

SRI LANKA SCIENCE, TECHNOLOGY & INNOVATION STATISTICAL HANDBOOK 2015



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Sri Lanka Science, Technology & Innovation Statistical Handbook 2015

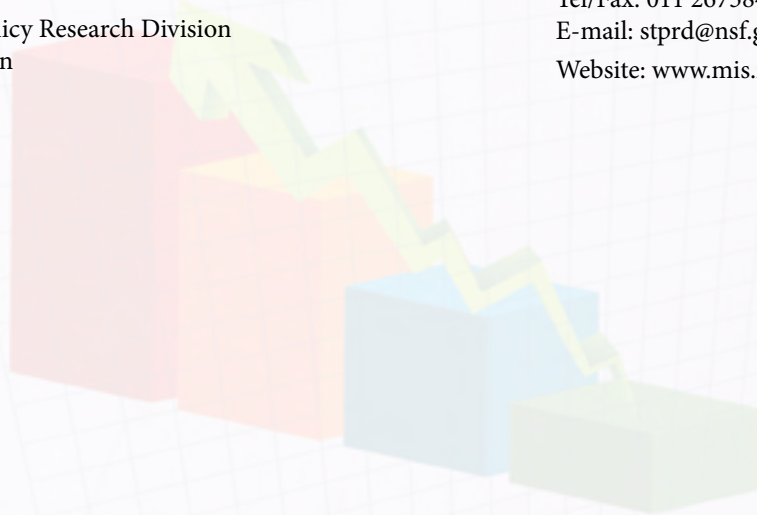
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FOREWORD

Sri Lanka Science, Technology & Innovation Statistical Handbook 2015, 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 2015 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. The fourth chapter presents the basic innovation indicators that were developed using the data collected through the National R&D Survey 2015, and hence, the readers will have an idea on how Sri Lanka performed in the year 2015 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 2015** also includes the highlights of the Survey and the general definitions used for the purpose.

Prof. Sirimali Fernando
Chairperson
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Colombo, Sri Lanka

January 2018

PREFACE

Sri Lanka Research and Development Survey 2015 was designed to measure the status of research and development in the country pertaining to the surveyed year 2015. The indicators presented in the handbook are aimed at policy planners, policy authorities, researchers and academics who require evidence based information to overview the national S&T status and benchmark Sri Lanka with the other countries globally. The definitions and classifications used in the survey appear at the end of the book.

Sri Lanka Science, Technology & Innovation Statistical Handbook 2015 was produced by the research team of the Science and Technology Policy Research Division of the NSF.

The valuable comments and editorial changes made by the external reviewer Prof. M.J.S. Wijeratne and Director General of the NSF, Prof. Ananda Jayawardane were greatly helpful in finalizing the document.

The Management Information System (MIS) Unit of the University Grants Commission (UGC) assisted the data collection of Higher Education Sector Institutions coming under the purview of the UGC.

All the institutions under the scope of the survey that provided information for the success of this survey are gratefully acknowledged. The support and guidance received from the Chairperson, Director General and Board of Management of the NSF are immensely appreciated.

Dr P.R.M.P. Dilrukshi Ranathunge

Head

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National Science Foundation

Sri Lanka

January 2018

TECHNICAL NOTES

The Research, Development and Innovation (RDI) 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 advance the future economic prosperity, social development and quality of life of people.

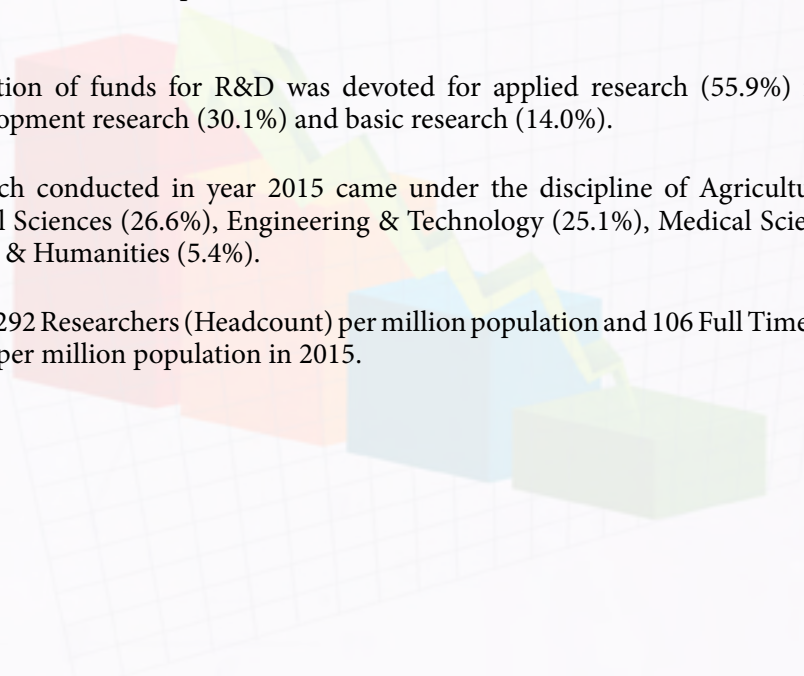
This survey covered four major S&T sectors in the country such as:

- 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 Department of Census and Statistics.
- d. Private Non Profit Institutions (PNP)–all institutions that were 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-2015

- Total investment for R&D from Gross Domestic Product (GDP) is 0.11% in 2015 and it remains constant 0.1-0.11 during 2013-2015.
- When considered the R&D expenditure the highest investment was done by Government Sector (59.6%) followed by Business Enterprise Sector (34.4%), Private Non Profit Sector (2.3%) and Foreign Sector (1.5%).
- The highest proportion of funds for R&D was devoted for applied research (55.9%) followed by experimental development research (30.1%) and basic research (14.0%).
- Most of the research conducted in year 2015 came under the discipline of Agriculture (31.5%), followed by Natural Sciences (26.6%), Engineering & Technology (25.1%), Medical Sciences (8.6%) and Social Sciences & Humanities (5.4%).
- Sri Lanka recorded 292 Researchers (Headcount) per million population and 106 Full Time Equavalant (FTE) Researchers per million population in 2015.



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	Purchasing 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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Definitions

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FINANCIAL RESOURCES
FOR
RESEARCH AND DEVELOPMENT

1.1: Gross Expenditure on R&D (GERD) in Sri Lanka 1966-2015

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
2004	1,800,750	3,807.5 (40.9)	0.21	19.4	196.2
2006	2,939,000	5,119.2 (47.9)	0.17	19.8	258.5
2008	4,410,682	5,047.7 (46.1)	0.11	20.2	249.9
2010	5,605,104	8,778.2 (69.4)	0.16	20.7	424.1
2013	8,674,230	9,670.0 (73.3)	0.11	20.5	471.7
2014	10,448,479	10,350.1 (79.0)	0.10	20.7	500.0
2015	11,183,220	11,904.1 (83.8)	0.11	20.9	569.6

Source: National R&D Surveys Sri Lanka, 1996 (NARESA), 2000, 2004, 2006, 2008, 2013, 2014 & 2015 (NSF)

*Estimates

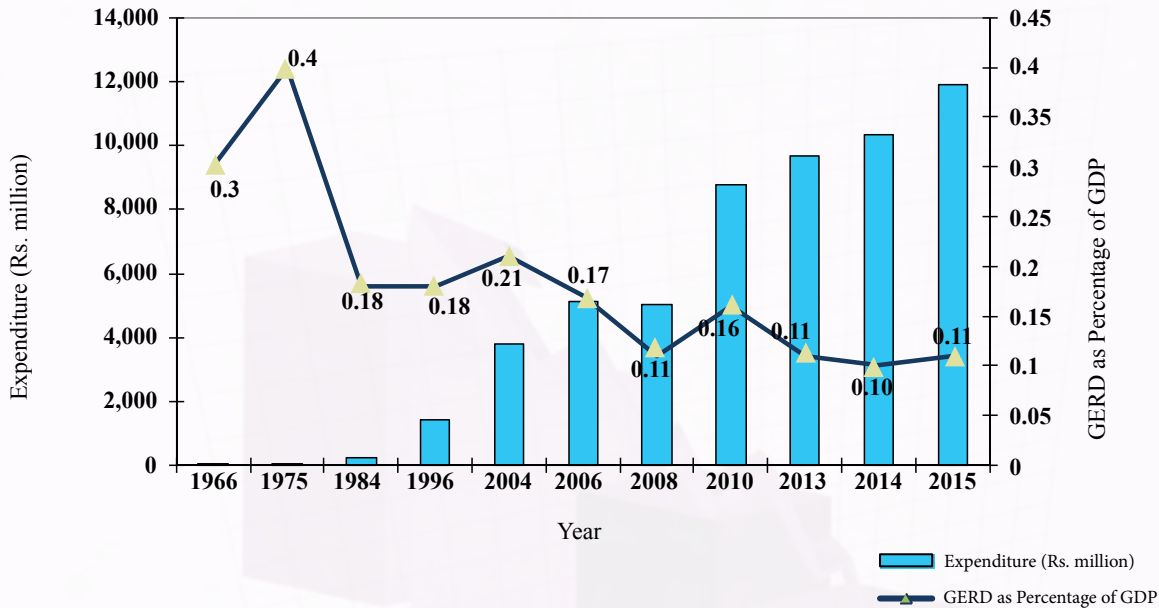


Figure 1: Trends in Gross Expenditure on R&D (GERD) in Sri Lanka

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	2.20	994.12
Brazil	2014	32,498,467	1.17	186.57
China	2015	342,513,404	2.07	297.65
France	2015	46,972,923	2.23	945.22
Germany	2015	87,179,229	2.88	1,398.08
India	2015	42,038,378	0.63	38.34
Indonesia	2013	1,832,856	0.08	8.48
Iraq	2015	174,475	0.04	5.73
Japan	2015	140,316,886	3.28	1,343.74
Malaysia	2015	8,895,835	1.30	344.33
New Zealand	2013	1,391,195	1.15	415.94
Pakistan	2015	1,944,365	0.25	12.31
Philippines	2013	762,767	0.14	9.09
Republic of Korea	2015	69,848,079	4.23	1,475.69
Saudi Arabia	2013	10,766,303	0.82	414.33
Singapore	2014	8,510,212	2.20	1,828.39
South Africa	2013	4,264,722	0.72	92.79
Sri Lanka	2015*	11,725	0.11	5.70
Thailand	2015	5,809,929	0.63	102.23
United Kingdom	2015	37,327,531	1.70	715.39
United States of America	2015	420,550,104	2.79	1,562.88

Source: Adopted from UNESCO Statistics 2015

*National R&D Survey Sri Lanka, 2015

1.3: National Gross Investment on R&D by Source of Funding 2015

Source of Funding	Rs. million			
	Recurrent	Capital	Total	GERD (as a % of GDP)
Government	6,181.5	918.0	7,099.5	0.063
	(51.9%)	(7.7%)	(59.6%)	
Business Enterprise	3,737.6	362.3	4,099.9	0.037
	(31.4%)	(3.0%)	(34.4%)	
Foreign	133.7	42.7	176.4	0.002
	(1.1%)	(0.4%)	(1.5%)	
Other	400.8	127.5	528.3	0.004
	(3.4%)	(1.1%)	(4.4%)	
Total	10,453.6	1,450.5	11,904.1	0.106
	(87.8%)	(12.2%)	(100.0%)	

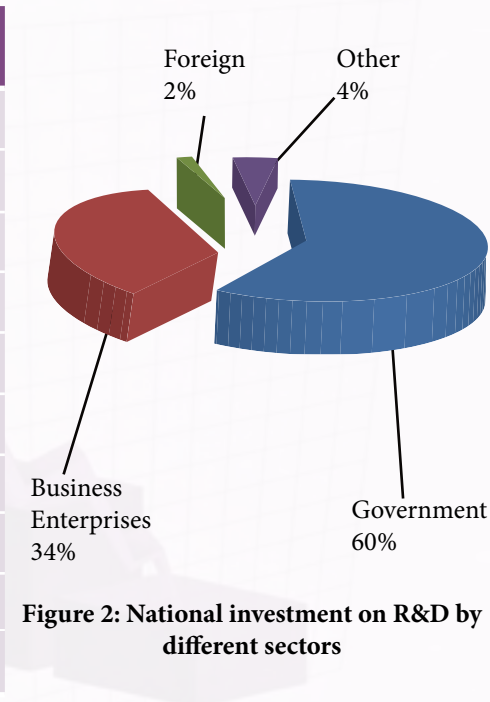


Figure 2: National investment on R&D by different sectors

Source: National R&D Survey Sri Lanka, 2015 (NSF)

NOTE: Percentage indicated in the table counted taking individual count as percentage of the overall total (Rs. million 11,904.1)

1.4: National Gross Investment on R&D for Different Sectors by Source of Funding in 2015

Rs. million

Source of Investment	Sector of Performance				Total
	Higher Education	S&T	Industry	PNP	
Government	3,730.3	3,366.3	2.9	0.0	7,099.5
	(98.3%)	(82.9%)	(0.1%)	0.0	(59.6%)
Business Enterprise	48.5	50.1	4,001.3	0.0	4,099.9
	(1.3%)	(1.2%)	(99.9%)	0.0	(34.4%)
Foreign	1.3	162.3	0.0	12.8	176.4
	(0.03%)	(4.00%)	(0.0%)	(30.5%)	(1.5%)
PNP	14.2	233.4	0.0	29.2	276.8
	(0.4%)	(5.8%)	(0.0%)	(69.5%)	(2.3%)
Other	1.0	250.4	0.0	0.0	251.4
	(0.0%)	(6.2%)	(0.0%)	0.0	(2.1%)
Total	3,795.3	4,062.5	4,004.2	42.0	11,904.1
	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)

Source: National R&D Survey Sri Lanka, 2015 (NSF)

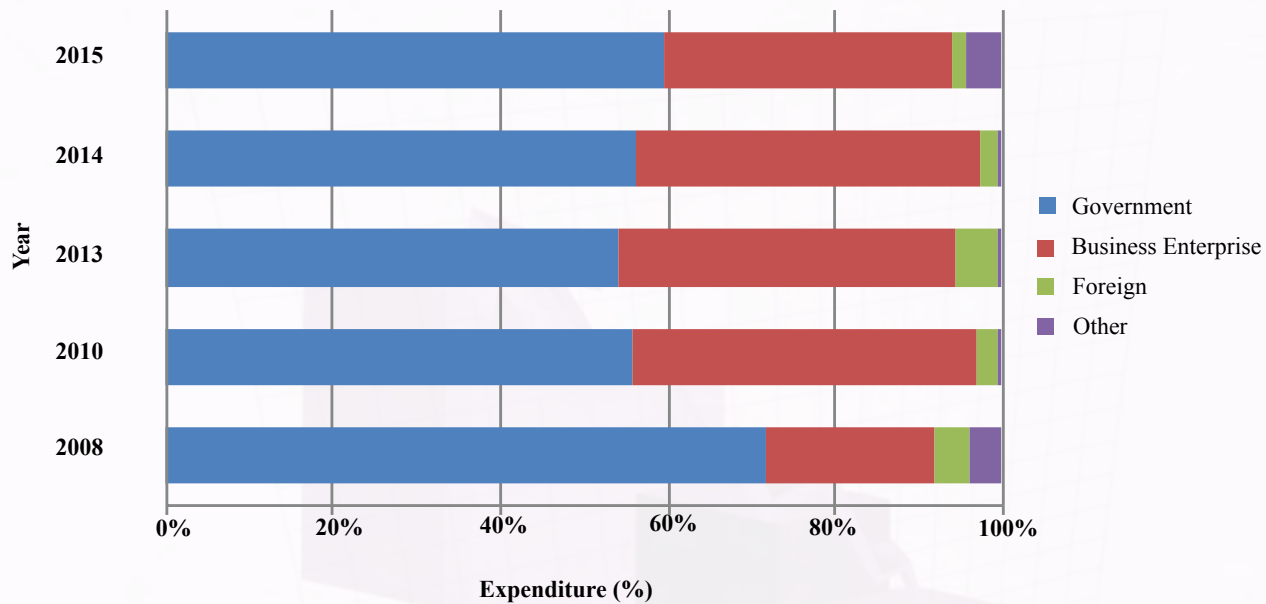


Figure 3: National R&D investment by sectors during 2008-2015

1.5: Trends in Gross Expenditure on R&D (GERD) by Source of Funding as a Percentage of GDP 2008-2015

Source of Funding	2008	2010	2013	2014	2015
Government	0.08	0.09	0.06	0.06	0.063
Business Enterprise	0.02	0.07	0.05	0.04	0.037
Foreign	0.00	0.00	0.00	0.00	0.002
Other*	0.01	0.00	0.00	0.00	0.004
Total	0.11	0.16	0.11	0.10	0.106

Source: National R&D Surveys Sri Lanka, 2008, 2010, 2013, 2014 & 2015 (NSF)

*Other: Funds generated by the institution itself by providing services etc. and funds received from Private Non Profit Sector or of non specified sources.

