MAIN

NATIONAL SURVEY OF RESEARCH AND EXPERIMENTAL DEVELOPMENT

MAIN ANALYSIS REPORT
2012/13

REPORT

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Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

HSRC
Human Sciences
Research Council

REPUBLIC OF SOUTH AFRICA
STATISTICIAN-GENERAL
NSS
National Statistics System

ACKNOWLEDGEMENTS

The South African National Survey of Research and Experimental Development (R&D Survey) is conducted annually by the Human Sciences Research Council's Centre for Science, Technology and Innovation Indicators (HSRC-CeSTII) on behalf of the Department of Science and Technology (DST).

The project team extends its appreciation to Dr Phil Mjwara, Director-General of the DST, Prof. Olive Shisana, Chief Executive Officer of the HSRC, Dr Temba Masilela, Deputy CEO: Research of the HSRC, and Mr Pali Lehohla, Statistician-General, for their support of the R&D survey. The support and contributions of Mr Imraan Patel, Mr Godfrey Mashamba, Ms Tshidi Mamogobo, Ms Rose Msiza, and Ms Kgomotso Matlapeng of the DST are much appreciated.

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Interactions with the Organisation for Economic Co-operation and Development's (OECD) Working Party of National Experts on Science and Technology Indicators (NESTI) have provided invaluable assistance in improving the standard of the South African R&D surveys and analysis of the results. We are also most grateful for and acknowledge the co-operation of the respondents to the questionnaire.

The core team of the R&D survey included the following persons in alphabetical order:

Thomson Batidzirai, Isabel Basson, Mario Clayford, Takura Kupamupindi, Demetre Labadarios, Vaughan Leiberum, Natalie le Roux, Gillian Marcelle, Zandile Matshaya, Neo Molotja, Precious Mudavanhu, Nazeem Mustapha, Nolitha Nkobole, Saahier Parker, Julien Rumbelow, Natasha Saunders, Ronel Sewpaul, Moses Sithole and Natalie Vlotman.

FOREWORD

The Statistics Act (No. 6 of 1999) is the institutional machanism by which the Statistican General (SG) leads and coordinates statistical production and use in the country. Statistics as a global lingua franca and currency through the Act, the Statistician-General leads and coordinates stastistical knowledge bases between South Africa and the world. This provision enables an arrangement whereby, for more than a decade, the Department of Science and Technonlogy (DST) has been coordinating the production of Research and Experimental Development (R&D) survey as a partner within the National Statistics System (NSS). The survey contributes to a body of statistics that on the contribution of R&D to development and change in South Africa as well as in the global context.

The survey is subject to an ongoing quality assessment process in terms of the South African Statistical Quality Assessment Framework (SASQAF) to ensure that the survey remains credible and fit for purpose. Through implementing the quality improvement plan, major strides have been made in improving the quality of the R&D survey processes and its output over time. The response rate of 67.6% achieved in the 2012/13 survey, for instance, is a 10.4 percentage point improvement from the 2011/12 survey. This still needs to be improved further, and can only be achieved with greater cooperation from organisations targeted by the survey in providing responses.

Recent revisions of international guidelines concerning R&D and economic measurement recognise R&D as an activity leading to the creation of intellectual asset, thus contributing to future economic activity. This requires that we change the way we treat R&D data when compiling national Gross Domestic Product (GDP) estimates so that it becomes part of the capital formation and not as an intermediate consumption expenditure, as has been done in the past. Accordingly, work to incorporate this requirement is already underway in South Africa.

Given my assessment of this survey, I endorse the 2012/13 Research and Development Survey results and urge institutions of the state to use it as an integral part of the information arsenal that informs development in South Africa and globally.

Pali J Lehohla
Statistician-General

PREFACE

The South African government's Medium Term Strategic Framework (2014-2019) includes a policy target for increasing research and development (R&D) expenditure – to 1,5% of GDP - in order to support growth and development. This is because our country relies on scientific research and technological advancements to maintain its competitive edge.

By giving estimates of the magnitude, supply and flows of resources devoted to R&D, the national R&D survey not only helps us monitor the country's performance against targets, but also helps us understand how the R&D system is changing over time.

The 2012/13 GERD results suggest that the decline in investment in Research and Development from 2009/10, has been arrested. South Africa has recorded increased investment in R&D during the period from 2011/12 to 2012/13. This trend has also been seen in other countries after the economic challenges from 2008. However, even with this increased investment and an improved outlook for the future years, South Africa's Gross Expenditure on Research and Development has remained at 0,76% of GDP over the past three years. Increased investment in Research and Development must be encouraged in order to reap the benefits of our geographic advantages as well as to increase our competitiveness in a challenging global environment. Government's focus on creating a climate for this investment has resulted in enabling policies in Human Capital development, research infrastructure, incentives for increased private sector investment, and international cooperation in science and technology. Over the next five years we will continue to encourage a significantly increased private and public sector investment in Research and Development.

I extend my appreciation, on behalf of the Department of Science and Technology, to the Centre for Science, Technology and Innovation Indicators for their efforts in conducting this survey each year, and to Statistics South Africa for facilitating the process to assess the quality of the R&D statistics.

A special word of thanks goes to all the survey respondents, in both the private and the public sector, who gave their time so readily to make this survey a success.

GNM Pandor, MP
Minister of Science and Technology

LIST OF ABBREVIATIONS

AIDS	Acquired immune deficiency syndrome
AU	African Union
BERD	Business expenditure on R&D
BRICS	Brazil, the Russian Federation, India, China and South Africa
CEO	Chief Executive Officer
CeSTII	Centre for Science, Technology and Innovation Indicators
DACST	Department of Arts, Culture, Science and Technology
DST	Department of Science and Technology
FTE	Full-time equivalent
GDP	Gross domestic product
GERD	Gross domestic expenditure on R&D
HERD	Higher education expenditure on R&D
HIV	Human immunodeficiency virus
HSRC	Human Sciences Research Council
ICT	Information and communication technology
NEPAD	New Partnership for Africa's Development
NESTI	National Experts on Science and Technology Indicators
NDP	National Development Plan
NSS	National Statistics System
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing power parity
QMP	Quality Management Plan
R	Rand (South African currency)
R&D	Research and experimental development
SA	South Africa
SASQAF	South African Statistical Quality Assessment Framework
SEO	Socio-economic objective
SIC	Standard Industrial Classification
SOE	State-owned enterprise
Stats SA	Statistics South Africa
SVC	Statistical Value Chain
TB	Tuberculosis
UIS	UNESCO Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USS	User Satisfaction Survey

DEFINITION OF TERMS

Applied research is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.

Basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.

BERD refers to business expenditure on research and experimental development.

Biotechnology is an application of science and technology to living organisms as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.

Capital expenditure is the annual gross expenditure on fixed assets used in the R&D programmes of statistical units. Such expenditure is reported in full in the period in which it took place and is registered as an element of depreciation. Capital expenditure includes expenditure on land, buildings, instruments and equipment.

Experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

Full-time equivalent (FTE) refers to the number of hours (person years of effort) spent on R&D activities.

Gross domestic product (GDP) is the total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment and government spending, plus the value of exports, minus the value of imports (Statistics South Africa)

Gross expenditure on research and experimental development (GERD) covers all expenditures for R&D performed on national territory in a given year. It thus includes domestically performed R&D which is financed from abroad but excludes R&D funds paid abroad, notably to international agencies.

Headcount refers to the actual number of people directly involved in or supporting R&D (i.e. the total number of R&D personnel).

HERD refers to higher education expenditure on research and experimental development.
In-house or intramural R&D refers to R&D performed by the unit or entity itself (i.e. by the personnel of the unit or entity). This is R&D performed within the borders of South Africa, even if funded by foreign sources.

Labour costs comprise annual wages and salaries and all associated costs or fringe benefits, such as bonus payments, holiday pay, contributions to pension funds and other social security payments, and payroll taxes. The labour costs of persons providing indirect services that are not included in the personnel data (such as security and maintenance personnel or the staff of central libraries, computer departments or head offices) are excluded from labour costs and included in other current expenditure.

New materials pertain to the technology and R&D activities of high-tech companies particularly in the aerospace, construction, electronic, biomedical, renewable energy, environmental remediation, food and packaging, manufacturing and motor car industries. New materials include multi-functional materials, advanced materials, nano-materials, nano-composites and nanotechnology.

Other current expenditure comprises non-capital purchases of materials, supplies and equipment to support R&D performed by the statistical unit in a given year

Other support staff include skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with such projects.

Outsourced R&D refers to R&D done by another entity on behalf of the reporting unit and paid for by the reporting unit.

Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.
Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the management of the projects concerned.

R&D intensity refers to gross expenditure on R&D as a percentage of GDP.

R&D personnel include all persons employed directly on R&D activities, as well as those providing direct services such as R&D managers, administrators and clerical staff.

R&D-performing sectors comprise the government, higher education, business and not-for-profit sectors.

Standard Industrial Classifications (SIC) are codes published by Statistics South Africa for classification of economic activities of industries. (Stats SA, 2004)
Socio-economic objectives (SEO). The SEO classification provides an indication of the main beneficiary(ies) of R&D activities.

Technicians and equivalent staff are persons whose main tasks require technical knowledge and experience in one or more fields of engineering, physical and life sciences, or social sciences and humanities.

Total employment is the total employment in the economy. This statistic is obtained from Stats SA Labour Force Survey series P0211, where employed persons are those aged 15–64 years who, during the reference week, did any work for at least one hour, or had a job or business but were not at work (temporarily absent) . (Stats SA 2014)

Year-on-year changes are calculated as follows: Current year's figure - previous year's figure / previous year's figure × 100%.

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EXECUTIVE SUMMARY

The National Survey of Research and Experimental Development (R&D survey) is undertaken annually to collect data that are used to produce statistics of R&D activities in South Africa. The statistics are used in the development of science policy to set government R&D priorities and funding levels, and for monitoring and benchmarking purposes.

The data are collected from the government, business, not-for-profit, science councils and higher education sectors. This report presents the findings of the 2012/13 R&D survey, which is the eleventh of the series conducted by the Centre for Science, Technology and Innovation (CeSTII) to date.

GERD INCREASED BETWEEN 2011/12 AND 2012/13 IN BOTH NOMINAL AND REAL TERMS

South Africa's gross domestic expenditure on R&D (GERD) amounted to R23.871 billion at current Rand value in 2012/13. This represented a nominal increase of 7.5% from the R22.209 billion recorded in 2011/12. This is the second consecutive year that GERD has increased. At constant 2005 Rand value, GERD amounted to R14.878 billion in 2012/13, representing a real increase of 2.6% from 2011/12. The long-term trend shows that South Africa has almost treble its R&D expenditure in real terms since the 1990s.

GERD AS A PERCENTAGE OF GDP REMAINED AT 0.76% FOR THREE CONSECUTIVE YEARS

GERD as a percentage of gross domestic product (GDP) was 0.76% in 2012/13. This ratio remained constant between 2010/11 and 2012/13. The trend shows that GERD as a percentage of GDP increased from 0.60% in 1997/98, peaked at 0.95% in 2006/07, and declined until it reached 0.76%, where it has remained for three consecutive years from 2010/11 to 2012/13.

GOVERNMENT WAS THE LARGEST FUNDER OF R&D IN 2012/13

Government funded 45.4% while the business sector funded 38.3% of all R&D undertaken in 2012/13. R&D funding from government increased by 13.3% from R9.562 billion in 2011/12 to R10.832 billion in 2012/13. Higher education received 49.8% (R5.396 billion) of the total government funding for R&D, while government institutions including science councils received 42.8% (R4.638 billion). The business sector was the second-largest funder of R&D, contributing 38.3% (R9.152 billion) towards total R&D funding. Most of the R&D funding (91.8.0%) from business was spent in the business sector. The third-largest source of funding for R&D in 2012/13 was from abroad, amounting to 13.1% of total R&D funding, although funding from this source decreased by 6.4% from R3.330 billion in 2011/12 to R3.117 billion in 2012/13.

THE BUSINESS SECTOR WAS THE LARGEST PERFORMER OF R&D IN 2012/13

The R&D expenditure of the business sector (BERD) amounted to R10.571 billion in 2012/13, equivalent to 44.3% of GERD. In real terms, this represented a decline of 3.6% between 2011/12 and 2012/13. R&D expenditure for the higher education sector amounted to R7.333 billion or 30.7% of GERD, making it the second-highest performer of R&D. The increase in the not-for-profit frame resulted in an increase in R&D expenditure from R171 million in 2011/12 to R504 million (2.1% of GERD) in 2012/13.

R&D IN THE BUSINESS SECTOR WAS MOSTLY PERFORMED IN THE FINANCIAL INTERMEDIATION, REAL ESTATE AND BUSINESS SERVICES DURING 2012/13

In 2012/13 expenditure on R&D in the financial intermediation, real estate and business services amounted to R3.915 billion. This was the second consecutive year in which expenditure in this sector was higher than expenditure on R&D in the manufacturing sector. R&D expenditure in the manufacturing sector amounted to R3.477 billion, followed by mining and quarrying at R1.554 billion.

LABOUR COSTS AND OTHER CURRENT EXPENDITURE ON R&D ACCOUNTED FOR THE LARGEST PORTION OF R&D EXPENDITURE

The labour costs of R&D personnel increased from R10.608 billion in 2011/12 to R13.109 billion in 2012/13. Labour costs together with other current expenditure accounted for 90.6% of total GERD. Expenditure on R&D infrastructure and general equipment amounted to R2.243 billion or 9.4% of GERD in 2012/13.

BASIC RESEARCH WAS MOSTLY CONDUCTED IN THE HIGHER EDUCATION SECTOR, WHILE APPLIED RESEARCH WAS DOMINANT IN THE BUSINESS, NOT-FOR-PROFIT, GOVERNMENT AND SCIENCE COUNCILS SECTORS

Applied research accounted for the largest proportion of R&D expenditure in 2012/13, comprising 46.3%, followed by experimental development at 28.4% and basic research at 25.3%. Basic research was the main type of research performed in the higher education sector, accounting for 63.7% of all basic R&D in South Africa in 2012/13. The business sector performed 50.3% of all applied research and 62.0% of total experimental development in 2012/13. In nominal Rand terms, the business sector spent R5.569 billion on applied research and R4.199 billion on experimental development.

IMPROVEMENTS IN INDICATORS OF R&D PERSONNEL ARE LARGELY DRIVEN BY THE INCREASED NUMBER OF RESEARCHERS IN THE HIGHER EDUCATION SECTOR

The R&D personnel headcount increased by 9.1% from 59 487 in 2011/12 to 64 917 in 2012/13. The associated full-time equivalents (FTEs) increased by 13.1% between 2011/12 and 2012/13. Researchers accounted for 66.0% (42 828) of the total R&D workforce in 2012/13. The higher education sector employed the largest number of researchers, with a headcount of 32 955 in 2012/13; 15 514 of these researchers were post-doctoral fellows and doctoral students.

The number of researcher FTEs per 1 000 in total employment remained static at approximately 1.5 over the previous eight years. The number of female researchers was 18 724 in 2012/13 or 43.7% of the total researcher headcount, indicating an increase of 9.0% over the 17 184 recorded in 2011/12.

R&D PERFORMANCE GLOBALLY

Having increased GERD in both 2011/12 and 2012/13, South Africa seems to have followed the general pattern of recovering global R&D expenditure. International comparisons, however, indicate that South Africa's R&D intensity for 2012/13 was below the world average of 1.77%, the European Union average of 1.97% and the OECD average of 2.40%. Among the BRICS countries, Brazil, China and the Russian Federation had an R&D share of GDP above 1.0%, while this figure was below 1% for South Africa and India (2011 data). Different economic contexts must be taken into account when interpreting international comparisons.

INTRODUCTION

This report provides analysis and commentary on the results of the 2012/13 South African National Survey of Research and Experimental Development (R&D survey). This report is accompanied by the Metadata report as well as the Statistical Report that presents key findings and trend data.
The survey covered the main institutional sectors that perform R&D in South Africa, namely the business, not-for-profit, government, science council and higher education sectors. The South African R&D survey is informed by the guidelines of the Organisation for Economic Co-operation and Development (OECD) for measuring R&D, as presented in *The Measurement of Scientific and Technological Activities: Proposed Standard Practice for Surveys on Research and Experimental Development*, commonly known as the Frascati Manual (OECD 2002).

The data in this report are presented in terms of the dimensions of research and experimental development (R&D) expenditure, sources of funding and human resources:

- Gross domestic expenditure on research and experimental development (GERD);
- R&D expenditure by R&D-performing sectors;
- Sources and flows of funding for R&D;
- R&D expenditure by field of research and socio-economic objectives, and by industrial sector in the business sector;
- R&D expenditure in selected areas of policy interest, namely biotechnology, nanotechnology, environment related, open-source software, new materials, and tuberculosis (TB), HIV/AIDS and malaria research; and
- R&D personnel by occupation (researchers, technicians and support staff) and full-time equivalents (FTEs).

The description of the survey methodology is contained in Annexure I.

CHAPTER 1
1. R&D INDICATORS IN CONTEXT

1.1 The importance of R&D statistics

Research and experimental development (R&D) contributes to innovation, competitiveness and economic growth through the creation and diffusion of new knowledge. Countries that appreciate the importance of R&D and innovation acknowledge that increased investments in R&D and other activities such as education lead to technological progress, innovation and skilled human resources, which in turn lead to improved productivity, economic growth and employment.

The R&D survey provides statistics on R&D expenditure and human resources devoted to R&D. In South Africa, the overall objective of the survey is to provide an overview of the status of R&D activities in the country. The data serve as the basis for the development of science policy related to the setting of research priorities, government research funding levels, human capital development, and R&D and innovation incentive schemes. Comparisons are made with the R&D data of other countries, where available.
Key R&D indicators have grown to become important instruments for policy makers. Gross expenditure on R&D (GERD) as a percentage of gross domestic product (GDP), or R&D intensity, has become the key indicator of R&D performance. It is now common practice for countries to adopt targets for this indicator to help focus policy decisions and public funding.

The second-most widely used R&D statistic is R&D personnel with a focus on researchers, who are critical to the creation of new knowledge. R&D intensity is used in conjunction with other indicators such as GERD per capita to benchmark the level of performance of countries, regions, sectors, R&D teams and individual researchers.

The indicators go beyond the expenditure and personnel statistics; lately statistical agencies around the world are seeking to incorporate R&D in the system of national accounts to measure its relation to productivity growth. Furthermore, the internationalisation of R&D activities has gained momentum during the past two decades, and the R&D activities of foreign affiliates are therefore tracked. The cross-border R&D expenditure of foreign affiliates is an indicator of the openness of the economy.

