

# **SRI LANKA SCIENCE, TECHNOLOGY & INNOVATION STATISTICAL HANDBOOK 2014**



**NATIONAL  
SCIENCE  
FOUNDATION**

**National Science Foundation  
47/5, Maitland Place  
Colombo 07  
Sri Lanka  
[www.nsf.gov.lk](http://www.nsf.gov.lk)**





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**For a copy of the Publication or suggestions for improvements, please write to:**

Head  
Science and Technology Policy Research Division  
National Science Foundation  
47/5, Maitland Place  
Colombo 07  
Sri Lanka

Tel/Fax : 011 2675841  
E-mail : [stprd@nsf.gov.lk](mailto:stprd@nsf.gov.lk)  
Website : [www.mis.nsf.gov.lk](http://www.mis.nsf.gov.lk)



## FOREWORD

Sri Lanka Science, Technology & Innovation Statistical Handbook 2014, is a compilation of key findings of the National Research & Development (R&D) Survey carried out by the NSF during 2016-2017 to provide the nationally and internationally comparable statistical indicators on Science, Technology and Innovation. The definitions and classifications used in the National R&D Survey 2014 are based on the International Standardization of Statistics on Science and Technology (UNESCO, 2010) and the Frascati Manual (OECD, 2002).

The indicators presented in the first three chapters cover the input measures such as expenditure on research and development; available human resources; and the output measures such as patents, publications etc., respectively. The fourth chapter of this book presents the basic innovation indicators that were developed using the data collected through the National R&D Survey 2014, and hence the readers will have an idea on how Sri Lanka performed in the year 2014 in the area of innovation. The last chapter presents some useful indicators relevant to broader areas such as economic and development activities in the country along with the indicators relevant to education, health and natural resources in Sri Lanka.

For easy reference of the users, **Sri Lanka Science, Technology & Innovation Statistical Handbook 2014** also includes the highlights of the Survey and the general definitions used for the purpose.

**Prof. Sirimali Fernando**  
Chairperson  
National Science Foundation  
Colombo, Sri Lanka

May 2017

## PREFACE

Sri Lanka Science, Technology and Innovation Statistical Handbook 2014, comprises the findings of the National Research, Development and Innovation Survey 2014 conducted by the National Science Foundation (NSF), Sri Lanka. The data collection reports the status of Science, Technology (S&T) and Innovations occurred during the period of 1<sup>st</sup> January 2014- 31<sup>st</sup> December 2014. This Handbook mainly focuses on the policy authorities, scientists, researchers, donors, and other stakeholders who are interested in having a broad picture of the status of S&T sector in the country during the year 2014. The statistical indicators presented in the book have been developed according to definitions and guidelines of UNESCO, 2010 and the Frascati Manual 2002 (OECD, 2015) for international comparability.

The data presented in the Handbook also gives a qualitative analysis of the different aspects of the S&T sector of the country representing, all the higher education institution; R&D Institutions; S&T institutions (S&T management, administration and services); Industries; and the national & international non-governmental institutions. In most cases, the data given in this Handbook is relevant to the surveyed year of 2014 depicting different perspectives of the S&T sector of the country under many different indicators which allows international comparisons.

Sri Lanka Science and Technology Statistical Handbook 2014 has been prepared by the Science and Technology Policy Research Division (STPRD) of the National Science Foundation, Sri Lanka.

**Dr P.R.M.P. Dilrukshi Ranathunge**

Head

Science and Technology Policy Research Division (STPRD)

National Science Foundation

Sri Lanka

May 2017

## TECHNICAL NOTES

The research and development (R&D) and innovation consist of people, institutions, processes, infrastructure, linkages and collaborations that involved in the generation, diffusion and absorption of scientific and technological knowledge. The capability and performance of Sri Lanka's Science, Technology and Innovation (STI) system is crucial to advancing the future economic prosperity, social development and quality of life of people.

This Survey covered four major S&T sectors in the country such as:

- a. Higher Education sector (State and Private) - full coverage
- b. State S&T sector that included Research Institutions, S&T service providing Institutions – full coverage
- c. Business Enterprises – 250 institutions were selected for the survey considering the size of the establishment, degree of their R&D activity and proportion of their contribution to national economy. All the major industries that conduct a substantial amount of R&D were included in the sample as per the guidance of the Dept. of Census and Statistics.
- d. Private Non Profit Institutions – all the institutions that are involved in the activities related to S&T were covered in the survey

The data, presented in this book are in line with the standards and methodologies laid down by the UNESCO and OECD. International standard classifications relevant to Science, Technology and Innovation were followed in questionnaire development, indicators development and presentation.



## HIGHLIGHTS-2014

- Total investment for R & D from Gross Domestic Product (GDP) is 0.1% and this is the least record in the country after independence.
- Business sector contribution for overall R&D investment has been increasing gradually from 0.6% in 2004 to 41.24% in 2014.
- When considered the R & D performance of different sectors based on their R&D expenditure the highest performance was recorded in Business Enterprise sector (40.88%) followed by Government Institution (38.82%) and Higher Education sector institutions (20.02%).
- The highest proportion of funds for R&D was devoted for applied research (57.37%) followed by experimental development research (27.38%) and basic research (15.25%).
- Most of the research conducted in year 2014 came under the discipline of Agricultural Sciences (39.4%) followed by Natural Sciences (25.76%), Engineering Technology (23.65%), Social Sciences & Humanities (5.83%) and Medical Sciences (3.59%).
- Sri Lanka recorded 261 Researchers (Head Count) per million population and 100 Full Time Equivalent (RTE) Researchers per million population.

## Abbreviations

FTE	Full Time Equivalent
GDP	Gross Domestic Product
GERD	Gross Expenditure on R&D
IPR	Intellectual Property Rights
IT	Information Technology
MIS	Management Information System
na	not available
NA	Not Applicable
NARESA	Natural Resources, Energy & Science Authority
nes	not elsewhere specified
nm	not mentioned
NSF	National Science Foundation
o/w	of which
OECD	Organization for Economic Co-operation and Development
PCT	Patent Cooperation Treaty
PNP	Private Non Profit
PPP	Perchasing Power Parity
R&D	Research and Development
S&T	Science and Technology
SCI	Science Citation Index
STI	Science, Technology and Innovation
STP	Science and Technology Personnel
STPRD	Science & Technology Policy Research Division
UGC	University Grants Commission
UIS	UNESCO Institute of Statistics



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FINANCIAL RESOURCES  
FOR  
RESEARCH AND DEVELOPMENT



## 1.1 : Gross Expenditure on R&D (GERD) in Sri Lanka 1966-2014

Year	GDP current prices Rs.million	GERD Rs. million (US\$ million)	GERD as percentage of GDP	Total population million	GERD per million population Rs. million
1966	7,529	19.8 (4.1)	0.30	11.5	1.7
1975	11,100	45.1 (6.4)	0.40	13.5	3.3
1984	142,700	257.0 (9.7)	0.18	15.6	16.5
1996	769,900	1,410.0 (23)	0.18	18.3	77.0
2000	1,258,000	1,810.0 (22.9)	0.14*	18.4	98.4
2004	1,800,750	3,807.5 (40.9)	0.21	19.4	196.2
2006	2,939,000	5,119.19 (47.9)	0.17	19.8	258.5
2008	4,410,682	5,047.73 (46.1)	0.11	20.2	249.9
2010	5,605,104	8,778.16 (69.4)	0.16	20.7	424.1
2013	8,674,230	9,670.00 (73.3)	0.11	20.5	471.7
2014	10,448,479	10,350.07 (79.0)	0.10	20.7	500.00

\*Estimates

Source: National R&D Surveys, Sri Lanka 1996 (NARESA), 2000, 2004, 2006, 2008, 2010, 2013 & 2014 (NSF)

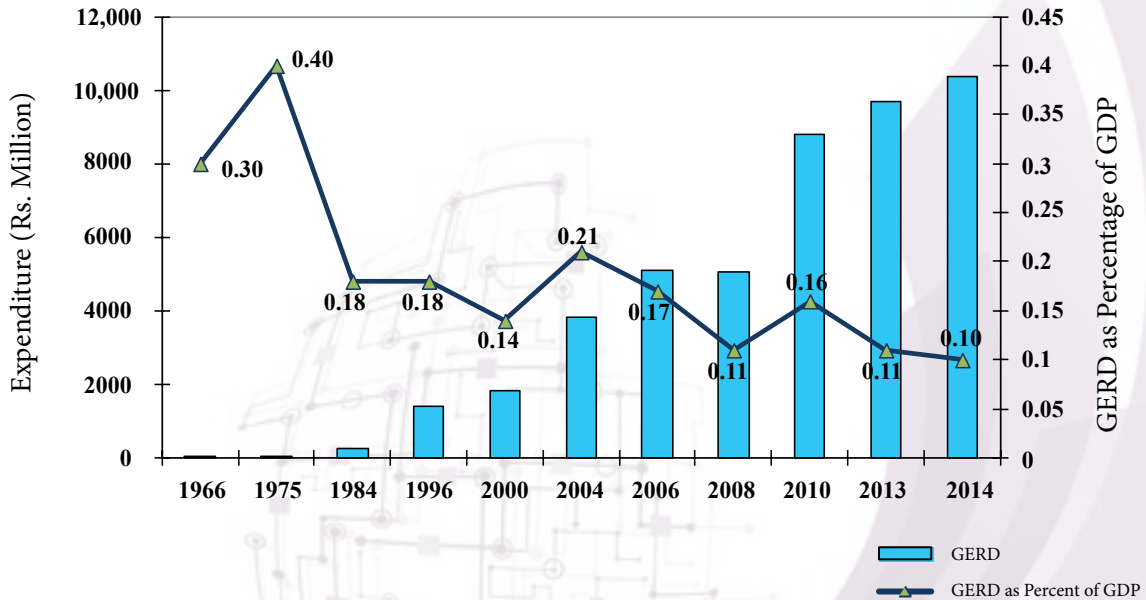


Figure 1 : Trends in Gross Expenditure on R&D (GERD) in Sri Lanka

## 1.2 : Gross expenditure on R&D (GERD) in Selected Countries

Country	Year (Data available)	GERD in Constant PPP\$	GERD as a % of GDP	GERD per Capita (in PPP\$)
Australia	2013	18,241,431	2.19	944.9
Brazil	2013	34,219,206	1.23	194.4
China	2014	313,139,232	2.05	269.2
France	2014	46,393,079	2.6	904.9
Germany	2014	85,859,232	2.86	1317.8
India	2011	42,794,911	0.82	38.5
Indonesia	2013	1,837,356	0.08	8.5
Iraq	2014	174,514	0.04	4.6
Japan	2014	130,648,702	3.6	1309.1
Malaysia	2014	8,222,356	1.29	323.7
New Zealand	2013	1,406,183	1.17	409.5
Pakistan	2013	2,115,220	0.29	13.5
Philippines	2013	567,736	0.13	9.1
Republic of Korea	2014	69,008,660	4.29	1484.7
Saudi Arabia	2009	775,163	0.07	30.7
Singapore	2014	8,405,181	2.19	1796.9
South Africa	2012	4,219,650	0.73	91.3
Sri Lanka	2014 *	197,301	0.10	9.5
Thailand	2014	4,371,020	0.48	75.9
United Kingdom	2014	39,353,362	1.7	678.1
United States of America	2013	393,844,620	2.72	1440.9

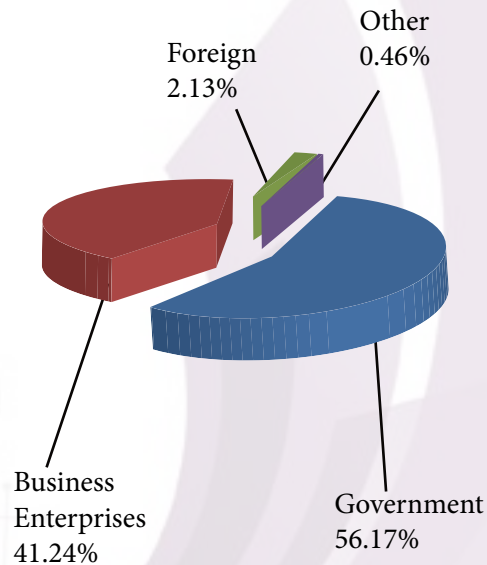
Source: Adopted from UNESCO Statistics 2014

\* National R&D Survey, Sri Lanka 2014 - Current Price (Rs)

### 1.3 National Gross Investment on R&D (GERD) by Source of Funding 2014

Rs.million

Source of Funding	Recurrent	Capital	Total	GERD (as a percentage of GDP)
Government	4,660.79	1,152.43	5,813.22	0.06
	(45.3%)	(11.1%)	(56.2%)	
Business Enterprise	3,956.73	311.68	4,268.41	0.04
	(38.2%)	(3.0%)	(41.2%)	
Foreign	201.34	19.47	220.81	0.00
	(2.0%)	(0.2%)	(2.1%)	
Other	32.18	15.45	47.63	0.00
	(0.3%)	(0.2%)	(0.5%)	
<b>Total</b>	<b>8,851.04</b>	<b>1,499.03</b>	<b>10,350.07</b>	<b>0.10</b>
	(85.5%)	(14.5%)	(100.0%)	



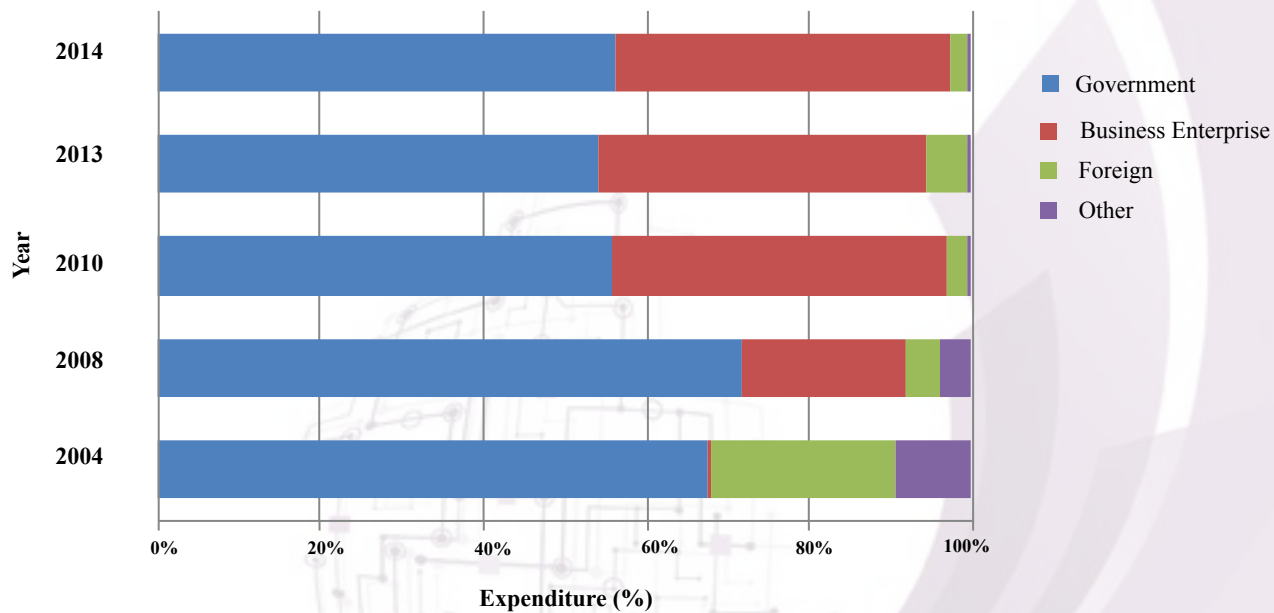
**Figure 2 : National investment on R&D by different sectors**

Source: National R&D Surveys Sri Lanka 2014 (NSF)

## 1.4: Trends in National Investment on R&D by Source of Funding 2004-2014

Source of Funding	2004	2008	2010	2013	2014
Government	2571.3	3,624.41	4,907.16	5,209.97	5,813.22
	(67.5%)	(71.8%)	(55.9%)	(53.9%)	(56.2%)
Business Enterprise	21.9	1,004.01	3,592.58	3,934.04	4,268.41
	(0.6%)	(19.9%)	(40.9%)	(40.7%)	(41.2%)
Foreign	861.8	215.59	239.13	486.17	220.82
	(22.6%)	(4.3%)	(2.7%)	(5.0%)	(2.1%)
Other*	352.5	203.74	39.29	39.83	47.63
	(9.3%)	(4.0%)	(0.5%)	(0.4%)	(0.5%)
<b>Total</b>	<b>3807.5</b>	<b>5,047.73</b>	<b>8,778.16</b>	<b>9,670.00</b>	<b>10,350.07</b>
	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)

\*Other: funds generated by the institution itself by providing services etc. and funds received from Private Non Profit Sector  
 Source: National R&D Surveys Sri Lanka, 2006, 2008, 2010, 2013 & 2014 (NSF)



**Figure 3 : National R&D investment by sectors during 2004-2014**



## 1.5: Trends in Gross Expenditure on R&D (GERD) by Source of Funding as a Percentage of GDP 2004-2014

Source of Funding	2004	2006	2008	2010	2013	2014
Government	0.14	0.11	0.08	0.09	0.06	0.06
Business Enterprise	0.00	0.03	0.02	0.07	0.05	0.04
Foreign	0.05	0.01	0.00	0.00	0.00	0.00
Other*	0.01	0.01	0.01	0.00	0.00	0.00
<b>Total</b>	<b>0.21</b>	<b>0.17</b>	<b>0.11</b>	<b>0.16</b>	<b>0.11</b>	<b>0.10</b>

\*Other: funds generated by the institution itself by providing services etc and funds received from Private Non Profit Sector.