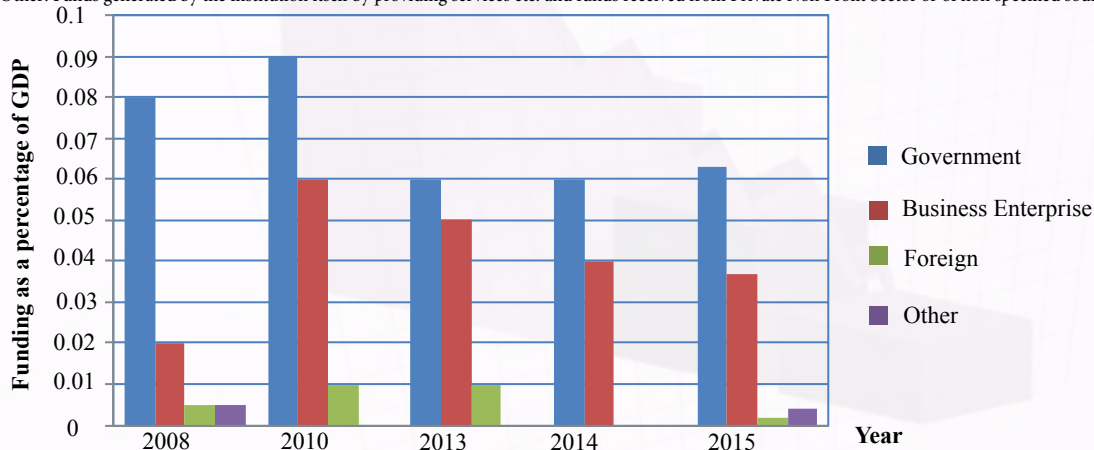


Figure 4: Gross expenditure on R&D by different sectors during 2008-2015

1.6: Trends in National Investment on R&D by Source of Funding 2008-2015

Rs. million

Source of Funding	2008	2010	2013	2014	2015
Government	3,624.41 (71.8%)	4,907.16 (55.9%)	5,209.97 (53.9%)	5,813.22 (56.2%)	7,099.60 (59.6%)
Business Enterprise	1,004.01 (19.9%)	3,592.58 (40.9%)	3,934.04 (40.7%)	4,268.41 (41.2%)	4,099.90 (34.4%)
Foreign	215.59 (4.3%)	239.13 (2.7%)	486.17 (5.0%)	220.82 (2.1%)	176.40 (1.5%)
Other*	203.74 (4.0%)	39.29 (0.5%)	39.83 (0.4%)	47.63 (0.5%)	528.20 (4.4%)
Total	5,047.75 (100.0%)	8,778.16 (100.0%)	9,670.01 (100.0%)	10,350.08 (100.0%)	11,904.10 (100.0%)

Source: National R&D Surveys Sri Lanka, 2008, 2010, 2013, 2014 & 2015 (NSF)

*Other: Funds generated by the institution itself by providing services etc. and funds received from Private Non Profit Sector or of non specified sources

1.7: National Gross Expenditure on R&D (GERD) by Sector of Performance 2015

Rs. million

Sector	Recurrent	Capital	Total	%
Government	3,008.1	1,054.4	4,062.5	34.1
Higher Education	3,749.1	46.2	3,795.3	31.9
Business Enterprise	3,656.3	347.9	4,004.2	33.6
Private Non Profit	40.1	2.0	42.1	0.4
Total	10,453.6	1,450.5	11,904.1	100.0

Source: National R&D Survey Sri Lanka, 2015 (NSF)

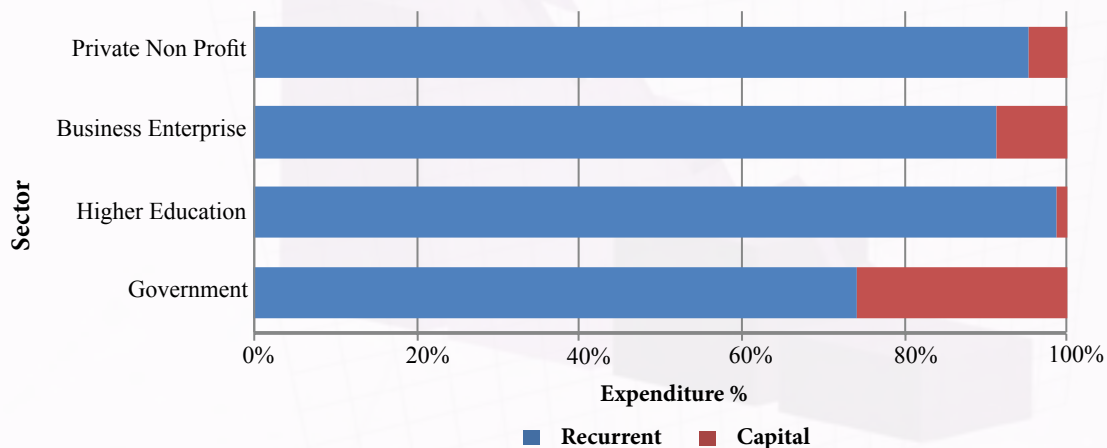


Figure 5: Gross expenditure on R&D by sector of performance

1.8: Trends in National Expenditure by Sectors of Performance 2010-2015

Rs. million

Sector	Year			
	2010	2013	2014	2015
Government	3,927.90 (44.8%)	3,365.95 (34.8%)	4,018.09 (38.8%)	4,062.50 (34.1%)
Higher Education	1,008.34 (11.5%)	1,931.12 (20.0%)	2,072.60 (20.0%)	3,795.30 (31.9%)
Business Enterprise	3,840.36 (43.7%)	4,339.60 (44.9%)	4,230.87 (40.9%)	4,004.20 (33.6%)
Private Non Profit	1.56 (0.0%)	33.33 (0.3%)	28.51 (0.3%)	42.10 (0.4%)
Total	8,778.16 (100.0%)	9,670.00 (100.0%)	10,350.07 (100.0%)	11,904.10 (100.0%)

Source: National R&D Surveys Sri Lanka, 2010, 2013, 2014 & 2015 (NSF)

1.9: 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	56.31	11.21	29.63	2.84
Canada	2014	49.89	9.20	40.41	0.50
China	2015	76.79	16.16	7.05	na
France	2015	65.10	13.07	20.28	1.55
Germany	2015	67.74	14.91	17.35	na
India	2015	43.58	52.47	3.94	Nil
Indonesia	2013	25.68	39.39	34.93	na
Iraq	2015	1.64	39.27	59.09	Nil
Japan	2015	78.49	7.90	12.28	1.33
Malaysia	2015	51.95	19.56	28.48	Nil
Republic of Korea	2015	77.53	11.74	9.09	1.64
Singapore	2014	61.17	11.40	27.43	na
Sri Lanka	2015	33.60	34.10	31.90	0.40
United Kingdom	2015	65.73	6.80	25.62	1.86
United States of America	2015	71.52	11.18	13.23	4.08

Source: Adopted from: <http://www.uis.unesco.org/ScienceTechnology/Pages/default.aspx>

na: not available; Nil: No adequate data

*Data is available for this year only

1.10: National R&D Expenditure by Nature of Research Activity 2015

Rs. million

Nature of research	Government	Higher Education	Business Enterprise	PNP	Total	%
Basic	593.0	211.8	850.9	13.0	1,668.7	14.0
Applied	2,609.4	2,811.4	1,198.5	29.0	6,648.3	55.9
Experimental Development	860.1	772.1	1,954.9	0.0	3,587.1	30.1
Total	4,062.5	3,795.3	4,004.3	42.0	11,904.1	100.0

Source: National R&D Survey Sri Lanka, 2015 (NSF)

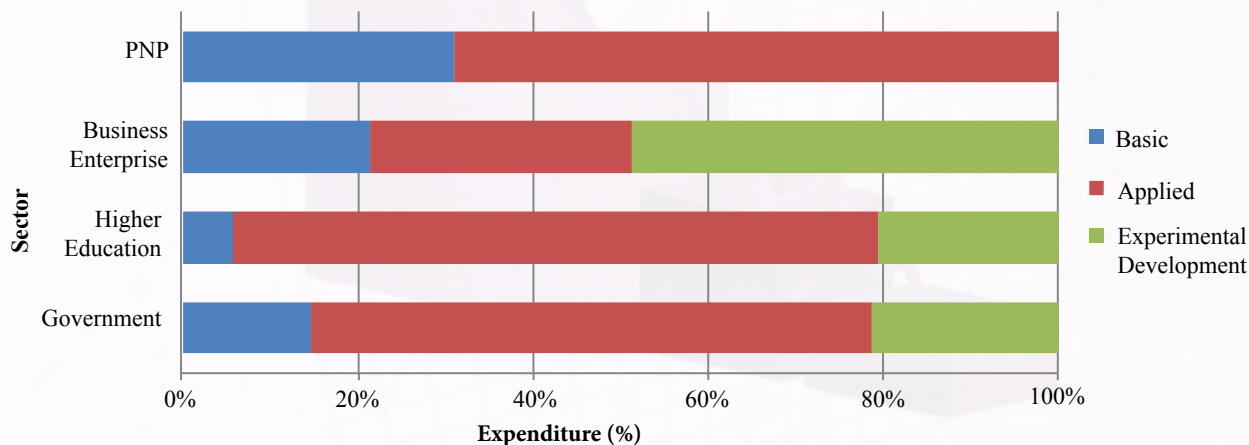


Figure 6: National R&D expenditure by nature of research activity 2015

1.11: National R&D Expenditure by Nature of Research Activity 2013-2015

Rs. million

Nature of Research	2013		2014		2015	
	Amount	%	Amount	%	Amount	%
Basic Research	959.29	10.0	1,578.47	15.2	1,668.80	14.0
Applied Research	5,518.65	57.0	5,938.05	57.4	6,648.20	55.9
Experimental Development	3,192.06	33.0	2,833.56	27.4	3,587.10	30.1
Total	9,670.00	100.0	10,350.08	100.0	11,904.10	100.0

Source: National R&D Surveys Sri Lanka, 2013, 2014 & 2015 (NSF)

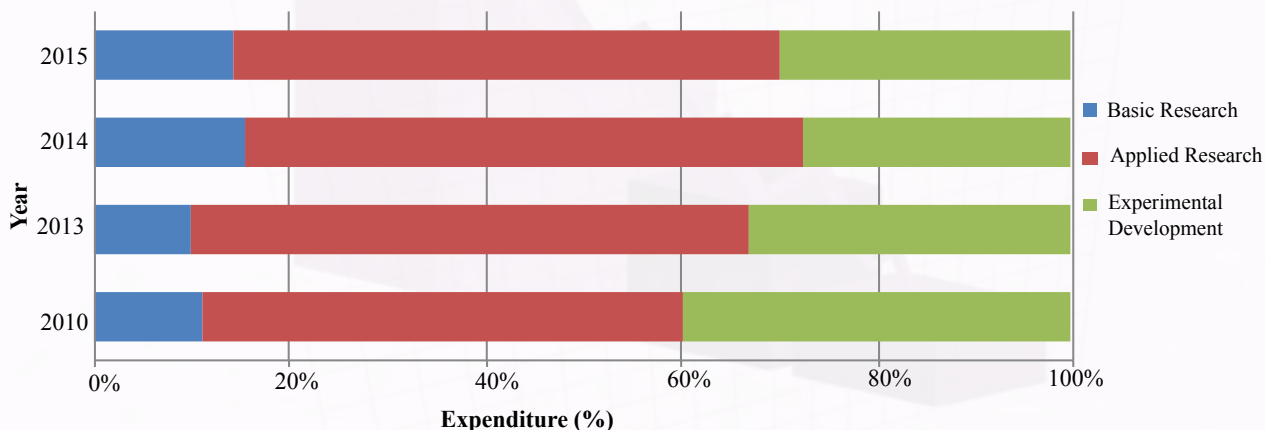


Figure 7: National R&D expenditure by nature of research activity 2010-2015

1.12: Percentage of GERD by the Type of R&D Activity in Selected Countries

Country	Year	% of GERD			
		Basic Research	Applied Research	Experimental Development	Not Specified
China	2015	5.05	10.79	84.16	0.00
France	2014	24.39	37.59	34.75	0.00
Japan	2015	11.91	19.86	63.69	4.55
Malaysia	2015	20.93	70.48	8.58	0.00
New Zealand	2013	25.18	39.11	35.75	0.00
Republic of Korea	2015	17.23	20.84	61.94	0.00
Singapore	2014	19.67	32.07	48.25	0.00
South Africa	2013	23.78	47.28	28.94	0.00
Sri Lanka	2015	14.02	55.85	30.13	0.00
Thailand	2015	14.70	35.67	42.68	6.95
United Kingdom	2014	16.91	43.33	39.76	0.00

Source: Adopted from: <http://www.uis.unesco.org/ScienceTechnology/Pages/default.aspx>

1.13: National R&D Expenditure of Different Sectors by Discipline 2015

Rs. million

Discipline	Higher Education	State Sector	Business Enterprise	PNP	Total	%
Natural Sciences	1,182.8	888.1	1,060.8	38.6	3,170.3	26.6
Engineering & Technology	679.5	683.1	1,629.0	0.2	2,991.8	25.1
Medical Sciences	974.5	42.8	1.8	0.0	1,019.1	8.6
Agricultural Sciences	419.3	2,035.1	1,291.7	0.0	3,746.1	31.5
Social Sciences & Humanities	253.9	390.6	0.0	3.3	647.8	5.4
Other	285.3	22.8	20.9	0.0	329.0	2.8
Total	3,795.3	4,062.5	4,004.2	42.1	11,904.1	100.0

Source: National R&D Survey Sri Lanka, 2015 (NSF)

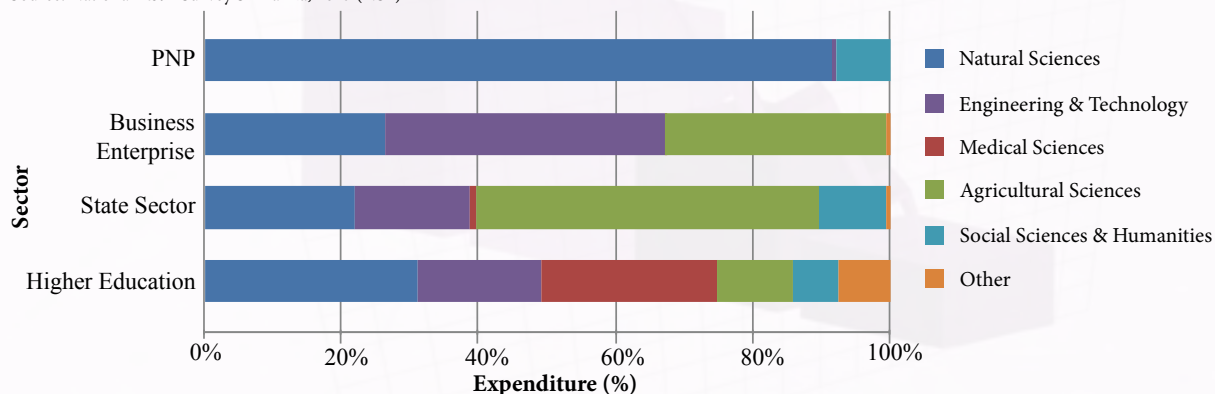


Figure 8: National R&D expenditure by different sectors 2015

1.14: National R&D Expenditure by Discipline 2008-2015

Rs. million

Discipline	Year				
	2008	2010	2013	2014	2015
Natural Sciences	645.00 (12.8%)	1,064.11 (12.1%)	2,376.86 (24.6%)	2,666.19 (25.8%)	3,170.30 (26.6%)
Engineering & Technology	1,490.20 (29.5%)	1,771.38 (20.2%)	3,195.52 (33.1%)	2,447.55 (23.5%)	2,991.80 (25.1%)
Medical Sciences	875.10 (17.3%)	498.62 (5.7%)	904.49 (9.4%)	371.84 (3.7%)	1,019.10 (8.6%)
Agricultural Sciences	1,669.60 (33.1%)	2,925.99 (33.3%)	2,693.25 (27.8%)	4,077.77 (39.4%)	3,746.10 (31.5%)
Social Sciences & Humanities	367.80 (7.3%)	577.81 (6.6%)	475.77 (4.9%)	603.85 (5.8%)	647.80 (5.4%)
Other	0.00 (0.0%)	1,940.25 (22.1%)	24.11 (0.2%)	182.87 (1.8%)	329.00 (2.8%)
Total	5,047.70 (100.0%)	8,778.16 (100.0%)	9,670.00 (100.0%)	10,350.07 (100.0%)	11,904.10 (100.0%)

Source: National R&D Surveys Sri Lanka, 2008, 2010, 2013, 2014 & 2015 (NSF)

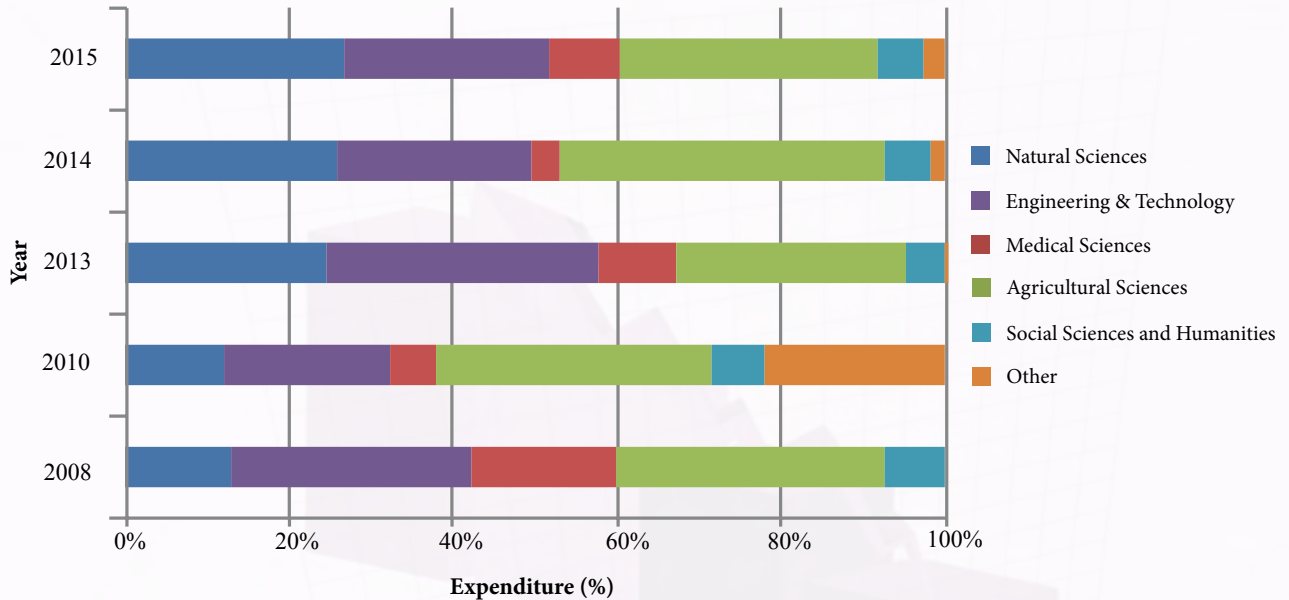


Figure 9: National expenditure on R&D by discipline from 2008-2015



HUMAN RESOURCES
IN
SCIENCE AND TECHNOLOGY

2.1: Distribution of R&D Scientists (Headcount) by Sector 2014-2015

Sector	2014			2015		
	No. of Scientists	No. of Technicians	No. of Technicians per Scientists	No. of Scientists	No. of Technicians	No. of Technicians per Scientists
Government	1,614	1,607	1.00	1,798	1,833	1.00
Higher Education	2,657	391	0.15	3,059	348	0.10
Business Enterprise	1,141	720	0.63	1,244	846	0.70
Private Non Profit (PNP)	12	13	1.08	16	11	0.70
Total	5,424	2,731	0.50	6,117	3,038	0.50