The South African R&D survey also provides information that can be used in addressing a range of socio-economic issues. Strategic policy documents such as the White Paper on Science and Technology (DACST 1996), the National Research and Development Strategy (DACST 2002), the Ten Year Innovation Plan for South Africa, 2008–2018 (DST, 2007) and the National Development Plan (The Presidency, 2011) make specific commitments with respect to the

country's scientific and technological activities, including R&D, in order to attain national goals. The measurement and monitoring of R&D is therefore also linked to other mechanisms for understanding the output of R&D and its impact on the economy and society.

1.2. Key indicators

The R&D survey produces a number of indicators. The key indicators for 2012/13 are presented in Table 1.1 and compared with the equivalent indicators for 2011/12 and 2010/11.

TABLE 1.1: KEY R&D INDICATORS, SOUTH AFRICA, 2012/13 WITH COMPARATIVE FIGURES FOR 2011/12 AND 2010/11

KEY INDICATOR	VALUE		
	2010/11	2011/12	2012/13
Gross domestic expenditure on R&D (GERD) (R million)	20 254	22 209	23 871
Gross domestic product (GDP) at current prices (R million)	2 664 269	2 917 539	3 138 980
GERD as a percentage of GDP (%)	0.76	0.76	0.76
Civil GERD as a percentage of GDP (%)	0.71	0.72	0.72
Basic research (R million)	4 848	5 440	6 031
Total R&D personnel (FTE*)	29 486.4	30 978.4	35 050.3
Total researchers (FTE*)	18 719.6	20 115.1	21 382.4
Total researchers (FTE*) per 1 000 in total employment	1.4	1.5	1.5
Total R&D personnel (FTE*) per 1 000 in total employment	2.2	2.3	2.4
Total researchers (headcount)	37 901	40 653	42 828
Female researchers (headcount) as a percentage of total researchers (%)#	41.7	42.3	43.7
Total employment	**13 118**	**13 497**	**14 558**

Data note	* FTE = Full-time equivalent. # Following OECD practice, doctoral students and post-doctoral fellows are included as researchers.
Data sources	South African National Survey of Research and Experimental Development, 2010/11 to 2012/13 GDP values: Stats SA, P0441 series, GDP 3rd Quarter 2013 (Stats SA 2013) Total employment value: Stats SA, Labour Force Survey, P0211 series (Stats SA 2014)

CHAPTER 2
R&D EXPENDITURE

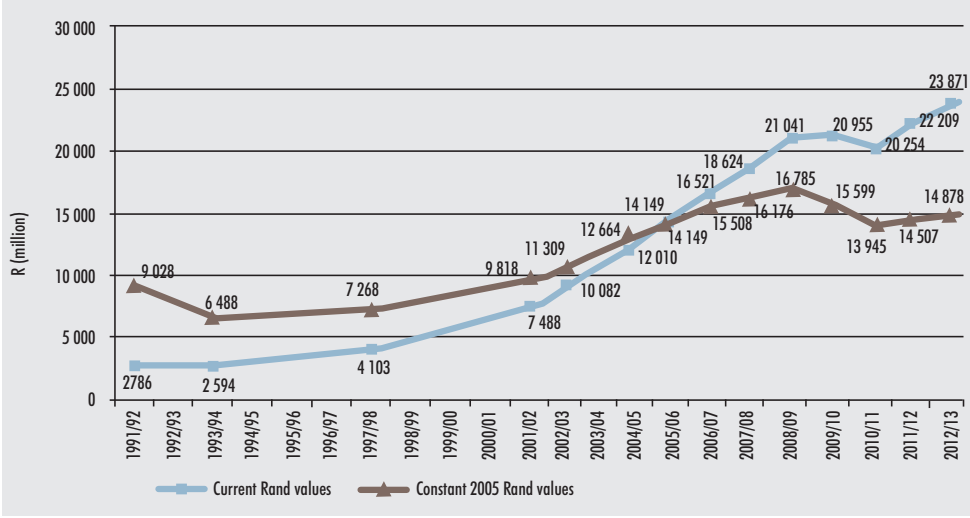
2.1. Gross domestic expenditure on R&D

Gross domestic expenditure on research and experimental development (GERD) amounted to R23.871 billion in 2012/13. This represents a nominal increase of 7.5% from the R22.209 billion recorded in 2011/12. At constant 2005 Rand value, GERD amounted to R14.878 billion in 2012/13, which was an increase of R371 million from R14.507 billion in 2011/12.

R&D expenditure has been increasing nominally between 2001/02 and 2012/13, with the exception of 2008/09 and 2009/10. R&D expenditure at constant Rand values has yet to reach the highest value recorded in 2008/09.

All sectors registered an increase in nominal R&D expenditure in 2012/13, with noticeable increases particularly in the not-for-profit and higher education sectors.

FIGURE 2.1: GERD IN CURRENT AND CONSTANT 2005 RAND VALUE (R MILLION), SOUTH AFRICA, 1991/92 TO 2012/13



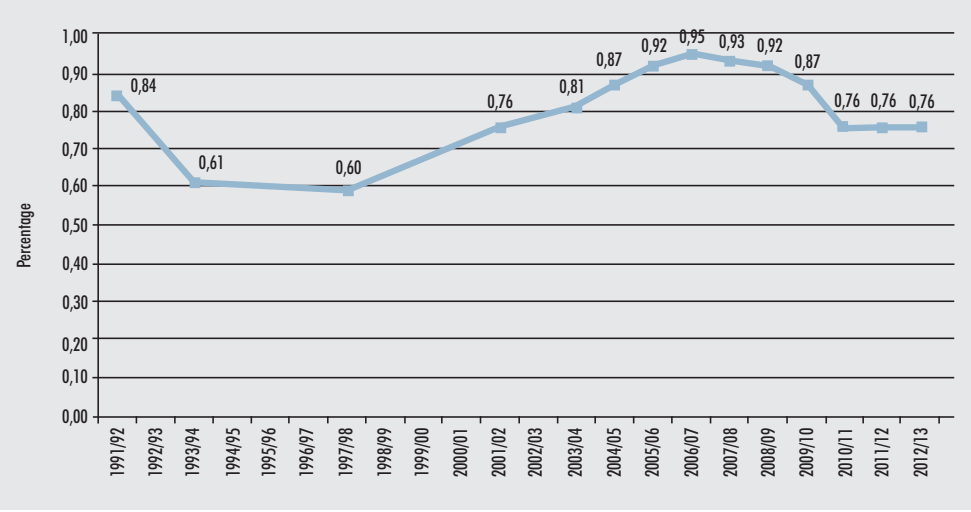
Data note	The GDP deflator value of 160.44313, derived from the Stats SA GDP series P0441 in November 2013 (Stats SA 2013), was used to calculate constant 2005 Rand values. The differences in figures between 2011/12 and 2012/13 are due to StatsSA revisions of GDP which were applied in 2011/12 but not in 2012/13.
Data sources	South African National Survey of Research and Experimental Development, 1991/92 to 2012/13 GDP values: Stats SA, P0441 series, GDP 3rd Quarter 2013 (Stats SA 2013); South African Reserve Bank (2013) for 1991/92 GDP.

2.2. GERD as a percentage of GDP

GERD expressed as a percentage of GDP indicates the concentration or intensity of R&D in an economy. GERD as a percentage of GDP is one of the indicators used to compare countries' research efforts and competitiveness internationally. GERD as a percentage of GDP in South Africa was 0.76% in 2012/13. This ratio has been constant for three consecutive years since 2010/11.

The trend shows that GERD as a percentage of GDP in South Africa increased from 0.60% in 1997/98 and peaked at 0.95% in 2006/07. Since then, the rate of increase in R&D expenditure in nominal Rand value has increased, but not at the same rate as the growth in GDP, and thus the indicator has displayed a relative decline since 2007/08, and no change between 2010/11 and 2012/13.

FIGURE 2.2: GERD AS A PERCENTAGE OF GDP, SOUTH AFRICA, 1991/92 TO 2012/13



Data sources	National Survey of Research and Experimental Development, 1991/92 to 2012/13. GDP values: Stats SA, P0441 series, GDP 3rd Quarter 2013 (Stats SA 2013); South African Reserve Bank (2013) for 1991/92 GDP

2.3. GERD by sector

Business expenditure on R&D (BERD) amounted to R10.571 billion in 2012/13, equivalent to 44.3% of GERD. This represented R6.588 billion BERD at constant 2005 Rand value for 2012/13, which was a 3.6% decrease from the R6.835 billion recorded in 2011/12. The business sector remained the largest performer of R&D in South Africa; however, increases in

expenditure in the higher education sector over the past four years have increased the share of GERD attributed to higher education.

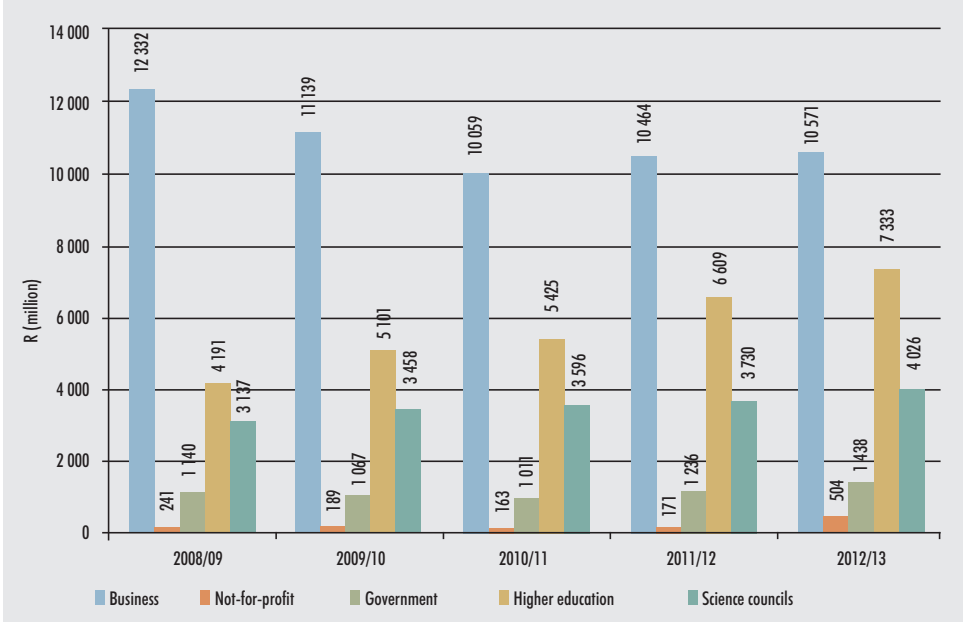
Higher education expenditure on R&D (HERD) increased from R6.609 billion in 2011/12 to R7.333 billion in 2012/13 and accounted for 30.7% of GERD. At constant 2005 Rand value, this represented a 5.9% increase in R&D expenditure by higher education institutions from R4.317 billion in 2011/12 to R4.571 billion in 2012/13.

Government expenditure on R&D constituted 6.0% of GERD and increased from R1.236 billion in 2011/12 to R1.438 billion in 2012/13. At constant 2005 Rand value, this represented an increase of 11.0% from R807 million in 2011/12 to R896 million in 2012/13.

The science councils spent R4.026 billion on R&D in 2012/13, which accounted for 16.9% of GERD. This was an increase of R296 million from the R3.730 billion expenditure in 2011/12. At constant 2005 Rand value, this represented a 3.0% increase from R2.436 billion in 2011/12 to R2.509 billion in 2012/13.

Not-for-profit organisations recorded an increase in R&D expenditure from R171 million in 2011/12 to R504 million in 2012/13. At constant 2005 Rand value, this represented a 181.8% increase from R111 million in 2011/12 to R314 million in 2012/13.

FIGURE 2.3: R&D EXPENDITURE BY SECTOR (R MILLION), SOUTH AFRICA, 2008/09 TO 2012/13



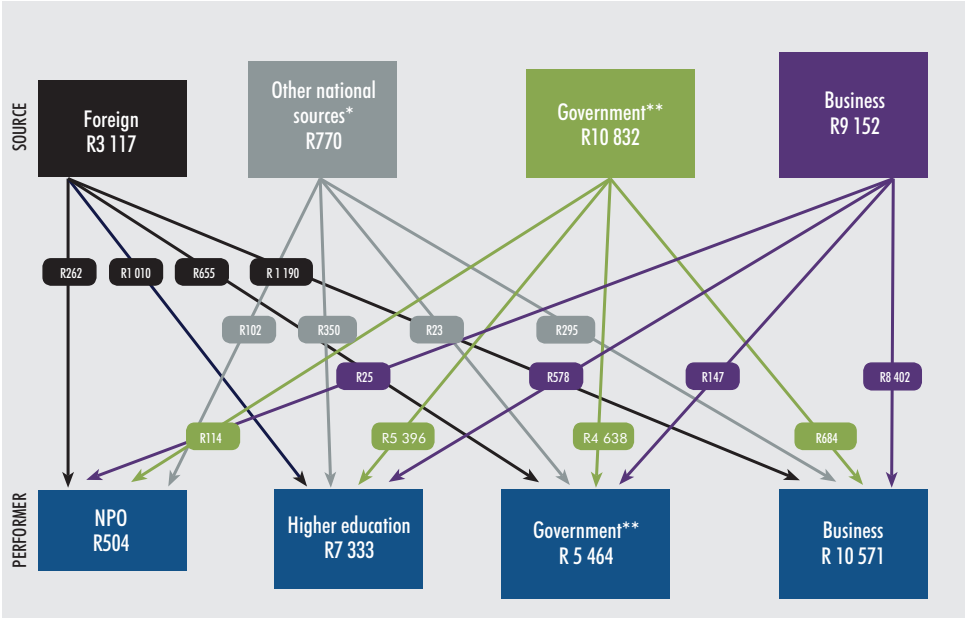
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

CHAPTER 3
FUNDING FOR R&D

3.1. Major flows of R&D funding

Government funded the largest proportion of R&D in South Africa in 2012/13. The funding increased by 13.3% from R9.562 billion in 2011/12 to R10.832 billion in 2012/13. Higher education received 49.8% (R5.396 billion) of the total government R&D funding, while government institutions including science councils received 42.8% (R4.638 billion) from the same source. The business and not-for-profit sectors were the smallest recipients of R&D funding from government, receiving 6.3% (R684 million) and 1.1% (R114 million) respectively. The business sector was the second-largest funder of R&D, contributing 38.3% (R9.152 billion) towards total R&D funding. The third-largest source of funding for R&D in 2012/13 was from abroad, amounting to 13.1% (R3.117 billion). R&D funding from abroad decreased by 6.4% from R3.330 billion in 2011/12 to R3.117 billion in 2012/13.

FIGURE 3.1: MAJOR FLOWS OF FUNDING, (R MILLION), SOUTH AFRICA, 2012/13



*Other national sources includes contributions from higher education, not-for-profit organisations and individual donations
**Government includes science councils

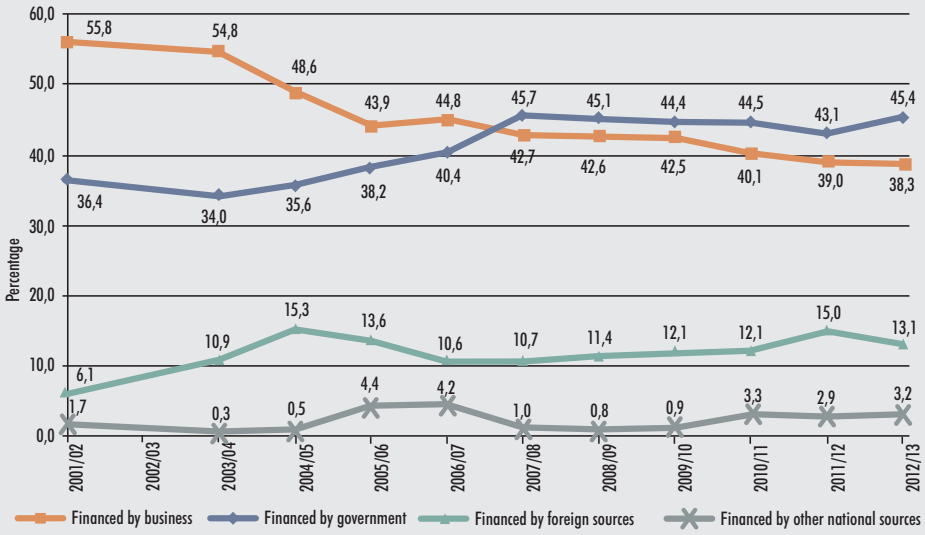
Data sources	National Survey of Research and Experimental Development, 2012/13

3.2. GERD by sources of funds

Government-funded R&D included all public funding for R&D received by the higher education, science councils, business and government departments. Government and business enterprises have consistently funded the largest proportion of GERD in South Africa, with government funding exceeding business funding since 2007/08. The proportion of R&D funds from government and other national sources increased in 2012/13, while the proportion of funds from business and foreign sources decreased.

The proportion of GERD financed from abroad decreased to 13.1% of GERD in 2012/13 after increasing from 10.6% in 2006/07 to 15.0% in 2011/12. There was an increase in the percentage of GERD funded by other national sources from 2.9% in 2011/12 to 3.2% in 2012/13; this percentage has stayed relatively constant since 2010/11.

FIGURE 3.2: GERD BY SOURCE OF FUNDS (PERCENTAGE), SOUTH AFRICA, 2001/02 TO 2012/13



Data sources	National Survey of Research and Experimental Development, 2001/02 to 2012/13

3.3. Business-funded R&D

The business sector almost exclusively funded its own research in the period 2008/09 to 2012/13. The funding increased steadily between 2007/08 and 2012/13, with the only decrease experienced in 2010/11.

