

INNOVATION IN SELECTED SOUTH AFRICAN SERVICES SECTORS, 2010-2012

**A micro-data report based on the 2010-2012
South African Business Innovation Survey
undertaken by the Centre for Science, Technology
and Innovation Indicator for the Department of
Science and Technology**



CONTENTS

CONTENTS	ii
ACKNOWLEDGEMENTS	iv
LIST OF ABBREVIATIONS AND ACRONYMS	v
FIGURES AND TABLES	vi
List of Figures.....	vi
List of Tables.....	vii
EXECUTIVE SUMMARY	10
Results Highlights.....	11
<i>Proportion of innovative enterprises</i>	12
<i>Type of innovation activities undertaken</i>	12
<i>Expenditure on innovation activities</i>	12
<i>Government financial support for innovation in the services sector</i>	12
<i>Sources of information and ideas for innovation</i>	12
<i>Collaborations and their nature</i>	13
<i>Effects of innovations</i>	13
<i>Perceptions of factors hampering innovation</i>	13
CHAPTER 1: BACKGROUND AND INTRODUCTION	14
CHAPTER 2: METHODOLOGY	16
2.1 Data source.....	16
2.2 Statistical analysis.....	16
CHAPTER 3: WHOLESALE AND RETAIL TRADE	17
3.1 Characteristics of enterprises in the wholesale and retail trade sector covered by the survey ...	17
3.2 Profile of the wholesale and retail trade sectors.....	20
3.3 Results.....	21
3.3.1 <i>Types of Technological Innovation</i>	21
3.3.2 <i>Innovation expenditures and financial support for innovation activities</i>	25
3.3.4 <i>Sources of information and co-operation partners for innovation activities</i>	29
3.3.5 <i>Effects of innovation</i>	31
3.3.6 <i>Factors hampering innovation</i>	33
3.3.7 <i>Intellectual property rights</i>	33
3.3.8 <i>Innovation with environmental benefits</i>	34
3.3.9 <i>Non-technological innovation activities</i>	36
Chapter 4: FINANCIAL INTERMEDIATION	39
4.1 Characteristics of enterprises in the financial intermediation sector covered by the survey.....	39
4.2 Profile of the financial intermediation sector.....	41
4.3 Results.....	42
4.3.1 <i>Introduction</i>	42
4.3.2 <i>Types of Technological Innovation</i>	43
4.3.3 <i>Innovation expenditures and financial support for innovation activities</i>	47
4.3.4 <i>Sources of information and co-operation partners for innovation activities</i>	51
4.3.5 <i>Effects of innovation</i>	53
4.3.6 <i>Factors hampering innovation</i>	55
4.3.7 <i>Intellectual property rights</i>	55
4.3.8 <i>Innovation with environmental benefits</i>	56

4.3.9	<i>Non-technological innovation activities</i>	58
Chapter 5: TRANSPORT STORAGE AND COMMUNICATION		61
5.1	Characteristics of enterprises in the transport, storage and communications sectors covered by the survey	61
5.2	Profile of the transport, storage and communications sectors	63
5.3	Results	65
5.3.1	<i>Introduction</i>	65
5.3.2	<i>Types of Technological Innovation</i>	66
5.3.3	<i>Innovation expenditures and financial support for innovation activities</i>	69
5.3.4	<i>Sources of information and co-operation partners for innovation activities</i>	73
5.3.5	<i>Effects of innovation</i>	75
5.3.6	<i>Factors hampering innovation</i>	76
5.3.7	<i>Intellectual property rights</i>	77
5.3.8	<i>Innovation with environmental benefits</i>	78
5.3.9	<i>Non-technological innovation activities</i>	80
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS		82
6.1	Innovation is pervasive	82
6.2	Some innovations did not succeed	82
6.3	Acquiring machinery and intramural R&D accounted for the largest share of expenditure on innovation.....	82
6.4	A significant number of enterprises undertake R&D to innovate.....	82
6.5	To some extent, enterprises find an incentive to innovate, from procurement contracts to provide goods or services for the South African public sector.....	83
6.6	Innovation is a connected activity	83
6.7	Innovation has impact	83
6.8	There are barriers to innovation	84
6.9	Innovations with environmental benefits were produced	84
REFERENCES AND FURTHER READING		85
APPENDICES*		89
Appendix 1:	The Community Innovation Survey 2006 Methodological Recommendations.....	89
Appendix 2:	South African Business Innovation Survey 2010-2012 Questionnaire	89
Appendix 3:	Frequently Asked Questions booklet.....	89
Appendix 4:	List of A Tables.....	89
Appendix 5:	List of B Tables.....	90

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LIST OF ABBREVIATIONS AND ACRONYMS

CEO	Chief Executive Officer
CeSTII	Centre for Science, Technology and Innovation Indicators
CIS	Community Innovation Survey
DST	Department of Science and Technology
EU-27	Expanded European union (27 countries)
FI	Financial Intermediation
FRD	Foundation for Research Development
HSRC	Human Sciences Research Council
IPR	Intellectual Property Rights
ISP	Industrial Strategy Project
NACI	National Advisory Council on Innovation
NESTI	National Experts on Science and Technology Indicators
NRF	National Research Foundation
NSI	National System of Innovation
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Experimental Development
SEDA	Small Enterprise Development Agency
S&T	Science and Technology
SIC	Standard Industrial Classification
SPII	Support Programme for Industrial Innovation
THRIP	Technology and Human Resources for Industry Programme
TSC	Transport, Storage and Communication
WRT	Wholesale and Retail Trade

FIGURES AND TABLES

List of Figures

Figure 3.1.1 Age of innovation-active and non-innovation-active wholesale and retail trade enterprises .	18
Figure 3.1.2 Enterprises that merged with others, closed or established subsidiaries	19
Figure 3.1 Wholesale and retail trade sector value added as a percentage of Gross Domestic Product (GDP)	20
Figure 3.3.1 Innovation rate by type of innovation, 2010-2012	22
Figure 3.3.2 Types of innovation activities among enterprises, 2010-2012	26
Figure 3.3. 3 Enterprise awareness of government funding	27
Figure 3.3. 4 Reasons why innovation-active enterprises did not access government funds, 2010-2012 ...	28
Figure 3.3.5 Innovation-active enterprises that had public sector procurement contracts to provide goods and services, 2010-2012	29
Figure 3.3.6 Sources of information for innovation rated as "highly important" by innovation-active enterprises.....	30
Figure 3.3.7 Innovative collaborative partnerships by type of partner, 2010-2012	31
Figure 3.3.8 Innovation-active enterprises that introduced organisational innovation and rated various results as highly important, 2010-2012	32
Figure 3.3.9 Innovation-active wholesale enterprises that made use of intellectual property rights (IPR), 2010-2012.....	34
Figure 3.3.10 Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods or services, 2010-2012.....	36
Figure 3.3.11 Percentage of innovation-active enterprises that introduced organisational or marketing innovation, 2010-2012	38
Figure 4.1.1 Age of innovation-active and non-innovation-active enterprises in the financial intermediation sector	40
Figure 4.1.2 Enterprises in the financial intermediation sector that merged with others, closed or established subsidiaries.....	41
Figure 4.1 Financial services sector value added as a percentage of Gross Domestic Product (GDP)	42
Figure 4.3.1 Innovation rate in the financial intermediation sector by type of innovation, 2010-2012	44
Figure 4.3.2 Types of innovation activities among enterprises, 2010-2012	48
Figure 4.3.3 Awareness of government financial support for innovation	49
Figure 4.3.4 Reasons why innovation-active enterprises did not access government funds.....	50
Figure 4.3.5 Innovation-active enterprises that had public sector procurement contracts to provide goods and services, 2010-2012	51
Figure 4.3.6 Sources of information for innovation rated as "highly important" by innovation-active enterprises.....	52
Figure 4.3.7 Innovation-active collaborative partnerships by type of partner, 2010-2012.....	53
Figure 4.3. 8 Innovation-active enterprises that introduced organisational innovation and rated various results as highly important, 2010-2012	54
Figure 4.3.9 Innovation-active finance enterprises that made use of intellectual property rights (IPR), 2010-2012	56
Figure 4.3.10 Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods or services, 2010-2012.....	58
Figure 4.3.11 Percentage of innovation-active enterprises that introduced organisational or marketing innovation, 2010-2012	60
Figure 5.1.1 Age of innovation-active and non-innovation-active enterprises in the transport, storage and communication sector.....	62

Figure 5.1.2 Enterprises in the transport, storage and communication sector that merged with others, closed or established subsidiaries.....	63
Figure 5.1 Transport, storage and communication sector value added as a percentage of Gross Domestic Product (GDP).....	64
Figure 5.3.1 Innovation rate by type of innovation in the transport, storage and communication sector, 2010-2012*.....	66
Figure 5.3.2 Types of innovation activities among enterprises in the transport, storage and communication sector, 2010-2012.....	70
Figure 5.3.3 Transport, storage and communication sector awareness of government financial support for innovation, 2012.....	71
Figure 5.3.4 Reasons why innovation-active enterprises in the transport, storage and communication sector did not access government funds.....	72
Figure 5.3.5 Innovation-active enterprises in the transport, storage and communication sector that had public sector procurement contracts to provide goods and services, 2010-2012.....	73
Figure 5.3.6 Sources of information for innovation rated as "highly important" by innovation-active enterprises in the transport, storage and communication sector	74
Figure 5.3.7 Innovative collaborative partnerships by type of partner of enterprises in the transport, storage and communication sector, 2010-2012	74
Figure 5.3.8 Innovation-active enterprises in the transport, storage and communication sector that introduced organisational innovation and rated various results as highly important, 2010-2012	76
Figure 5.3.9 Innovation-active transport, storage and communication sector enterprises that made use of intellectual property rights (IPR), 2010-2012	78
Figure 5.3. 10 Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods	80
Figure 5.3.11 Percentage of innovation-active enterprises in the transport, storage and communication sector that introduced organisational or marketing innovation, 2010-2012.....	81

List of Tables

Table 1: Key Innovation indicators of selected services sectors.....	11
Table 3.1.1 Total enterprises, number of employees and turnovers: comparison of enterprises with innovation activities, 2010-2012	17
Table 3.1.2 Number and percentage of enterprises that stated they were part of a larger.....	18
Table 3.1.3 Employees in the wholesale and retail trade sector	19
Table 3.3.1 Innovation rate: Percentage innovation for innovation-active and non-innovation-active wholesale and retail trade enterprises 2010-2012.....	21
Table 3.3.2 Product (goods and services) innovators: percentage of the wholesale and retail trade enterprises by product type, 2012 (year specific question)	22
Table 3.3.3 All product innovators: proportion of turnover attributed to types of product innovations, 2012 (year-specific question)	23
Table 3.3.4 Product innovators: proportion of turnover attributed to types of product innovations, by size of enterprises, 2012 (year-specific question).....	23
Table 3.3.5 Responsibility for the development of product innovations in innovative enterprises, 2010-2012	24
Table 3.3.6 Origin of product innovation, 2010-2012.....	24
Table 3.3.7 Enterprises involved in specific process innovations, 2010-2012	24
Table 3.3.8 Responsibility for the development of process innovation, 2010-2012.....	25
Table 3.3.9 Origin of Process innovation, 2010-2012	25
Table 3.3.10 Enterprises that declared innovation expenditure for the wholesale and retail trade sector, 2012 (year-specific question).....	26
Table 3.3.11 Enterprises with successful innovations that performed R&D, 2012	27
Table 3.3.12 Innovation-active enterprises that received financial support for innovation activities from government sources, 2010-2012	28

Table 3.3.13 "Highly important" effects of innovation on outcomes for innovation-active enterprises, 2010-2012	32
Table 3.3.14 Highly important factors that hampered innovation activities of innovation-active and non-innovation-active wholesale enterprises, 2010-2012	33
Table 3.3.15 Introduction of innovations with environmental benefits, 2010-2012.....	35
Table 3.3.16 Procedures to identify and reduce environmental impacts.....	36
Table 3.3.17 Enterprises with organisational and/or marketing innovations, 2010-2012.....	37
Table 4.1.1 Total enterprises, number of employees and turnovers: comparison of enterprises with innovation activities in the financial intermediation sector, 2010-2012	39
Table 4.1.2 Number and percentage of enterprises in the financial intermediation sector that stated they were part of a larger group.....	40
Table 4.1.3 Employees in the financial intermediation sector.....	41
Table 4.3.1 Innovation rate: Percentage innovation for innovative and non-innovative enterprises in the financial intermediation sector 2010-2012.....	43
Table 4.3.2 Product (goods and services) innovators: Percentage of enterprises in the financial intermediation sector by product type and size of enterprises, 2012 (year specific question).....	44
Table 4.3.3 Product Innovators: proportion of turnover attributed to types of product innovations, 2012 (year specific question).....	45
Table 4.3.4 Product innovators: proportion of turnover attributed to types of product innovations, by size of enterprises, 2012 (year-specific question).....	45
Table 4.3.5 Responsibility for the development of product innovations in innovative enterprises, 2010-2012	46
Table 4.3.6 Origin of product innovation, 2010-2012.....	46
Table 4.3.7 Enterprises involved in specific process innovations, 2010-2012	46
Table 4.3.8 Responsibility for the development of process innovations, 2010-2012	47
Table 4.3.9 Origin of process innovation, 2010-2012.....	47
Table 4.3.10 Enterprises that declared innovation expenditure for the financial intermediation sector, 2012 (year-specific question).....	48
Table 4.3.11 Enterprises with successful innovations that performed R&D, 2012	49
Table 4.3.12 Number and percentage of innovation-active enterprises that received financial support for innovation activities from government sources, 2010-2012.....	50
Table 4.3.13 "Highly important" effects of innovation on outcomes for innovation-active enterprises, 2010-2012	54
Table 4.3.14 Highly important factors that hampered innovation activities of innovation-active and non-innovation-active enterprises, 2010-2012.....	55
Table 4.3.15 Introduction of innovations with environmental benefits, 2010-2012.....	57
Table 4.3.16 Procedures to identify and reduce environmental impacts.....	58
Table 4.3.17 Enterprises with organisational and/or marketing innovations, 2010-2012.....	59
Table 5.1.1 Total enterprises, number of employees and turnovers: comparison of enterprises with innovation activities in the transport, storage and communication sector, 2010-2012.....	61
Table 5.1.2 Number and percentage of enterprises in the transport, storage and communication sector that stated they were part of a larger group.....	62
Table 5.1.3 Employees in the transport, storage and communication sector	63
Table 5.3.1 Innovation rate: Percentage innovation for innovation-active and non-innovation-active enterprises in the transport, storage and communication sector enterprises 2010-2012.....	65
Table 5.3.2 Product (goods and services) innovators: percentage of enterprises in the financial intermediation sector by product type and size of enterprises, 2012 (year specific question).....	67
Table 5.3.3 Product Innovators: proportion of turnover attributed to types of product innovations in the transport, storage and communication sector, 2012 (year specific question).....	67
Table 5.3.4 Product innovators: proportion of turnover in 2012 attributed to the types of products, by size of enterprises (%) in the transport, storage and communication sector.....	67
Table 5.3.5 Responsibility for the development of product innovations in innovative enterprises in the transport, storage and communication sector, 2010-2012	68

Table 5.3.6 Origin of product innovations for enterprises in the transport, storage and communication sector, 2010-2012.....	68
Table 5.3.7 Enterprises in the transport, storage and communication sector involved in specific process innovations, 2010-2012.....	68
Table 5.3.8 Responsibility for the development of process innovations in the transport, storage and communication sector, 2010-2012.....	69
Table 5.3.9 Origin of process innovation in the transport, storage and communication sector, 2010-2012.....	69
Table 5.3.10 Enterprises in the transport, storage and communication sector that declared innovation expenditure by sector, 2012 (year-specific question).....	70
Table 5.3.11 Enterprises with successful innovations that performed R&D, 2012	71
Table 5.3.12 Number and percentage of innovation-active enterprises in the transport, storage and communication sector that received financial support for innovation activities from government sources, 2010-2012.....	72
Table 5.3.13 Highly important effects of innovation on outcomes for innovation-active enterprises in the transport, storage and communication sector, 2010-2012	75
Table 5.3.14 Highly important factors that hampered innovation activities of innovation-active and non-innovation-active enterprises in the transport, storage and communication sector, 2010-2012	77
Table 5.3.15 Enterprises with innovation activity in the transport, storage and communication sector that introduced innovations with environmental benefits, 2010-2012	79
Table 5.3.16 Procedures to identify and reduce environmental impacts.....	80
Table 5.3.17 Enterprises with organisational and/or marketing innovations in the transport, storage and communication sector, 2010-2012.....	81

EXECUTIVE SUMMARY

Innovation, a function of knowledge and its diffusion, is an important driver of competitiveness of firms and nations. This is the reason why many countries continue to place a growing emphasis on policies that spur it. Better understanding of the innovation process and its economic and development impact is crucial for all the actors involved in its realisation.

Innovation takes place through a variety of practices, and however complex and multifaceted it may be, a great amount of effort has been invested to develop methods to measure innovation. Several methodologies are available to do so. There are specific indicators that can be used to measure its level within the enterprise or in an economy or region. The Oslo Manual, first published in 1997 and a second edition in 2005, provides theoretical and methodological foundations and guidelines for surveys to produce innovation data and indicators. The Oslo Manual defines innovation as “the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organizational method in business practice, workplace organization or external relations (OECD, 1997; 2005).

In South Africa, measurement of innovation is an essential part of policy management, to inform the evaluation of progress and refinements to national policies and strategies, particularly in the domains of science, technology and industrial development. The first South African Innovation Survey was carried out by the Foundation for Research and Development (FRD) and the Industrial Strategy Project (ISP) for the years 1992-1994. The second Survey was undertaken by the University of Pretoria and the Eindhoven University of Technology (in the Netherlands) for the period 1998-2000. An approach of measuring innovation was adopted in the early 2000s, leading to the third innovation survey covering the period 2002-2004 and the fourth one covering the period 2005-2007. The third innovation survey, which forms the basis for this report, was undertaken to cover the period 2010-2012. To formalise and regularise the production of the innovation survey series, the Department of Science & Technology (DST) commissioned the Centre for Science, Technology and Innovation Indicators (CeSTII), which is based at the Human Sciences Research Council (HSRC) to conduct these surveys.

Users must note that the survey response rate was less than sufficient to produce national aggregates of overall innovation indicators as intended with the national Business Innovation Survey. It was determined, in the final analysis of responses, that a series of analytical products, which would include reports, policy and journal articles, are possible from the data that was collected, particularly for the manufacturing sector and the selected industries within the services sector, namely Wholesale and Retail Trade (WRT), Financial Intermediation (FI), and Transport, Storage and Communication (TSC).

The results reported in this report, therefore, do not represent the national aggregates of innovation performance, but only the aspects of innovation activities in the services sector. This report draws from the dataset of the 2010-2012 South African Business Innovation Survey and profiles the innovation patterns in the three South African services sectors (WRT, FI and TSC). It is based on the 379 services enterprises that responded to the survey questionnaire. Available data was used to compute standard indicators covering technological innovation; new or significantly improved goods or services; the implementation of new or significantly improved processes; or ongoing/abandoned innovation for products and processes. The report also presents a number of other variables and factors that provide insight into innovation processes in South Africa. A short overview of the three sectors is presented to provide the economic context that prevailed during the reference period of 2010-2012.

Results Highlights¹

Table 1: Key Innovation indicators of selected services sectors

Indicator	Wholesale and Retail Trade (Value)	Financial Intermediation (Value)	Transport, Storage and communication (Value)
Innovative enterprises (with successful technological innovations)	43.0%	69.2%	59.1%
Innovation-active enterprises (technological innovation)	45.8%	73.8%	61.3%
Technological innovations			
Enterprises that produced new to the market products	23.7%	15.2%	22.0%
Non-technological innovations			
Enterprises with marketing innovations	30.2%	40.2%	28.0%
Enterprises with organisational innovations	40.8%	61.7%	54.8%
Inputs			
Expenditure on innovation activities	R 16 258 million	R 180 665 million	R 42 081 million
Innovation expenditure as % of turnover	6.0%	9.8%	0.5%
Enterprises that engaged in intramural Research and Development activities	51.2%	77.2%	54.4%
Enterprises with successful innovations that engaged in intramural Research and Development (R&D) activities (2012)	50.0%	72.2%	54.4%
Outputs			
Turnover from sales of new to the market products (technological innovators)	43.8%	14.6%	5.8%
Support for innovation			
Percentage of innovation-active enterprises that were aware of government financial support	46.3%	50.6%	29.8%
Percentage of non-innovative enterprises that were aware of government financial support	4.1%	7.1%	5.6%
Percentage of innovation-active enterprises receiving financial support from government sources	8.5%	20.3%	10.5%

Please note: Where not indicated numbers are reported in the following order – WRT, FI, TSC

¹ A distinction is made in this report between an **innovation-active enterprise** and an **innovative enterprise**. An innovation active enterprise is one that has undertaken any form of innovation activities during the period under review, including those with ongoing and abandoned activities. In other words, enterprises that have had innovation activities during the period under review, regardless of whether the activity resulted in the implementation of an innovation, are **innovation-active**. Such innovation activities would include the acquisition of machinery, equipment, software, licences, engineering and development work, training, marketing and R&D. A common feature of an innovation is that it must have been **implemented**. Thus, an **innovative enterprise** is one that has **implemented** an innovation during the period under review. Two types of innovations are recognised, namely technological innovations (which cover product and process innovations) and non-technological innovations (which cover marketing and organizational innovations). A new or improved product is implemented when it is introduced on the market. New processes, marketing methods or organisational methods are implemented when they are brought into actual use in the enterprise's operations.

Proportion of innovative enterprises

More than half of the enterprises in the FI and the TSC sectors that took part in this study, had engaged in technological innovations which were successful (69.2% and 59.1% respectively). Only 43.0% of the WRT enterprises were successful innovators.

About 23.7% of the WRT enterprises engaged in technological innovations that were new to the market, whilst 22.0% was reported for TSC and 15.2% for the FI sector. This category should be distinguished from innovations that are new to the enterprise concerned or those that involve marginal modifications. In terms of non-technological innovations in the WRT, FI and TSC sectors, 40.8%, 61.7% and 54.8% of enterprises in the respective sectors introduced organizational innovations and 30.2%, 40.2% and 28.0% of enterprises in the respective sectors had introduced marketing innovations.

The patterns of innovation noted in this report are in line with a key finding in the previous series of the South African Innovation survey reports that a large number of enterprises across the sectors are innovation active.

Type of innovation activities undertaken

There is a high number of enterprises in these selected services sectors depending on research and development (R&D) to introduce innovations. In the respective sectors, the proportion of innovation-active firms that had performed intramural R&D as part of their innovation processes were as follows: WRT 51.2%, FI 77.2% and TSC 54.4%. Training seemed to be the most important innovation activity (64.6%, 77.2% and 70.2% of enterprises in the respective sectors), followed by the acquisition of new machinery, equipment or software (58.5%, 72.2% and 70.2% respectively).

Expenditure on innovation activities

FI enterprises with innovation activity spent a total of R 180 665million on innovation activities, which is 9.8% of their turnover during 2012. Expenditure on outsourced R&D accounted for 51.0% of the total expenditure on all innovation activities of FI enterprises. Only 23.0% of the total expenditure was devoted to intramural R&D. Innovation-active enterprises in the TSC sector spent a total of R 42 081million on innovation activities, 87.1% of which was devoted to the acquisition of machinery, equipment and software. The highest expenditure for the WRT was an amount of R 15 528 million on intramural R&D which is a 95.5% expenditure.

Government financial support for innovation in the services sector

Less than half of the enterprises in the three selected services sectors, with successful innovations were aware of government funding opportunities (43.9%, 46.8% and 29.8% respectively). Very few successful innovators received funding from government to undertake their innovation activities (7.3%, 19.0% and 10.5% of enterprises in the respective sectors). The dti was the principal promoter of innovation with 2.4%, 10.1% and 1.8% of innovation active enterprises in the three respective sectors indicating that they had received funding for innovation from this government department.

Sources of information and ideas for innovation

Enterprises source most of their innovative ideas from their immediate market. Clients or customers were rated as 'highly important' sources of information for innovation activities by 56.1%, 62.0% and 38.6% of enterprises in the respective three service sectors. This was followed by sources within the enterprise group (46.3%, 68.4% and 36.8% of enterprises in the respective sectors) and then suppliers (39.0%, 39.2% and 36.8% respectively). Professional industry associations were the next most important sources of information (14.6%, 20.3% and 12.3% respectively).

Collaborations and their nature

Partners that services enterprises principally cooperated with on their innovation activities, were clients or customers (17.1%, 44.3% and 26.3% respectively) and suppliers of equipment, materials, components and software (24.4%, 41.8% and 24.6% respectively). Although collaborative partnerships with universities or higher education institutions was reported by only 8.5%, and 7.0% for both WRT, and TSC, respectively the FI sector collaborations by 34.2% of innovative enterprises.

Effects of innovations

'Increasing the range of goods and services' were ranked as 'highly important' by 35.4%, 46.8% and 24.6% of innovative enterprises in the respective selected services sectors. 'Improving quality of goods or services' was ranked as 'highly important' by 30.5%, 43.0% and 28.1% of enterprises in the respective services sectors.

'Improved flexibility of production or service provision' was an important outcome of innovation for 23.2%, 22.8% and 31.6% of enterprises in the respective sectors. Other 'highly important' effects of innovation mentioned were 'meeting government regulatory requirements' (mentioned by 23.2%, 20.3% and 24.6% of innovators in the three respective sectors) and 'reduced environmental impacts or improved health and safety' (15.9%, 13.9% and 12.3%),

Perceptions of factors hampering innovation

All three services sectors cited cost factors as the biggest factor impacting on their ability to innovation. 'Lack of funds within their own enterprise or group' was cited as the most important factor (19.5%, 24.1% and 22.8%) followed by the 'lack of qualified personnel' (19.5%, 27.8% and 14.0%). Innovation cost being too high was also cited by WRT and TSC enterprises as being a barrier to their innovation activities. The

CHAPTER 1: BACKGROUND AND INTRODUCTION

This is a micro-data analysis report, drawing from the dataset of the 2010-2012 South African Business Innovation Survey, to provide a sense of the profile the innovation patterns in the South African services sector.

The results of innovation surveys can assist government to identify policy measures on a range of issues relating innovation, targeted at the promotion of economic and social growth for competitiveness. Examples include policies for science and technology, industrial development, financial as well as other types of incentives for encouraging enterprises to innovate, and the legislation that encourages private sector collaboration and cooperation with universities and research organisations and international partners (see, for example, World Bank, 2006, Chapter 6). The impact of innovation-related policies can be evaluated by the enterprises' responses to their frequency, and importance, of access to services, programmes or financial tools that have been designed to support or promote innovation-related activities. The results of innovation surveys have been used to develop models that identify determinants of decisions of whether to innovate or not among services enterprises. Innovation surveys also inform the degree of impact which specific constraints have on innovation in industry.

Innovation is now the single most important engine of long-term competitiveness, growth and employment (EC, 2001 p11).

Innovation takes place through a wide variety of business practices and a range of indicators can be used to measure its level within the enterprise or in the economy as a whole. These include the levels of effort employed (measured through resources allocated to innovation) and of achievement (the introduction of new or improved products and processes). Four types of innovations are distinguished: *product innovations*, *process innovations*, *marketing innovations* and *organisational innovations*. Innovations comprise several types of activities and expenditures, including intramural and extramural (or outsourced) R&D; acquisition of machinery, equipment and software; acquisition of other external knowledge and know-how; training; market introductions and other activities (including significant design changes). The defining element for these various activities to be classified as innovations is that they result in improved products or services being introduced to the market.

There is a second group of innovation activities, the non-technological innovations, which comprise of organisational and marketing innovations. Organisational innovations are new or significant changes to firm structure or management methods while marketing innovations include the implementation of new or significantly improved designs or sales methods. The two different types of innovations (technological, and non-technological) are normally reported separately, since a combination of the two tends to result in a very high innovation rate (often close to 100%), which makes international or sectoral comparisons less meaningful.

There are four broad levels of novelty of innovations that are defined in relation to the firm and the market. In levels of increasing novelty, these are:

1. Innovations that are only new to the firm.
2. Innovations that are new to the market of the firm (and its competitors).
3. Innovations that are new to South Africa.
4. Innovations that are a world first.

While some innovation is directly based on the results of R&D, much innovation by the enterprises concerned is based on non-R&D activities aimed at producing new or improved products and/or processes. These non-R&D activities include the acquisition of external knowledge or new equipment and machinery.

Innovation surveys serve two purposes. Firstly, policy makers use the data collected from innovation surveys to monitor innovation and benchmark innovation performance (Mairesse and Mohnen, 2008). Mario and Sirilli (1997, 1998) showed that, based on firms' responses to the relevance of various government support programmes for innovation, the largest firms in high-technology sectors were the major recipients of most public support and funding, while many smaller innovating firms reported that these government policy tools were insufficient to support their innovation requirements. In South Africa, the Department of Science and Technology (DST) established the technology stations programme that offer technology support and advice to low technology-based Small, Medium and Micro Enterprises (SMMEs) to grow and graduate them into high-technology SMMEs (CHE, 2008, cited in Ndabeni, 2010)

Secondly, researchers use the data to determine the reasons for innovating and the effects of innovation of economic performance (Mairesse and Mohnen, 2008). The innovation surveys have also been used by researchers to examine all sorts of aspects of innovation, ranging from the analysis of determinants (of innovation activities, innovation outputs, collaborations, obstacles, sources of information), to complementarities (between these same set of variables), to their mutual interrelations and effects on various measures of performance (exports, productivity, employment). Innovation surveys provide us with three broad groups of measures: innovation inputs, innovation outputs, and modalities of innovation. The inputs include amongst others, research and experimental development, expenditure relation to innovation such as acquisitions of patents and licenses, product design, training of personnel and market analysis.

The modalities of innovation are the sources of information that lead to an innovation, the effects or innovation or the reasons for innovating, the perceived obstacles to innovation, the perceived strength of various appropriability mechanisms, and the cooperation in research and innovation (Mairesse and Mohnen, 2008)

The way in which the process of innovation is managed within the firm is a significant area of investigation because it provides information on the firm's internal factors, that shape choices about whether each firm decides to innovate, their type of innovation and by what means to innovate. The results of innovation surveys have been used to develop models that identify determinants of decisions of whether to innovate or not among services. Innovation surveys also inform the degree of impact which specific constraints have on innovation in industry. This report will give an overview of innovation behaviour in of the services sector of the South African Economy and provide evidence for policy analysis and implementation.