Source: National R&D Surveys Sri Lanka, 2014 & 2015 (NSF)

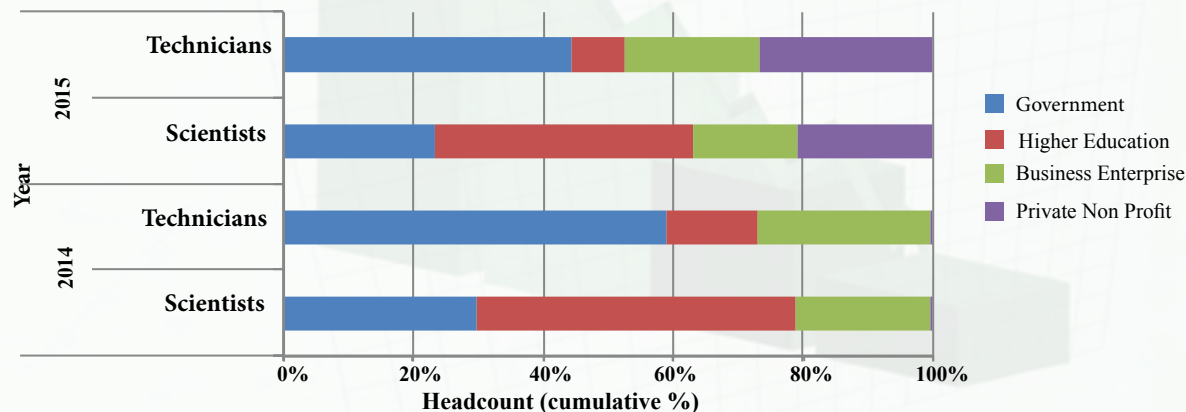


Figure 10: R&D headcount in different sectors in 2014-2015

2.2: Number of R&D Scientists (Headcount) by Discipline and Gender 2014-2015

Discipline	Headcount of R&D Scientists (2014)						Headcount of R&D Scientists (2015)					
	Male		Female		Total		Male		Female		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Natural Sciences	891	30	738	30	1,629	30	993	30	904	32	1,897	31
Agricultural Sciences	651	22	638	26	1,289	23	737	23	686	24	1,423	23
Engineering & Technology	713	24	334	13	1,047	19	780	24	506	18	1,286	21
Medical Sciences	360	12	434	18	794	15	441	14	335	12	776	13
Social Sciences & Humanities	233	8	175	7	408	8	239	7	232	8	471	8
Other	97	4	160	6	257	5	76	2	188	6	264	4
Total	2,945	100	2,479	100	5,424	100	3,266	100	2,851	100	6,117	100

Source: National R&D Surveys Sri Lanka, 2014 & 2015 (NSF)

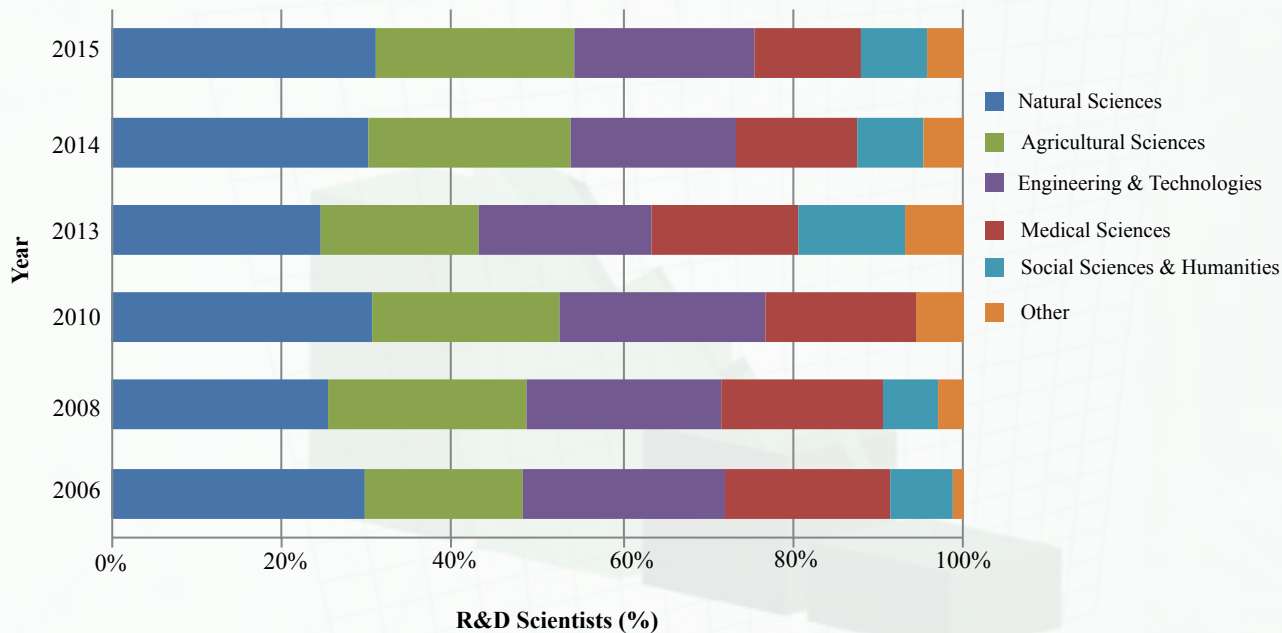


Figure 11: Distribution of R&D scientists in different disciplines 2008-2015

2.3: Educational Qualifications of R&D Scientists 2015

Qualification	Male		Female		Total	
	No	%	No	%	No	%
PhD	594	18	350	12	944	15
MPhil	144	4	122	4	266	4
MD/MS	336	11	304	11	640	10
MSc	316	10	293	10	609	10
BSc+PGDip	854	26	802	28	1,656	27
BSc (Sp)	425	13	282	11	707	12
BSc	419	13	601	21	1,020	17
Other	178	5	97	3	275	5
Total	3,266	100	2,851	100	6,117	100

Source: National R&D Survey Sri Lanka, 2015 (NSF)

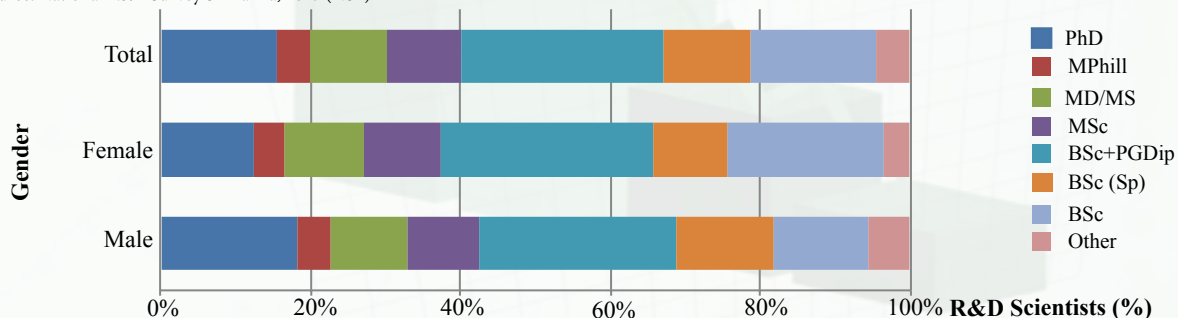


Figure 12: Distribution of R&D scientists as per education and gender 2015

2.4: Distribution of R&D Scientists Full Time Equivalent (FTE) by Sector 2015

Sector	Full Time Equivalent of R&D Scientists			
	Male	Female	Total	% of Female
Government	608	490	1,098	24
Higher Education	334	278	612	13
Business Enterprise	253	245	498	12
PNP	3	5	8	0
Total	1,198	1,018	2,216	49

Source: National R&D Survey Sri Lanka, 2015 (NSF)

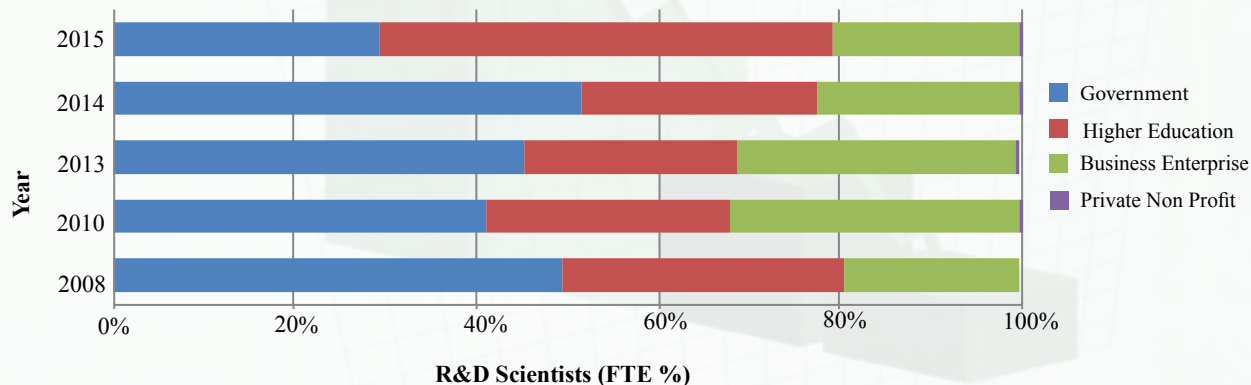


Figure 13: Trends in R&D scientists (FTE) distribution by sector 2008-2015

2.5: Distribution of R&D Scientists of Full Time Equivalent (FTE) by discipline 2015

Discipline	2015		
	Male	Female	Total
Natural Sciences	320	291	611
Agricultural Sciences	352	309	661
Engineering & Technology	295	161	456
Medical Sciences	112	93	205
Social Sciences and Humanities	87	86	173
Other	32	78	110
Total	1,198	1,018	2,216

Source: National R&D Survey Sri Lanka, 2015 (NSF)

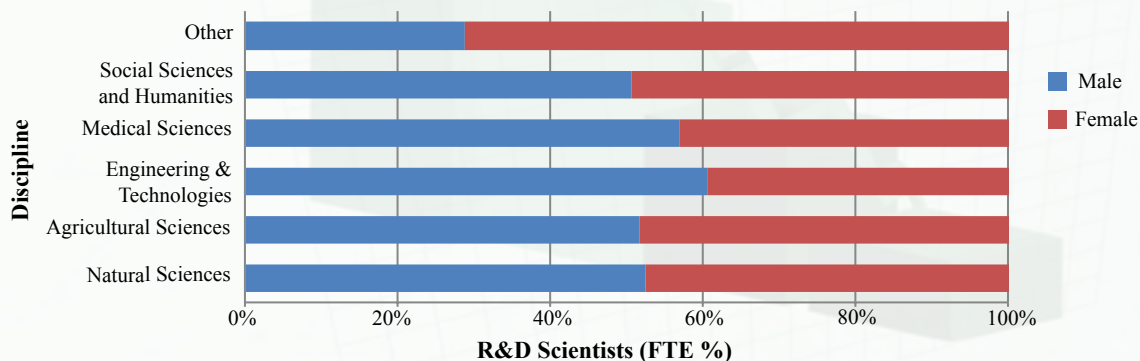


Figure 14: Trends in distribution of R&D scientists (FTE) in different disciplines 2015

2.6: Educational Qualifications of Full Time Equivalent (FTE) Scientists -2015

Qualification	Male	Female	Total
	No	No	No
PhD	204	120	324
MPhil	79	60	139
MD/MS	37	36	73
MSc	234	211	445
BSc+PGDip	233	209	442
BSc (Sp)	262	263	525
BSc	66	86	152
Other	83	33	116
Total	1,198	1,018	2,216

Source: National R&D Survey Sri Lanka, 2015 (NSF)

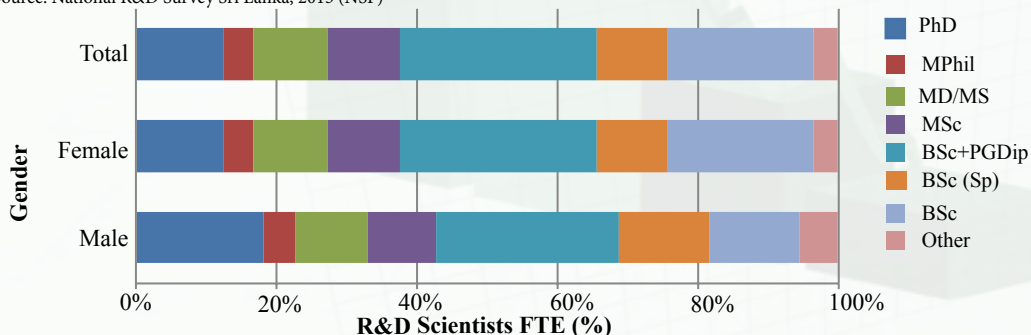


Figure 15: Educational qualifications of R&D scientists (FTE) - 2015

2.7: Number of R&D Scientists (Headcount) by Age and Sex 2015

Age group	Headcount of R&D Scientists			Headcount of Full Time Equivalent (FTE) Scientists		
	Male	Female	Total	Male	Female	Total
21-30	554	349	903	238	168	406
31-40	508	635	1,143	254	277	531
41-50	869	817	1,686	335	297	632
51-60	750	573	1,323	270	177	447
Above 60	446	309	755	100	75	175
Not mentioned	139	168	307	1	24	25
Total	3,266	2,851	6,117	1,198	1,018	2,216

Source: National R&D Survey Sri Lanka, 2015 (NSF)

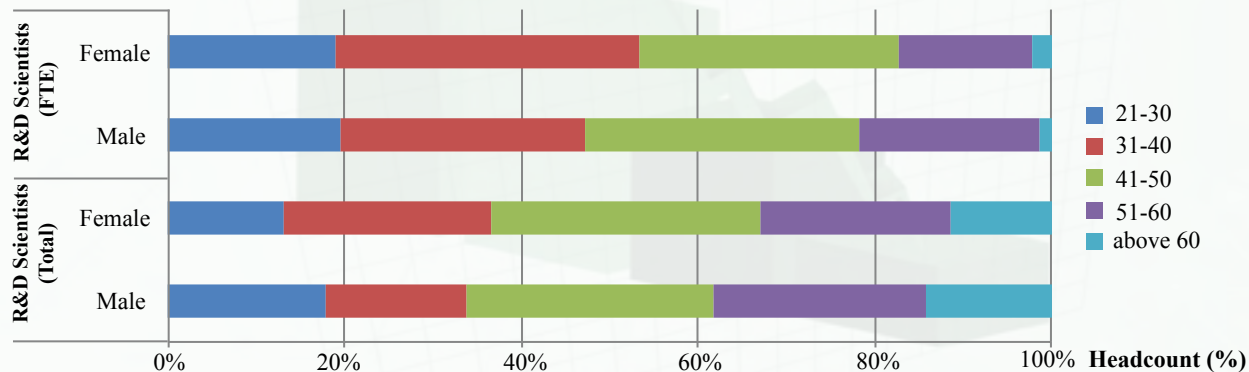


Figure 16: Age distribution of R&D scientists engaged in research in 2015

2.8: Number of R&D Scientists in Selected Countries

Country	Year (Data available)	Researchers (HC) per million population	Researchers (FTE) per million population
Austria	2013	8,419	4,763
Belgium	2013	5,982	4,156
China	2012	1,527	1,036
France	2014	5,770	4,169
Germany	2013	6,818	4,400
Iraq	2015	169	64
Ireland	2013	5,436	3,606
Italy	2014	2,811	1,977
Japan	2015	7,169	5,231
Malaysia	2015	2,909	2,261
New Zealand	2013	6,562	4,009
Pakistan	2015	430	294
Republic of Korea	2015	9,012	7,087
South Africa	2013	860	437
Sri Lanka	2015*	292	106
United Kingdom	2014	7,604	4,299

Source: Adopted from UNESCO Statistics;

*National R&D Survey Sri Lanka, 2015 (NSF)