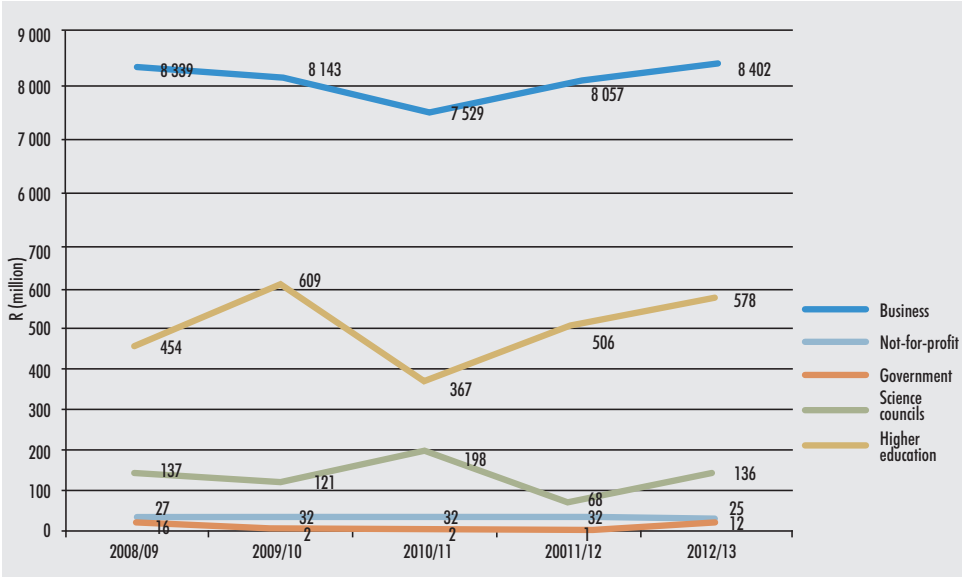
Higher education was the second-largest recipient of funding from the business sector, with the investment increasing from R506 million in 2011/12 to R578 million in 2012/13. R&D funding by business to science councils grew from R68 million in 20011/12 to R136 million in 2012/13. The not-for-profit and government sectors received the least funding from business; in 2012/13 the non-for-profit sector received R25 million and the government sector R12 million. However, there was a tenfold increase in funding from the business sector to government during the same year.

TABLE 3.1: BUSINESS-FUNDED R&D BY SECTOR OF PERFORMANCE (R '000), SOUTH AFRICA, 2008/09 TO 2012/13

Sector	2008/09	2009/10	2010/11	2011/12	2012/13
Business	8 339 379	8 142 996	7 528 667	8 056 545	8 402 340
Not-for-profit	26 591	32 427	31 627	32 081	24 894
Government	15 980	2 326	2 406	1 355	11 552
Science councils	137 356	120 528	198 206	67 614	135 729
Higher education	454 184	609 250	367 340	505 510	577 527
Total (current Rand value)	**8 973 490**	**8 907 527**	**8 128 246**	**8 663 105**	**9 152 042**
Total (constant 2005 Rand value)	**7 216 201**	**6 614 370**	**5 630 165**	**5 658 736**	**5 704 202**

Data note	The GDP deflator value of 160.44313, derived from the Stats SA GDP series P0441 in November 2013 (Stats SA 2013), was used to calculate constant 2005 Rand values.
Data sources	South African National Survey of Research and Experimental Development, 1991/92 to 2012/13 GDP values: Stats SA, P0441 series, GDP 3rd Quarter 2013 (Stats SA 2013); South African Reserve Bank (2013) for 1991/92 GDP.

FIGURE 3.3: BUSINESS-FUNDED R&D BY SECTOR OF PERFORMANCE (R MILLION), SOUTH AFRICA, 2008/09 TO 2012/13



Data sources	National Survey of Research and Experimental Development, 2008/09 to 2012/13

3.4. Government funding of local R&D

Science councils and higher education institutions receive the most funding from government. This trend continued in 2012/13, with higher education institutions receiving R5.396 billion and science councils R3.369 billion from government for R&D performance. Government funding of R&D to the government sector (excluding science councils) increased from R1.112 billion in 2011/12 to R1.269 billion in 2012/13. The business sector received R684 million from government in 2012/13, while not-for-profit organisations received R114 million in funding over the same period.

TABLE 3.2: GOVERNMENT-FUNDED R&D (R'000), 2008/09 TO 2012/13

Sector	2008/09	2009/10	2010/11	2011/12	2012/13
Business	2 567 140	1 429 766	832 173	499 298	683 669
Not-for-profit	32 711	38 484	41 830	40 992	114 461
Government	1 068 527	1 008 475	990 290	1 112 307	1 269 337
Science councils	2 602 458	2 917 683	2 932 489	3 310 894	3 368 555
Higher education	3 226 674	3 918 620	4 222 092	4 598 426	5 395 871
Total (current Rand value)	**9 497 510**	**9 313 028**	**9 018 874**	**9 561 917**	**10 831 893**
Total (constant 2005 Rand value)	**7 637 601**	**6 915 479**	**6 247 073**	**6 245 839**	**6 751 302**

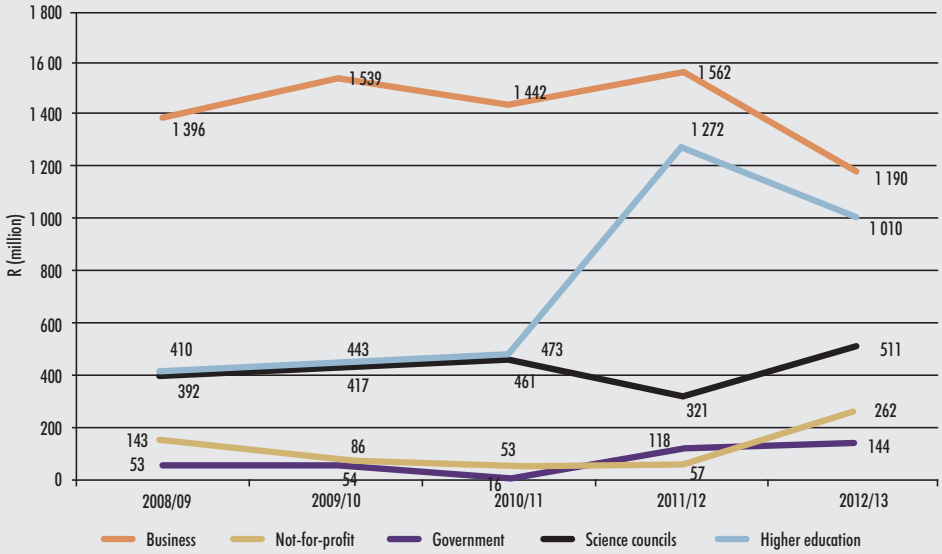
Data note	The GDP deflator value of 160.44313, derived from the Stats SA GDP series P0441 in November 2013 (Stats SA 2013), was used to calculate constant 2005 Rand values.
Data sources	National Survey of Research and Experimental Development, 2008/09 to 2012/13 GDP values: Stats SA P0441 series, GDP third Quarter 2013 (Stats SA 2013)

3.5. Foreign funding of local R&D

The proportion of foreign-funded R&D was highest in the business sector, although it decreased from R1.562 billion in 2011/12 to R1.190 billion in 2012/13. Foreign funding of higher education R&D decreased from R1.272 in 2011/12 to R1.010 in 2012/13. The increase in 2011/12 was mainly due to one institution that received a large R&D project. Science councils received more foreign funding for R&D in 2012/13 than in 2011/12; the funding increased by 59.0% over that period, from R321 million to R511 million.

Not-for-profit organisations and government, which receive the smallest percentages of foreign funds, showed an increase in foreign funding in 2012/13. Not-for-profit organisations recorded R262 million in foreign funding (an increase of R205 million), and government recorded R144 million (an increase of R26 million).

FIGURE 3.4: FOREIGN-FUNDED R&D BY SECTOR OF PERFORMANCE (R MILLION), SOUTH AFRICA, 2008/09 TO 2012/13



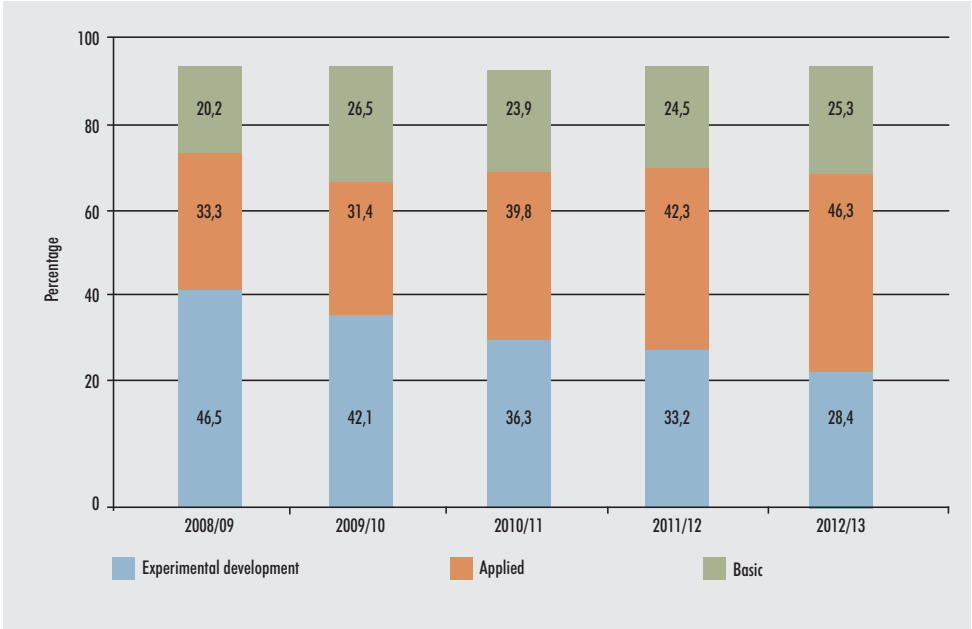
Data note	Foreign sources include all funding from foreign sources from all sectors.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

CHAPTER 4
CATEGORIES OF GERD

4.1. GERD by type of research

R&D expenditure on applied research continued to account for the largest proportion of R&D expenditure in 2012/13 at 46.3% of total GERD, compared to 42.3% in 2011/12. R&D expenditure on experimental development was 28.4% and basic research stood at 25.3% in 2012/13. The observed trend in R&D expenditure towards increased expenditure on applied research over the five-year period continued from 2008/09 to 2012/13, with a 4.0% nominal increase between 2011/12 and 2012/13. The share of GERD apportioned to basic research increased from 20.2% in 2008/09 to 25.3% in 2012/13, indicating sustained focus on areas of basic research in South Africa. The proportion of applied research increased nominally by 13.0% over the same period. The proportion of experimental development decreased from 46.5% in 2008/09 to 28.4% in 2012/13, with a nominal decrease of 4.8% between 2011/12 and 2012/13.

FIGURE 4.1: GERD BY TYPE OF RESEARCH (PERCENTAGE), SOUTH AFRICA, 2008/09 TO 2012/13



Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

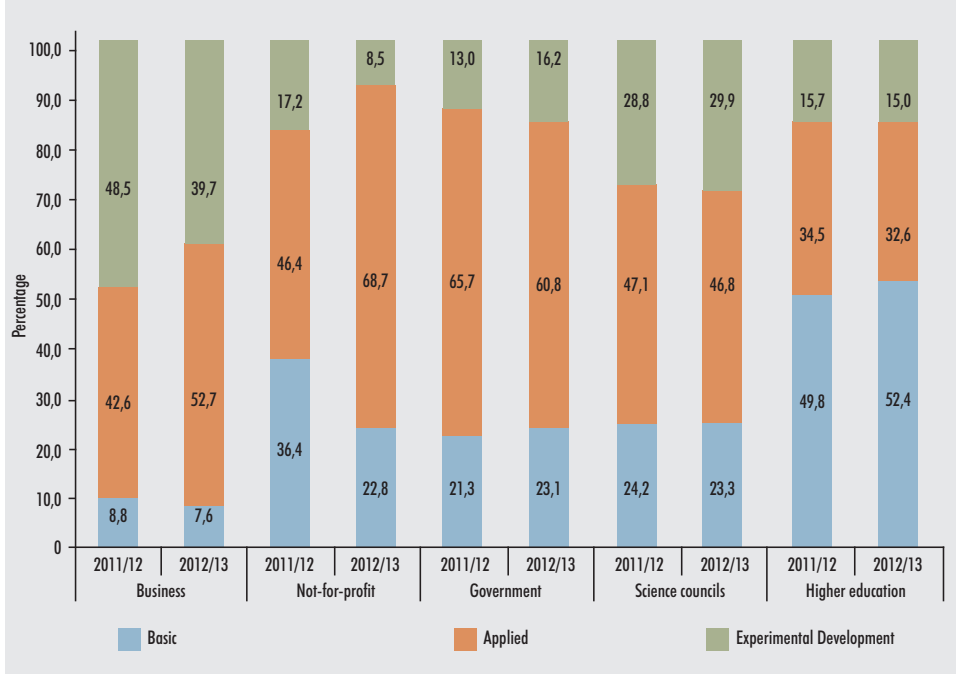
4.2. GERD by type of research and sector of performance

In 2012/13 R&D activities in the business sector shifted towards more applied research, with 52.7% of expenditure devoted to this type of research, an increase of 10.1% from 2011/12.

The not-for-profit sector showed a similar increase in expenditure on applied research, from 46.4% in 2011/12 to 68.7% in 2012/13, as a result of increased expenditure of R333 million by new R&D-performing units, from R171 million in 2011/12 to R504 million in 2012/13.

The higher education sector remained the largest performer of basic research, increasing its share of expenditure devoted to basic research from 49.8% in 2011/12 to 52.4% in 2012/13. In the government sector, there was growth in basic research and in experimental development, but applied research continued to account for the major share of R&D expenditure.

FIGURE 4.2: GERD BY TYPE OF RESEARCH AND SECTOR OF PERFORMANCE (PERCENTAGE), SOUTH AFRICA, 2011/12 AND 2012/13



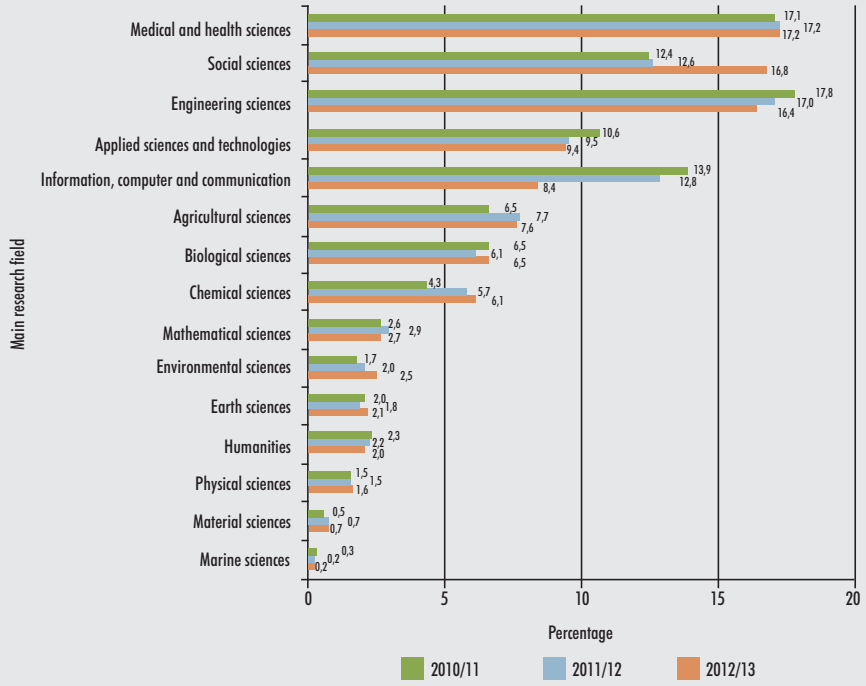
Data source	National Survey of Research and Experimental Development, 2011/12 and 2012/13

4.3. GERD by major research field

The medical and health sciences continued to attract the largest share of GERD in 2012/13 at 17.2%, amounting to R4.108 billion. R&D expenditure in the social sciences amounted to R4 billion or 16.8% of GERD in 2012/13. R&D expenditure on the social sciences increased from R2.79 billion in 2011/12 to R4 billion in 2012/13, which was an increase of R1.2 billion. The increase in the social sciences was the result of one firm switching from performing R&D in the information, computer and communication technologies sector to R&D in finance.

After the social sciences, the next-largest research fields were the engineering sciences (which attracted 16.4% of GERD), applied sciences and technologies (9.4%) and information, computer and communication technologies (8.4%).

FIGURE 4.3: GERD BY RESEARCH FIELD (PERCENTAGE), SOUTH AFRICA, 2010/11 TO 2012/13

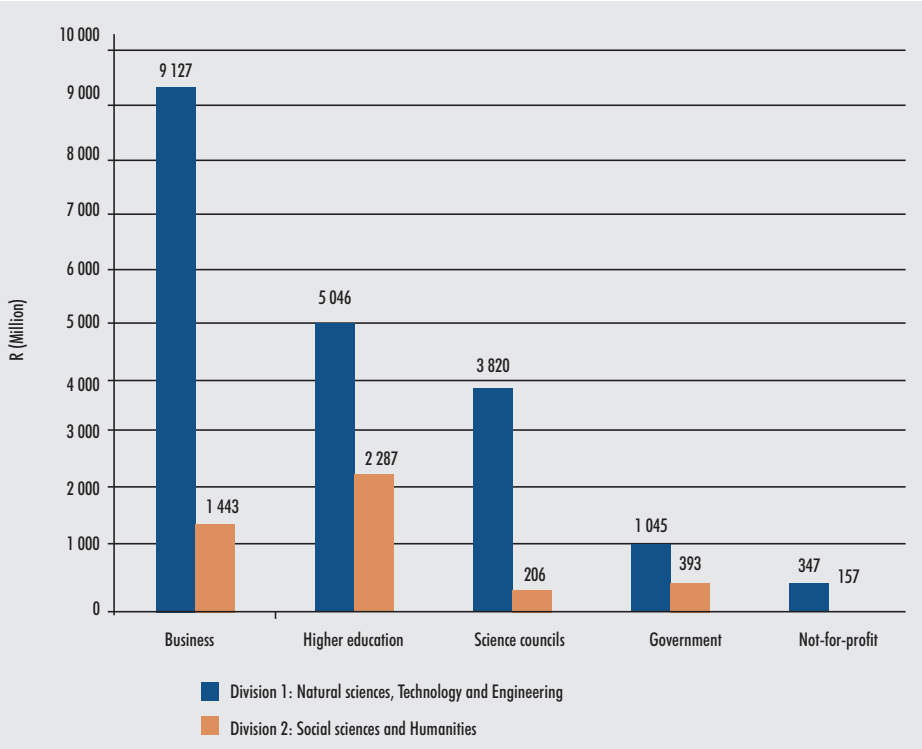


Data note	GERD according to research field as measured in the R&D survey.
Data source	National Survey of Research and Experimental Development, 2010/11 to 2012/13

4.4. GERD by division of research field and sector of performance

Division 1, which includes the natural sciences, technology and engineering, remained the dominant field of R&D expenditure in 2012/13, accounting for 81.2% of GERD. Division 2, which represents the social sciences and humanities, accounted for the remaining 18.8% of GERD. R&D in the social sciences and humanities increased from R3.285 billion in 2011/12 to R4.486 billion in 2012/13. The higher education sector accounted for the largest proportion of R&D spending on the social sciences and humanities. The business sector experienced an increase in Division 2 investment between 2011/12 and 2012/13.