Source: National R&D Surveys Sri Lanka 1996 (NARESA), 2004 to 2006, 2008, 2010, 2013 & 2014 (NSF)

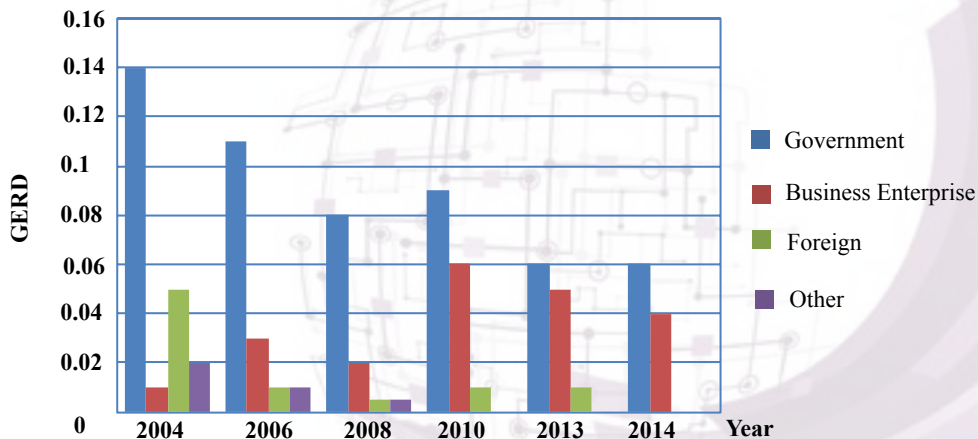


Figure 4 : Gross R&D expenditure by different sectors during 2004-2014

## 1.6 : National R&D Expenditure on R&D (GERD) by Sector of Performance 2014

Sector	Recurrent	Capital	Total	%
Government	2,866.46	1,151.63	4,018.09	38.82
Higher Education	2,032.02	40.57	2,072.60	20.02
Business Enterprise	3,924.15	306.72	4,230.87	40.88
Private Non Profit	28.40	0.11	28.51	0.28
<b>Total</b>	<b>8,851.04</b>	<b>1,499.03</b>	<b>10,350.07</b>	<b>100.00</b>

Source: National R&D Surveys Sri Lanka, 2014 (NSF)

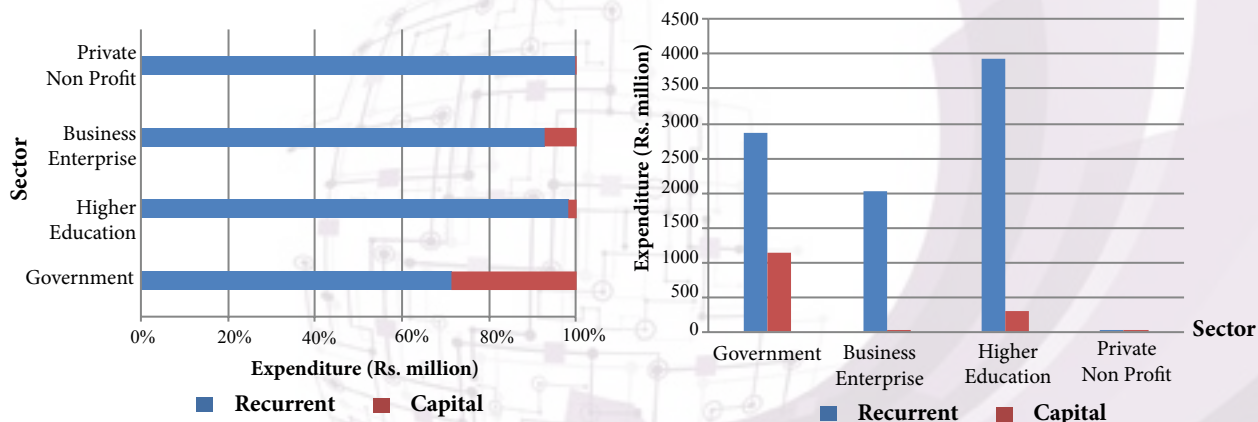


Figure 5 : Gross R&D expenditure by sector of performance

## 1.7 : Trends in National Expenditure by Sectors of Performance 2004-2014

Rs.million

Sector	Year				
	2004	2008	2010	2013	2014
Government	2321.1 (61.0%)	1,250.67 (24.8%)	3,927.90 (44.8%)	3,365.95 (34.8%)	4,018.09 (38.8%)
Higher education	1277.6 (33.5%)	2,872.56 (56.9%)	1,008.34 (11.5%)	1,931.12 (20.0%)	2,072.60 (20.0%)
Business enterprise	208.8 (5.5%)	924.50 (18.3%)	3,840.36 (43.8%)	4,339.60 (44.9%)	4,230.87 (40.9%)
Private non profit	na	na	1.56 (0.0%)	33.33 (0.3%)	28.51 (0.2%)
<b>Total</b>	<b>3,807.5</b> <b>(100.0%)</b>	<b>5,047.73</b> <b>(100.0%)</b>	<b>8,778.16</b> <b>(100.0%)</b>	<b>9,670.00</b> <b>(100.0%)</b>	<b>10,350.07</b> <b>(100.0%)</b>

na: Not Available

Source: National R&D Surveys Sri Lanka 2008, 2010, 2013 & 2014 (NSF)

## 1.8 : Percentage Gross Expenditure on R&D (GERD) by Source of Funding in Selected Countries

Country	Percentage Contribution to GERD by different sector				
	Year	Business enterprise	Government	Higher education	Private non-profit
Australia	2013	56.3	11.2	29.6	2.8
China	2014	77.3	15.8	6.9	na
Colombia	2014	25.8	4.9	42.3	26.9
France	2014	64.8	13.1	20.6	1.5
Germany	2014	68.1	14.7	17.1	
India	2011	35.5	60.5	4.1	na
Indonesia	2013	25.7	39.4	34.9	na
Iraq	2014	2.6	59.4	38.0	
Japan	2014	77.8	8.3	12.6	1.3
Malaysia	2014	45.7	8.2	46.1	na
New Zealand	2013	46.4	23.2	30.4	na
Pakistan	2013	-	67.1	32.9	na
Philippines	2013	35.7	29.7	33.7	0.8
Republic of Korea	2014	78.2	11.2	9.0	1.5
Singapore	2013	59.4	11.3	29.2	na
South Africa	2012 *	44.3	22.9	30.7	2.1
Sri Lanka	2014	40.9	38.8	20.0	0.3
United Kingdom	2014	64.4	7.8	26.1	1.7
United States of America	2013	70.6	11.2	14.2	4.1

\*National R&D Survey, Sri Lanka 2014 (NSF)

Source: adopted from UNESCO statistics 2014, <http://www.uis.unesco.org/ScienceTechnology>

## 1.9 National R&D Expenditure by Nature of Research Activity 2014

Rs.million

Nature of research	Government	Higher Education	Industry	PNI	Total	%
Basic	473.83	115.69	982.41	6.55	1,578.47	15.2
Applied	3,191.62	1,535.27	1,189.30	21.86	5,938.05	57.4
Experimental Development	352.65	421.64	2,059.17	0.11	2,833.56	27.4
<b>Total</b>	<b>4,018.10</b>	<b>2,072.60</b>	<b>4,230.87</b>	<b>28.51</b>	<b>10,350.08</b>	<b>100.0</b>

Source : National R&D Survey, Sri Lanka 2014 (NSF)

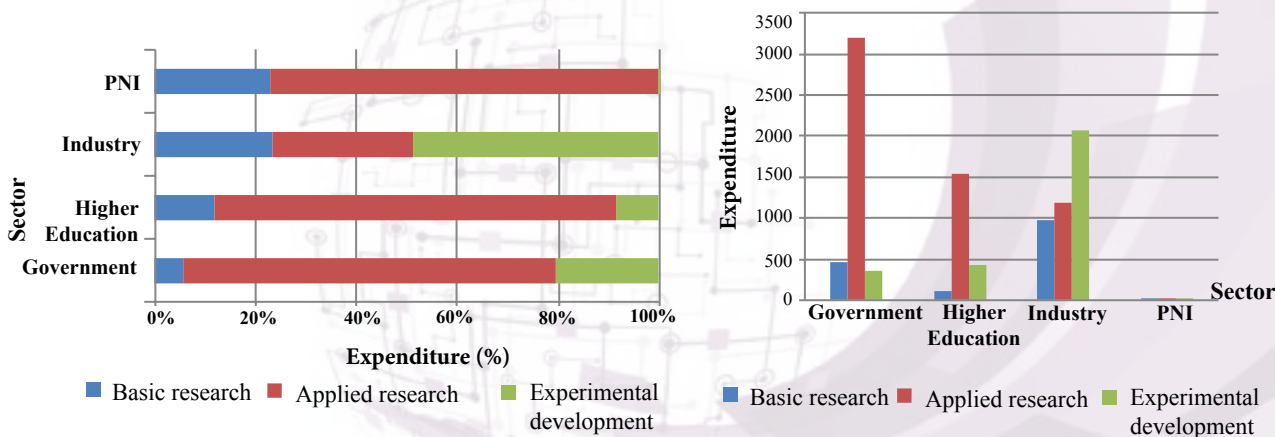


Figure 6 : National R&D expenditure by Nature of Research Activity 2014

## 1.10: National R&D Expenditure by Nature of Research Activity 2010-2014

Rs.million

Nature of Research	2010		2013		2014	
	Amount	%	Amount	%	Amount	%
Basic Research	956.78	11.00	959.29	10.00	1,578.47	15.2
Applied Research	4,302.20	49.00	5,518.65	57.00	5,938.05	57.4
Experimental Development	3,519.18	40.00	3,192.07	33.00	2,833.56	27.4
<b>Total</b>	<b>8,778.16</b>	<b>100.00</b>	<b>9,670.00</b>	<b>100.00</b>	<b>10,350.08</b>	<b>100.0</b>

Source: National R&D Surveys Sri Lanka, 2010, 2013 & 2014 (NSF)

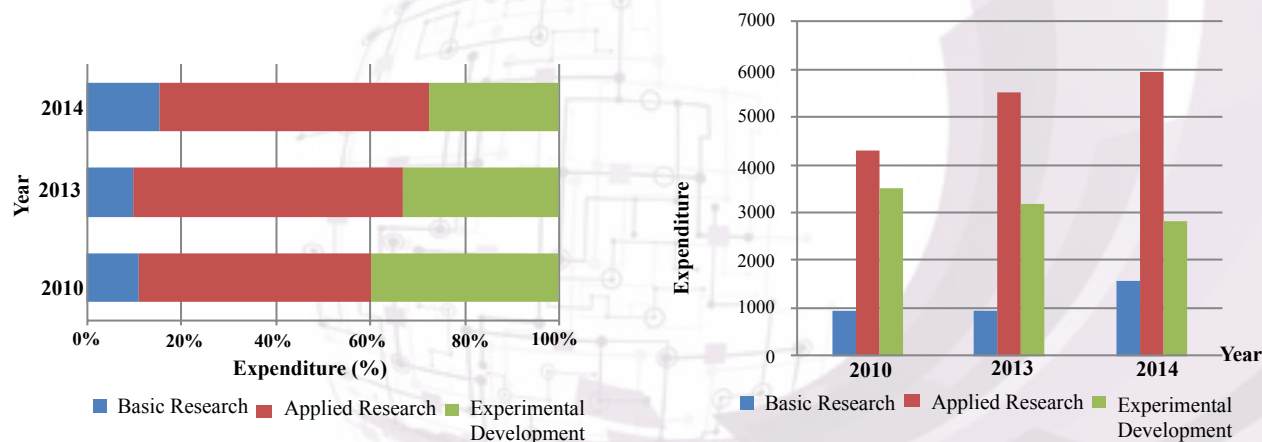


Figure 7 : National R&D expenditure by Nature of Research Activity 2010-2014



## 1.11 Percentage GERD by the Type of R&D Activity in Selected Countries

Country	Year	% of GERD			
		Basic Research	Applied Research	Experimental Development	Not Specified
China	2014	4.7	10.7	84.5	na
France	2013	24.2	37.9	34.5	3.4
Japan	2014	12.3	19.9	63.4	4.4
Malaysia	2014	16.9	75.5	7.5	na
New Zealand	2013	25.2	39.1	35.8	na
Republic of Korea	2014	17.6	18.9	63.4	na
Singapore	2013	20.5	33.2	46.4	na
South Africa	2012	25.3	46.3	28.4	na
Sri Lanka*	2014	15.3	57.4	27.4	na
Thailand	2014	21.7	28.5	35.4	14.3
United Kingdom	2013	15.6	46.2	37.5	na
United States of America	2013	17.6	19.9	62.5	na

na - not available

\*National R&D Surveys, Sri Lanka 2014 (NSF)

Source: <http://www.uis.unesco.org/ScienceTechnology>

## 1.12: National R&D Expenditure of Different Sectors by Discipline 2014

Discipline	Higher Education	State Sector	Industry	PNI	Total
Natural Sciences	545.72	973.44	1,120.85	26.18	2,666.19
Engineering & Technology	327.09	399.09	1,721.27	0.11	2,447.56
Medical Sciences	346.67	23.23	1.94	0.00	371.84
Agricultural Sciences	501.70	2,211.25	1,364.82	0.00	4,077.77
Social Sciences and Humanities	207.48	394.14	-	2.22	603.84
other	143.94	16.94	21.99	0.00	182.87
<b>Total</b>	<b>2,072.60</b>	<b>4,018.09</b>	<b>4,230.87</b>	<b>28.51</b>	<b>10,350.07</b>

Source: National R&D Surveys Sri Lanka 2006, 2008, 2010, 2013 & 2014 (NSF)

## 1.13 National R&D Expenditure by Discipline 2004-2014

Discipline	Year					
	2004	2006	2008	2010	2013	2014
Natural Sciences	627.6 (16.5%)	1,148.7 (22.4%)	645.0 (12.8%)	1,064.11 (12.1%)	2,376.55 (24.6%)	2,666.19 (25.8%)
Engineering & Technology	614.0 (16.1%)	1,096.5 (21.4%)	1,490.2 (29.5%)	1,771.38 (20.2%)	3,195.32 (33.1%)	2,447.55 (23.5%)
Medical Sciences	531.4 (14.0%)	726.7 (14.2%)	875.1 (17.3%)	498.62 (5.7%)	904.37 (9.4%)	371.84 (3.7%)
Agricultural Sciences	1002.5 (26.3%)	1,258.9 (24.6%)	1,669.6 (33.1%)	2,925.99 (33.3%)	2,693.05 (27.8%)	4,077.77 (39.4%)
Social Sciences and Humanities	999.5 (26.3%)	393.9 (7.7%)	367.8 (7.3%)	577.80 (6.6%)	475.77 (4.9%)	603.85 (5.8%)
Other	23.4 (0.9%)	494.7 (9.7%)	0.0 (0.0%)	1,940.25 (22.1%)	24.08 (0.2%)	182.87 (1.8%)
<b>Total</b>	<b>3,807.5</b> (100.0%)	<b>5,119.2</b> (100.0%)	<b>5,047.7</b> (100.0%)	<b>8,778.16</b> (100.0%)	<b>9,670.00</b> (100.0%)	<b>10,350.07</b> (100.0%)

Source: National R&D Surveys Sri Lanka 2004, 2006, 2008, 2010, 2013 & 2014 (NSF)

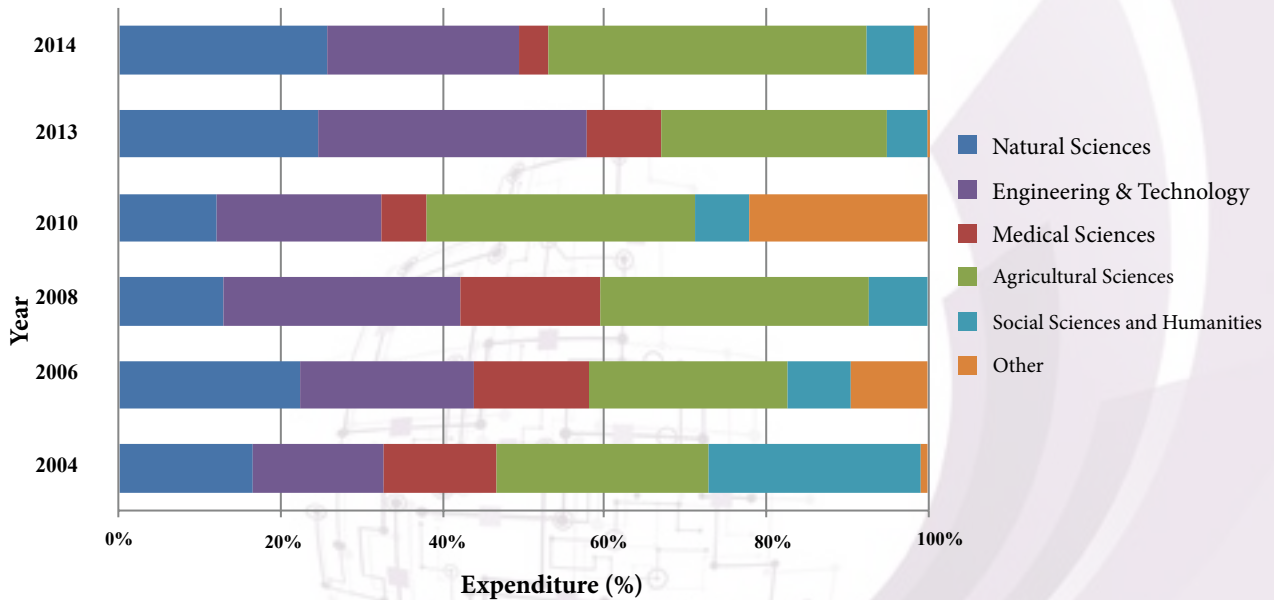


Figure 8 : National R&D expenditure by discipline from 2004-2014

## 1.14 Percentage GERD by Discipline in Selected Countries in 2014

Country	GERD %					
	Natural Sciences	Engineering & technology	Medical Sciences	Agricultural Sciences	Social Sciences & Humanities	Other
Colombia	14.30	14.60	10.00	12.80	13.00	35.30
Malaysia	47.20	31.10	5.90	7.60	8.20	0.00
Oman	9.60	32.50	2.60	48.90	6.40	0.00
Republic of Korea	13.80	68.60	11.80	2.20	3.60	0.00
Russian Federation	18.30	72.90	3.10	1.60	4.10	0.00
Sri Lanka	25.80	23.50	3.70	39.40	5.80	1.80
Turkey	10.70	54.60	15.00	4.40	15.30	0.00