HC: Headcount

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

Country	Year	Researchers (Total)	Researchers (with PhD or similar Level %)	Researchers (Bachelor or Master Level %)	Researchers (short occupancy programmes %)	Researchers (All other qualifications %)	Researchers (Female %)
Austria	2013	71,448	27.87	52.57	2.53	17.02	29.60
Bulgaria	2014	17,795	53.07	43.97	1.73	1.24	49.50
Chile	2015	13,015	45.14	32.21	17.33	5.32	33.00
Iraq	2015	6,158	47.56	52.40	0.03	(n)	39.90
Malaysia	2015	89,861	25.31	67.42	1.55	1.80	49.60
Pakistan	2015	81,306	12.30	87.70	(n)		33.90
Russian Federation	2015	37,9411	29.40	70.60			40.30
Singapore	2014	4,0730	23.70	71.16		5.14	30.10
South Africa	2013	45,935	59.46	32.59	7.94		44.00
Sri Lanka	2015	6,117	19.00	76.00	5.00		46.62
Turkey	2014	181,544	41.24	56.51	1.29	0.95	36.90

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

2.10: Science and Technology Personnel (STP) by Category 2015

Category	Male	Female	Total	Per million population
S&T Scientists	7,211	5,134	12,345	591
Technicians	17,173	5,884	13,057	1,103
Other Supporting Staff	44,045	24,212	68,257	3,266
STP	68,429	35,230	93,659	4,960

Source: National R&D Survey Sri Lanka, 2015 (NSF)

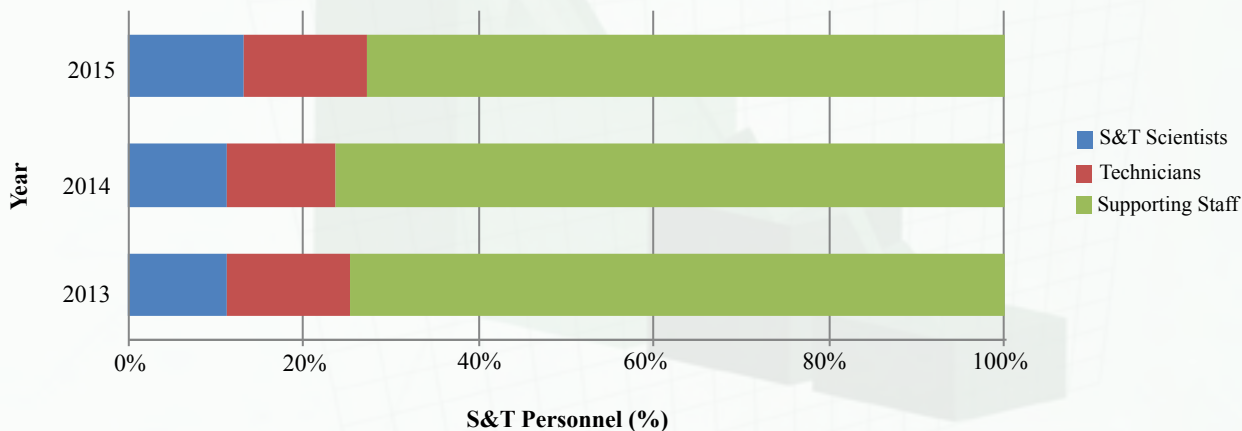


Figure 17: Trends in science and technology personnel (STP) distribution 2013-2015

2.11: Distribution of Science and Technology Personnel (STP) by Sector 2013-2015

Sector	2013		2014		2015	
	STP	Percent	STP	Percent	STP	Percent
Government	18,992	16.74	21,986	25.07	11,965	13
Higher Education	3,873	3.42	6,140	7.00	6,656	07
Business Enterprise	90,546	79.81	59,509	67.86	74,985	80
PNP	36	0.03	57	0.07	53	0
Total	113,447	100.00	87,692	100.00	93,659	100

Source: National R&D Surveys Sri Lanka, 2013, 2014 & 2015 (NSF)

NOTE: Total STP includes all Researchers, other Scientists Technicians and Supporting Staff

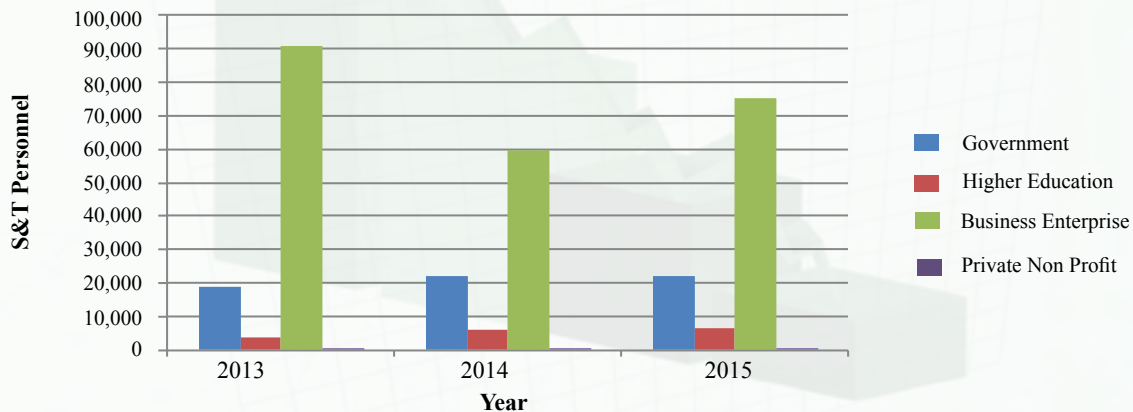


Figure 18: Trends in Science and Technology Personnel (STP) across different sectors, 2013-2015

2.12: Distribution of Scientists and Technologists (in R&D and S&T Services) by Discipline 2015

STP	Male	Female	Total	% Female of Total
Natural Sciences	2,242	1,837	4,079	15
Agricultural Sciences	1,120	863	1,983	7
Engineering & Technologies	2,122	966	3,088	8
Medical Sciences	742	532	1,274	4
Social Sciences & Humanities	734	667	1,401	5
Other/Not specified	251	269	520	2
Total	7,211	5,134	12,345	42

Source: National R&D Survey Sri Lanka, 2015 (NSF)

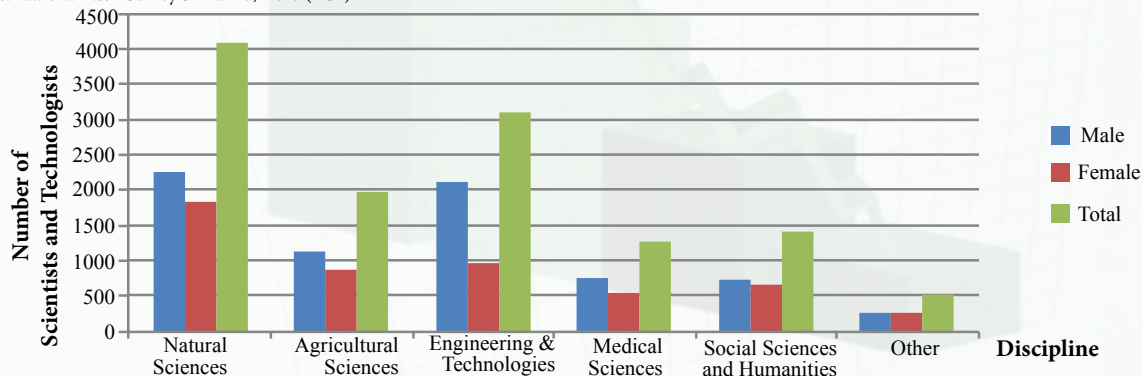


Figure 19: Distribution of Scientists and Technologists in different disciplines 2015

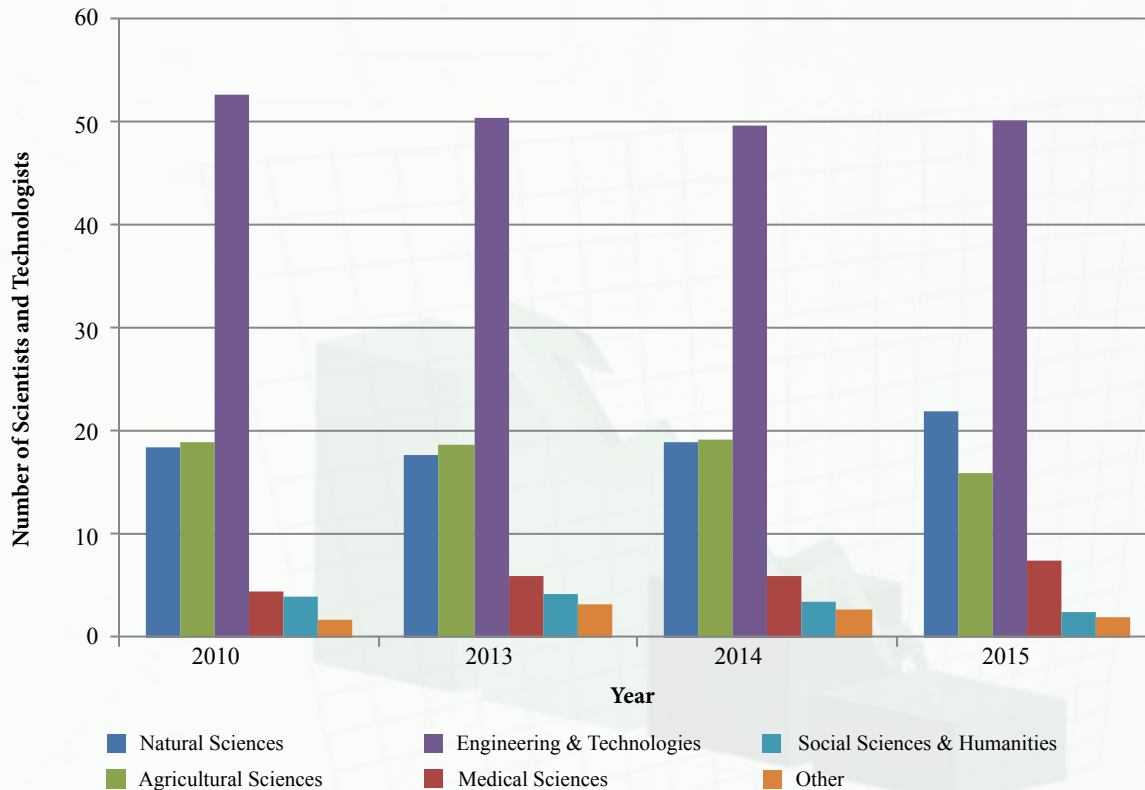


Figure 20: Distribution of scientists by discipline 2010-2015

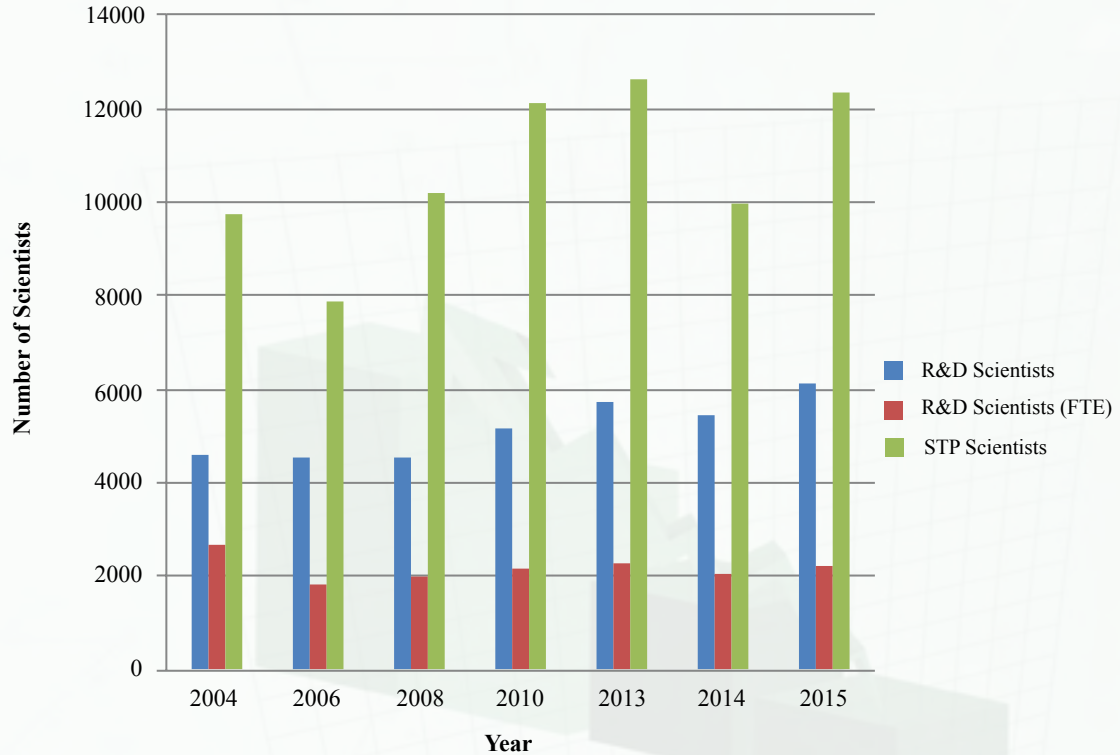


Figure 21: Distribution of Scientists 2004-2015



PERFORMANCE INDICATORS
FOR
SCIENCE AND TECHNOLOGY

3.1: Number of Patents Locally Applied and Registered During 2000-2015

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	326	188	514	71	165	236
2014	314	222	536	43	220	263
2015	218	263	481	38	224	262

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

3.2: Number of Industrial Design Locally Applied and Registered During the Period of 2000-2015

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
2015	392	68	460	179	67	246

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

3.3: Distribution of Patents Registered According to Classification 2013-2015

Patent Categories	2013	2014	2015
Agriculture related developments	12	12	19
Construction technology and material developments	07	07	17
Drugs, cosmetics and other related product developments	30	26	37
Dryers and dehydration technology	01	04	03
Energy saving and generating devices	16	16	11
Food and beverage process technology	08	05	09
Development of domestic appliances and utilities	10	08	05
Information Communication Technologies (ICT), electronic and related	16	20	14
Packaging and packing materials	00	00	04
Process technologies	38	35	24
Rubber production and processing technology	02	01	05
Chemical production and related findings	73	78	82
Textile technology and related inventions	04	12	08
Automobile and related inventions	08	12	13
Other	11	27	11
Total	236	263	262

Source: National Intellectual Property Office (NIPO), Sri Lanka

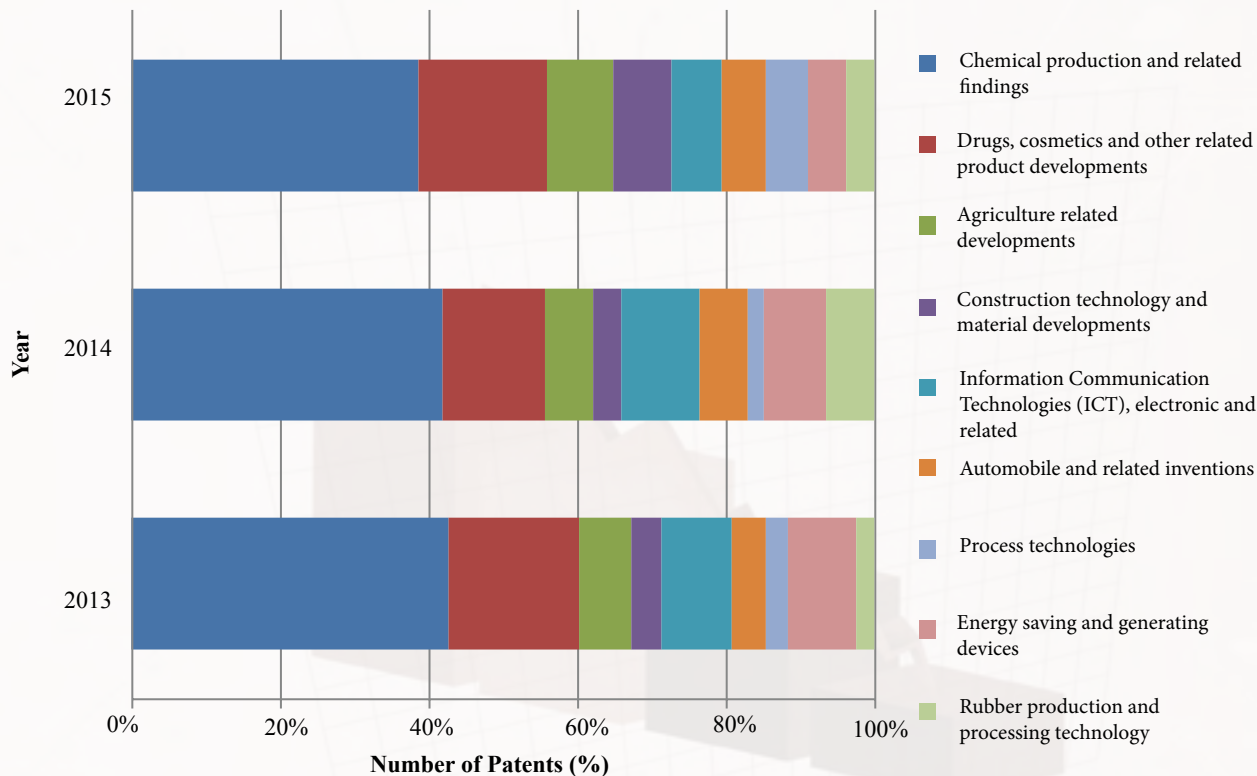


Figure 22: Trends in patents registered across different disciplines 2013-2015

3.4: Patent Applications in Selected Countries 2013-2015

Country	Resident			Non-Resident		
	2013	2014	2015	2013	2014	2015
Australia	3,061	1,988	2,291	26,656	23,968	26,314
Bangladesh	60	44	41	243	249	299
Switzerland	1,525	1,480	1,477	631	568	446
China	704,936	801,135	968,252	120,200	127,042	133,612
United Kingdom	14,972	15,196	14,867	7,966	7,844	7,934
Ireland	333	263	250	57	58	190
Italy	8,307	8,601	na	905	781	na
Japan	271,731	265,959	258,839	56,705	60,030	59,882
Malaysia	1,199	1,353	1,272	6,006	6,267	6,455
New Zealand	1,614	1,636	1,184	5,167	6,092	5,317
Philippines	220	334	375	3,065	3,255	3,359
Thailand	1,572	1,006	na	5,832	6,924	na
Sri Lanka	328	314	218	188	222	263
United States of America	287,831	285,096	288,335	283,781	293,706	301,075