FIGURE 4.4: GERD BY RESEARCH FILED AND SECTOR OF PERFORMANCE (R MILLION), SOUTH AFRICA 2012/13



Data note	Research field codes are used to classify research expenditure according to defined scientific disciplines into two divisions: Division 1 (Natural sciences, technology and engineering) and Division 2 (Social sciences and humanities).
Data source	National Survey of Research and Experimental Development, 2012/13

4.5. GERD by accounting category

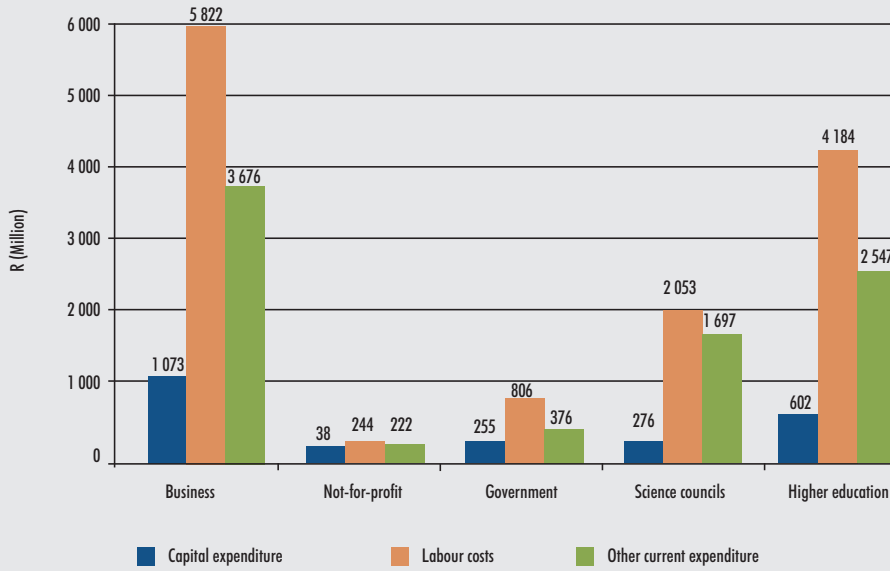
The proportion of R&D expenditure allocated to labour costs increased from 43.7% in 2008/09 to 54.9% in 2012/13, while the percentage of R&D expenditure allocated to other current expenditure decreased from 40.1% in 2008/09 to 35.7% in 2012/13. The percentage of R&D expenditure on capital items similarly decreased from 16.2% in 2008/09 to 9.4% in 2012/13.

FIGURE 4.5: GERD BY ACCOUNTING CATEGORY (PERCENTAGE), SOUTH AFRICA, 2008/09 AND 2012/13

Data source	National Survey of Research and Experimental Development R&D, 2012/13

Labour costs and other current expenditure accounted for 90.6% of total R&D expenditure in 2012/13. In the business sector, labour costs accounted for 55.1% of BERD, totalling R5.822 billion. Capital expenditure in the government sector accounted for 17.7% of total government expenditure on R&D.

FIGURE 4.6: GERD BY ACCOUNTING CATEGORY (R MILLION), SOUTH AFRICA, 2012/13



Data source	National Survey of Research and Experimental Development R&D, 2012/13

4.6. Business sector R&D expenditure by Standard Industrial Classification

In the 2012/13 R&D survey, the financial intermediation, real estate and business services sector continued to account for the largest share of BERD, spending R3.915 billion on R&D, compared to expenditure of R3.477 billion in the manufacturing sector expenditure.

Mining and quarrying remained the third-largest contributor to BERD, with expenditure of R1.554 billion, following large growth in R&D expenditure in the sector of 168.5% over the five-year period between 2008/09 (when R&D expenditure totalled R0.579) and 2012/13 (when R&D expenditure totalled R1.554). The year-on-year growth in expenditure in the mining and quarrying sector was R1.353 billion in 2011/12 and R1.554 billion in 2012/13, representing an increase of 14.9%.

There was a decrease in R&D expenditure in the electricity, gas and water supply sector from R2 306 billion in 2008/09 to R386 million in 2012/13. This was due to the discontinuation of a single large R&D project in the sector.

FIGURE 4.7: BUSINESS R&D EXPENDITURE BY STANDARD INDUSTRIAL CLASSIFICATION (SIC) CATEGORY (AS A PERCENTAGE OF GERD), SOUTH AFRICA, 2008/09 AND 2012/13

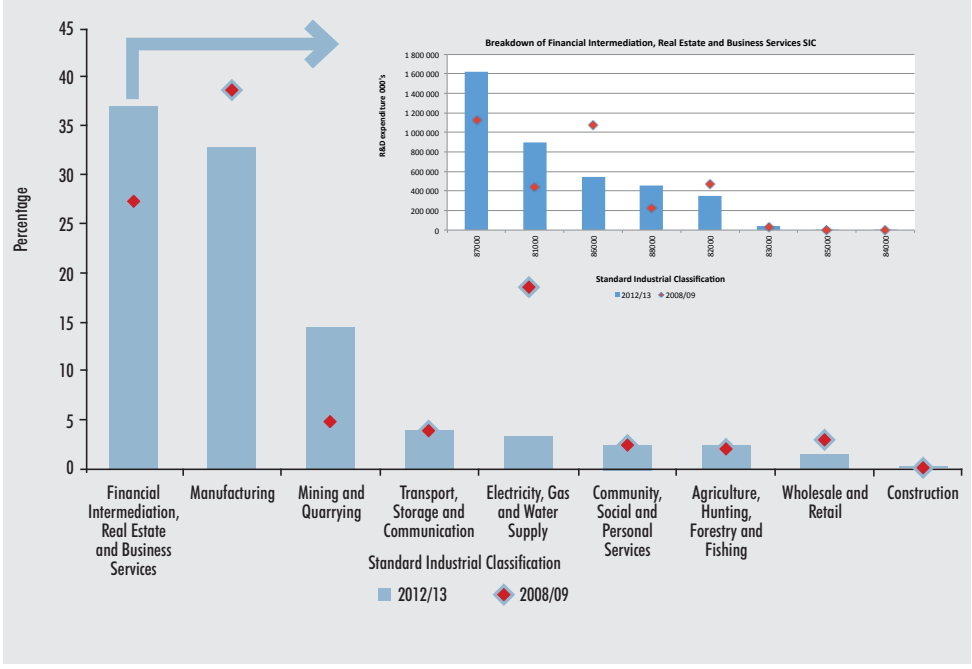


TABLE 4.1: STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODES IN THE 80 000 GROUP

81000	Financial Intermediation, Except Insurance and Pension Funding
82000	Insurance and Pension Funding, Except Compulsory Social Security
83000	Activities Auxiliary to Financial Intermediation
84000	Real Estate Activities
85000	Renting of Machinery and Equipment, and of Personal and Household Goods
86000	Computer and related activities
87000	Research and Development
88000	Other Business Activities not elsewhere classified

Data note	Industry classification is based on Stats SA's five-digit Standard Industrial Classification (SIC) codes, which are used to classify businesses according to their economic activities.

While the manufacturing sector did not account for the largest share of BERD, it still remained a significant contributor to total GERD. In 2012/13, the manufacturing sector spent R3.477 billion on R&D, compared to R3.551 billion in 2011/12, a contraction of 2.1%. The largest manufacturing sub-sector remained the chemical and petroleum sector (SIC 33000), which contributed 10.8% towards BERD in 2012/13, totalling R1.140 billion; this was a decrease of R1.381 billion from expenditure in 2011/12. This sector recorded large decreases in R&D expenditure between 2008/09 and 2012/13.

FIGURE 4.8: BUSINESS R&D EXPENDITURE BY MANUFACTURING SIC CATEGORY, SOUTH AFRICA, 2008/09 AND 2012/13

Data source	National Survey of Research and Experimental Development, 2008/09 and 2012/13

TABLE 4.2: STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODES IN THE 30000 GROUP

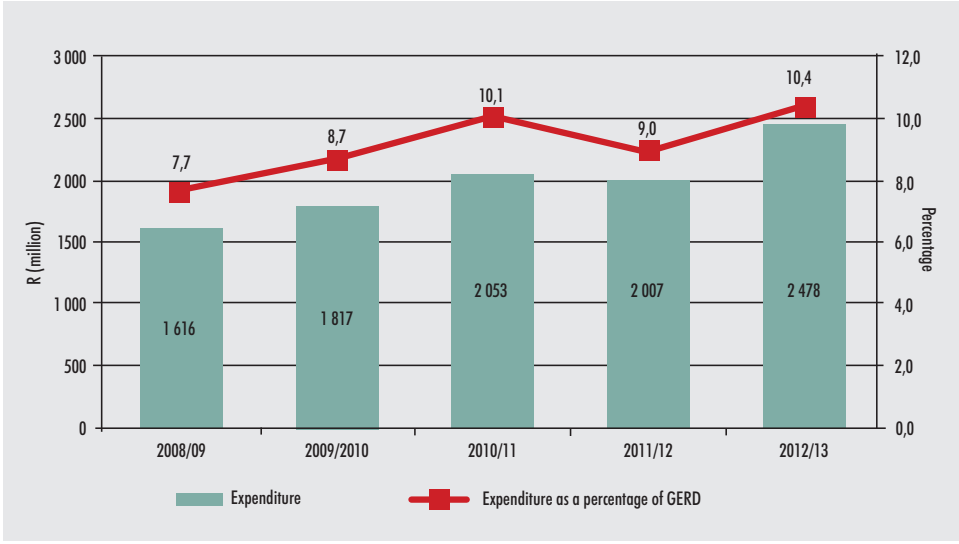
30000	Manufacture of Food Products, Beverages and Tobacco Products
31000	Manufacture of Textiles, Clothing and Leather Goods
32000	Manufacture of Wood Products, except furniture , Paper Products, Publishing and Printing material
33000	Manufacture of Refined Petroleum ,Nuclear Fuel, Chemical Products (including Pharmaceuticals, Rubber and Plastic)
34000	Manufacture of Non-Metallic Mineral Products
35000	Manufacture of Basic and Fabricated Metal Products, Machinery and Equipment, Office, Accounting and Computing
36000	Manufacture of Electrical Machinery and Apparatus
37000	Manufacture of Communication Equipment and Apparatus, Medical, Precision and Optical Instruments
38000	Manufacture of Transport Equipment
39000	Manufacture of Furniture, Recycling, Manufacturing not elsewhere classified

4.7. GERD by areas of special interest

4.7.1. R&D expenditure on tuberculosis, HIV/AIDS and malaria

R&D expenditure on health-related areas of R&D, including tuberculosis (TB), HIV/AIDS and malaria, increased by R472 million from R2.007 billion in 2011/12 to R2.478 billion in 2012/13. This expenditure increased from 9.0% of GERD in 2011/12 to 10.4% in 2012/13, reaching its highest level since 2008/09.

FIGURE 4.9: GERD ON TB, HIV/AIDS AND MALARIA (R MILLION AND AS A PERCENTAGE OF GERD), SOUTH AFRICA, 2008/09 TO 2012/13

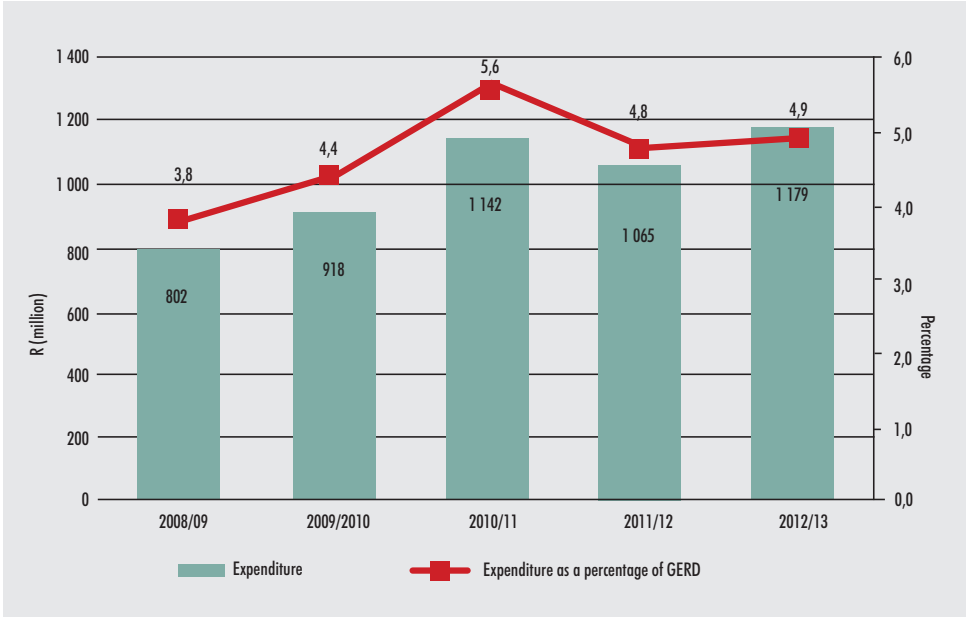


Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

4.7.2. Biotechnology-related R&D

Total R&D expenditure on biotechnology increased from R1.065 billion in 2011/12 to R1.179 billion in 2012/13, which represented an increase of 10.7%.

FIGURE 4.10: GERD ON BIOTECHNOLOGY (R MILLION AND AS A PERCENTAGE OF GERD), SOUTH AFRICA, 2008/09 TO 2012/13



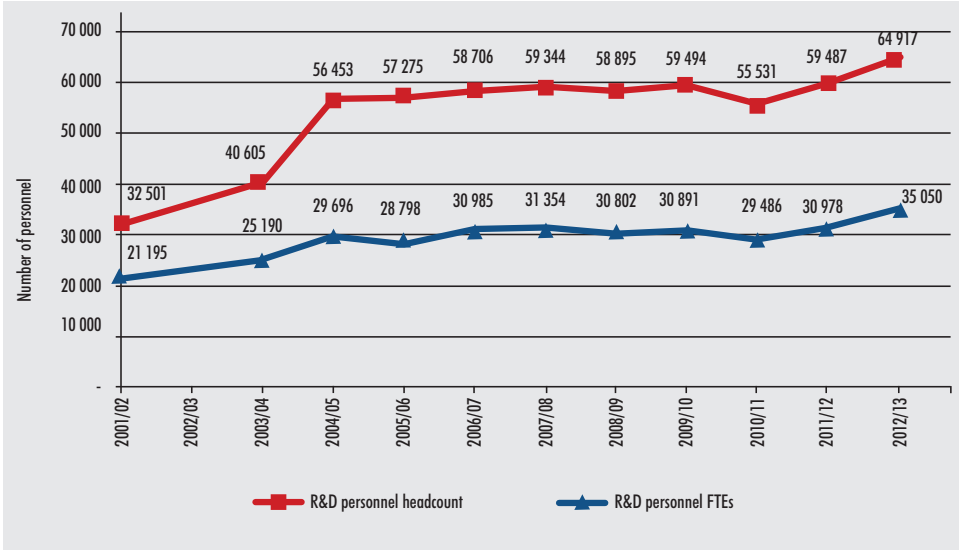
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

CHAPTER 5
PEOPLE IN R&D

5.1. R&D personnel

R&D personnel headcount totalled 64 917 in 2012/13, which was 9.1% (5 430) more than in 2011/12. Of the additional personnel reported, about 37.7% (2 048) were in higher education, 34.4% (1 867) in the business sector, 16.7% (905) in the science councils, and the remaining 11.2% in the government (109) and not-for-profit (501) sectors.
R&D personnel (FTEs) increased by 13.1% between 2011/12 and 2012/13, totalling 35 050.3 in 2012/13. There was a decrease in R&D personnel between 2009/10 and 2010/11, followed by increases in headcount and FTEs in 2011/12 and 2012/13.

FIGURE 5.1: R&D PERSONNEL (HEADCOUNT AND FTEs), SOUTH AFRICA 2001/02 TO 2012/13

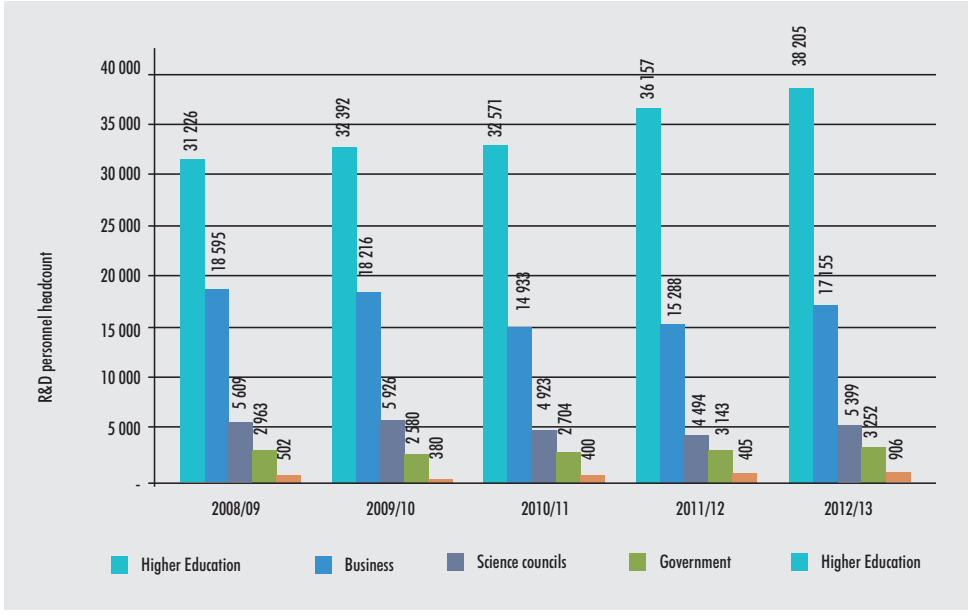


Data note	Following OECD practice, doctoral students and post-doctoral fellows are counted as researchers.
Data source	National Survey of Research and Experimental Development, 2001/02 to 2012/13

5.1.1. R&D personnel headcount by sector of performance

The 2012/13 R&D survey recorded increases in R&D personnel across all sectors. The business and science councils sectors have yet to recover the personnel numbers reported in 2008/09. The majority of R&D personnel were employed in the higher education sector, followed by the business and science councils sectors. The government and not-for-profit sectors had fewer R&D personnel than the other sectors. The headcount of R&D personnel in the not-for-profit sector increased from 405 in 2011/12 to 906 in 2012/13 as a result of new R&D entities entering the survey with large numbers of R&D personnel.