Source:<http://www.uis.unesco.org/ScienceTechnology>



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## 2.1: Distribution of R&D Scientists (Head Count) by Sector 2013-2014

Sector	2013			2014		
	No. of Scientists	No. of Technicians	No. of Technicians per Scientists	No. of Scientists	No. of Technicians	No. of Technicians per Scientists
Government	1,819	1,278	0.70	1,614	1,607	1.00
Higher Education	2,668	543	0.20	2,657	391	0.15
Business Enterprise	1,204	1,366	1.13	1,141	720	0.63
Private Non Profit (PNP)	14	13	0.93	12	13	1.08
<b>Total</b>	<b>5,705</b>	<b>3,200</b>	<b>0.56</b>	<b>5,424</b>	<b>2,731</b>	<b>0.50</b>

Source: R&D Survey National Science Foundation Sri Lanka, 2013 & 2014

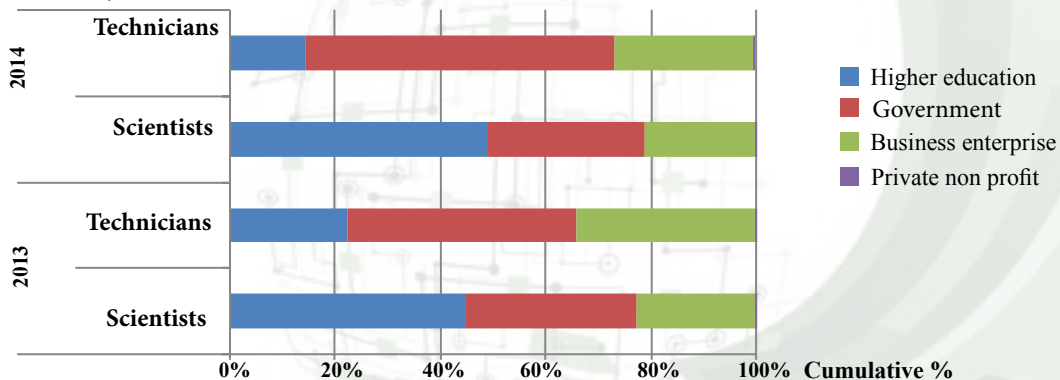


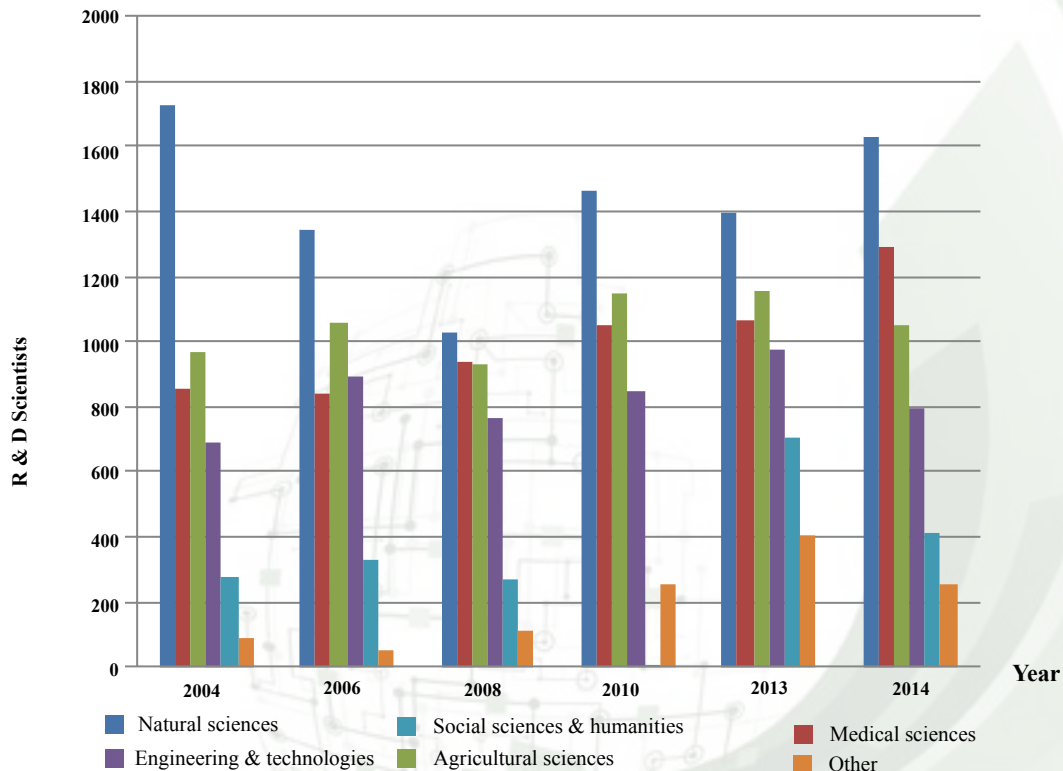
Figure 9 : R&D headcount in different sectors

## 2.2: Number of R&D Scientists (Head Count) by Discipline and Gender

Discipline	Headcount of R&D scientists (2013)						Headcount of R&D scientists (2014)					
	Male		Female		Total		Male		Female		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Natural Sciences	870	25	529	24	1,399	25	891	30	738	30	1,629	30
Agricultural Sciences	657	19	407	18	1,064	19	651	22	638	26	1,289	23
Engineering and Technology	819	24	339	15	1,158	20	713	24	334	13	1,047	19
Medical Sciences	493	14	483	22	976	17	360	12	434	18	794	15
Social Sciences and Humanities	424	12	283	13	707	12	233	8	175	7	408	8
Other	217	6	184	8	401	7	97	3	160	6	257	5
<b>TOTAL</b>	<b>3,480</b>	<b>100</b>	<b>2,225</b>	<b>100</b>	<b>5,705</b>	<b>100</b>	<b>2,945</b>	<b>100</b>	<b>2,479</b>	<b>100</b>	<b>5,424</b>	<b>100</b>

Source: R&D Survey National Science Foundation Sri Lanka, 2013 & 2014





**Figure 10 : Distribution of R&D Scientists in Different Disciplines 2004-2014**

## 2.3: Educational Qualifications of R&D Scientists -2014

Qualification	Male		Female		Total	
	No	%	No	%	No	%
Ph.D.	570	19	329	13	899	17
M.Phil.	132	4	105	4	237	4
MD/MS	113	4	106	4	219	4
M.Sc.	314	11	330	13	644	12
B.Sc+P.Dip.	719	25	646	27	1,365	25
B.Sc. (sp)	622	21	387	16	1,009	19
B.Sc.(gen)	384	13	551	22	936	17
Other	91	3	25	1	116	2
<b>Total</b>	<b>2,945</b>	<b>100</b>	<b>2,479</b>	<b>100</b>	<b>5,424</b>	<b>100</b>

Source: National R&D Survey, Sri Lanka 2014 (NSF)

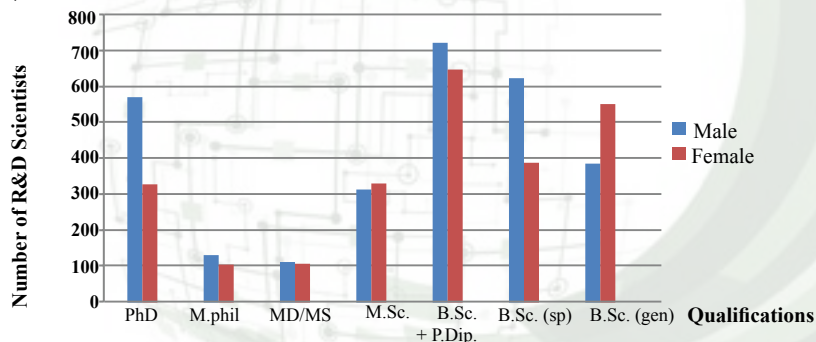


Figure 11 : Distribution of R&D Scientists as per education and gender

## 2.4 Distribution of R&D Scientists (FTE) by Sector 2014

Sector	Full Time Equivalent of R&D scientists			
	Male	Female	Total	% of Female
Government	566	497	1063	47
Higher Education	296	236	532	44
Industry	241	215	456	47
PNP	3	3	6	50
<b>Total</b>	<b>1106</b>	<b>951</b>	<b>2057</b>	<b>56</b>

Source: National R&D Survey, Sri Lanka 2014 (NSF)

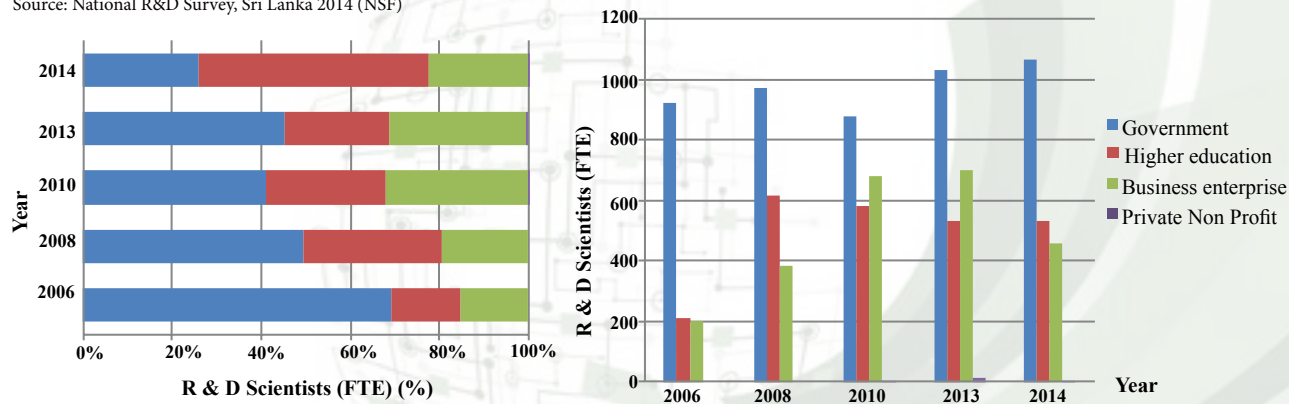


Figure 12 : Trends in R&D Scientists (FTE) distribution by sector 2006-2014

## 2.5: Distribution of R&D Scientists of Full Time Equivalent (FTE) by discipline-2014

Discipline	2014		
	Male	Female	Total
Natural Sciences	326	278	604
Agricultural Sciences	335	343	678
Engineering & Technology	251	105	356
Medical Sciences	82	102	184
Social Sciences and Humanities	88	61	149
Other	24	62	86
<b>Total</b>	<b>1,106</b>	<b>951</b>	<b>2,057</b>

Source: National R&D Survey, Sri Lanka 2014 (NSF)

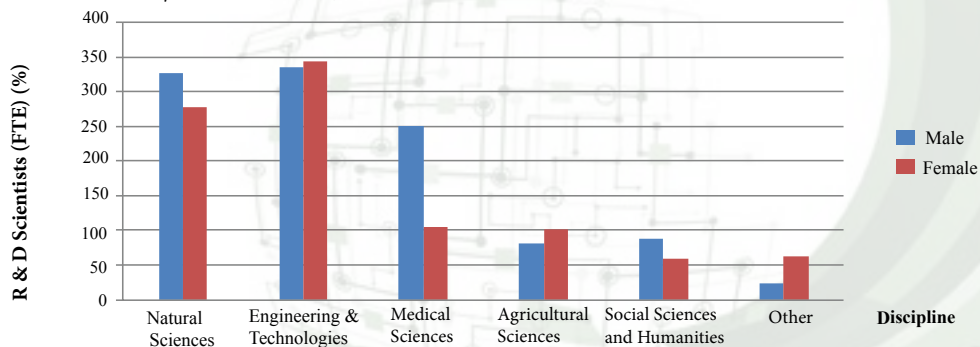


Figure 13 : Trends in Distribution of R&D Scientists (FTE) in Different Disciplines

## 2.6: Educational Qualifications of Full Time Equivalent (FTE) Scientists -2014

Qualification	Male	Female	Total
	No	No	No
PhD	382	347	729
M.Phil.	207	195	404
MD/MS	84	47	131
M.Sc.	47	49	96
B.Sc+P.Dip	206	183	389
B.Sc. (sp)	96	122	218
B.Sc.(gen)	82	8	90
<b>Total</b>	<b>1106</b>	<b>951</b>	<b>2057</b>

Source: National R&D Survey, Sri Lanka 2014 (NSF)

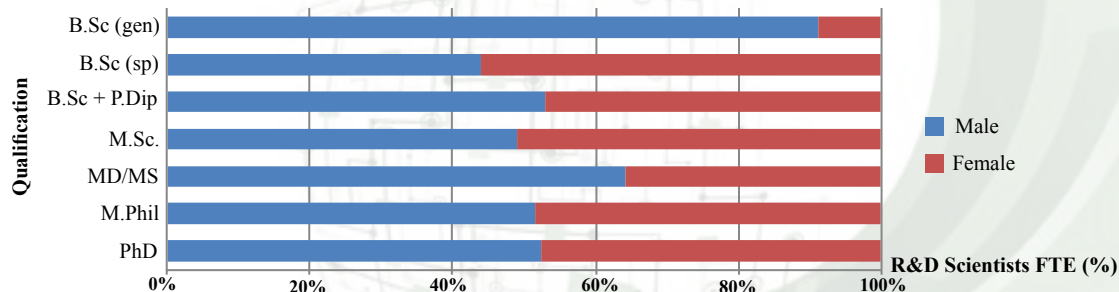


Figure 14 : Educational qualifications of R&D Scientists (FTE) - 2014

## 2.7: Number of R&D Scientists (Headcounts) by Age and Sex 2014

Age group	Headcount of R&D scientists			Headcount of Fulltime (FTE) scientists		
	Male	Female	Total	Male	Female	Total
21-30	425	312	737	191	126	317
31-40	548	559	1,107	209	209	418
41-50	655	514	1,170	234	191	425
51-60	361	245	606	133	85	218
Above 60	108	55	163	29	16	45
Not mentioned	848	793	1,641	310	324	634
<b>Total</b>	<b>2,945</b>	<b>2,479</b>	<b>5,424</b>	<b>1,106</b>	<b>951</b>	<b>2,057</b>

Source: National R&D Survey, Sri Lanka 2014 (NSF)

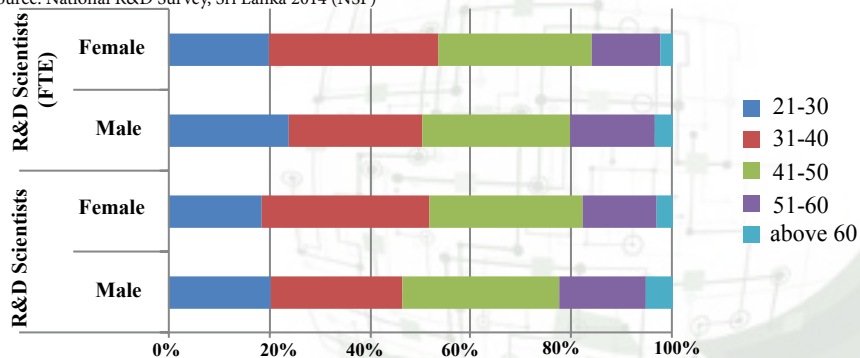


Figure 15 : Age distribution of R&D scientists engaged in research in 2014

## 2.8 : Number of R&amp;D Scientists in Selected Countries

Country	Year(Data available)	Researchers(HC) per million population	Researcher(FTE) per million population
Belgium	2013	8,966	4,156
Brazil	2010	2,404	698
China	2014	3,907	1,113
France	2013	8,989	4,170
Germany	2013	10,693	4,388
Iraq	2014	190	68
Ireland	2014	8,932	3,793
Japan	2012	8,930	5,386
Kuwait	2013	1,364	129
New Zealand	2013	9,600	3,978
Pakistan	2013	780	167
Republic of Korea	2014	12,112	69,010
Singapore	2013	8,592	6,665
Sri Lanka	2014*	261	100

\* National R&D Survey, Sri Lanka 2014 (NSF)  
Source:Adopted from UNESCO Statistics 2014

## 2.9 : World Statistics of Researchers by Formal Qualification & Sex (HC)

Country	Year	Research- ers - Total	Researchers - with PhD, or similar level %	Researchers - Bachelor Master	Research- ers – short occupancy programmes	Re- search- ers - All other qualifi- cations%	Researchers -Female (%)
Austria	2013	71,448	27.9	52.6	2.5	17	29.6
Belgium	2011	63,207	27.1	57.2	10.8	4.9	33.5
Bulgaria	2013	16,095	51.2	47.2	0.7	0.9	49.7
Chile	2014	12,320	44.5	34.1	16.1	5.3	31.5
China, Macao Special Administrative Region	2014	1,379	64.1	34.9	0.1	0.9	32.6
Greece	2011	53,744	45.4	50	2.5	2.1	39.4
Iraq	2014	4,765	45.1	54.7	0.2	0	37.5
Malaysia	2014	84,516	20.2	74.5	2	(n)	48.8
Pakistan	2013	60,699	17.6	74.7	(n)	7.7	29.8
Russian Federation	2014	373,905	29.3	70.7	na	na	40.5
Singapore	2014	40,730	22.6	71.4	na	6	30.1
South Africa	2012	42,828	55.4	37.2	7.4	na	43.7
Sri Lanka	<b>2014</b>	<b>5,424</b>	<b>17</b>	<b>81</b>	<b>2</b>	-	<b>45.7</b>
Turkey	2014	181,544	41.2	56.5	na	na	36.9