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

na: not available

3.5: Main Fields of Publications in the SCI Journals 2013-2015

Field	2013		2014		2015	
	Total number	With foreign Co-authorship (%)	Total number	With foreign Co-authorship(%)	Total number	With foreign Co-authorship(%)
Agriculture	37	73.0	36	83.3	41	87.8
Biological Science	20	85.0	19	84.2	23	91.3
Molecular Biology & Biotechnology	39	79.5	28	85.7	22	81.8
Chemical Science	22	81.8	24	75.0	26	80.8
Earth Sciences	18	72.2	17	82.3	14	85.7
Engineering & Technologies	13	69.2	11	72.7	15	60.0
Environmental Science	36	88.9	29	89.6	33	87.9
Fisheries, Aquaculture	6	100.0	9	100.0	7	100.0
Food Science	17	88.2	23	95.6	29	86.2
Forestry	12	100.0	15	100.0	16	100.0
Health Science	122	72.1	118	70.3	126	84.1
Mathematics	5	80.0	4	100.0	5	100.0
Nanotechnology	14	92.9	12	91.7	6	83.3
Physics	17	47.1	16	50.0	18	61.1
Veterinary	2	100.0	3	100.0	3	100.0
Social Sciences	11	54.5	9	55.5	12	58.3
Total	391	77.0	373	79.3	396	83.6

Source: Adopted from the Science Citation Index (SCI)

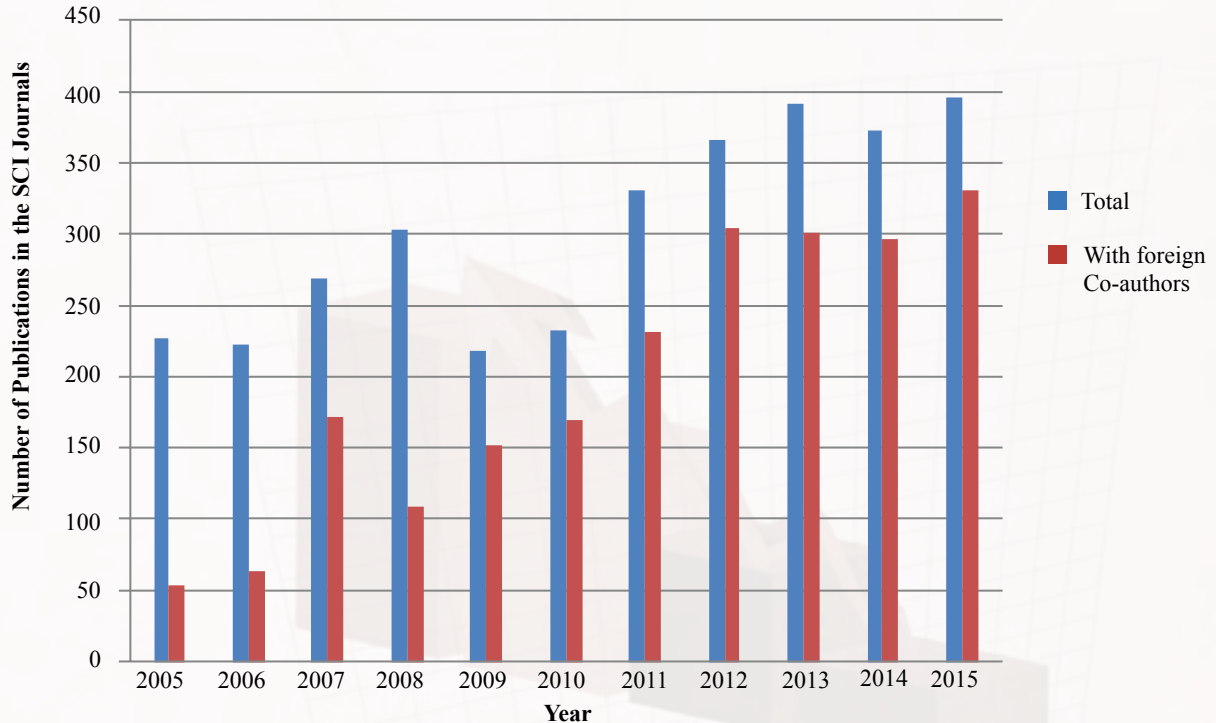


Figure 23: Publication trends in the SCI journals by Sri Lankan scientists 2005-2015

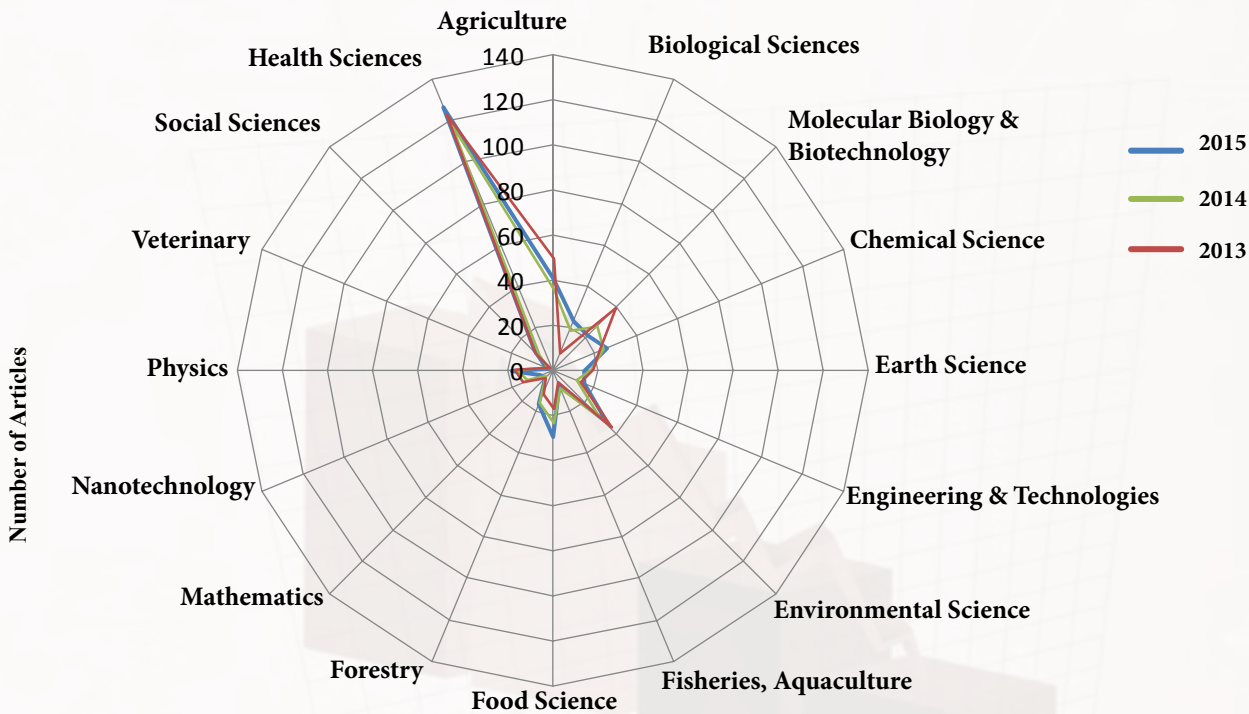


Figure 24: Publication trends in different subject areas 2013-2015 with the publications in the area of health sciences

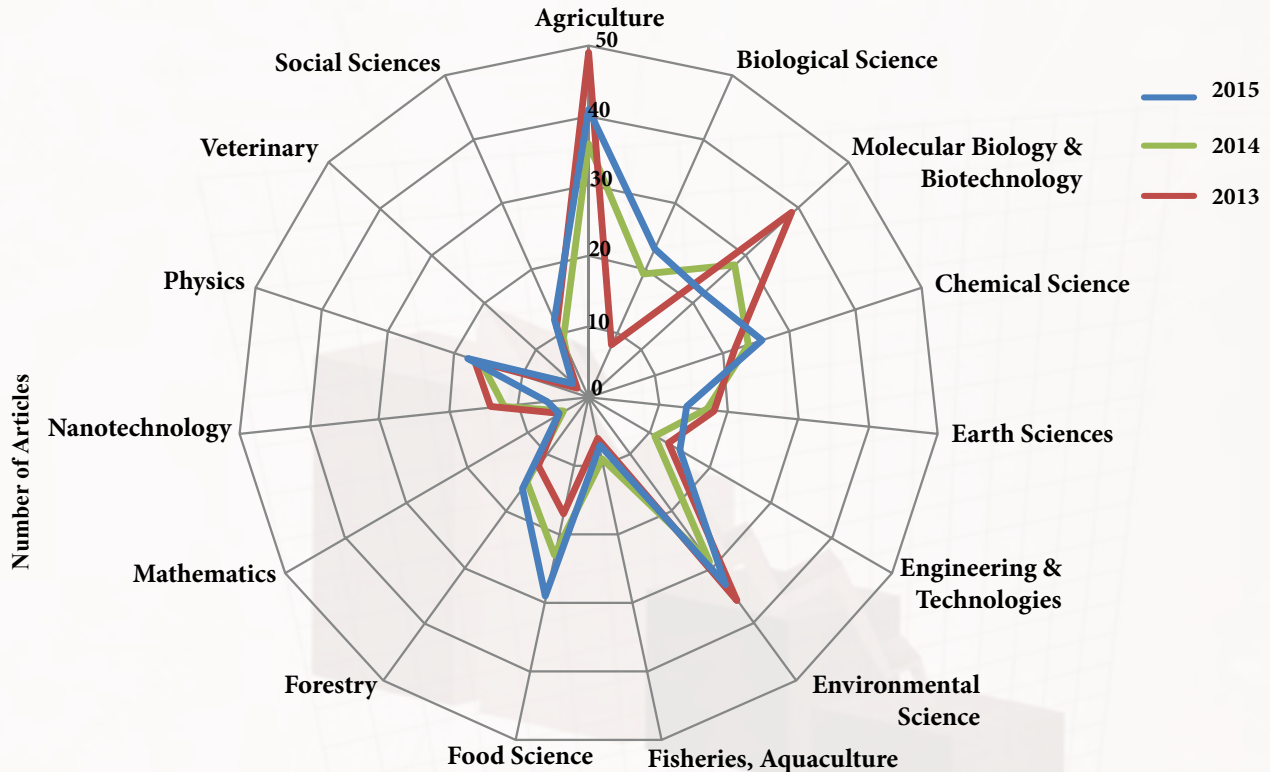


Figure 25: Publication trends in different subject areas 2013-2015 (without Health Sciences)

Note: The publications done in health sector were not included to give clear distribution trends in the other disciplines.

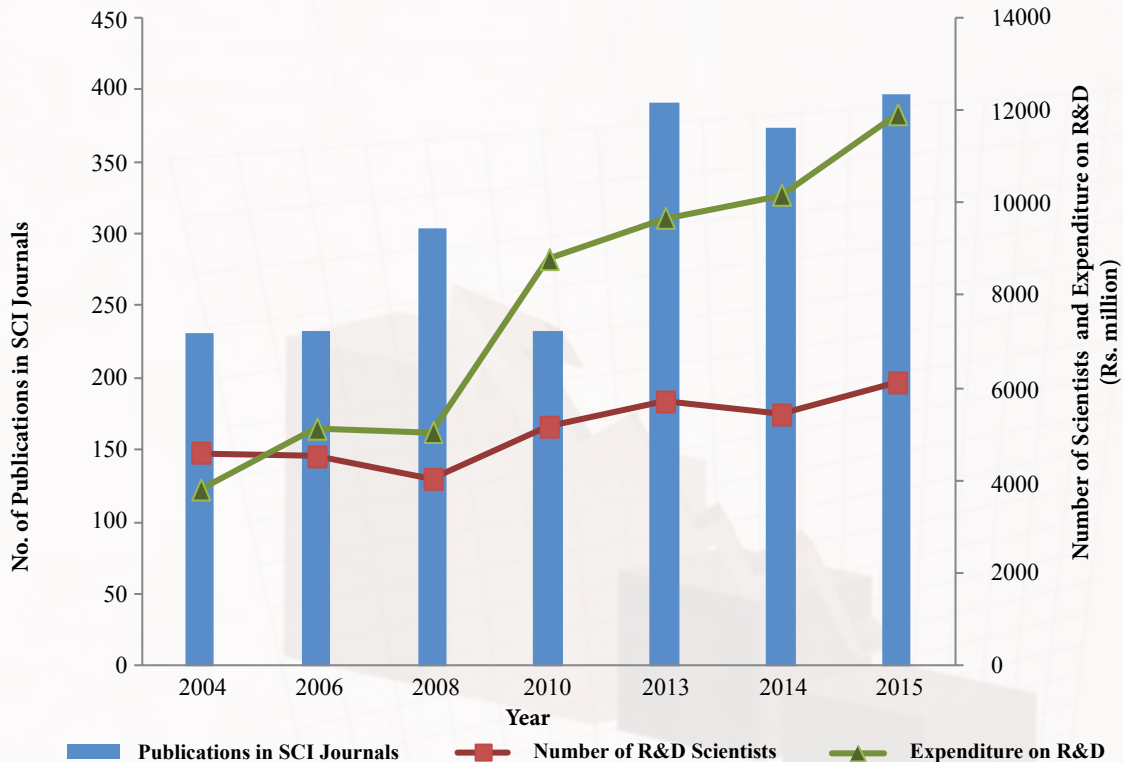


Figure 26: Trends in scientific publications based on R&D expenditure and human resources available during 2004-2015

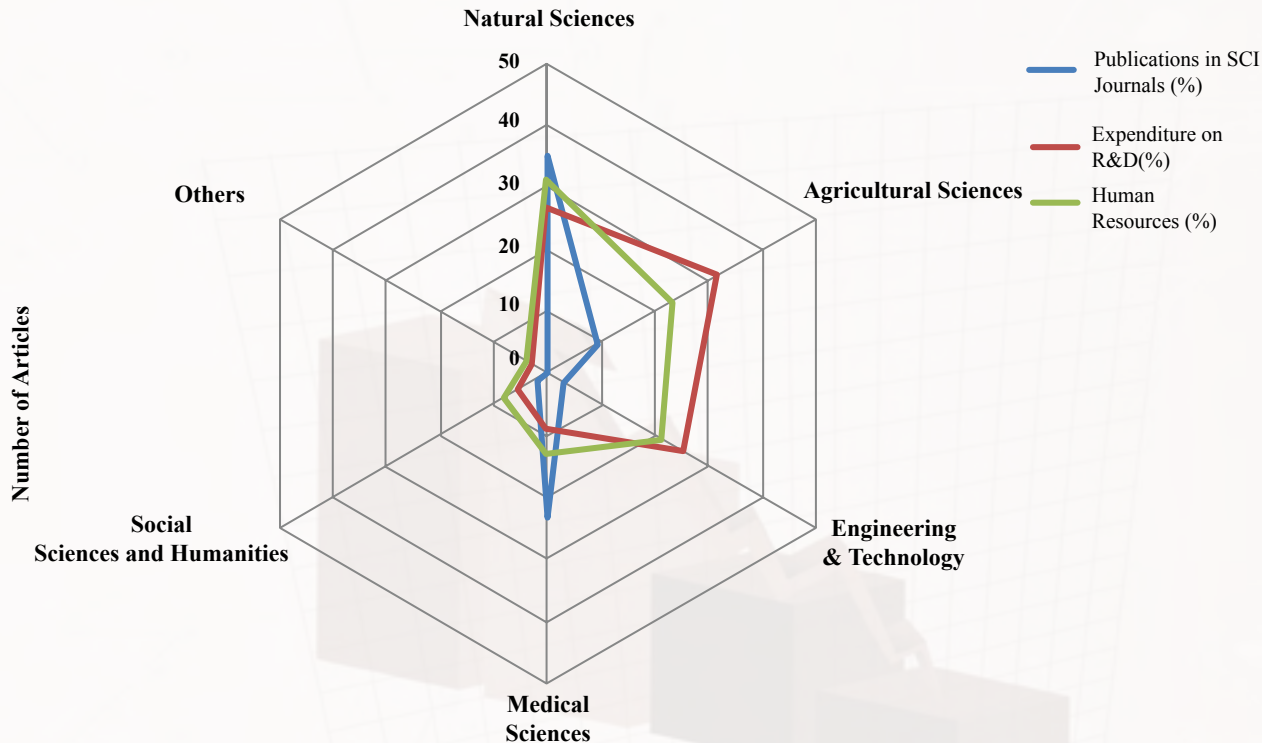


Figure 27: Trends in scientific publications based on R&D expenditure and human resources (by percentage) 2015

3.6: Knowledge Disseminations During 2015

Publication/Activity	State Sector		Higher Education		Total		Higher Education (%)	
	Local	Int	Local	Int	Local	Int	Local	Int
Books and Book Chapters	31	68	272	65	303	133	90	49
Journal articles (peer reviewed)	49	177	57	817	106	994	54	82
Journal articles (other)	91	20	481	310	572	330	84	94
Newspaper articles	152	103	185	27	337	130	55	21
Abstracts	227	57	833	465	1,060	522	79	89
Newsletters, handbooks, manuals etc. that aim general public	105	3	2,223	584	2,328	587	95	99
Presentations/Resource Persons seminars/conference that aim general public	1,128	325	836	30	1,964	355	43	8