There are various approaches available in the literature for measurement of innovation, some of which draw the data from innovation surveys. The scopes of the measurement differ widely and are usually applied in different contexts and levels. From the contextual perspective, examples include economic, social and inclusive development, while in terms of levels, analysis could include global or regional comparisons, or could be at country or sector level. The OECD uses innovation micro-data analysis to examine a range of issues relating to innovation and firm level performance, focusing on the development of indicators that could aid in informing policy makers and changing nature of innovation and its relation to economic growth and social well-being.

Therefore, it is important to note that the Innovation Survey on which the micro-data analysis in this report was based, which focuses on innovation in the South African services sector, was a survey of businesses which was informed by the guidelines of the Organisation for Economic Cooperation and Development's (OECD) Oslo Manual (Eurostat/OECD, 1997, 2005).

This report gives an overview of innovation patterns in three selected services sectors of the South African economy and provides evidence for policy analysis and implementation. These sectors are: 1) Wholesale and Retail trade (WRT), 2) Financial Intermediation (FI), and 3) Transport, Storage and Communication (TSC). The present chapter (Chapter 1) introduces the report followed by the methodology of the study (Chapter 2). Chapters 3, 4 and 5 present the characteristics, profiles and results of the respective sectors. Chapter 6 presents conclusions and recommendations.

CHAPTER 2: METHODOLOGY

2.1 Data source

The micro-data analysis in this report which was undertaken to evaluate the innovation performance of three selected services sectors of the South African economy (WRT; FI; TSC) was based on relevant data from the South African National Business Innovation Survey 2010 - 2012, which covered the period 2010 to 2012. It was also informed by the structure of the Business Register of Statistics South Africa, from which a stratified random sample by sector determined on the basis of Standard Industrial Classification (SIC) and size of the business enterprise based on turnover was drawn.

An important aspect of the South African Business Innovation Survey 2010-2012 that collected the data on which the micro-data analysis report is based, is that enterprise size classes are currently officially determined by turnover and not employee numbers of the enterprises. The Eurostat guidelines recommend that the CIS 2006 should base enterprise size classes on number of employees and should target only enterprises that have ten or more employees. However, due to the use of turnover as a proxy for number of employees in the national Business Register, this cut-off point is achieved for South Africa by including in the sample frame only enterprises above the 30.5 percentile of very small enterprises (those with a turnover of less than R3 - 6 million per year, depending on the SIC sector). This is because according to a schedule prescribed National Small Business Amendment Act (No. 26 of 2003), these enterprises employ less than 20 personnel. In this schedule, enterprises are divided into four different size classes (large, medium, small and very small). Therefore, any comparisons with countries that base their size classes on employee numbers, as recommended by CIS 4 methodology, should be viewed in the light of these differences. Other countries such as China and Malaysia also use turnover as a proxy for size of enterprises, and this does not detract the nature of the survey population results, particularly those for the largest two size classes which are generally more robust because they are based on a relatively large sample size and hence better sector coverage.

The data for the selected South African services sectors that was used for the production of this report was extracted from the South African Business innovation Survey 2010-2012 database as built from the data collected from the survey, which was conducted as described above. The results reported here are not intended to represent the population of all business enterprises in each of the selected services sectors. Instead, only the realised samples in each of the selected services sectors that responded to the survey are represented (179 enterprises for WRT; 107 for FI; 93 for TSC) Thus the generated statistics are purely descriptive.

2.2 Statistical analysis

The statistical analysis comprised of computing descriptive statistics, such as the numbers and proportions of enterprises involved in various types of innovation activities, classified by sector and size class. As the number of responses were too few in some size classes per sector, these statistics were also computed for an additional size class that was created by combining the medium, small and very small size classes. The response rate was 12.2% for the wholesale and retail trade sector, 37.7% for the financial intermediation sector and 17.9% for the transport, storage and communication sector. For quantitative indicators, such as turnover, expenditure on innovation and number of employees, totals and proportions were also computed, based on a similar categorization. All these statistics were estimates based on the realised sample, as the response rate for each sector was too low for generalisation of the results to the population of South African business enterprises.

CHAPTER 3: WHOLESALE AND RETAIL TRADE

The selected services sectors covers: wholesale and retail trade, financial intermediation, and transport, storage and communication.

3.1 Characteristics of enterprises in the wholesale and retail trade sector covered by the survey

This section reports on the characteristics of enterprises in the wholesale and retail trade sectors that responded to the South African Business Innovation Survey 2013 covering the period 2010-2012.

The 179 enterprises in the wholesale and retail sector that responded to the survey, employed about 123 163 employees, 80.1% of whom worked in enterprises with innovation activities (Table 3.1.1). About 80.4% of the staff employed by large WRT enterprises was accounted for by innovation-active large enterprises.

Total turnover of the enterprises was recorded as R3 212 billion. Enterprises with innovation activities accounted for 8.4% of this turnover (Table 3.1.1). In the large wholesale and retail enterprises at least 8.4% of the total turnover was generated by innovation active enterprises and at least 29.3% of the total turnover was generated by medium, small and very small innovative enterprises.

[Table 3.1.1 Total enterprises, number of employees and turnovers: comparison of enterprises with innovation activities, 2010-2012](#)

	Total (number)	Total (%)	Large (%)	*M, S, VS (%)
Total number of enterprises	179	100.0	100.0	100.0
Enterprises with innovation activities	82	45.8	45.8	45.7
Number of employees	123 163	100.0	100.0	100.0
Number of employees in enterprises with innovation activities	98 676	80.1	80.4	57.0
Turnover (R billions)	3 212	100.0	100.0	100.0
Turnover (R billions of enterprises with innovation activities)	270	8.4	8.4	29.3

Source: Appendix 4 Tables A1.1, A2 and A3 and Appendix 5 Tables B1.1, B2 and B3

* Medium, Small and Very small enterprises have been combined

Most of the WRT enterprises (62.0%) reported that they were independent enterprises and not part of a larger group (Table 3.1. 2). At least 35.2% were part of a larger group. However 56.9% of the larger enterprises are not part of a larger group.

Table 3.1.2 Number and percentage of enterprises that stated they were part of a larger

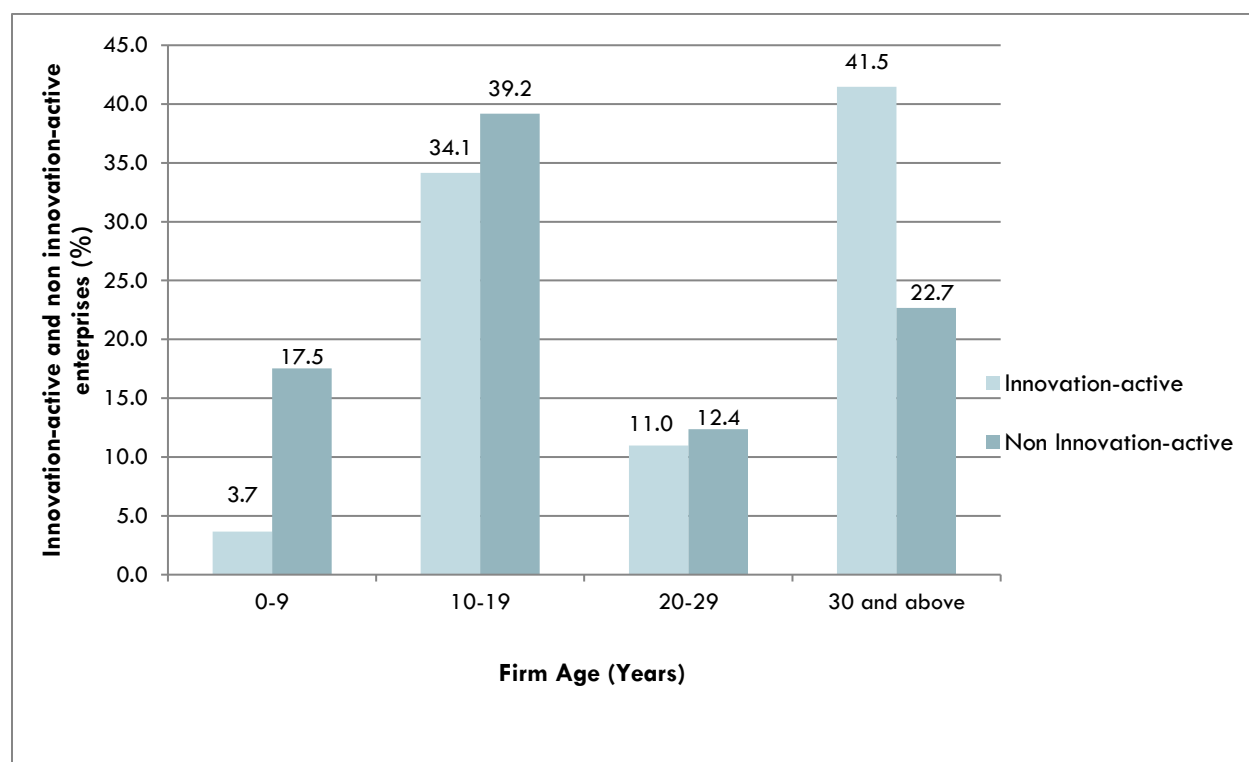
	Total	Large	*M, S, VS
Enterprise group status (number)			
Part of a larger group	63	57	6
Not part of a larger group	111	82	29
Enterprises which did not respond to the question	5	5	0
Enterprise group status (%)			
Part of a larger group	35.2	39.6	17.1
Not part of a larger group	62.0	56.9	82.9
Enterprises which did not respond to the question	2.8	3.5	0.0

Sources: Appendix 4 Tables A27 and Appendix 5 Table B27

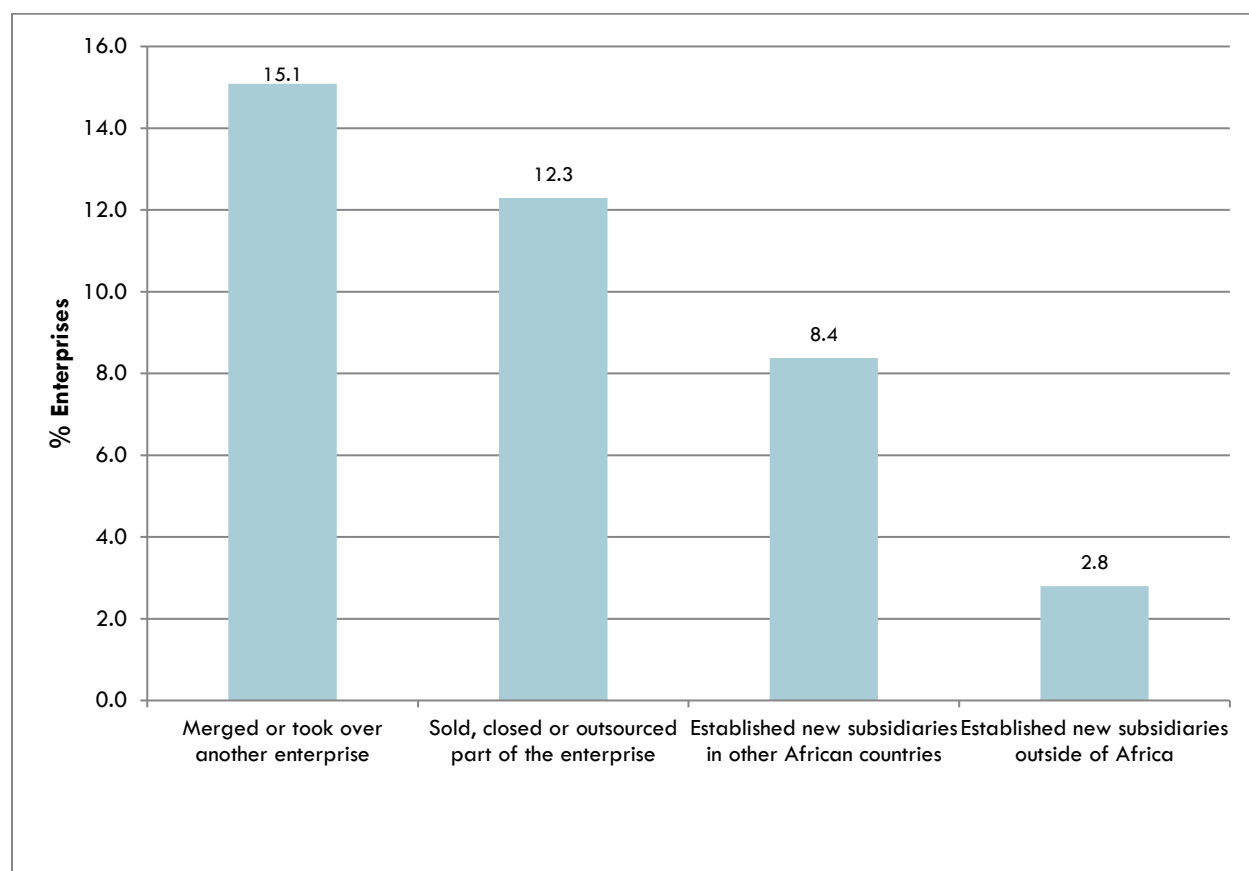
*Numbers do not always add up because of rounding effects

Figure 3.1.1 shows that the firms that are more established are more innovative than younger firms. About 41.5% innovation-active enterprises of the WRT was 30 and above years old, and between 10 -19 years most enterprises were non-innovation-active (39.2%).

About 15.1% of WRT enterprises reported that they had merged with, or taken over another company (Figure 3.1.2) while 12.3% reported that they had sold closed or outsourced parts of their enterprise. Not many enterprises had established new subsidiaries in other African countries or outside of Africa (8.4% and 2.8% respectively).

Figure 3.1.1 Age of innovation-active and non-innovation-active wholesale and retail trade enterprises

Source: Appendix 4 Table A28

Figure 3.1.2 Enterprises that merged with others, closed or established subsidiaries

Source: Appendix 4 Table A27

Table 3.1.3 shows that 80.1% of the total number of staff employed in the WRT sector were in innovation-active enterprises. Innovation-active enterprises employed about 98 676 staff of whom 46 336 employees, or 47.0% had a tertiary education qualification (degree or diploma).

Table 3.1.3 Employees in the wholesale and retail trade sector

	Total	Large	*M, S, VS
Number and percentage of employees by innovation activity			
All enterprises - number of employees	123 163	121 893	1 270
Enterprises with innovation activity (%)	80.1	80.4	57.0
Enterprises without innovation activity (%)	19.9	19.6	43.0
Employees with tertiary qualification in innovation-active enterprises	46 336	47.3	9.7

Source: Appendix 4 Tables A2 and A19 and Appendix 5 Tables B2 and B19

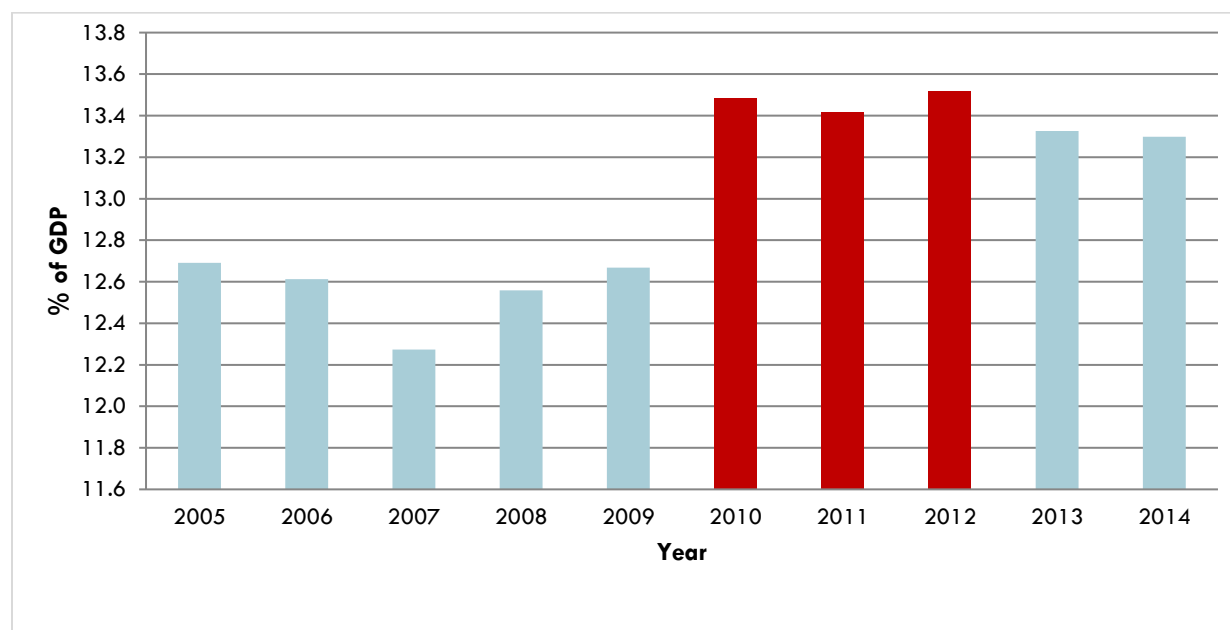
*Numbers do not always add up because of rounding effects

3.2 Profile of the wholesale and retail trade sectors

According to Thomas White International, the services sector was the largest contributor to South Africa's GDP by July 2011. Although the country has experienced significant advancements in the financial services, tourism and telecommunications markets, retail has emerged as a strong contender. The rising affluence among the country's black African majority, principally the middle class of this population group, has delivered the much needed stimulus to this sector. In the second quarter of 2006 the wholesale and retail trade, hotels and restaurants sector grew by 6.1%, contributing around 1% to GDP and by 2013 the sector contributed 12.5% to GDP growth. South African retailers have invested heavily in high-tech electronic systems, allowing them to efficiently control stock and monitor trading density.

The retail sector has experienced growth over the years as a result of steady economic growth, increase in disposable income and high consumer confidence with a sharp growth from approximately US\$28 billion in 1998 to US\$92 billion in 2007 (Thomas White International, 2011). Like other sectors, the global economic melt-down of 2008 negatively affected this sector too, though consumer spending rebounded in 2010, with retail sales, which have averaged at 29% per annum over the years, expected to reach US\$117 billion by 2011 as forecasted by Economic Intelligence Unit. Growth of the industry is largely influenced by economic conditions that consumers find themselves in. Amongst others, these include the level of the interest rate, inflation and economic growth.

Figure 3.1 Wholesale and retail trade sector value added as a percentage of Gross Domestic Product (GDP)



Data Source: Stats SA GDP series P0441, GDP Fourth Quarter 2014 published in February 2015 (Stats SA, 2015)

Overall, growth relative to GDP in the South African WRT sector has shown an increase over the period 2005-2014 (Figure 3.1). Aside from the negative effect of the global economic slow-down around 2007 and 2008, the sector's contribution to the economy experienced a rebound increase as part of the increase by the services and mining sectors, seemingly compensating for a steady decrease in the contribution of the services sector over the same period (IDC, 2013). The WRT sectors showed a slight decrease during 2013 and 2014.

3.3 Results

This section shows the results of the analyses of the trends in innovation performance in the WRT sectors and the focus is on identifying some of the main Innovation Indicators such as:

- Product (goods or services), process, organisational and marketing innovation;
- Innovation expenditure and financial support;
- Sources of information for innovation activities and cooperation for innovation
- Effects of innovation;
- Barriers and Constraints of Innovation;
- Use of intellectual property rights; and
- Environmental benefits of innovation

The survey distinguishes between technological and non-technological innovations. This section of the report represents the activities of a total of 179 WRT enterprises, 45.8% of which reported undertaking technological innovation activities (Table 3.3. 1). Of all the innovation-active enterprises, 43.0% had successful technological innovations, meaning that they completed and implemented product and/or process innovations during the three years covered by the survey. The large WRT enterprises reported the most innovation activity (45.8% of large enterprises) and 43.8% of these enterprises reported successful innovations. Of all the wholesale and retail enterprises that responded, 2.8% indicated that they had 'only ongoing or abandoned' innovation activities. The technological innovative enterprises comprised 6.7% with 'product only' innovations; 10.1% with 'process only' innovations; and 26.3% with both product and process innovations.

Table 3.3.1 Innovation rate: Percentage innovation for innovation-active and non-innovation-active wholesale and retail trade enterprises 2010-2012

Wholesale and Retail Trade	Total (%)	Large (%)	*M, S, VS (%)
<i>Enterprises with innovation activity</i>	45.8	45.8	45.7
Product only innovators	6.7	4.9	14.3
<i>Enterprises with successful innovation</i>	43.0	43.8	40.0
Process only innovators	10.1	10.4	8.6
Product and process innovators	26.3	28.5	17.1
Enterprises with abandoned and/or ongoing product innovation activities only	2.8	0.0	0.0
Process innovation activities only	2.8	2.1	5.7
Product and process innovation activities only	0.0	0.0	0.0
<i>Enterprises without innovation activity</i>	54.2	54.2	54.3

Source: Appendix 4 Tables A1.1 and A1.2 and Appendix 5 Tables B1.1 and B1.2

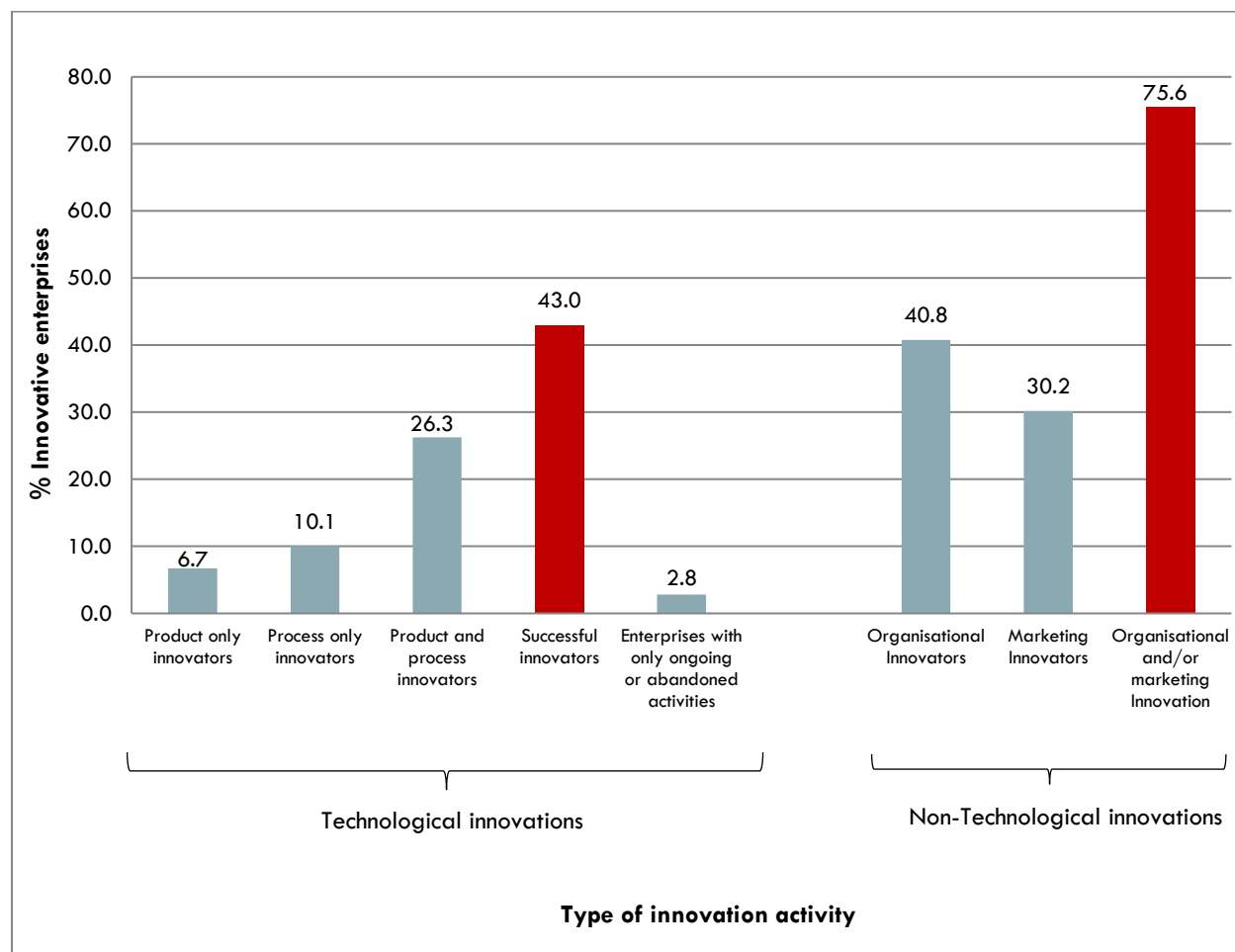
*M, S, VS: Medium, Small and Very Small

3.3.1 Types of Technological Innovation

As innovation is a key driver of economic growth, information about four types of innovation activities namely product, process, organisational and marketing innovation was collected. Innovation activities include the development, introduction or implementation of new or significantly improved goods, services or processes. During the reference period 2010-2012, the rate of innovation in the WRT sector for different types varies as shown in Figure 3.3.1 About 45.8% of the enterprises in the wholesale and retail sector reported that they had technological innovation activities. About 26.3% of innovative enterprises had both product and process innovations, while 10.1% of enterprises had 'process only' innovations and

6.7% had 'product only' innovations. Ongoing or abandoned innovation activities were reported by 2.8% of the enterprises. Organisational innovations were reported by 40.8% innovative enterprises and 30.2% reported having marketing innovations.

[Figure 3.3.1 Innovation rate by type of innovation, 2010-2012](#)



Sources: Appendix 4 Table A1 and A20

3.3.1.1 Product (goods or services) innovation

A total of 27 of the innovative enterprises of the WRT sector that responded, introduced product innovations that were both new to the market and / or new to the firm, 14 innovative the WRT enterprises that introduced product innovations that were new to the market (Table 3.2.2). Enterprises across all the size categories mostly produced product innovations that were both new to the market and/or firm product innovations: large (43.8%), medium, small and very small (54.5%).

[Table 3.3.2 Product \(goods and services\) innovators: percentage of the wholesale and retail trade enterprises by product type, 2012 \(year specific question\)](#)

Size Class	Total (%)	Large (%)	*M, S, VS (%)
<i>All product Innovators</i>	100.0	100.0	100.0
Product innovations new to the market	23.7	27.1	9.1
Product innovations new to the firm	20.3	22.9	9.1
Product innovations both new to the market and/or new to the firm	45.8	43.8	54.5
Products unchanged or only marginally modified	10.2	6.3	27.3

Source: Appendix 4 Table A5.3 and A5.4 and Appendix 5 Tables B5.3 and B5.4

Product innovations (comprising innovation in either goods or services produced) that were new to the firm generated a 44.6% turnover, representing a turnover of about R 108 billion (Table 3.3.3). About 43.8% of the turnover was generated by innovations that were new to the market, and 11.6% turnover was from unchanged or marginally modified product innovations.

[Table 3.3.3 All product innovators: proportion of turnover attributed to types of product innovations, 2012 \(year-specific question\)](#)

Type of Product innovation	Turnover generated (R millions)	Percentage turnover generated
Product innovations new to the market	106 752	43.8
Product innovations new to the firm	108 833	44.6
Products unchanged or only marginally modified	28 233	11.6
Total (All product innovators)	243 818	100

Source: Appendix 4 Table A5.1 and A5.2

Table 3.3.4 shows that large enterprises generated the highest percentage of turnover based on product innovations that were new to the market (44.0%). Product innovations that were new to the firm were also highest in large enterprises (44.8%). Overall, large enterprises generated the highest turnover from product innovations (99.4%).

[Table 3.3.4 Product innovators: proportion of turnover attributed to types of product innovations, by size of enterprises, 2012 \(year-specific question\)](#)

Size Class	Large (%)	*M, S, VS (%)
Type of Product Innovation		
Product innovations new to the market	44.0	5.5
Product innovations new to the firm	44.8	14.1
Products unchanged or only marginally modified	11.1	80.4
Total (%) of turnover produced by product innovators by enterprise size class)	99.4	0.6

Source: Appendix 5 Table B5.2

Table 3.3.5 shows that product innovations by innovative enterprises were developed mainly enterprise itself (57.6%), while 15.3% of innovators relied on adapting and modifying goods or services developed by other institutions. The same percentage relied solely on other enterprises or institutions to develop product innovations on their behalf. Only 8.5% of product innovations were developed by the enterprise itself in collaboration with other enterprises or institutions.

Enterprises in the WRT sector reported that their product innovations mainly originated in South Africa (67.8%). Table 3.3.6 shows that only 28.8% of product innovations had its origin abroad.

[Table 3.3.5 Responsibility for the development of product innovations in innovative enterprises, 2010-2012](#)

Product innovations developed mainly by:	Number of enterprises	Percentage of enterprises (%)
Mainly own enterprise	34	57.6
Own enterprise in collaboration with other enterprises or institutions	5	8.5
Adapting and Modifying goods or services developed by other institutions	9	15.3
Other enterprises or institution	9	15.3
Enterprises which did not respond to the question	2	3.4
Total	59	100

Source: Appendix 4 Table A6

[Table 3.3.6 Origin of product innovation, 2010-2012](#)

Origin	Number	%
All product innovative enterprises (number of enterprises)	59	100.0
South Africa	40	67.8
Abroad	17	28.8
Enterprises which did not respond to the question	2	3.4

Source: Appendix 4 Table A7

3.3.1.2 Process innovation

New or significantly improved supporting activities for processes were reported by 58.5% of process innovators (Table 3.3.7). About 48.8% of process innovators spent time improving their delivery and distribution methods, and improved methods of manufacturing or production was reported by 37.8% of process innovators.

[Table 3.3.7 Enterprises involved in specific process innovations, 2010-2012](#)

Process innovation	Number of enterprises	%
New or significantly improved methods of manufacturing or producing goods or services	31	37.8
New or significantly improved logistics, delivery or distribution methods for inputs, goods or services	40	48.8
New or significantly improved supporting activities for processes such as maintenance and operating systems for purchasing, accounting or computing	48	58.5

Source: Appendix 4 Table A23

Process innovations were mostly developed in-house: 44.6% of enterprises reported that innovations were mainly developed by their own enterprise, while 33.8% of enterprises developed process innovations in collaboration with other enterprises or institutions (Table 3.3.8). A total of 10.8% of enterprises relied

mainly on other enterprises or institutions for the development of process innovations, and also by adapting or modifying process innovations developed by others.

The majority of process innovations (76.9%) originated mainly in South Africa (Table 3.3.9), and about 23.1% of process innovations originated from abroad.