(n) Magnitude nil or negligible, na - not available

Source: Adopted from UIS statistics, NSF R&D Survey 2014



## 2.10 : Science and Technology Personnel (STP) by Category 2014

Category	Male	Female	Total	Per million population
S&T Scientists	5,538	4,415	9,953	480.82
Technicians	7,470	3,375	10,845	523.91
Other Supporting staff	42,856	24,038	66,894	3,231.59
<b>STP</b>	<b>55,864</b>	<b>31,828</b>	<b>87,692</b>	<b>4,236.32</b>

Source: R&D Survey National Science Foundation Sri Lanka, 2004, 2006, 2008, 2010,2013 & 2014

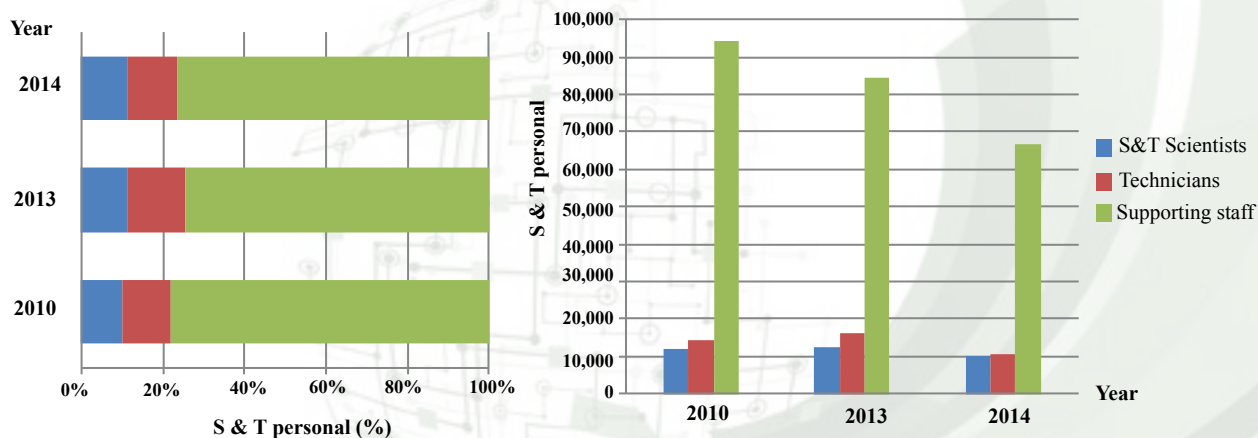


Figure 16 : Trends in Science and Technology Personnel (STP) distribution 2010-2014

## 2.11 : Distribution of S&T Personnel (STP) by Sector -2010-2014

Sector	2010		2013		2014	
	STP	Percent	STP	Percent	STP	Percent
Government	28,247	23.38	18,992	16.74	21,986	25.07
Higher Education	4,609	3.82	3,873	3.42	6,140	7.00
Industry	87,909	72.77	90,546	79.81	59,509	67.86
PNP	32	0.03	36	0.03	57	0.07
<b>Total</b>	<b>120,797</b>	<b>100.00</b>	<b>113,447</b>	<b>100.00</b>	<b>87,692</b>	<b>100.00</b>

Source: R&D Survey National Science Foundation Sri Lanka, 2008, 2010, 2013 & 2014 (NSF)

NOTE: Total STP includes all Researchers, other Scientists in the Service sector Institutions, Technicians and Supporting Staff

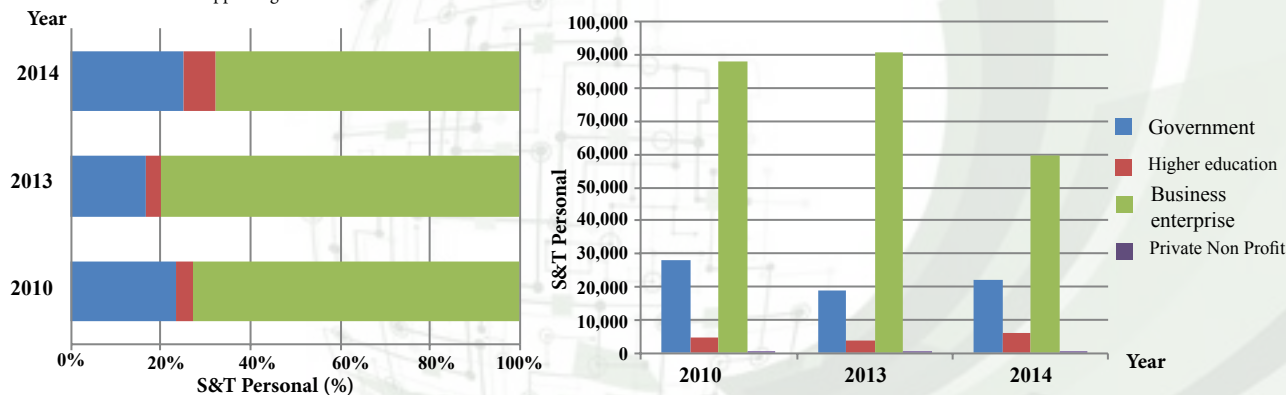
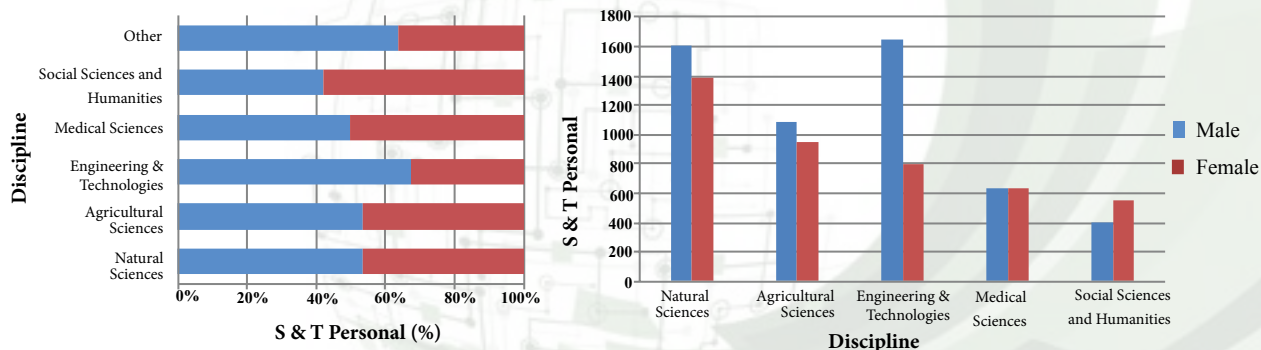


Figure 17 : Trends in S&T Personnel (STP) across different sector, 2010-2014

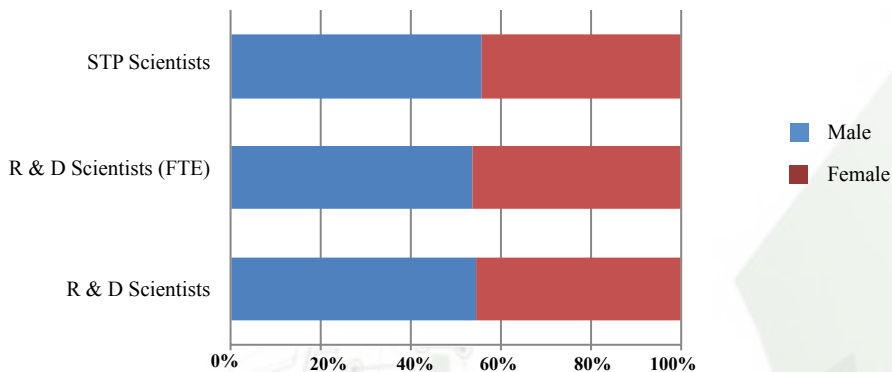
## 2.12 : Distribution of Science and Technology Scientists Technologists (R&D and S&T Service) by discipline 2014

STP	Male	Female	Total	% Female of Total
Natural Sciences	1,605	1,387	2,992	53.6
Agricultural Sciences	1,084	943	2,027	45.6
Engineering & Technologies	1,641	794	2,435	32.6
Medical Sciences	631	636	1,267	50.2
Social Sciences and Humanities	406	558	964	57.9
Other /Not specified	171	97	268	39.2
<b>Total</b>	<b>5,538</b>	<b>4,415</b>	<b>9,953</b>	<b>44.4</b>

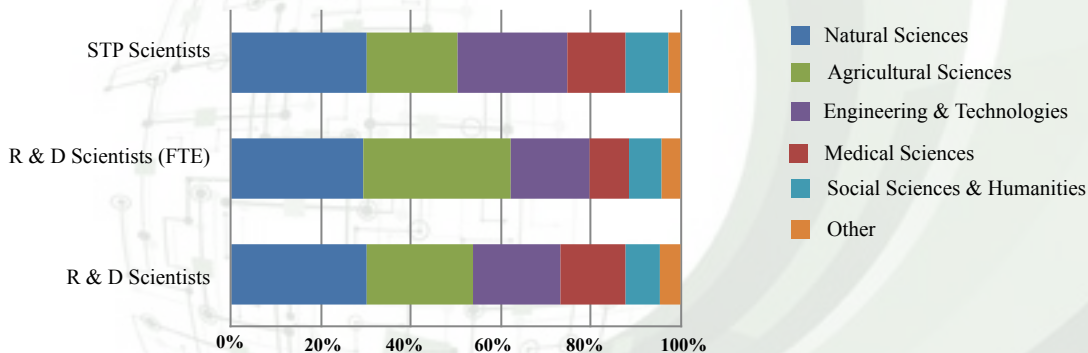
Source: National R&D Surveys, Sri Lanka 2006, 2008, 2010, 2013 & 2014 (NSF)



**Figure 18 : Distribution of Scientists and Technologists in different disciplines**



**Figure 19 : Distribution of Scientists by Gender 2014**



**Figure 20 :Distribution of Scientists by Discipline 2014**

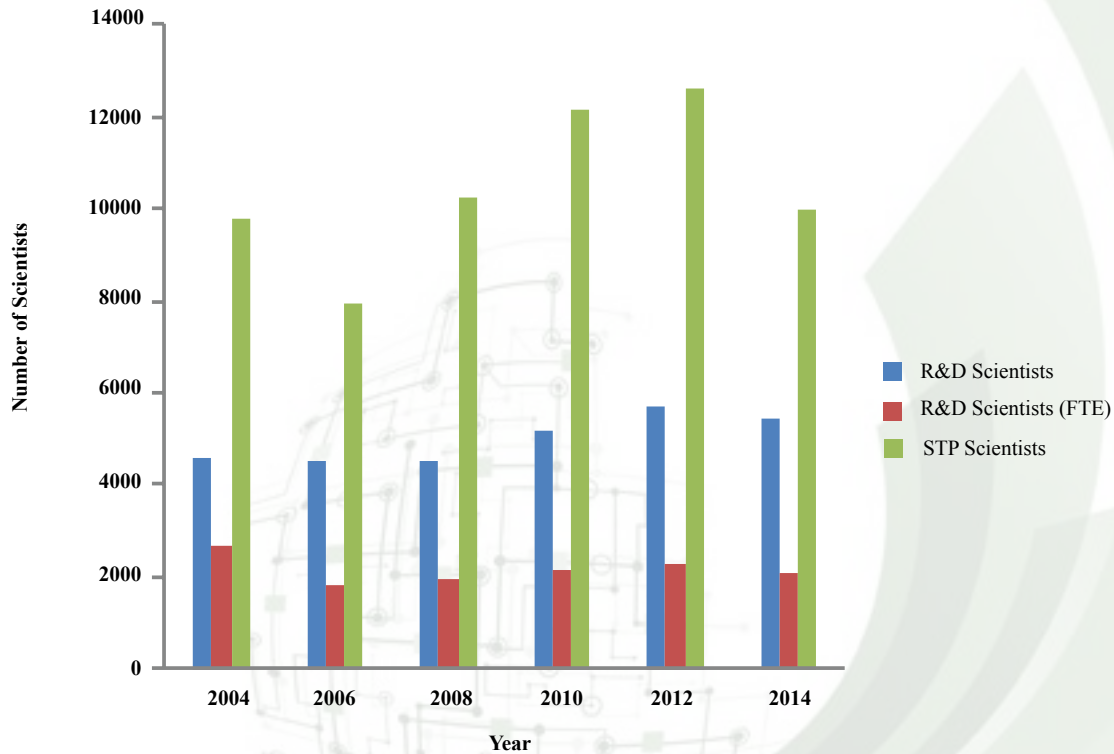


Figure 21 : Distribution of Scientists 2004-2014

The background features a globe with a circuit board overlay, symbolizing technology and science. The globe is centered and slightly tilted. Overlaid on the globe is a complex network of lines and nodes, representing a circuit board or a data network. The nodes are small squares and circles, connected by thin lines. The background also includes large, abstract, overlapping shapes in shades of beige and brown, creating a modern, geometric aesthetic.

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**3.1 : Number of Patents Awarded Locally During 2000-2014**

Year	Applications			Registration		
	Resident	Non-resident	Total	Resident	Non-resident	Total
2000	71	250	321	59	169	228
2001	120	236	356	71	104	175
2002	123	202	325	59	54	113
2003	95	189	284	63	52	115
2004	120	195	315	103	85	188
2005	149	211	360	64	116	180
2006	153	270	423	68	69	137
2007	151	279	430	54	37	91
2008	209	241	450	89	70	159
2009	202	200	402	11	254	265
2010	225	235	460	220	284	504
2011	194	235	429	45	227	272
2012	242	297	539	37	89	126
2013	328	188	516	71	165	236
2014	314	222	536	43	220	263

Source: National Intellectual property Office (NIPO) , Sri Lanka (<http://www.nipo.gov.lk/satistic.htm>)

### 3.2 : Number of Industrial Design Awarded Locally During the Period of 2000-2014 by Sector

Year	Applications			Registration		
	Resident	Non-resident	Total	Resident	Non-resident	Total
2000	187	10	197	179	6	185
2001	520	26	546	482	11	493
2002	345	40	385	253	13	266
2003	385	42	427	365	23	388
2004	254	50	304	224	40	264
2005	257	47	304	269	88	357
2006	477	39	516	422	45	467
2007	328	24	352	8	6	14
2008	333	56	389	85	4	89
2009	273	40	313	238	36	274
2010	233	51	284	228	37	265
2011	387	56	443	88	21	109
2012	365	29	394	60	28	88
2013	260	99	359	100	30	130
2014	245	47	292	471	58	529

Source: National Intellectual property Office (NIPO) , Sri Lanka (<http://www.nipo.gov.lk/satistic.htm>)



## 3.3 : Distribution of Patents According to Classification 2013-2014

Patent Categories	2013	2014
Agriculture related developments	12	12
Construction technology and materials developments	7	7
Drugs , cosmetics & other related product developments	30	26
Dryers/ dehydration technology	1	4
Energy saving / generating devices	16	16
Food and beverage process technology and related findings	8	5
Development of domestic appliances/utilities	10	8
IT and telecommunication & electronic and related	16	20
Packaging and packing materials	0	0
Process technology	33	31
Process technology - Manufacturing sector	5	4
Rubber production and processing technology	2	1
Chemicals productions and related findings	<b>73</b>	<b>78</b>
Textile technology and related inventions	4	12
Automobile and related inventions	8	12
Other	11	14
<b>Total</b>	<b>236</b>	<b>250</b>