FIGURE 5.2: R&D PERSONNEL BY SECTOR (HEADCOUNT), SOUTH AFRICA, 2008/09 TO 2012/13



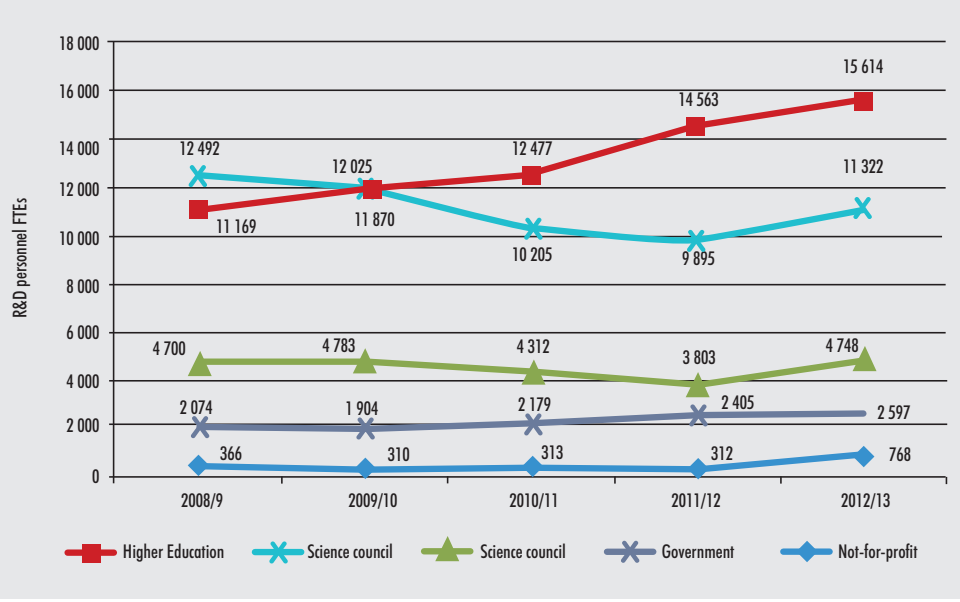
Data note	Higher education R&D personnel include post-doctoral fellows and doctoral students under the 'researcher' category. The Frascati Manual (OECD 2002) recommends that masters students should not be counted as researchers. However, data on masters students are considered very important and reported on in selected sections, due to the potential of these students to possibly pursue a doctoral degree.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.1.2. R&D personnel full-time equivalents (FTEs) by sector of performance

In the 2012/13 R&D survey, all sectors reported increases in FTE R&D personnel. The highest numbers of FTEs were in higher education (15 614.4) and the business sector (11 322.3).

The year-on-year increase in R&D personnel (FTEs) of 13.1% in 2012/13 was relatively high compared to previous years. The number of R&D personnel (FTEs) per thousand in total employment was 2.4 in 2012/13, which was a relatively small increase in the indicator of only 0.1% from 2011/12. The increase in R&D personnel (FTEs) was attributed to an increase in researchers, mainly postgraduate students.

FIGURE 5.3: R&D PERSONNEL BY SECTOR (FTEs), SOUTH AFRICA, 2008/09 TO 2012/13

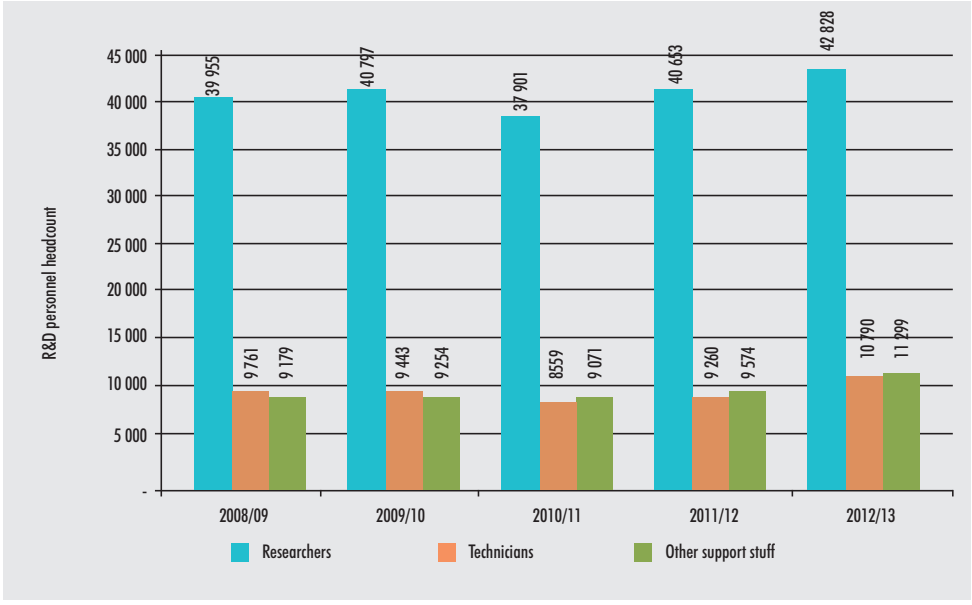


Data note	Following OECD practice, doctoral students and post-doctoral fellows are counted as researchers.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.1.3 R&D personnel by occupation

The majority of R&D personnel consisted of researchers, who accounted for 66.0% of the total, followed by other support staff directly supporting R&D at 17.4% and technicians at 16.6%. The headcount of researchers increased from 40 653 in 2011/12 to 42 828 in 2012/13. The headcount of technicians increased from 9 260 in 2011/12 to 10 790 in 2012/13, while the headcount of other support staff directly supporting R&D increased from 9 574 to 11 299 over the same period.

FIGURE 5.4: R&D PERSONNEL BY OCCUPATION (HEADCOUNT), SOUTH AFRICA, 2008/09 TO 2012/13



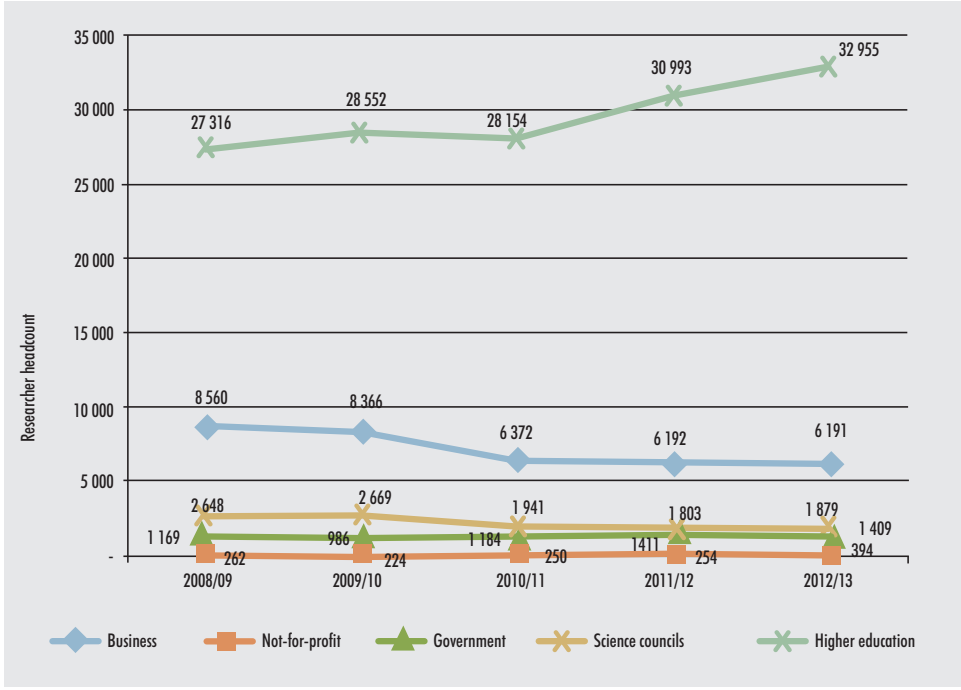
Data note	Higher education R&D personnel include post-doctoral fellows and doctoral students under the 'researcher' category.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.2. Researchers

5.2.1. Researcher headcount by sector of performance

The higher education sector had the largest number of researchers, with a headcount of 32 955 in 2012/13, having increased by 6.3% between 2011/12 and 2012/13. Researcher headcounts in the not-for-profit sector increased by 55.1% between 2011/12 and 2012/13, and by 4.2% in the science councils sector over the same period. Researchers in the business, science councils and government sectors remained constant between 2011/12 and 2012/13.

FIGURE 5.5: RESEARCHERS BY SECTOR (HEADCOUNT), SOUTH AFRICA, 2008/09 TO 2012/13

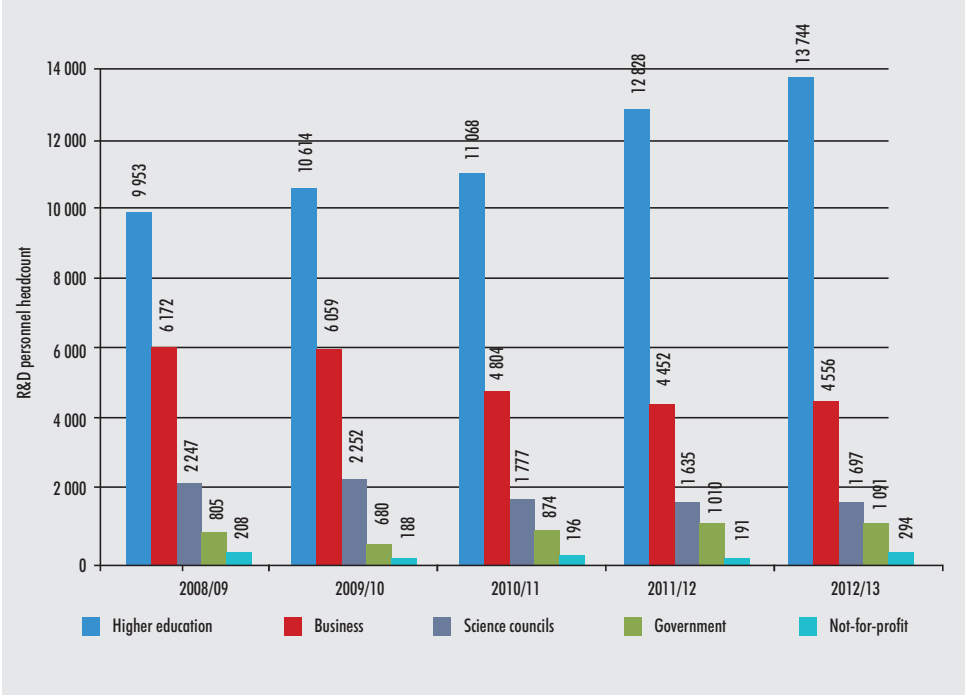


Data note	Higher education R&D personnel include post-doctoral fellows and doctoral students under the 'researcher' category.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.2.2. Researcher full-time equivalent (FTEs) by sector of performance

The number of researcher FTEs increased from 12 827.6 in 2011/12 to 13 743.6 in 2012/13 in the higher education sector, while the not-for-profit sector experienced an increase from 190.8 to 294.5 over the same period. The researcher FTEs in the government, business and science councils sectors followed similar trends to those observed for the corresponding researcher headcount in these sectors, suggesting that despite increases in the number of R&D personnel, the time they spent on research activities did not increase proportionally.

FIGURE 5.6: RESEARCHERS BY SECTOR (FTEs), SOUTH AFRICA, 2008/09 TO 2012/13

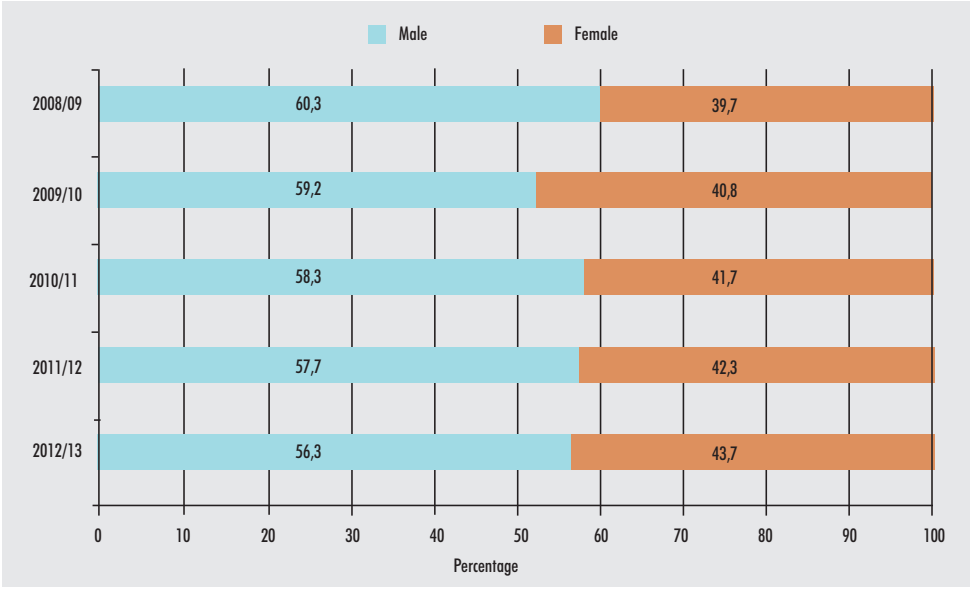


Data note	Higher education researchers include post-doctoral fellows and doctoral students under the 'researcher' category. Full-time equivalent (FTE) refers to the number of hours (in terms of person years of effort) spent on R&D activities.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.2.3. Researcher headcount by gender

Researchers, including post-doctoral fellows and doctoral students, remained predominantly male between 2008/09 and 2012/13 at 60.3% and 56.3% respectively. The percentage of female researchers increased steadily from 39.7% in 2008/09 to 43.7% in 2012/13.

FIGURE 5.7: RESEARCHERS BY GENDER (PERCENTAGE), SOUTH AFRICA, 2008/09 TO 2012/13

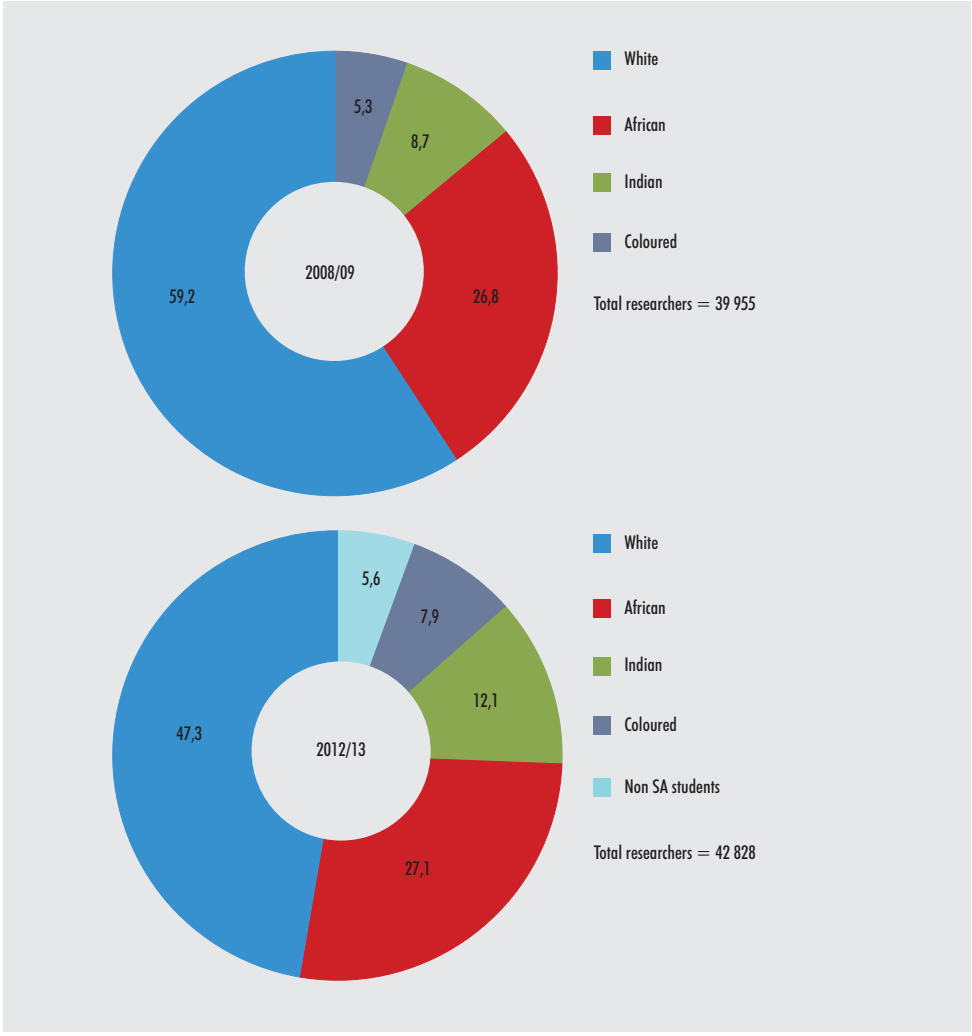


Data note	Higher education R&D personnel include post-doctoral fellows and doctoral students under the 'researcher' category.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.2.4. Researchers by population group

The proportion of African researchers increased from 26.8% in 2008/09 to 27.1% in 2012/13. The percentage of Coloured researchers increased from 5.3% to 7.9%, and Indian researchers from 8.7% to 12.1% over the same period. The majority of researchers were still from the White population group, although the percentage of White researchers declined from 59.2% to 47.3% between 2008/09 and 2012/13.