[Table 3.3.8 Responsibility for the development of process innovation, 2010-2012](#)

Process innovators	Number of enterprises	%
Mainly own enterprise	29	44.6
Own enterprise in collaboration with other enterprises or institutions	22	33.8
Adapting or modifying process developed by other enterprises or institutions	7	10.8
Mainly other enterprises or institutions	7	10.8
Total	65	100.0

Source: Appendix 4 Table A24

[Table 3.3.9 Origin of Process innovation, 2010-2012](#)

Process Innovators	Number of enterprises	%
South Africa	50	76.9
Abroad	15	23.1
Enterprises which did not respond to the question	0	0.0
Total	65	100.0

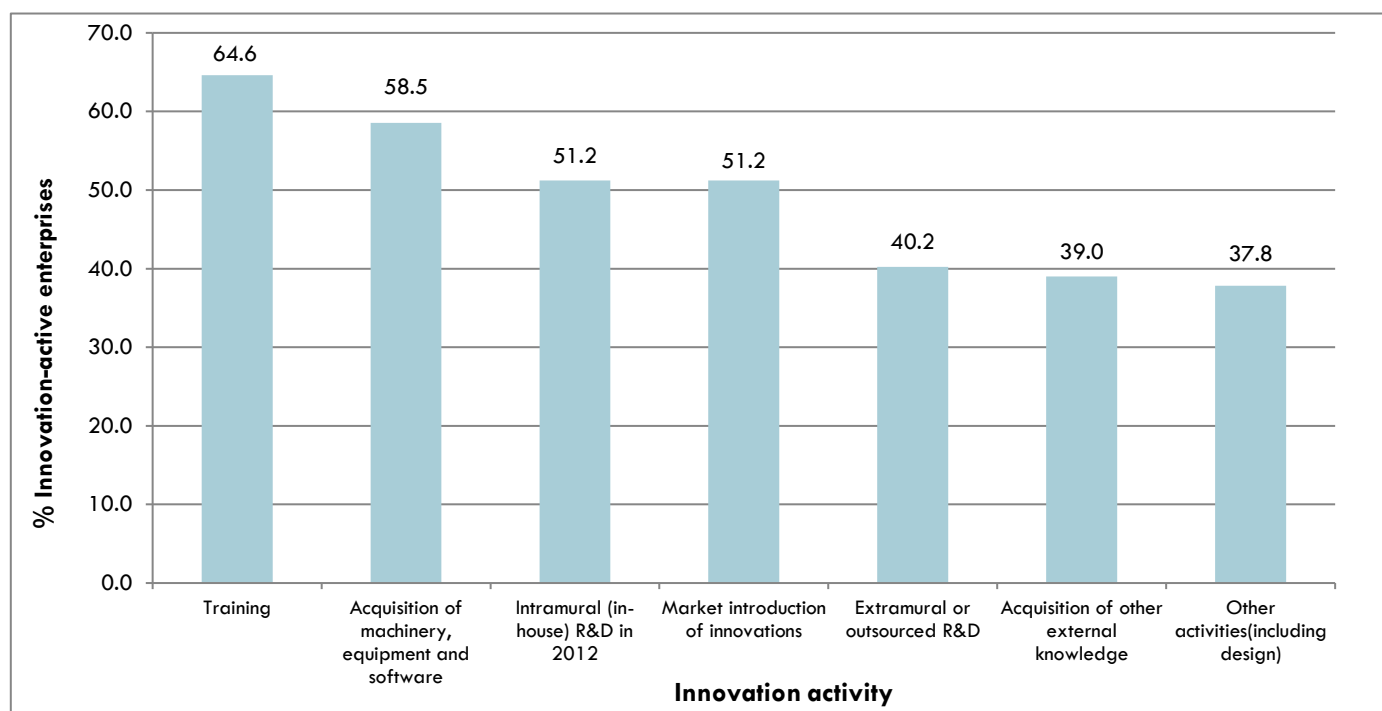
Source: Appendix 4 Table A25

3.3.2 Innovation expenditures and financial support for innovation activities

3.3.2.1 Innovation expenditures

Innovation may be related to any scientific, technical, organisational, financial or commercial activities, including investment in new knowledge that leads to, or is intended to lead to, the implementation of innovations. The activities measured by the survey include, among others, the acquisition of machinery, equipment and software, training, in-house and outsourced expenditure, and the acquisition of other external knowledge.

Figure 3.3.2 shows that most innovation-active enterprises were involved in training as part of their innovation activities followed by the acquisition of machinery equipment and software (64.6% and 58.5% respectively). Intramural R&D activities and the market introduction of innovations were both cited by 51.2% of enterprises.

Figure 3.3.2 Types of innovation activities among enterprises, 2010-2012

Source: Appendix 4 Table A4.2

Table 3.3.10 indicates that the bulk of innovation expenditure was devoted to intramural R&D and was equivalent to about 95.5% of the total innovation expenditure. Extramural or outsourced R&D accounted for 1.0% of the total innovation expenditure whilst the acquisition of new machinery, equipment and software and was equivalent to about 2.9% of the total innovation expenditure.

Table 3.3.10 Enterprises that declared innovation expenditure for the wholesale and retail trade sector, 2012 (year-specific question)

Type of innovation expenditure	Total R millions	% of total expenditure of all enterprises	Large R millions	*M, S, VSR millions
Intramural (in-house) R&D	15 528	95.5	15 521	7
Extramural or outsourced R&D	160	1.0	160	0
Acquisition of machinery, equipment and software	477	2.9	450	27
Acquisition of other external knowledge	93	0.6	92	1
Total	16 258	100	16 223	35

Source: Appendix 4 Table A4.1 and Appendix 5 Table B4.1

3.3.2.2 Innovation and R&D

Comparing the number of innovating enterprises with innovation activity and those with successful innovations to the number that did R&D is an important and essential undertaking developing innovation policy. Table 3.3.11 summarized the analysis for the WRT sector. The results show that more enterprises

innovated than did R&D (93.9%), an indication that, apart from using R&D, enterprises used other methods to implement their innovations. Only 50.0% of successful innovators engaged in R&D.

Table 3.3.11 Enterprises with successful innovations that performed R&D, 2012

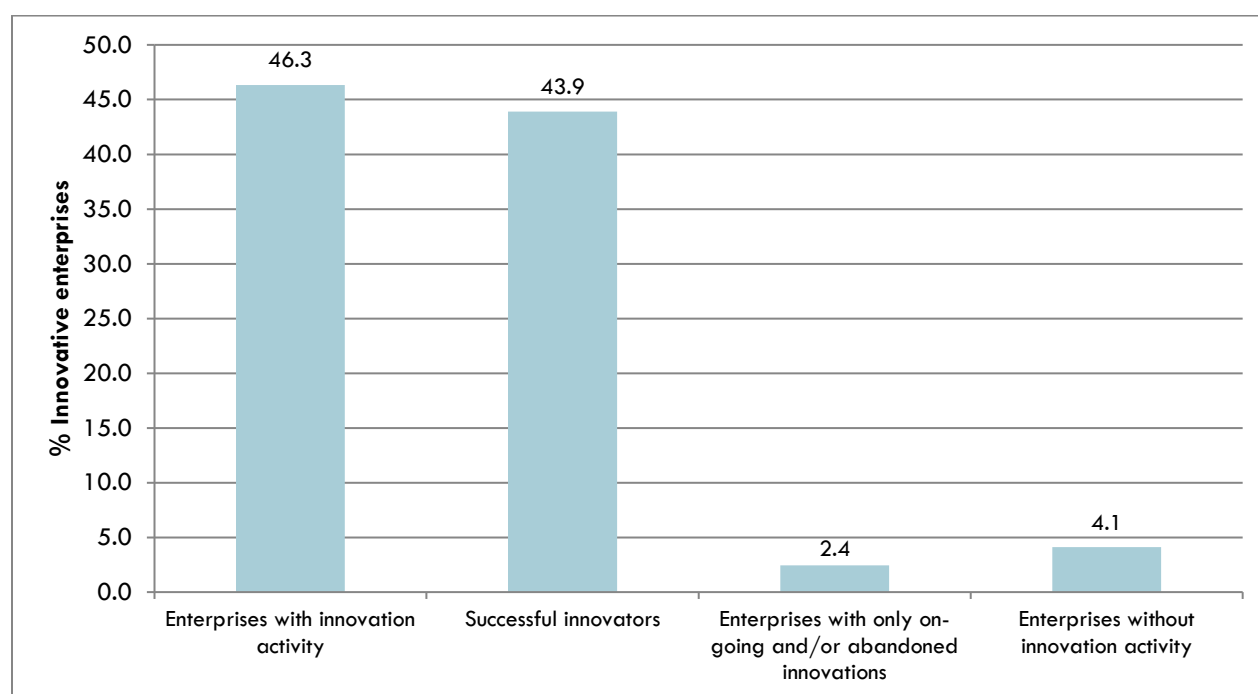
	Number of enterprises	%
Enterprises with successful innovations	77	93.9
Enterprises that engaged in intramural R&D	42	51.2
Enterprises with successful innovations and engaged in intramural R&D	41	50.0

Source: Appendix 4 Table A4.3

3.3.2.3 Financial support for innovation activities

Respondents were asked if they were aware that government offers financial support for innovation. Figure 3.3.3 indicates that almost half (46.3%) of the enterprises with innovation activity reported that they were aware of this funding opportunities. About 43.9% of successful innovators reported that they knew about government funding opportunities. Only 4.1% of non-innovation-active enterprises were aware of government financial support for innovation.

Figure 3.3. 3 Enterprise awareness of government funding



Source: Appendix 4 Table A10.1

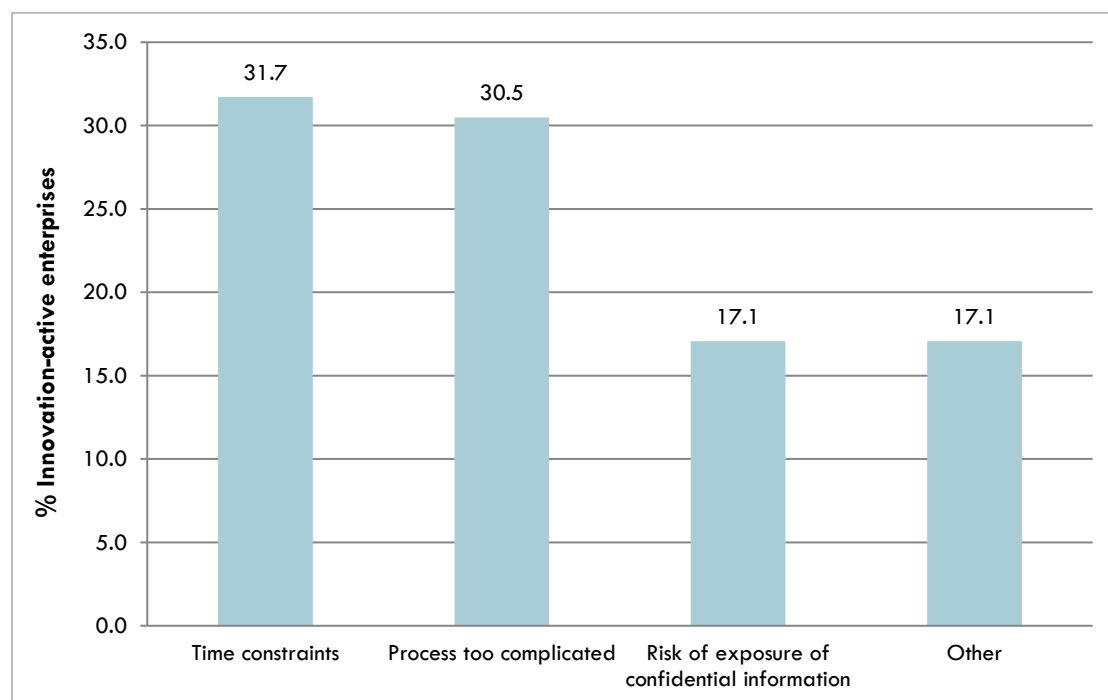
Government funded very few innovation-active enterprises in the WRT sector. A total of 2.4% of enterprises received funding for their innovation activities from both the Department of Trade and Industry (the *dti*) and the Department of Science and Technology (DST) (Table 3.3.12). National funding agencies such as the Industrial Development Cooperation supported only 2.4% of innovators whilst 1.2% enterprises received funding from other sources for their innovation activities.

Table 3.3.12 Innovation-active enterprises that received financial support for innovation activities from government sources, 2010-2012

Source of financial support	Number of enterprises	Percentage of enterprises (%)
National government:		
Department of Science and Technology (DST)	2	2.4
Department of Trade and Industry (dti)	2	2.4
Other	1	1.2
National funding agencies:		
National Research Foundation (NRF)	1	1.2
Medical Research Council (MRC)	0	0.0
Industrial Development Cooperation (IDC)	2	2.4
Technology Innovation Agency (TIA)	0	0.0
Other	1	1.2
Foreign government/public sources	0	0.0

Source: Appendix 4 Table A18

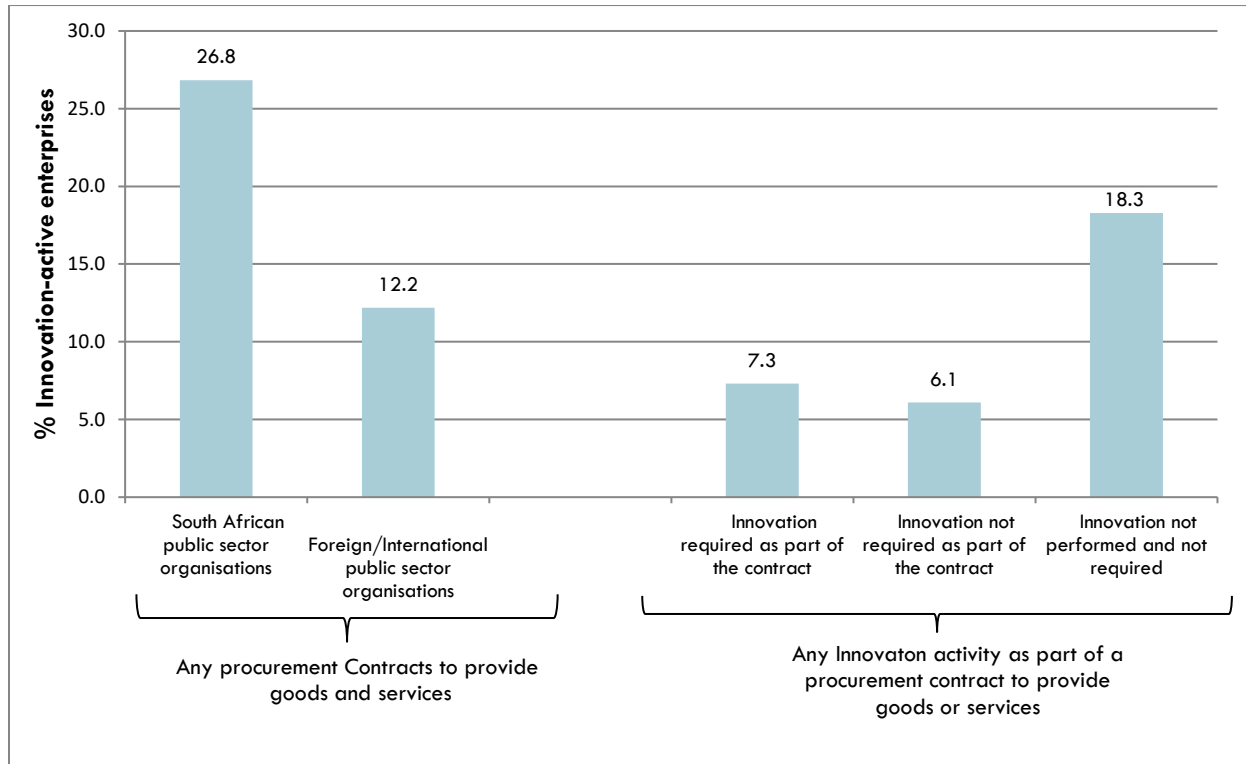
Figure 3.3.4 shows the reasons why innovation-active enterprises in the wholesale and retail sector had not accessed government funds for innovation activities. About 31.7% innovation-active enterprises indicated that the application process for funding is time consuming, and 30.5% indicated that the process is too complicated. The risk of exposing confidential information was a concern for 17.1% of enterprises.

Figure 3.3. 4 Reasons why innovation-active enterprises did not access government funds, 2010-2012

Source: Appendix 4 Table A10.3

During the reference period, 26.8 % of innovation-active enterprises had procurement contracts from South African public sector organisation to provide goods and service and 12.2% had contracts from Foreign/International public sector organisations (Figure 3.3.5). For 7.3% of innovation-active enterprises innovation was required as part of the contract whilst for 6.1% innovation was not a requirement. For 18.3% of innovation-active enterprises, innovation was not a requirement and was not performed.

Figure 3.3.5 Innovation-active enterprises that had public sector procurement contracts to provide goods and services, 2010-2012



Source: Appendix 4 Table A10.4

3.3.4 Sources of information and co-operation partners for innovation activities

About 56.1% of innovation-active enterprises rated sources of information from clients or customers as highly important for innovation activities (Figure 3.3.6). Information sources within the enterprise or group was rated as highly important by 46.3% of enterprises. Suppliers were rated important by 39% of enterprises followed by competitors (20.7%). Universities and technikons as well as government institutes were considered the least important information sources.

[Figure 3.3.6 Sources of information for innovation rated as "highly important" by innovation-active enterprises](#)

Sources: Appendix 4 Table A11.2

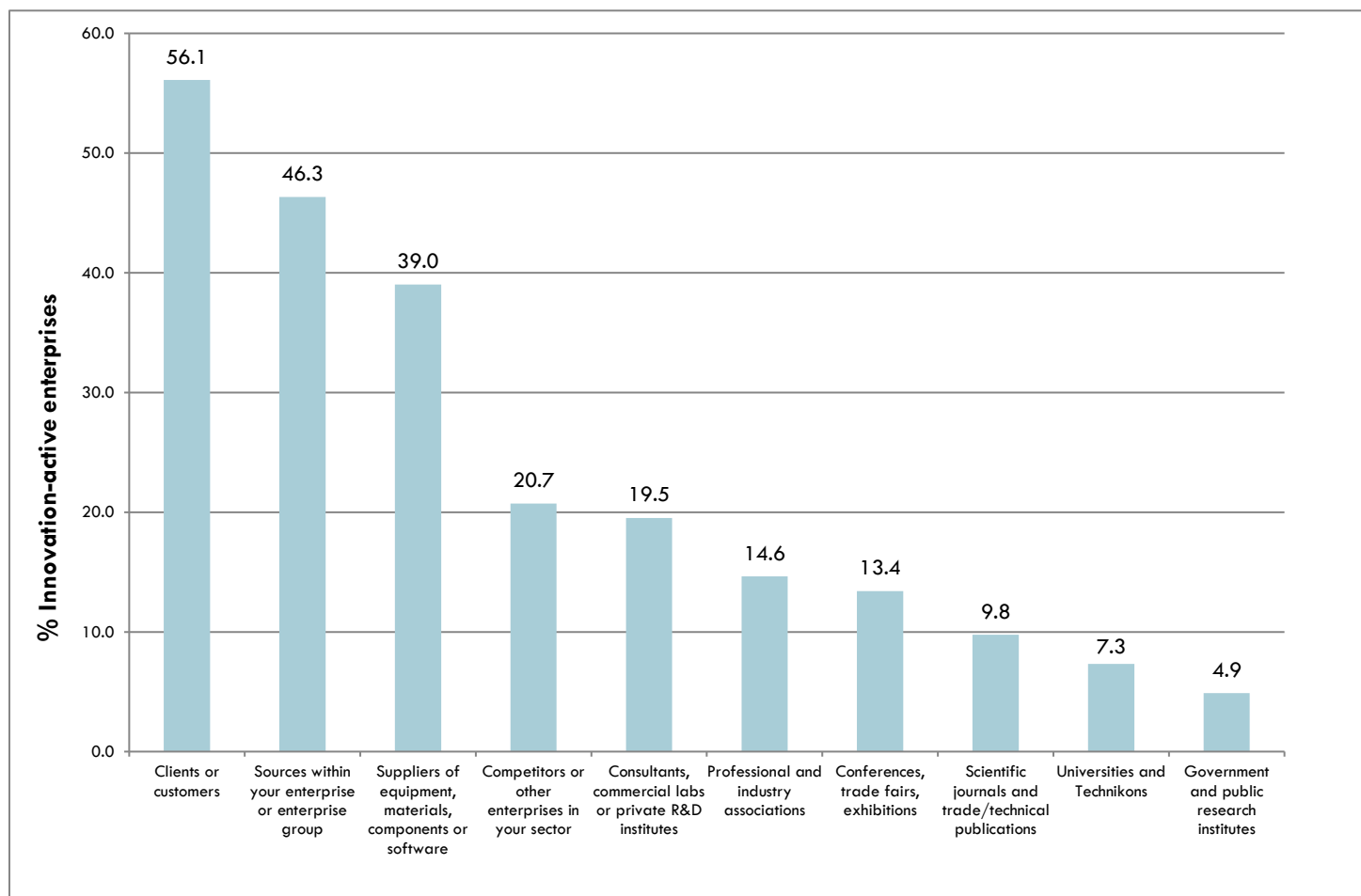
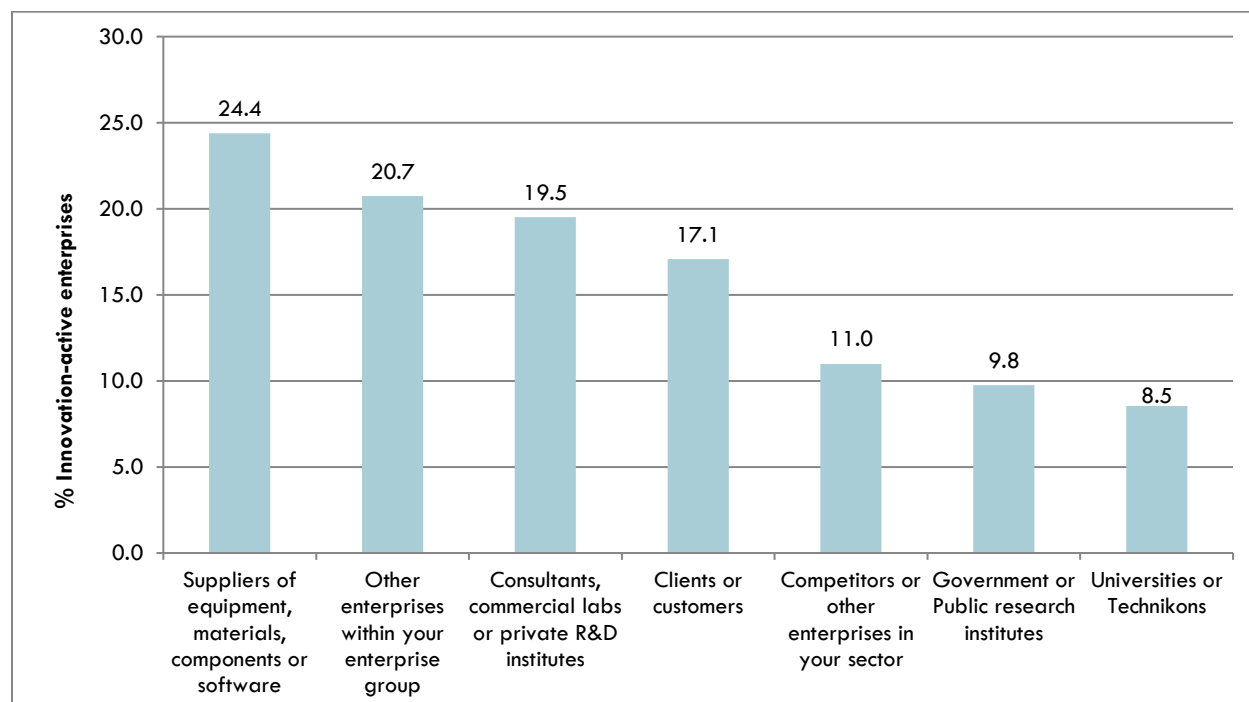


Figure 3.3.7 shows that the 24.4% of collaborative partnerships for innovation activities were between suppliers of equipment, materials, components or software, followed by 20.7% collaborative partnerships with suppliers. Competitors were reported as collaborative partners for 19.5% of enterprises. Only 8.5% of enterprises collaborated with government and public research institutes.

Figure 3.3.7 Innovative collaborative partnerships by type of partner, 2010-2012



Source: Appendix 4 Table A21.1

3.3.5 Effects of innovation

Innovation outcomes ranked for importance of various market and operational outcomes resulting from both product and process innovations are presented in Table 3.3.13. 'Increased range of goods and services' was cited as having a highly important effect on product innovation outcomes for 35.4% of innovators, followed by 'improved quality of goods or services' (30.5% of innovators). 'Improved flexibility of production or service provision' was cited as being a highly important effect on innovation by about 23.2% of innovation-active enterprises and 20.7% of innovators reported that 'increased capacity of production or service provision' was a highly important effect of innovation. 'Entering new markets' or 'increasing market share' was cited as a highly important outcome by 25.6% innovation-active enterprises. 'Reduced environmental impacts or improved health and safety' was cited as highly important effects of innovation by 15.9%, and 'meeting government regulatory requirements' by 23.2% of innovation-active enterprises.

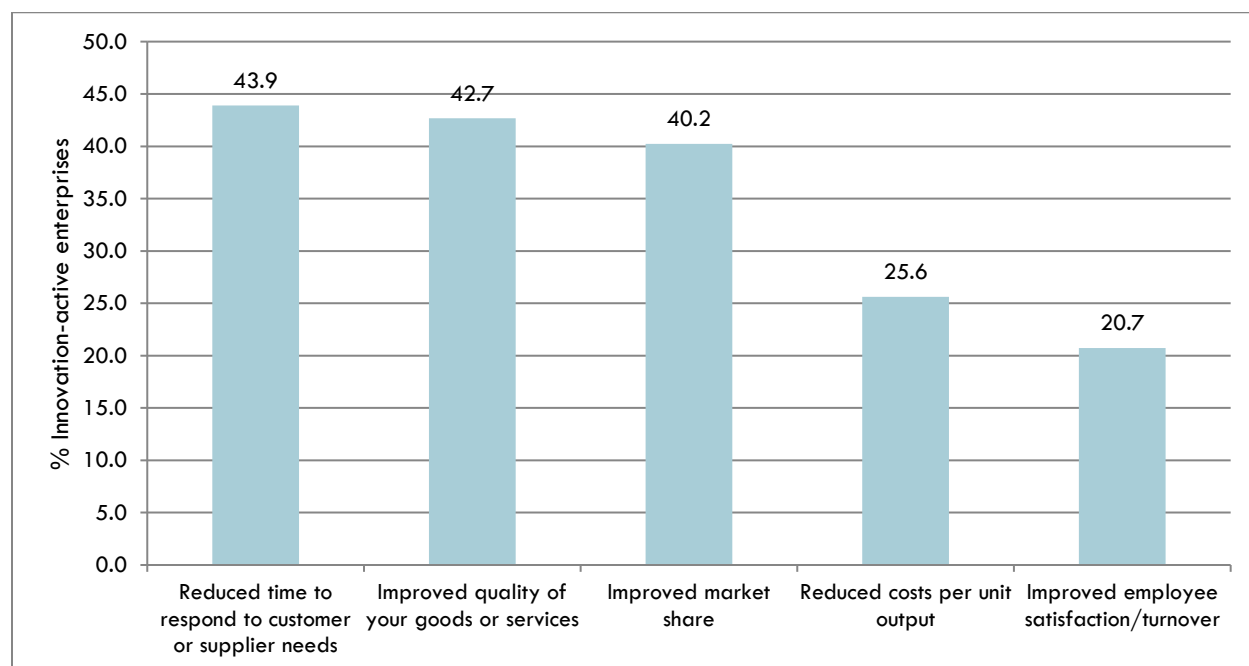
Table 3.3.13 "Highly important" effects of innovation on outcomes for innovation-active enterprises, 2010-2012

Effects of Innovation	Number of enterprises	%
Product outcomes		
Increased range of goods and services	29	35.4
Entered new markets or increased market share	21	25.6
Improved quality of goods or services	25	30.5
Process outcomes		
Improved flexibility of production or service provision	19	23.2
Increased capacity of production or service provision	17	20.7
Reduced labour costs per unit output	7	8.5
Reduced materials and energy per unit output	13	15.9
Other outcomes		
Reduced environmental impacts or improved health and safety	13	15.9
Met Governmental regulatory requirements	19	23.2

Source: Appendix 4 Table A8.1 and A8.2

Figure 3.3.8 shows that 43.9% of innovation-active enterprises that introduced organisational innovations reported 'reduced time to respond to customer needs' as highly important. 'Improved quality of goods and services' was rated as highly important by 42.7% of enterprises, whilst 40.2% rated 'Improved market share' as highly important.

Figure 3.3.8 Innovation-active enterprises that introduced organisational innovation and rated various results as highly important, 2010-2012



Source: Appendix 4 Table A17

3.3.6 Factors hampering innovation

Enterprises were asked to rate the degree to which a number of specified factors hampered their innovation activities during the period 2010 - 2012. Table 3.3.14 shows that 19.5% of all innovation-active enterprises and 9.3% of non-innovation-active enterprises indicated that the development of innovations within their enterprises was hampered or restrained by a 'lack of funds within the enterprise or group'. The second most cited factor for innovation-active enterprises was 'lack of qualified personnel (19.5%) and for non-innovators this factor also hampered their innovation activities (13.4%). The third most cited reason not to innovate was that the market was dominated by already established enterprises (12.2% for innovation-active enterprises and 11.3% for non-innovation-active enterprises).

