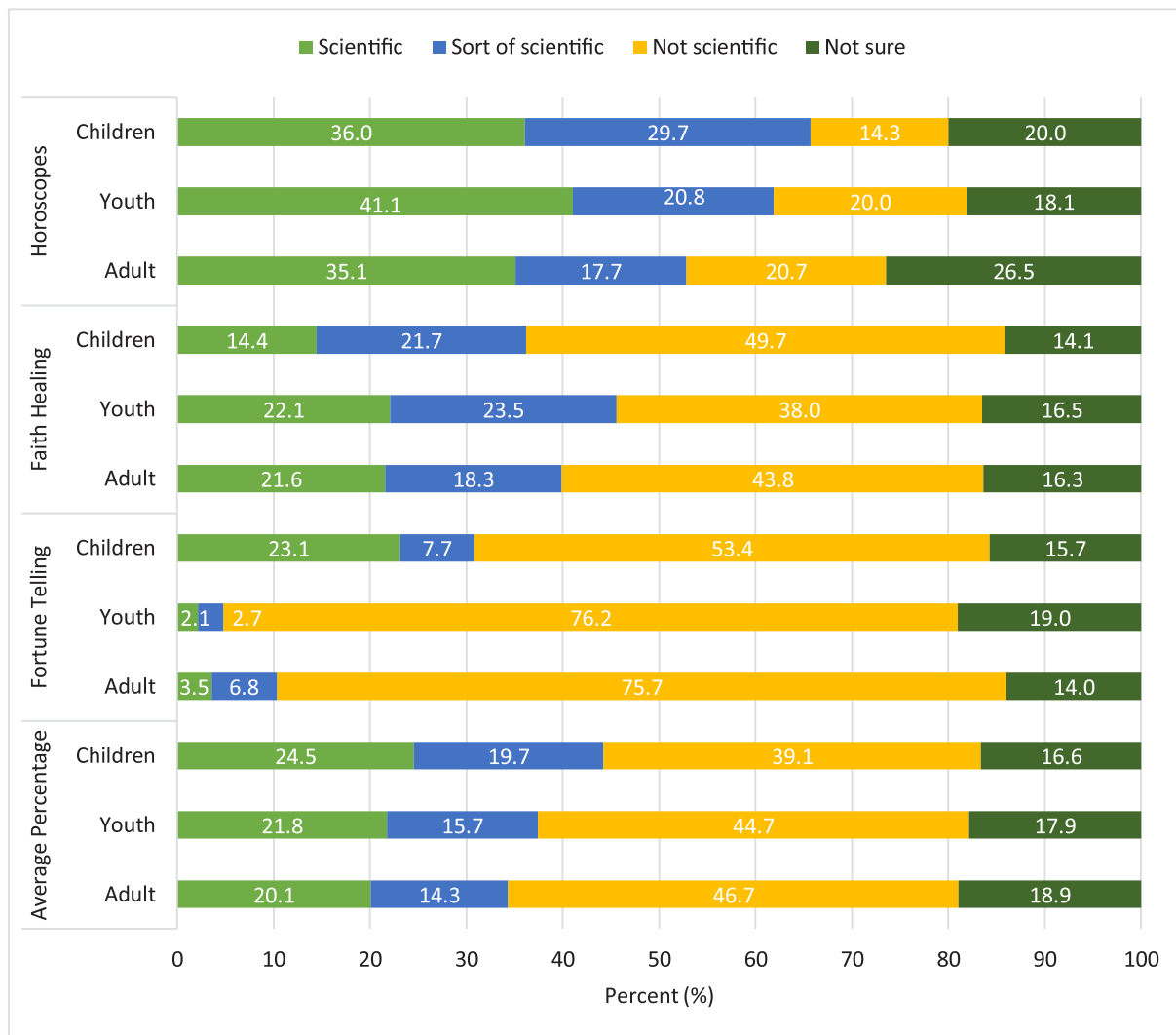


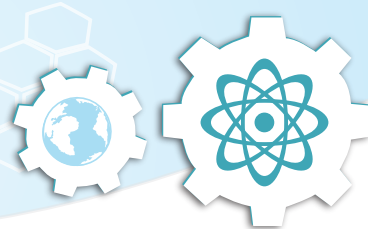
Appendix 12: Public Assessment of Selected Pseudoscience Topics, by Locality



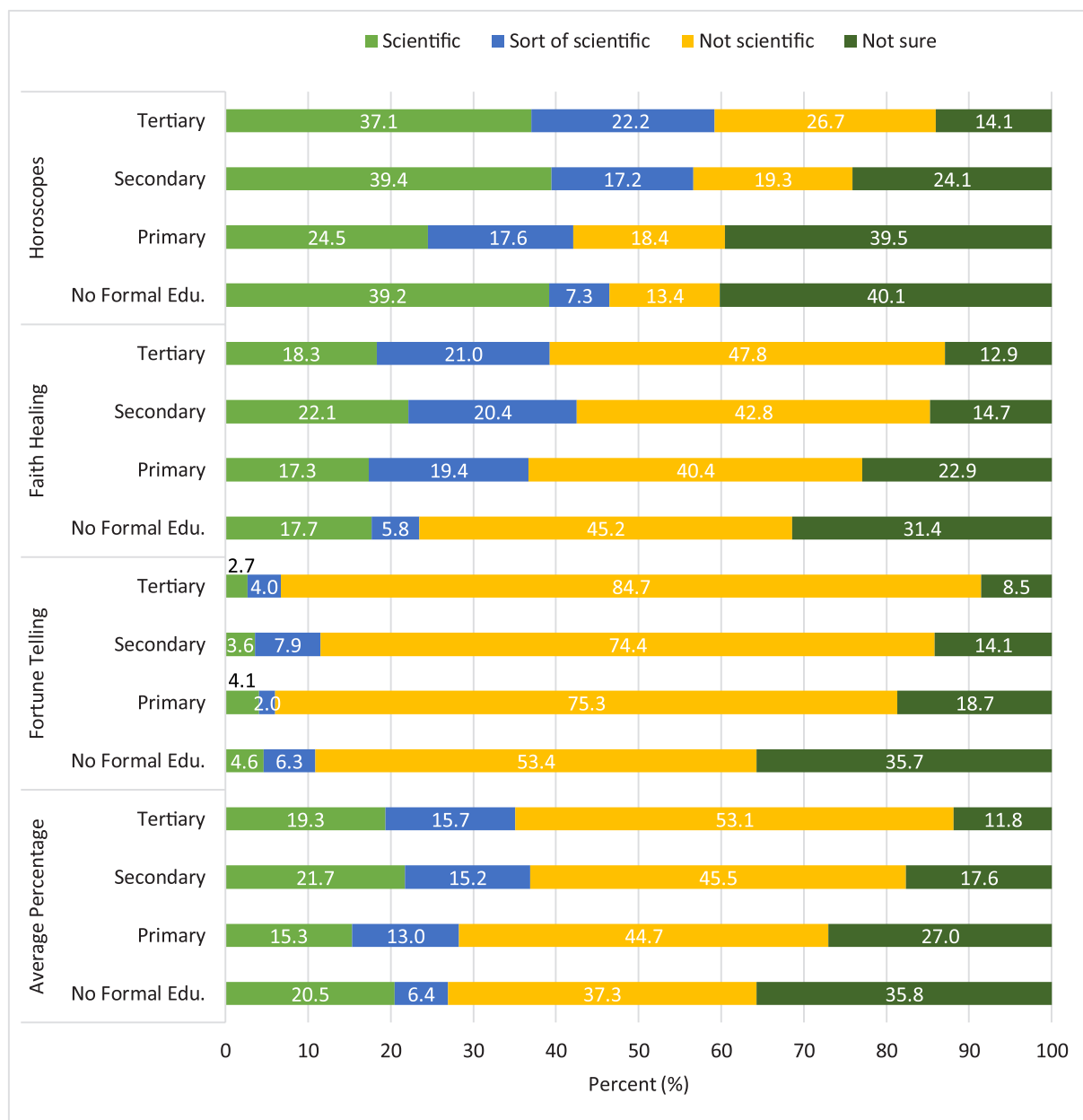


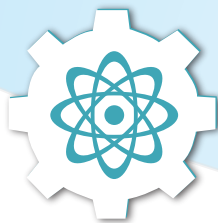
Appendix 13: Public Assessment of Selected Pseudoscience Topics, by Age Group





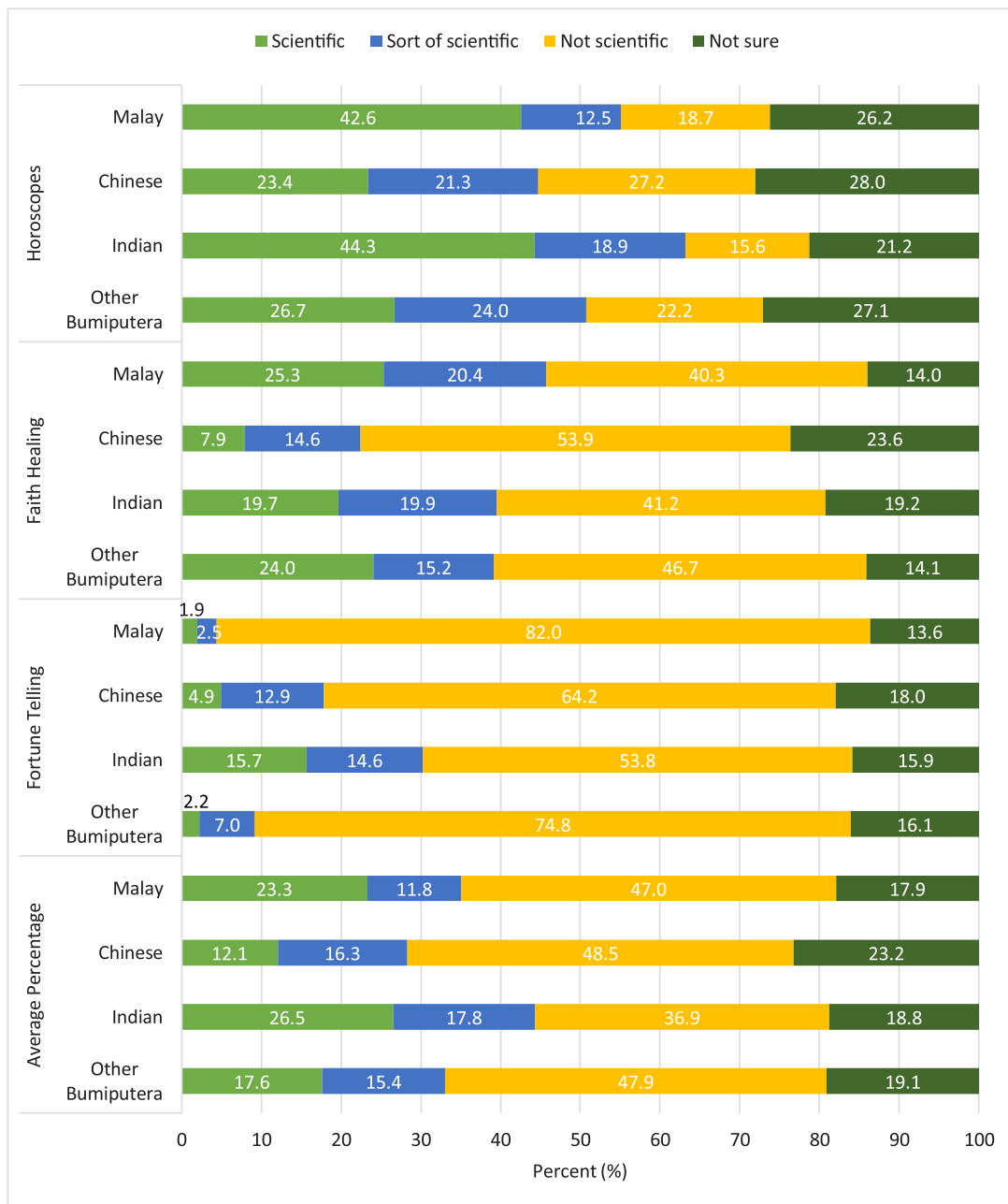
Appendix 14 : Public Assessment of Selected Pseudoscience Topics, by Educational Attainment

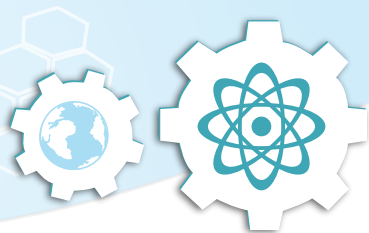




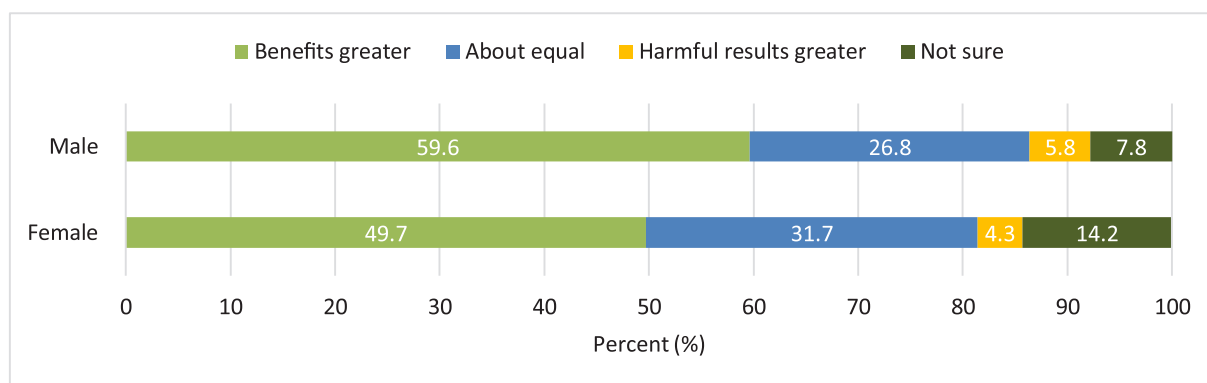
PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

Appendix 15: Public Assessment of Selected Pseudoscience Topics, by Ethnicity

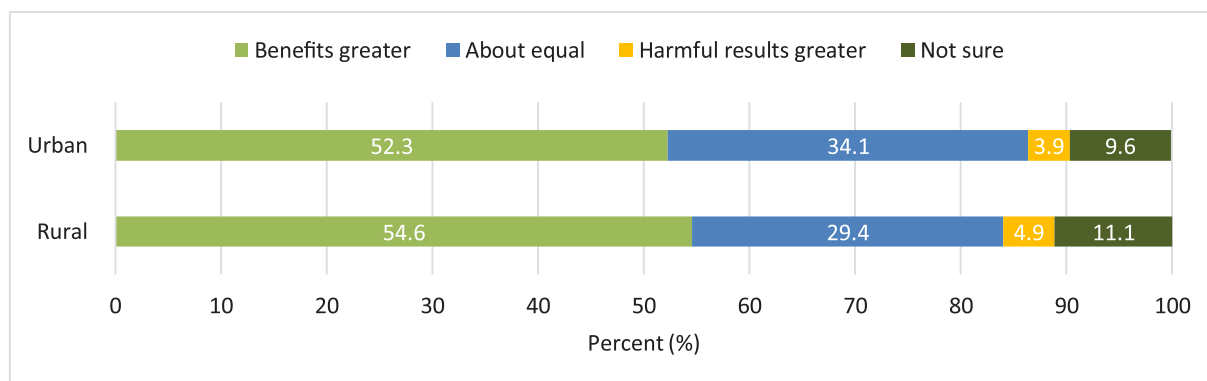


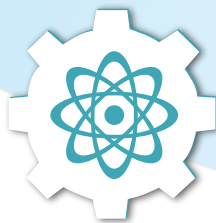


Appendix 16: Public Assessment of Scientific Research, by Gender



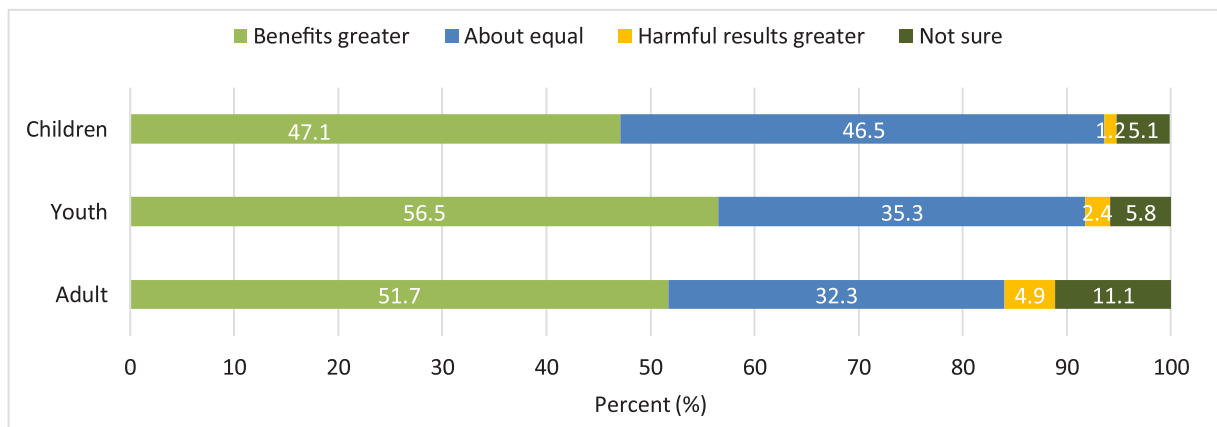
Appendix 17: Public Assessment of Scientific Research, by Locality



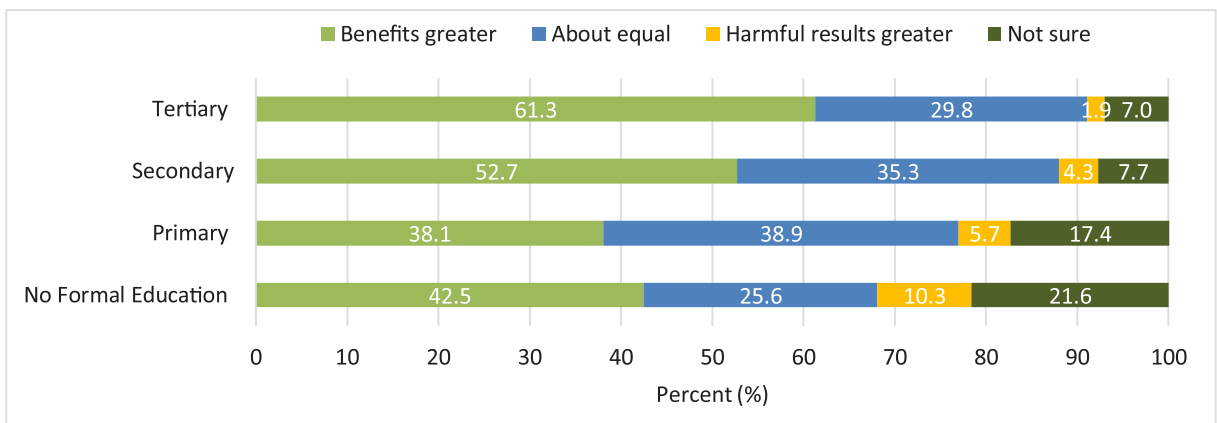


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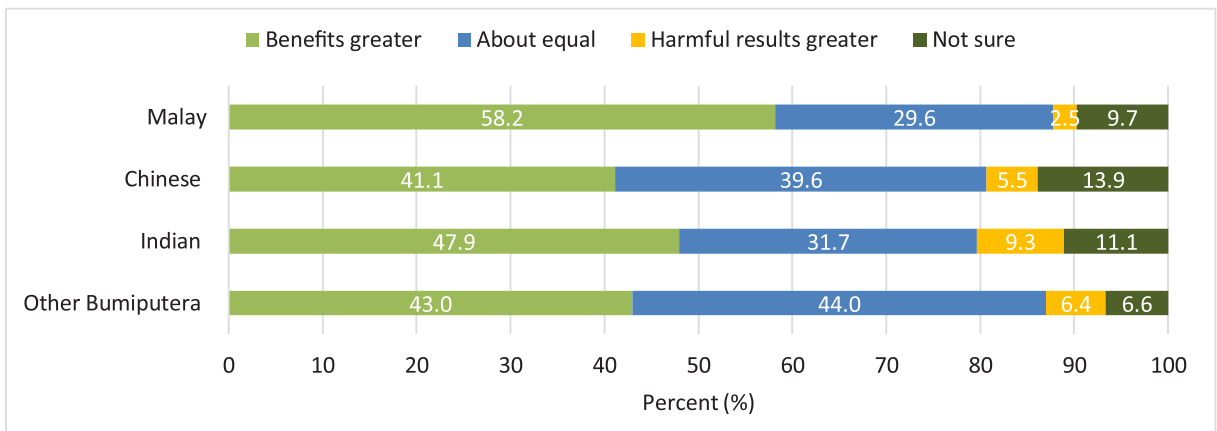
Appendix 18: Public Assessment of Scientific Research, by Age Group