Source: National Intellectual property office(NIPO),Sri Lanka

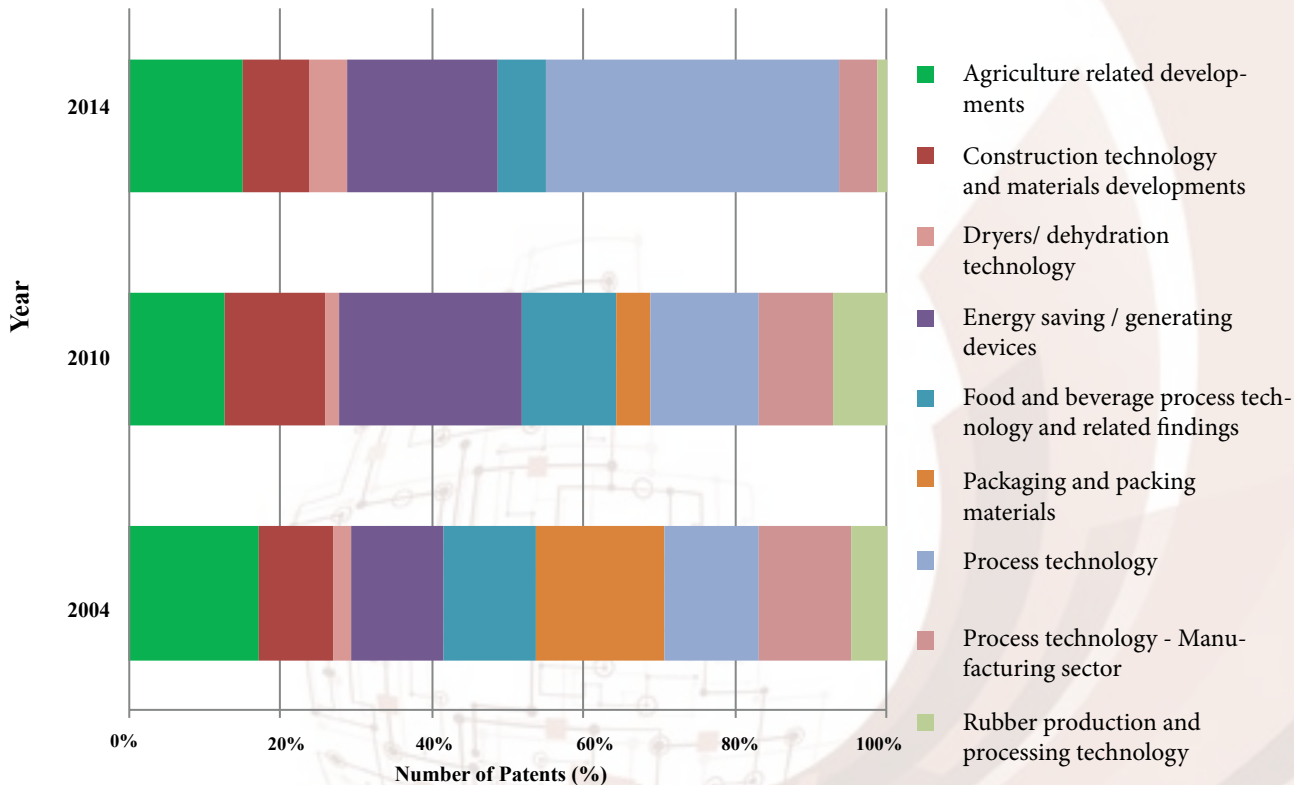


Figure 22 : Trends in patents licentine across different disciplines

## 3.4 : Patent Applications in Selected Countries 2012-2014

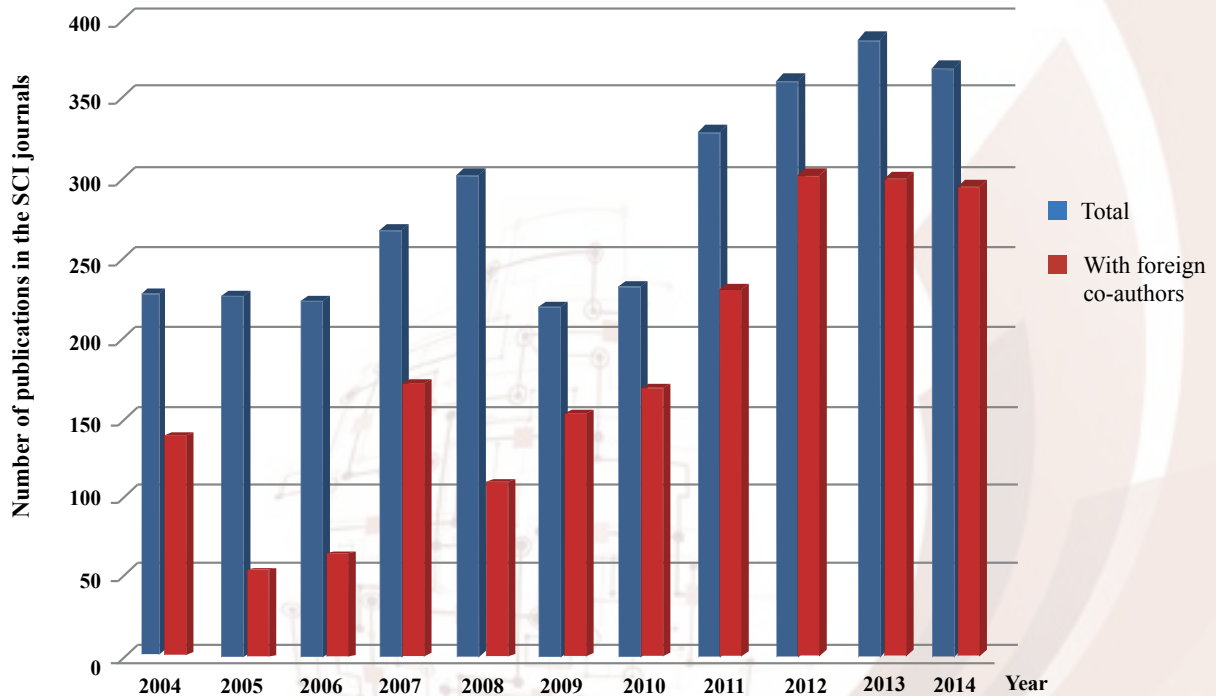
Country	Resident			Non-resident		
	2012	2013	2014	2012	2013	2014
Australia	2,627	3,061	1,988	23,731	26,656	23,968
Bangladesh	67	60	44	287	243	249
Switzerland	1,480	1,525	1,480	1,508	631	568
China	535,313	704,936	801,135	117,464	120,200	127,042
United Kingdom	15,370	14,972	15,196	7,865	7,966	7,844
Ireland	492	333	263	63	57	58
Italy	8439	8,307	8,601	871	905	781
Japan	287,013	271,731	265,959	55,783	56,705	60,030
Malaysia	1,114	1,199	1,353	5,826	6,006	6,267
New Zealand	1,425	1,614	1,636	5,674	5,167	6,092
Philippines	162	220	334	2,832	3,065	3,255
Thailand	1,020	1,572	1,006	5,726	5,832	6,924
<b>Sri Lanka</b>	<b>242</b>	<b>328</b>	<b>314</b>	<b>539</b>	<b>516</b>	<b>536</b>
United States of America	268,782	287,831	285,096	274,033	283,781	293,706

Source : World Bank Data, <http://data.worldbank.org/indicator/>

### 3.5 : Main Fields of Sri Lanka Publications in the SCI Journals 2012, 2013 and 2014

Field	2012		2013		2014	
	Total number	% With foreign Co-authorship	Total number	% With foreign Co-authorship	Total number	% With foreign Co-authorship
Agriculture	29	86.2	37	73.0	36	83.3
Biological science	20	90.0	20	85.0	19	84.2
Molecular biology & biotechnology	37	94.6	39	79.5	28	85.7
Chemical science	20	70.0	22	81.8	24	75.0
Earth Sciences	18	88.9	18	72.2	17	82.3
Engineering & Technologies	4	50.0	13	69.2	11	72.7
Environmental Science	27	81.5	36	88.9	29	89.6
fisheries, Aquaculture	2	100.0	6	100.0	9	100.0
food science	19	84.2	17	88.2	23	95.6
Forestry	19	100.0	12	100.0	15	100.0
Health science	114	80.7	122	72.1	118	70.3
Mathematics	2	50.0	5	80.0	4	100
Nanotechnology	32	90.6	14	92.9	12	91.7
Physics	11	54.5	17	47.1	16	50
Veterinary	6	100.0	2	100.0	3	100
Social Sciences	6	16.7	11	54.5	9	55.5
Total	366	83.1	391	77.0	373	79.3

Source: Adopted from from the SCI database, SCI science Citation Index



**Figure 23 : Publication Trends in the SCI Journals by Sri Lankan Scientists 2004-2014**

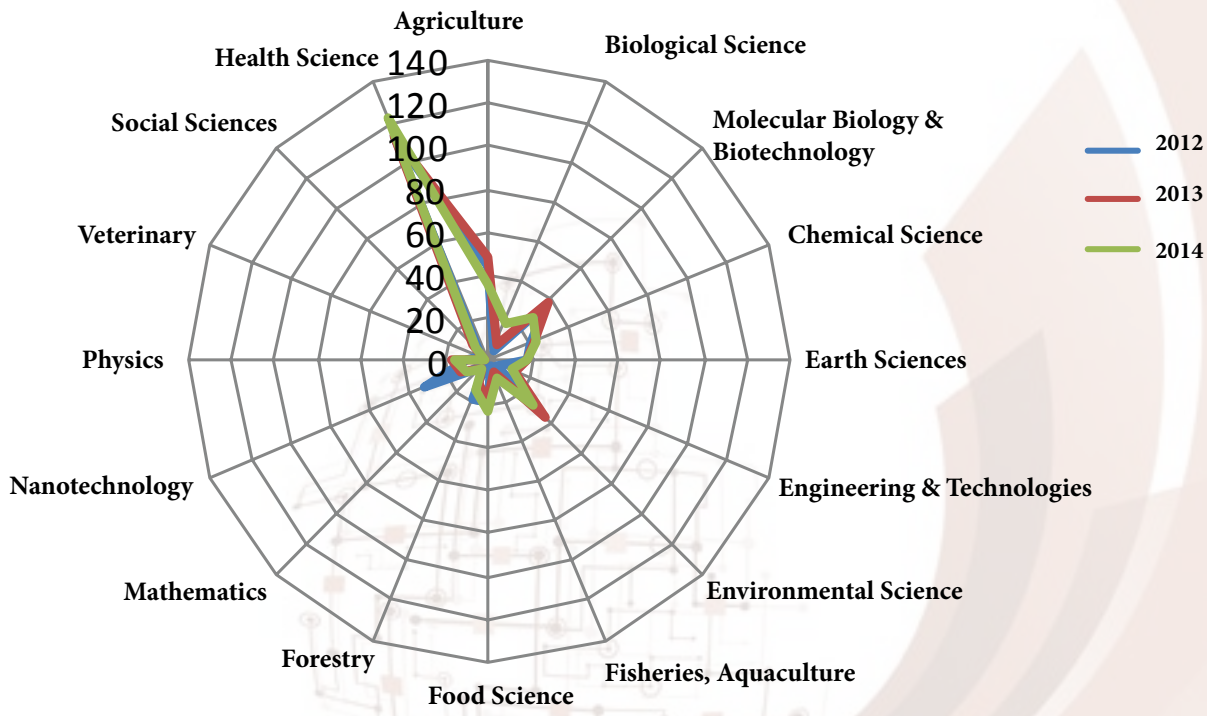
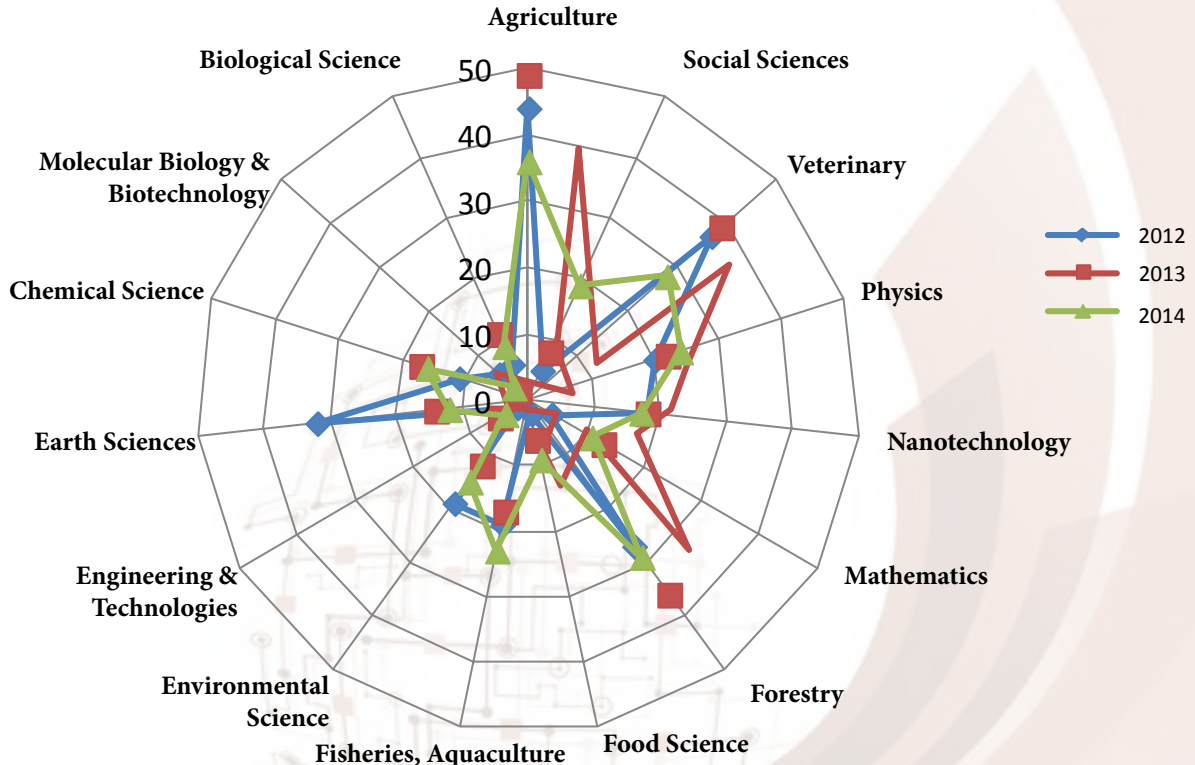


Figure 24 : Publication Trends in Different Subject Areas 2013-2014 with the publications of health sciences



**Figure 25 : Publication Trends in Different Subject Areas 2012-2014 (without Health Sciences)**

Note : The publications done in health sector not included to give clear distribution of other publication.

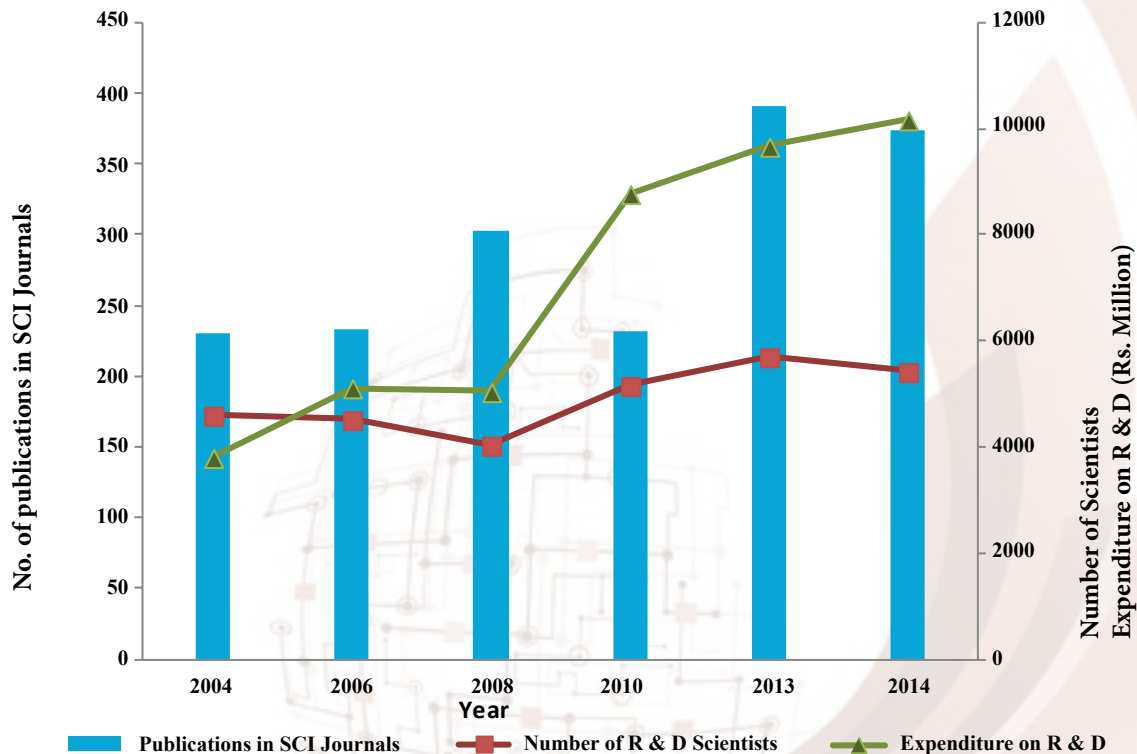
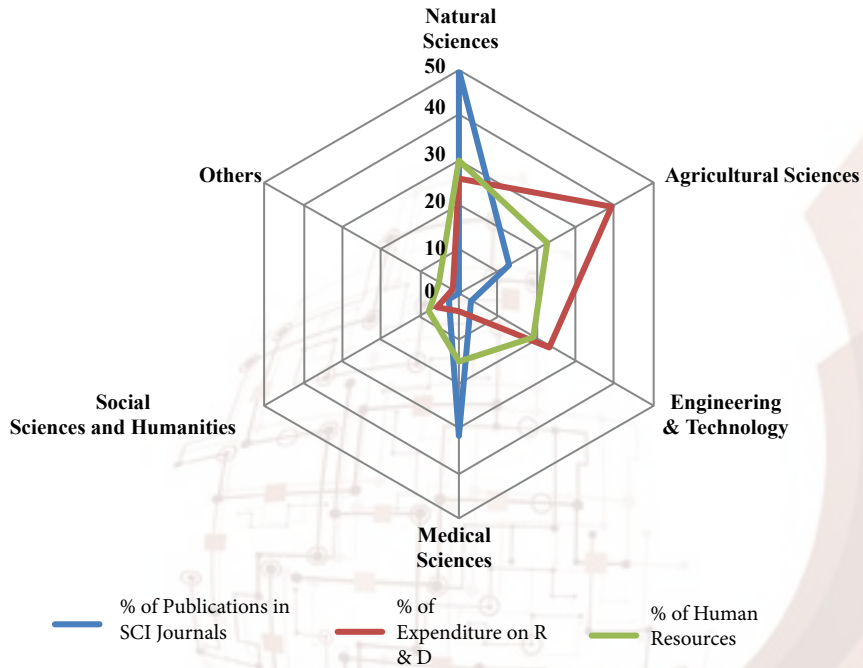


Figure 26 : Trends in Scientific publications based on R&D expenditure and human resources available during 2004-2014





**Figure 27 : Trends in Scientific publications based on R&D expenditure and human resources (by percentage)**

### 3.6 : Knowledge Disseminations During 2014

Publication/ Activity	State Sector		Higher Education		Toal		% Higher Education	
	Local	Int	Local	Int	Local	Int	Local	Int
Books and Book Chapters	92	8	457	109	549	117	83.24	93.16
Journal articles (peer reviewed)	75	74	54	787	129	861	41.86	91.41
Journal articles (other)	94	37	541	301	635	338	85.20	89.05
Newspaper articles	132	10	196	45	328	55	59.76	81.82
Abstracts	119	127	914	614	1,033	741	88.48	82.86
Newsletters, handbooks, manuals etc. that aim general public	91	0	nm	nm	91	0		
Presentations/ Resource Person in seminars/conference *	671	109	2,378	893	3,049	1,002	77.99	89.12

\* only aim at general public

Int. - International

nm=not mentioned

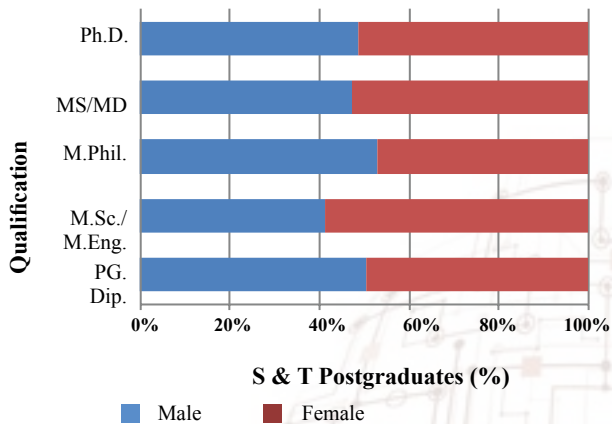
Source : National Science Foundation 2014