[Table 3.3.14 Highly important factors that hampered innovation activities of innovation-active and non-innovation-active wholesale enterprises, 2010-2012](#)

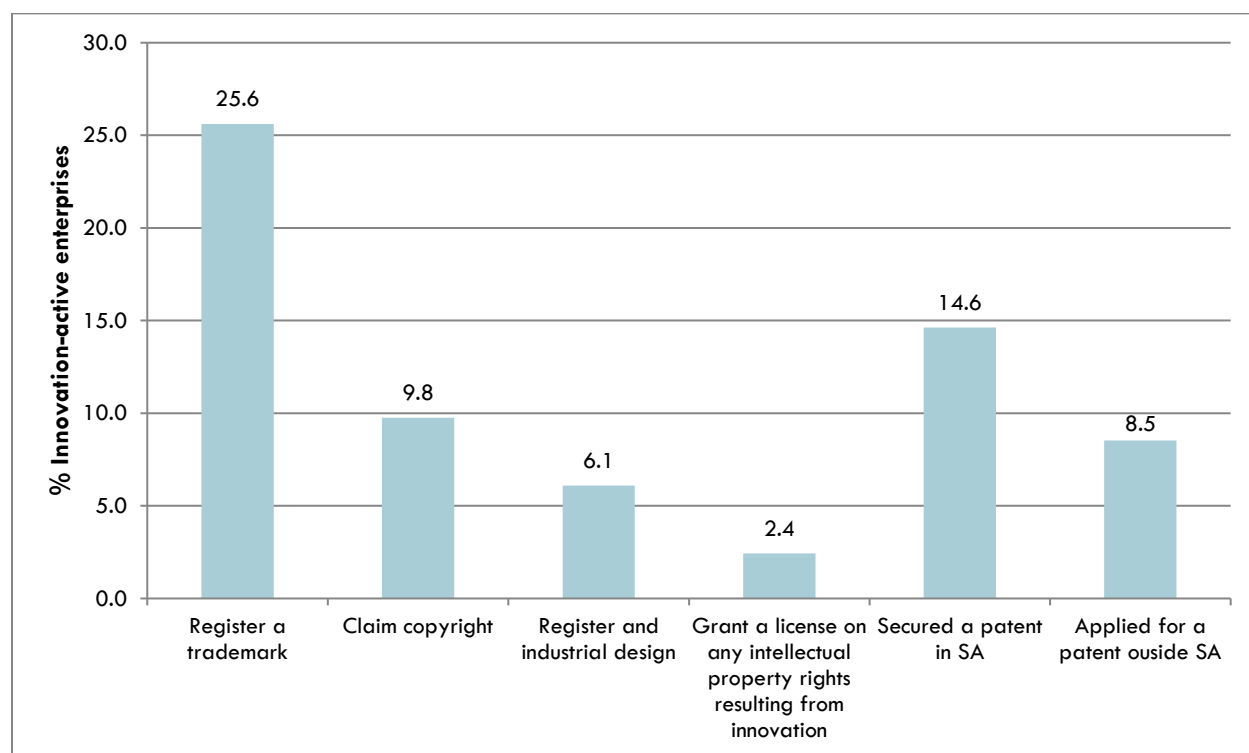
Percentage of enterprises	Industry	
	Innovation-active	Non-Innovation-active
Cost factors		
Lack of funds within your enterprise or group	19.5	9.3
Lack of finance from sources outside your enterprise	14.6	3.1
Innovation costs too high	12.2	7.2
Knowledge factors		
Lack of qualified personnel	19.5	13.4
Lack of information on technology	7.3	5.2
Lack of information of markets	6.1	4.1
Difficulty in finding co-operation partners	9.8	7.2
Market factors		
Market dominated by established enterprises	12.2	11.3
Uncertain demand for innovative goods or services	8.5	9.3
Reasons not to innovate		
No need due to prior innovations	4.9	9.3
No need because of no demand for innovations	2.4	11.3

Sources: Appendix 4 Table A12.2, and A12.4

3.3.7 Intellectual property rights

Figure 3.3.9 shows that 26% of the innovation-active enterprises reported that they registered a trademark in the reference period while 9.8% reported that they claimed copyrights from their innovations. Almost 15% of innovation-active enterprises secured patents in South Africa from their innovation activities and about 9% applied for patents outside of South Africa. Only 2.4% of innovation-active enterprises granted licences on intellectual property rights to third parties.

Figure 3.3.9 Innovation-active wholesale enterprises that made use of intellectual property rights (IPR), 2010-2012



Sources: Appendix 4 Table A14 and A15

3.3.8 Innovation with environmental benefits

Innovation-active enterprises were required to state the importance of their innovation activities with environmental benefits. A total number of 100 enterprises reported introducing product, process, organisational and marketing innovation with environmental benefits (Table 3.3.15). With regards to enterprises having environmental benefits from the production of goods or services within their enterprise, about 33% of innovators reduced their energy usage per unit of output and 22% of innovators reduced their material use per unit out. Reducing the carbon footprint was reported by 25% of enterprises. Enterprises were also asked to report on their environmental benefits from the after sales use of a good or service by the end user. About 39 % of enterprises reported reduced energy usage and 33% reported improved recycling of product after use and reduced air, water, soil and noise pollution.

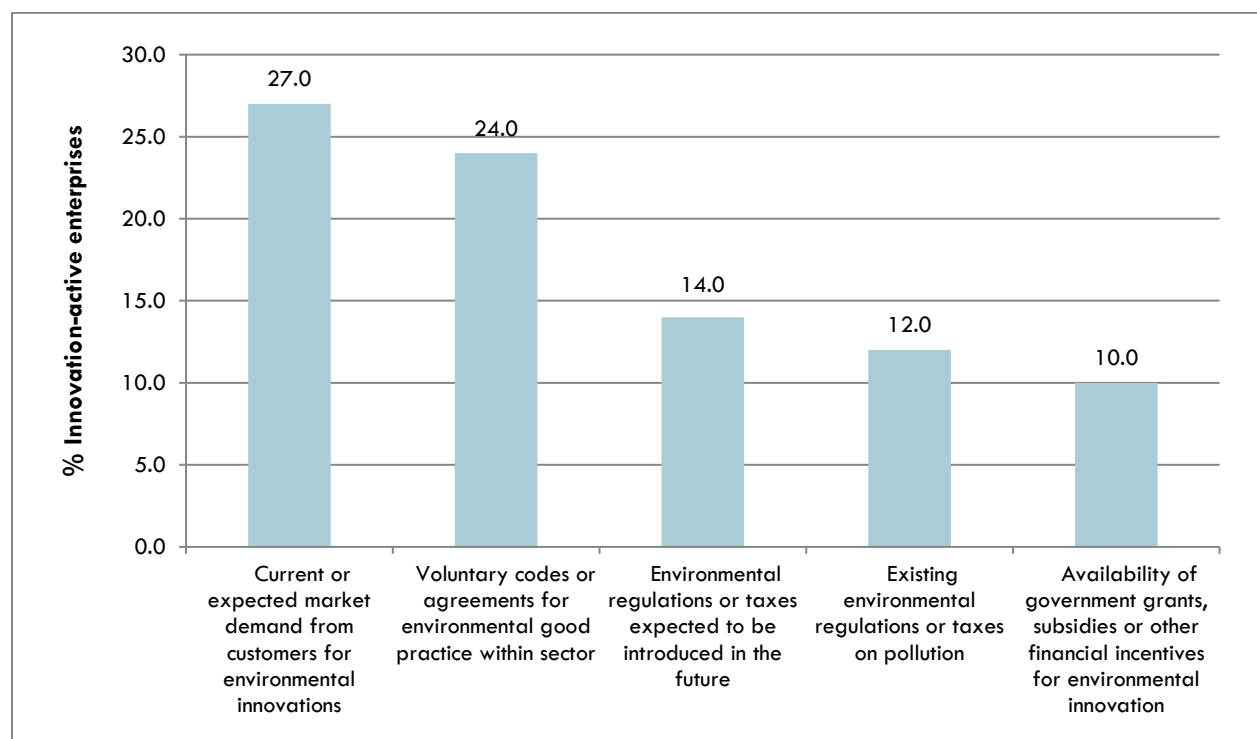
Table 3.3.15 Introduction of innovations with environmental benefits, 2010-2012

Environmental Benefit	Number of enterprises	Percentage of enterprises (%)
Enterprises that introduced product, process, organisational or marketing innovation	100	100.0
Enterprises that had environmental benefits from the production of goods or services:		
Reduced material use per unit output	22	22.0
Reduced energy use per unit output	33	33.0
Reduced carbon dioxide 'footprint' (total carbon dioxide production) by the enterprise	25	25.0
Replaced materials with less polluting or hazardous substitutes	25	25.0
Reduced soil, water, noise, or air pollution	26	26.0
Recycled waste, water or materials	34	34.0
Enterprises that had environmental benefits from the after sales of a good or service:		
Reduced energy use	39	39.0
Reduced air, water, soil or noise pollution	33	33.0
Improved recycling of product after use	33	33.0

Source: Appendix 4 Table A29

Figure 3.3.10 shows that 27.0% of enterprises introduced an environmental innovation in response to environmental benefits from the production of goods or services based on the current or expected demand from their customer for environment innovations. Environmental innovations were produced by 24.0% of enterprises based on voluntary codes or agreements for environmental good practice within the sector. Only 10% of enterprises responded with the introduction of an environmental innovation because of availability of government grants, subsidies or other financial incentives for environmental innovations. Enterprises also responded to having procedures in place to regularly identify and reduce the enterprise's environmental impacts eg environmental audits, setting environmental performance goals etc., and 31% of enterprises responded positively to this question (Table 3.3.16).

Figure 3.3.10 Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods or services, 2010-2012



Source: Appendix 4 Table A30

Table 3.3.16 Procedures to identify and reduce environmental impacts

	Total	Large	M,S,VS
Number of innovation-active wholesale enterprises that had procedures in place to regularly identify and reduce their environmental impact	31	29	2
Percentage of innovation-active wholesale enterprises (%) that had procedures in place to regularly identify and reduce their environmental impact	31.0	34.9	11.8

Source: Appendix 4 Table A31

3.3.9 Non-technological innovation activities

3.3.9.1 Organisational and marketing innovation

Table 3.3.17 shows that 40.8% of innovation-active enterprises had organisational innovations whilst 30.2% had marketing innovations. At least 75.6% of innovation-active enterprises reported having organisational and/or marketing innovations. About 11% of 'product only' innovators had organisational and/or marketing innovations and 12.2% 'process only' innovators had organisational and/or marketing innovations. A total of 51.2% of product and process innovation-active enterprises also had organisational and/or marketing innovations.

About 19% of enterprises with non-technological innovation reported having 'organisational only' innovation and only 2.1% indicated they had 'marketing only' innovations. Approximately 22.7% of non-technological innovators reported having organisational or marketing innovations and only 2.1% reported organisational and marketing innovations.

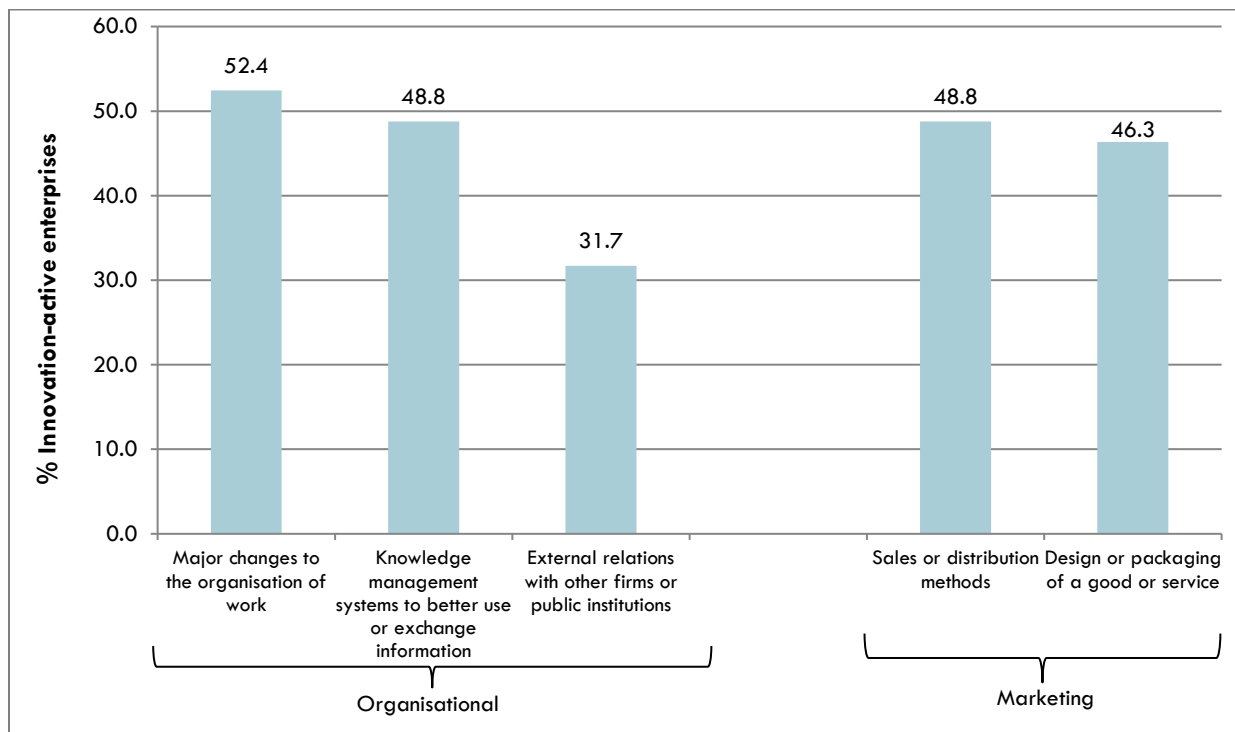
[Table 3.3.17 Enterprises with organisational and/or marketing innovations, 2010-2012](#)

Innovation type	Number of enterprises	%
Enterprises with organisational innovation	73	40.8
Enterprises with marketing innovation	54	30.2
Innovative enterprises with organisational and/or marketing Innovation	62	75.6
Product Only Innovative enterprises with organisational and/or marketing innovation	9	11.0
Process Only Innovative enterprises with organisational and/or marketing innovation	10	12.2
Product and Process Innovative enterprises with organisational and/or marketing innovation	42	51.2
Non-Innovative enterprises with:		
Organisational innovation only	18	18.6
Marketing innovation only	2	2.1
Organisational or marketing Innovation	22	22.7
Organisational and marketing Innovation	2	2.1

Source: Appendix 4 Table A20

More detail on the organisational and marketing innovations undertaken by innovative enterprises in the WRT sector is presented in Figure 3.3.11. Enterprises were generally more active in the organisational aspects of innovation compared to marketing innovation. In terms of organisational innovations, 52.4% of enterprises introduced 'major changes to the organisation of work'. 'Knowledge management systems to better use or exchange information', was introduced by 48.8% of enterprises, while 31.7% introduced 'external relations with other firms of public institutions'.

Figure 3.3.11 Percentage of innovation-active enterprises that introduced organisational or marketing innovation, 2010-2012



Source: Appendix 4 Table A 13.2

CHAPTER 4: FINANCIAL INTERMEDIATION

4.1 Characteristics of enterprises in the financial intermediation sector covered by the survey

This section reports on the characteristics of enterprises in the financial intermediation sector that responded to the South African Business Innovation Survey 2010 – 2012 covering the period 2010-2012.

The 107 enterprises that responded to the survey, employed about 390 702 employees, 99.4% of whom worked in enterprises with innovation activities (Table 4.1. 1). Most of the staff employed by enterprises within the different size classes in the FI sector, are employed by innovation-active enterprises; large (99.4%), medium, small and very small (88.5%).

Enterprises with innovation activities accounted for about 94.9 % of the turnover recorded in this survey (Table 4.1. 1). Almost all the turnover for medium, small and very small enterprises was generated by innovation-active enterprises (99.8%). Large innovation-active enterprises also generated the bulk of turnover in this size class (94.7%).

Table 4.1.1 Total enterprises, number of employees and turnovers: comparison of enterprises with innovation activities in the financial intermediation sector, 2010-2012

	Total (number)	Total (%)	Large (%)	*M, S, VS (%)
Total number of enterprises	107	100.0	100.0	100.0
Enterprises with innovation activities	79	73.8	74.4	72.4
Number of employees	390 702	100.0	100.0	100.0
Number of employees in enterprises with innovation activities	388 167	99.4	99.4	88.5
Turnover (R billions)	1 946	100.0	100.0	100.0
Turnover (R billions of enterprises with innovation activities)	1 846	94.9	94.7	99.8

Sources: Appendix 4 Tables A1, A2 and A3 and Appendix 5 B1, B2 and B3

*Numbers do not always add up because of rounding effects

Most of the enterprises in the FI sector (57.9%) reported that they were part of a larger group (Table 4.1. 2). At least 40.2% were independent and not part of a larger group. The enterprises in the medium, small and very small size classes were mostly independent enterprises (69.0%).

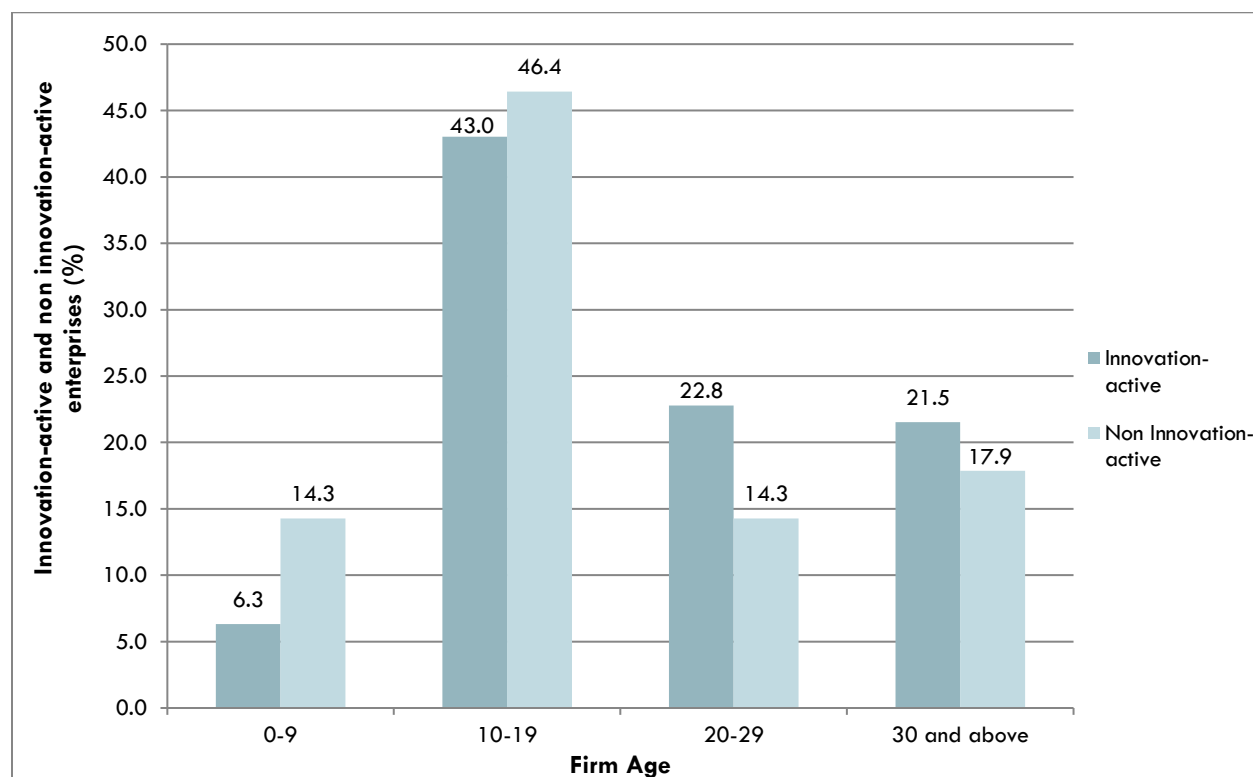
Table 4.1.2 Number and percentage of enterprises in the financial intermediation sector that stated they were part of a larger group

	Total	Large	*M, S, VS
Enterprise group status (number)			
Part of a larger group	62	53	9
Not part of a larger group	43	23	20
Enterprises which did not respond to the question	2	2	0
Enterprise group status (%)			
Part of a larger group	57.9	67.9	31.0
Not part of a larger group	40.2	29.5	69.0
Enterprises which did not respond to the question	1.9	2.6	0.0

Source: Appendix 4 Table A27 and Appendix 5 Table B27

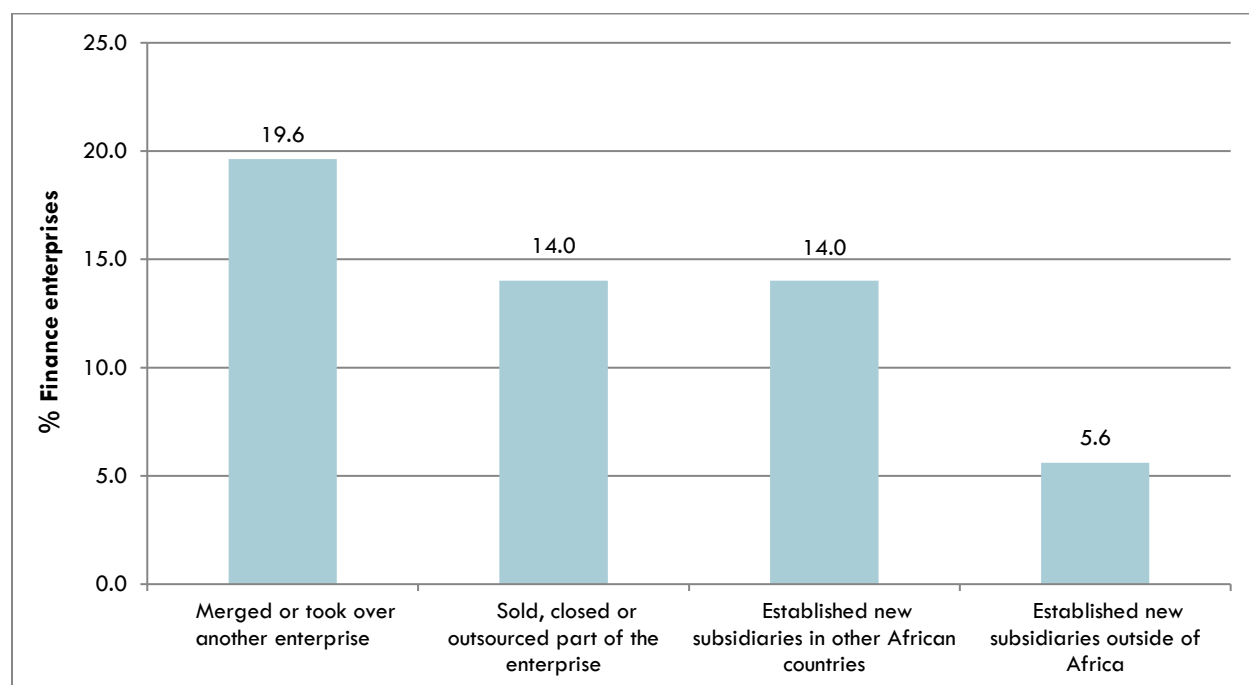
*Numbers do not always add up because of rounding effects

Figure 4.1.1 shows that the firms that between 10 and 19 years old are more innovation-active than younger firms. About 19.6% of FI enterprises reported that they had merged with, or taken over another company (Figure 4.1.2) while 14.0% reported that they had sold closed or outsourced parts of their enterprise. Not many enterprises had established new subsidiaries in other African countries or outside of Africa (14.0% and 5.6% respectively).

Figure 4.1.1 Age of innovation-active and non-innovation-active enterprises in the financial intermediation sector

Source: Appendix 4 Table A28

[Figure 4.1.2 Enterprises in the financial intermediation sector that merged with others, closed or established subsidiaries](#)



Source: Appendix 4 Table A27

Table 4.1.3 shows that 99.4% of the total number of staff employed in the FI sector were in innovation-active enterprises. Innovation-active enterprises employed about 390 702 staff of whom 63 711 employees, or 16.4% had a tertiary education qualification (degree or diploma).

[Table 4.1.3 Employees in the financial intermediation sector](#)

	Total	Large	*M, S, VS
Number and percentage of employees by innovation activity			
All enterprises - number of employees	390 702	114	3033
Enterprises with innovation activity (%)	99.4	99.4	88.5
Enterprises without innovation activity (%)	0.6	0.6	11.5
Employees with tertiary qualification in innovation-active enterprises (%)	16.4	16.4	16.3

Source: Appendix 4 Tables A2 and A19 and Appendix 5 Tables B2 and B19

*Numbers do not always add up because of rounding effects

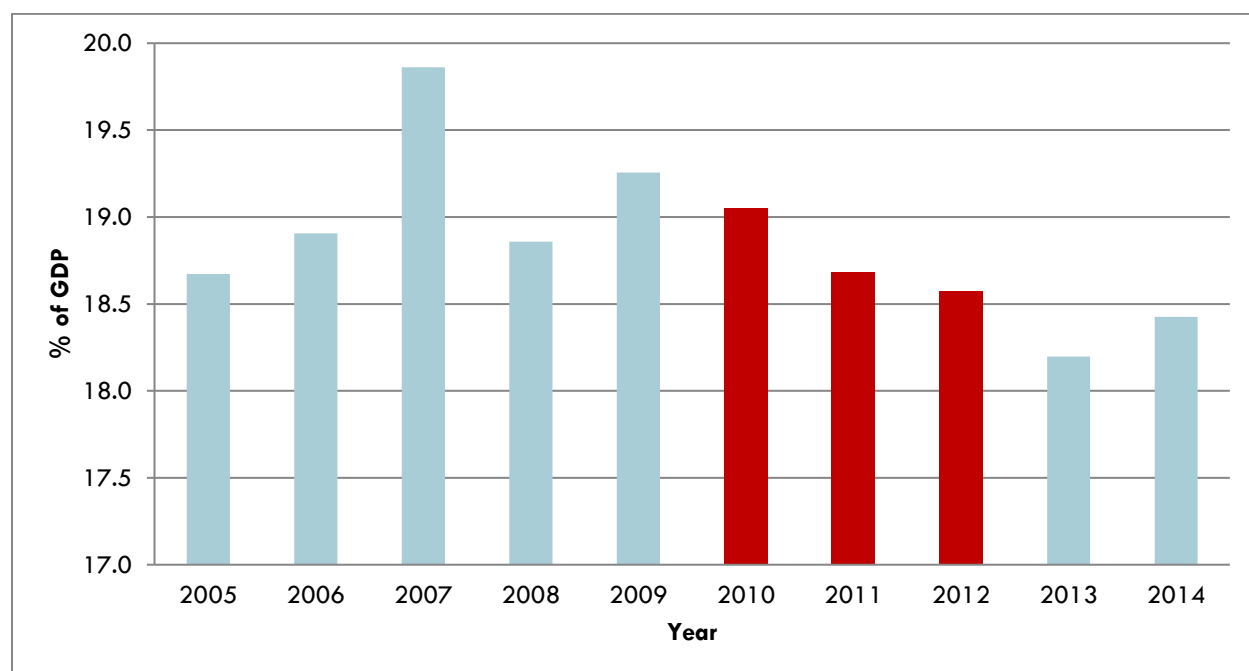
4.2 Profile of the financial intermediation sector

The financial services sector is at the core of South Africa's economy and affects the lives of all citizens (Department of National Treasury, 2011). Through financial services, people are able to process their daily economic transactions, save and preserve wealth towards fulfillment of their future goals and take insurance against natural and man-made catastrophes. At the macroeconomic level, supports economic growth, creation of jobs, building of vital infrastructure and the country's sustainable development. As a

direct result of this key role that the financial sector plays in the country's economy, the global economic slow-down of 2007-2008 emphasized the enormous costs of a poorly regulated financial services sector. Despite the resilience of South Africa's financial services sector to this crisis, the country was hard-hit by the indirect impact through losses of jobs (Department of National Treasury, 2011).

Figure 4.1 shows the sector's percentage contribution to the GDP over the period 2005-2014. The graph shows that the sector's contribution grew from 18.7% in 2005 to 19.9% in 2007, followed by a sharp drop to 18.9% in 2008 due to the global economic slow-down between 2007 and 2008. A substantial recovery to 19.3% in 2009 was recorded, which, however, preceded a steady decrease to 18.4% by 2014.

Figure 4.1 Financial services sector value added as a percentage of Gross Domestic Product (GDP)



Data Source: Stats SA GDP series P0441, GDP Fourth Quarter 2014 published in February 2015 (Stats SA, 2015)

4.3 Results

4.3.1 Introduction

This section shows the results of the analyses of the trends in innovation performance in the FI sector and the focus is on identifying some of the main Innovation Indicators such as:

- Product (goods or services), process, organisational and marketing innovation;
- Innovation expenditure and financial support;
- Sources of information for innovation activities and cooperation for innovation
- Effects of innovation;
- Barriers and Constraints of Innovation;
- Use of intellectual property rights; and
- Environmental benefits of innovation

This section of the report represents the activities of a total of 107 enterprises in the FI sector, 73.8% of which reported undertaking technological innovation activities (Table 4.3.1). Of all the innovation-active enterprises, 69.2% had successful technological innovations, meaning that they completed and implemented product and/or process innovations during the three years covered by the survey. The medium sized FI enterprises reported the most innovation activity (87.5% of enterprises) all of which were successful innovations. The technological innovative enterprises comprised 15.0% with 'product only' innovations; 7.5% with 'process only' innovations; and 46.7% with both product and process innovations. Of all the FI enterprises that responded, 4.7% indicated that they had 'only ongoing or abandoned' innovation activities. In terms non-technological innovations, 61.7% of enterprises had organisational innovations and 40.2% had marketing innovations.