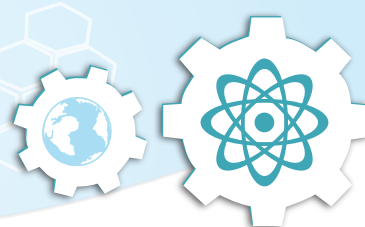


Appendix 19: Public Assessment of Scientific Research, by Educational Attainment

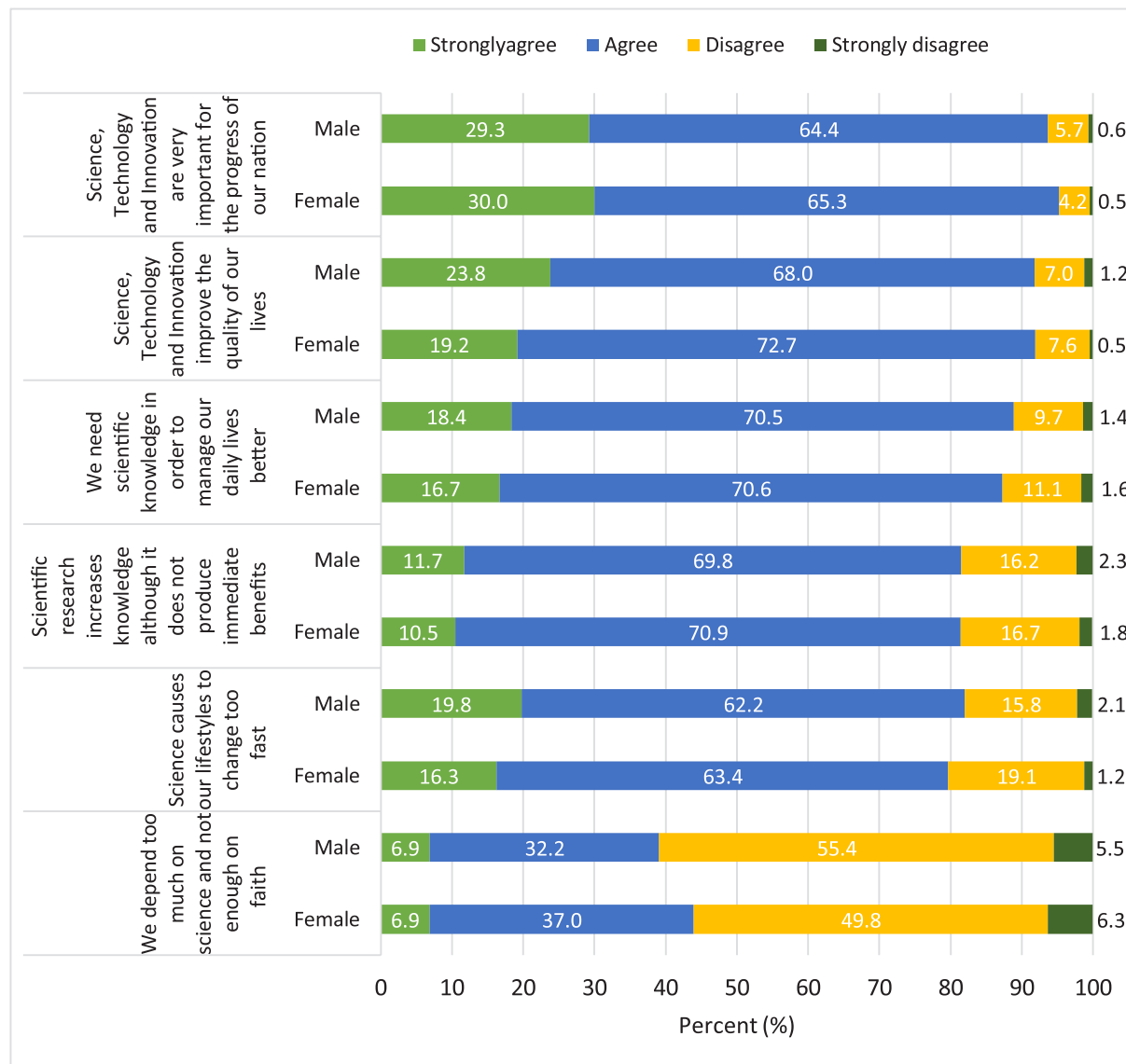


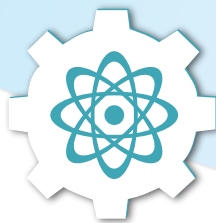
Appendix 20: Public Assessment of Scientific Research, by Ethnicity





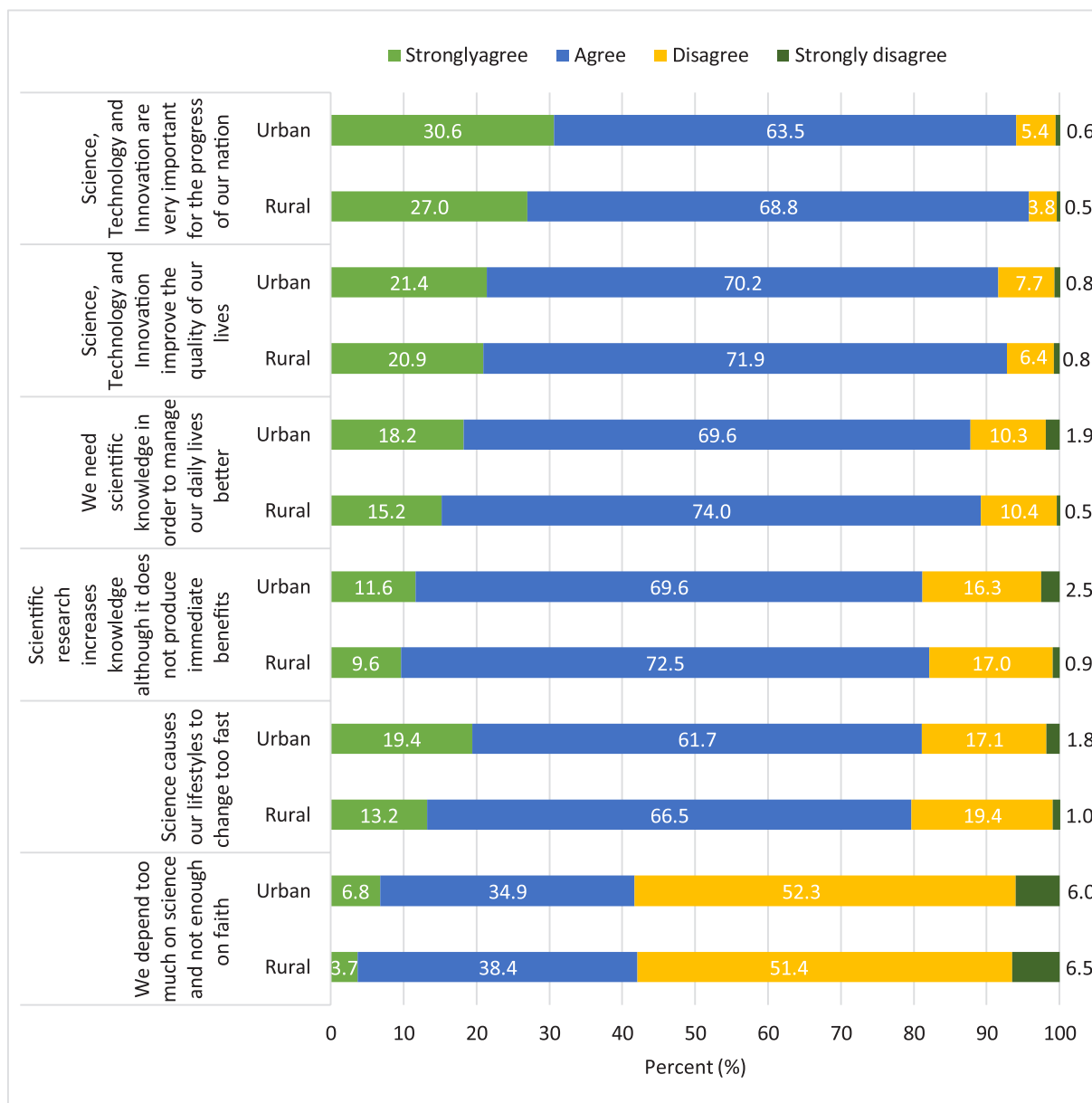
Appendix 21: Public Attitudes toward Science and Technology, by Gender

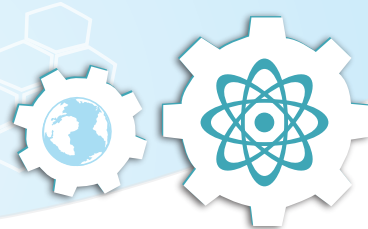




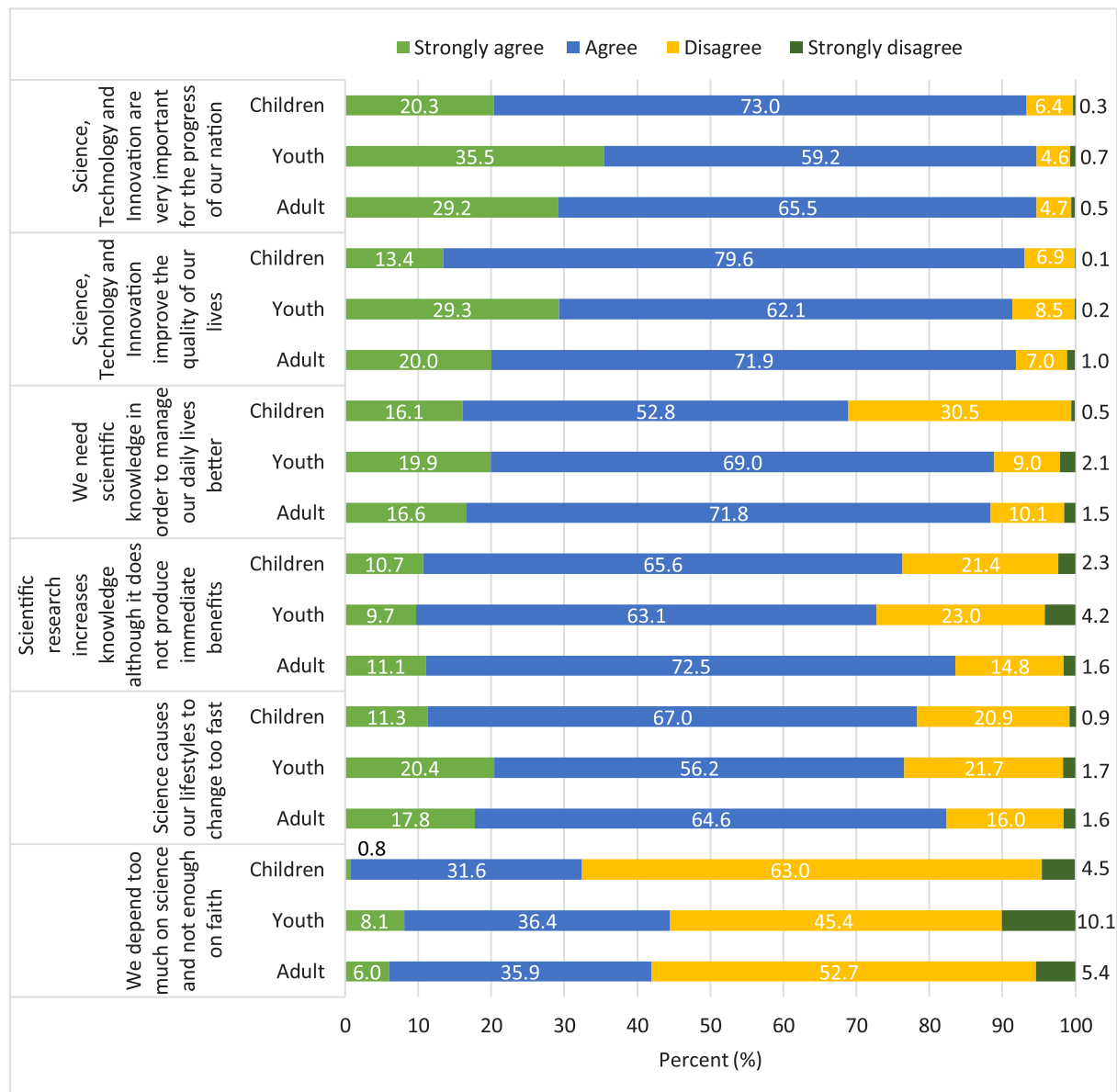
PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

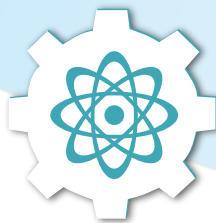
Appendix 22: Public Attitudes toward Science and Technology, by Locality





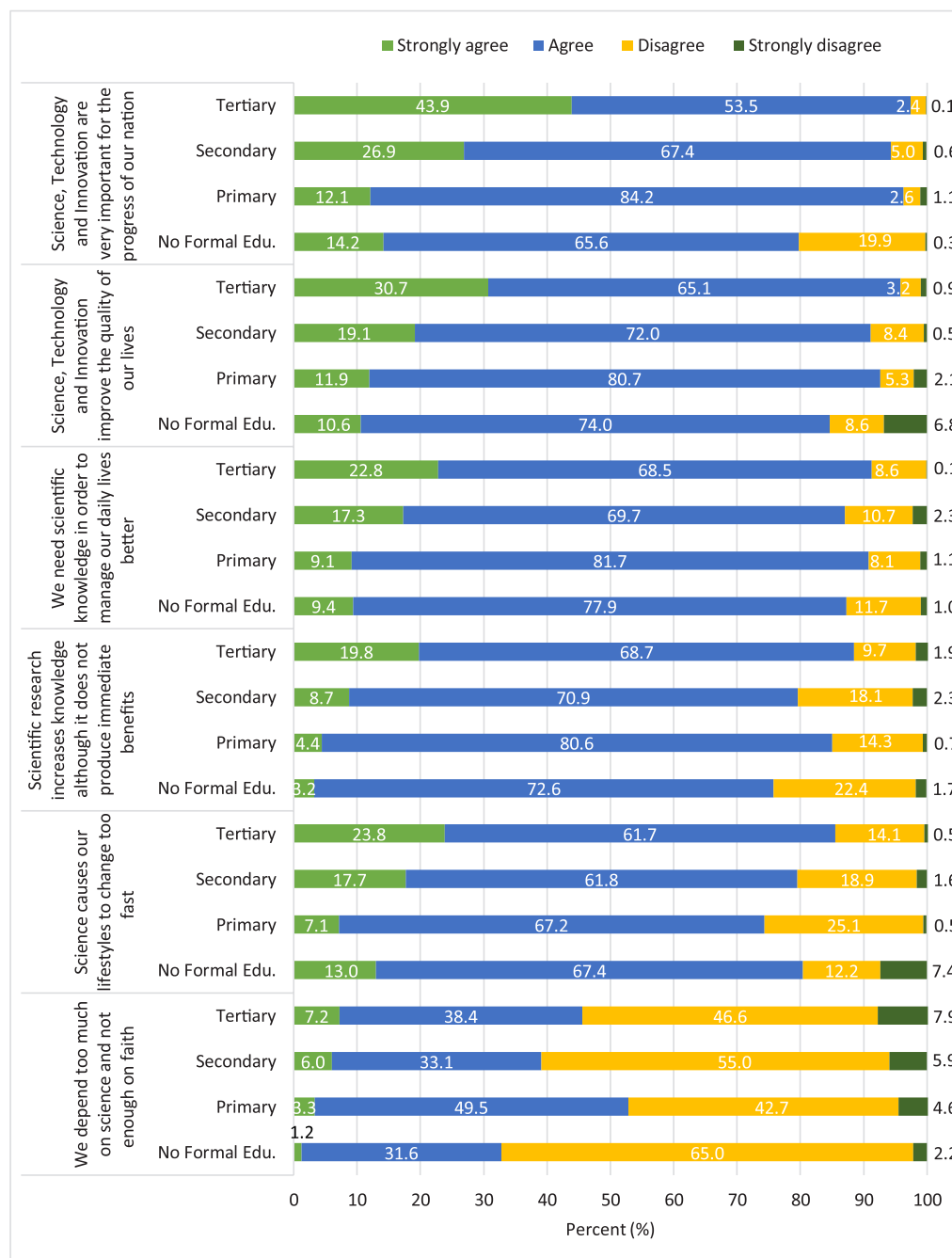
Appendix 23: Public Attitudes toward Science and Technology, by Age Group