## 3.7 : Sri Lanka S&T Postgraduate Output 2012-2014

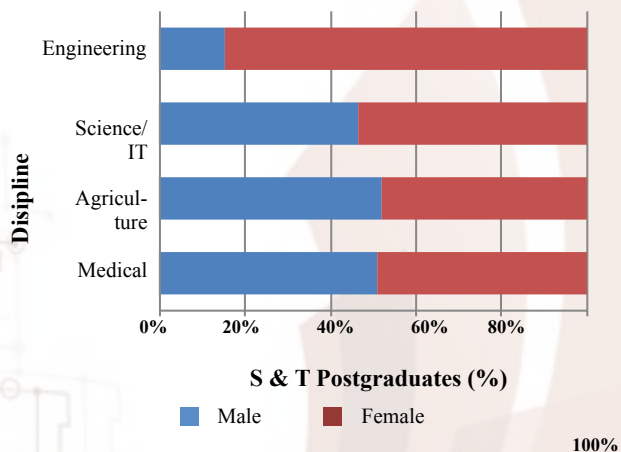
Degree	Year	Medical	Agriculture	Science/IT	Engineering	Total
PG. Dip.	2012	164	00	140	09	313
	2013	310	11	156	02	479
	2014	230	18	229	06	483
M.Sc./M.Eng.	2012	68	176	284	101	629
	2013	47	170	591	210	1,018
	2014	93	241	470	205	1,009
M.Phil.	2012	04	24	38	05	71
	2013	04	23	43	12	82
	2014	05	18	34	09	66
MS/MD	2012*	00	00	00	00	00
	2013	251	00	00	00	251
	2014	265	00	00	00	265
Ph.D.	2012*	229	07	08	04	248
	2013	02	07	16	02	27
	2014	08	05	18	02	33
Total	2012	465	207	470	119	1,261
	2013	614	211	806	226	1,857
	2014	601	282	751	222	1,856

\* MS/MD were included under PhD during 2002

Source: UGC Statistics 2014,



**Figure 28 : Distribution of postgraduate output across gender**



**Figure 29 : Distribution of postgraduate across different discipline**

## 3.8 : World Statistics of Researchers by Formal Qualification &amp; Sex (HC)

Country	Year	Research- ers - Total	Research- ers - with PhD, or similar level %	Research- ers – Bachelor Master	Research- ers – short occupancy pro- grammes	Research- ers - All other qualifica- tions%	Research- ers -Fe- male (%)
Austria	2013	71,448	27.9	52.6	2.5	17	29.6
Belgium	2011	63207	27.1	57.2	10.8	4.9	33.5
Bulgaria	2013	16095	51.2	47.2	0.7	0.9	49.7
Chile	2014	12320	44.5	34.1	16.1	5.3	31.5
China, Macao Special Administrative Region	2014	1379	64.1	34.9	0.1	0.9	32.6
Greece	2011	53744	45.4	50	2.5	2.1	39.4
Iraq	2014	4765	45.1	54.7	0.2	0	37.5
Malaysia	2014	84516	20.2	74.5	2	(n)	48.8
Pakistan	2013	60699	17.6	74.7	(n)	7.7	29.8
Russian Federation	2014	373905	29.3	70.7			40.5
Singapore	2014	40730	22.6	71.4		6	30.1
South Africa	2012	42828	55.4	37.2	7.4		43.7
Sri Lanka	2013	5424	21	77	2		
Turkey	2014	181544	41.2	56.5			36.9

(n) Magnitude nil or negligible  
 Source: Adopted from UIS statistics

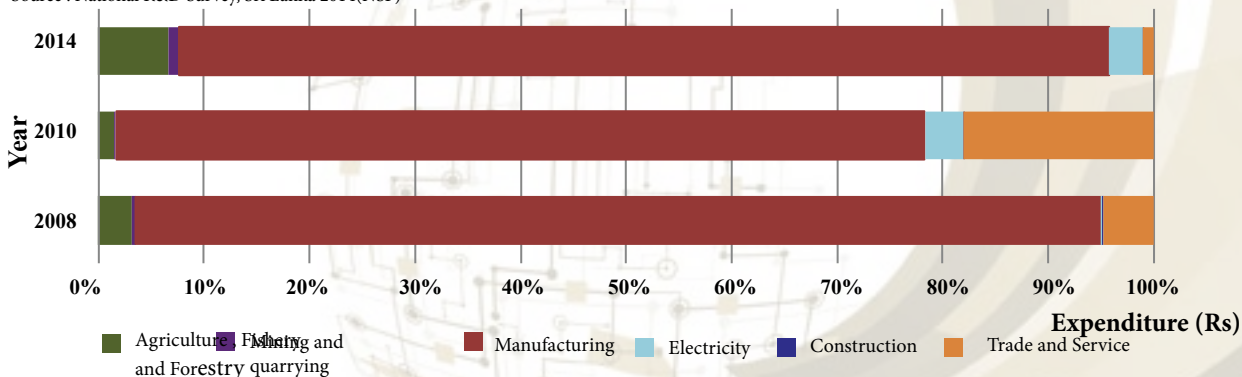


# INNOVATION INDICATORS

## 4.1 : R&D Expenditure of Different Industrial Categories 2014

Category	2014		
	Capital	Recurrent	Total
Agriculture , Fishery and Forestry	20.59	263.40	283.99
Mining and Quarrying	2.83	36.17	39.00
Manufacturing	270.22	3,457.19	3,727.41
Electricity	9.79	125.31	135.10
Construction	0.04	0.48	0.52
Trade and Service	3.25	41.60	44.85
<b>Total</b>	<b>306.72</b>	<b>3,924.15</b>	<b>4,230.87</b>

Source : National R&D Survey, Sri Lanka 2014(NSF)



**Figure 30 : Trends in R&D expenditure of different R&D categories 2008-2014**

## 4.2 : Percentage of Total Revenue that came from the Sale of Products/Service by Industry Involved in R&D in 2010- 2014

Category	2010	2013	2014
Local Market	66.1	66.1	68.8
Asia Pacific Countries	8.8	8.8	6.6
European Countries	14.8	14.8	10.8
United States	7.9	7.9	5.8
Middle East Countries	0.7	0.7	3.2
Africans Countries	0.7	0.7	3.8
Rest of the World	1.0	1.0	1.0
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source : National R&D Surveys, Sri Lanka 2006, 2008 & 2010 (NSF);

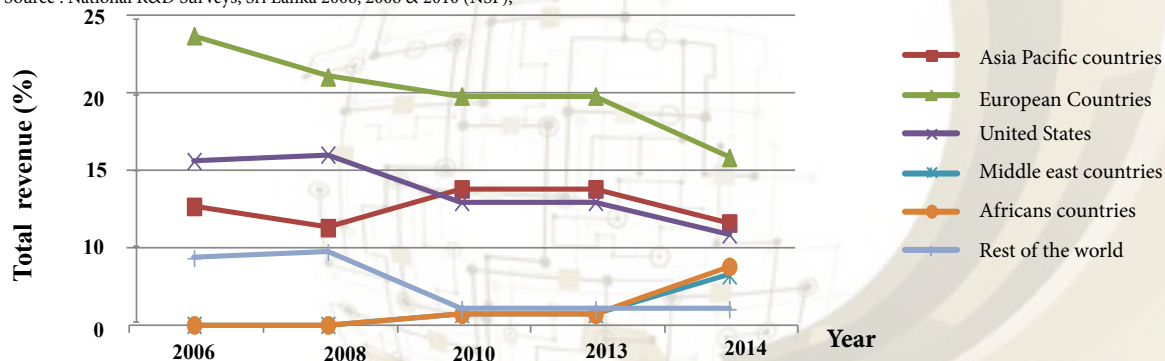


Figure 31 : Trends in revenue generations by industries within the period 2006 - 2014



4.3 : Number of Innovation carried out by the Industrial Sector (R&D)Institutions in 2014

Innovation Type	Number		
	Developed	Transferred	Commercialized/ publicized
Development of new product/services/ processes	91	16	57
Existing products/services significantly improved	69	17	54
Existing processes significantly improved	10	5	5
New plant varieties/hybrids developed	9	1	4
Substitute developed for imports	10	4	1
Designs/ Prototypes developed	536	0	298

Source : National R&D Surveys, Sri Lanka, 2014

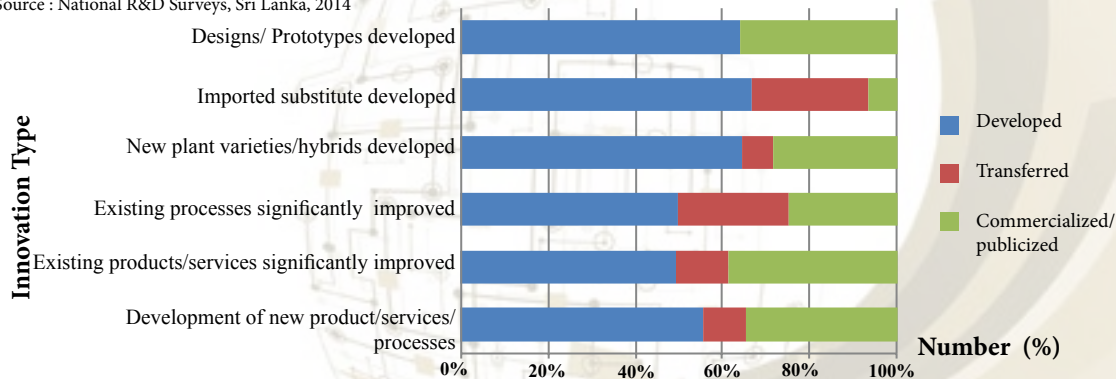


Figure 32 : Difeent innovations types carried out by industrial sector during 2014

#### 4.4 : Number of Innovation carried out by the Government Sector (R&D)Institutions in 2014

Innovation Type	Number		
	Developed	Transferred	Commercialized/ publicized
Development of new product/services/pro- cesses	39	20	14
Existing products/services significantly improved	12	4	4
Existing processes significantly improved	5	0	0
New plant varieties/hybrids developed	27	2	12
Substitute developed for imports	0	0	0
Designs/ Prototypes developed	18	4	1

Source : National R&D Surveys, Sri Lanka, 2014

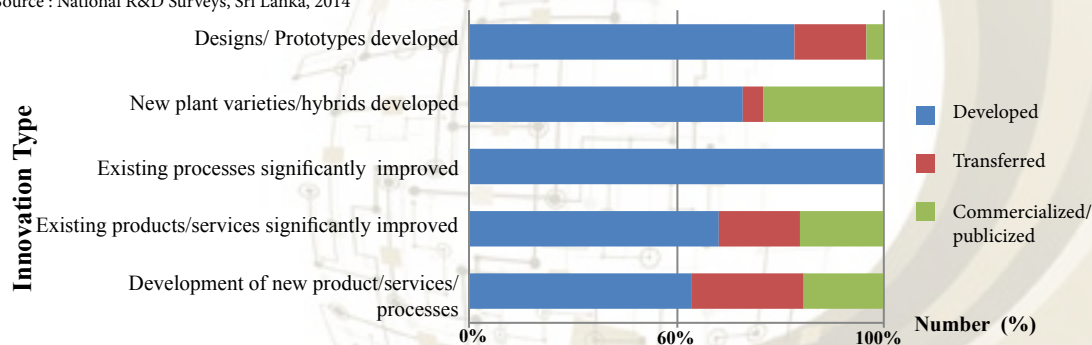


Figure 33 : Different innovation types carried out of Government Sector institutions in 2014

4.5 : Number of Innovation carried out by the Higher Education Sector in 2014

Innovation Type	Number		
	Developed	Transferred	Commercialized/ publicized
Development of new product/services/ processes	73	15	na
Existing products/services/ processes significantly improved	28	8	na
New plant varieties/hybrids /Micro organism based products developed	0	0	na
Development of substitute for imports	5	3	na
Designs/ Prototypes developed	20	0	na
Other	8	0	na

Source : National R&D Surveys, Sri Lanka, 2014

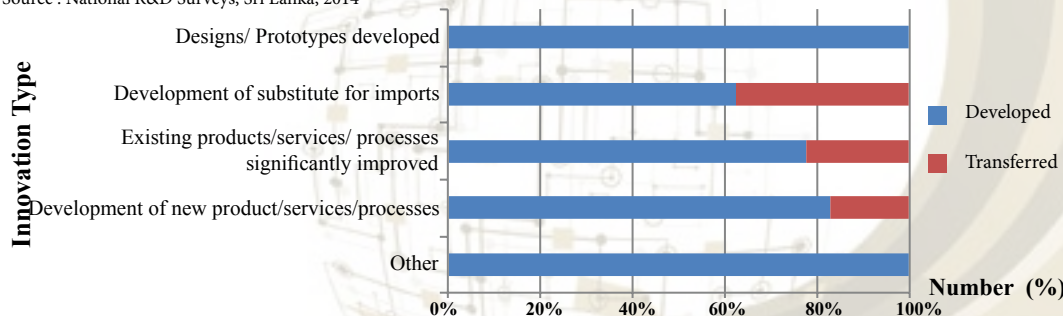


Figure 34 : Different innovation types carried out by higher education sector in 2014

#### 4.6 : High-Technology Exports (current US\$ per million) in Selected Countries 2012-2014

Country	2012	2013	2014
Australia	4,761	4,565	4,691
Canada	29,087	29,026	31,535
China	505,646	560,058	558,606
Germany	187,016	193,799	199,718
France	108,586	113,251	114,697
United Kingdom	67,787	69,224	70,653
India	12,434	16,693	17,316
Japan	123,393	105,076	100,955
Sri lanka	58	69	68
New Zealand	709	723	645
Thailand	33,768	33,901	34,992
United States	148,331	148,531	155,641
Republic of Korea	121,313	130,460	133,447
Malaysia	61,229	60,378	63,376
Philippines	20,795	21,810	23,839
Pakistan	309	349	259
Singapore	128,239	135,602	137,369
Vietnam	16,259	27,819	30,864

Source: World Bank Data, (<http://data.worldbank.org/indicator/>)

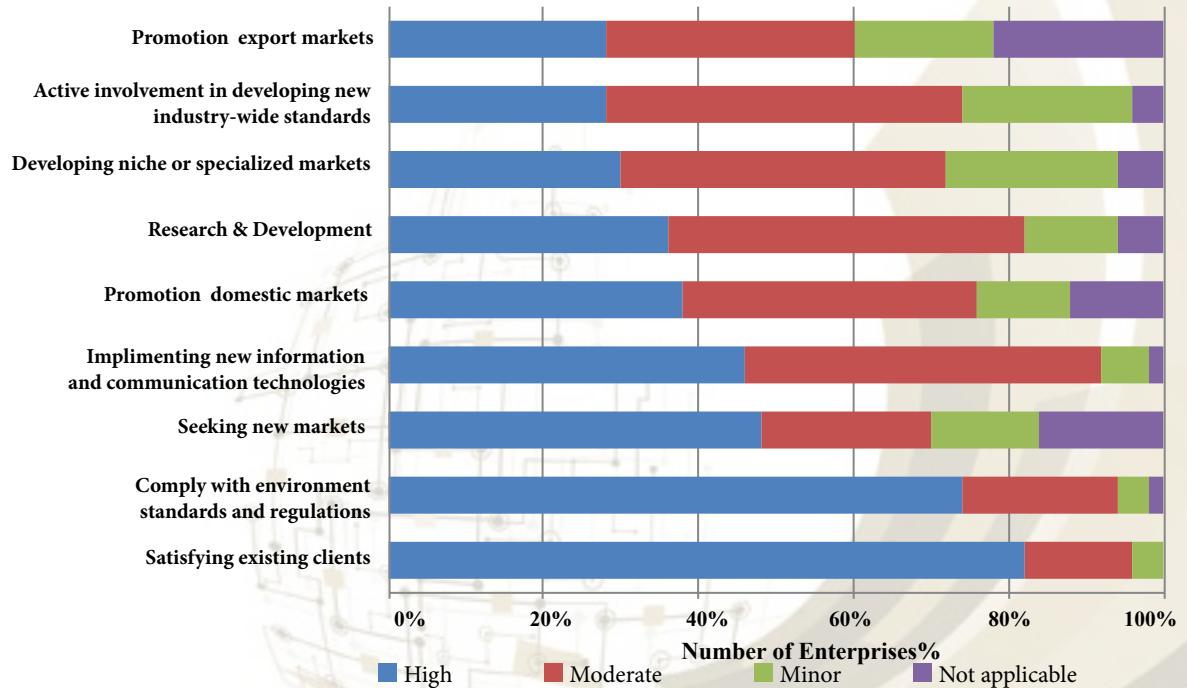


Figure 35 : Rate of importance given by the enterprises for their activities during 2014

#### 4.7 : Involvement of Industrial Sector with other Institutions in Conducting R&D and Innovation Activities 2006-2014

Institution	% Institutional involvement in R&D			
	2006	2008	2010	2014
Own company alone	48.6	52.7	52.2	60.0
With Parent Company	25.8	20.7	18.1	13.8
Collaboration with other institution	16.4	19.0	21.3	18.5
Out sourcing	9.2	7.6	8.5	7.7
Total	100	100	100	100

Source : National R&D Surveys, Sri Lanka 2006, 2008 & 2010 (NSF)