Table 4.3.1 Innovation rate: Percentage innovation for innovative and non-innovative enterprises in the financial intermediation sector 2010-2012

Financial Intermediation	Total (%)	Large (%)	*M, S, VS (%)
Enterprises with innovation activity	73.8	74.4	72.4
Enterprises with successful innovation	69.2	70.5	65.5
Product only innovators	15.0	11.5	24.1
Process only innovators	7.5	9.0	3.4
Product and process innovators	46.7	50.0	37.9
Enterprises with abandoned and/or ongoing innovation	4.7	2.1	5.7
Product innovation activities only	0.9	0.0	3.4
Process innovation activities only	3.7	3.8	3.4
Product and process innovation activities only	0.0	0.0	0.0
Enterprises without innovation activity	26.2	25.6	27.6

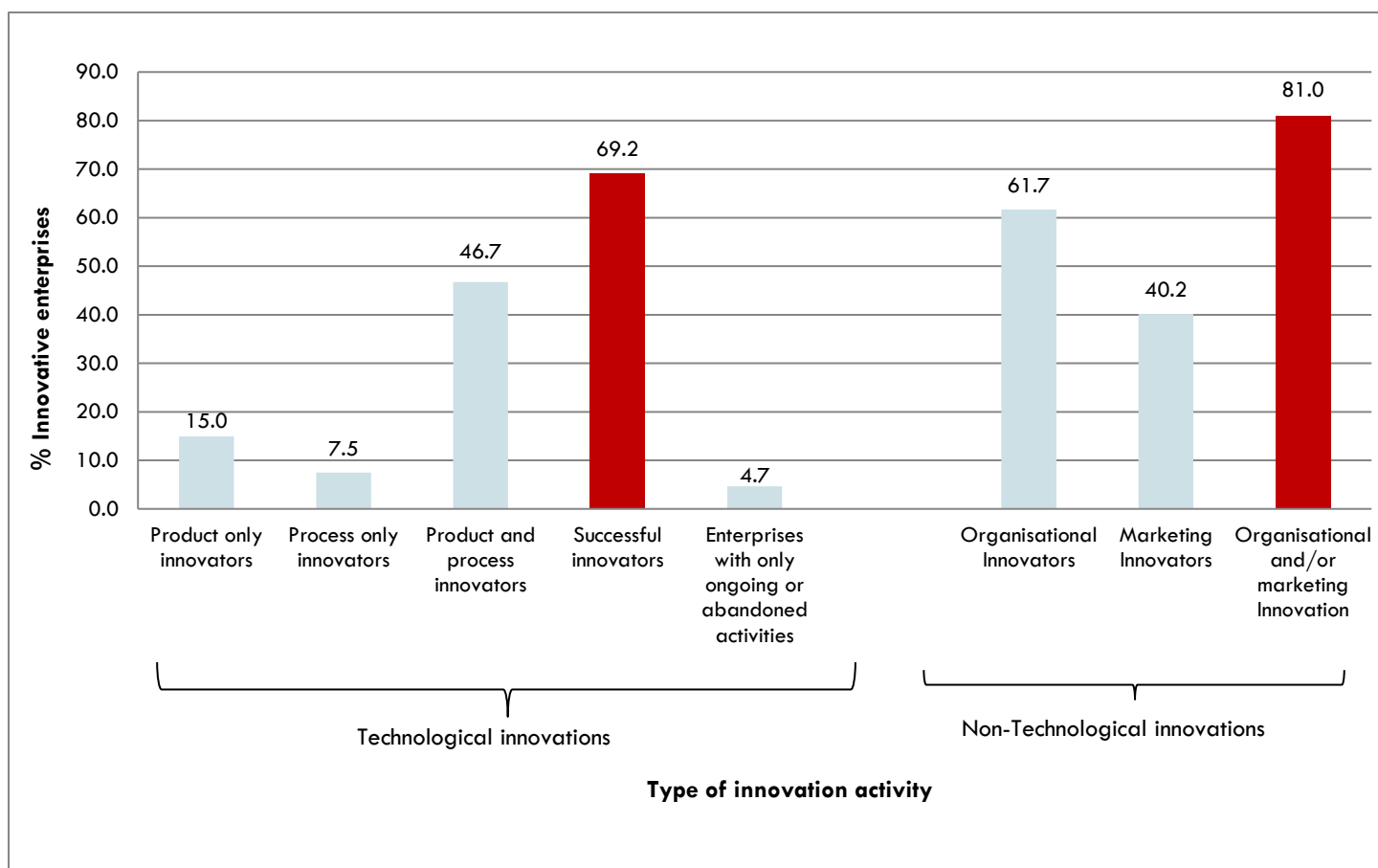
Sources: Appendix 4 Tables A1.1 and A1.2 and Appendix 5 B1.1 and B1.2

*Numbers do not always add up because of rounding effects

4.3.2 Types of Technological Innovation

Information about four types of innovation activities namely product, process, organisational and marketing innovation was collected for the purposes of this study. Figure 4.3.1 shows that 69.2% of the enterprises that responded had successful innovations. Most of the enterprises were both product and process innovative (46.7% of FI enterprises), with only 15.0% being 'product only' innovative and 7.5% being 'process only' innovative. The remaining 4.7% had 'only abandoned or ongoing' innovation activities. At least 61.7% of these enterprises had some form of organisational innovation, whilst 40.2% was market innovative. The total innovation rate for the responding enterprises in this sector was 73.8% and this includes all technological innovations.

[Figure 4.3.1 Innovation rate in the financial intermediation sector by type of innovation, 2010-2012](#)



Sources: Appendix 4 Table A1 and A20

4.3.2.1 Product (goods or services) innovation

A total of 28 of the innovative FI enterprises that responded, introduced product innovations that were both new to the market and / or new to the firm and 24 innovative FI enterprises introduced product innovations that were only new to the firm (Table 4.3.2). Almost 45% of medium, small and very small enterprises introduced product innovations that were both new to the market/or new to the firm. A total of 41.7% of large enterprises also produced new to the market/or firm product innovations.

[Table 4.3.2 Product \(goods and services\) innovators: Percentage of enterprises in the financial intermediation sector by product type and size of enterprises, 2012 \(year specific question\)](#)

Size Class	Total (%)	Large (%)	*M, S, VS (%)
All Product Innovators	100.0	100.0	100.0
Product innovations new to the market	15.2	16.7	11.1
Product innovations new to the firm	36.4	37.5	33.3
Product innovations both new to the market and/or new to the firm	42.4	41.7	44.4
Products unchanged or only marginally modified	6.1	4.2	11.1

Sources: Appendix 4 Table A5.3, A5.4, B5.3 and B5.4

Enterprises that had product innovations (comprising innovation in either goods or services produced) accounted for more innovators than those with process innovations. Approximately 14.6% of the turnover of product innovators in 2012 was generated by innovations that were new to the market (Table 4.3.3). A total of 18.3% of turnover was generated by the sale of products that were new to the enterprise concerned but not new to the market.

[Table 4.3.3 Product Innovators: proportion of turnover attributed to types of product innovations, 2012 \(year specific question\)](#)

Type of Product innovation	Turnover generated (R millions)	Percentage turnover generated
Product innovations new to the market	236 146	14.6
Product innovations new to the firm	296 172	18.3
Products unchanged or only marginally modified	1 090 459	67.2
Total (All Product innovators)	1 622 777	100

Source: Appendix 4 Table A5.1 and A5.2

Table 4.3.4 shows that most of the turnover generated by all size classes were from products that were unchanged or marginally modified. Large enterprises generated 18.9% of turnover from product innovations that were new to the firm and 15.0% of turnover that was new to the market. The other size classes generated 2.8% and 0.2 % of turnover for the respective categories. Overall, large enterprises generated the highest turnover from product innovations (96.4%)

[Table 4.3.4 Product innovators: proportion of turnover attributed to types of product innovations, by size of enterprises, 2012 \(year-specific question\)](#)

Size Class	Large (%)	*M, S, VS (%)
Type of Product Innovation		
Product innovations new to the market	15.0	2.8
Product innovations new to the firm	18.9	0.2
Products unchanged or only marginally modified	66.1	97.1
Total (%) of turnover produced by product innovators by enterprise size class)	96.4	3.6

Source: Appendix 4 Table B5.2

Table 4.3.5 shows that product innovations by innovative enterprises were developed mainly by the enterprise itself (53.0%). Collaboration with other enterprises or institution was the source of development of product innovations for 21.2% of innovators whilst 15.2% of innovators adapted and modified goods or services by other institutions. Only 9.1% of innovators relied on other enterprises to develop their innovations.

[Table 4.3.5 Responsibility for the development of product innovations in innovative enterprises, 2010-2012](#)

Product innovations developed mainly by:	Number of enterprises	Percentage of enterprises (%)
Mainly own enterprise	35	53.0
Own enterprise in collaboration with other enterprises or institutions	14	21.2
Adapting and Modifying goods or services developed by other institutions	10	15.2
Other enterprises or institution	6	9.1
Enterprises which did not respond to the question	1	1.5
<i>Total</i>	66	100

Source: Appendix 4 Table A6

[Table 4.3.6 Origin of product innovation, 2010-2012](#)

Origin	Number	%
All product innovative enterprises (number of enterprises)	66	100.0
South Africa	49	74.2
Abroad	17	25.8
Enterprises which did not respond to the question	0	0.0

Source: Appendix 4 Table A7

Table 4.3.6 shows that of the 66 product innovative enterprises, 74.2% reported that their innovations originated in South Africa. Only 25.8% reported that their innovations were developed abroad. This is an indication that South African Enterprises are capable of producing their own product innovations.

4.3.2.2 Process innovation

New or significantly improved supporting activities for processes, which include maintenance and operating systems for purchasing, accounting or computing, were reported by 54.4% of process innovators (Table 4.3.7). This was followed by improved methods of manufacturing or production of goods and services (41.8%). Only 30.4% of process innovators spent time improving their delivery and distribution methods.

[Table 4.3.7 Enterprises involved in specific process innovations, 2010-2012](#)

Process innovation	Number of enterprises	%
New or significantly improved methods of manufacturing or producing goods or services	33	41.8
New or significantly improved logistics, delivery or distribution methods for inputs, goods or services	24	30.4
New or significantly improved supporting activities for processes such as maintenance and operating systems for purchasing, accounting or computing	43	54.4

Source: Appendix 4 Table A23

Process innovations were mostly developed in-house: 53.4% of enterprises reported that innovations were mainly developed by their own enterprise 25.9% of enterprises developed process innovations in collaboration with other enterprises or institutions (Table 4.3.8). Only 6.9% of enterprises relied mainly on

other enterprises or institutions for the development of process innovations while 13.8% of enterprises adapted or modified processes developed by other enterprises or institutions

[Table 4.3.8 Responsibility for the development of process innovations, 2010-2012](#)

Process innovators	Number of enterprises	%
Mainly own enterprise	31	53.4
Own enterprise in collaboration with other enterprises or institutions	15	25.9
Adapting or modifying process developed by other enterprises or institutions	8	13.8
Mainly other enterprises or institutions	4	6.9
Total	58	100

Source: Appendix 4 Table A24

The majority of process innovations (81.0%) were developed within South Africa (Table 4.3.9) while 19.0% of process innovations originated mainly from abroad. This indicates that South African financial enterprises appear to be capable of developing their own new processes and are not as dependent on foreign technology as is sometimes indicated (Oerlemans et al. 2004).

[Table 4.3.9 Origin of process innovation, 2010-2012](#)

Process Innovators	Number of enterprises	%
South Africa	47	81.0
Abroad	11	19.0
Enterprises which did not respond to the question	0	0.0
Total	58	100

Source: Appendix 4 Table A25

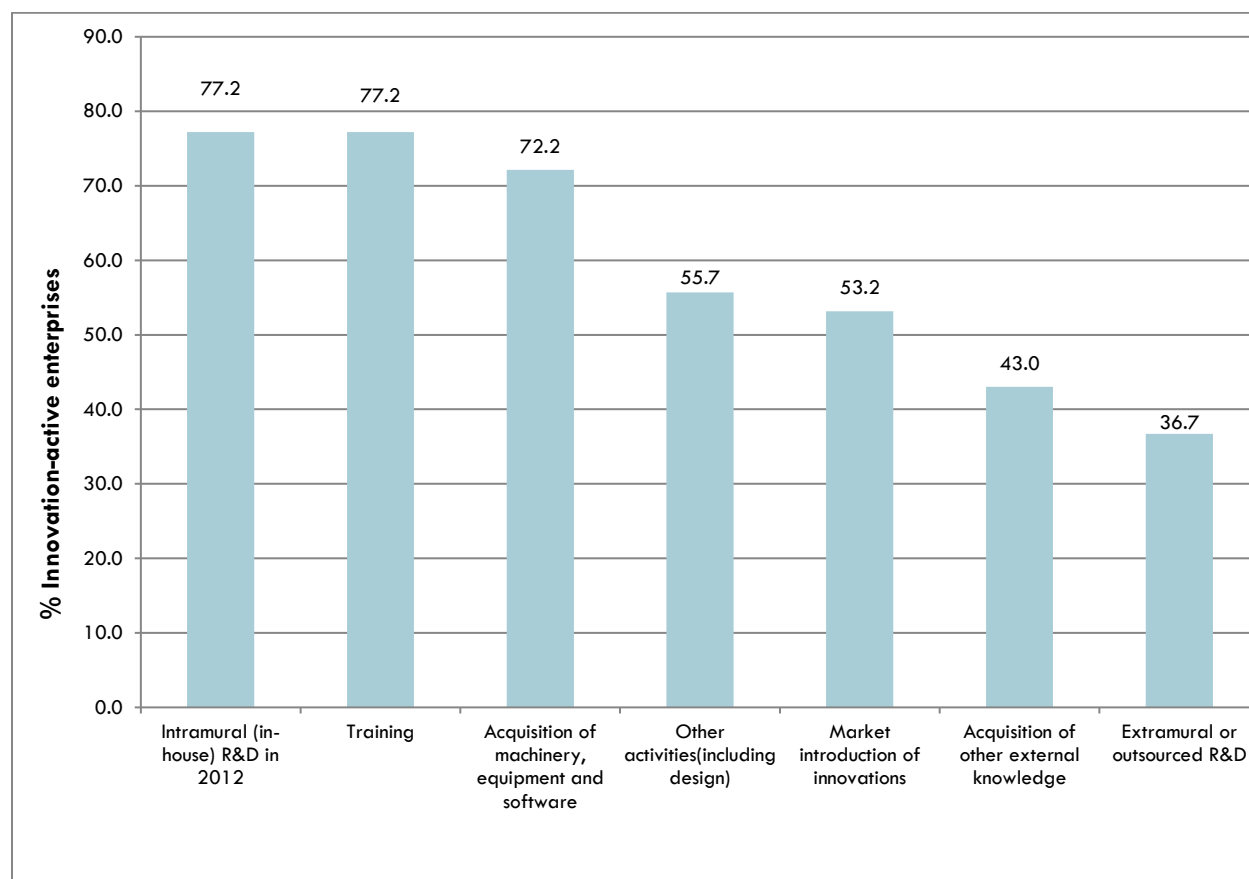
4.3.3 Innovation expenditures and financial support for innovation activities

4.3.3.1 Innovation Expenditure

The activities measured by the survey include, among others, the acquisition of machinery, equipment and software, training, in-house and outsourced R&D expenditure, and the acquisition of other external knowledge.

Figure 4.3.2 shows that most innovation-active enterprises were involved in intramural R&D activities as well as training (both 77.2%) as part of their innovation activities. The acquisition of new machinery, equipment or software was the second most important innovation activity (72.2%), and more than half of all innovation-active enterprises spent money on market introduction of innovation and other activities (53.2% and 55.7% respectively).

Figure 4.3.2 Types of innovation activities among enterprises, 2010-2012



Source: Appendix 4 Table A4.2

Table 4.3.10 Enterprises that declared innovation expenditure for the financial intermediation sector, 2012 (year-specific question)

Type of innovation expenditure	Total R millions	% of total expenditure of all enterprises	Large R millions	*M, S, VSR millions
Intramural (in-house) R&D	41 559	23.0	41 523	36
Extramural or outsourced R&D	92 155	51.0	92 054	101
Acquisition of machinery, equipment and software	20 065	11.1	19 762	304
Acquisition of other external knowledge	26 886	14.9	26 664	222
Total	180 665	100.0	180 002	663

Source: Appendix 4 Table A4.1

Table 4.3.10 indicates that the bulk of innovation expenditure was devoted to Extramural or outsourced R&D (51.0%) and this was followed by intramural R&D expenditure (23.0%). Acquisition of new machinery, equipment and software accounted for 14.9% of the the total innovation expenditure.

4.3.3.2 Innovation and R&D

Comparing the number of innovating enterprises with innovation activity and those with successful innovations to the number that did R&D is an important and essential undertaking developing innovation policy. The results of this analysis for the FI sector are summarized in Table 4.3.11. The results show that more enterprises innovated (93.7%), than did R&D (77.2%), an indication that, apart from using R&D, enterprises used other methods to implement their innovations. Of the successful innovators 72.2% performed intramural R&D.

Table 4.3.11 Enterprises with successful innovations that performed R&D, 2012

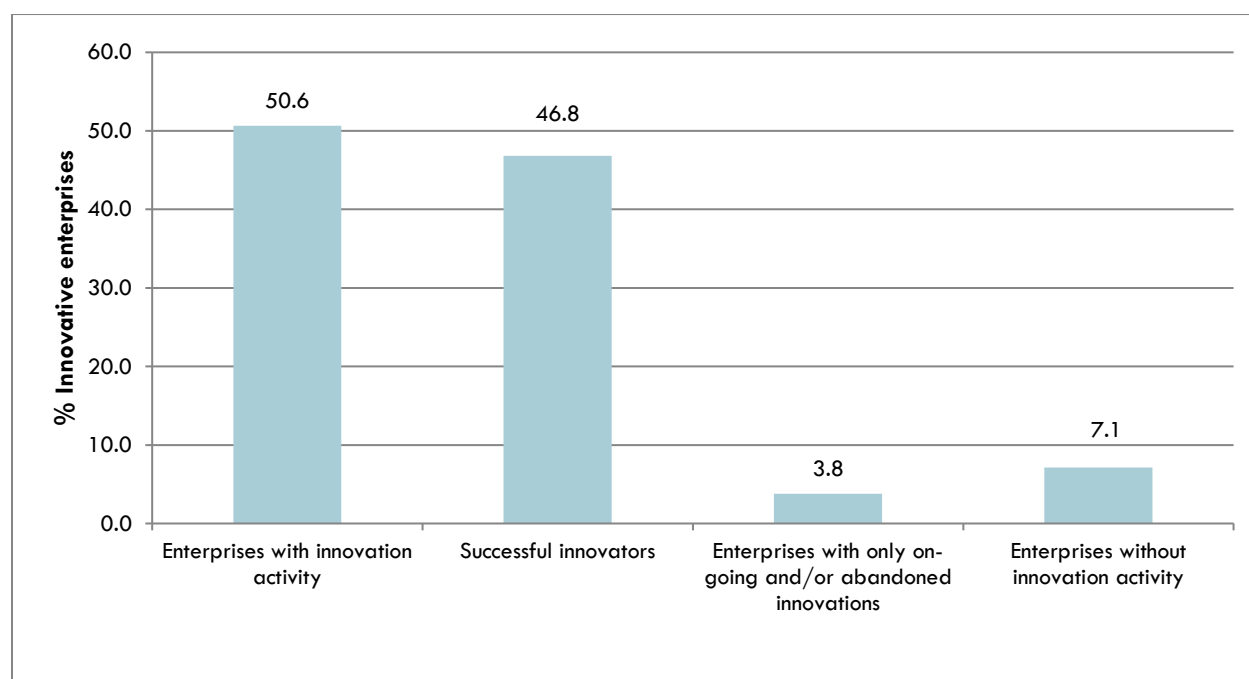
	Number of enterprises	%
Enterprises with successful innovations	74	93.7
Enterprises that engaged in intramural R&D	61	77.2
Enterprises with successful innovations and engaged in intramural R&D	57	72.2

Source: Appendix 4 Table A4.3

4.3.3.3 Financial support for innovation activities

Adequate funding is a prerequisite for innovation activities and enterprises should make use of the funding sources made available for them. In South Africa funding are available for innovation activities from national government, national funding agencies as well as foreign government/public sources. Figure 4.3.3 indicates that at least 50.6% of enterprises with innovation activities were aware of government funding opportunities. Of the successful innovators, 46.8% were aware of government funding whilst only 7.1% of non-innovators were aware that government gives financial support for innovation activities.

Figure 4.3.3 Awareness of government financial support for innovation



Source: Appendix 4 Table A10.1

The Department of Trade and Industry (the *diti*) contributed financially to 10.1% of the enterprises in the FI sector and the Department of Science and Technology gave financial assistance to 6.3% of innovation-active FI enterprises (Table 4.3.12). National funding agencies such as the NRF contributed funding to 3.8% of innovation-active enterprises and the three national funding agencies namely the Medical Research Council (MRC), Technology Innovation Agency (TIA) and the Industrial Development Corporation (IDC) each contributed financially to 1.3% of innovation-active enterprises. At least 5.1% of innovation-active enterprises received funding from foreign government or public sources.

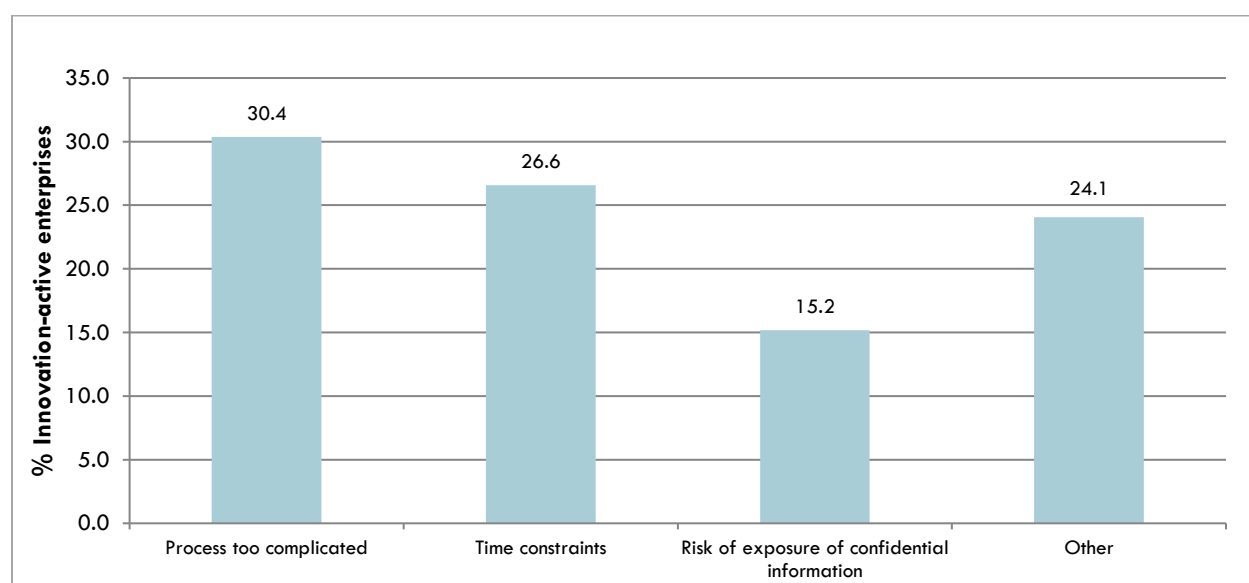
[Table 4.3.12 Number and percentage of innovation-active enterprises that received financial support for innovation activities from government sources, 2010-2012](#)

Source of financial support	Number of enterprises	Percentage of enterprises (%)
National government:		
Department of Science and Technology (DST)	5	6.3
Department of Trade and Industry (<i>diti</i>)	8	10.1
Other	6	7.6
National funding agencies:		
National Research Foundation (NRF)	3	3.8
Medical Research Council (MRC)	1	1.3
Industrial Development Corporation (IDC)	1	1.3
Technology Innovation Agency (TIA)	1	1.3
Other	2	2.5
Foreign government/public sources	4	5.1

Source: Appendix 4 Table A18

Figure 4.3.4 gives an indication of the reasons why innovation-active enterprises did not access government funds. Most FI enterprises reported that the process to access funding was too complicated (30.4%) and also very time consuming (26.6%). A number of enterprises (15.2%) felt that there was too big a risk of exposure of their confidential information and therefore they did not access government funds.

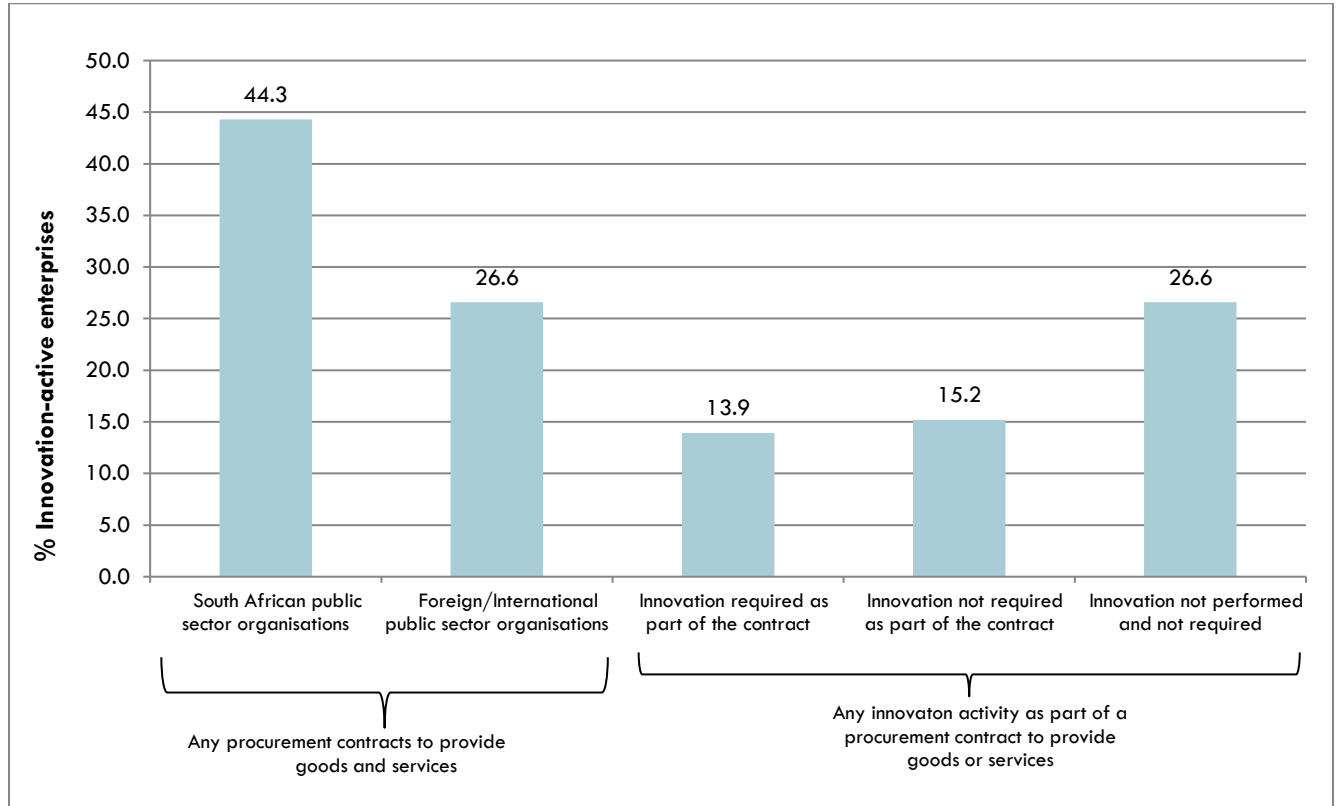
[Figure 4.3.4 Reasons why innovation-active enterprises did not access government funds](#)



Source: Appendix 4 Table A10.3

At least 44.3 % of innovation-active enterprises had procurement contracts from South African public sector organizations to provide goods and services and 26.6% had contracts form Foreign/International public sector organisations (Figure 4.3.5). For 13.9% of innovation-active enterprises innovation was required as part of the contract whilst for 15.2% innovation was not a requirement. For 26.6% of innovation-active enterprises, innovation was not a requirement and was not performed.

[Figure 4.3.5 Innovation-active enterprises that had public sector procurement contracts to provide goods and services, 2010-2012](#)

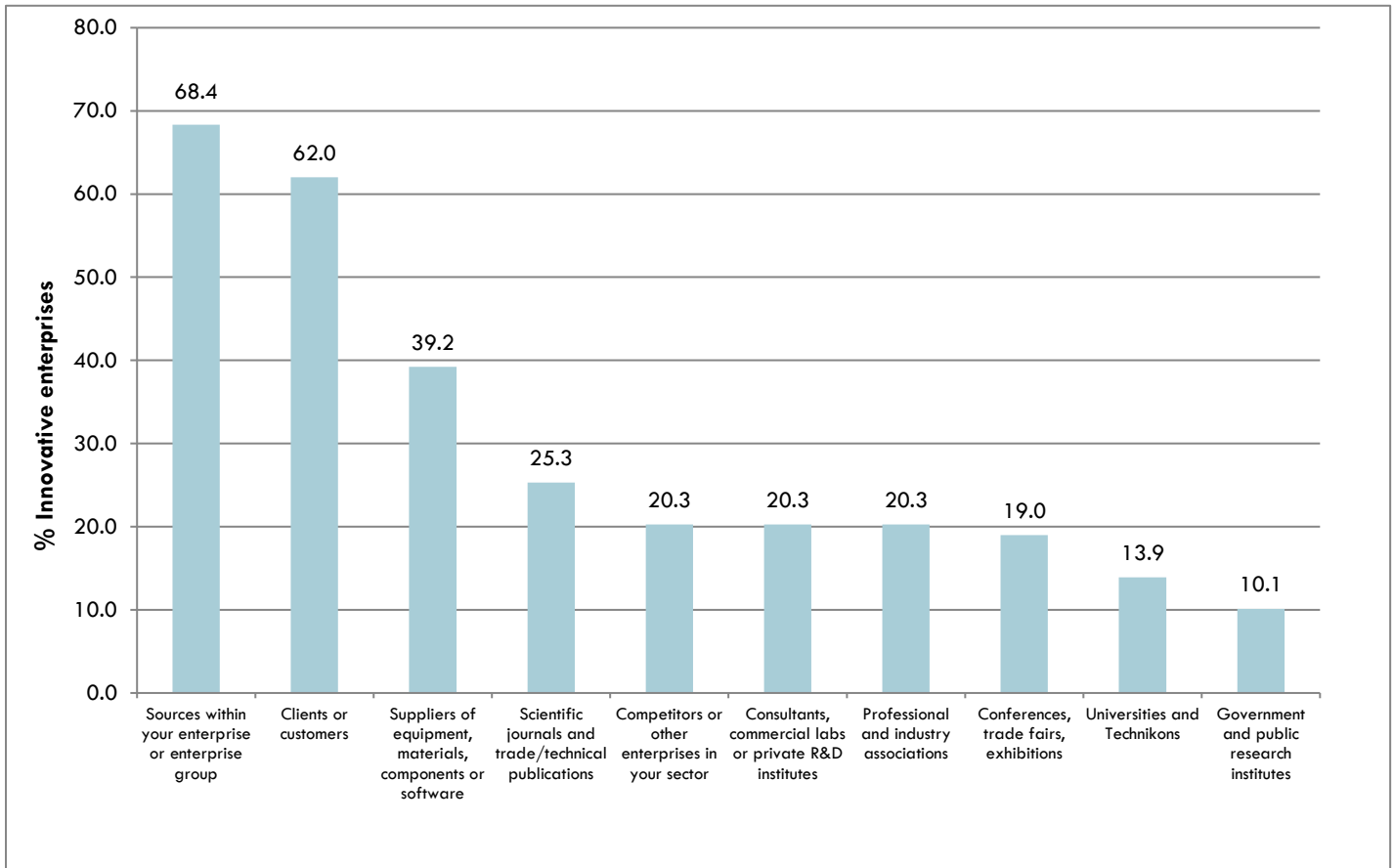


Source: Appendix 4 Table A10.4

4.3.4 Sources of information and co-operation partners for innovation activities

At least 68.4% of all innovation-active enterprises rated sources of information within the enterprise as highly important for innovation activities (Figure 4.3.6). Clients and customers as external market sources were rated as highly important by 62.0% of innovation-active enterprises, followed by suppliers (39.2%), scientific journals (25.3%), competitors, consultants and professional associations (20.3%) and conferences, trade fairs and exhibitions (19.0%). Universities and technikons as well as government appeared to be relatively minor sources of information for innovation, with only 13.9% and 10.1% respectively, of enterprises rating them as highly important.