Source: National R&D Survey Sri Lanka, 2015 (NSF)
Int: International



3.7: Science & Technology Postgraduate Output 2013-2015

Degree	Year	Medical	Agriculture	Science/IT	Engineering	Total
PGDip	2013	310	11	156	02	479
	2014	230	18	229	06	483
	2015	341	04	352	146	843
MSc/MEng	2013	47	170	591	210	1,018
	2014	93	241	470	205	1,009
	2015	56	195	397	171	819
MPhil	2013	04	23	43	12	82
	2014	05	18	34	09	66
	2015	09	16	46	08	79
MS/MD	2013	251	00	00	00	251
	2014	265	00	00	00	265
	2015	268	00	00	00	268
PhD	2013	02	07	16	02	27
	2014	08	05	18	02	33
	2015	04	10	19	07	40
Total	2013	614	211	806	226	1,857
	2014	601	282	751	222	1,856
	2015	678	225	814	332	2,049

Source: UGC Statistics 2014 & 2015

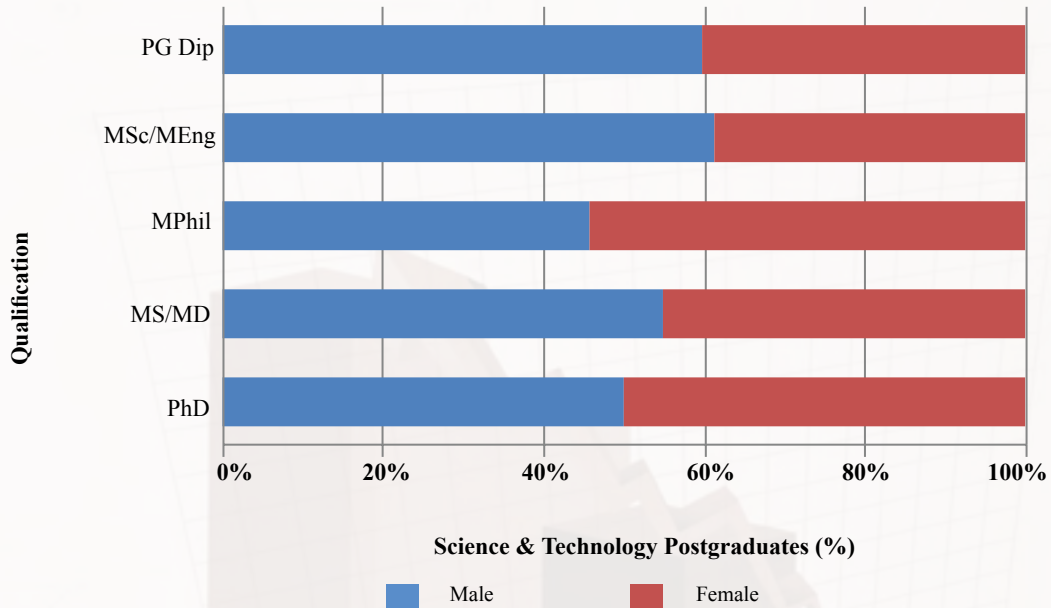


Figure 28: Distribution of postgraduate output by gender 2015

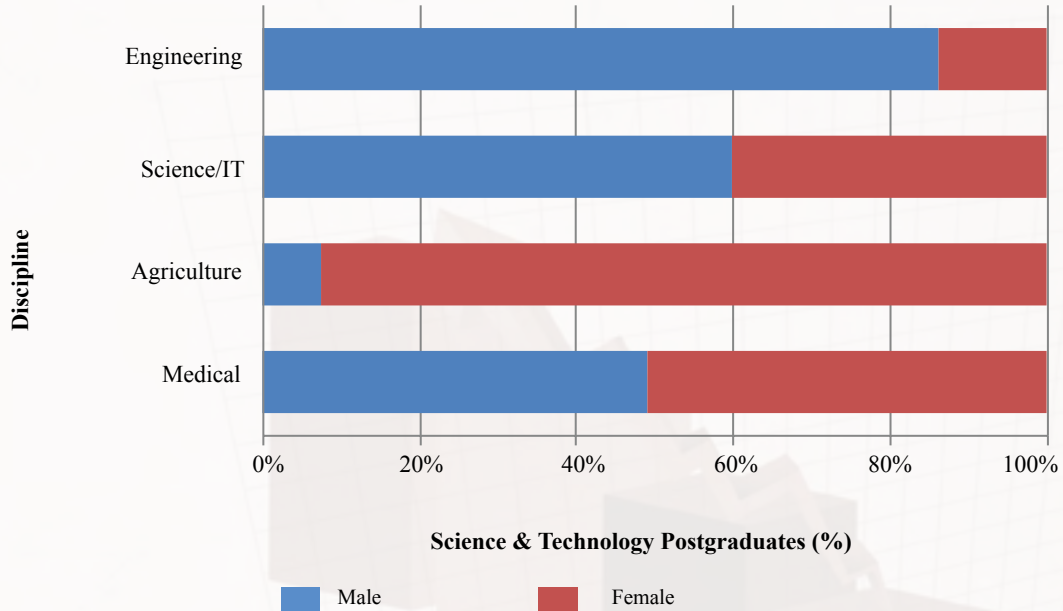


Figure 29: Distribution of postgraduates output by different discipline 2015

A 3D bar chart with four bars of increasing height from left to right. A large, light-colored arrow points upwards and to the right, starting from the first bar and ending above the fourth bar. The chart is set against a grid background.

INNOVATION INDICATORS

4.1: R&D Expenditure by Different Industrial Categories 2015

Rs. million

Category	2015			%
	Recurrent	Capital	Total	
Agriculture, Fisheries and Forestry	245.42	23.35	268.77	7.00
Mining and Quarrying	33.70	3.21	36.91	1.00
Manufacturing	3,221.12	306.50	3,527.62	88.00
Electricity	116.76	11.11	127.87	3.00
Construction	0.45	0.04	0.49	0.00
Trade and Services	0.18	0.02	0.20	0.00
R&D	19.38	1.84	21.22	0.50
Other	19.20	1.83	21.03	0.50
Total	3,656.21	347.90	4,004.11	100.00

Source: National R&D Survey Sri Lanka, 2015 (NSF)

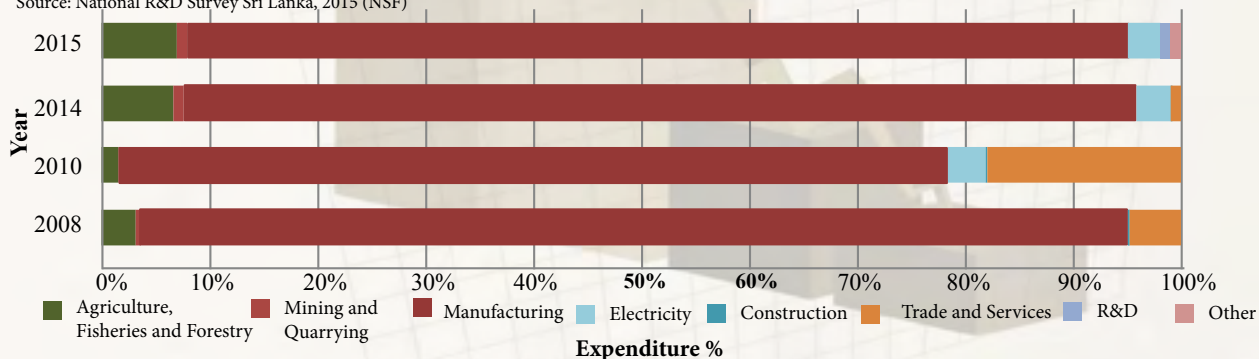


Figure 30: Trends in R&D expenditure of different R&D categories 2008-2015

4.2: Percentage of Total Revenue that came from the Sale of Products and Services by Industries Involved in R&D in 2006-2015

Rs. million

Category	2006	2008	2010	2013	2014	2015
Local Market	58.84	62.07	66.12	66.12	68.81	68.62
Asia Pacific Countries	7.64	6.27	8.77	8.77	6.57	7.56
European Countries	18.65	15.99	14.76	14.76	10.8	9.98
United States	10.57	10.98	7.93	7.93	5.84	2.98
Middle East Countries	-	-	0.71	0.71	3.20	2.98
Africans Countries	-	-	0.69	0.69	3.77	7.19
Rest of the World	4.30	4.69	1.02	1.02	1.01	0.69
Total	100%	100%	100%	100%	100%	100%

Source: National R&D Surveys Sri Lanka, 2006, 2008, 2010, 2013, 2014 & 2015 (NSF)

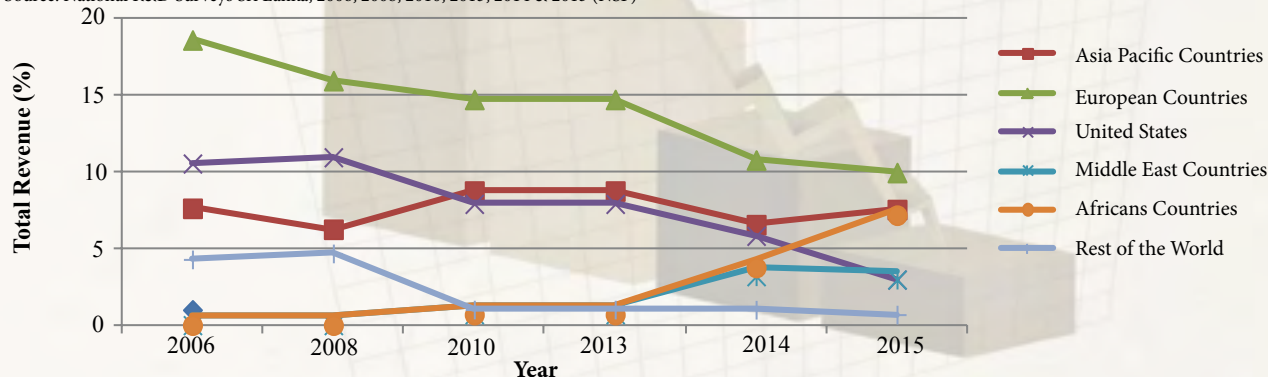


Figure 31: Trends in revenue generated by industries within the period 2006-2015

4.3: Number of Innovations Developed by the Business Enterprises in 2015

Innovation Type	Number		
	Developed	Transferred	Commercialized
New products/services/processes developed	152	16	66
Existing products/services/processes significantly improved	84	7	43
New plant varieties/hybrids developed	7	1	6
Import substitutes developed	9	5	0
Designs/Prototypes developed	261	1	122

Source: National R&D Surveys Sri Lanka, 2015

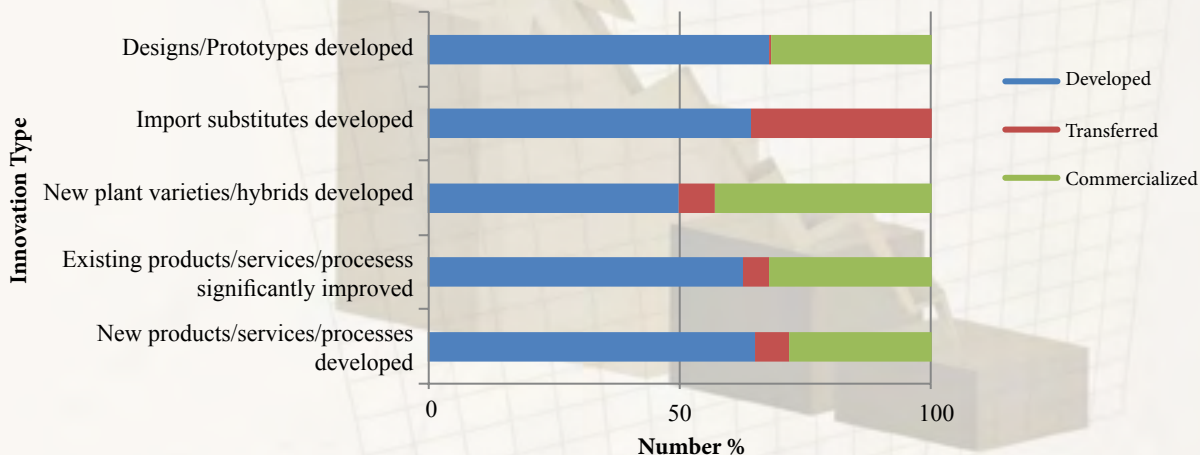


Figure 32: Different innovation types developed by business enterprise sector during 2015

4.4: Number of Innovations Developed by the Government Sector (R&D) Institutions in 2015

Innovation Type	Number		
	Developed	Transferred	Commercialized
New products/services/processes developed	59	96	96
Existing products/services/processes significantly improved	38	12	11
New plant varieties/hybrids developed	22	17	18
Import substitutes developed	1	6	0
Designs/Prototypes developed	4	1	1

Source: National R&D Surveys Sri Lanka, 2015

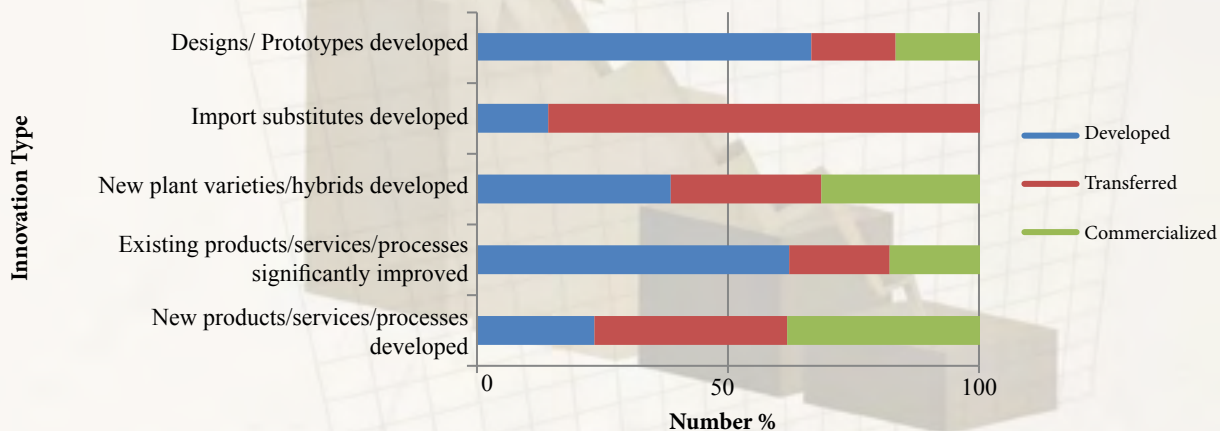


Figure 33: Different innovation types developed by government sector institutions in 2015

4.5: Number of Innovations Developed by the Higher Education Sector in 2015

Innovation Type	Number		
	Developed	Transferred	Commercialized
New products/services/processes developed	67	26	na
Existing products/services/processes significantly improved	34	8	na
New plant varieties/hybrids developed	47	7	na
Import substitutes developed	5	3	na
Designs/Prototypes developed	0	0	na

Source: National R&D Surveys Sri Lanka, 2015

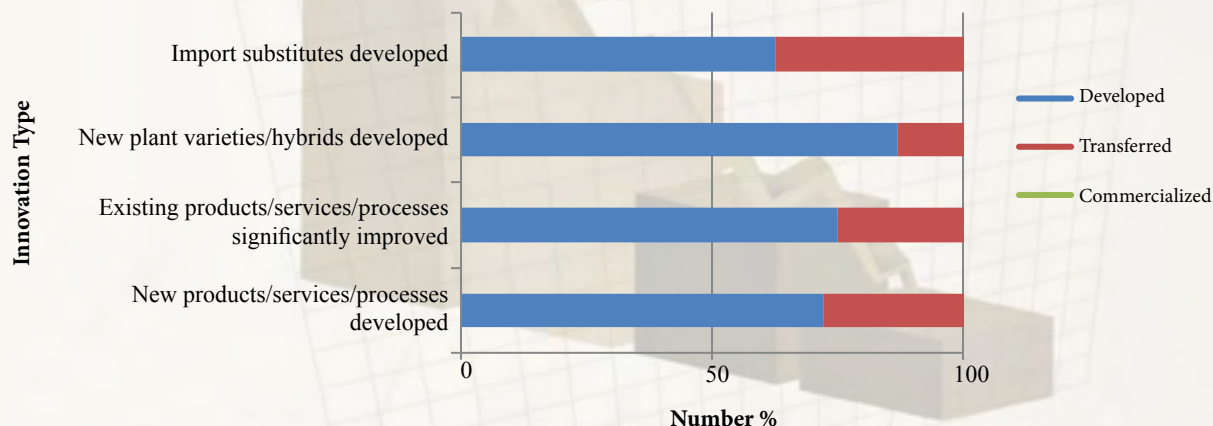


Figure 34: Different innovation types developed by higher education sector in 2015

4.6: High-Technology Exports (Current US\$) in Selected Countries 2013-2015

Country	2013	2014	2015
Australia	4,565	4,691	4,237
Canada	29,026	31,535	26,318
China	560,058	558,606	549,799
Germany	193,799	199,718	185,556
France	113,251	114,697	104,340
United Kingdom	69,224	70,653	69,417
India	16,693	17,316	13,751
Japan	105,076	100,955	91,514
Sri Lanka	69	68	59
New Zealand	723	645	604
Thailand	33,901	34,992	34,544
United States	148,531	155,641	154,346
Malaysia	60,378	63,376	57,258
Philippines	21,810	23,839	26,192
Pakistan	349	259	259
Singapore	135,602	137,369	130,989
Vietnam	27,819	30,864	38,736