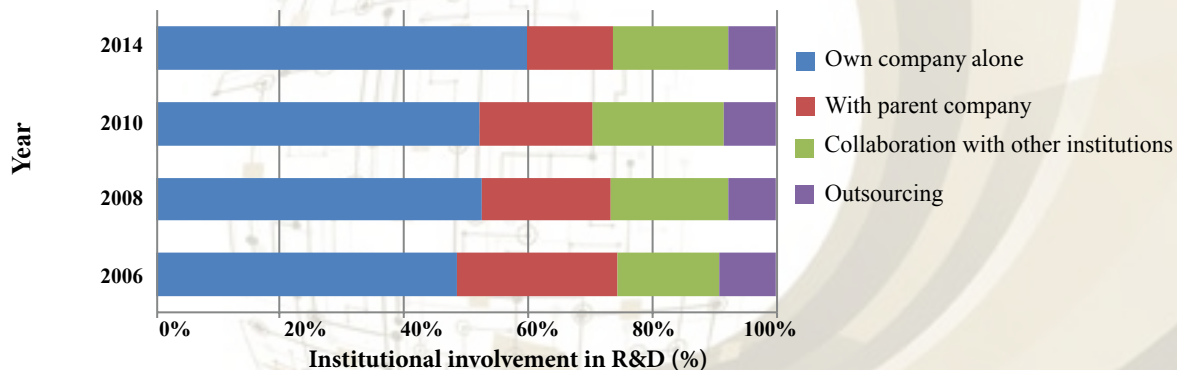


Figure 36 : The degree of engagement with other institutions for R&D by industries during 2006-2014

**4.8: Institution/countries Industries Bought Technologies/ Patent/Knowledge Relevant to their R&D and Innovation activities**

Locality	Country	2008	2010	2014
Local	Government	13	12	12
	Private	02	16	19
Foreign	Individual	01	-	-
	Australia	-	01	01
	Belgian	03	06	01
	China	01	01	04
	Denmark	-	01	-
	Dubai	-	-	01
	France	01	01	-
	Germany	03	11	05
	India	07	15	12
	Italy	02	-	-
	Hong Kong	-	-	02
	Japan	01	03	02
	South Korea	-	01	1
	Switzerland	-	-	01
	Spain	-	-	01
	Pakistan	-	02	01
	Taiwan	-	01	01
	Thailand	01	-	-
	UK	01	03	01
	USA	04	05	01

Source: R&amp;D Survey National Science Foundation Sri Lanka, 2008,2010 &amp; 2014

#### 4.9: Methodologies used by the Industries (%) of the Sample to Protect its Intellectual Property Right (IPR) during 2008-2014

Methodologies	2008	2010	2014
<b>Formal :</b>			
Patents	23.1	23.3	8.0
Trademarks	65.1	74.1	85.0
Copyrights	14.8	20.6	28.1
<b>Strategic Methods:</b>			
Secrecy	64.5	67.2	70.0
Complexity of design	37.3	31.2	30.3
Other	2.4	1.05	0.0

Source: R&D Survey National Science Foundation Sri Lanka, 2008,2010 & 2014

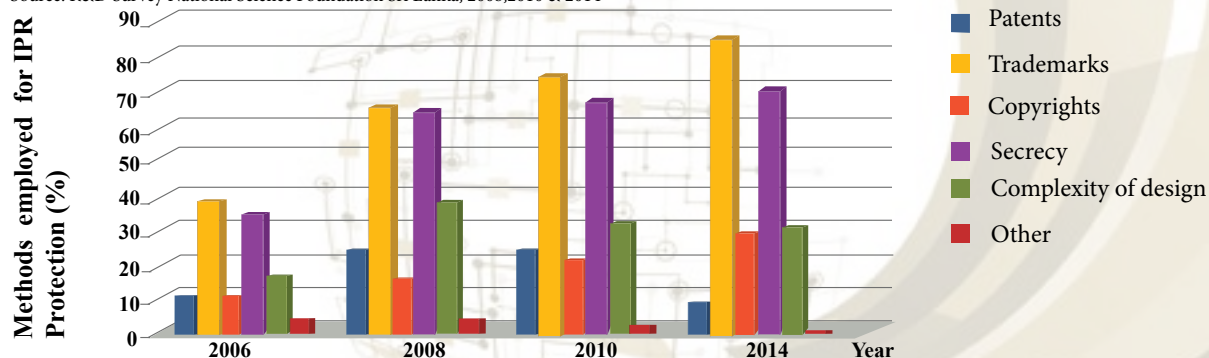


Figure 37 : Type of Intellectual Property Rights employed by industries to protect their innovations during 2008-2014



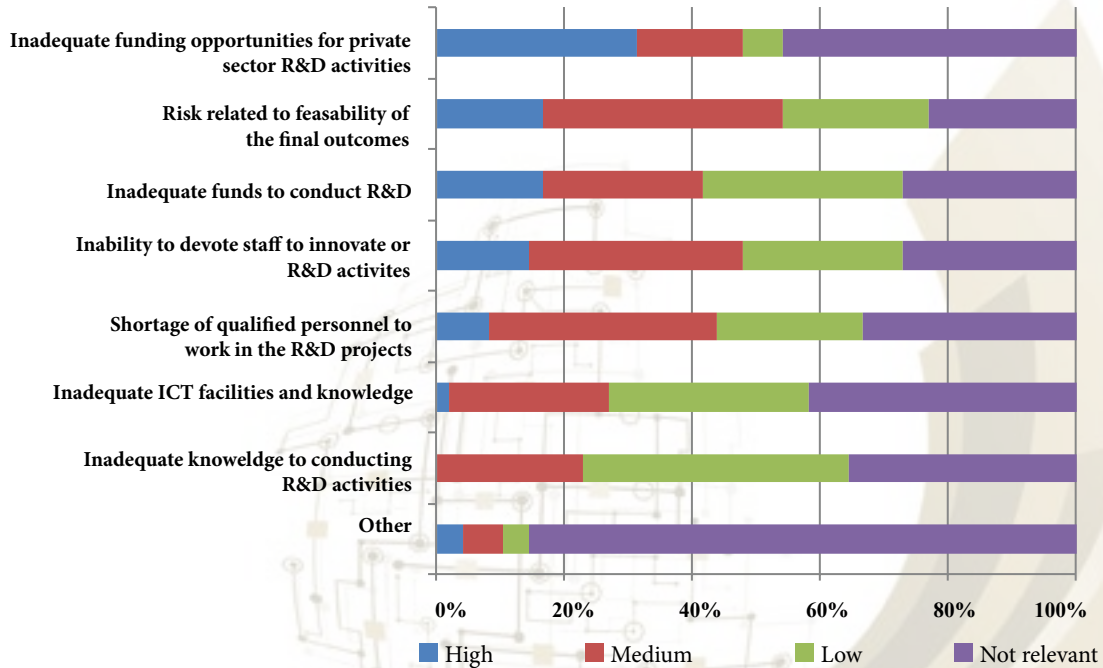


Figure 38 : Factors that affected to abandon the R&D work initiated by industries before their successful completion in 2014



# KEY SOCIO-ECONOMIC INDICATORS

## 5.1: Demographic Indicators of Sri Lanka(2013-2014)

Item	2013(a)	2014(a)
Mid-Year population, '000 (b)	20,579	20,771
0-14 Years, '000	5,187	5235
15-54 Years, '000	11,768	11,879
55 Years and over, '000	3,624	3,657
Growth of population, %	0.8	0.9
Crude birth rate, per 1,000 population	17.9	16.9
Crude death rate, per 1,000 population	6.2	6.2
Rate of natural increase, per 1,000 population	11.7	10.7
Net migration rate, per 1,000 population	-2.3	-2.2
Infant mortality rate, per 1,000 live births	8.2	n.a
Density of population, persons per Sq.Km.	328	331

(a) Provisional

(b) Until 2011, mid-year population estimates were prepared based on the Census of Population and Housing-2001

Mid-Year population estimates 2012 onwards were prepared based on the final report of the Census of Population and Housing-2012

n.a. - Not available

Sources : Registrar General's Department

Department of Census and Statistics 2010-2013

## 5.2: Demographic Indicators: SAARC countries

Indicator	Ref. Year	Sri Lanka	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan
Mid-Year population, Mn.	2013	20.6	27.5	154.7	0.7	1,228.80	0.4	27.3	181.7
Population growth, %	2013	0.8	1.9	1.4	1.7	1.3	3.5	1.4	0.6
Land area, '000 Sq.km.	2003	65.6	na	130.2	na	2,973.20	0.3	143	770.9
Density of population [Persons per Sq. km.] (a)	2013	328	42	1,048.00	19.00	374	2,645.00	185	227
0-14 Years	2013*	25.2	46.6	30	28.1	29.1	28.7	34.7	33.8
15-64 Years	2013*	66.9	51	65.2	67.1	65.6	66.3	60.2	61.8
65 Years & above	2013*	7.9	2.3	4.8	4.8	5.3	4.9	5.1	4.4
Urban population, %	2013	18.3 (a)	22.9	25.9 (b)	33.7 (c)	30.5	40.5 (d)	17 (b)	33.7
Crude birth rate, Per 1,000	2012	17.5	35.3	20.3	19.9	20.7	22.2	21.6	25.7
Crude death rate, Per 1,000	2012	6	8.1	5.7	6.5	7.9	3.4	6.7	7
Total Fertility Rate [Births per Women]	2012	2.3	5.1	2.2	2.3	2.5	2.3	2.4	3.3
Infant mortality rate [per 1,000 live births]	2012	8	71	33	36	44	9	34	69
Maternal mortality rate [per 100,000 live births]	2010	35	460	240	180	200	60	170	260
Expectation of life at birth, Years	2013	74.3	60.9	70.7	68.3	66.4	77.9	68.4	66.6
Infant mortality rate [per 1,000 live births]	2009	8.5(b)	134	41	52	50	11	39	71
Maternal mortality rate [per 100,000 live births]	2008	39	1,400	340	200	230	37	380	260
Expectation of life at birth, Years	2010	74.7	48.3	68.6	66.9	65.1	76.6	68.4	65.2

(a) Revised data based on the final report of the census of population and housing - 2012, (b) 2011, (c) 2012, (d) 2010

na - Not available

Sources : Key Indicators for Asia and the Pacific 2012 & 2014, ADB FAOSTAT Database Access website ([www.faostat.fao.org](http://www.faostat.fao.org))  
Human Development Report 2015, UNDP ,Central Bank of Sri Lanka

## 5.3: Social Indicators: SAARC Countries

Indicator	Ref. Year	Sri Lanka	Afganistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan
Human Development Index (a) (Max.:1,000; Min.: 0.000)	2013	0.75	0.468	0.558	0.584	0.586	0.698	0.54	0.537
Literacy Rate, % (15 Years and over)									
Male	2012	96.8	45.4(b)	62.5	na	75.2 ( c )	98.4 ( c )	71.1(l)	67(l)
Female	2012	94.6	17.6(b)	55.1	na	50.8 ( c )	98.4 ( c )	46.7(b)	42(b)
Physicians per 10,000 people	2012	6.8 (d)	2.3 (b)	3.6 (b)	2.6	7	14.2 (d)	na	8.3(d)
Hospital Beds per 10,000 people	2012	36	5	6	18	7 (g)	43 (h)	50.0 (c)	60
Daily News Papers per 1,000 Persons	2007	26	na	na	na	71	na	na	50
Television Sets per 1,000 Persons	2007	142	3	7	45	34	109	27	30
Radios per 1,000 Persons	2004	215	na	49	na	120	na	39	105
Per Capita Electricity Consumption (kWh)	2011	490	38(i)	259	977 (g)	684	521	106	449
Internet Subscriptions, per 100 people (j)	2013	2	0	0.6	2.7	1.20	5.8	0.8	0.6
Telephones per 1,000 Persons (Main Lines)	2013	127	3	7	35	23	65	31	35
Telephones per 1,000 Persons (Mobile Phones)	2013	955	700	671	722	708	1,812	715	701
Labour Force Participation Rate, % Male	2012	75	79.7	84.1	76.9	80.9	77.1	63.2	82.9
Female	2012	32.9	15.7	57.3	66.4	28.8	55.9	54.3	24.4
Unemployment Rate, %	2013	4.4	na	4.5 (d)	2.9	2.8 (b)	11.7 (d)	2.7 (e)	6.2

(a) A composite index of life expectancy, education and income. (b) 2011 (c) 2006 (d) 2010 (e) 2008 (f) National poverty line, (g) 2005 (h) 2009 (i) 2012 (j) Fixed Broadband Internet, na - Not available

Sources : Key Indicators for Asia and the Pacific 2012 & 2014, ADB/ Human Development Report 2015, 2011 UNDP Department of Census and Statistics

## 5.4: Economic Indicators: National Output and Expenditure

Economic Activity	Value (Rs.million)		As a share of GDP(%)		Rate of Change(%)	
	2013 (a)	2014(b)	2013 (a)	2014(b)	2013 (a)	2014(b)
<b>AGRICULTURE</b>	<b>352,583</b>	<b>353,799</b>	<b>10.8</b>	<b>10.1</b>	<b>4.7</b>	<b>0.3</b>
Agriculture, Livestock and Forestry	309,134	308,403	9.5	8.8	4.5	-0.2
Fishing	43,449	45,397	1.3	1.3	6.2	4.5
<b>INDUSTRY</b>	<b>1,016,886</b>	<b>1,132,892</b>	<b>31.1</b>	<b>32.3</b>	<b>9.9</b>	<b>11.4</b>
Mining and Quarrying	94,388	104,797	2.9	3.0	11.5	11.0
Manufacturing	229,843	604,677	17.1	17.2	7.5	8.0
Electricity, Gas & Water	79,913	83,542	2.4	2.4	10.3	4.5
Construction	282,742	339,906	8.7	9.7	14.4	20.2
<b>SERVICES</b>	<b>1,896,572</b>	<b>2,019,973</b>	<b>58.1</b>	<b>57.6</b>	<b>6.4</b>	<b>6.5</b>
Wholesale and Retail Trade	739,826	798,837	22.7	22.8	5.5	8.0
Hotels and Restaurants	25,715	28,676	0.8	0.8	22.3	11.5
Transport and Communication	476,721	511,296	14.6	14.6	9.4	7.3
Banking, Insurance and Real Estate tec.	285,750	304,478	8.7	8.7	5.9	6.6
Ownership of Dwellings	79,175	80,178	2.4	2.3	2.9	1.3
Government Services	213,439	216,477	6.5	6.2	2.8	1.4
Private Services	75,946	80,030	2.3	2.3	7.3	5.4
<b>GROSS DOMESTIC PRODUCT</b>	<b>3,266,041</b>	<b>3,506,664</b>	<b>100.0</b>	<b>100.0</b>	<b>7.2</b>	<b>7.4</b>
<b>GROSS NATIONAL PRODUCT</b>	<b>3,180,915</b>	<b>3,420,629</b>			<b>6.6</b>	<b>7.5</b>

(a) Revised, (b) Provisional

Sources : Central Bank of Sri Lanka, Annual Report 2013,2014,2015

## 5.5: Composition of Exports 2013-2014

US Dollars million

Category	2013		2014 (a)		Change in value	Y-O-Y (b) change %	Contribution to change %
	Value	Share %	Value	Share %			
Rubber	71.3	0.7	45.3	0.4	-26.0	-36.5	-3.5
Coconut	204.6	2.0	356.4	3.2	151.7	74.2	20.6
Other Agricultural Products ©	762.9	7.3	763.9	14.2	0.9	93.3	0.2
Industrial Exports	7749.4	74.6	8262.0	74.2	512.6	6.6	69.7
Textiles and Garments	4508.3	43.4	4929.9	44.3	421.6	9.4	57.3
Rubber products	887.8	8.5	889.8	8.0	2.0	0.2	0.3
Petroleum products	427.7	4.1	338.0	3.0	-89.8	-21.0	-12.2
Gem, Diamond and Jewellery	445.5	4.3	393.6	3.5	-51.9	-11.7	-7.1
Food, Beverages and Tobacco	235.2	2.3	289.3	2.6	54.0	23.0	7.3
Machinery and Mechanical Appliances	312.3	3.0	342.9	3.1	30.7	9.8	4.2
Printing Industry Products	36.3	0.3	52.4	0.5	16.1	44.5	2.2
Transport Equipment	146.3	1.4	151.8	1.4	5.4	3.7	0.7
Leather, Travel Goods and Footwear	76.8	0.7	138.9	1.2	62.1	80.8	8.4
Ceramic Products	40.4	0.4	41.3	0.4	0.9	2.2	0.1
Other Industrial Exports	632.7	6.1	694.1	6.2	61.5	9.7	8.4
<b>Mineral Exports</b>	<b>51.6</b>	<b>0.5</b>	<b>59.5</b>	<b>0.5</b>	<b>7.9</b>	<b>15.3</b>	<b>1.1</b>
<b>Unclassified Exports</b>	<b>12.2</b>	<b>0.1</b>	<b>14.7</b>	<b>0.1</b>	<b>2.5</b>	<b>20.7</b>	<b>0.3</b>
<b>Total Exports (d)(e)</b>	<b>10349.3</b>	<b>100.0</b>	<b>11130.1</b>	<b>100.0</b>	<b>735.8</b>	<b>7.1</b>	<b>100.0</b>

(a) Provisional, (b) Year over year (c) Includes spices, vegetables, unmanufactured tobacco, minor agricultural products and seafood, (d) Adjusted, (e) Excludes re-exports  
Sources : Annual Report 2014 , Central Bank of Sri Lanka.