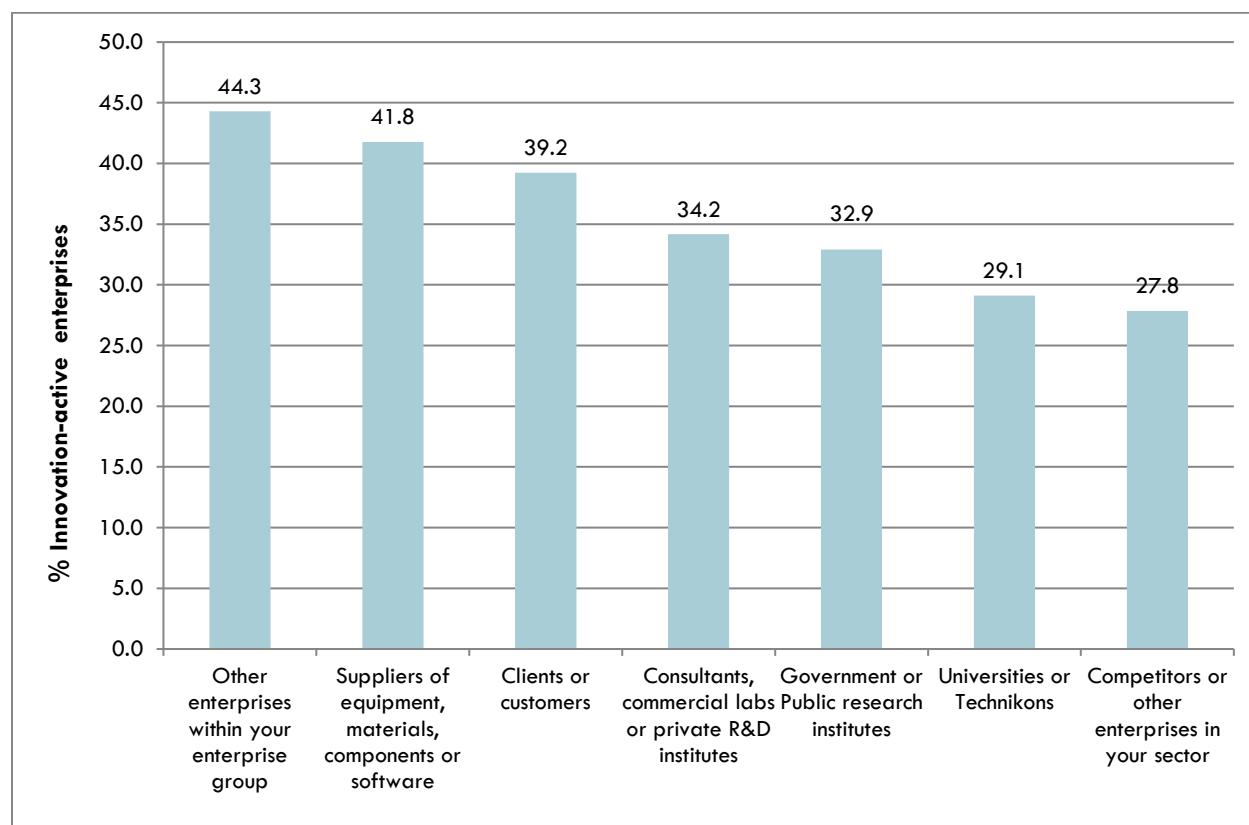
Figure 4.3.6 Sources of information for innovation rated as "highly important" by innovation-active enterprises



Sources: Appendix 4 Table A11.1 and A11.2

Figure 4.3.7 shows that the most important collaborative partnerships for innovation were between enterprises and their clients or customers, which comprised 44.3% of collaborative partnerships. Collaboration efforts between enterprises and their suppliers were indicated by 41.8% of enterprises. A total of 27.8% of innovation-active enterprises collaborated with public research institutes and a further 32.9% also collaborated with their consultants, commercial labs or private R&D institutes. Universities and technikon were rated as "highly important" collaborative partners by 34.2% of innovation-active enterprises.

Figure 4.3.7 Innovation-active collaborative partnerships by type of partner, 2010-2012



Source: Appendix 4 Table A21.1

4.3.5 Effects of innovation

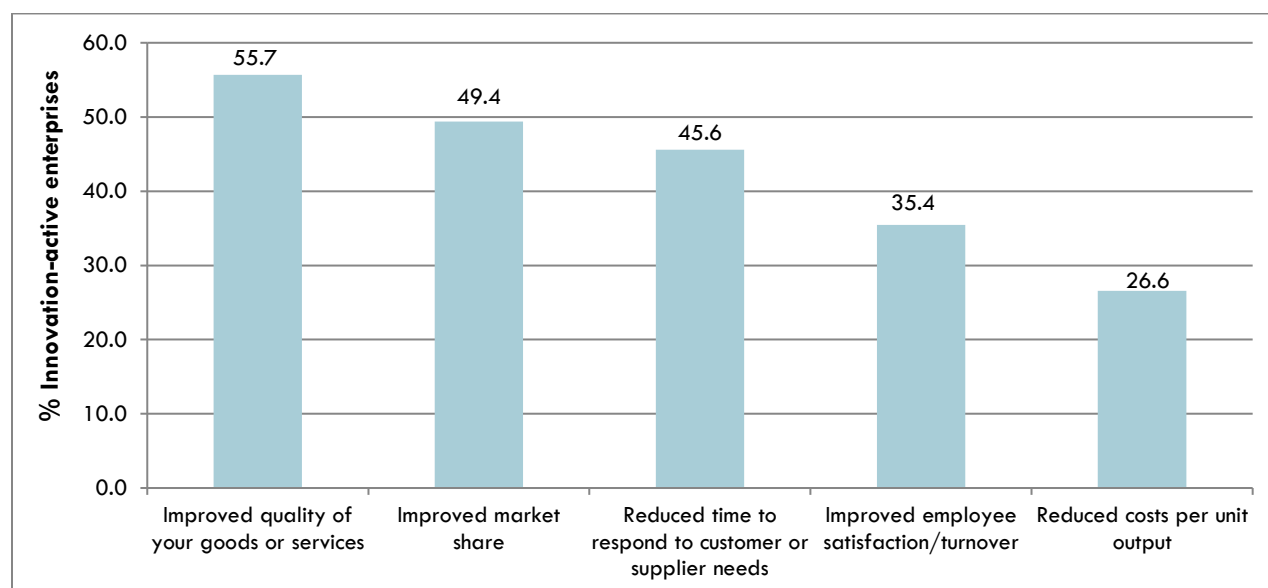
The innovation survey included a question that required innovation-active enterprises to rank the importance of various market and operational outcomes resulting from both product and process innovations. 'Increasing the range of goods and services' was cited as having a highly important effect on innovation by 46.8% of innovation-active enterprises (Table 4.3.13). 'Improved quality of goods and services' was also an important outcome for 43.0% of while 'entering new markets or increasing market share' was cited as a highly important outcome by 36.7% of innovators. 'Improved flexibility of production or service provision' was cited as the most important effect of process innovation by 22.8% of innovation-active enterprises, followed by 'increased capacity of production or service provision' (20.3%). Other highly important effects of innovation cited were 'meeting government regulatory requirements' (cited by 20.3% of innovators) and 'reduced environmental impacts or improved health and safety' (13.9%).

Table 4.3.13 "Highly important" effects of innovation on outcomes for innovation-active enterprises, 2010-2012

Effects of Innovation	Number of enterprises	%
Product outcomes		
Increased range of goods and services	37	46.8
Entered new markets or increased market share	29	36.7
Improved quality of goods or services	34	43.0
Process outcomes		
Improved flexibility of production or service provision	18	22.8
Increased capacity of production or service provision	16	20.3
Reduced labour costs per unit output	7	8.9
Reduced materials and energy per unit output	5	6.3
Other outcomes		
Reduced environmental impacts or improved health and safety	11	13.9
Met Governmental regulatory requirements	16	20.3

Source: Appendix 4 Table A8.1 and A8.2

Figure 4.3.8 shows that innovation-active enterprises that introduced organisational innovations reported 'improved quality of goods and services' as 'highly important (55.7%)'. This was followed by 'improved market share' which approximately 50% of enterprises rated as highly important. 'Reduced time to respond to customer or supplier needs' was also highly important to 45.6% of enterprises. For 35.4% of enterprises, improved employee satisfaction/turnover' was rated as a highly important outcome of organisational innovation.

Figure 4.3. 8 Innovation-active enterprises that introduced organisational innovation and rated various results as highly important, 2010-2012

Source: Appendix 4 Table A17

4.3.6 Factors hampering innovation

Enterprises were asked to rate the degree to which a number of specified factors hampered their innovation activities during the period 2010 - 2012. Table 4.3.14 shows that 24.1% of all innovation-active enterprises and 17.9% of non-innovation-active enterprises indicated that the development of innovation-active activities within their enterprises was hampered or restrained by a 'lack of funds within the enterprise or group'. The second most-cited factor for innovation-active enterprises was 'lack of information on technology' (27.8%) and for non-innovators the cost of innovation was perceived as being too high (21.4%). The third most cited reason not to innovate was that there was 'no need due to prior innovations' (20.3% for innovation-active enterprises and 25.0% for non-innovation-active enterprises).

[Table 4.3.14 Highly important factors that hampered innovation activities of innovation-active and non-innovation-active enterprises, 2010-2012](#)

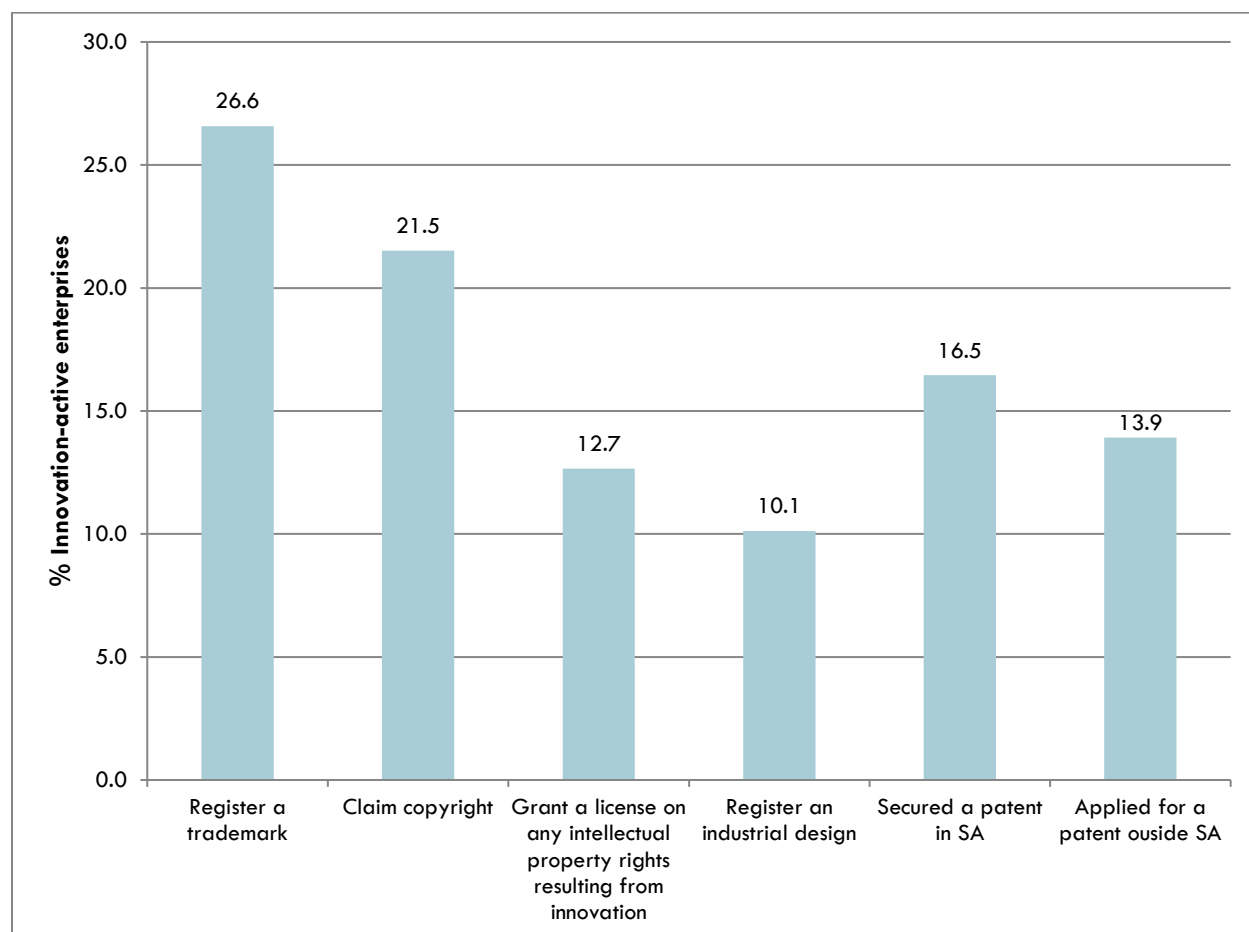
Percentage of enterprises	Industry	
	Innovation-active	Non-Innovation-active
Cost factors		
Lack of funds within your enterprise or group	24.1	17.9
Lack of finance from sources outside your enterprise	17.7	17.9
Innovation costs too high	16.5	21.4
Knowledge factors		
Lack of qualified personnel	27.8	10.7
Lack of information on technology	15.2	3.6
Lack of information of markets	12.7	3.6
Difficulty in finding co-operation partners	7.6	3.6
Market factors		
Market dominated by established enterprises	16.5	25.0
Uncertain demand for innovation-active goods or services	20.3	25.0
Reasons not to innovate		
No need due to prior innovations	2.5	17.9
No need because of no demand for innovations	6.3	17.9

Sources: Appendix 4 Table A12.1, A 12.2, A12.3 and A12.4

4.3.7 Intellectual property rights

About 27% of innovators in the financial sector managed to register a trademark (Figure 4.3.9). This was followed by 21.5% of innovators that claimed copyright and 12.7% that granted licences on intellectual property rights resulting from innovation to third parties. Patents were secured in South Africa by 12.1% of innovators and applied for outside South Africa by 10.3% of innovators.

Figure 4.3.9 Innovation-active finance enterprises that made use of intellectual property rights (IPR), 2010-2012



Sources: Appendix 4 Table A14 and A15

4.3.8 Innovation with environmental benefits

Innovation-active enterprises were required to state the importance of their innovation activities with environmental benefits. A total number of 85 enterprises reported to have introduced product, process, organisational and marketing innovation with environmental benefits (Table 4.3.15). With regards to enterprises having environmental benefits from the production of goods or services within their enterprise, about 26% of innovators reduced their material use per unit out whilst at least 25% reported reducing their energy usage per unit of output. Reducing the carbon footprint was reported by 22.4% of enterprises. Enterprises were also asked to report on their environmental benefits from the after sales use of a good or service by the end user. Almost 25% of enterprises reported reduced energy usage, 22.4% reported improved recycling of product after use and 20.0% reported reduced air, water, soil and noise pollution.

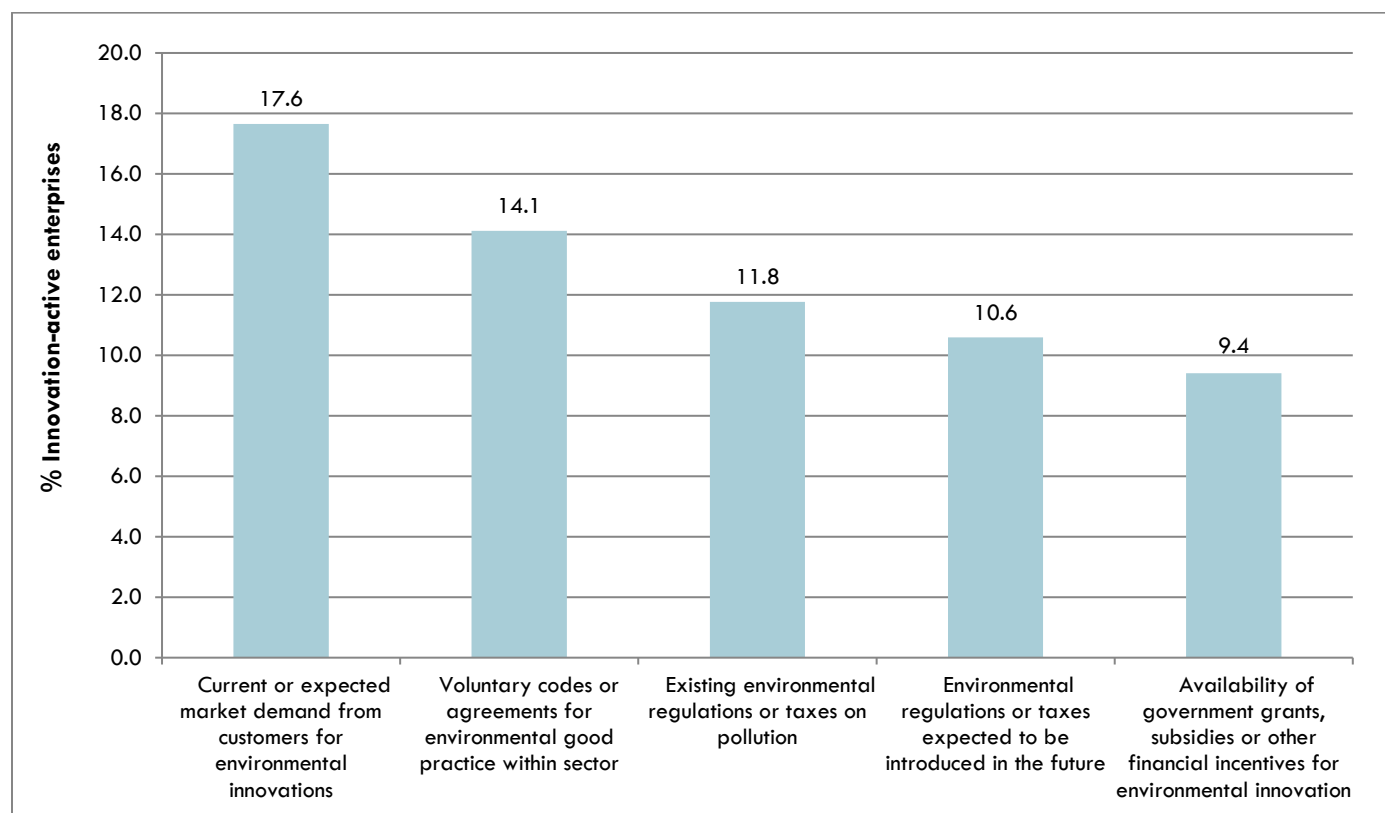
Table 4.3.15 Introduction of innovations with environmental benefits, 2010-2012

Environmental Benefit	Number of enterprises	Percentage of enterprises (%)
Enterprises that introduced product, process, organisational or marketing innovation	85	100.0
Enterprises that had environmental benefits from the production of goods or services:		
Reduced material use per unit output	22	25.9
Reduced energy use per unit output	21	24.7
Reduced carbon dioxide 'footprint' (total carbon dioxide production) by the enterprise	19	22.4
Replaced materials with less polluting or hazardous substitutes	18	21.2
Reduced soil, water, noise, or air pollution	16	18.8
Recycled waste, water or materials	27	31.8
Enterprises that had environmental benefits from the after sales of a good or service:		
Reduced energy use	21	24.7
Reduced air, water, soil or noise pollution	17	20.0
Improved recycling of product after use	19	22.4

Source: Appendix 4 Table A29

Figure 4.3.10 shows that 17.6% of enterprises introduced an environmental innovation in response to environmental benefits from the production of goods or services based on the current or expected demand from their customer for environment innovations. Environmental innovations were produced by 14.1% of enterprises based on voluntary codes or agreements for environmental good practice with the sector. Only 9.4% of enterprises responded with the introduction of an environmental innovation because of availability of government grants, subsidies or other financial incentives for environmental innovations. Enterprises also responded to having procedures in place to regularly identify and reduce the enterprise's environmental impacts, for example, environmental audits, setting environmental performance goals etc., and 42.4% of enterprises responded positively to this question (Table 4.3.16).

Figure 4.3.10 Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods or services, 2010-2012



Source: Appendix 4 Table A30

Table 4.3.16 Procedures to identify and reduce environmental impacts

	Total	Large	M,S,VS
Number of innovation-active finance enterprises that had procedures in place to regularly identify and reduce their environmental impact	36	32	4
Percentage of innovation-active finance enterprises (%) that had procedures in place to regularly identify and reduce their environmental impact	42.4	51.6	17.4

Source: Appendix 4 Table A31 and B31

4.3.9 Non-technological innovation activities

4.3.9.1 Organisational and marketing innovation

Table 4.3.17 shows that 61.7% of innovation-active enterprises had organisational innovations whilst 40.2% had marketing innovations. About 13.9% of 'product only' innovators had organisational and/or marketing innovations and 7.6% of 'process only' innovators had organisational and/or marketing innovations. A total of 57.0% of product and process innovation-active enterprises also had organisational and/or marketing innovations.

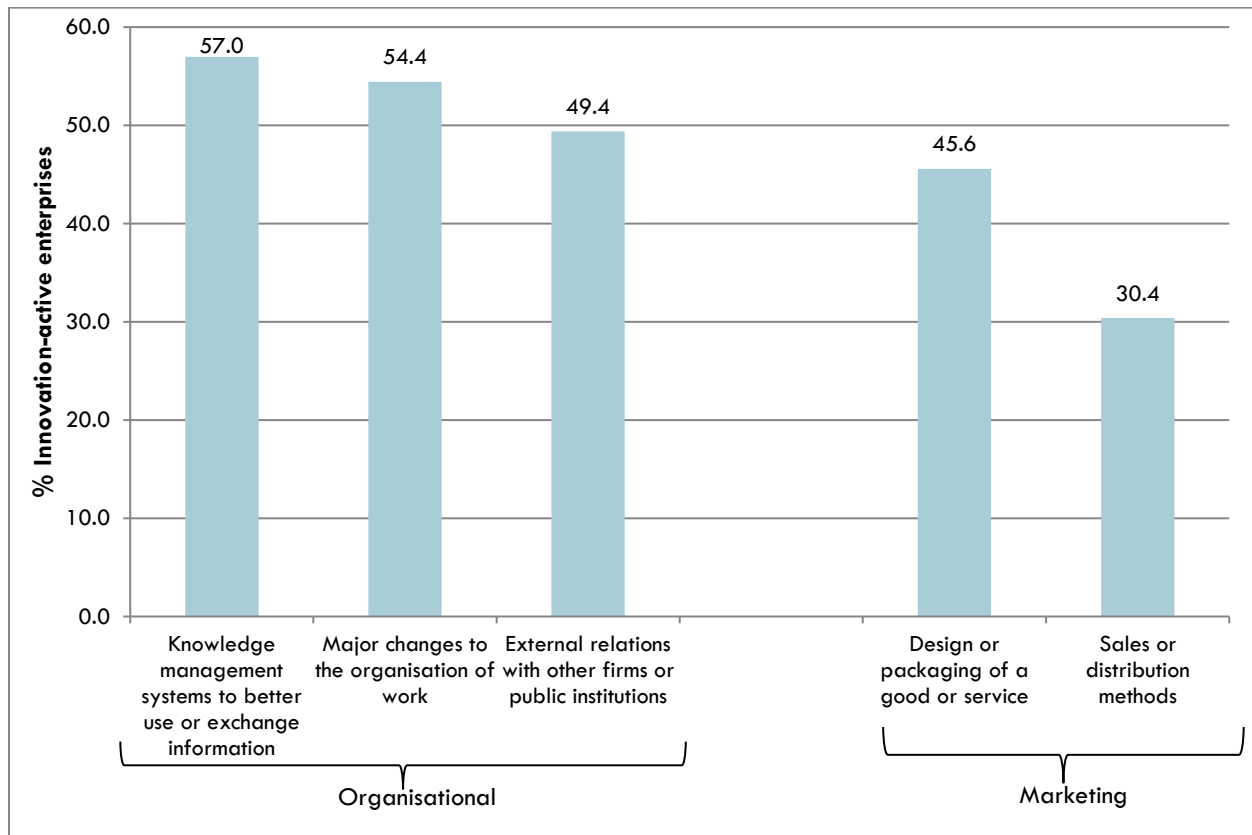
Table 4.3.17 Enterprises with organisational and/or marketing innovations, 2010-2012

Innovation type	Number of enterprises	%
Enterprises with organisational innovation	66	61.7
Enterprises with marketing innovation	43	40.2
Innovation-active enterprises with organisational and/or marketing Innovation	64	81.0
Product Only Innovative enterprises with organisational and/or marketing innovation	11	13.9
Process Only Innovative enterprises with organisational and/or marketing innovation	6	7.6
Product and Process Innovative enterprises with organisational and/or marketing innovation	45	57.0
Non-technological Innovation-active enterprises with:		
Organisational innovation only	8	28.6
Marketing innovation only	0	0.0
Organisational or marketing Innovation	9	32.1
Organisational and marketing Innovation	1	3.6

Source: Appendix 4 Table A20

Figure 4.3.11 provides more detail on the organisational and marketing innovations undertaken by innovation-active enterprises. More enterprises reported organisational innovations activities than marketing innovation activities. A total of 57.0% of enterprises reported that they were involved in creating 'knowledge management systems to better use or exchange information'. At least 54.4% of financial enterprises reported that they made 'major changes to the organisation of work', whilst around 49.4% of enterprises reported that they had external relations with other firms or public institutions. About 45.6% of FI enterprises reported involvement in the 'design or packaging of goods or services' and 30.4% of FI enterprises reported changes in 'sales distribution methods'.

Figure 4.3.11 Percentage of innovation-active enterprises that introduced organisational or marketing innovation, 2010-2012



Source: Appendix 4 Table A 13.2

CHAPTER 5: TRANSPORT STORAGE AND COMMUNICATION

5.1 Characteristics of enterprises in the transport, storage and communications sectors covered by the survey

This section reports on the characteristics of enterprises in the transport, storage and communication sector that responded to the South African Business Innovation Survey 2013 covering the period 2010 – 2012 . A total of 67 324 employees were employed by the 93 enterprises in the TSC sector that responded to the survey and of these 94.7% worked in enterprises with innovation activities (Table 5.1.1). All the employees in medium enterprises came from enterprises with innovation activity, while employees employed in large enterprises with innovation activity accounted for 94.8% of the total number of employees in all large enterprises.

A total turnover of R12 323 billion was recorded for the enterprises of the TSC sector that responded to the survey, of which 71.9% came from enterprises with innovation activity (Table 5.1.1). In the large TSC enterprises at least 71.8% of the total turnover was generated by innovation active enterprises. Enterprises with innovation activity accounted for all the turnover of the sector's medium sized enterprises, while small enterprises with innovation activity accounted for 99.9% of the small enterprises

[Table 5.1.1 Total enterprises, number of employees and turnovers: comparison of enterprises with innovation activities in the transport, storage and communication sector, 2010-2012](#)

	Total (number/value)	Total (%)	Large (%)	*M, S, VS (%)
Total number of enterprises	93	100.0	100.0	100.0
Enterprises with innovation activities	57	61.3	61.3	61.5
Number of employees	67 324	100.0	100.0	100.0
Number of employees in enterprises with innovation activities	63 778	94.7	94.8	82.4
Turnover (R billions)	12 323	100.0	100.0	100.0
Turnover (R billions) of enterprises with innovation activities	8 856	71.9	71.8	99.8

Source: Appendix 4 Tables A1.1, A2 and A3 and Appendix 5 B1.1, B2 and B3

*Medium, Small and Very Small

The majority of the enterprises in the TSC sector (53.8% of the sector's enterprises) reported that they were not part of a larger group (Table 5.1.2). Enterprises that were part of a larger group constituted 44.1% of the sector's enterprises. However, large enterprises that were part of a larger group tied with those that were not part of a larger group at 48.8%.

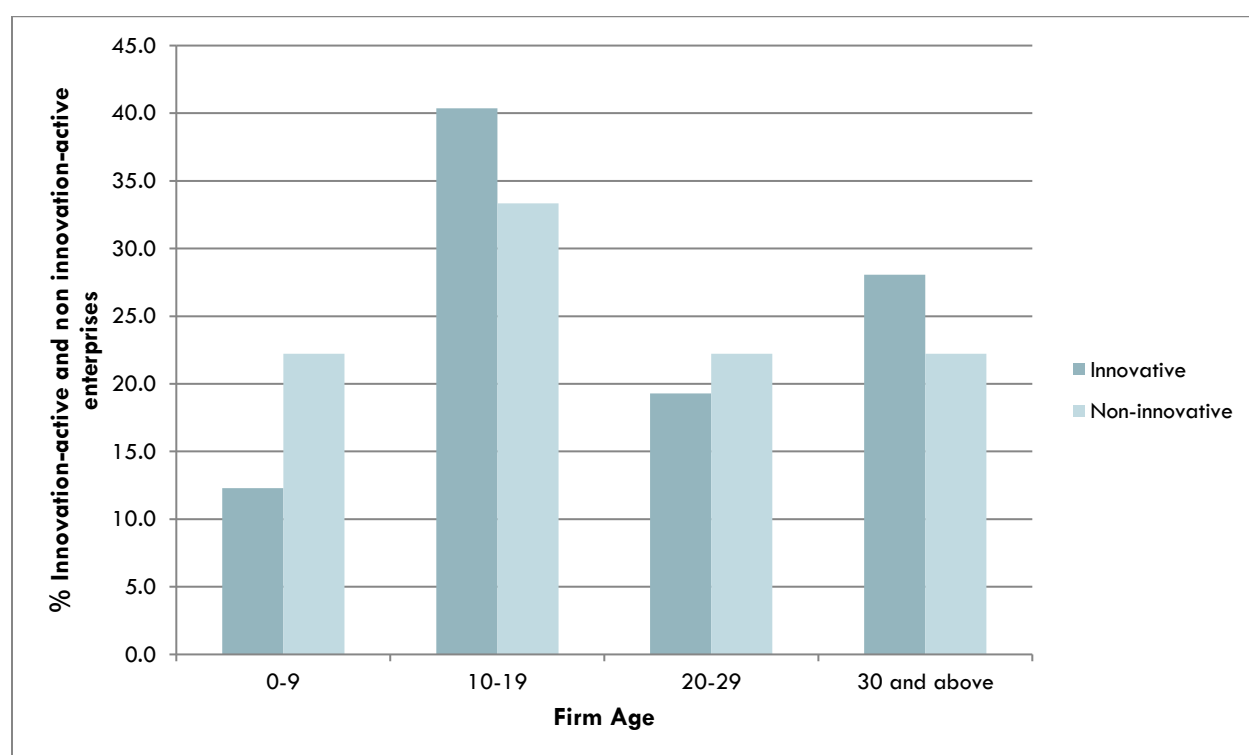
[Table 5.1.2 Number and percentage of enterprises in the transport, storage and communication sector that stated they were part of a larger group](#)

	Total	Large	*M, S, VS
Enterprise group status (number)			
Part of a larger group	41	39	2
Not part of a larger group	50	39	11
Enterprises which did not respond to the question	2	2	0
Enterprise group status (%)			
Part of a larger group	44.1	48.8	15.4
Not part of a larger group	53.8	48.8	84.6
Enterprises which did not respond to the question	2.2	2.5	0.0

Source: Appendix 4 Table A27 and Appendix 5 Table B27

Figure 5.1.1 shows that the firms that were between 10 and 19 years of age were more innovation active than younger firms and even the firms older than 20 years of age.