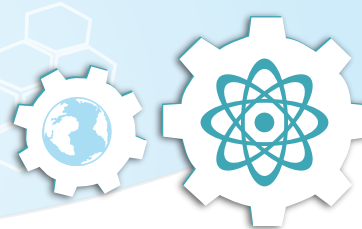




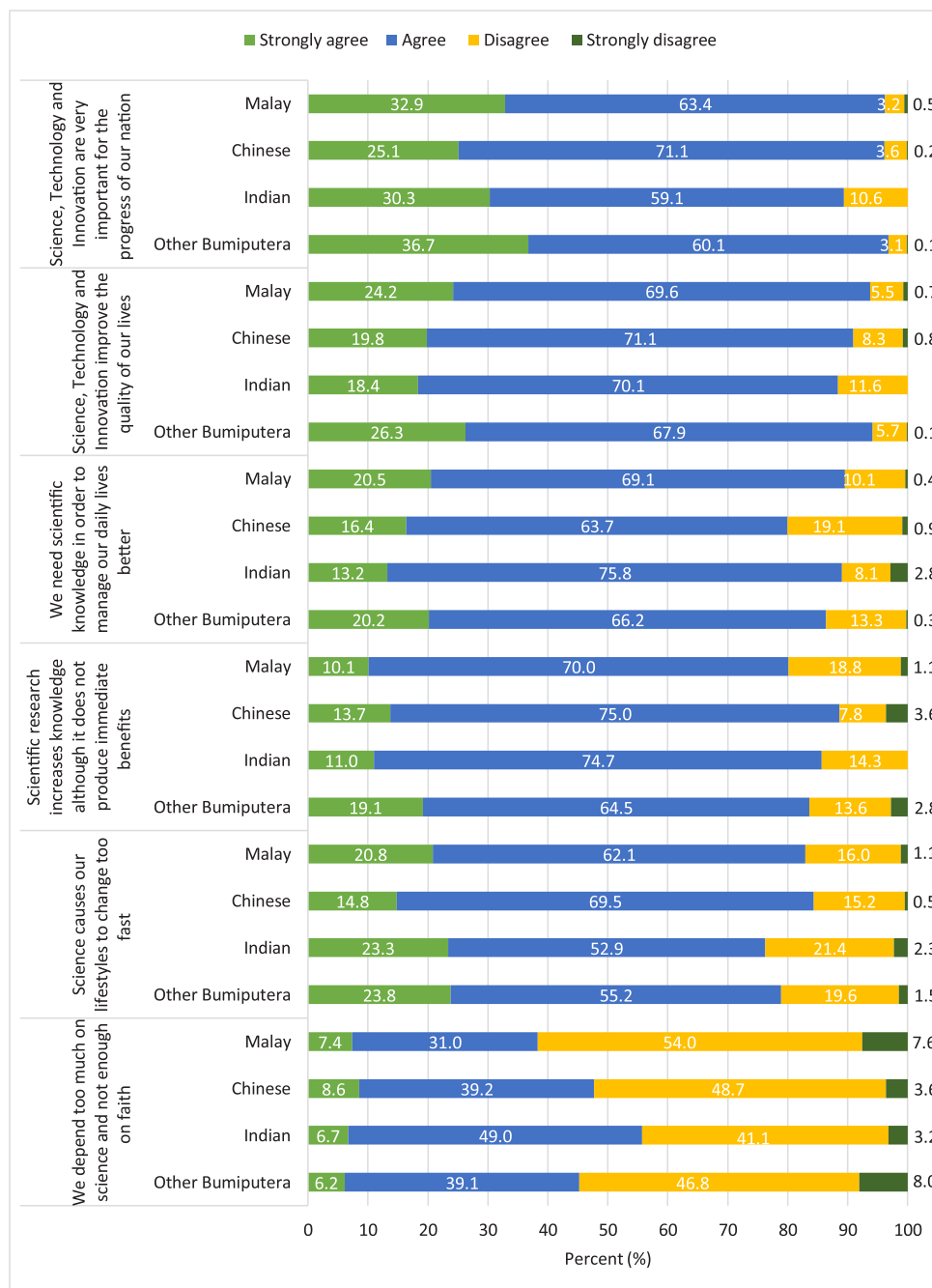
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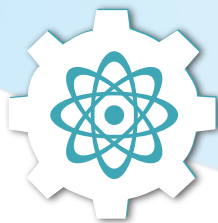
Appendix 24: Public Attitudes toward Science and Technology, by Educational Attainment





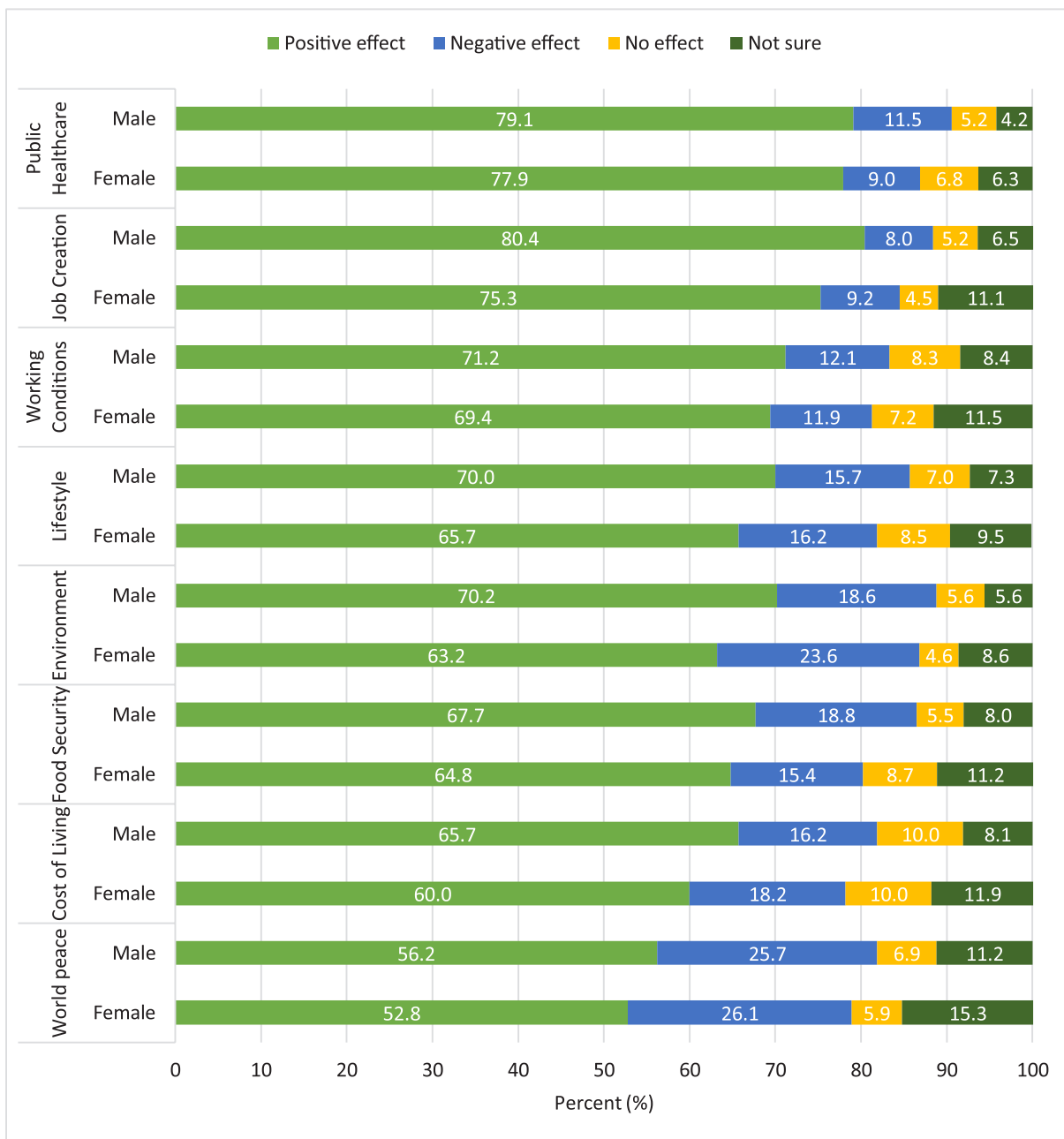
Appendix 25: Public Attitudes toward Science and Technology, by Ethnicity

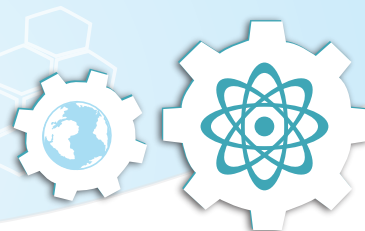




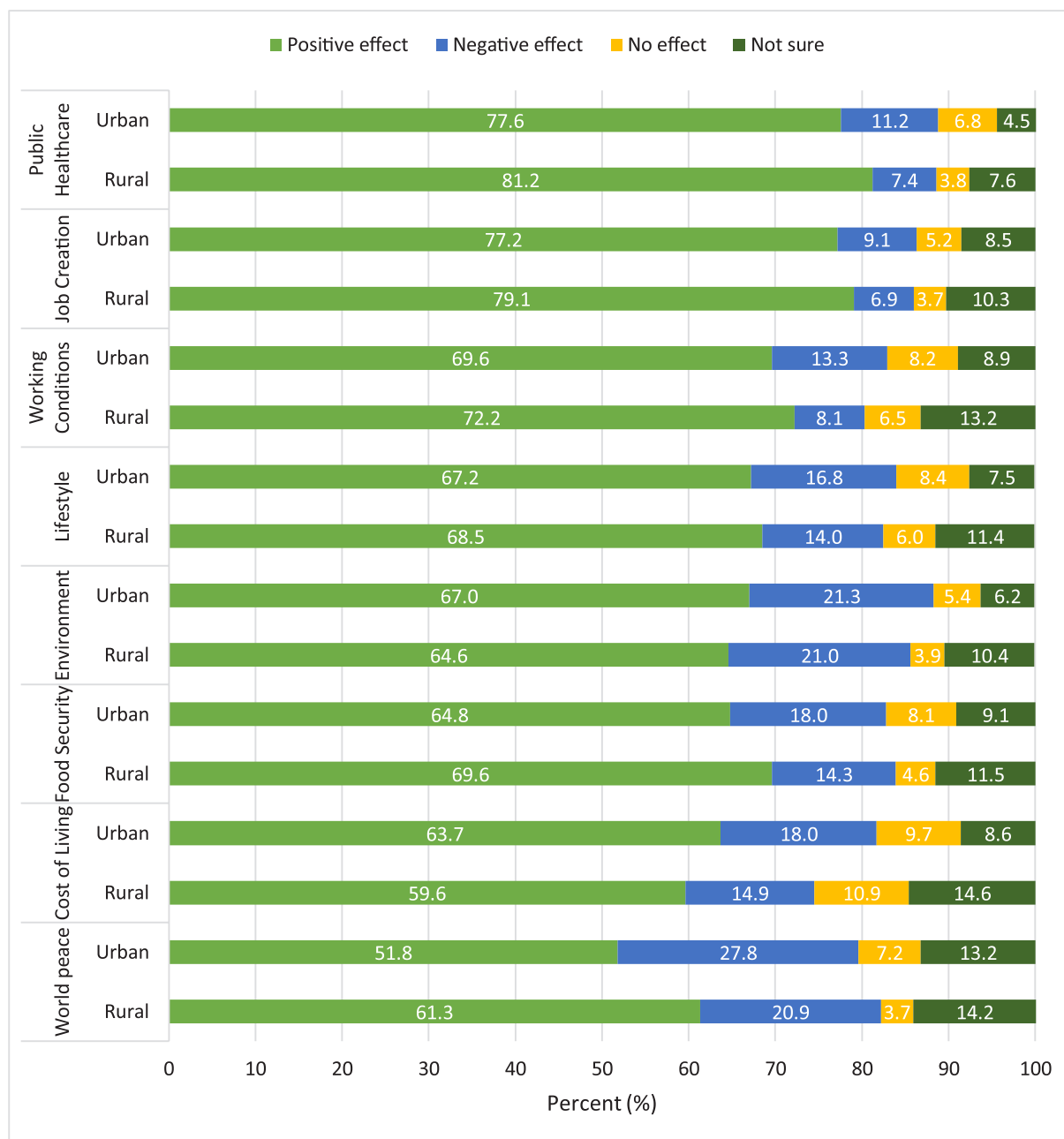
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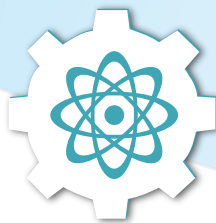
Appendix 26: Assessment of STI Effects, by Gender





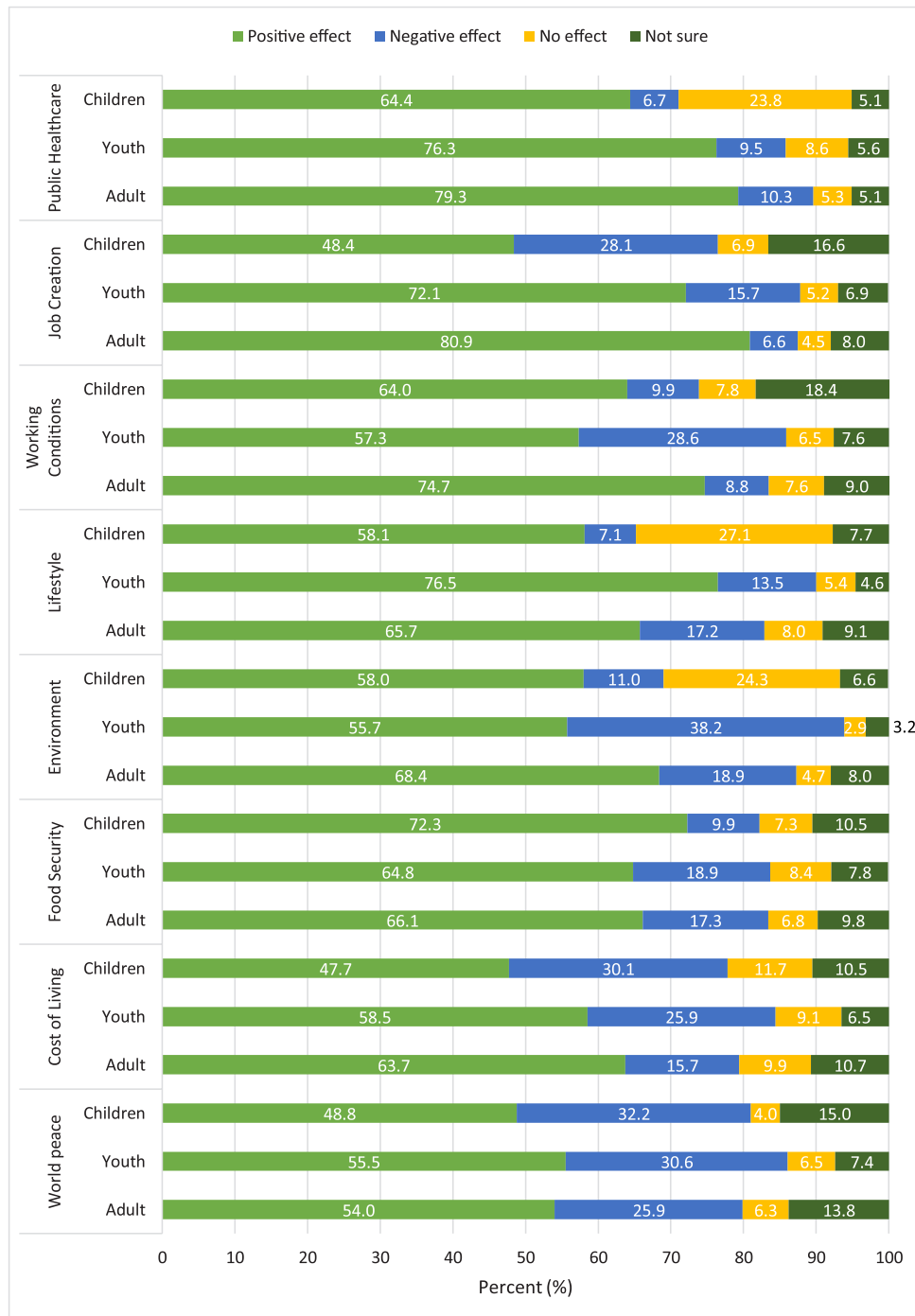
Appendix 27: Assessment of STI Effects, by Locality

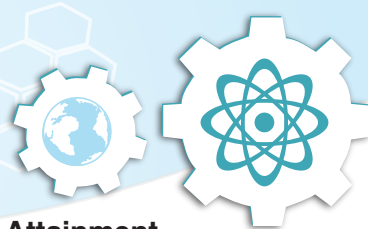




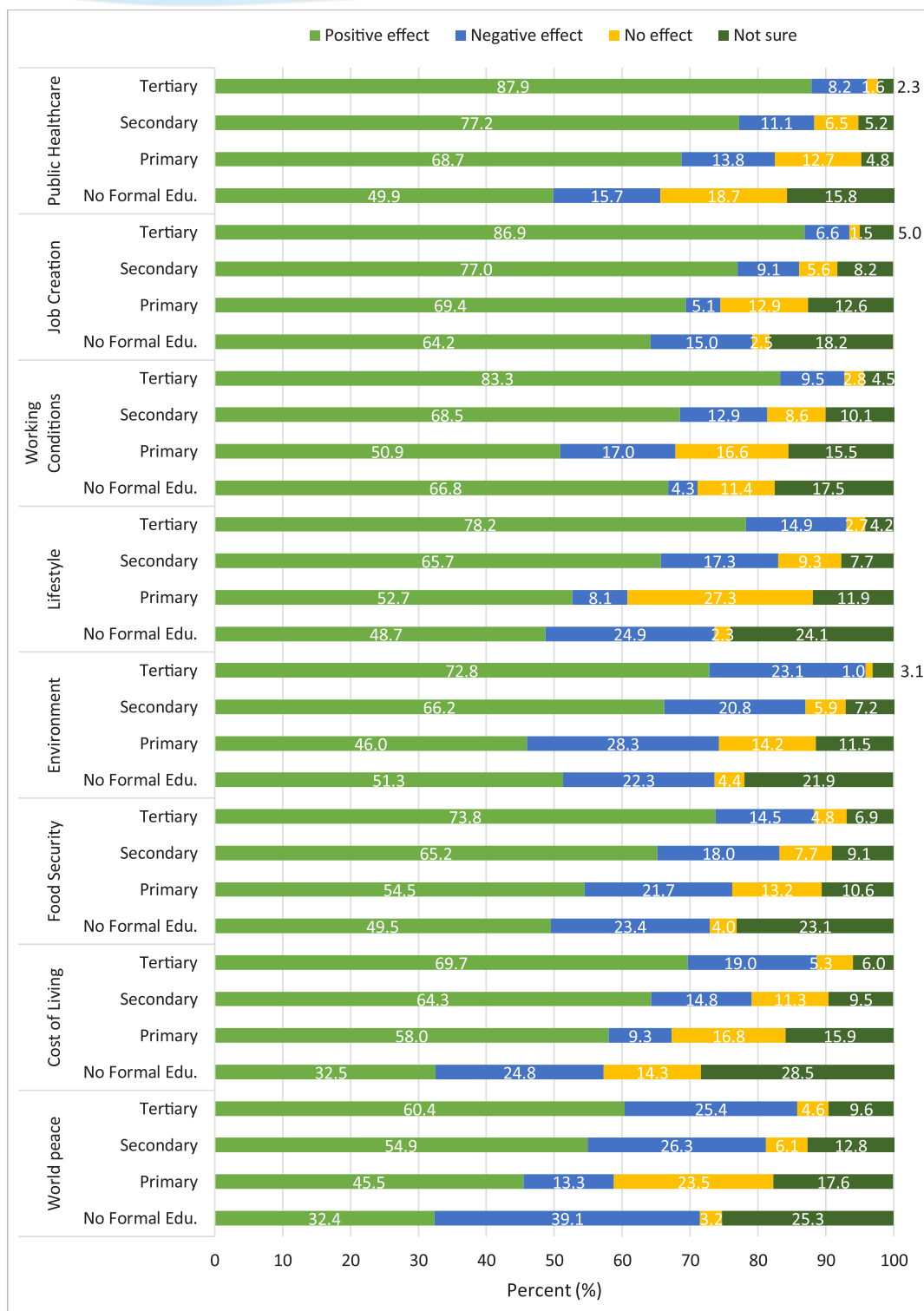
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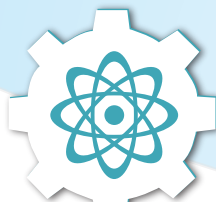
Appendix 28: Assessment of STI Effects, by Age Group