FIGURE 5.8: RESEARCHERS BY POPULATION GROUP (PERCENTAGE), SOUTH AFRICA, 2008/09 AND 2012/13

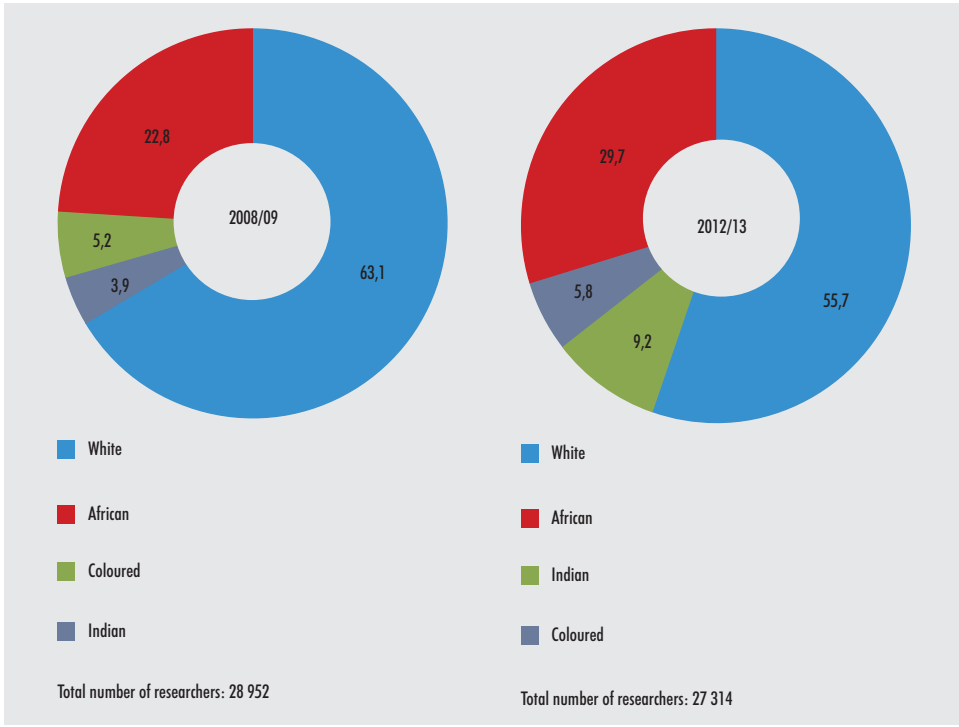


Data note	Higher education researchers include post-doctoral fellows and doctoral students under the 'researcher' category. The 2008/09 data had non-South African postgraduate students spread across each race category and could not be separated as is the case in 2012/13.
Data source	National Survey of Research and Experimental Development, 2008/09 and 2012/13

5.2.5. Researchers (excluding doctoral students and post-doctoral fellows) by population group

The workforce of researchers (excluding doctoral students and post-doctoral fellows) by population group consisted of 55.7% White researchers (headcount), 29.7% African researchers, 9.2% Indian researchers and 5.8% Coloured researchers. By excluding postgraduate students from the R&D personnel, the data revealed shifts in the overall racial composition of the researcher headcount over time. The proportion of African researchers increased from 22.8% in 2008/09 to 29.7% in 2012/13, Indian researchers increased from 3.9% to 9.2%, and Coloured researchers increased from 5.2% to 5.8%. The percentage of White researchers decreased from 63.1% to 55.3% over the same period.

FIGURE 5.9: RESEARCHERS (EXCLUDING DOCTORAL STUDENTS AND POST-DOCTORAL FELLOWS) BY POPULATION GROUP (PERCENTAGE), SOUTH AFRICA, 2008/09 TO 2012/13

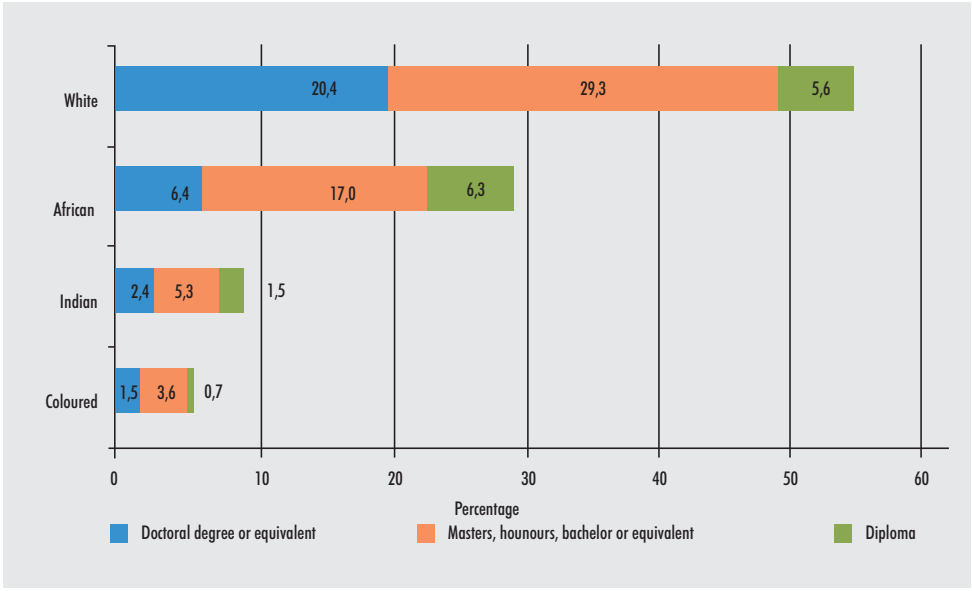


Data note	For the discussion under this section, higher education researchers do not include post-doctoral fellows and doctoral students under the 'researcher' category.
Data source	National Survey of Research and Experimental Development, 2008/09 and 2012/13

5.2.6. Researchers (excluding doctoral students and post-doctoral fellows) by qualification and population group

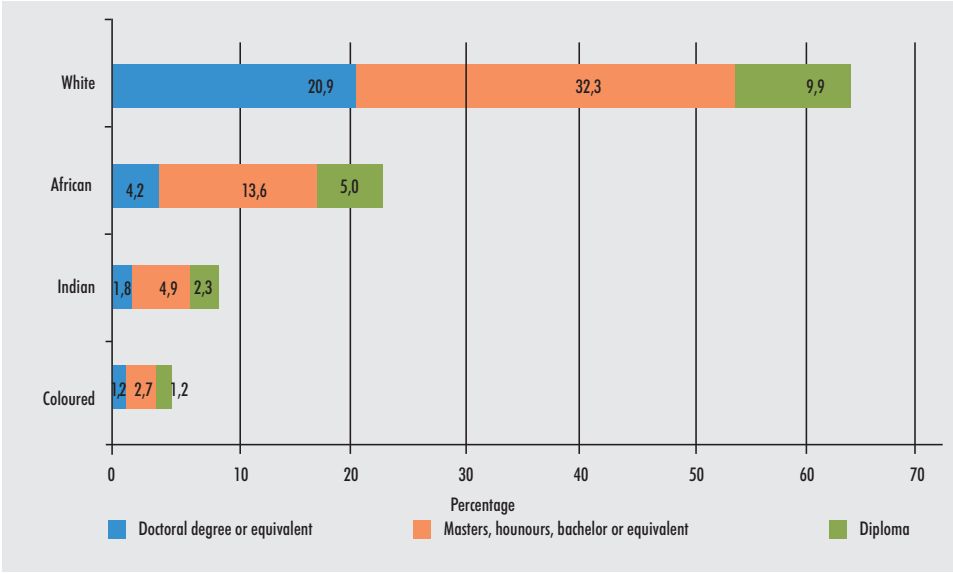
In 2012/13, 29.7% of researchers (excluding doctoral students and post-doctoral fellows) were African and 6.4% held a doctoral qualification. African researchers with a doctoral degree increased from 4.2% of all researchers in 2008/09 to 6.4% in 2012/13. In 2012/13 the majority of researchers with a doctoral qualification were still in the White population group. The majority of South African researchers held a masters, honours, bachelor or equivalent degree in 2008/09 and 2012/13.

FIGURE 5.10: RESEARCHERS (EXCLUDING DOCTORAL STUDENTS AND POST-DOCTORAL FELLOWS) BY QUALIFICATION AND POPULATION GROUP (PERCENTAGE), SOUTH AFRICA, 2012/13



Data source	National Survey of Research and Experimental Development, 2012/13

FIGURE 5.11: RESEARCHERS (EXCLUDING DOCTORAL STUDENTS AND POST-DOCTORAL FELLOWS) BY QUALIFICATION AND POPULATION GROUP (PERCENTAGE), SOUTH AFRICA, 2008/09



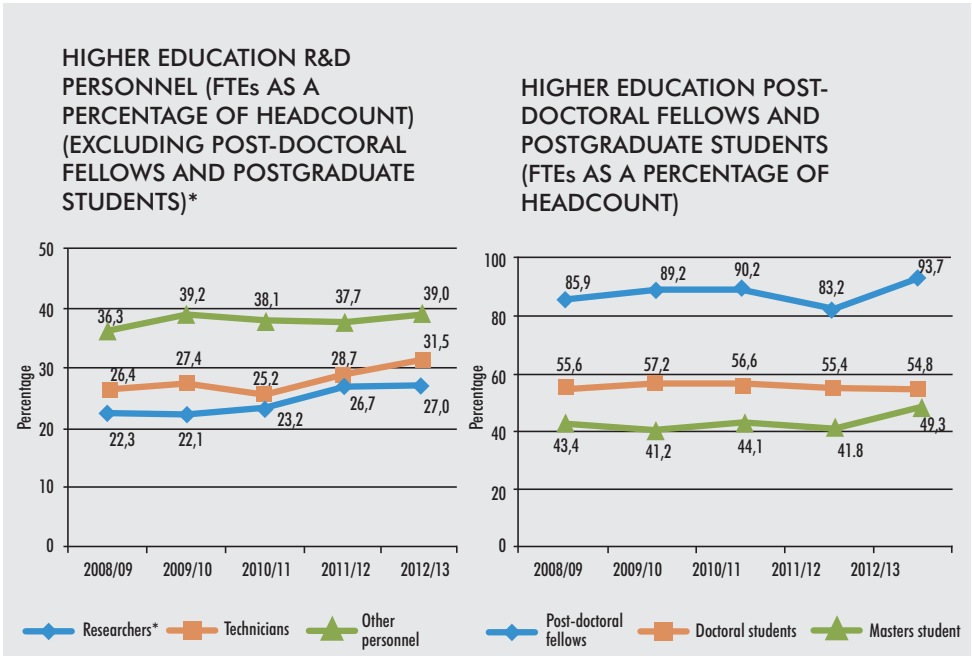
Data note	For the discussion under this section, higher education researchers do not include post-doctoral fellows and doctoral students under the 'researcher' category.
Data source	National Survey of Research and Experimental Development, 2008/09 and 2012/13

5.3. Higher education R&D personnel

5.3.1. Higher education R&D personnel: FTEs as a percentage of headcount

The higher education sector accounted for the largest proportion of R&D personnel. The 2012/13 R&D survey data reflected increases in FTEs in both the R&D personnel and researcher categories. Higher education researchers (excluding post-doctoral fellows and postgraduate students) spent 22.3% of their time on research in 2008/09, and this percentage increased to 27.0% in 2012/13. Doctoral students spent 55.6% of their time on research activities in 2008/09 and 54.8% in 2012/13, while masters students spent 43.4% of their time on research in 2008/09 and 49.3% in 2012/13. Post-doctoral fellows spent most of their time performing research, as indicated by the high ratio for FTEs as a percentage of headcount. In 2011/12 post-doctoral fellows reported that the time they spent on research had decreased to 83.2%, but this percentage improved to 93.7% in 2012/13.

FIGURE 5.12: HIGHER EDUCATION R&D PERSONNEL AND STUDENTS (FTEs AS A PERCENTAGE OF HEADCOUNT), SOUTH AFRICA, 2008/09 TO 2012/13

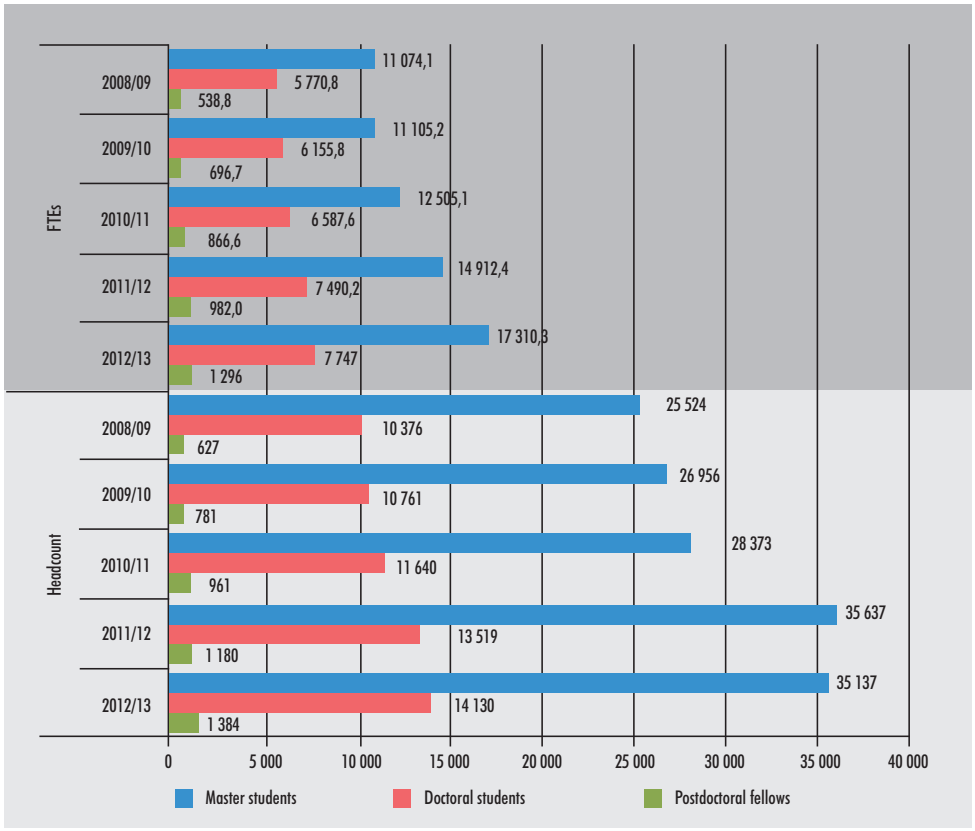


Data note	FTEs as a percentage of headcount.
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.3.2. Post-doctoral fellow and postgraduate student headcount and full-time equivalents (FTEs)

There was an increase in headcounts and FTEs among post-doctoral fellows, doctoral and masters students between 2008/09 and 2012/13. The headcount of doctoral students exceeded 10 000 in 2008/09 and reached 14 130 in 2012/13, while the headcount of masters students increased from 25 524 in 2008/09 to 35 137 in 2012/13.

FIGURE 5.13: HIGHER EDUCATION POST-DOCTORAL FELLOWS AND POSTGRADUATE STUDENTS (HEADCOUNT AND FTEs), SOUTH AFRICA, 2008/09 TO 2012/13

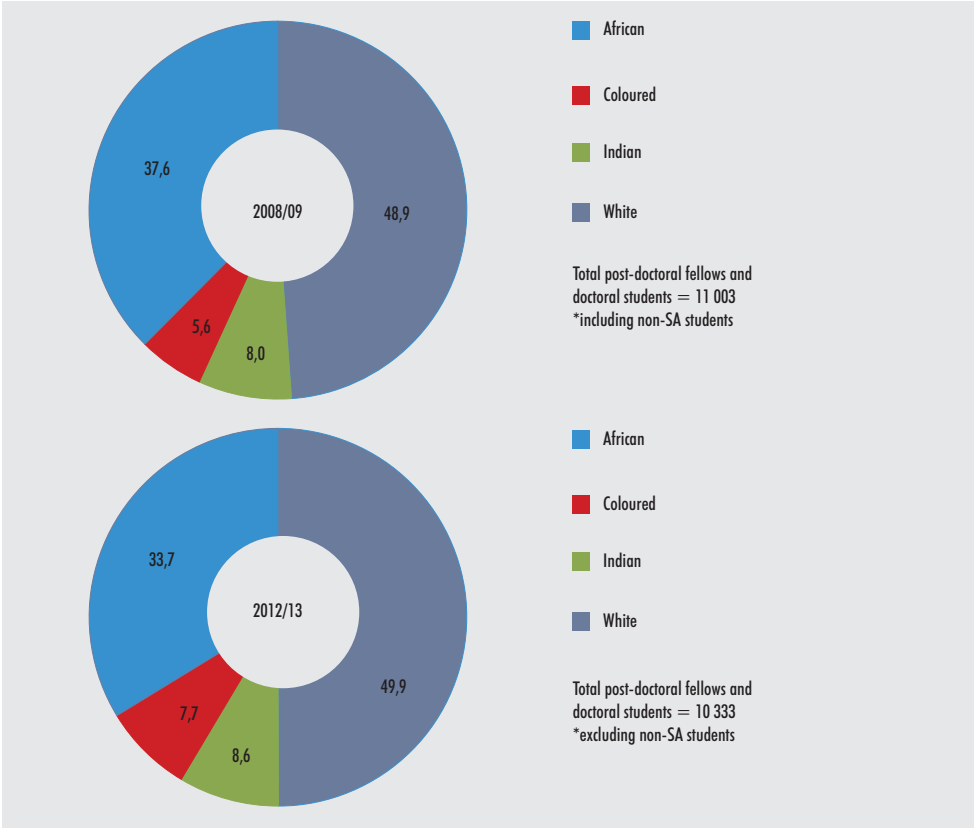


Data note	Masters students are not counted as R&D personnel according to the Frascati Manual (OECD 2002).
Data source	National Survey of Research and Experimental Development, 2008/09 to 2012/13

5.3.3. Post-doctoral fellows and doctoral students by population group

In 2008/09, 48.9% of all post-doctoral fellows and doctoral students were White and 37.6% were African; these included non-South African students. The figures for the 2012/13 survey did not include non-South African students. Of the South African post-doctoral fellows and doctoral students in 2012/13, approximately 49.9% were White and 33.7% were African. The percentage of Indian postgraduate students remained almost unchanged between 2008/09 and 2012/13, while the percentage of Coloured postgraduate students increased from 5.6% in 2008/09 to 7.7% in 2012/13.