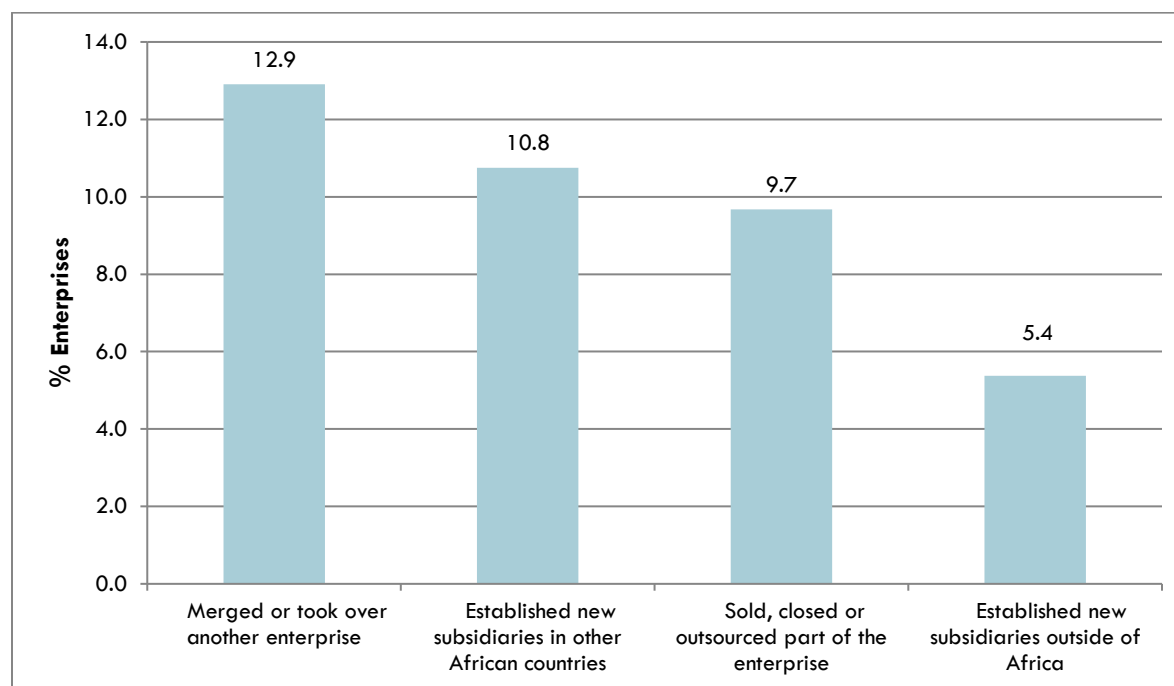
[Figure 5.1.1 Age of innovation-active and non-innovation-active enterprises in the transport, storage and communication sector](#)



Source: Appendix 4 Table A28

Enterprises in the TSC sector that reported that they had merged or taken over another company comprised 12.9% of all enterprises in the sector (Figure 5.1.2). Enterprises that reported that they had sold closed or outsourced parts of their enterprise constituted 9.7%, which was lower than the proportion that had established new subsidiaries in other African countries (10.8%), but higher than those that had established new subsidiaries outside of Africa (5.4%).

[Figure 5.1.2 Enterprises in the transport, storage and communication sector that merged with others, closed or established subsidiaries](#)



Source: Appendix 4 Table A27

Of the total personnel employed in the TSC sector, 61.3% were in enterprises with innovation activity (Table 5.1.3). Of the total employees in enterprises with innovation activity, 21.7% had tertiary educational qualifications (degree or diploma).

[Table 5.1.3 Employees in the transport, storage and communication sector](#)

	Total	Large	*M, S, VS
Number and percentage of employees by innovation activity			
All enterprises - number of employees	67 324	67 159	167
Enterprises with innovation activity (%)	61.3	61.3	61.5
Enterprises without innovation activity (%)	38.7	38.8	38.5
Employees with tertiary (degree or diploma) qualification in innovation-active enterprises (%)	21.7	21.7	33.0

Source: Appendix 4 Tables A1.1, A2 and A19 and Appendix 5 Tables B1.1, B2 and B19

*Medium, Small and Very Small

5.2 Profile of the transport, storage and communications sectors

The TSC sector has been highlighted by the government as a key contributor to South Africa's competitiveness in global markets. It is regarded as a crucial engine for economic growth and social development, and the government has unveiled plans to spend billions of rands to improve the country's roads, railways and ports.

The communications sector - which, together with transport and storage, accounted for roughly 9 % of GDP in 2012 - has been one of the fastest growing sectors of the South African economy, reflecting the rapid expansion of mobile telephony across the country.

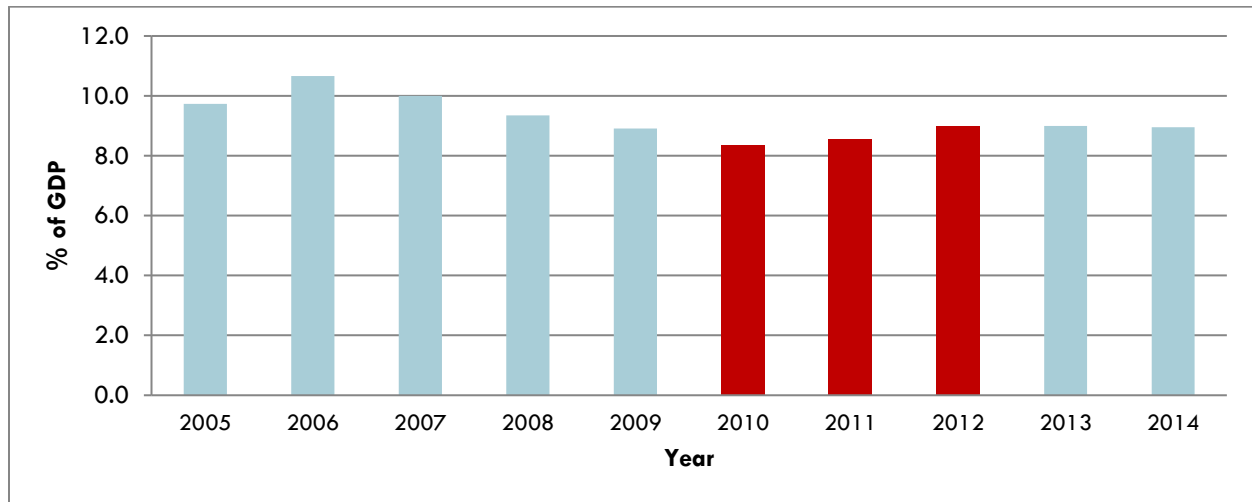
The following presents a summary of the key drivers that shape the TSC industry, as provided by Standard Bank (2007), the National Treasury (2007) and Cosatu (2006).

Focused investment in sustainable public passenger transport:

- The existence of a well-maintained transport infrastructure which must meet the needs of commuters and freight transporters as a precondition for a successful economy, especially in rural areas as transport consumes a large proportion of the disposable income of the poor.
- A competitive telecommunications industry
- Broad-based access to these telecommunications services. Despite significant expansion, access to telecoms services in South Africa remains a problem for many, especially in rural and other neglected areas. The introduction of various wireless services has promoted the accessibility to internet services to a large extent.
- Efficient postal services. The South African Post Office operates more than 2 000 outlets and delivers approximately 8 million postal articles to 6.5 million addresses annually. Continued focus on these services is critical to ensure competitiveness and reliability.

Figure 5.1 shows the percentage contribution to GDP of the TSC sector as a whole for the period 2005-2014. It shows that the sector's contribution averaged at about 9.0% during this period, with a slight steady decrease from 10.7% in 2006 to 8.4% in 2010. This was followed by a slight increase to 8.6% in 2011, rising to 9.0% in 2012 and this has remained at this level up to 2014.

[Figure 5.1 Transport, storage and communication sector value added as a percentage of Gross Domestic Product \(GDP\)](#)



Data Source: Stats SA GDP series P0441, GDP Fourth Quarter 2014 published in February 2015 (Stats SA, 2015)

5.3 Results

5.3.1 Introduction

This section shows the results of the analyses of the trends in innovation performance in the TSC sector and the focus is on identifying some of the main Innovation Indicators such as:

- Product (goods or services), process, organisational and marketing innovation;
- Innovation expenditure and financial support;
- Sources of information for innovation activities and cooperation for innovation
- Effects of innovation;
- Barriers and Constraints of Innovation;
- Use of intellectual property rights; and
- Environmental benefits of innovation

A total of 93 enterprises in the TSC sector responded to the survey, with 61.3% of these reporting that they had undertaken technological innovation activities during the period 2010-2012 (Table 5.3.1). The survey distinguished technological (product and/or process) and non-technological (organisational and/or marketing) innovations. Enterprises that reported having introduced the latter type of innovations comprised 82.5%, with 54.8% for organisational and 28.0% for marketing innovations individually (Figure 5.3.1). Of these innovation active enterprises, 59.1% had successful technological innovations, as they completed and implemented product and/or process innovations during the three years covered by the survey. Innovation activity in the TSC sector was principally reported by small enterprises (75.0% of the responding enterprises in the sector). However, successful innovations were mostly reported by medium enterprises (66.7%), with small enterprises among the lowest ranking (50.0%). Of all the enterprises that responded to the survey in the TSC sector, 2.2% indicated that they had 'only ongoing or abandoned' innovation activities. Enterprises with 'product only' innovations comprised 7.5% of all the sector's enterprises that responded to the survey. Enterprises with 'process only' innovations comprised 15.1% of all the enterprises in the sector while 36.6% had both product and process innovations.

Table 5.3.1 Innovation rate: Percentage innovation for innovation-active and non-innovation-active enterprises in the transport, storage and communication sector enterprises 2010-2012

Transport, Storage and Communication	Total (%)	Large	*M, S, VS
Enterprises with innovation activity	61.3	61.3	61.5
Enterprises with successful innovation	59.1	60.0	53.8
Product only innovators	7.5	7.5	7.7
Process only innovators	15.1	16.3	7.7
Product and process innovators	36.6	36.3	38.5
Enterprises with abandoned and/or ongoing product innovation activities only	0.0	0.0	0.0
Enterprises with abandoned and/or ongoing process innovation activities only	1.1	0.0	7.7
Enterprises with abandoned and/or ongoing product and process innovation activities only	1.1	1.3	0.0
Enterprises without innovation activity	38.7	38.8	38.5

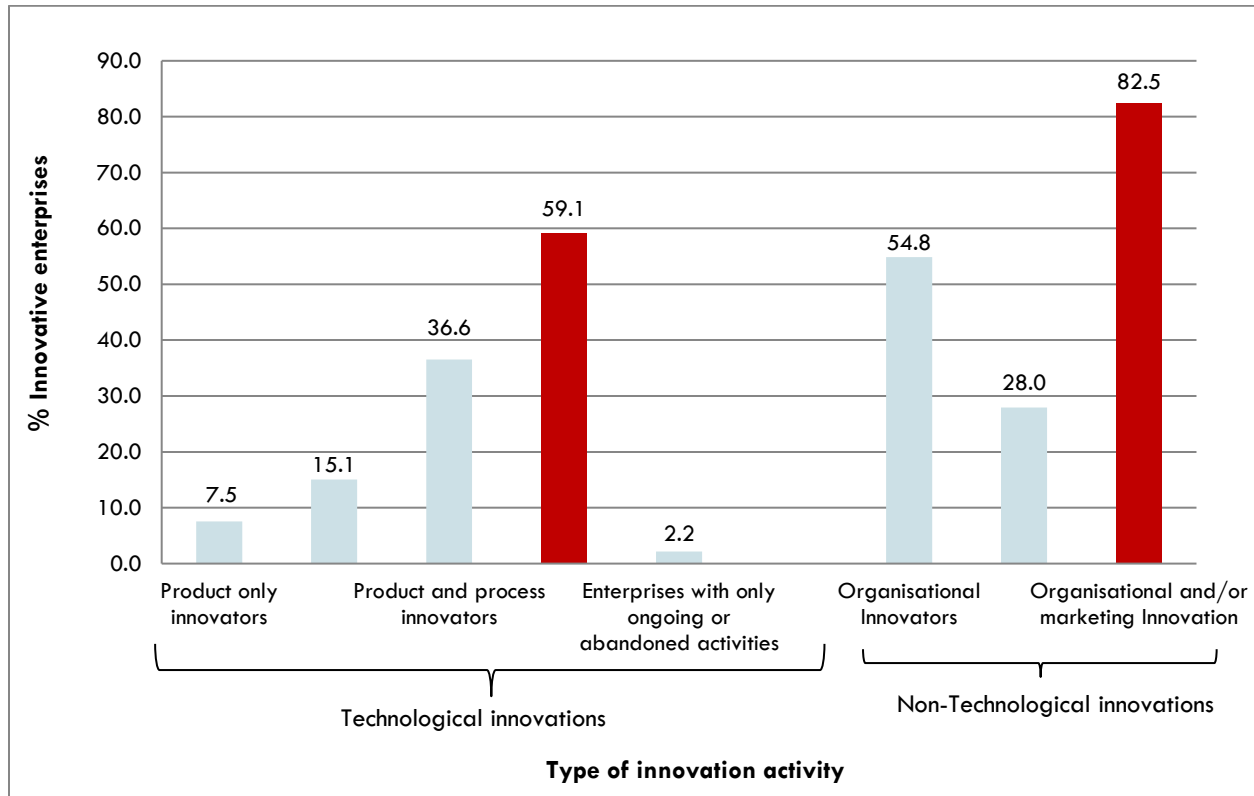
Source: Appendix 4 Tables A1.1 and A1.2 and Appendix 5 B1.1 and B1.2

*Numbers do not always add up because of rounding effects

5.3.2 Types of Technological Innovation

Figure 5.3.1 shows the rate of innovation for different categories. Most enterprises had both product and process innovations (36.6%), whilst only 2.2% of enterprises had only ongoing or abandoned activities. Enterprises that had process only innovations accounted for more innovators (15.1%) than those with product only innovations (7.5%). Organisational innovations were found in 54.8 % of enterprises and 28% of enterprises were marketing innovators. The proportion of enterprises that reported successful innovations in this sector was 59.1%, which includes all technological innovations.

Figure 5.3.1 Innovation rate by type of innovation in the transport, storage and communication sector, 2010-2012*



Sources: Appendix 4 Table A1.1 and A20

5.3.2.1 Product (goods or services) innovation

The majority of product innovators had introduced product innovations that were either both new to the market and to the firm (34.1%), new to the firm (31.7%), or new to the market (22.0%) (Table 5.3.2). Large enterprises exhibited a similar pattern with product innovators principally reporting that they had introduced products that were both new to the firm and new to the market (37.1%), new to the market (25.7%) or new to the firm (22.9%), . The majority (83.3%) of the enterprises in the combined sizes of medium, small and very small had introduced products that were new to the firm.

[Table 5.3.2 Product \(goods and services\) innovators: percentage of enterprises in the financial intermediation sector by product type and size of enterprises, 2012 \(year specific question\)](#)

All Product Innovators	Total (%)	Large (%)	*M, S, VS (%)
All product innovators	100.0	100.0	100.0
Product innovations new to the market	22.0	25.7	0.0
Product innovations new to the firm	31.7	22.9	83.3
Product innovations both new to the market and/or new to the firm	34.1	37.1	16.7
Products unchanged or only marginally modified	12.2	14.3	0.0

Source: Appendix 4 Table A5.3, A5.4, B5.3 and B5.4

Table 5.3.3 shows that 5.8% of the turnover of product innovators in 2012 was generated by innovations that were new to the market, representing turnover of about R324 billion.

[Table 5.3.3 Product Innovators: proportion of turnover attributed to types of product innovations in the transport, storage and communication sector, 2012 \(year specific question\)](#)

All Product innovators	Turnover generated (R millions)	Percentage turnover generated (%)
Product innovations new to the market	324 614	5.8
Product innovations new to the firm	515 986	9.2
Products unchanged or only marginally modified	4 779 160	85.0
Total (All product innovators)	5 619 761	100

Source: Appendix 4 Table A5.1

Table 5.3.4 shows that medium, small and very small enterprises generated the highest percentage of turnover based on product innovations that were new to the market (20.0%), and product innovations that were new to the firm were also highest in large enterprises (9.2%). A total of 5.8% of turnover was generated by the sale of products that were new to the enterprise concerned but not new to the market. Overall, large enterprises generated the highest turnover from product innovations (45.5.0%)

[Table 5.3.4 Product innovators: proportion of turnover in 2012 attributed to the types of products, by size of enterprises \(%\) in the transport, storage and communication sector](#)

Size Class	Large (%)	*M, S, VS (%)
Type of Product Innovation		
Product innovations new to the market	5.7	20.0
Product innovations new to the firm	9.2	0.0
Products unchanged or only marginally modified	85.1	80.0
Total (%) of turnover produced by product innovators)	99.6	0.4

Source: Appendix 4 Table A5.1

Table 5.3.5 shows that product innovations were developed mainly by the enterprise itself (43.9%). Collaboration with other enterprises or institution was the source of development of product innovations for 34.1% of innovators whilst 12.2% of innovators adapted and modified goods or services by other institutions. A total of 7.3% of innovators relied on other enterprises to develop their innovations.

[Table 5.3.5 Responsibility for the development of product innovations in innovative enterprises in the transport, storage and communication sector, 2010-2012](#)

Product innovations developed mainly by:	Number of enterprises	Percentage of enterprises (%)
Mainly own enterprise	18	43.9
Own enterprise in collaboration with other enterprises or institutions	14	34.1
Adapting and Modifying goods or services developed by other institutions	5	12.2
Other enterprises or institution	3	7.3
Enterprises which did not respond to the question	1	2.4
Total	41	100

Source: Appendix 4 Table A6

Table 5.3.6 shows that of the 41 product innovative enterprises, 47.4% reported that their innovations originated in South Africa. Only 22.8% reported that their innovations were developed abroad.

[Table 5.3.6 Origin of product innovations for enterprises in the transport, storage and communication sector, 2010-2012](#)

Origin (%)	Number	%
All product innovative enterprises (number and percentage of enterprises)	41	100
South Africa	27	47.4
Abroad	13	22.8
Non-responsive enterprises	1	1.8

Source: Appendix 4 Table A7

5.3.2.2 Process innovation

New or significantly improved supporting activities for processes were reported by 63.2% of process innovators; including maintenance and operating systems for purchasing, accounting or computing (Table 5.3.7). This was followed by improvement of delivery and distribution methods (56.1%). Methods of manufacturing or production were reported by 38.6% of enterprises.

[Table 5.3.7 Enterprises in the transport, storage and communication sector involved in specific process innovations, 2010-2012](#)

Process innovation	Number of enterprises	%
New or significantly improved methods of manufacturing or producing goods or services	22	38.6
New or significantly improved logistics, delivery or distribution methods for inputs, goods or services	32	56.1
New or significantly improved supporting activities for processes such as maintenance and operating systems for purchasing, accounting or computing	36	63.2

Source: Appendix 4 Table A23

Process innovations were mostly developed in-house: 47.9% of enterprises reported that innovations were mainly developed by their own enterprise. Some 29.2% of enterprises developed process innovations in

collaboration with other enterprises or institutions (Table 5.3.8). Only 8.3% of enterprises relied mainly on other enterprises or institutions for the development of process innovations.

[Table 5.3.8 Responsibility for the development of process innovations in the transport, storage and communication sector, 2010-2012](#)

Process innovators	Number of enterprises	%
Mainly own enterprise	23	47.9
Own enterprise in collaboration with other enterprises or institutions	14	29.2
Adapting or modifying process developed by other enterprises or institutions	4	8.3
Mainly other enterprises or institutions	7	14.6
Total	48	100.0

Source: Appendix 4 Table A24

The majority of process innovations (57.9%) were developed within South Africa (Table 5.3.9) while 26.3% of process innovations originated mainly from abroad.

[Table 5.3.9 Origin of process innovation in the transport, storage and communication sector, 2010-2012](#)

Process Innovators	Number of enterprises	%
South Africa	33	57.9
Abroad	15	26.3
Enterprises which did not respond to the question	0	0.0
Total	48	100.0

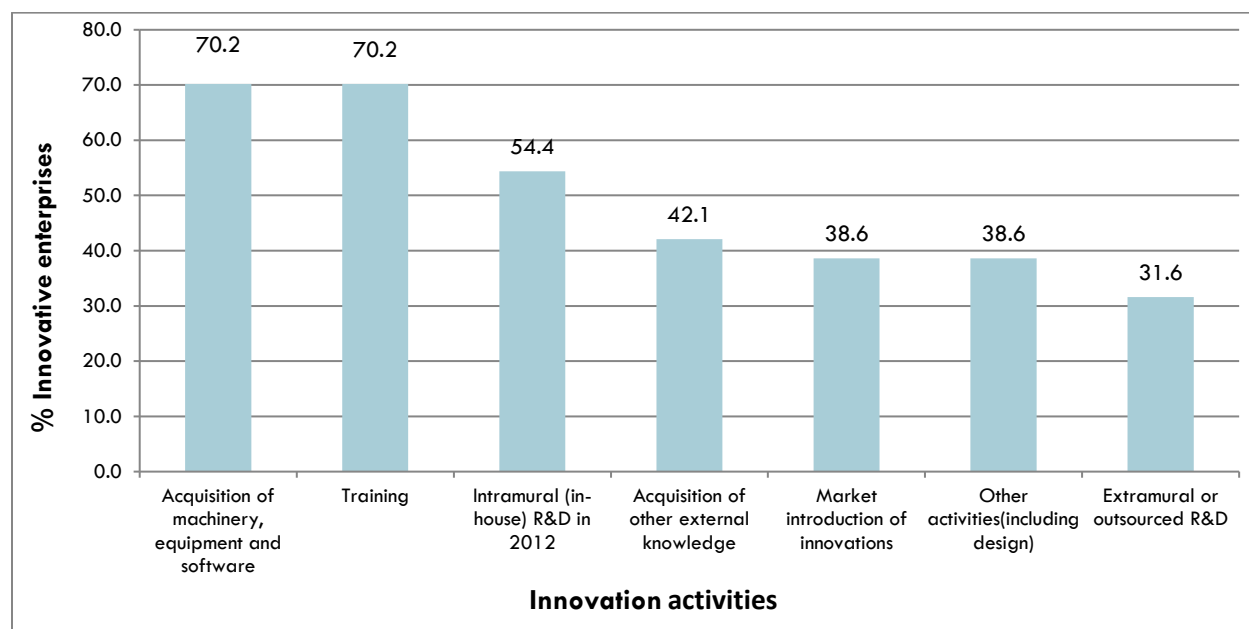
Source: Appendix 4 Table A25

5.3.3 Innovation expenditures and financial support for innovation activities

5.3.3.1 Innovation Expenditure

Figure 5.3.2 shows that most innovative enterprises were involved in intramural R&D activities as well as Training (both 70.2%) as part of their innovation activities. Intramural R&D was the second most important innovation activity (54.4%), followed by the acquisition of other external knowledge (42.1%). Extramural R&D was and innovation activity for only 31.6% of innovators.

Figure 5.3.2 Types of innovation activities among enterprises in the transport, storage and communication sector, 2010-2012



Source: Appendix 4 Table A4

Table 5.3.10 indicates that the bulk of innovation expenditure was devoted to the acquisition of machinery, equipment and software (87.1% of total innovation expenditure). Intramural R&D accounted for 10.8% of the total innovation expenditure.

Table 5.3.10 Enterprises in the transport, storage and communication sector that declared innovation expenditure by sector, 2012 (year-specific question)

Type of innovation expenditure	Total R millions	% of total expenditure of all enterprises	Large R millions	*M, S, VSR millions
Intramural (in-house) R&D	4 551	10.8	4 551	0
Extramural or outsourced R&D	279	0.7	233	46
Acquisition of machinery, equipment and software	36 634	87.1	36 582	52
Acquisition of other external knowledge	616	1.5	256	360
Total	42 081	100.0	41 623	458

Source: Appendix 4 Table A4.1

5.3.3.2 Innovation and R&D

Comparing the number of innovating enterprises with innovation activity and those with successful innovations to the number that did R&D is an important and essential undertaking developing innovation policy. The results of this analysis for the financial intermediation sector are summarized in Table 5.3.11. The results show that more enterprises innovated (96.5%), than did R&D (54.4%), an indication that, apart from using R&D, enterprises used other methods to implement their innovations. Only 54.4% of successful innovators were performed intramural R&D.

Table 5.3.11 Enterprises with successful innovations that performed R&D, 2012

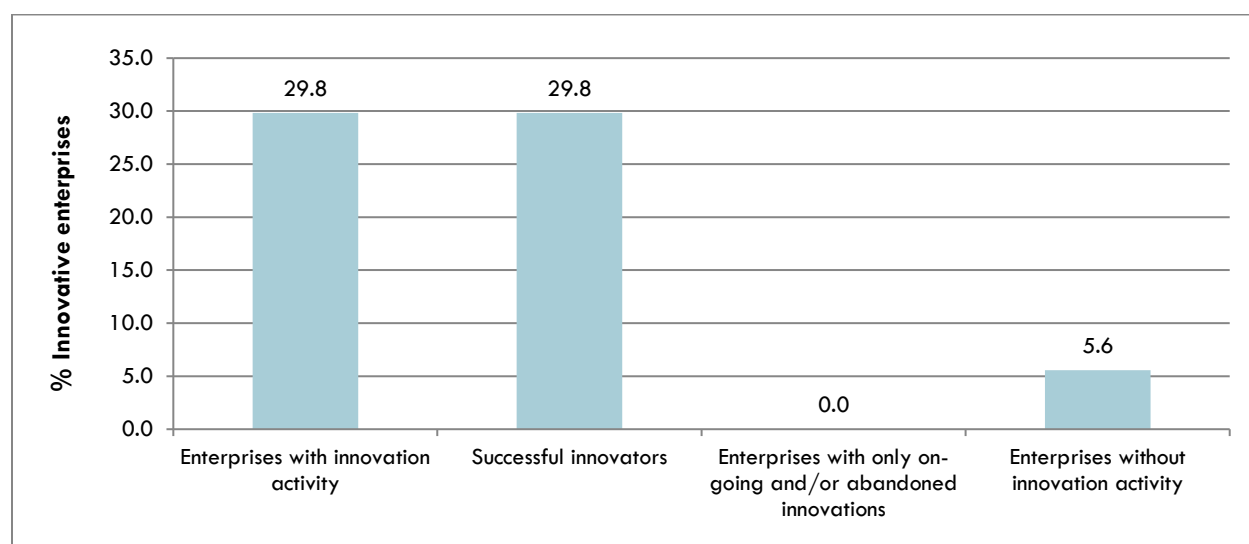
	Number of enterprises	%
Enterprises with successful innovations	55	96.5
Enterprises that engaged in intramural R&D	31	54.4
Enterprises with successful innovations and engaged in intramural R&D	31	54.4

Source: Appendix 4 Table A4.3

5.3.3.3 Financial support for innovation activities

Respondents were asked if they were aware that government offers financial support for innovation. Figure 5.3.3 indicates that 29.8% of successful innovators were aware of government funding opportunities. Only 5.6% of non-innovation-active enterprises were aware of government financial support for innovation.

Figure 5.3.3 Transport, storage and communication sector awareness of government financial support for innovation, 2012



Source: Appendix 4 Table A10.1

Table 5.3.12 shows that most of the funding was reported as coming from National Government came from the Department of Trade and Industry (dti) (1.8% of enterprises), while no enterprises reported receiving any funding from the Department of Science and Technology (DST). National funding agencies such as the Industrial Development Corporation (IDC) contributed financially to 1.8% of innovation-active enterprises. At least another 1.8% of innovation-active enterprises received funding from foreign government or public sources.