## 5.6: Composition of Imports 2013 & 2014

Category	2013		2014 (a)		Change in Value	US Dollars million	
	Value	Share %	Value	Share %		Y-O-Y (c) change %	Contribution to change %
<b>Consumer Goods</b>	<b>3,182.5</b>	<b>17.7</b>	<b>3,852.5</b>	<b>19.8</b>	<b>670</b>	<b>21.1</b>	<b>47.4</b>
Food and Beverages	1,368.1	7.6	1,633.7	8.4	265.7	19.4	18.8
Non-Food Consumer goods	1,814.4	10.1	2,218.8	11.4	404.4	22.3	28.6
<b>Intermediate Goods</b>	<b>10,553.7</b>	<b>58.6</b>	<b>11,397.7</b>	<b>58.7</b>	<b>843.9</b>	<b>8</b>	<b>59.7</b>
Fuel	4,308.2	23.9	4,597.3	23.7	289.2	6.7	20.4
Textiles and Textile Articles	2,045.8	11.4	2,327.6	12	281.7	13.8	19.9
Diamonds and Precious stones and Metals	482.9	2.7	175.4	0.9	-307.4	-63.7	-21.7
Chemical Products	734.3	4.1	808.2	4.2	73.9	10.1	5.2
Wheat and Maize	323.2	1.8	404.7	2.1	81.5	25.2	5.8
Fertilizer	238.7	1.3	272.4	1.4	33.8	14.1	2.4
Other Intermediate Goods	2,420.8	13.4	2,812	14.5	391.2	16.2	27.7
<b>Investment Goods</b>	<b>4,252.7</b>	<b>23.6</b>	<b>4,152.2</b>	<b>21.4</b>	<b>-100.5</b>	<b>-2.4</b>	<b>-7.1</b>
Machinery and Equipment	2,221.9	12.3	2,131	11	-90.9	-4.1	-6.4
Transport Equipment	667.8	3.7	707.3	3.6	39.5	5.9	2.8
Building Materials	1,357.2	7.5	1,308.9	6.7	-48.3	-3.6	-3.4
Other Investment Goods	5.8	-	4.9	-	-0.9	-15	-0.1
<b>Unclassified Imports</b>	<b>13.9</b>	<b>0.1</b>	<b>14.4</b>	<b>0.1</b>	<b>0.6</b>	<b>4.1</b>	<b>-</b>
<b>Total Imports(b) (c)</b>	<b>18,002.8</b>	<b>100</b>	<b>19,416.8</b>	<b>100</b>	<b>1,414</b>	<b>7.9</b>	<b>100</b>

(a) Provisional, (b) Adjusted (c) Year over Year, (d) Adjusted

Sources : Annual Report 2015 ,Central Bank of Sri Lanka.



## 5.7 Realised investments in the Board of Investment (BOI) Enterprises (a) 2013-2014

Category	Number of Projects		Foreign Investment (Rs. Million)		Total Investment Potential (Rs. Million)	
	2013	2014	2013	2014	2013	2014
Food, beverages and tobacco products	132	131	35,858	40,374	63,238	72,409
Textiles, wearing apparel and leather products	341	320	70,862	79,070	111,911	128,828
Wood and wood products	26	26	9,212	9,149	10,871	10,731
Paper products, publishing and printing	28	30	5,170	9,306	6,624	11,719
Chemical, petroleum, coal, rubber and plastic products	128	132	61,305	69,581	78,977	92,381
Non-metallic mineral products	76	80	20,294	23,443	43,814	46,948
Basic metal products	–	–	–	–	–	–
Fabricated metal products, machinery and transport equipment	87	88	20,691	21,283	29,367	30,201
Manufactures products(n.e.s.)	152	151	23,790	26,719	33,726	37,286
Services	1027	993	711,776	854,080	1,133,493	1,325,199

(a) Cumulative figures as at end of the year

(b) Provisional

n.e.s. not elsewhere specified

Source: Annual Report 2013, Central Bank of Sri Lanka(17\_Appendix)

## 5.8 Education Indicators: General Education

Item	2013	2014 (a)
<b>Total Schools (No.)</b>	<b>10,849</b>	<b>10,971</b>
Government Schools	10,012	10,121
Private & Special Schools (b)	103	103
Pirivenas	734	747
<b>Total Students (No.)</b>	<b>4,307,625</b>	<b>4,354,011</b>
Government Schools	4,037,095	4,078,798
Private & Special Schools (b)	130,344	131,397
Pirivenas	66,116	62,897
<b>New Admissions (No.) (c)</b>	<b>342,451</b>	<b>348,288</b>
<b>Total Teachers (No.)</b>	<b>243,332</b>	<b>253,649</b>
Government Teachers	223,752	232,990
Other (Private Schools and Pirivenas)	12,379	12,932
<b>Student/Teacher Ratio (Government Schools)</b>	<b>18</b>	<b>18</b>
<b>Expenditure on Education (Rs. Mn.) (d)</b>	<b>151,801</b>	<b>190,150</b>
<b>Expenditure as a % of Total Govt. Expenditure</b>	<b>9.1</b>	<b>10.6</b>
<b>Expenditure as a % of GDP(e)</b>	<b>1.58</b>	<b>1.82</b>

(a) Provisional.

(b) Private Schools approved by the government and schools for children with special needs (This figure excludes international schools which are registered under the Companies Act).

(c) Government Schools only, (d) Government expenditure on General and Higher Education.

(e) Data based on GDP estimates compiled by the Department of Census and Statistics

Source : Sri Lanka Socio-Economic Data 2014, Central Bank of Sri Lanka

## 5.9 Education Indicators: Tertiary and Vocational Education and Training

Item	2013	2014
<b>Number of Registered TVET Institutions</b>	<b>1081</b>	<b>1191</b>
Public	519	531
Private and Non-Governmental Organizations	562	660
<b>Total Number of Accredited Courses</b>	<b>1601</b>	<b>2277</b>
Public	1175	1754
Private and Non-Governmental Organizations	426	523
<b>Number of Issued NVQ Certificates</b>	<b>22855</b>	<b>28535</b>
DTET	2932	3481
NAITA	6085	6185
VTA	6262	7711
NYCS	656	720
Private	6920	10438
<b>Training Performance of Registered Public Sector Institutions</b>		
Number Recruited	68554	86989
Number Completed	31392	45552

(a) Provisional

Source: Central Bank of Sri Lanka(Socio\_Econ\_Data\_2013) Tertiary and Vocational Education Commission

## 5.10 Global Innovation Indicators in 2014 (By Rank) in Selected Countries(Out of 143)

Country	Global Innovation Index	Innovation Output Sub-Index	Innovation Input sub-Index	Innovation Efficiency Ratio	Institutions	Human Capital & Research	Infrastructure	Market Sophistication	Business Sophistication	Knowledge & Technology outputs	Creative outputs
Australia	17	22	10	82	11	7	7	10	26	31	12
China	29	16	45	2	114	32	39	54	32	2	59
France	22	26	20	64	25	15	19	24	16	20	23
India	76	65	93	31	106	96	87	50	93	50	82
Japan	21	27	15	88	18	17	11	13	17	12	46
New Zealand	18	18	13	66	2	16	24	8	33	17	17
Republic of Korea	16	15	16	54	32	3	5	14	30	6	37
Singapore	7	25	1	110	6	2	2	4	1	13	33
South Africa	53	63	47	93	44	70	84	18	68	62	70
Sri Lanka	105	81	125	17	134	115	69	124	132	75	91
Thailand	48	49	52	62	94	31	71	34	55	47	60
United Kingdom	2	4	3	29	13	10	6	2	14	5	7
USA	6	7	4	57	17	11	14	1	10	4	20

Source: The Global Innovation Index 2014

## 5.11 Education Indicators: University Education

Item	2012	2013	2014(a)
<b>Universities(No.)</b>	15	15	15
Students(No.) (b)	70,222	77,126	81,153
Lecturers(no.)	5176	5,457	5,809
Number of Graduated (c)	11,614	20,839	24,559
Arts & Oriental Studies	2321	5985	5602
Commerce and Management Studies	984	3876	3096
Law	225	265	64
Science	1251	2471	1934
Engineering	591	1321	1284
Medicine	1031	547	1144
Dental Science	20	73	68
Agriculture	724	816	857
Veterinary Science	54	59	57
Architecture and Quantity Surveying	228	201	214
Computer Science	402	454	722

(a)Provisional, (b) Excluding external degree courses, (c) Including external degrees and Open University  
 Sources: Annual Report 2014 ,Central Bank of Sri Lanka, University Statistics 2014,University Grants Commission

## 5.12 Health Service Indicators-Public sector

Item	2012	2013	2014
Hospitals (Practicing Western Medicine) (No.)	593	603	601
Beds (No.)	73437	74636	76,918
Primary Health Care Units	480	481	484
Doctors (No.)	17,129	17,553	17,903
Asst. Medical Practitioners	1,061	1,057	1,055
Nurses (No.)	30,136	30,928	31,964
Attendants (No.)	8,403	8,091	8,215
In-Patients (No.'000)	5840	5926	n.a
Out-Patients (No.'000)	50631	53861	54,970
Ayurvedic Physicians (No.) (a)	20,712	21,060	22,422
Total Health Expenditure (Rs. million)	99,101	119,530	138,403
Current Expenditure	81,946	99,609	116,151
Capital Expenditure	17,155	19,920	22,252
Total Health Expenditure as a % of GDP(b )	1.13	1.25	1.32

(a) Registered with the Department of Ayurvedic Commissioner

(b) Based on GDP estimates compiled by the Department of Census and Statistics

Sources: Ministry of Healthcare and Nutrition

Department of Ayurveda

Ministry of Finance and Planning, Central Bank of Sri Lanka

## 5.13: Key indicators in Infrastructure development-Communication 2012-2014

Commodity	2012	2013	2014(a)
<b>Telecommunication</b>			
Telephones – Wire line Telephones	999,354	1,062,065	1,128,291
Wireless Local Loop	2,450,037	1644722 ( C )	1,472,905
Cellular Phones	20,324,070	20315150 ( C )	24,384,544
Public Pay Phones(No. of Booths)	6,983	6,773	5,809
Internet and E-mail Subscribers	1,365,655(b)	2,009,456	4090920
<b>Postal Services</b>			
Delivery Areas (No.)	6,729	6,729	6,729
Main Post Offices (No.)	651	651	653
Sub Post Offices (No.)	3,413	3,375	3,410
Agency Post Offices (No.)	684	497	524
Area Served by a Post Office (Sq. Km)	14	14	13
Population Served by a Post Office (No.)	4,214	4,447	4,468
Letters per Inhabitant (No.)	13	13	18

Source: Sri Lanka Socio-Economic Data 2011, Central Bank of Sri Lanka

(a) Wireline telephones declined in 2009 due to shift of some subscribers to cellular phones, (b) Including mobile broadband connections.

## 5.14 Power Sector Performance

Item	2013	2014(a)	Growth Rate (%)	
			2013	2014(a)
Installed Capacity (MW)	3,362	3,939	1.5	17.2
Hydro(b)	1,361	1,377	0.3	1.2
Fuel Oil ( c )	1,335	1,215	-0.2	-9
Coal	300	900	0	200
NCRE(d)	366	447	15.5	22.1
Units Generated (GWh)	11,898	12,357	0.8	3.9
Hydro(b)	5,990	3,632	119.6	-39.4
Fuel Oil(c )	3,260	4,305	-53	32.1
Coal	1,469	3,202	4.6	118
NCRE(d)	1179	1217	60.4	3.3
Total Sales by CEB (GWh)	10,621	11,063	1.4	4.2
Total Sales LECO (GWh)	1,283	1,271	5.5	-0.9
Overall Transmission and Distribution Loss of CEB (%)	10.7	10.5	-4.2	-2.4
Number of Consumers ('000) (f)	5,717	5,929	4.4	3.7
o/w Domestic and Religious	5,050	5,235	4.3	3.7
Industrial	56	58	3.7	3.6
General Purpose and Hotel (e)	607	633	5.4	4.3

(a) Provisional, (b) Excluding mini hydro power plants, (c) Inclusive of independent Power Producers(IPP's)

(d) Refers to Non-Conventional Renewable Energy including mini hydro, (e) Inclusive of sales to government category, (f) Inclusive of LECO consumers

Sources : Central Bank of Sri Lanka Annual Report 2014



## 5.15: Deforestation and Pollution

Country	Deforestation Rate(a) (average % change)			Nitrous oxide emissions (thousand metric tons of CO2 equivalent)			Methane emissions in energy sector (thousand metric tons of CO2 equivalent)		
	2012	2013	2014	2010	2011	2012	1990	2000	2008
Australia	16.12	16.16	16.20	51,462	52,855	54,247	24,676	31,775	39,063
Bangladesh	11.04	11.02	11.00	26,160	26,421	26,683	5,770	7,928	11,284
China	21.70	21.86	22.03	550,297	568,731	587,166	353,529	377,354	738,367
India	23.59	23.65	23.71	234,136	236,946	239,755	67,311	82,274	104,339
Japan	68.47	68.47	68.46	25,762	25,599	24,911	6,885	4,500	3,375
Indonesia	51.37	50.99	50.62	91,313	92,226	93,139	37,767	45,889	57,736
Korea, Rep.	63.76	63.60	63.52	14,686	14,832	14,979	8,750	5,905	7,014
Malaysia	67.42	67.47	67.51	15,010	15,160	15,310	9,079	17,841	23,251
Nepal	25.36	25.36	25.36	4,508	4,553	4,598	1,297	1,405	1,459
Pakistan	2.08	2.02	1.97	30,050	30,351	30,651	15,372	24,641	37,956
Singapore	23.16	23.13	23.06	1,871	1,890	1,909	401	887	1,385
Sri Lanka	33.32	33.22	33.11	2,132	2,153	2,174	592	641	583
Thailand	31.92	31.98	32.04	30,228	30,531	30,833	14,543	16,496	21,639
United Kingdom	12.78	12.85	12.93	26,536	25,878	25,335	32,842	21,935	13,833
United States	33.81	33.84	33.87	304,082	296,744	288,878	252,382	235,275	219,505
Vietnam	46.40	46.81	47.23	33,818	34,156	34,494	6,575	14,451	36,938

(a) A negative value indicates that deforestation rate is decreasing (i.e., reforestation)

Source: The World Bank Data (<http://databank.worldbank.org/data>)

## DEFINITIONS

The definitions and classifications used in the National R&D Survey 2010 and in this Handbook are based on the International Standardization of Statistics on Science and Technology (UNESCO, 2010) and the Frascati Manual (OECD, 2002).

### 1. Research and Experimental Development (R&D)

Comprises creative work undertaken on a systematic basis in order to increase the stock knowledge including the knowledge of humanity, culture and society, and the use of this stock knowledge to devise new applications. The term R&D covers three activities: basic research, applied research and experimental development work.

- a. Basic research : the experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations phenomena and observed facts, without any particular application or use in view.
- b. Applied research: the original investigations undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.
- c. Experimental development : the systematic work, drawing on existing knowledge gained from research and practical experience that is directed to producing new materials, products and devices; to installing new processes, systems and services; or to improving substantially those already produced or installed.

### 2. Sectors

Government sector : includes all departments, offices and other bodies, which furnish but normally do not sell to the community, those common services.

Higher Education sector : includes all universities, colleges of technology and other institutions providing tertiary education, whatever their sources of funds or legal status.

Private sector : includes all firms, organizations and institutions whose primary activity is the market production of the goods or services (other than higher education) for sale to the general public at an economically significant price and to the private non profit institutions mainly serving them.

### 3. R&D Expenditures

R&D Expenditures : all expenditures for R&D performed within a sector of the economy, including both:

- a. Current cost (labour cost, non capital purchases of materials, supplies of R&D equipments, water, fuel, gas, electricity, library materials etc.).
- b. Capital expenditure (reported in full for the period when they took place and should not register as element of depreciation).

### 4. Source of R&D expenditure (Investment)

The sectors/ institutions who invest (put money) for R&D work

### 5. Human Resources in Research and Development

Science and Technology Personnel (STP) : It is defined according to the Canberra Manual (OECD) as persons fulfilling one of the following conditions:

- Successfully completed education at the tertiary level in a S&T field of study (seven broad S&T fields of study are Natural Sciences, Engineering and Technology, Medical Sciences, Agriculture Sciences, Social Sciences, Humanities and other fields).
- Not formally qualified as above but employed in an occupation where the above qualifications are normally required.
- Working in the above fields providing technical services or supporting services.

R&D Personnel : all persons employed directly on R&D, as well as those providing direct services such as R&D managers, administrators, and clerical staff excluding persons providing an indirect service such as canteen and security.

Researchers : professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned. Postgraduate students at the Ph.D. level engaged in R&D are also considered as researchers.

Technicians and equivalent staff : persons whose main tasks require technical knowledge and experience in one or more fields of engineering, physical and life sciences (technicians) or social sciences and humanities (equivalent staff). They participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods normally under the supervision of researchers.

Other supporting staff : includes skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with (or providing services to researchers involved in) such projects.

Headcount : reflects the total number of persons employed in R&D, independently from their dedication. These data allow links to be made with other data series, such as education and employment data or the results of population censuses. They are also used for calculating indicators, analyzing the characteristics of the R&D workforce, with respect to age, gender or national origin.

One Full-time equivalent : one person-year. (e.g. if a person normally spends 30% of his/her time on R&D and the rest on other activities such as teaching , administration and counseling, the FTE is then counted as 0.3). Similarly, if a full time R&D worker is employed at an R&D unit for only a six month period, the FTE is calculated as 0.5.

Innovation : the use of new or significantly improved production process, distribution method, or support activity for goods or services.

## **Survey Team - Science & Technology Policy Research Division (STPRD)**

- ***Dr P.R.M.P Dilrukshi (Head)***  
Overall coordination of the survey including questionnaire preparation, data analysis, indicator development and preparation of the handbook
- ***Mrs Upuli Rathnayake, Mrs Chamika Dharmasena, Mrs Dilushi Munasinghe, (Scientific Officers)***  
Coordination of data collection
- ***Mr Y.S. Lakmal Silva, Mr Thanuja Senevirathne, Mrs N.B.W.I. Udeshika, Mrs Ayesha Gunasekara, Mrs Y.S.L Kumaranayake, Ms B.G.A.R.L. Batheegama, Ms M.K.U.L. Mirihana and Mr M.W.H. Gayan (Research Assistants)***  
Assisting data collection, data analysis, data compilation and preparation of the handbook
- ***Ms Ayomi Palihawadana, Confidential Secretary and Mrs Ajantha Kanthi (Management Assistant)***  
Maintaining correspondence with institutions and data entry
- ***Mrs Chandima Samarasinghe (Management Assistant)***  
Data entry and designing of the handbook and typesetting

National Science Foundation  
47/5, Maitland Place  
Colombo 07  
Sri Lanka.  
[www.nsf.gov.lk](http://www.nsf.gov.lk)  
Tel/Fax : 011 2675841