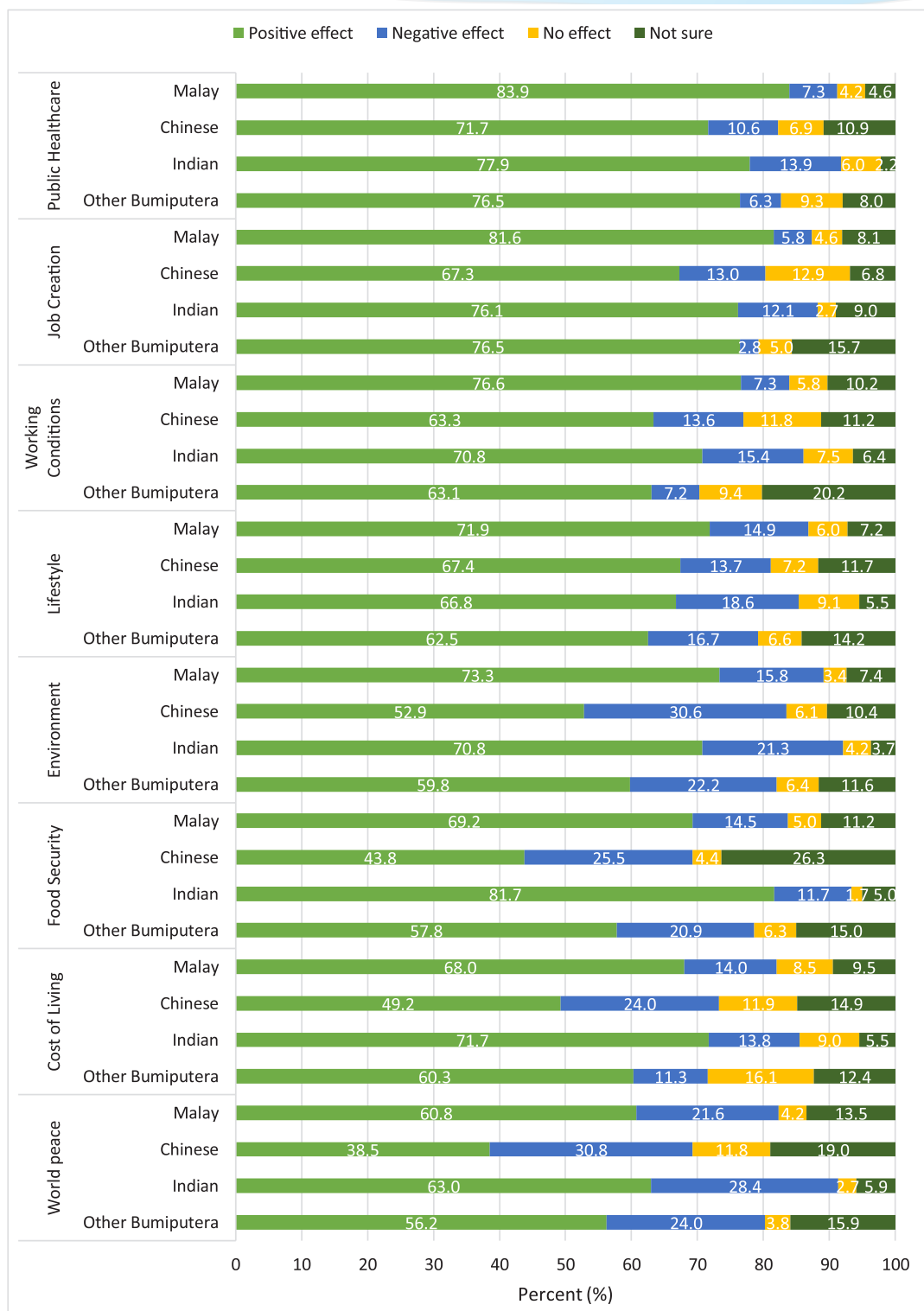
Appendix 29: Assessment of STI Effects, by Educational Attainment

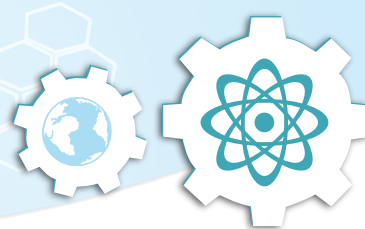




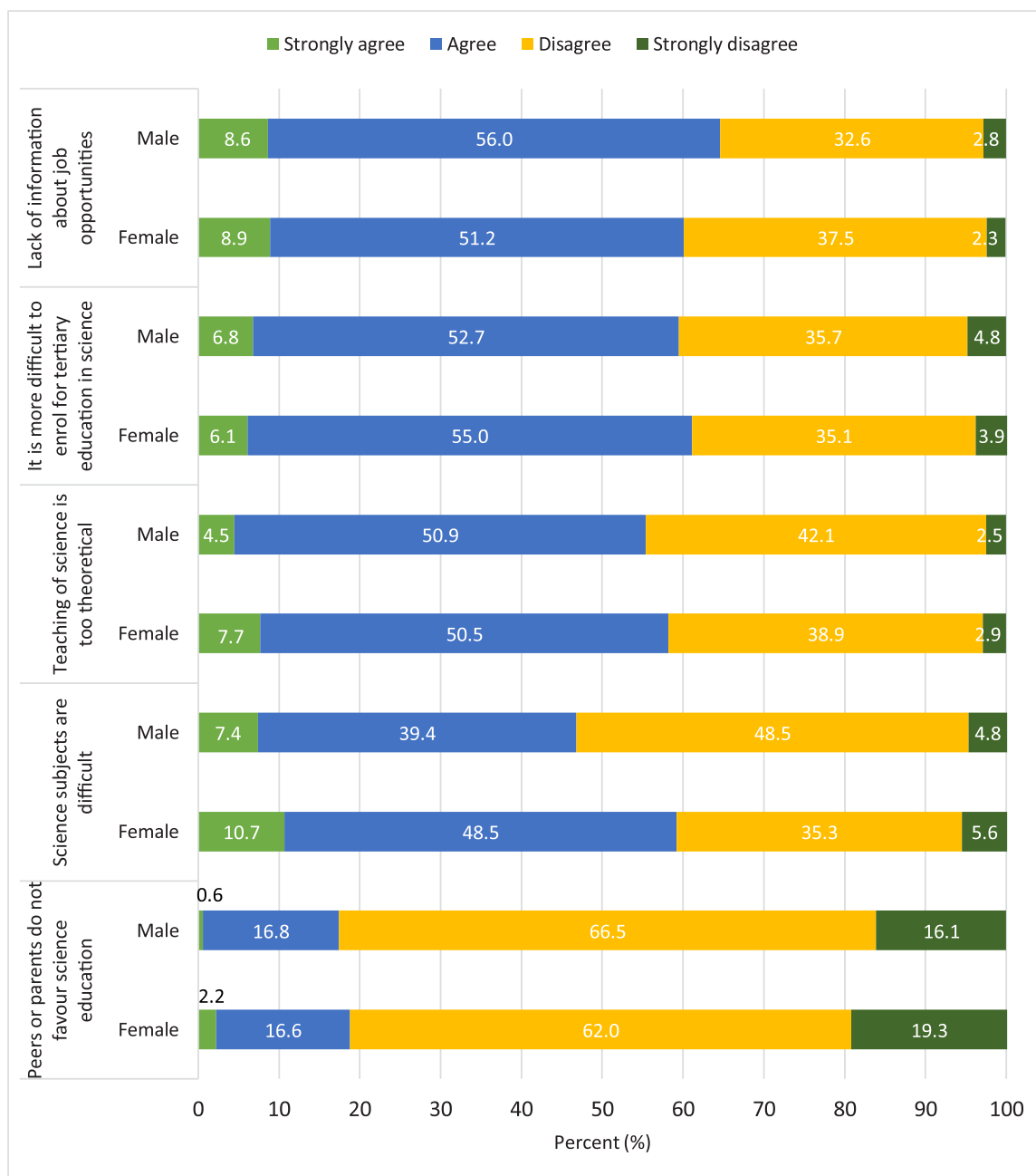
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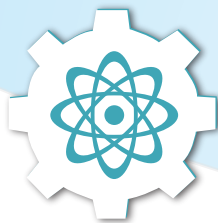
Appendix 30: Assessment of STI Effects, by Ethnicity





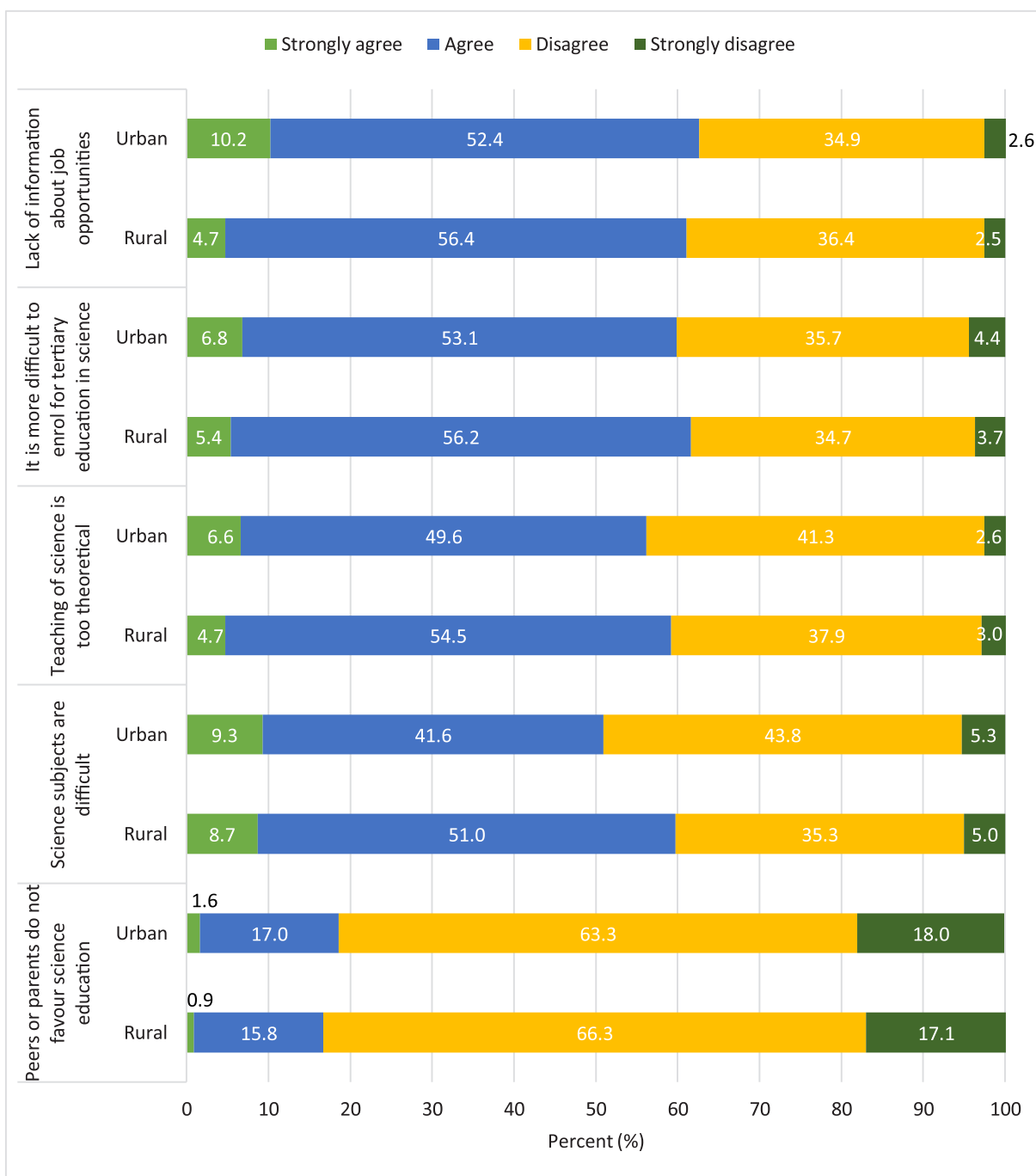
Appendix 31: Reasons for Low Science Stream Enrolment, by Gender

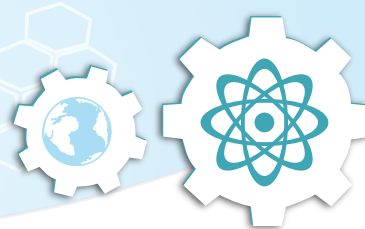




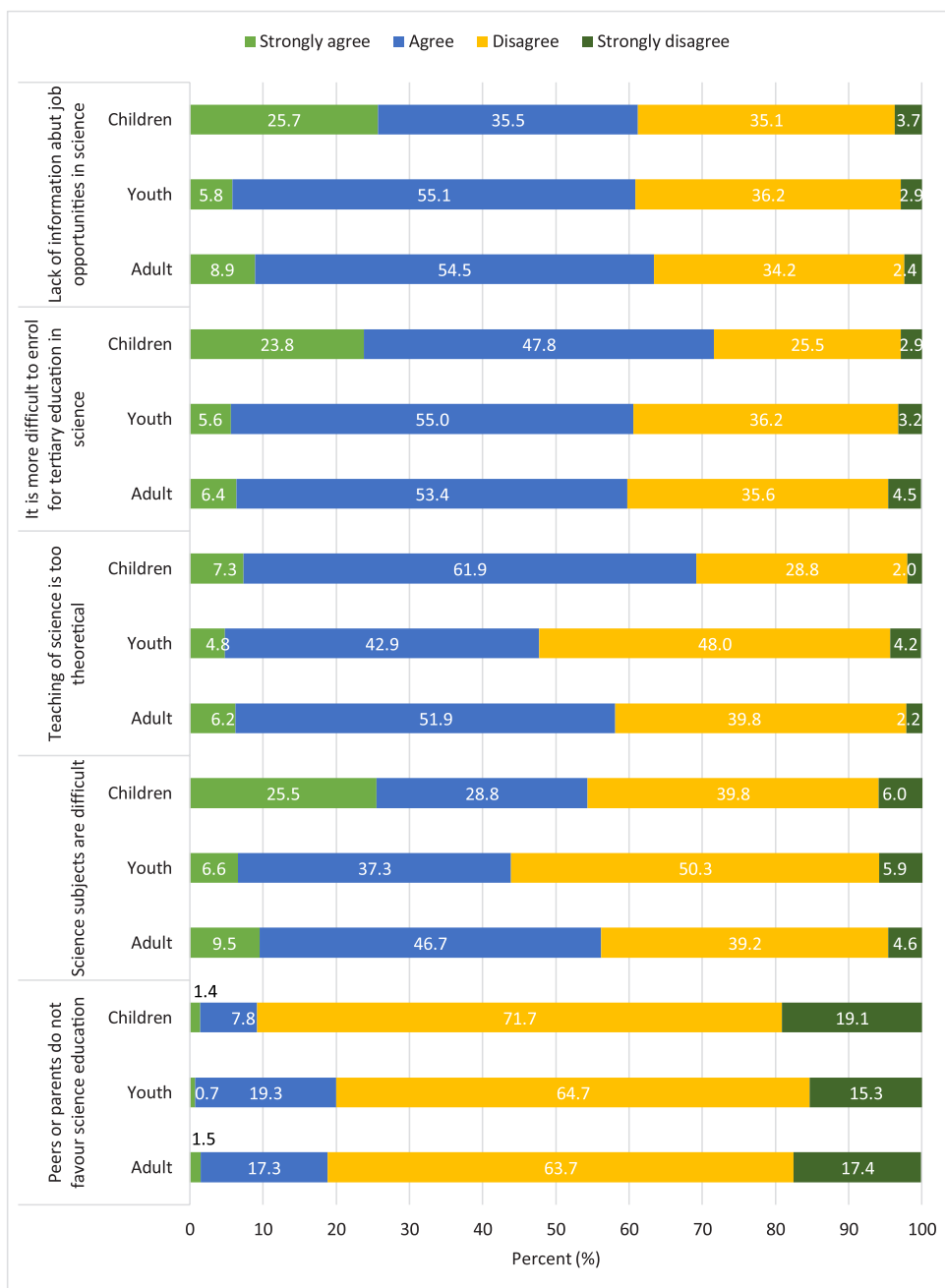
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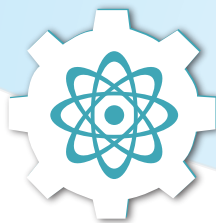
Appendix 32: Reasons for Low Science Stream Enrolment, by Locality





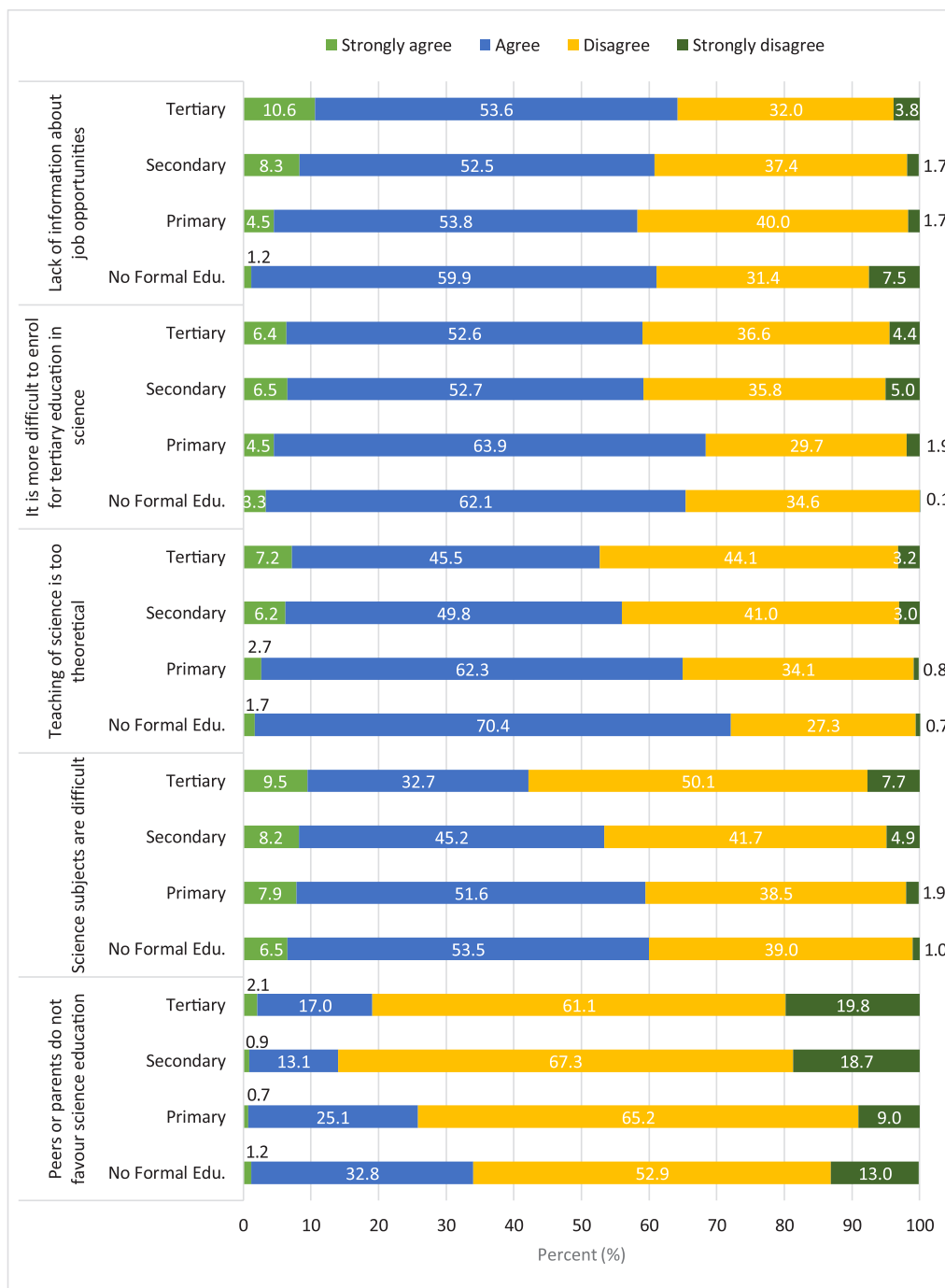
Appendix 33: Reasons for Low Science Stream Enrolment, by Age Group