FIGURE 5.14: HIGHER EDUCATION POST-DOCTORAL FELLOWS AND DOCTORAL STUDENTS BY POPULATION GROUP (PERCENTAGE), SOUTH AFRICA, 2008/09 AND 2012/13

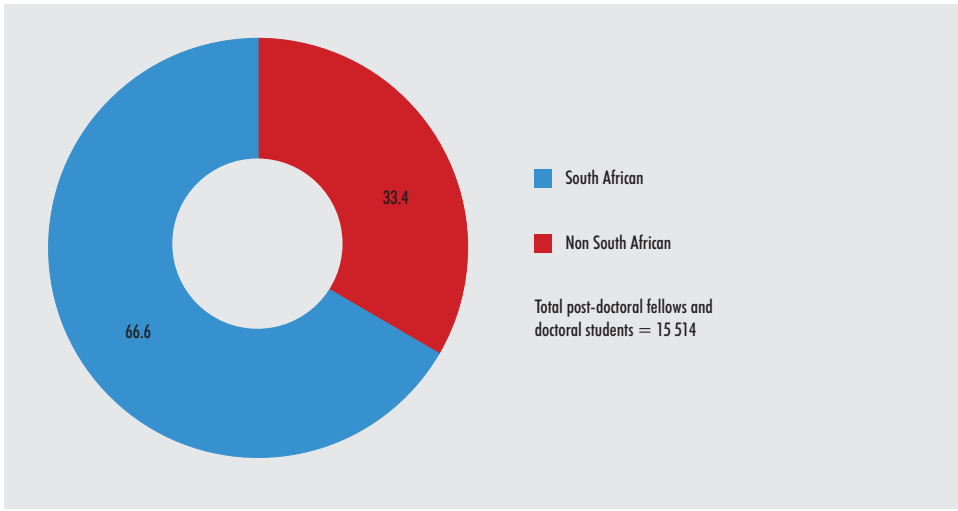


Data note	The data on post-doctoral fellows and doctoral students for 2008/09 included non-South African students that could not be separated from the data. The 2012/13 survey distinguished between South African and non-South African nationals.
Data source	National Survey of Research and Experimental Development, 2008/09 and 2012/13

5.3.4. Profile of South African and non-South African postgraduate students

The 2012/13 R&D survey captured data for postgraduate students according to race, gender and whether they were South African nationals or not. Of the total post-doctoral fellow and doctoral student headcount of 15 514, 66.6% were South African and 33.4% were non-South African.

FIGURE 5.15: HIGHER EDUCATION POST-DOCTORAL FELLOWS AND DOCTORAL STUDENTS BY NATIONALITY (HEADCOUNT), SOUTH AFRICA, 2012/13

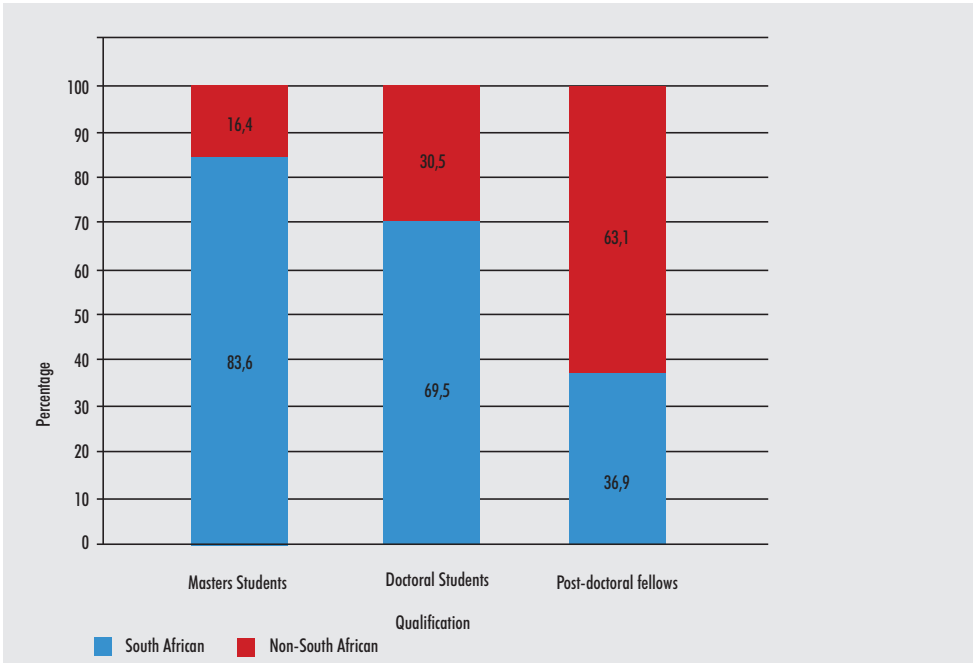


Data note	The 2012/13 survey distinguished between South African and non-South African nationals.
Data source	National Survey of Research and Experimental Development, 2012/13

5.3.5. South African and non-South African postgraduate students by qualification

The breakdown by qualification shows that the majority of masters and doctoral students were South African nationals, with the exception of post-doctoral fellows where non-South African nationals were in the majority (63.1%). The number of foreign post-doctoral fellows and PhD students increased between 2011/12 and 2012/13, while South African post-doctoral fellows and PhD students declined.

FIGURE 5.16: HIGHER EDUCATION POSTGRADUATE STUDENTS BY QUALIFICATION (PERCENTAGE), SOUTH AFRICA, 2012/13



Data note	The 2012/13 survey distinguished between South African and non-South African nationals.
Data source	National Survey of Research and Experimental Development, 2012/13

TABLE 5.1: HIGHER EDUCATION POSTGRADUATES BY QUALIFICATION (HEADCOUNT), SOUTH AFRICAN, 2011/12 AND 2012/13

Higher education postgraduate students	2011/12			2012/13		
	South African	Non-South African	Total	South African	Non-South African	Total
Masters students	29 131	6 506	35 637	29 364	5 773	35 137
Doctoral students	10 135	3 384	13 519	9 822	4 308	14 130
Post-doctoral fellows	538	642	1 180	511	873	1 384
Total	**39 804**	**10 532**	**50 336**	**39 697**	**10 954**	**50 651**

Data note	The 2012/13 survey captured postgraduate students according to race, gender and whether they were South African nationals or not.
Data source	National Survey of Research and Experimental Development, 2011/12 and 2012/13

CHAPTER 6
GEOGRAPHIC DIMENSIONS OF R&D

6.1. R&D expenditure by province

R&D in South Africa is concentrated in three provinces, namely Gauteng, Western Cape and KwaZulu-Natal. Gauteng was responsible for about R10.602 billion (44.4%) of total GERD, followed by the Western Cape with R4.555 billion (19.1%) and KwaZulu-Natal with R3.013 billion (12.6%). Together these three provinces accounted for 76.1% of total GERD in 2012/13. An increase of 5.9% in the proportion of GERD spent in the other provinces was observed; from 18.0% in 2008/09 to 23.9% in 2012/13.

TABLE 6.1: R&D EXPENDITURE BY PROVINCE (R'000), SOUTH AFRICA, 2008/09 AND 2012/13

Province	2008/09		2012/13	
	R'000	%	R'000	%
Eastern Cape	889 081	4,2	1 463 590	6,1
Free State	1 562 720	7,4	1 714 472	7,2
Gauteng	10 981 587	52,2	10 602 434	44,4
KwaZulu-Natal	2 210 336	10,5	3 013 373	12,6
Limpopo	286 157	1,4	619 436	2,6
Mpumalanga	379 123	1,8	612 030	2,6
North West	487 376	2,3	890 363	3,7
Northern Cape	174 453	0,8	400 975	1,7
Western Cape	4 070 214	19,3	4 554 545	19,1
TOTAL	**21 041 047**	**100,0**	**23 871 218**	**100,0**

Data source | National Survey of Research and Experimental Development R&D, 2008/09 and 2012/13

6.2. Proportions of R&D expenditure by sector

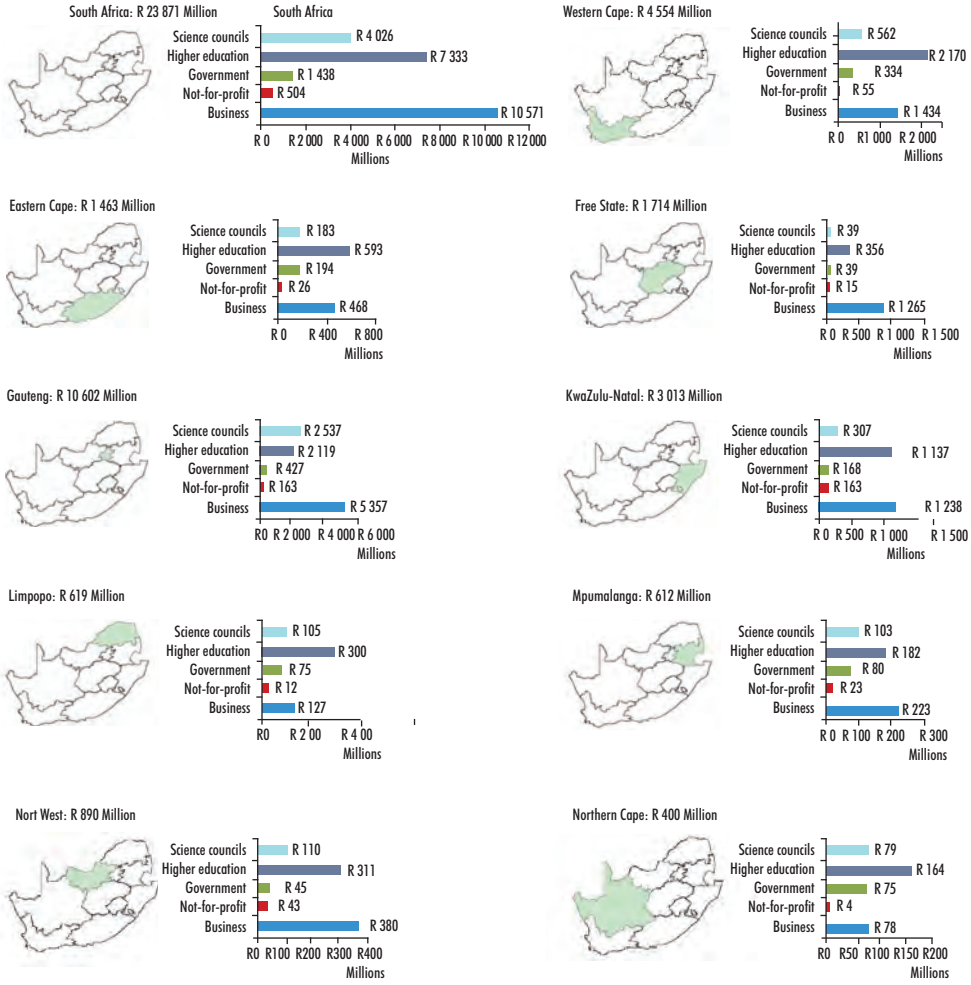
The provincial R&D expenditure differed among the five R&D performing sectors (Fig 6.1). The contribution of the business sector as a proportion of R&D expenditure was predominant in the Free State, Gauteng, North West and KwaZulu-Natal provinces. The proportion of R&D expenditure by the government sector was highest in the Northern Cape (18.8%), Eastern Cape (13.3%) and Mpumalanga (13.1%). The higher education sector contributed a significant proportion of R&D expenditure in Limpopo, Western Cape and Northern Cape provinces. In 2008/09 (Table 6.2) by comparison, the higher education sector made the biggest contribution to R&D expenditure in the Northern Cape, Eastern Cape and Western Cape.

TABLE 6.2: R&D EXPENDITURE BY PROVINCE AND SECTOR OF PERFORMANCE (R'000 AND PERCENTAGE), SOUTH AFRICA, 2008/09

Province	Business		Government		Higher education		Not-for-profit		Science councils		Total
	R'000	%	R'000	%	R'000	%	R'000	%	R'000	%	R'000
Eastern Cape	316 089	35.6%	107 929	12.1%	286 605	32.2%	6 790	0.8%	171 669	19.3%	**889 081**
Free State	1 213 808	77.7%	58 697	3.8%	226 892	14.5%	4 763	0.3%	58 561	3.7%	**1 562 720**
Gauteng	7 131 411	64.9%	264 273	2.4%	1 467 914	13.4%	126 136	1.1%	1 991 853	18.1%	**10 981 587**
KwaZulu-Natal	1 255 509	56.8%	115 302	5.2%	567 999	25.7%	40 492	1.8%	231 033	10.5%	**2 210 336**
Limpopo	75 675	26.4%	55 252	19.3%	86 635	30.3%	5 138	1.8%	63 455	22.2%	**286 157**
Mpumalanga	201 550	53.2%	39 103	10.3%	72 590	19.1%	10 332	2.7%	55 547	14.7%	**379 123**
North West	222 630	45.7%	70 741	14.5%	150 125	30.8%	2 339	0.5%	41 541	8.5%	**487 376**
Northern Cape	7 319	4.2%	52 907	30.3%	68 443	39.2%	2 159	1.2%	43 624	25.0%	**174 453**
Western Cape	1 908 020	46.9%	375 473	9.2%	1 264 162	31.1%	42 500	1.0%	480 059	11.8%	**4 070 214**
TOTAL	**12 332 012**		**1 139 676**		**4 191 366**		**240 649**		**3 137 343**		**21 041 046**

Data note	Subject to rounding errors
Data source	National Survey of Research and Experimental Development, 2012/13

FIGURE 6.1: R&D EXPENDITURE BY PROVINCE (R MILLION AND PERCENTAGE), 2012/13



Data source	National Survey of Research and Experimental Development R&D, 2012/13

CHAPTER 7
INTERNATIONAL COMPARISONS

7.1. Gross domestic expenditure on R&D

This section presents a selection of R&D indicators from various countries for comparison. The comparison takes into consideration the differences in economic structures between countries and the fact that R&D is concentrated in certain parts of the world; for example, ten countries account for almost 80% of total global R&D. These comparisons should be treated with caution due to differences between countries with respect to the availability of data. The country selection was a combination of African countries that had complete datasets during their respective survey periods, R&D statistics of upper middle income countries, the BRICS countries and other developing countries. Some of the top R&D-performing countries were also included for further international comparisons.

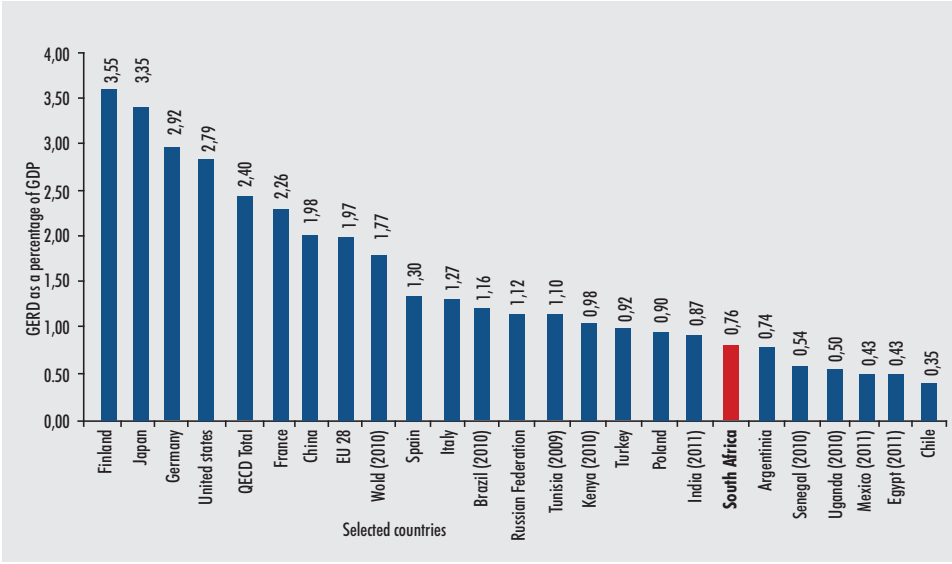
7.1.1. GERD as a percentage of GDP

For the third consecutive year, GERD as a percentage of GDP in South Africa remained constant at 0.76%.

The African Innovation Outlook (AIO) presents 2010/11 R&D data for some African countries, which makes it possible to determine the levels of research intensity in these countries (AU-NEPAD 2010). GERD as percentage of GDP varied among countries; Kenya, Senegal and Uganda reported their research intensity as 0.98%, 0.54% and 0.50% respectively. South Africa's GERD as a percentage of GDP was comparable with upper middle-income countries such as Argentina (0.74%) and India (0.87%). GERD as percentage of GDP was above 1 for BRICS member countries other than India and South Africa: China recorded R&D intensity of 1.98%, followed by Brazil at 1.16% and the Russian Federation at 1.12%.

The most research-intensive countries in 2012/13 were in the high-income category and included Finland (3.55%), Japan (3,35%) and Germany (2.92). The European Union reported an average research intensity of 1.97% for its 28 members, which was an increase of 0.03% from 2011/12.

FIGURE 7.1: GERD AS A PERCENTAGE OF GDP FOR SELECTED COUNTRIES, 2012/13 OR LATEST AVAILABLE YEAR



Data notes	Reported data are for the 2012/13 financial year or the latest available year as indicated in brackets. Calculations are based on current national currencies.
Data sources	Country data: South Africa: National Survey of Research and Experimental Development, 2012/13 Argentina, Chile, China, EU 28, Finland, France, Germany, Italy, Japan, Mexico, OECD Total, Poland, Russian Federation, Spain, Turkey, United States, OECD 2014 Kenya, Senegal and Uganda: AU-NEPAD 2014 Brazil, Egypt, India, Turkey, Tunisia and World: UIS 2013 India: Ministry of Science and Technology 2012

7.1.2. GERD for selected countries

South Africa's GERD in US dollar purchasing power parity (PPP$) increased from $4.158 billion in 2011/12 to $4.308 billion in 2012/13, which represented an increase of 3.6%.

All the selected countries, with the exception of Spain and Finland, reported a year-on-year increase in GERD between 2010/11 and 2012/13. It is encouraging that countries are increasing their investment in R&D after the decline in most countries in 2010/11.