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

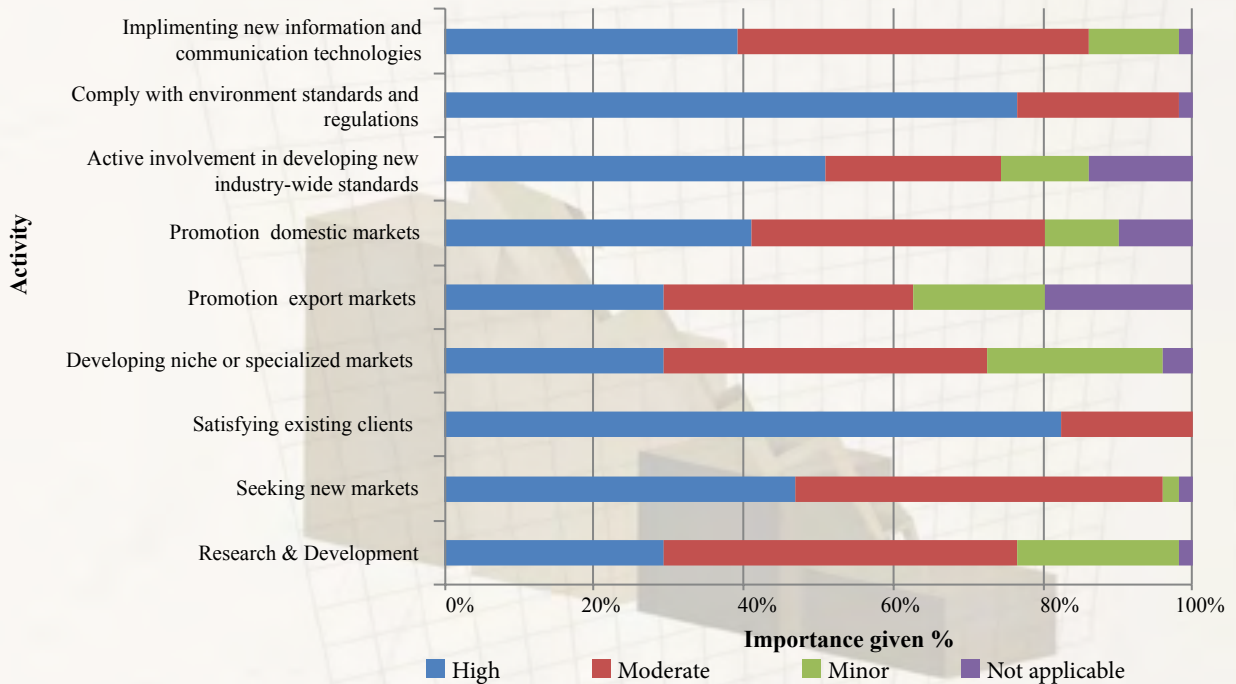


Figure 35: Importance given by the enterprises for their activities during 2015

4.7: Involvement of Industrial Sector with Other Institutions in Conducting R&D and Innovation Activities 2006-2015

Institution	% Institutional Involvement in R&D				
	2006	2008	2010	2014	2015
Own company alone	48.6	52.7	52.2	60.0	53.4
With parent company	25.8	20.7	18.1	13.8	17.8
Collaboration with other institution	16.4	19.0	21.3	18.5	20.5
Outsourcing	9.2	7.6	8.5	7.7	8.3
Total	100.0	100.0	100.0	100.0	100.0

Source: National R&D Surveys Sri Lanka, 2006, 2008, 2010, 2014 & 2015 (NSF)

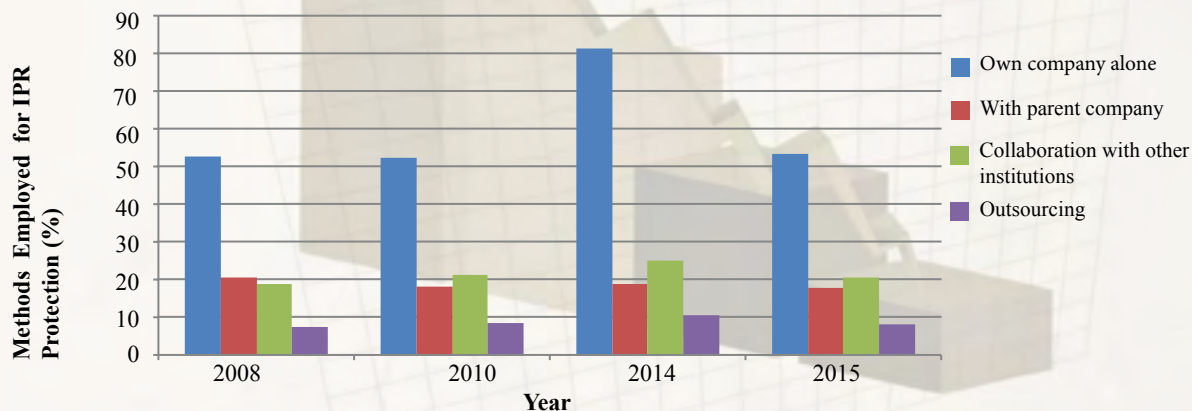


Figure 36: The degree of engagement with other institutions for R&D by industries during 2006-2015

4.8: Countries where Sri Lankan Business Enterprises Acquired their Technologies during 2008-2015

Locality	Country	2008	2010	2014	2015
Local	Government	13	12	12	5
	Private	02	16	19	2
Foreign	Individual	01	-	-	-
	Australia	-	01	01	01
	Belgian	03	06	01	-
	China	01	01	04	-
	Denmark	-	01	-	-
	Dubai	-	-	01	01
	France	01	01	-	-
	Germany	03	11	05	01
	India	07	15	12	03
	Italy	02	-	-	01
	Hong Kong	-	-	02	01
	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	01

Source: National R&D Surveys Sri Lanka, 2008, 2010, 2014 & 2015

4.9: Methodologies Used by Industries (%) to Protect their Intellectual Property Rights (IPR) during 2006-2015

Methodologies	2006	2008	2010	2014	2015
Formal:					
Patents	9.7	23.1	23.3	8.0	9.0
Trademarks	37.8	65.1	74.1	85.0	71.0
Copyrights	9.7	14.8	20.6	28.1	21.0
Strategic Methods:					
Secrecy	34.1	64.5	67.2	70.0	17.0
Complexity of design	15.9	37.3	31.2	30.3	9.0
Other	3.0	2.4	1.05	0.0	0.0

Source: National R&D Surveys Sri Lanka, 2006, 2008, 2010, 2014 & 2015

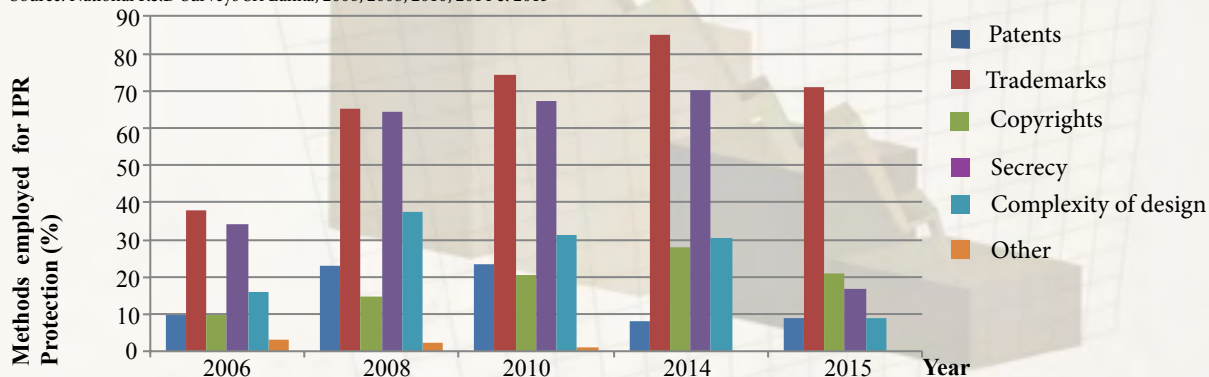


Figure 37: Type of Intellectual Property Rights (IPR) employed by industries to protect their innovations during 2006-2015

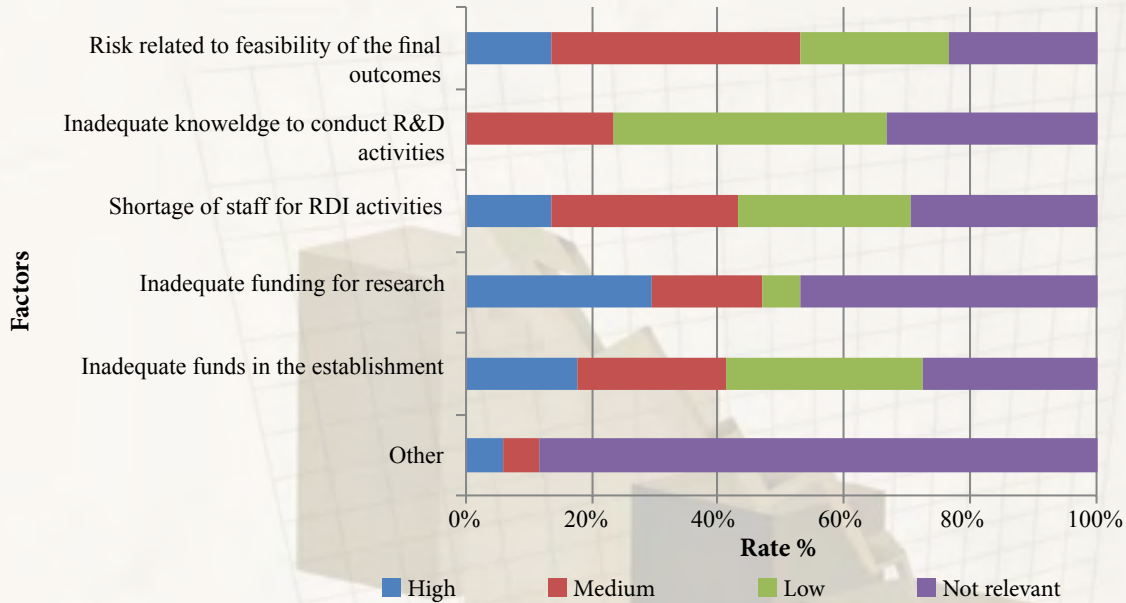


Figure 38: Factors that affected to abandon the R&D work initiated by industries before their successful completion in 2015



KEY SOCIO-ECONOMIC INDICATORS

5.1: Demographic Indicators of Sri Lanka 2014-2015

Item	2014(a)	2015(a)
Mid-Year population, '000 (b)	20,771	20,966
0-14 Years, '000	5,235	5,288
15-54 Years, '000	11,879	11,989
55 Years and over, '000	3,657	3,689
Growth of population, %	0.9	0.9
Crude birth rate, per 1,000 population	16.9	16.0
Crude death rate, per 1,000 population	6.2	6.3
Rate of natural increase, per 1,000 population	10.7	9.7
Net migration rate, per 1,000 population	-2.2	0.7
Infant mortality rate, per 1,000 live births	na	na
Density of population, persons per Sq.Km.	331	334

Sources: Central Bank of Sri Lanka 2014 & 2015

(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

na: not available

5.2: Demographic Indicators of SAARC Countries

Indicator	Year	Sri Lanka	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan
		Mid-Year population, Mn.	2013	20.6	27.5	154.7	0.7	1,228.8	0.4
	2014	20.8	28.1	155.8	0.7	1,267.0	0.4	27.8	188.0
Population growth, %	2013	0.9	1.9	1.4	1.7	1.3	3.5	1.4	0.6
	2014	0.9	2.2	1.4	1.7	1.2	3.6	1.4	2.0
Land area, '000 Sq.km.	2014	65.6	652.8	147.5	38.3	3,287.2	0.3	147.2	796.1
Density of population [Persons per Sq. km.]	2014	334.0(a)	43.0	1,060.0	19.0	363.0	2,739.0	187.0	236.0
Population by Age Groups, %									
0-14 Years	2014	25.2(a)	44.9	30.0	27.4	29.2	27.6	33.5	35.2
15-64 Years	2014	66.9(a)	52.7	65.1	67.6	65.3	67.7	61.1	60.3
65 Years & above	2014	7.9(a)	2.4	5.0	5.0	5.5	4.7	5.4	4.5
Urban population, %	2014	18.2(b)	24.4	32	38.1	30.8	40.5 (c)	17.0 (d)	38.6
Crude birth rate, Per 1,000	2013	16.0 (a)	34.1	20	19.6	20.4	22	21	25.2
Crude death rate, Per 1,000	2013	6.3(a)	7.8	5.7	6.5	7.9	3.4	6.7	6.9
Total fertility rate [Births per Women]	2010	2.3	6.3	2.2	2.4	2.6	1.8	2.7	3.4
Infant mortality rate [per 1,000 live births]	2013	2.3	4.9	2.2	2.2	2.5	2.3	2.3	3.2
Maternal mortality rate [per 100,000 live births]	2013	29.0	400.0	170.0	120.0	190.0	31.0	190.0	170.0
Expectation of life at birth, Years	2014	74.9	60.4	71.6	69.5	68	76.8	69.6	66.2

Sources: Key Indicators for Asia and the Pacific 2015, ADB Human Development Report 2015, UNDP World Development Indicators 2015, Central Bank of Sri Lanka (a) 2015; (b) 2012; (c) 2010; (d) 2011

5.3: Social Indicators of SAARC Countries

Indicator	Year	Sri Lanka	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan
Human Development Index (a) (Max.:1,000; Min.: 0.000)	2014	0.757	0.465	0.570	0.605	0.609	0.706	0.548	0.538
Literacy Rate, % (15 Years and over)									
Male	2013	94.1(b)	45.4(c)	62.5(d)	na	75.2(3)	98.4(e)	71.1(c)	67.0(c)
Female	2013	92.4(b)	17.6(c)	55.1(d)	na	50.8(e)	98.4(e)	46.7(c)	42.0(c)
Labour Force Participation Rate, %									
Male	2013	74.7(f)	79.5	84.1	77.2	79.9	77.5	87.1	82.9
Female	2013	35.9(f)	15.8	57.4	66.7	27	56.2	79.9	24.6
Unemployment Rate, %									
	2014	4.7(f)	na	4.3(g)	2.9(g)	2.8(c)	na	na	6.0
Employment (% of total employment)									
Agriculture	2013	28.7(f)	na	77.6	56.3	47.2	na	na	43.7
Industry	2013	25.8(f)	na	na	11.0	24.7	na	na	14.1
Services	2013	45.6(f)	na	na	32.7	28.1	na	na	42.2
Population below the income of Poverty Line, % (h)	2004-2014	na	35.8	31.5	12.0	21.9	na	25.2	22.3
Physicians per 10,000 people	2013	9.3(f)	2.7	3.6(c)	2.6(d)	7.0(d)	14.2(i)	na	8.3(i)
Hospital Beds per 10,000 people	2013	37(f)	5(d)	6(c)	18(d)	7(c)	43(j)	5(e)	6(d)
Internet Subscriptions, per 1,000 Persons	2014	20(f)	0	12	33	12	56	8	11
Telephones per 1,000 Persons (Main Lines)	2014	124(f)	3	7	31	21	61	30	26
Telephones per 1,000 Persons (Mobile Phones)	2014	124(f)	3	7	31	21	61	30	26

Sources: Key Indicators for Asia and the Pacific 2015, ADB, Human Development Report 2015, UNDP, Department of Census and Statistics, Central Bank of Sri Lanka

(a) A composite index of life expectancy, education and income.; (b) 2015 provisional data.; (c) 2011; (d) 2012; (e) 2006; (f) 2015; (g) 2013;

(h) National Poverty Line (Data refer to the most recent year available during the period specified); (i) 2010; (j) 2009, na: not available

5.4: Economic Indicators on National Output and Expenditure

Economic Activity	Value (Rs. million)		As a Share of GDP (%)		Rate of Change (%)	
	2014 (a)	2015	2014 (a)	2015	2014 (a)	2015
AGRICULTURE, FORESTRY & FISHERIES	641,493	676,899	7.8	7.9	4.9	5.5
Agriculture and Forestry	520,835	559,445	6.3	6.5	5.1	7.4
Fisheries	120,658	117,453	1.5	1.4	3.7	-2.7
INDUSTRY	2,194,167	2,259,223	26.7	26.2	3.5	3.0
Mining and Quarrying	202,905	201,036	2.5	2.3	2.2	-0.9
Manufacturing	1,292,994	1,354,083	15.7	15.7	2.3	4.7
Electricity, Gas, Water and Waste Treatment	108,157	119,105	1.3	1.4	4.7	10.1
Construction	590,111	584,999	7.2	6.8	6.6	-0.9
SERVICES	4,634,805	4,881,273	56.3	56.6	5.2	5.3
Wholesale and Retail Trade, Transportation, Storage, Accommodation and Food Service Activities	1,914,236	2,002,655	23.3	23.2	4.0	4.6
Information & Communication	44,102	49,613	0.5	0.6	11.6	12.5
Financial, Insurance and Real Estate Activities including Ownership of Dwellings	945,090	1,061,757	11.5	12.3	8.1	12.3
Professional Services and Other Personal Service Activities	1,007,434	1,020,397	12.2	11.8	4.3	1.3
Public Administration, Defence, Education, Human Health and Social Work Activities	723,943	746,852	8.8	8.7	5.5	3.2