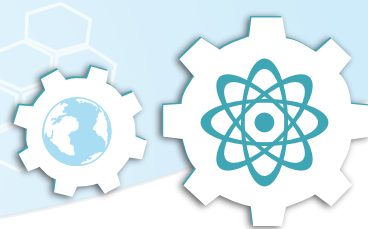




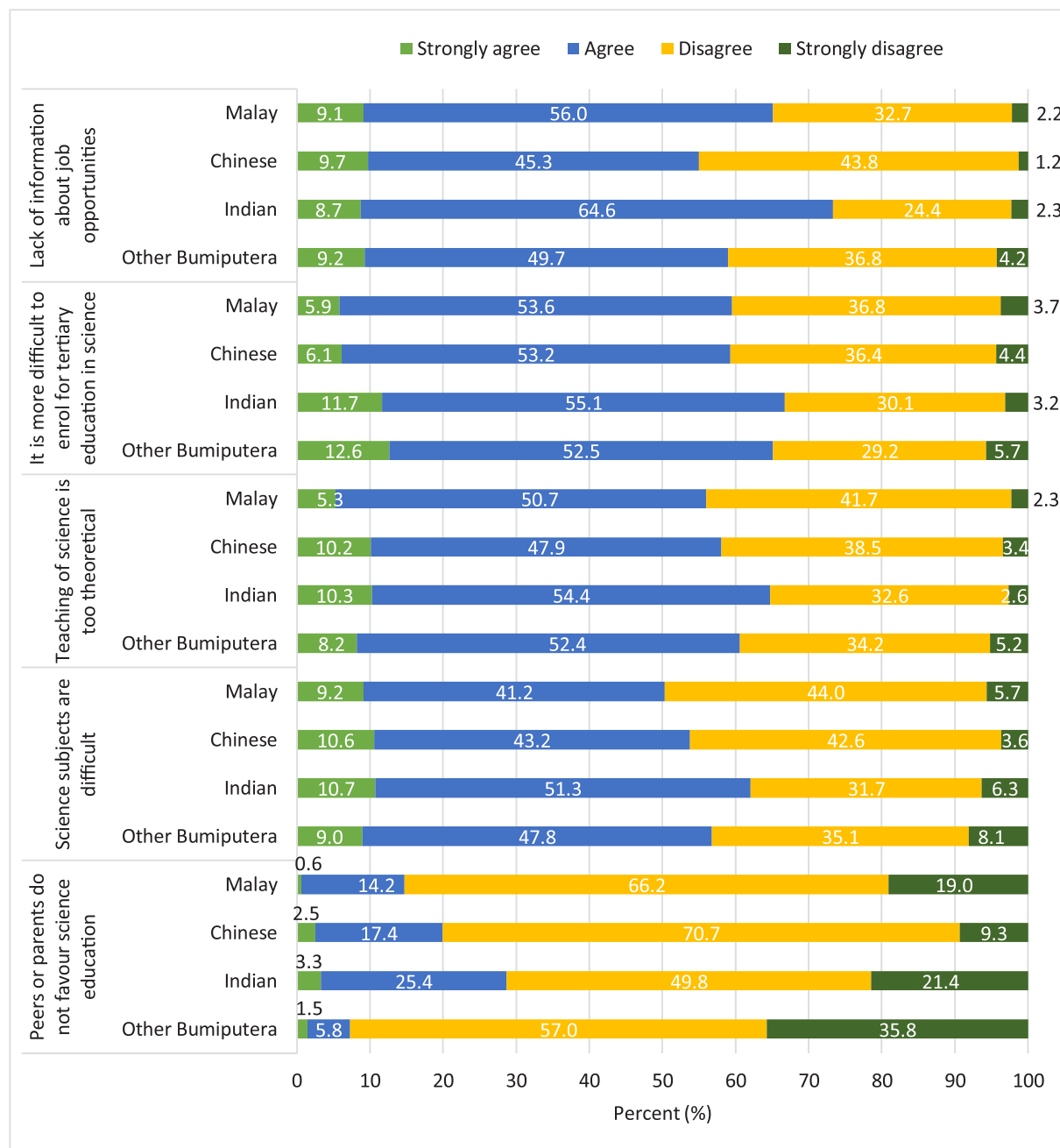
PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

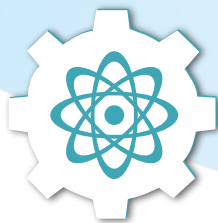
Appendix 34: Reasons for Low Science Stream Enrolment, by Educational Attainment



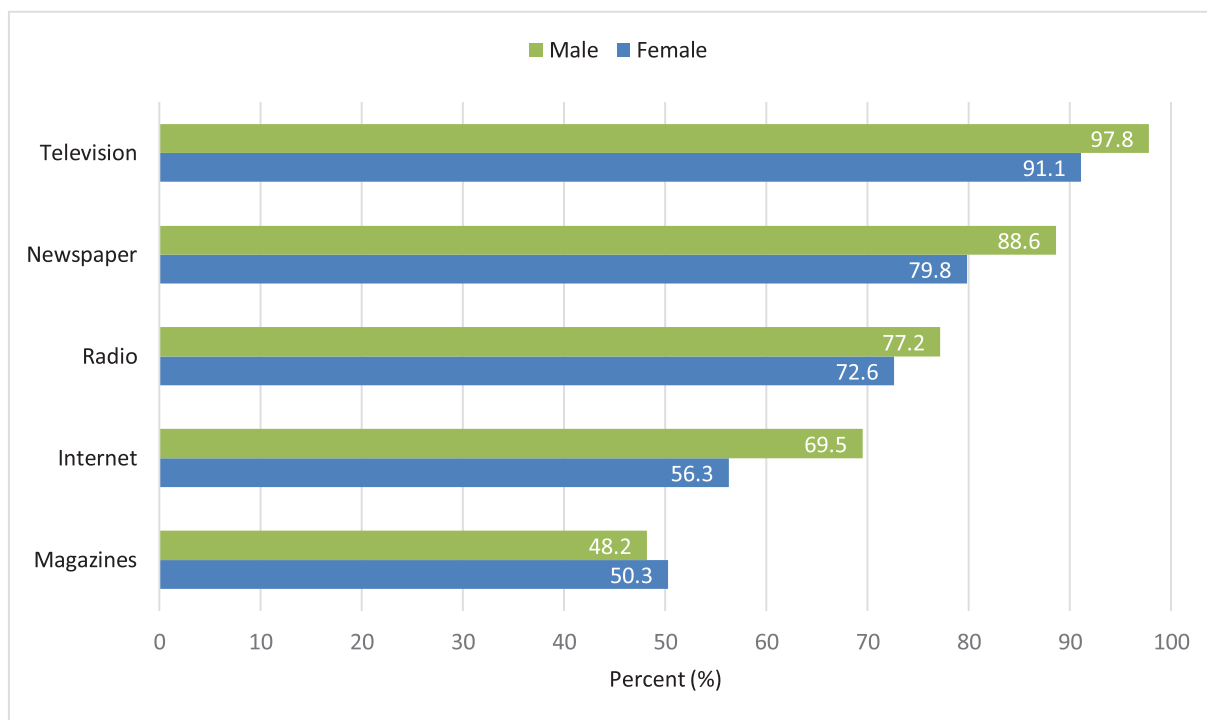


Appendix 35: Reasons for Low Science Stream Enrolment, by Ethnicity

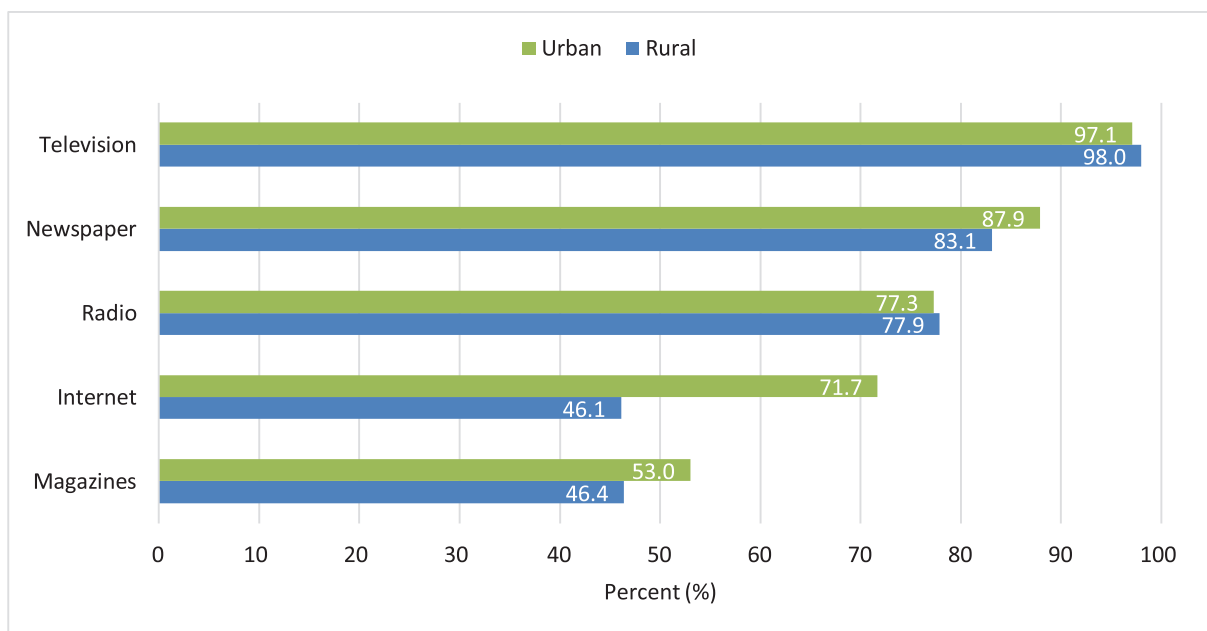


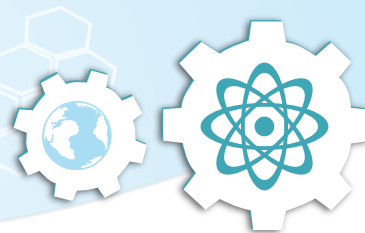


Appendix 36: Source of Information through Media, by Gender

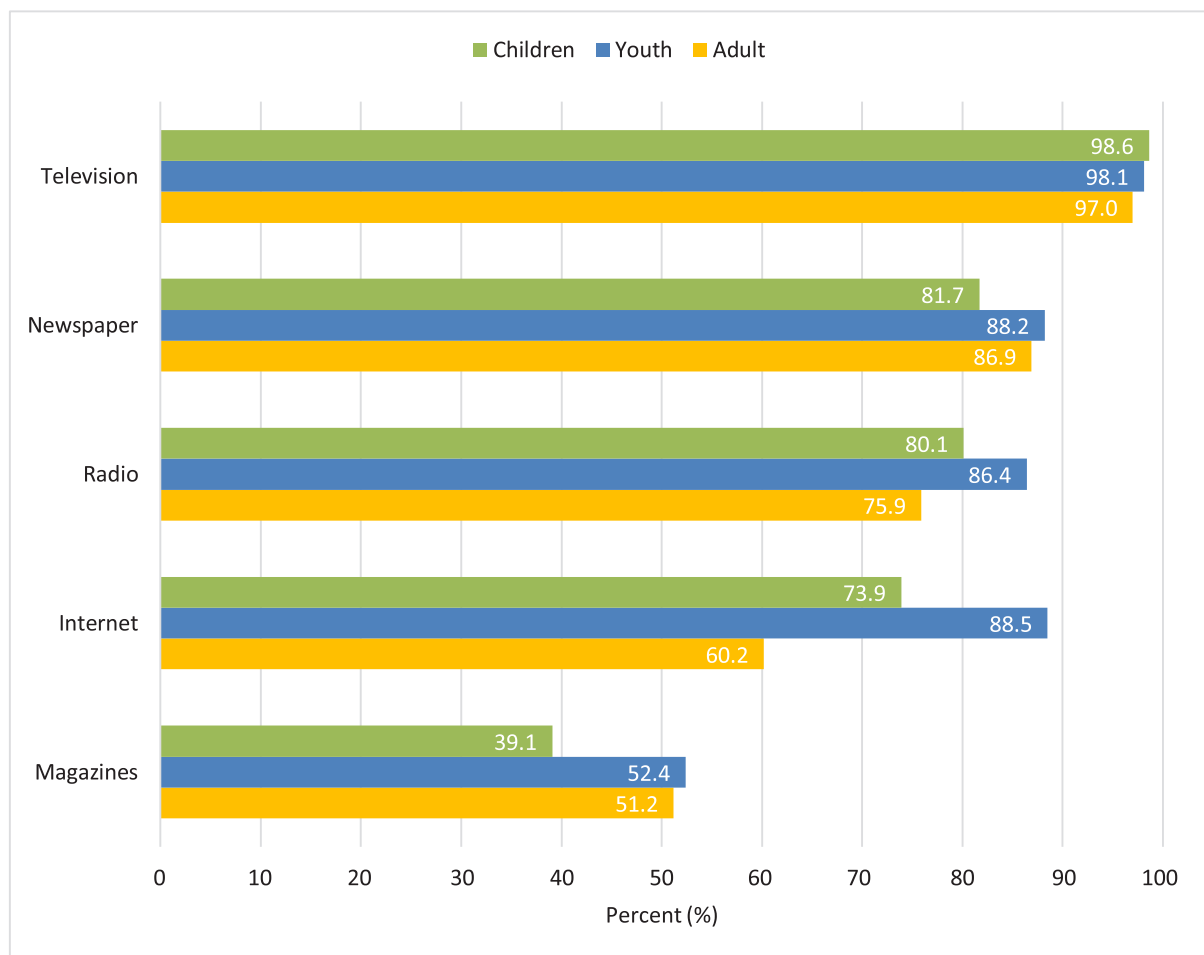


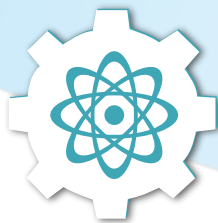
Appendix 37: Source of Information through Media, by Locality



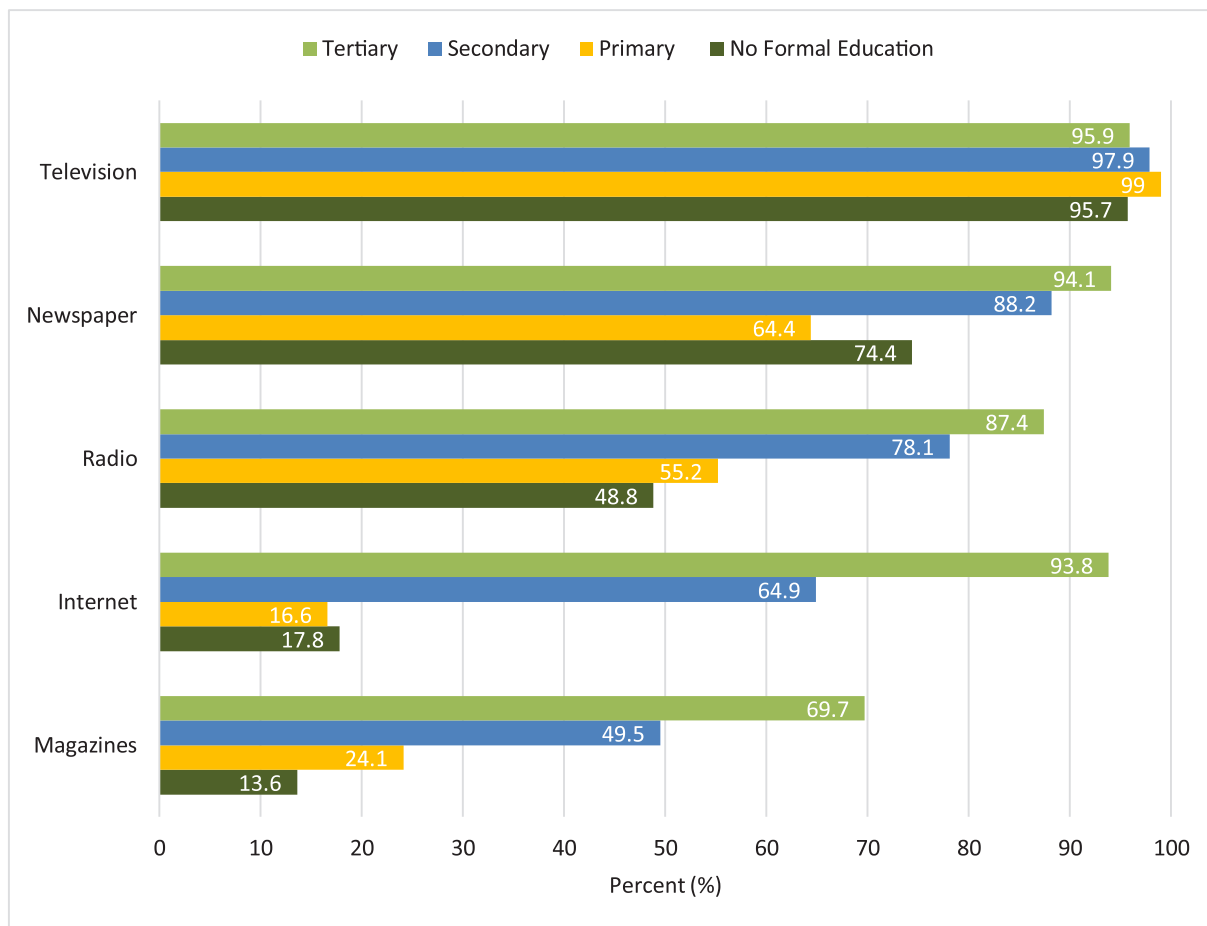


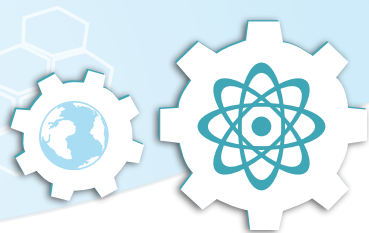
Appendix 38: Source of Information through Media, by Age Group