TABLE 7.1: GERD FOR SELECTED COUNTRIES (BILLION CURRENT PPP$), 2010/11 TO 2012/13 OR LATEST AVAILABLE YEAR

Country	2010		2011		2012	
Argentina	3 946		4 592		5 446	
Mexico	7 883		8 058		*	
Turkey	9 713		10 826		12 656	
OECD total	994 566	b	1034 024	b	1107 397	b
United States	408 657	d	415 193	jp	453 544	
China	178 167		208 171		293 549	
Japan	140 656		148 389	b	151 837	b
Germany	87 831		96 971	c	102 238	c
France	50 735	a	53 310	p	55 352	p
Russian Federation	33 055		35 192		37 854	
Italy	25 154		25 780		26 320	p
India	32 923	c	36 195	c	*	
Spain	20 338		20 106		19 556	
Poland	5 723		6 409		7 899	
Finland	7 563		7 897		7 530	
Brazil	25 121		27 430		*	
South Africa	4 009		4 158		4 308	
Chile	1 035		1 173		1 312	

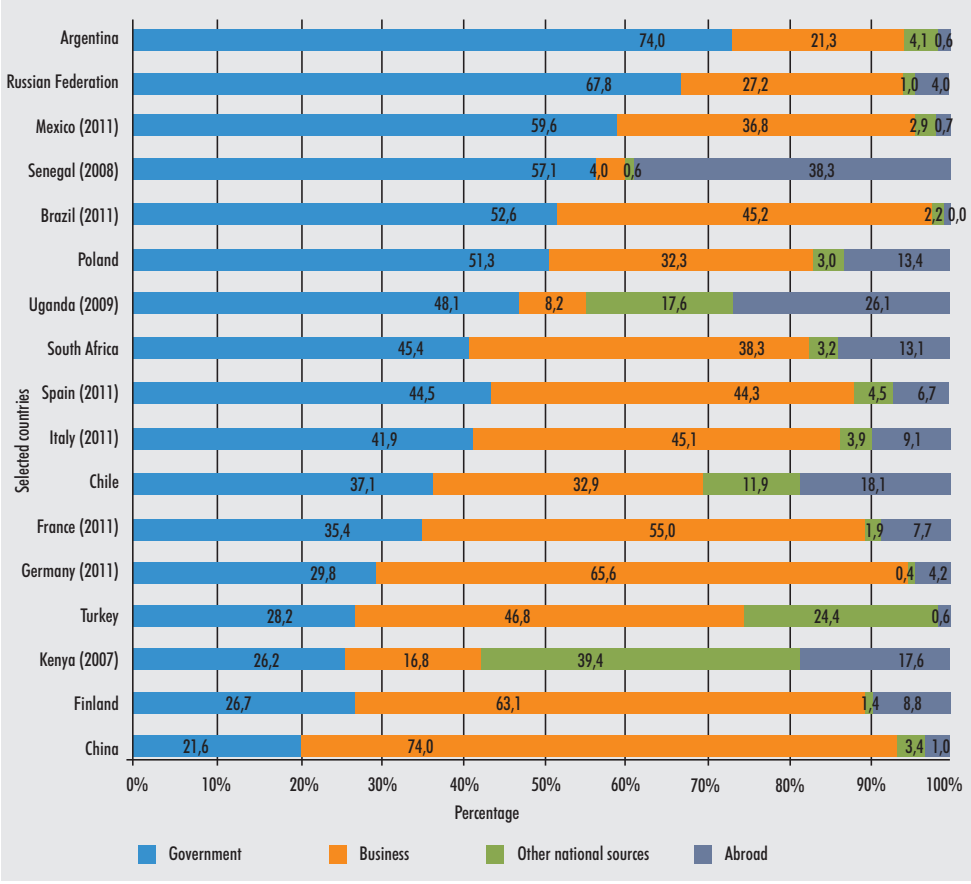
Data notes	*Data not available a) Break in series with previous year for which data are available b) Secretariat estimate or projection based on national sources c) National estimate or projection d) Excluding most or all defence expenditure g) Excluding R&D in the social sciences and humanities j) Excluding most
Data sources	South Africa: National Survey of Research and Development 2012/13; OECD 2014

7.1.3. GERD by source of funds

R&D is financed by government, business, foreign sources, and other national sources including the higher education institutions and not-for-profit organisations The sources of funds for R&D, and the proportion of funding from the various sources, vary among countries. According to the OECD (2010), governments are the major sources of funding for R&D in developing countries, while the business sector is the largest funder of R&D in developed countries.

South Africa received 45.4% of its R&D funding from government in 2012/13 and 38.3% from the business sector. Argentina, the Russian Federation, Mexico, Senegal, Poland, Uganda, Spain and Italy reported that more than 40% their R&D funding came from government. The countries that received the largest share of R&D funding from the business sector were China (74.0%), Germany (65.6%), Finland (63.1%) and France (55.0%). Senegal, Kenya, Uganda and Chile reported that more than 15% of their GERD was financed by foreign sources.

FIGURE 7.2: GERD BY SOURCE OF FUNDS IN SELECTED COUNTRIES (PERCENTAGE), 2012/13 OR LATEST AVAILABLE YEAR



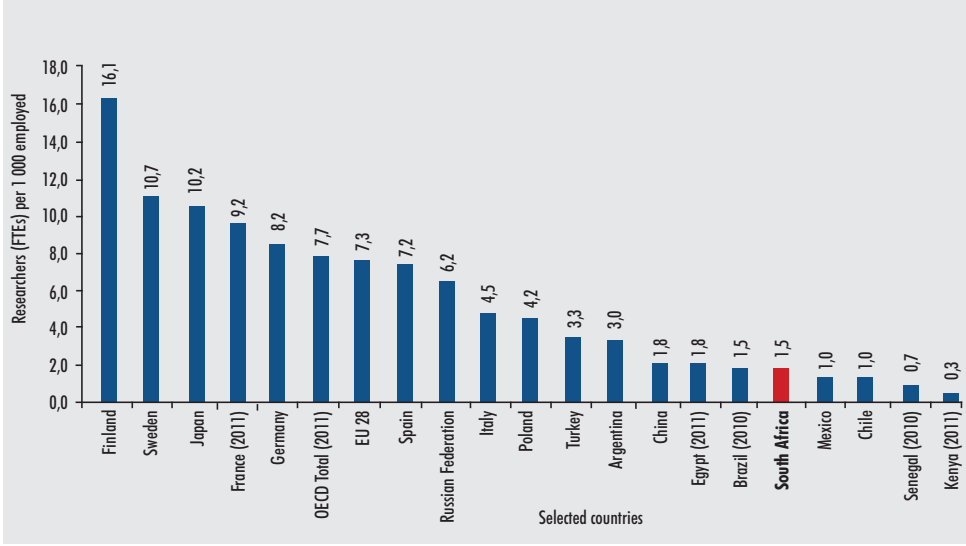
Data notes	Data are for 2012/13 or the latest available year as indicated in brackets. Other national sources include the not-for-profit and higher education sectors.
Data sources	Country data: South Africa: National Survey of Research and Experimental Development, 2012/13 Argentina, Chile, China, Finland, France, Germany, Italy, Mexico, Poland, Russian Federation, and Spain: OECD 2014 Kenya, Senegal, and Uganda: AU-NEPAD 2014 Brazil, Turkey: UIS 2013

7.2. R&D Personnel

7.2.1. Researchers: Full-time equivalents (FTEs) per thousand in total employment

South Africa had 1.5 researcher FTEs per thousand in total employment in 2012/13. This figure has been relatively constant over the last seven years, oscillating between 1.4 and 1.5. South Africa's figure of 1.5 was comparable with that of some of the other BRICS countries, namely China (1.8) and Brazil (1.5). However, the figure for South Africa was relatively low compared with the Russian Federation, which had 6.2 researchers per thousand employed. Developed countries such as Finland, Sweden and Japan reported more than 10.0 researcher FTEs per thousand in total employment, with Finland reporting 16.1.

FIGURE 7.3: RESEARCHERS (FTEs) PER 1 000 IN TOTAL EMPLOYMENT IN SELECTED COUNTRIES, 2012/13 OR LATEST AVAILABLE YEAR



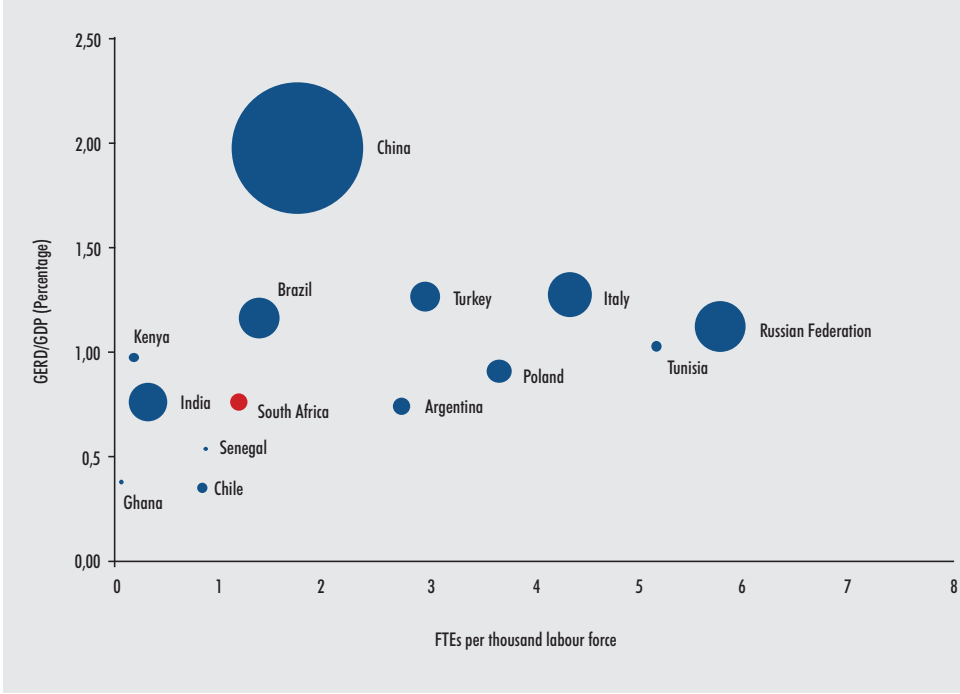
Data note	Data are for 2012/13 or the latest available year as indicated in brackets.
Definition	Country data: South Africa: National Survey of Research and Experimental Development, 2012/13 Argentina, Chile, China, EU 28, Finland, France, Germany, Italy, Japan, Mexico, OECD Total, Poland, Russian Federation, Spain, Sweden, Turkey: OECD 2014 Kenya, Senegal: African Union-NEPAD 2014 Brazil, Egypt: UIS 2013

7.2.2. Research and researcher intensity

Researcher intensity is calculated as FTEs as a percentage of the labour force in the country. The number of people employed in South Africa was 13.497 million in 2011/12 and 14.524 million in 2012/13, which reflects growth of 7.6% in the labour force of the country.

Figure 7.4 shows GERD as a percentage of GDP (research intensity) and researcher intensity for selected countries in 2012/13 or the latest year for which data are available. The Russian Federation had more researcher FTEs per thousand in the labour force than any of the other selected countries. China, which had the highest GERD, had fewer than two researcher FTEs per thousand in its labour force. The selected African countries had fewer than one researcher FTE per thousand in the labour force.

FIGURE 7.4: RESEARCH AND RESEARCHER INTENSITY (2012) OR LATEST AVAILABLE YEAR*



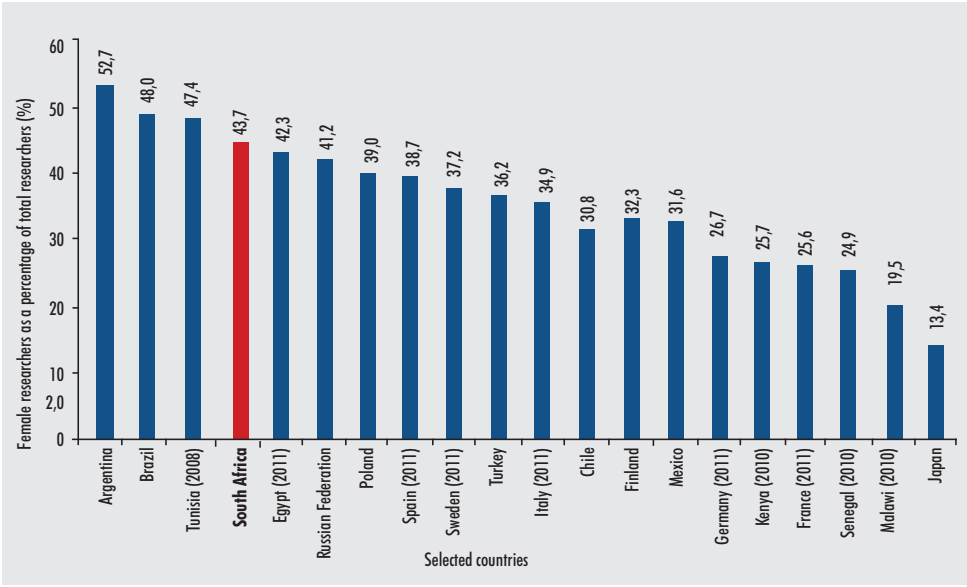
*Note: FTEs per thousand labour force are represented on the x-axis, while and the y-axis represents research intensity. The size of the bubbles indicates GERD expenditure in million PPP$.

Data note	The years for which data were available were as follows: 2012/13: Argentina, Chile, China, Italy, Poland, Russian Federation, South Africa, Turkey 2008/09: Tunisia and Ghana 2006/08: Kenya and Senegal 2005/06: India
Data sources	Country data: South Africa: National Survey of Research and Experimental Development 2012/13 GERD PPP$ data: Argentina, Chile, China, Italy, Poland, Russian Federation, Turkey: OECD 2014 Brazil, Ghana, Kenya, Senegal: UIS 2013 FTEs per thousand: UIS 2013 GERD/GDP data: UIS 2013

7.2.3. Female researchers as a percentage of total researchers

South Africa has consistently performed well in comparison with OECD and other selected countries with regard to the proportion of female researchers. The proportion of female researchers in South Africa increased from 42.3% in 2011/12 to 43.7% in 2012/13. This indicator has increased gradually over the last seven years. The representation of female researchers in Poland (39.0%), Mexico (31.6%) and Japan (13.40%) was well below the proportion of female researchers in South Africa.

FIGURE 7.5: FEMALE RESEARCHERS AS A PERCENTAGE OF TOTAL RESEARCHERS (HEADCOUNT) IN SELECTED COUNTRIES, 2012/13 OR LATEST AVAILABLE YEAR



Data note	Data for female researchers as a percentage of total researchers were not available for most countries. The year of the latest available data is indicated in brackets. The headcounts represent the number of female researchers divided by the total number of researchers.
Data sources	Country data: South Africa: National Survey of Research and Experimental Development, 2012/13 Argentina, Chile, Finland, France, Germany, Italy, Japan, Mexico, Poland, Russia, Spain, Sweden, Turkey: OECD 2014 Kenya, Malawi, Senegal: African Union-NEPAD 2014 Brazil, Tunisia, Egypt: UIS 2013

CHAPTER 8
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ANNEXURE I

Methodology

The survey was conducted according to the OECD guidelines presented in the Frascati Manual. The Frascati Manual defines R&D as follows:

Research and experimental development (R&D) is creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humanity, culture and society, and the use of this stock of knowledge to devise new application. (OECD 2002)

The Frascati Manual proposes several approaches to surveying R&D-performing entities, including a census, a sample survey or a hybrid of the census and sample survey approaches, comprising a census of all large R&D performers and a stratified random sample survey of the remaining R&D-performing entities. In South Africa, the survey is currently conducted using the census approach in all the sectors except the business and not-for-profit (NPO) sectors, where in each case a purposive sample of the entities is surveyed. As with the previous R&D surveys, the 2012/13 survey followed this approach. In accordance with the Frascati Manual, the survey covered the following sectors: business, government, higher education, not-for-profit and science councils sectors.

The sectors were surveyed during the period October 2013 to June 2014.

For science councils and all government departments, the survey covered expenditure in the year beginning 1 April 2012 and ended 31 March 2013. The data collected for the business and NPO sectors were for the financial year ended 28 February 2013 (or the nearest complete financial year). Data for the higher education sector correspond to the 2013 academic (calendar) year. Therefore, the survey mainly recorded R&D activities that took place in the 2012/13 fiscal year.

In addition to following the guidelines in the Frascati Manual, the survey was conducted according to a project plan aligned with the phases of the Statistical Value Chain (SVC), as described in the South African Statistical Quality Assessment Framework (SASQAF). As with previous surveys, the survey was conducted so as to ensure that it is compliant with certain SASQAF criteria for data quality on official statistics, as detailed in the Quality Management Plan (QMP). The resultant reports were subjected to a data quality clearance process, managed by a clearance committee established by the DST especially for that purpose.

The full and detailed methodology is presented in section D of the Statistical Report.

ANNEXURE II

Dissemination

This report may be downloaded free of charge from:

http://www.dst.gov.za/index.php/resource-center/rad-reports

http://www.hsrc.ac.za/en/research-areas/Research_Areas_PHHSI/CeSTii/sa-national-survey-of-research-and-experimental-development

User Satisfaction Survey

A User Satisfaction Survey (USS) questionnaire is included as Annexure IV to this report. It would be very much appreciated if users could complete the questionnaire and return it by fax to +27 (0)21 461 1255. The feedback is analysed following each survey cycle to ensure the continued improvement of the R&D survey.

Data extractions

Data extractions in response to users' special data requests are generally provided free of charge, unless fairly substantial analytical work is required to meet any such request. Such data extractions are done in accordance with the approved data access protocol, and requests should be sent to msithole@hsrc.ac.za.

Revisions

The Department of Science and Technology (DST), Statistics South Africa (Stats SA) and the Human Sciences Research Council's Centre for Science, Technology and Innovation Indicators (HSRC-CeSTII) jointly reserve the right to revise the data, indicators and analysis contained in this report. Such revisions may result from revisions by Stats SA of socio-economic indicators such as the gross domestic product (GDP) or population or employment numbers, or amendments in response to internal and external data quality and consistency monitoring such as that carried out by the Organisation for Economic Co-operation and Development (OECD), which conducts quality checks through global comparative analysis, time-series analyses and other methods. Explanations of any revisions will be made available and accessible on the DST and HSRC websites.

ANNEXURE III

User Satisfaction Survey

In order to improve the quality and relevance of the R&D statistics, it would be useful to receive the views of users of this publication. It would therefore be appreciated if you could complete the following questionnaire and return by fax to +27 (0)21 461 1255

1. Name and address of respondent:	
Name and title	
Designation/ occupation	
Name and address of organisation or enterprise	

2. Which of the following describes your area of work? Mark with 'X'.			
Government		International organisation	
Private enterprise		Media	
Public enterprise		Not-for-profit organisation	
Academic or research institution		Other, specify	

3. In which country do you work?

4. What is your assessment of the content of this publication?									
Excellent		Good		Average		Satisfactory		Poor	

5. How useful is this publication for your work?									
Extremely useful		Very useful		Useful		Partly useful		Not at all useful	

6. How accurate is the picture of R&D in your sector or research field(s) as presented in this publication?									
Very accurate		Fairly accurate		Unsure		Not very accurate		Not at all accurate	

7. How easy was it to find specific information that you required in the publication?									
Extremely easy		Very easy		Easy		Not very easy		Not at all easy	

8. What information (i.e. tables, text or figures) were of most interest to you? Please be as specific as possible (e.g. provide table, page or figure numbers).

9. What did you like best about the publication?

10. Provide any comments or recommendations for the improvement of the publication.

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