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

(a) Provisional

5.5: Composition of Exports 2014-2015

US Dollars million

Category	2014		2015 (a)		Change in value	Y-O-Y (b) Change %	Contribution to Change %
	Value	Share %	Value	Share %			
Agricultural Exports	2,793.9	25.2	2,481.5	23.6	-312.4	-11.2	50.0
Tea	1,628.3	14.6	1,340.5	12.8	-287.8	-17.7	46.0
Rubber	45.3	0.4	26.1	0.2	-19.2	-42.3	3.1
Coconut	356.4	3.2	351.7	3.3	-4.6	-1.3	0.7
Other Agricultural Products	763.9	7.0	763.2	7.3	-0.8	42.7	0.0
Industrial Exports	8,262.0	74.2	7,975.6	75.9	-286.5	-3.5	45.8
Textiles and Garments	4,929.9	44.3	4,820.2	45.9	-109.8	-2.2	17.6
Rubber Products	889.8	8.0	761.2	7.2	-128.6	-14.5	20.6
Petroleum Products	338.0	3.0	373.9	3.6	35.9	10.6	-5.8
Gem & Diamond and Jewellery	393.6	3.5	331.7	3.2	-61.9	-15.7	9.9
Food, Beverages and Tobacco	289.3	2.6	265.2	2.5	-24.0	-8.3	3.8
Machinery and Mechanical Appliances	342.9	3.1	293.8	2.8	-49.1	-14.3	7.9
Printing Industry Products	52.4	0.5	45.7	0.4	-6.7	-12.8	1.1
Transport Equipment	151.8	1.4	243.7	2.3	91.9	60.5	-14.7
Leather, Travel Goods and Footwear	138.9	1.2	135.7	1.3	-3.2	-2.3	0.5
Ceramic Products	41.3	0.4	35.2	0.3	-6.2	-14.9	1.0
Other Industrial Exports	694.1	6.2	669.4	6.4	-24.7	-3.6	4.0
Mineral Exports	59.5	0.5	28.4	0.3	-31.1	-52.3	5.0
Unclassified Exports	14.7	0.1	19.5	0.2	4.8	32.4	-0.8
Total Exports (b)(c)	11,130.1	100.0	10,504.9	100.0	-625.1	-5.6	100.0

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

(a) Provisional; (b) Adjusted; (c) Excludes re-exports, Y-O-Y: Year to Year Change

5.6: Composition of Imports by Major Categories 2014-2015

US Dollars million

Category	2014		2015 (a)		Change in Value	Y-O-Y Change %	Contribution to Change %
	Value	Share %	Value	Share %			
Consumer Goods	3,852.5	19.8	4,713.5	24.9	861.0	22.3	-178.6
Food and Beverages	1,633.7	8.4	1,627.8	8.6	-5.9	-0.4	1.2
Non-Food Consumer goods	2,218.8	11.4	3,085.7	16.3	866.9	39.1	-179.8
Intermediate Goods	11,397.7	58.7	9,638.2	50.9	-1,759.5	-15.4	364.9
Fuel	4,597.3	23.7	2,699.6	14.3	-1,897.7	-41.3	393.6
Textiles and Textile Articles	2,327.6	12	2,296.2	12.1	-32.3	-1.3	6.5
Diamond, Precious stones and Metals	175.4	0.9	161.5	0.9	-13.9	-7.9	2.9
Chemical Products	808.2	4.2	870.3	4.6	62.1	7.7	-12.9
Wheat and Maize	404.7	2.1	357.2	1.9	-47.5	-11.7	9.9
Fertilizer	272.4	1.4	289.6	1.5	17.2	6.3	-3.6
Other Intermediate Goods	2,812.0	14.5	2,963.7	15.7	151.7	5.4	-31.5
Investment Goods	4,152.2	21.4	4,567.0	24.1	414.8	10.0	-86.0
Machinery and Equipment	2,131.0	11.0	2,278.1	12.0	147.1	6.9	-30.5
Transport Equipment	707.3	3.6	930.9	4.9	223.7	31.6	-46.4
Building Materials	1,308.9	6.7	1,352.0	7.1	43.1	3.3	-8.9
Other Investment Goods	4.9	-	5.9	-	1.0	20.6	-0.2
Unclassified Imports	14.4	0.1	15.9	0.1	1.5	10.3	-0.3
Total Imports (b) (c)	19,416.8	100.0	18,934.6	100.0	-482.2	-2.5	100.0

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

(a) Provisional; (b) Adjusted; (c) Excludes re-imports, Y-O-Y: Year to Year Change

5.7: Realised Investments in the Board of Investment (BOI) Enterprises 2014-2015

Category	Number of Projects		Foreign Investment (Rs. million)		Total Investment Potential (Rs. million)	
	2014	2015 (b)	2014	2015 (b)	2014	2015 (b)
Food, beverages and tobacco products	131	130	40,374	44,353	72,409	84,423
Textiles, wearing apparel and leather products	320	318	79,070	84,590	128,828	140,077
Wood and wood products	26	27	9,149	9,466	10,731	10,677
Paper products, publishing and printing	30	29	9,306	9,615	11,719	12,156
Chemical, petroleum, coal, rubber and plastic products	132	133	69,581	78,244	92,381	101,563
Non-metallic mineral products	80	76	23,443	21,490	46,948	48,309
Basic metal products	–	–	–	–	–	–
Fabricated metal products, machinery and transport equipment	88	84	21,283	25,819	30,201	41,214
Manufactures products (nes)	151	154	26,719	29,661	37,286	39,979
Services	993	1038	854,080	933,014	1,325,199	1,513,410

Source: Annual Report 2014 & 2015, Central Bank of Sri Lanka

(a) Cumulative figures as at end of the year; (b) Provisional

nes: not elsewhere specified

5.8: Education Indicators in General Education

Item	2013	2014	2015 (a)
Total Schools (No.)	10,849	10,971	10,997
Government Schools	10,012	10,121	10,144
Private (b)	103	103	104
Pirivenas	734	747	749
Total Students (No.)	4,307,625	4,354,011	4,418,173
Government Schools	4,037,095	4,078,798	4,129,534
Private (b)	130,344	131,397	136,228
Pirivenas	66,116	62,897	64,806
New Admissions (No.) (c)	342,451	348,288	323,337
Total Teachers (No.)	243,332	253,649	259,697
Government Teachers	223,752	232,990	236,999
Other (Private Schools and Pirivenas)	12,379	12,932	13,851
Student/Teacher Ratio (Government Schools)	18	18	17
Expenditure on Education (Rs. million) (d)	151,801	190,150	225,047
Expenditure as a % of GDP (e)	1.58	1.82	2.01

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

(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

5.9: Number of Government Schools 2015

Province	1AB	1C	Type 2	Type 3	Total
Western	193	252	497	417	1,359
Central	115	317	467	620	1,519
Southern	150	206	378	379	1,113
Northern	98	109	302	471	980
Eastern	94	176	356	477	1,103
North Western	108	256	476	409	1,249
North Central	61	129	235	379	804
Uva	78	182	315	317	892
Sabaragamuwa	108	174	436	407	1,125
Total	1,005	1,801	3,462	3,876	10,144

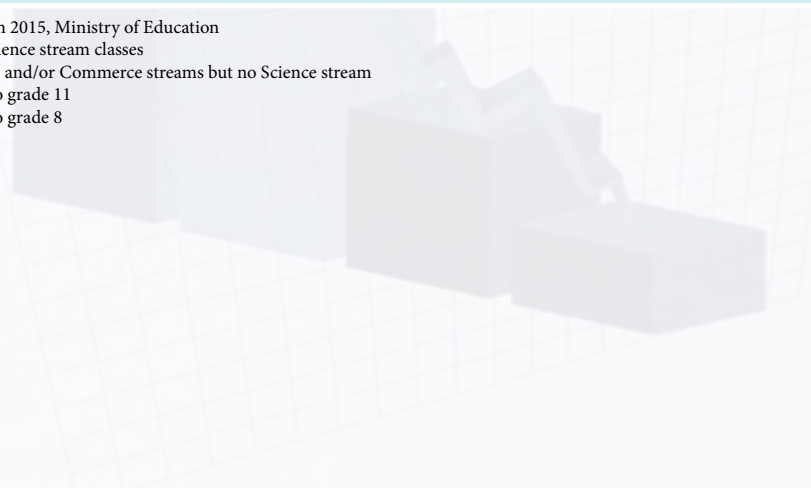
Source: Sri Lanka Education Information 2015, Ministry of Education

1AB: Schools having Advanced Level Science stream classes

1C: Schools having Advanced Level Arts and/or Commerce streams but no Science stream

Type 2: Schools having classes only up to grade 11

Type 3: Schools having classes only up to grade 8



5.10: Number of Students Studying Science in G.C.E. Advance Level in Government Schools 2015

Province	Sinhala Medium	English Medium (Students with Primary Education in Sinhala)	Tamil Medium	English Medium (Students with Primary Education in Tamil)	Total
Western	29,156	2,215	956	95	32,422
Central	10,992	575	1,880	315	13,762
Southern	20,372	81	73	0	20,526
Northern	41	0	6,524	201	6,766
Eastern	1,386	0	7,054	36	8,476
North Western	11,317	681	1,277	10	13,285
North Central	5,294	53	307	0	5,654
Uva	7,063	156	150	0	7,369
Sabaragamuwa	9,963	216	363	99	10,641
Total	95,584	3,977	18,584	756	118,901

Source: Sri Lanka Education Information 2015, Ministry of Education

5.11: Health Service Indicators of Public Sector 2012-2015

Item	2012	2013	2014	2015(a)
Hospitals (Practicing Western Medicine) (No.)	593	603	601	610
Beds (No.)	73,437	74,636	76,918	76,781
Primary Health Care Units	480	481	484	475
Doctors (No.)	17,129	17,553	17,903	19,429
Asst. Medical Practitioners (No.)	1,061	1,057	1,055	1,017
Nurses (No.)	30,136	30,928	31,964	32,272
Attendants (No.)	8,403	8,091	8,215	8,689
In-Patients (No.'000)	5,840	5,926	na	na
Out-Patients (No.'000)	50,631	53,861	54,970	na
Ayurvedic Physicians (No.) (b)	20,712	21,060	22,422	22,672
Total Health Expenditure (Rs. million)	99,101	119,530	138,403	177,789
Current Expenditure	81,946	99,609	116,151	140,560
Capital Expenditure	17,155	19,920	22,252	37,230
Total Health Expenditure as a % of GDP (c)	1.13	1.25	1.32	1.59

Sources: Ministry of Healthcare and Nutrition

Department of Ayurveda

Ministry of Finance and Planning

Central Bank of Sri Lanka

(a) Provisional;

(b) Registered with the Department of Ayurvedic Commissioner;

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

na: not available

5.12: Key Indicators in Infrastructure Development in Public Communication Sector 2013-2015

Commodity	2013	2014	2015(a)
Telecommunication			
Telephones–Wire line Telephones	1,062,065	1,123,126	1,128,291
Wireless Local Loop	1,644,722 (b)	158,722	1,472,905
Cellular Phones	20,315,150 (b)	22,123,000	24,384,544
Public Pay Phones (No. of Booths)	6,773	6,642	5,809
Internet and E-mail Subscribers	2,009,456	3,396,295	4,090,920
Postal Services			
Delivery Areas (No.)	6,729	6,729	6,729
Main Post Offices (No.)	651	653	653
Sub Post Offices (No.)	3,375	3,410	3,410
Agency Post Offices (No.)	497	524	524
Area Served by a Post Office (Sq. Km)	14	13	13
Population Served by a Post Office (No.)	4,447	4,427	4,468
Letters per Inhabitant (No.)	13	18	18

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

(a) Provisional

(b) Includes mobile broadband connections

5.13: Performance of Power and Energy Sector 2014-2015

Item	2014	2015(a)	Growth Rate (%)	
			2014	2015(a)
Installed Capacity (MW)	3,932	3,850	17.0	-2.1
Hydro (b)	1,377	1,377	1.2	0.0
Fuel Oil (c)	1,215	1,115	-9.0	-8.2
Coal	900	900	200.0	0.0
NCRE (d)	440	458	20.4	4.1
Units Generated (GWh)	12,357	13,090	3.9	5.9
Hydro (b)	3,632	4,904	-39.4	35.0
Fuel Oil (c)	4,305	2,276	32.1	-47.1
Coal	3,202	4,443	118	38.8
NCRE (d)	1,217	1,466	3.3	20.4
Total Sales by CEB (GWh)	11,063	11,786	4.2	6.5
Total Sales LECO (GWh)	1,271	1,352	-0.9	6.4
Overall System Loss of CEB (%)	10.5	10	-2.4	-4.5
Number of Consumers ('000) (f)	5,929	6,171	3.7	4.1
o/w Domestic and Religious	5,235	5,444	3.7	4.0
Industrial	58	60	2.5	3.4
General Purpose and Hotel (e)	633	665	4.2	5.1

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

(a) Provisional; (b) Excluding mini hydro power plants; (c) Inclusive of Independent Power Producers (IPPs); (d) Refers to Non-Conventional Renewable Energy including mini hydro; (e) Inclusive of sales to government category; (f) Inclusive of LECO consumers

DEFINITIONS

The definitions and classifications used in the National R&D Survey 2015 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 of knowledge including the knowledge of humanity, culture and society, and the use of this stock of knowledge to device new applications.

The term R&D covers three activities:

- 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. However, it is 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 produce new materials, products and devices; to install new processes, systems and services; or to improve substantially those already produced or installed.

2. Sectors

Government sector: Includes all Departments, Institutions and other Corporate or Statutory bodies, which furnishes different types of services but normally they do not sell them to the community.

Higher Education sector: Includes all Universities, Colleges of Technology and other Institutions that provide 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 (PNP) institutions mainly serving them.

3. 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 equipment, 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 (devote money) for R&D work

5. Sources of funds

Business Enterprise Sector:

- All firms organizations and institutions whose primary activity is the market production of goods or services (other than the higher education sector) for sale to the general public at an economically significant price.
- The Private Non Profit (PNP) institutions mainly serving them.

Private Non Profit (PNP) Sector:

- Non-market, Private Non Profit institutions serving the households
- Private individuals or households

Funds from Foreign Sources:

- All institutions and individuals located outside the country
- All international organizations (except business enterprises), including facilities and operations with frontiers of a country.

Own funds:

- Funds generated by the institutions of its own activities.

Funds from Other Sri Lankan Sources:

- All organizations, institutions, bodies, that are not mentioned in one of the above sectors e.g. NSF, NRC, CARP etc.

6. 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 services such as canteen and security.

Scientists: Experts who possess qualification on level of degree or above in the area of Science and Technology and presently engage in work related to science and technology including social sciences. The work can be R&D or services in the area of S&T. This excludes medical physicians, teachers etc.

Researchers: Professionals engaged in the conception or creation of new knowledge, products, processes, methods, systems and also in the management of the projects concerned. Postgraduate students at the PhD level and MPhil 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.

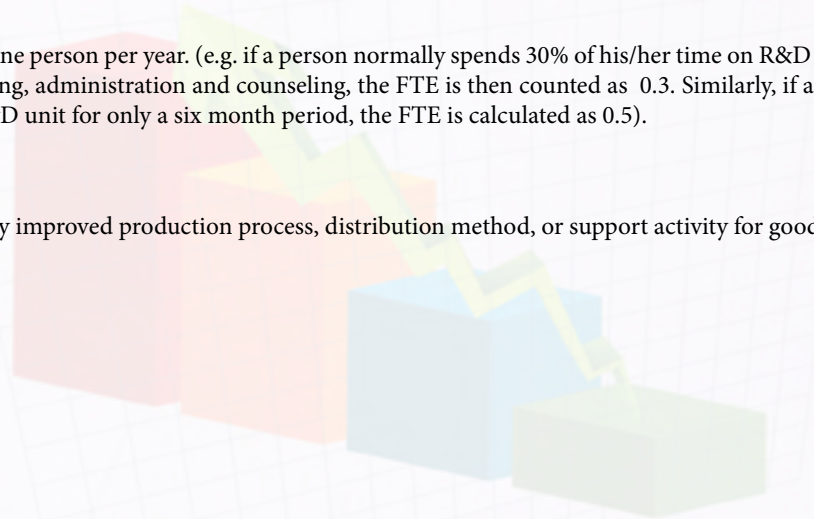
Other supporting staff: Includes skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with (or providing services to researchers involved in) such projects.

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.

Full Time Equivalent (FTE): One person per 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).

7. Innovation

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



Survey Team of 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
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- ***Ms Ayomi Palihawadana, Confidential Secretary and Mrs Ajantha Kanthi (Management Assistant)***
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- ***Mr H.D. Lakshitha (Technical Assistant)***
Gave Technical Assistant to conduct the survey
- ***Mrs Chandima Samarasinghe (Management Assistant)***
Overall typesetting and Designed of the handbook including designing of the coverpage

Science and Technology Policy Research Division of the National Science Foundation

“Science Indicators for Policy Development”

The NSF also functions as a research arm in the area of S&T Policy by providing evidence based policy recommendations for the policy formulation and addressing the gaps in the existing policies, aiming towards rapid socio-economic development in the country through Science Technology and Innovation.

The main focuses made on these directions are:

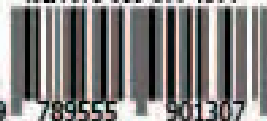
1. Undertaking science, technology and innovation (STI) policy research in the areas of importance to make recommendations towards policy formulation.
2. Developing various databases relevant to all sectors of STI that will be useful for decision making.
3. Undertaking public awareness programmes and public discourses on nationally important issues related to the areas of STI.
4. Investigating, collecting, researching and securing Indigenous Knowledge (IK) that exists and being practiced in Sri Lanka.
5. Undertaking capacity building of human resources especially in the areas of Social Sciences and Indigenous Knowledge.

Few activities of the Division:

1. National Research and Development (R&D) Survey
2. Science and Technology Management Information System (STMIS)
3. Study on Social Science Research in Sri Lanka
4. Study on employability of Science and Technology Graduate and Postgraduate passed out from local universities
5. Research and relevant activities under the areas of STI Policy and Social Sciences
6. Data collection, documentation, investigation and research in the areas of Indigenous Knowledge

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