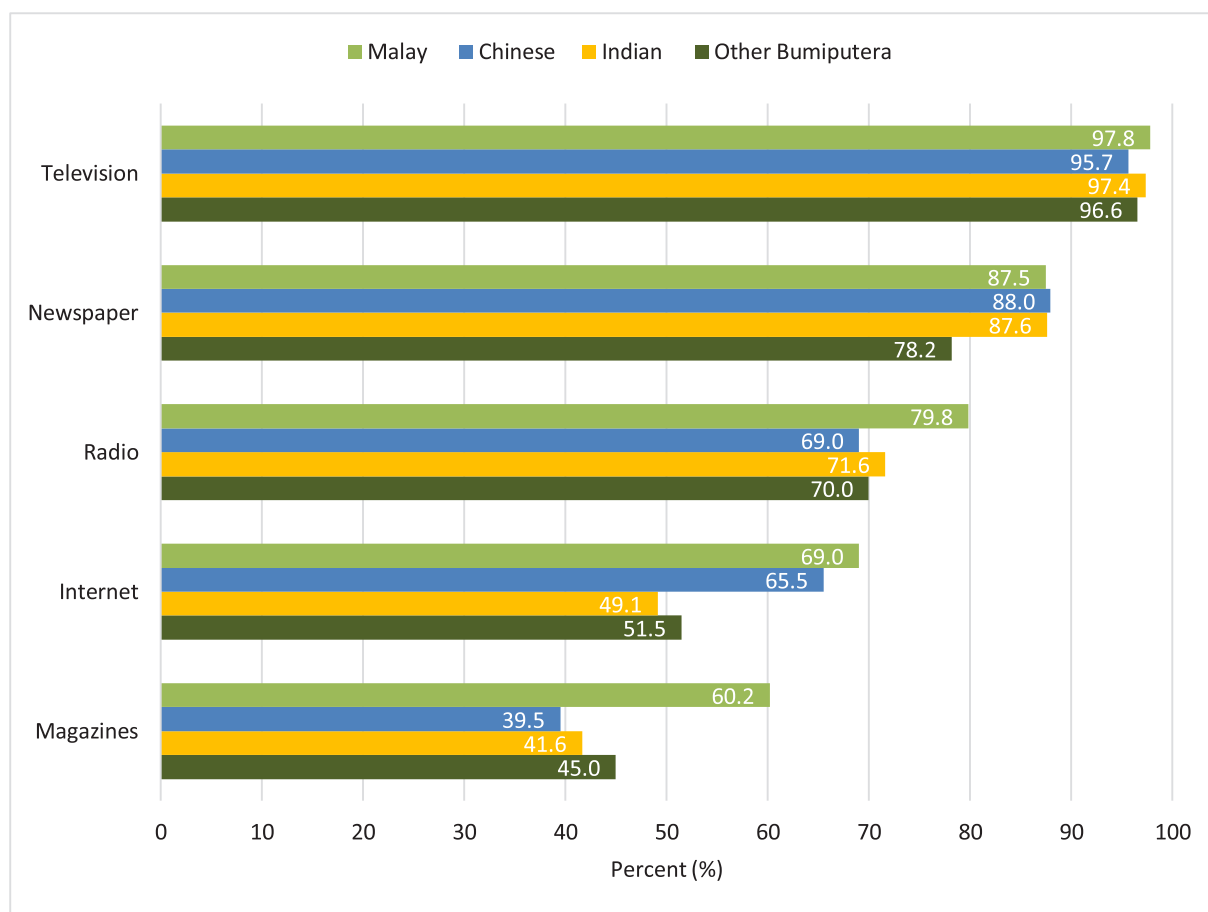


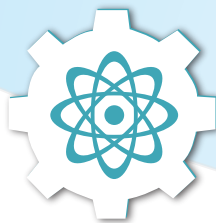
Appendix 39: Source of Information through Media, by Educational Attainment





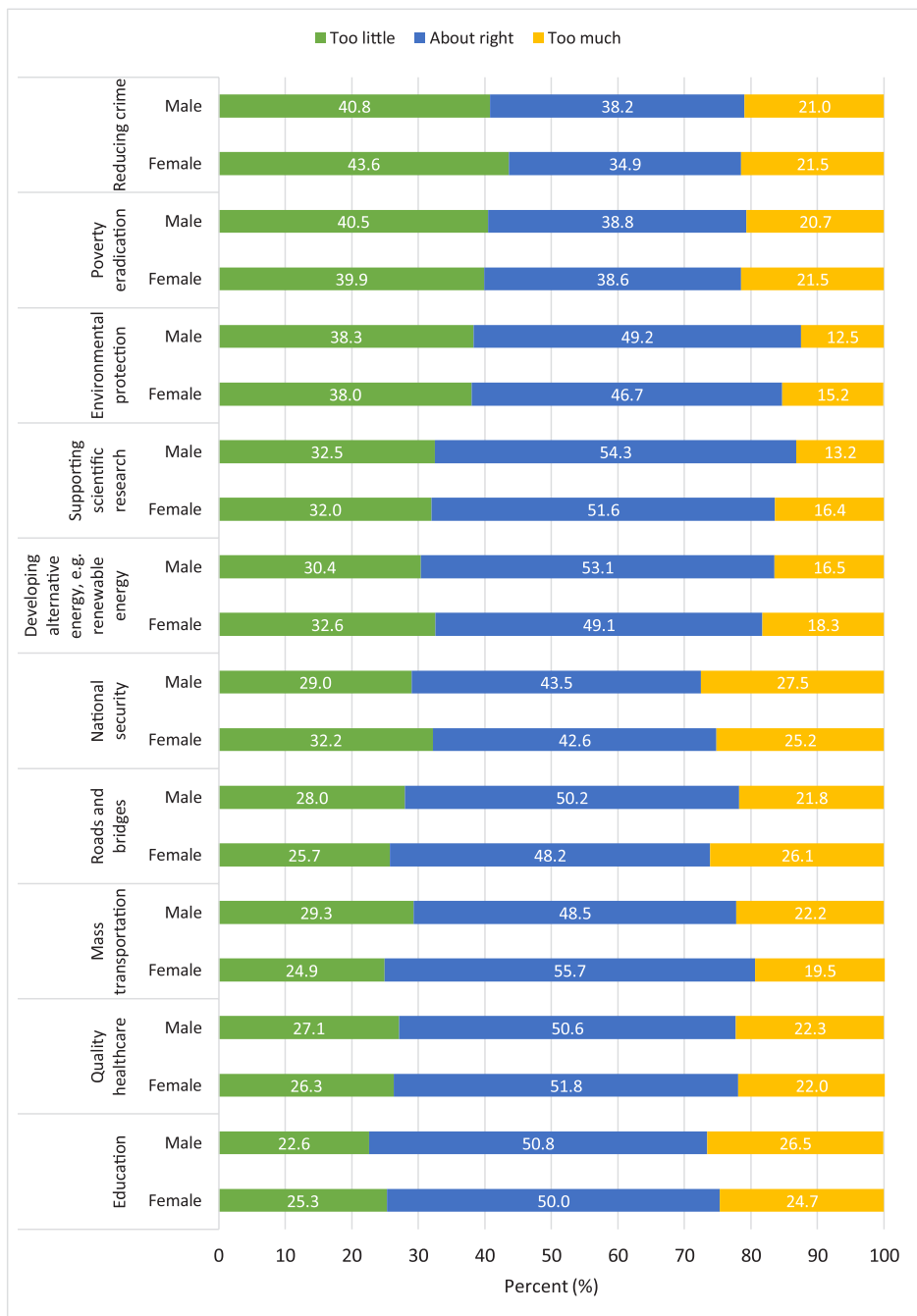
Appendix 40: Source of Information through Media, by Ethnicity

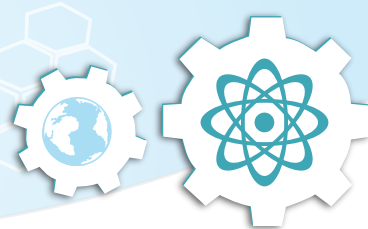




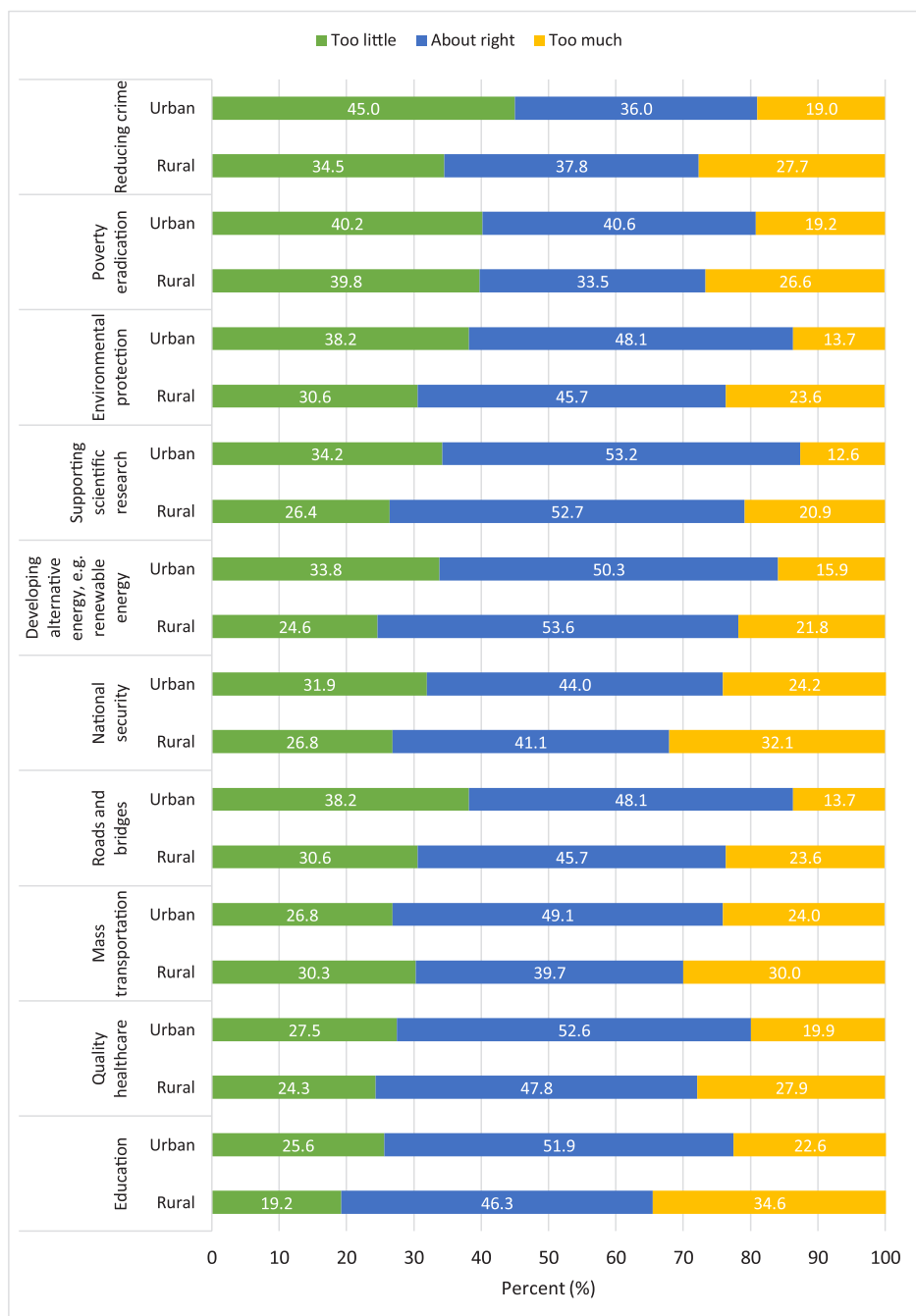
PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

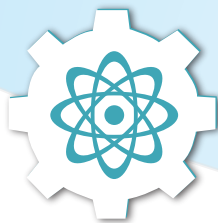
Appendix 41: Assessment of Government Spending, by Gender





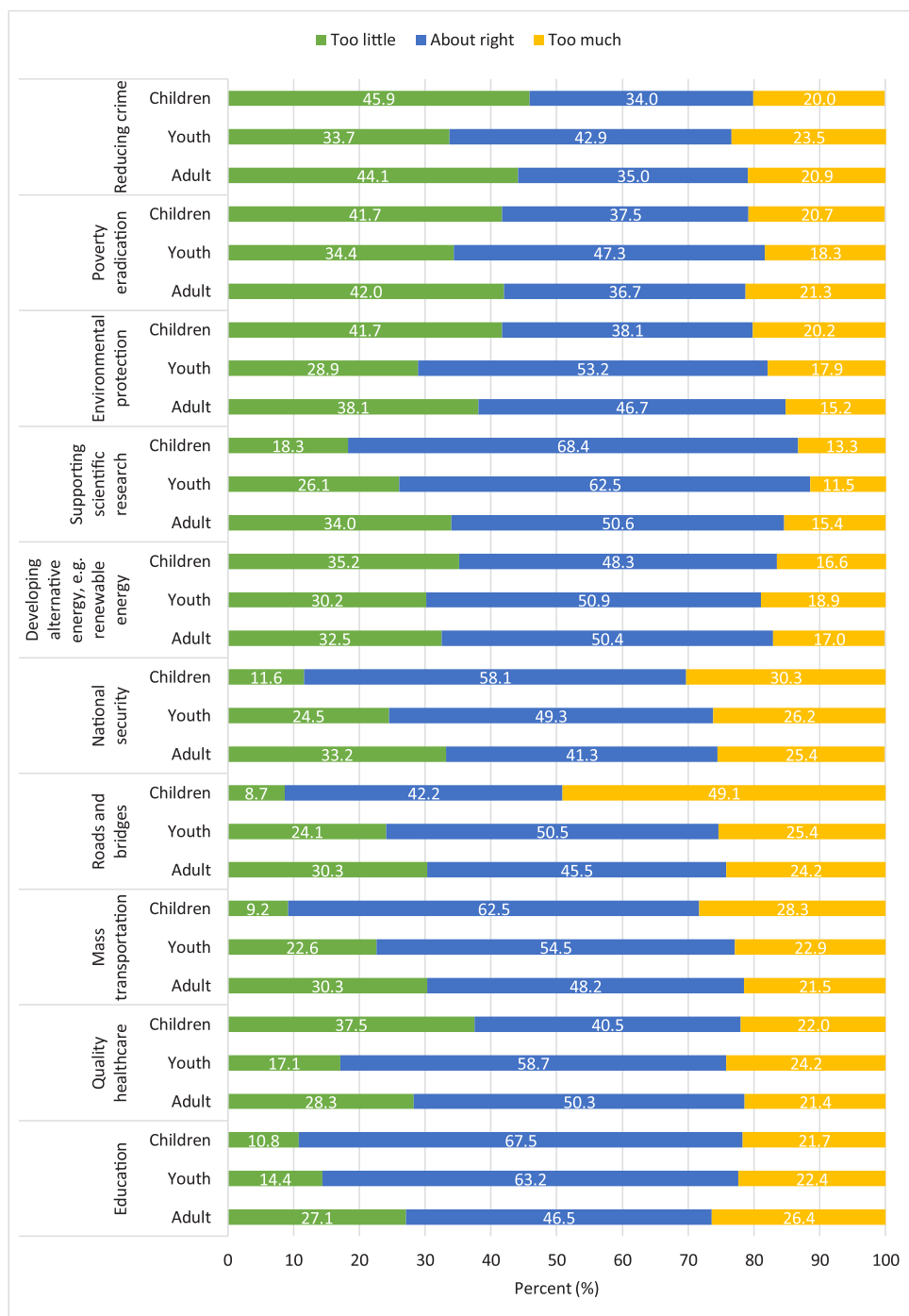
Appendix 42: Assessment of Government Spending, by Locality

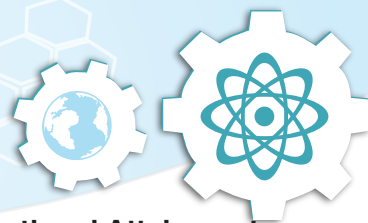




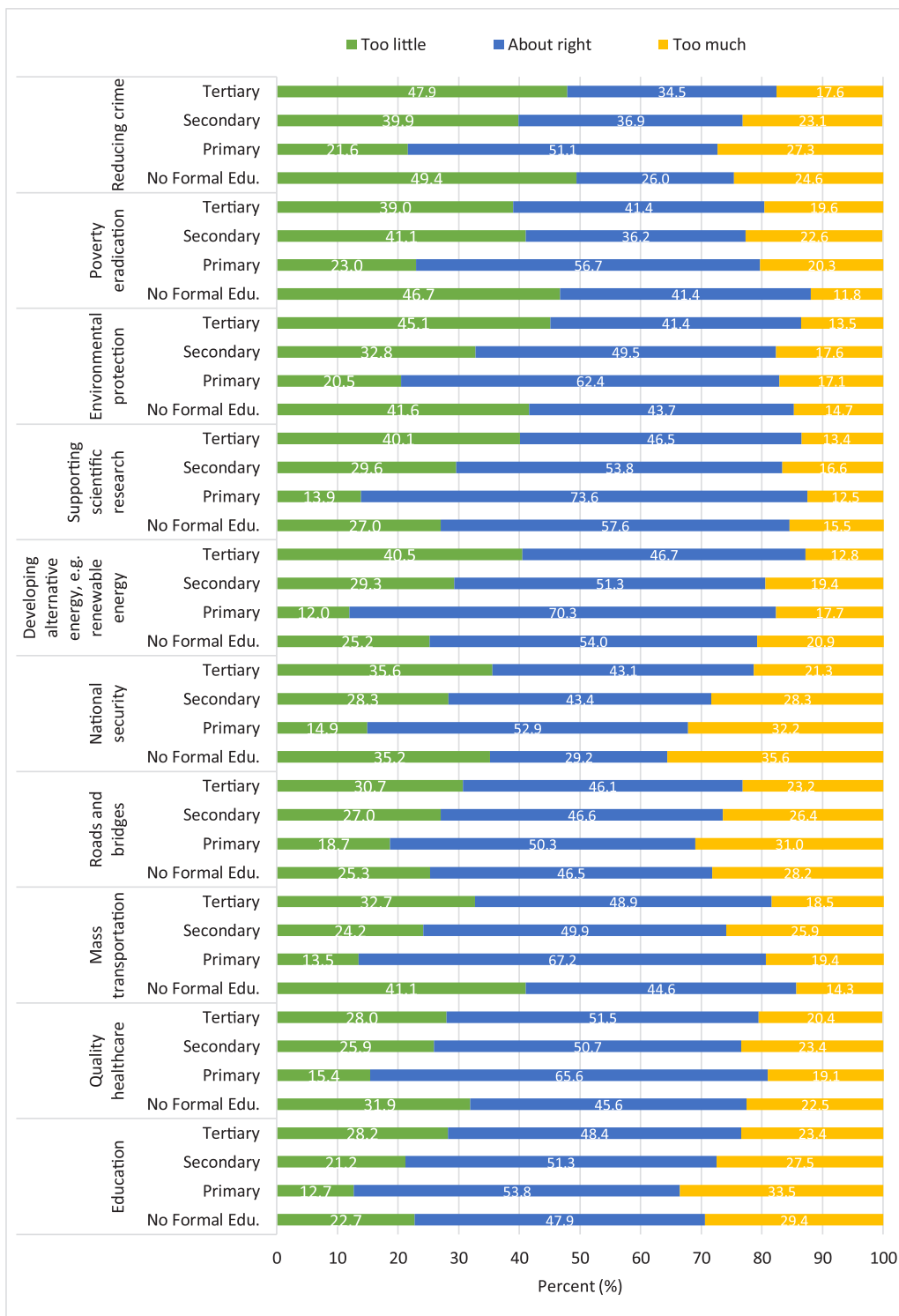
PUBLIC AWARENESS OF SCIENCE, TECHNOLOGY AND INNOVATION MALAYSIA 2014

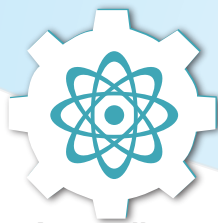
Appendix 43: Assessment of Government Spending, by Age Group





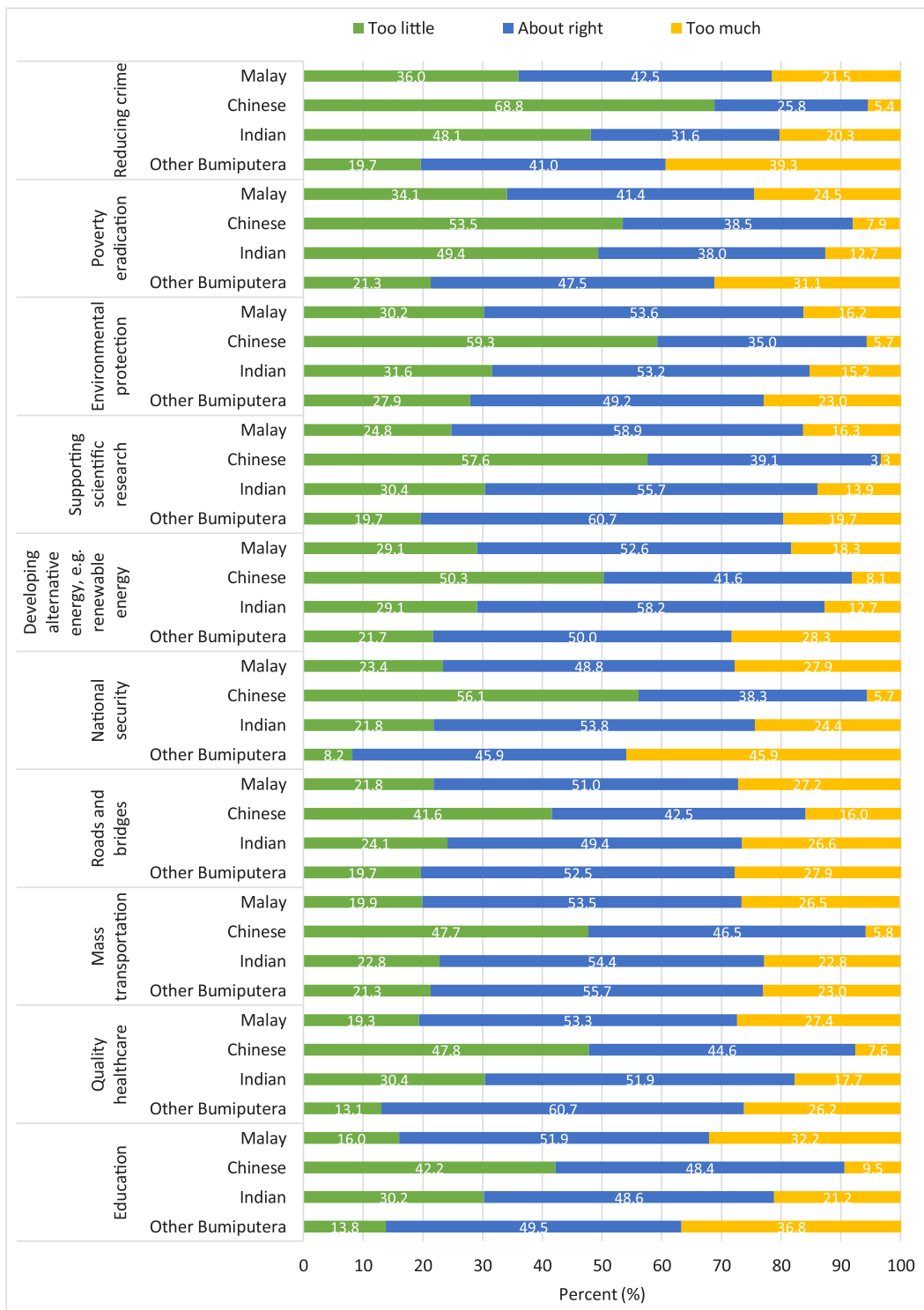
Appendix 44: Assessment of Government Spending, by Educational Attainment





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Appendix 45: Assessment of Government Spending, by Ethnicity



Survey Technical Note

I. SURVEY PROCEDURES

The survey procedures consist of the following five (5) steps:

- i) Mailing of the survey introduction letter;
- ii) Distribution of survey kits to interviewers;
- iii) Fieldwork Canvassing;
- iv) Supervision; and
- v) Collection of questionnaires.

Step 1: Mailing of survey introduction letter

An introduction letter was sent one week prior to the first visit and sought the cooperation from the selected living quarters (LQ). The letter stated the project objective and was signed by the Head of MASTIC.

Figure C-1: The MASTIC Survey Introduction Letter

 KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI MALAYSIA MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION Ara 1-7, Blok C4 & C5, Kompleks C Pusat Pentadbiran Kerajaan Persekutuan 62662 PUTRAJAYA MALAYSIA TEL : 603 - 8885 8000 FAXS : 603 - 8888 9070 Laman web : www.mosti.gov.my mosti	Ruj. Kami : MOSTI/MST/KPI/1-3 JLD. () Tarikh : / /2013 KEPADA YANG BERKENAAN Tuan/Puan, KAJI SELIDIK KESEDARAN AWAM TERHADAP SAINS, TEKNOLOGI DAN INOVASI (STI) 2013 DI MALAYSIA Dengan hormatnya saya ingin merujuk perkara tersebut di atas. 2. Sukacita dimaklumkan bahawa Kerajaan Malaysia melalui Pusat Maklumat Sains dan Teknologi Malaysia (MASTIC), Kementerian Sains, Teknologi dan Inovasi (MOSTI) sedang menjalankan Kaji Selidik Kesedaran Awam Terhadap Sains, Teknologi dan Inovasi 2013 seluruh negara. Kajian ini bertujuan mengukur tahap kefahaman, kesedaran, minat dan pengetahuan masyarakat Malaysia terhadap bidang STI. Hasil penemuan kajian akan digunakan oleh penggubal dasar untuk merancang strategi yang bersesuaian bagi memperkasa perkembangan bidang STI negara. 3. Kementerian ini telah melantik perunding PE Research Sdn. Bhd. untuk menjalankan kajian ini bagi pihak Kerajaan. Justeru itu, adalah diharapkan agar pihak tuan/puan dapat memberikan kerjasama penuh tanpa sebarang keraguan terhadap perunding berkenaan sepanjang proses pengumpulan data dijalankan bagi tempoh Disember 2013 hingga Mac 2014. Maklum balas pihak tuan/puan adalah rahsia dan tidak akan didedahkan kepada mana-mana pihak, di mana hanya analisis keseluruhan yang akan dimasukkan dalam laporan kajian kelak.
 (KAMARUZHAMAN MAT ZIN) b.p. Ketua Setiausaha Kementerian Sains, Teknologi dan Inovasi Malaysia (MOSTI)	4. Untuk makluman, tempat kediaman tuan/puan telah dipilih secara rawak oleh Jabatan Perangkaan Malaysia (DOSM) untuk mengambil bahagian dalam kajian ini. Wakil kami dengan kad ID dan surat kebenaran rasmi akan melawat kediaman tuan/puan bagi menjalankan temu bual bersemuka dengan ahli isi rumah yang berumur 12 hingga 64 tahun. Setiap sesi temu bual dijangka mengambil masa lebih kurang 20-30 minit. 5. Untuk maklumat lanjut, sila layari laman web www.mastic.gov.my atau www.peresearch.com.my/sti.html atau hubungi pegawai-pegawai berikut: (i). En. Ramlee Ab. Ghani, telefon: 03-8885 8108, e-mel: ramlee@mosti.gov.my; (ii). En. Vinson Embaran, telefon: 03-8885 8111, e-mel: vinson@mosti.gov.my; dan (iii). En. Mohamad Khairul Khalid, telefon: 03-8885 8652, e-mel: khairul@mosti.gov.my. 6. Kerjasama dan sokongan pihak tuan/puan dalam perkara ini amatlah dihargai dan didahului dengan ucapan ribuan terima kasih. Sekian. "BERKHIDMAT UNTUK NEGARA" SAINS DAN INOVASI PEMACU TRANSFORMASI

Step 2: Distribution of survey kits to interviewers

A survey kit was distributed to the interviewers. The survey kit included:

- i) Survey map showing the location of selected LQ;
- ii) LQ address list (consists of 10 LQ address);
- iii) Questionnaires;

- iv) Survey introduction letter;
- v) Notification card;
- vi) Interviewer identity card;
- vii) Survey manual; and
- viii) Souvenirs (for respondents who gave cooperation in the survey).

The survey map and the LQ address list were provided by the DOSM. Maps and address lists were provided to identify the location of EBs and selected LQs. Some addresses given by DOSM were incomplete, for example, addresses without house numbers. When the address was incomplete, the interviewer would identify the selected LQ according to the location marked in the survey map. The LQ ID stated in the LQ address list is additional information to help the interviewer to identify the selected LQ. It was because DOSM usually attached a completion card on the LQ's front door after they completed their survey. However, some LQs may have removed the DOSM completion card. This probably, made it impossible to confirm the selected LQ. In this case, the selected LQ will be put in the "can't locate" category. **Figure C-2** shows a sample survey map, and **Figure C-3** shows a sample of LQ address list.

The questionnaires were prepared in three languages: Malay, Mandarin and English. Interviewers were required to carry all three language versions of the questionnaire. Interviewers with the required language proficiency conducted the interview.

Figure C-2: Sample of Survey Map

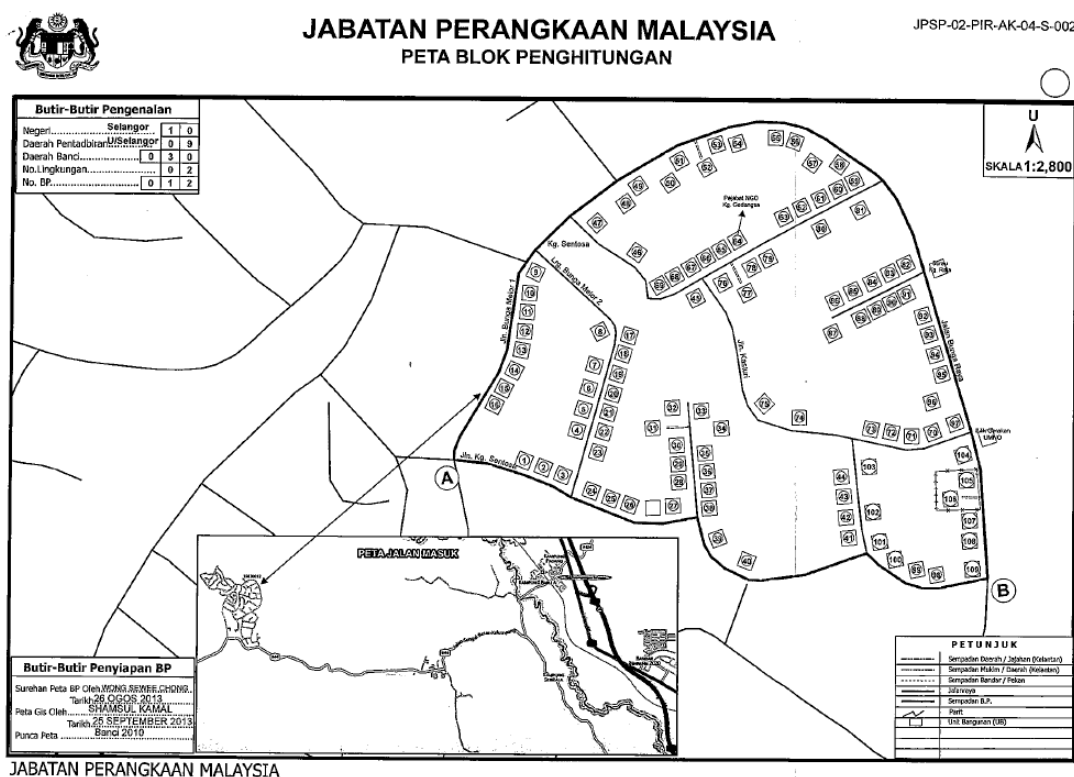


Figure C-3: Sample of LQ Address List

**JABATAN PERANGKAAAN MALAYSIA
NEGERI SELANGOR
SENARAI TEMPAT KEDIAMAN TERPILIH**

KAJIAN KESEDARAN AWAM MENGENAI SAINS DAN TEKNOLOGI oleh MOSTI

No. Siri	Bandar/Mukim	Kod Negeri	Kod DP	Kod DB	Kod BP	Strata	No. UB	No. TK	Alamat Tempat Kediaman
1.	Ulu Bernam	10	09	030	012	4	010	010	NO 2/84, JLN PEGAWAI, KG RAJA, FELDA GEDANGSA, KUALA KUBU BARU.
2	Ulu Bernam	10	09	030	012	4	023	023	NO 253, KG SENTOSA, FELDA GEDANGSA, KUALA KUBU BARU.
3	Ulu Bernam	10	09	030	012	4	033	033	NO 262, KG SENTOSA, FELDA GEDANGSA, KUALA KUBU BARU.
4	Ulu Bernam	10	09	030	012	4	043	043	NO 329, KG RAJA, FELDA GEDANGSA, KUALA KUBU BARU.
5	Ulu Bernam	10	09	030	012	4	053	053	NO 289, KG RAJA, FELDA GEDANGSA, KUALA KUBU BARU.
6	Ulu Bernam	10	09	030	012	4	065	065	NO. 295, KG SENTOSA, FELDA GEDANGSA, KUALA KUBU BARU.
7	Ulu Bernam	10	09	030	012	4	075	075	NO. 327, KG RAJA, FELDA GEDANGSA, KUALA KUBU BARU.
8	Ulu Bernam	10	09	030	012	4	086	086	NO 312, KG RAJA, FELDA GEDANGSA, KUALA KUBU BARU.
9	Ulu Bernam	10	09	030	012	4	096	096	NO 320, KG RAJA, FELDA GEDANGSA, KUALA KUBU BARU.
10	Ulu Bernam	10	09	030	012	4	106	106	D/A 340, KG RAJA, FELDA GEDANGSA, KUALA KUBU BARU.

Step 3: Field survey

The survey was carried out during weekends, when respondents were most likely to be home. If there is no one at home, a notification card would be left at the selected LQ. The notification card informed the resident of the date and time of the next visit. Sometimes, a respondent would contact the office to confirm or reschedule the date for the interviewer's visit.

Interviewers were required to fill in a reporting form after every visit to a LQ. At least three (3) visits were required before a case could be reported as a non-response. These interview visits had to fulfil the following criteria:

- i) One visit on a weekday after 5pm;
- ii) One visit during weekend; and
- iii) The third visit at any time and on any day, according to information given by the occupants, neighbours or knowledge from observation.

If during the first visit, the respondent had refused to answer the survey, the LQ was vacant or occupied by a foreigner; the non-response was reported earlier. All "refusal to cooperate" cases will be checked by the supervisors to confirm the situation.

Step 4: Supervision

The supervision ratio for the survey was 15 interviewers to one supervisor. Over the course of the survey, 68 interviewers were recruited, trained and supervised by five (5) supervisors and the survey manager. The supervisor had to monitor the progress and attended to all problems or issues faced by those under his/her charge. The interviewer was required to give a verbal weekly report to the supervisor.

The supervisor ensured that the standard survey procedure was followed by each and every interviewer.

Step 5: Collection of Questionnaire

The completed questionnaires were collected once all three visits to each LQ had been made. Supervisors checked each completed questionnaire. Those that were of questionable quality, i.e., with ambiguous or unclear answers were probed further through a re-interview with the respondents, or by telephone, if their contact numbers were provided. The re-visit was conducted by the interviewer, the supervisor, or supervisor and interviewer, depending on the degree of discrepancy/ambiguity in the information given.

II. INTERVIEWER SELECTION AND TRAINING PROCEDURES

The following criteria were applied when recruiting field interviewers:

- i) The candidate must possess at least an Sijil Pelajaran Malaysia (SPM) or equivalent certificate, or have 11 years of education (refer to earlier explanation of criteria for selection of interviewers);
- ii) They should be proficient in Malay, Mandarin and Tamil language, and;
- iii) Willing to work on Saturday and Sunday, and at night during week-days.

Altogether, more than 80 applicants were received, but only 68 interviewers were recruited after training. There was continuous recruitment due to frequent turnover of interviewers.

The training process was divided into two stages.

- Stage 1 – Classroom training
- Stage 2 – On-the-job training (actual data collection)

The first class room training for the interviewers was held on 7 December 2013 at PE Research office.

After an interviewer was confirmed in the job, they would receive a survey kit. The supervisor would accompany the interviewer on their first few interviews (average 2 to 3 interviews) for on-the-job (OTJ) training. During these interviews, the supervisor would ensure the interviewers knew how to read the map and address, how to greet respondents and introduce themselves, and how to get their cooperation. The interviewers were also reminded of safety tips. Interviewers were allowed to work on their own after the supervisors were satisfied with their quality.

III. TERMINOLOGY

Common Terms in the Survey

Science – Acquiring knowledge using observation and experimentation. Knowledge and learning about the physical world and its phenomena.

Technology – The application of scientific knowledge for practical purposes. Application of science which can be found in products such as airplanes, cars, computers, telephones, the internet, radios, televisions, and many more.

Innovation – The act of introducing something new Improvements to contribute to existing technologies, products and processes.

Invention – Creating new product, technology or process for the first time.

Knowledge – Information / skills acquired through experience and education.

Attitudes – The way of thinking or feeling towards: people, objects, event, anything in your environment and also about issues.

Awareness – The ability to feel / be conscious of these things (above).

Section 3: Interest and Knowledge in STI

(Question 7)

Antibiotics – Used as medicine to treat infections caused by bacteria. Antibiotics are agents that kill or stop the growth of bacteria.

Atom – The smallest unit of an element. Consists of a nucleus made of protons and neutrons, with electrons orbiting this nucleus.

Bacteria – A microscopic life form; made of single cells. There are many types of bacteria, some of them cause diseases.

Continent – One of the seven large land masses: Africa, Asia, Australia, Europe, North America, South America and Antarctica.

Electron – Electrons are tiny particles with a charge of negative electricity; found in all atoms. Electrons are involved in phenomena such as electricity, magnetism and heat conductivity (transfer of heat).

Gene – A basic unit of hereditary transmission. Responsible for transmitting characteristics from one generation to another.

Laser – A device which focuses light into a laser beam.

Radioactivity – A phenomena where an unstable atom emits radiation. This type of radiation is very harmful to living things.

Virus – An infectious agent that lives inside the cells of living things. Viruses can cause infections such as the common cold, influenza, Hepatitis, dengue fever, HIV and more.

(Question 8)

Horoscopes – A forecast of a person's future based on the positions of stars and planets at the time of a person's birth.

Faith Healing – The use of faith and prayer to bring about physical healing, often unexplainable by scientific medicine.

Fortune Telling – The practice of predicting the future, e.g., palm reading, tarot cards and tea leaves.

Section 4: Attitudes towards STI

Food Security – A condition where people have access to sufficient, safe and nutritious food for their dietary needs.

Section 5: Emerging Issues

Climate Change – A significant and lasting change in the weather patterns over a long period of time. Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate tectonics and volcanic eruptions. The effects of climate change are extreme weather patterns, e.g., severe floods, extreme drought, warming of colder regions, etc.

Global Warming – Changes in climate patterns and increased warmth due to increased levels of greenhouse gases in the atmosphere.

Nuclear Energy – Energy released from the nucleus of an atom as a result of nuclear fission, nuclear fusion or radioactive decay.

Section 6: Government Programmes and Policies

Agrotourism – Agrotourism involves any agriculturally-based activity that brings visitors to farms, orchards and ranches. It involves wide ranges of activities including farm stay, buying produce directly from stands, fruit picking, petting zoos, recreation, etc.

Biodiversity – The degree of variation of life in a particular habitat or ecosystem; the diversity of plant and animal life in a particular habitat (or in the world as a whole) as in large numbers and great variety.

Biotechnology – The use of living systems, organisms and biological processes for industrial and other uses. Examples of biotechnology include genomics, recombinant gene technologies, applied immunology, and development of pharmaceutical therapies and diagnostic tests

Green technology – Green technology is the application of technological advancement to decrease the negative impacts of human involvement in the natural environment and its resources, e.g., renewable energy, sewage treatment, solid waste management and energy conservation.

IV. STATISTICAL FORMULA

The statistical formula used in this study included:

- i) Relative Standard Error (RSE)

$$RSE\%(x) = \frac{SE(x)}{x} * 100$$

- ii) Pearson's R

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$$

- iii) Data Weighting

$$W_i = N_i / N$$

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MASTIC, MOSTI

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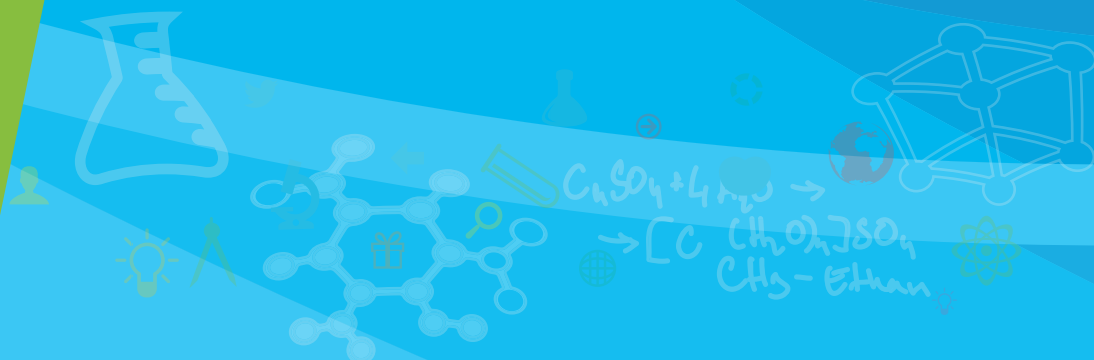
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Questionnaire



Ministry of Science, Technology
and Innovation



Malaysian Science and Technology
Information Centre (MASTIC)

Survey of Public Awareness of Science, Technology and Innovation (STI) Malaysia 2013

The Malaysian Science and Technology Information Centre (MASTIC) of the Ministry of Science, Technology and Innovation (MOSTI) is carrying out a survey on Public Awareness of Science, Technology and Innovation (STI) in Malaysia.

Findings from the survey will provide valuable information for policy makers to plan and execute suitable strategies to ensure easy understanding and to improve public interest in STI. Effective STI programmes will lead to positive socio-economic development.

The interview will take about 20 minutes. All information that you provide will be treated in strictest confidence and your identity will not be disclosed to any organisation that receives information on the survey results. All participants' answers are combined, and presented in the form of summary statistics, such as tables and graphs.

Thank you for your help with the survey.

LQ ID: _____

House address: _____

Respondent Name: _____

Contact No.: _____

Today's date: _____ Starting time: _____

Interviewer name: _____

Section 1: Household Information

- 1. How many people live in your household by age group? Fill in exact numbers, and please include yourself.**

_____ Children (less than 12 years)

_____ Teenager (12-14 years)

_____ Adult (15-64 years)

_____ Senior Citizen (65 years and above)

Section 2: Sources of Information

2. Do you read/watch/listen/use the following media every day?

Media	Yes	No	If not every day, how many days in a week?
a) Newspapers	☐ ₁	☐ ₂	_____ days
b) Magazines	☐ ₁	☐ ₂	_____ days
c) TV	☐ ₁	☐ ₂	_____ days
d) Radio	☐ ₁	☐ ₂	_____ days
e) Internet	☐ ₁	☐ ₂	_____ days (if never, skip to Q4)

3. What are the common topics that you use the internet for? (Choose all that apply)

☐ ₁ Entertainment	☐ ₄ Business	☐ ₇ Education
☐ ₂ Social media	☐ ₅ Religion	☐ ₈ STI (see below)
☐ ₃ Email	☐ ₆ Politics	☐ ₉ Others _____

What is Science, Technology and Innovation (STI)?

Science – Acquiring knowledge using observation and experimentation.

Knowledge and learning about the physical world and its phenomena.

- Study on light
- Study on wave

Technology – applying scientific knowledge for practical purposes.

Application: build cars, computers, planes, telephones, radios, televisions and more

- Camera
- Cellular /hand phone

Innovation – improving or introducing something new.

Improvements to existing technologies, products and processes.

- Camera phone
- Phone with entertainment, communications, other uses

4. Where are your sources of STI information? Which among them is the most reliable?

Sources	From where do you get information on STI issues? (Choose all that apply)	From your selection, which one is the most reliable on STI issues? (Choose one only)
a) Print Newspapers	☐ ₁	☐ ₁
b) Online Newspapers	☐ ₁	☐ ₂
c) Print Magazines	☐ ₁	☐ ₃
d) Online Magazines	☐ ₁	☐ ₄
e) Internet (other online sources)	☐ ₁	☐ ₅
f) TV	☐ ₁	☐ ₆
g) Radio	☐ ₁	☐ ₇
h) Books	☐ ₁	☐ ₈
i) Journals	☐ ₁	☐ ₉
j) Others (Please specify: _____)	☐ ₁	☐ ₁₀

5. In the last 12 months, how many times have you visited the following places? If you did not visit any in the last 12 months, please give us the main reason.

Places	Number of times	Reason for not visiting (Choose all that apply)				
		Not aware	Not interested	Cannot afford	No time	Others (Please specify)
a) Museum	_____	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 _____
b) Zoo	_____	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 _____
c) Aquarium	_____	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 _____
d) Planetarium	_____	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 _____
e) The National Science Centre	_____	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 _____
f) PETROSAINS	_____	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 _____

Section 3: Interest and Knowledge in STI

6. How interested are you in the following issues? Please state whether you are not interested, interested, or very interested.

Issues	Not interested	Interested	Very interested	Not sure
a) New scientific discoveries	☐ 1	☐ 2	☐ 3	☐ 4
b) New medical discoveries	☐ 1	☐ 2	☐ 3	☐ 4
c) The use of new inventions and technologies	☐ 1	☐ 2	☐ 3	☐ 4
d) Innovation	☐ 1	☐ 2	☐ 3	☐ 4
e) Environmental pollution	☐ 1	☐ 2	☐ 3	☐ 4
f) Renewable Energy	☐ 1	☐ 2	☐ 3	☐ 4
g) STI in Malaysia	☐ 1	☐ 2	☐ 3	☐ 4

7. In your opinion, are the following statements True or False? If you do not know or are not sure, just answer "not sure".

Statements	True	False	Not Sure
a) The centre of the earth is very hot.	☐ 1	☐ 2	☐ 3
b) All radioactivity is man-made.	☐ 1	☐ 2	☐ 3
c) It is father's gene that determines the gender of the baby.	☐ 1	☐ 2	☐ 3
d) Lasers work by focusing sound waves.	☐ 1	☐ 2	☐ 3
e) Electrons are smaller than atoms.	☐ 1	☐ 2	☐ 3
f) Antibiotics kill viruses as well as bacteria.	☐ 1	☐ 2	☐ 3
g) The continents have been moving their location for millions of years and will continue to move.	☐ 1	☐ 2	☐ 3
h) The earth travels around the sun.	☐ 1	☐ 2	☐ 3

8. Would you say the following aspects are scientific, sort of scientific, or not scientific? If you do not know or are not sure, just answer "not sure".

Aspects	Scientific	Sort of scientific	Not scientific	Not Sure
a) Horoscopes	☐ 1	☐ 2	☐ 3	☐ 4
b) Faith healing	☐ 1	☐ 2	☐ 3	☐ 4
c) Fortune telling	☐ 1	☐ 2	☐ 3	☐ 4

Section 4: Attitudes Towards STI

9. People have frequently noted that scientific research has produced benefits and harmful results. Would you say that the benefits of scientific research are greater or less than the harmful results?

- ☐ 1 Benefits greater ☐ 3 About equal
☐ 2 Harmful results greater ☐ 4 Not sure / Don't know

10. Overall, please state whether STI have a Positive Effect, Negative Effect or No Effect on the following aspects.

Aspects	Positive Effect	Negative Effect	No Effect	Not Sure
a) Cost of living	☐ 1	☐ 2	☐ 3	☐ 4
b) Public healthcare	☐ 1	☐ 2	☐ 3	☐ 4
c) Working conditions	☐ 1	☐ 2	☐ 3	☐ 4
d) The environment	☐ 1	☐ 2	☐ 3	☐ 4
e) Lifestyle	☐ 1	☐ 2	☐ 3	☐ 4
f) World peace	☐ 1	☐ 2	☐ 3	☐ 4
g) Job Creation	☐ 1	☐ 2	☐ 3	☐ 4
h) Food Security	☐ 1	☐ 2	☐ 3	☐ 4

11. For each of the following statements, please state if you strongly disagree, disagree, agree, or strongly agree.

Statements	Strongly Disagree	Disagree	Agree	Strongly Agree
a) STI improve the quality of our lives.	☐ 1	☐ 2	☐ 3	☐ 4
b) We depend too much on science and not enough on faith.	☐ 1	☐ 2	☐ 3	☐ 4
c) Scientific research increases knowledge although it does not produce immediate benefits.	☐ 1	☐ 2	☐ 3	☐ 4
d) Science causes our lifestyles to change too fast.	☐ 1	☐ 2	☐ 3	☐ 4
e) STI are very important for the progress of our nation.	☐ 1	☐ 2	☐ 3	☐ 4
f) We need scientific knowledge in order to manage our daily lives better.	☐ 1	☐ 2	☐ 3	☐ 4

12. I'm going to read you a list of statement that might describe the reasons of low enrolment into science stream. Please tell me whether you strongly agree, agree, disagree or strongly disagree with each of these statements.

Reasons	Strongly Disagree	Disagree	Agree	Strongly Agree
a) Science subjects are difficult.	☐ 1	☐ 2	☐ 3	☐ 4
b) The teaching of science is too theoretical.	☐ 1	☐ 2	☐ 3	☐ 4
c) Peers or parents do not favour science education.	☐ 1	☐ 2	☐ 3	☐ 4
d) It is more difficult to enrol for tertiary education in science.	☐ 1	☐ 2	☐ 3	☐ 4
e) Lack of information about job opportunities in science.	☐ 1	☐ 2	☐ 3	☐ 4

Section 5: Emerging Issues

We are going to ask you a few questions on climate change.

13. Have you ever read or heard of climate change?

☐ Yes

☐ No

14. Please indicate whether the statements below about climate change are true or false. If you do not know or are not sure, just answer "not sure".

Statements	True	False	Not Sure
a) Global warming can cause a decrease in the sea level.	☐ 1	☐ 2	☐ 3
b) Climate change will result in food shortage.	☐ 1	☐ 2	☐ 3

Now, please think about this situation.

Severe floods caused by extreme rainfall and storms, and prolonged hot weather and drought are symptoms of climate change. It is caused by emission from burning fossil fuel, which is the main source of our energy. And energy is the basis for our lifestyle today. If we want to reduce impact on the climate, we would have to change our lifestyle, viz. travel more efficiently, raise the temperature of your air-conditioning, reduce waste, turn off electricity usage that is not necessary, etc.

15. Do you strongly favour, favour, oppose or strongly oppose any change to your lifestyle in order to contribute to reducing emissions and climate change impacts?

☐ 1 Strongly favour

☐ 2 Favour

☐ 3 Oppose

☐ 4 Strongly oppose

We are going to ask you a few questions on **nuclear power**.

16. Have you ever read or heard of nuclear power?

☐ ₁ Yes

☐ ₂ No

17. Please indicate whether the statements on nuclear power are true or false. If you don't know or aren't sure, just say "not sure".

Statements	True	False	Not Sure
a) Nuclear power plant produces radioactive waste or substance.	☐ ₁	☐ ₂	☐ ₃
b) The reactor vessel in a nuclear power plant is able to explode like an atomic bomb.	☐ ₁	☐ ₂	☐ ₃

Now, please think about this situation.

Nuclear power uses the energy of the atom to generate electricity. Some people say that nuclear power is a green and clean option; energy is produced without emitting carbon dioxide from burning fossil fuels such as coal, oil, or natural gas. Others are concerned about its safety, i.e. risk of nuclear accidents, and about the disposal of nuclear waste.

18. Do you strongly favour, favour, oppose, or strongly oppose the use of nuclear power to generate electricity in Malaysia?

☐ ₁ Strongly favour

☐ ₂ Favour

☐ ₃ Oppose

☐ ₄ Strongly oppose

Section 6: Government Programmes and Policies

19. Are you aware of and participated in any of the programmes / activities below?

Programmes	Aware		Participated	
	Yes	No	Yes	No
a) Bio Malaysia	☐ ₁	☐ ₂	☐ ₁	☐ ₂
b) World Innovation Forum	☐ ₁	☐ ₂	☐ ₁	☐ ₂
c) Malaysia Agriculture, Horticulture & Agrotourism International Show (MAHA)	☐ ₁	☐ ₂	☐ ₁	☐ ₂
d) Centre for Education and Training in Renewable Energy and Energy Efficiency (CETREE)	☐ ₁	☐ ₂	☐ ₁	☐ ₂
e) Year of Science and National Innovation Movement 2012 (SGI2012)	☐ ₁	☐ ₂	☐ ₁	☐ ₂
f) 2011 Science and Mathematics Promotion Programme	☐ ₁	☐ ₂	☐ ₁	☐ ₂
g) Malaysia Innovative (2010)	☐ ₁	☐ ₂	☐ ₁	☐ ₂

20. Have you heard of the policies stated below?

Policies	Yes	No
a) ICT Security Policy	☐ 1	☐ 2
b) National Biotechnology Policy	☐ 1	☐ 2
c) National Policy on Science, Technology and Innovation	☐ 1	☐ 2
d) National Policy on Climate Change	☐ 1	☐ 2
e) National Biodiversity Policy	☐ 1	☐ 2
f) National Water Resources Policy	☐ 1	☐ 2
g) National Energy Policy	☐ 1	☐ 2
h) National Green Technology Policy	☐ 1	☐ 2

21. In your opinion, would you say that our government is spending too much, too little, or about the right amount of money on the following matters?

Matters	Too little	About right	Too much
a) Education	☐ 1	☐ 2	☐ 3
b) Developing alternative energy, e.g. renewable energy	☐ 1	☐ 2	☐ 3
c) Poverty eradication	☐ 1	☐ 2	☐ 3
d) Quality healthcare	☐ 1	☐ 2	☐ 3
e) Environmental protection	☐ 1	☐ 2	☐ 3
f) Roads and bridges	☐ 1	☐ 2	☐ 3
g) Mass transportation	☐ 1	☐ 2	☐ 3
h) Supporting scientific research	☐ 1	☐ 2	☐ 3
i) Reducing crime	☐ 1	☐ 2	☐ 3
j) National security	☐ 1	☐ 2	☐ 3

Section 7: Personal Information

22. Gender:

☐ 1 Male

☐ 2 Female

23. Age: _____ years

24. Ethnicity:

☐ 1 Malay

☐ 3 Indian

☐ 5 Kadazan/ Dusun/ Murut

☐ 7 Bidayuh

☐ 2 Chinese

☐ 4 Iban

☐ 6 Melanau

☐ 8 Others _____

25. Religion:

☐ 1 Islam

☐ 3 Buddhism

☐ 5 Sikhism

☐ 7 Others _____

☐ 2 Christianity

☐ 4 Hinduism

☐ 6 Taoism

26. Highest education level attained:

- | | |
|---|---|
| ☐ ₁ No formal education (skip to Q28) | ☐ ₅ Pre-University
(STPM/HSC/Matriculation/ A-Level) |
| ☐ ₂ Primary School (UPSR) (skip to Q28) | ☐ ₆ Certificate / Diploma |
| ☐ ₃ Lower Secondary (LCE/SRP/PMR) | ☐ ₇ Bachelor's Degree |
| ☐ ₄ Higher Secondary (MCE/SC/SPM/SPMV) | ☐ ₈ Master's / Doctorate Degree |

27. Education Stream:

(Please answer if the respondent studied or currently in Form 4 / Form 5, else skip to Q28)

- | | | | |
|---|--|--|---|
| ☐ ₁ Science | ☐ ₂ Arts | ☐ ₃ Technical & Vocational | ☐ ₄ Religious |
|---|--|--|---|

28. Current Occupation / Job Status

- | | |
|---|--|
| ☐ ₁ Manager | ☐ ₈ Plant & Machine Operator & Assembler |
| ☐ ₂ Professional | ☐ ₉ Elementary Occupation |
| ☐ ₃ Technician & Associate Professional | ☐ ₁₀ Student (Skip to Q30) |
| ☐ ₄ Clerical Support Worker | ☐ ₁₁ Retiree (Skip to Q30) |
| ☐ ₅ Service & Sales Worker | ☐ ₁₂ Unemployed (Skip to Q30) |
| ☐ ₆ Skilled Agricultural, Forestry & Fishery Worker | ☐ ₁₃ Homemaker (Skip to Q30) |
| ☐ ₇ Craft & Related Trades Worker | ☐ ₁₄ Others _____ |

29. In which sector are you employed?

- | | |
|--|--|
| ☐ ₁ Government | ☐ ₂ Private Sector |
|--|--|

30. What is your monthly household income?

- | | | |
|---|---|---|
| ☐ ₁ No income | ☐ ₄ RM2001 – RM3000 | ☐ ₇ RM7001 – RM10,000 |
| ☐ ₂ RM900 and below | ☐ ₅ RM3001 – RM5000 | ☐ ₈ Above RM10,000 |
| ☐ ₃ RM901 – RM2000 | ☐ ₆ RM5001 – RM7000 | |

This is the end of the interview, thank you for your cooperation.

Finishing time: _____