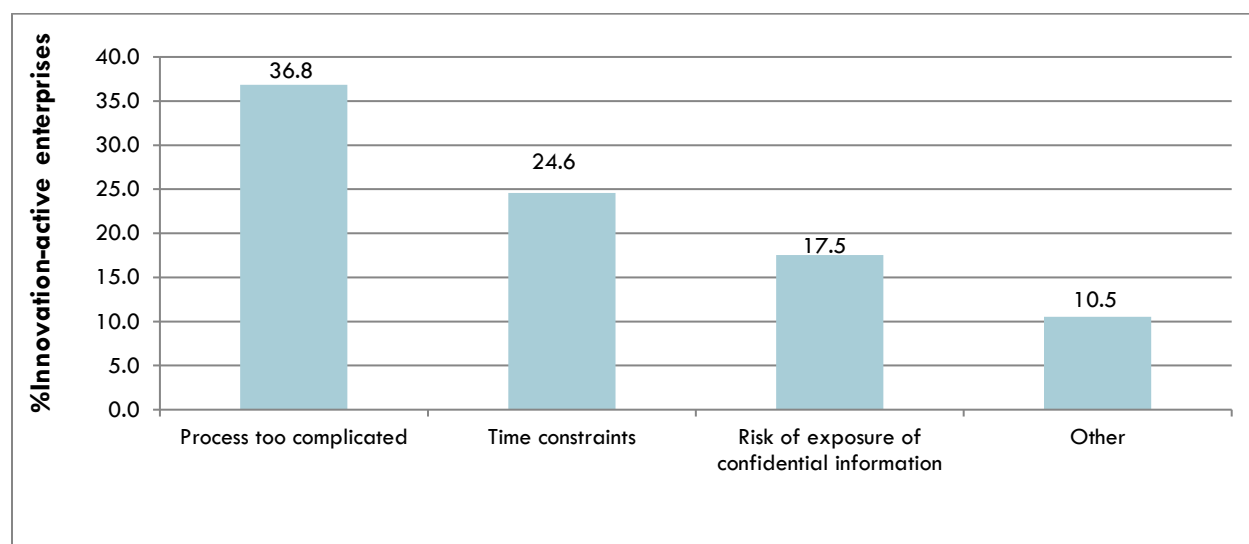
Table 5.3.12 Number and percentage of innovation-active enterprises in the transport, storage and communication sector that received financial support for innovation activities from government sources, 2010-2012

Source of financial support	Number of enterprises	Percentage of enterprises (%)
National government:		
Department of Science and Technology (DST)	0	0.0
Department of Trade and Industry (dti)	1	1.8
Other	1	1.8
National funding agencies:		
National Research Foundation (NRF)	0	0.0
Medical Research Council (MRC)	0	0.0
Industrial Development Corporation (IDC)	1	1.8
Technology Innovation Agency (TIA)	0	0.0
Other	3	5.3
Foreign government/public sources	1	1.8

Source: Appendix 4 Table A18

Figure 5.2.5 indicates that 36.8% of innovation active enterprises felt that the process to access government funding was too complicated and also very time consuming (24.6%). A number of enterprises (17.5%) felt that there was too big a risk of exposure of their confidential information and therefore they did not access government funds.

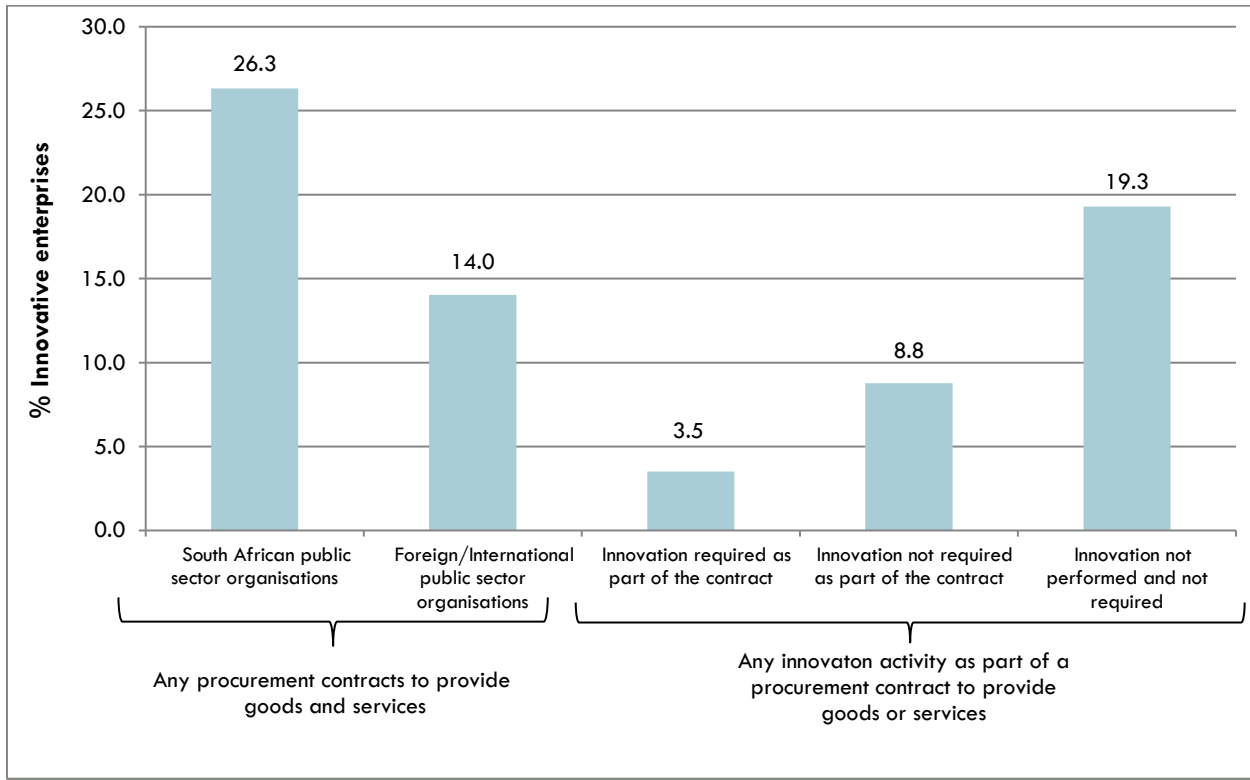
Figure 5.3.4 Reasons why innovation-active enterprises in the transport, storage and communication sector did not access government funds



Source: Appendix 4 Table A10.3

During the period 2010-2012, 26.3 % of innovation-active enterprises had procurement contracts from South African public sector organization to provide goods and service and 14.0% had contracts from Foreign/International public sector organisations (Figure 5.3.5). For 3.5% of innovation-active enterprises innovation was required as part of the contract whilst for 8.8% innovation was not a requirement. For 19.3% of innovation-active enterprises, innovation was not a requirement and was not performed.

Figure 5.3.5 Innovation-active enterprises in the transport, storage and communication sector that had public sector procurement contracts to provide goods and services, 2010-2012

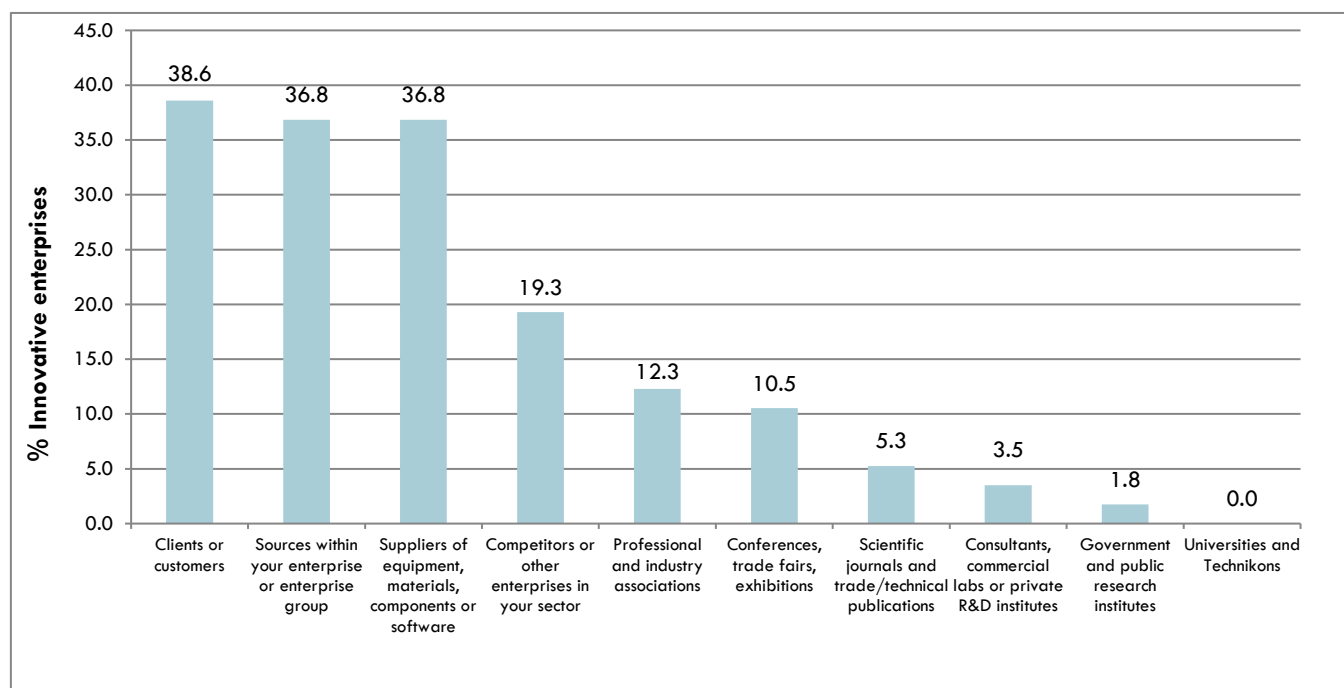


Source: Appendix 4 Table A10.4

5.3.4 Sources of information and co-operation partners for innovation activities

Almost 37% of all innovation-active enterprises rated sources of information within the enterprise as well as their suppliers as highly important for innovation activities (Figure 5.3.6). Clients and customers as external market sources were rated as highly important by 38.6% of innovation-active enterprises, followed by competitors (19.3%), professional associations (12.3%) and conferences, trade fairs and exhibitions (10.5%). Universities and technikons was not reported as a source of information and government was a minor source of information with only 1.8% of enterprises rating them as highly important

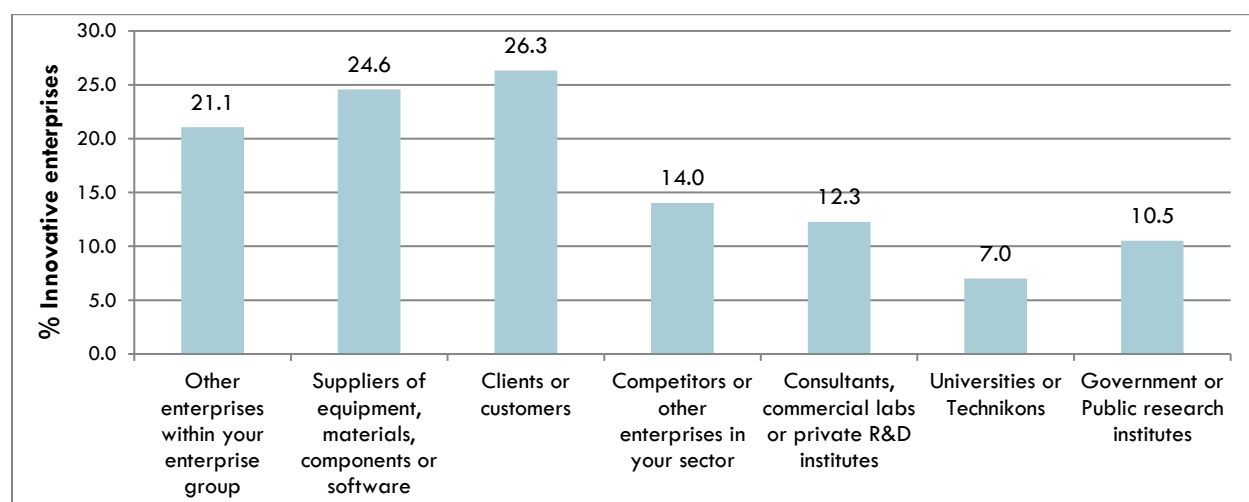
Figure 5.3.6 Sources of information for innovation rated as "highly important" by innovation-active enterprises in the transport, storage and communication sector



Sources: Appendix 4 Table A11.1 and A11.

Figure 5.3.7 shows that the most important collaborative partnerships for innovation were between enterprises and their clients or customers, which comprised 26.3% of collaborative partnerships. Collaboration efforts between enterprises and their suppliers were at 24.6%. A total of 21.1% of enterprises reported collaborative partnerships with other enterprises within their own group. Only 14.0% of enterprises collaborated with their competitors. The least number of enterprises collaborated with universities and government (7.0% and 10.5% respectively).

Figure 5.3.7 Innovative collaborative partnerships by type of partner of enterprises in the transport, storage and communication sector, 2010-2012



Source: Appendix 4 Table A21.1

5.3.5 Effects of innovation

'Improved quality of goods and services' was cited as having a highly important effect on innovation by 28.1% of innovation-active enterprises (Table 5.3.13). Increasing the range of goods and services was also an important outcome for 24.6% of while 'entering new markets or increasing market share' was cited as a highly important outcome by 17.5% of innovation-active enterprises. 'Increased capacity of production or service provision' was cited as the most important effect of process innovation by 33.3% of innovation-active enterprises, followed by 'Improved flexibility of production or service provision' (31.6%). Other highly important effects of innovation cited were 'meeting government regulatory requirements' (cited by 24.6% of innovators) and 'reduced environmental impacts or improved health and safety' (12.3%).

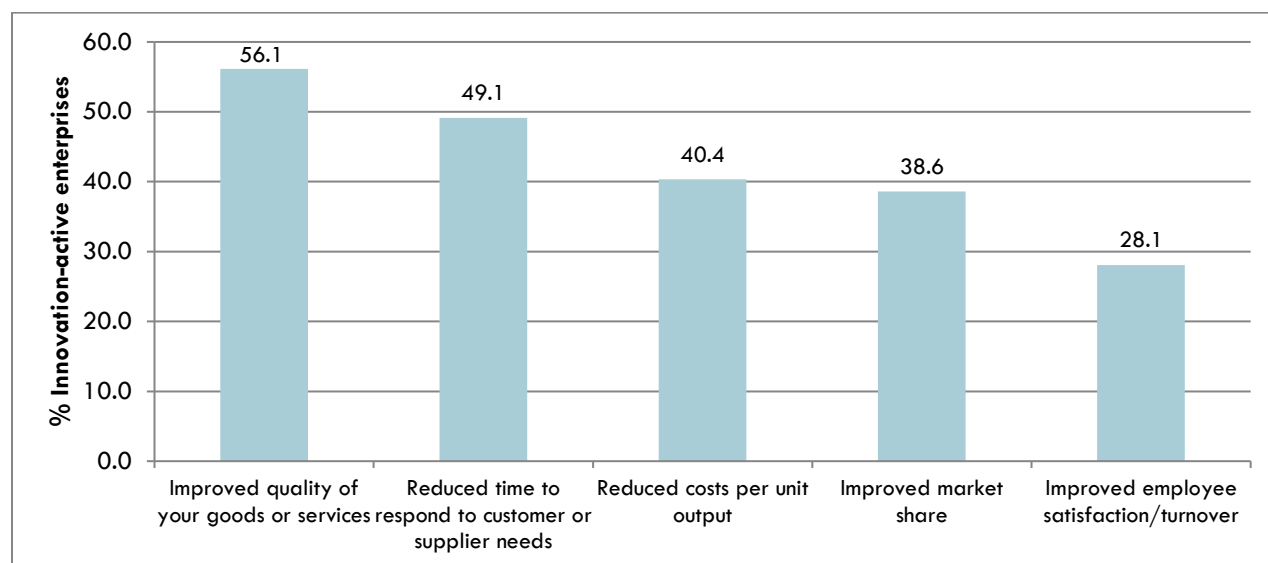
Table 5.3.13 Highly important effects of innovation on outcomes for innovation-active enterprises in the transport, storage and communication sector, 2010-2012

Effects of innovation	Number of enterprises	%
Product outcomes		
Increased range of goods and services	14	24.6
Entered new markets or increased market share	10	17.5
Improved quality of goods or services	16	28.1
Process outcomes		
Improved flexibility of production or service provision	18	31.6
Increased capacity of production or service provision	19	33.3
Reduced labour costs per unit output	12	21.1
Reduced materials and energy per unit output	9	15.8
Other outcomes		
Reduced environmental impacts or improved health and safety	7	12.3
Met Governmental regulatory requirements	14	24.6

Source: Appendix 4 Table A8.1 and A8.2

Enterprises that had introduced organisational innovations principally rated 'Improved quality of goods and services' (56.1%) as a 'highly important effect of innovation (Figure 5.3.8). 'Reduced time to respond to customer or supplier needs' was also 'highly important to 49.1% of these enterprises. Reducing the cost per unit output was 'highly important' for 40.4% of enterprises, while 'Improved market share' was rated as 'highly important' by 38.6% of innovation active enterprises.

[Figure 5.3.8 Innovation-active enterprises in the transport, storage and communication sector that introduced organisational innovation and rated various results as highly important, 2010-2012](#)



Source: Appendix 4 Table A17

5.3.6 Factors hampering innovation

Cost and knowledge factors were mostly cited by innovation-active enterprises as highly important factors that hampered innovation, while reasons not to innovate were the most predominant among non-innovation-active enterprises (Table 5.3.14). The principally cited factor among cost factors was 'lack of funds within the enterprise or group' (22.8% for innovation-active enterprises and 2.8% for non-innovation-active enterprises). This was followed by 'innovation costs too high' for innovation-active enterprises (19.3%). Among knowledge factors, the most predominant for innovation-active enterprises was 'lack of qualified personnel' (14.0%), followed by 'difficulty in finding cooperation partners' (10.5%), while 'lack of information on technology' was cited by 2.8% of non-innovation-active enterprises with none of the other knowledge factors cited by this category of enterprises as hampering their innovations. Non-innovation-active enterprises principally cited 'no need due to prior innovation' (16.7%) as the reason not to innovate.

[Table 5.3.14 Highly important factors that hampered innovation activities of innovation-active and non-innovation-active enterprises in the transport, storage and communication sector, 2010-2012](#)

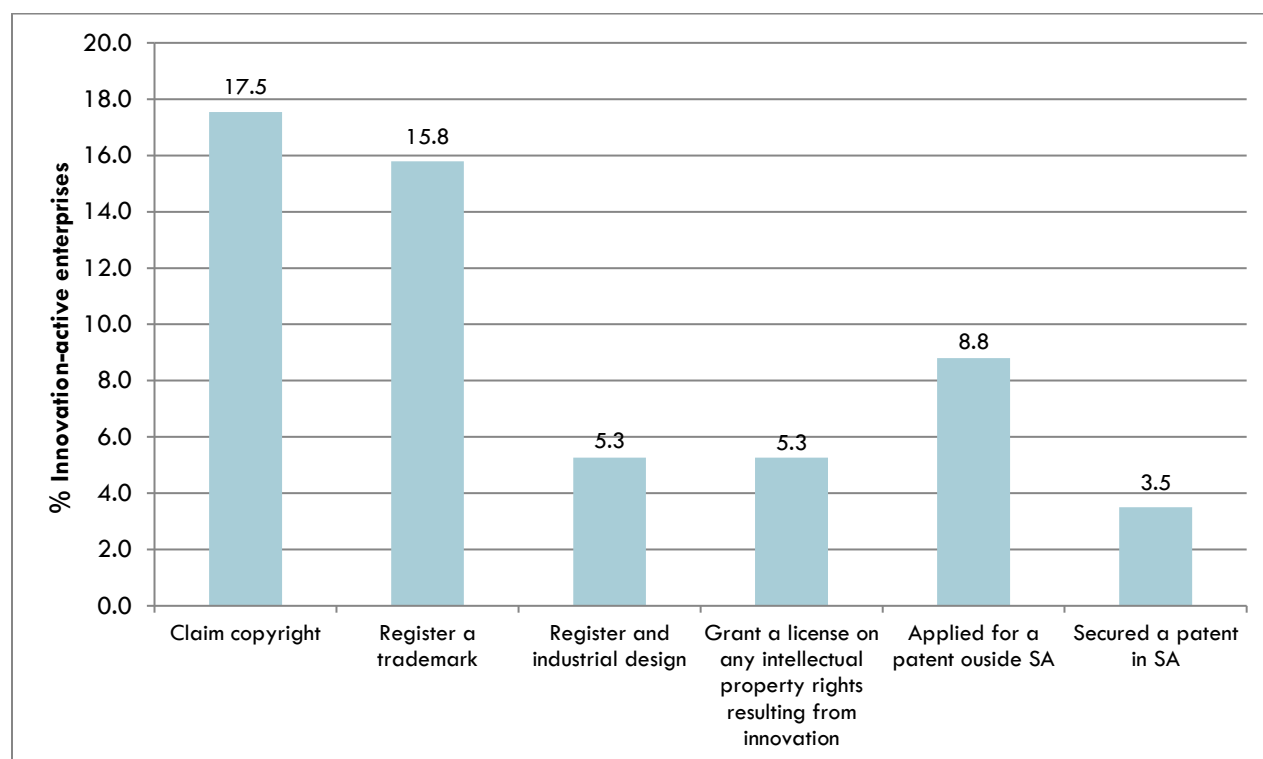
Percentage of enterprises	Industry	
	Innovation-active	Non-Innovation-active
Cost factors		
Lack of funds within enterprise or group	22.8	2.8
Lack of finance from sources outside your enterprise	10.5	0.0
Innovation costs too high	19.3	0.0
Knowledge factors		
Lack of qualified personnel	14.0	0.0
Lack of information on technology	7.0	2.8
Lack of information of markets	1.8	0.0
Difficulty in finding cooperation partners	10.5	0.0
Market factors		
Market dominated by established enterprises	19.3	5.6
Uncertain demand for innovative goods or services	12.3	2.8
Reasons not to innovate		
No need due to prior innovations	5.3	16.7
No need because of no demand for innovations	5.3	13.9

Sources: Appendix 4 Table A 12.2, and A12.4

5.3.7 Intellectual property rights

At least 17.5% of innovation-active enterprises claimed copyright during the reference period 2010 – 2012. A trademark was registered by 15.8% of innovation-active enterprises whilst 5.3% registered an industrial design (Figure 5.3.9). Only 2.2% of innovators secured a patent in South Africa and 5.4% applied for a patent outside of South Africa.

Figure 5.3.9 Innovation-active transport, storage and communication sector enterprises that made use of intellectual property rights (IPR), 2010-2012



Sources: Appendix 4 Table A14 and A15

5.3.8 Innovation with environmental benefits

A total number of 65 enterprises reported having introduced product, process, organisational and marketing innovation with environmental benefits (Table 5.3.15). With regards to enterprises having environmental benefits from the production of goods or services within their enterprise, about 26% of innovators reduced energy use per unit out whilst at least 23% reported recycled waste, water or materials. Replacing materials with less polluting or hazardous substitutes was reported by 18.5% of enterprises while reducing the carbon footprint was reported by 16.9% of enterprises. Enterprises were also asked to report on their environmental benefits from the after sales use of a good or service by the end user. Almost 16 % of enterprises reported reduced energy usage, 18.5% reported improved recycling of product after use and 9.2% reported reduced air, water, soil and noise pollution.

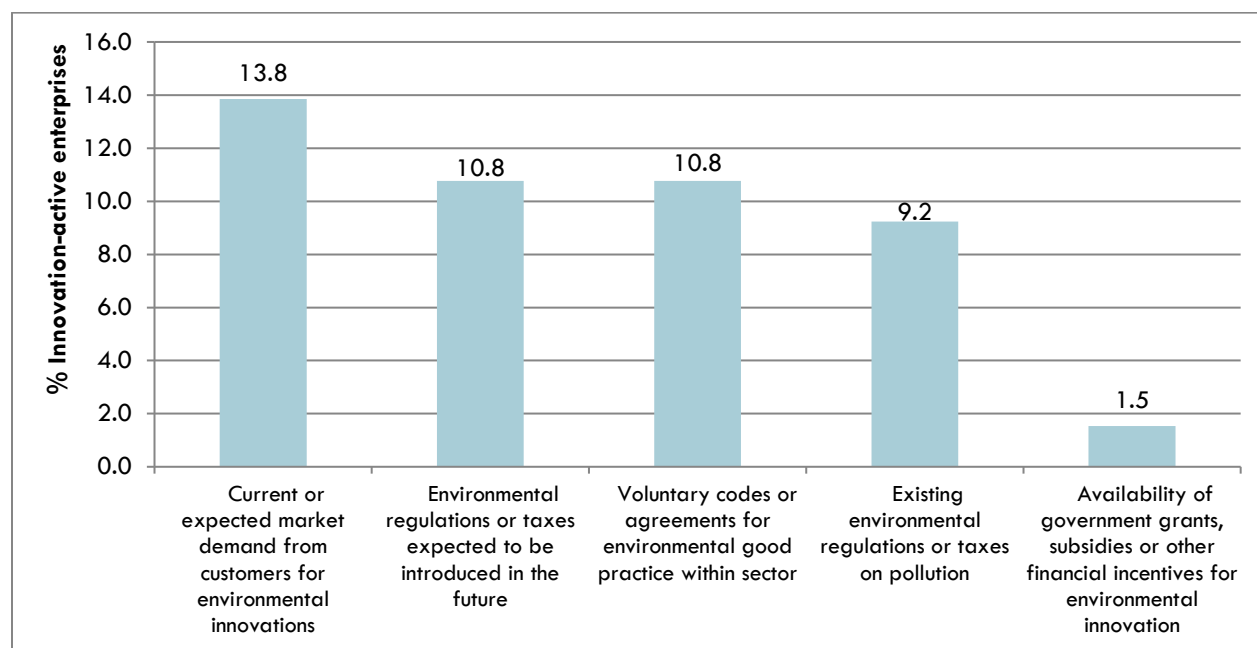
Table 5.3.15 Enterprises with innovation activity in the transport, storage and communication sector that introduced innovations with environmental benefits, 2010-2012

Environmental Benefit	Number of enterprises	Percentage of enterprises (%)
Enterprises that introduced product, process, organisational or marketing innovation	65	100.0
Enterprises that had environmental benefits from the production of goods or services:		
Reduced material use per unit output	11	16.9
Reduced energy use per unit output	17	26.2
Reduced carbon dioxide 'footprint' (total carbon dioxide production) by the enterprise	11	16.9
Replaced materials with less polluting or hazardous substitutes	12	18.5
Reduced soil, water, noise, or air pollution	10	15.4
Recycled waste, water or materials	15	23.1
Enterprises that had environmental benefits from the after sales of a good or service:		
Reduced energy use	10	15.4
Reduced air, water, soil or noise pollution	6	9.2
Improved recycling of product after use	12	18.5

Source: Appendix 4 Table A29

Figure 5.3.10 shows that 13.8% of enterprises introduced an environmental innovation in response to environmental benefits from the production of goods or services based on the current or expected demand from their customer for environment innovations. Environmental innovations were produced by 10.8% of enterprises in response to voluntary codes or agreements for environmental good practice within their sector. Only 1.5% of enterprises responded with the introduction of an environmental innovation because of availability of government grants, subsidies or other financial incentives for environmental innovations. Enterprises also responded to having procedures in place to regularly identify and reduce the enterprise's environmental impacts, such as environmental audits, setting environmental performance goals etc., and 40.0% of enterprises responded positively to this question (Table 5.3.16).

Figure 5.3. 10 Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods



Source: Appendix 4 Table A30

Table 5.3.16 Procedures to identify and reduce environmental impacts

	Total	Large	M,S,VS
Number of innovation-active finance enterprises that had procedures in place to regularly identify and reduce their environmental impact	26	26	0
Percentage of innovation-active finance enterprises (%) that had procedures in place to regularly identify and reduce their environmental impact	40.0	46.4	0.0

Source: Appendix 4 Table A31 and Appendix 5 Table B31

5.3.9 Non-technological innovation activities

5.3.9.1 Organisational and marketing innovation

Table 5.3.17 shows that 54.8% of innovation-active enterprises had organisational innovations whilst 28.0% had marketing innovations. More than 82% of innovation-active enterprises had organisation and/or marketing innovations. Only 10.5 of ‘product only’ innovators had organisational and/or marketing innovations and 21.1% of ‘process only’ innovators had organisational and/or marketing innovations. A total of 50.9% of product and process innovation-active enterprises also had organisational and/or marketing innovations.

Of the non-technological innovators, 22.2 % had ‘organisational only’ innovations with only 2.8% reporting ‘marketing only’ innovations. Organisational **or** marketing activities were reported by 27.8% of non-technological innovators and only 2.8% reported having organisation **and** marketing innovation.

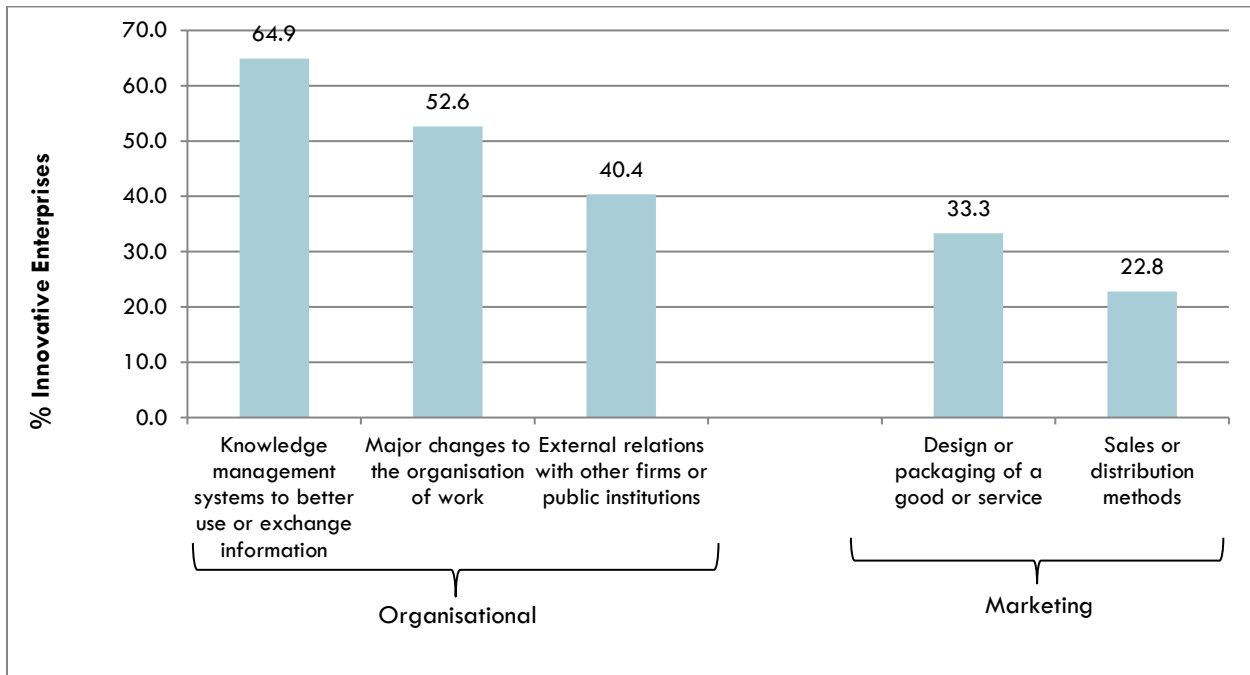
Table 5.3.17 Enterprises with organisational and/or marketing innovations in the transport, storage and communication sector, 2010-2012

Innovation type	Number of enterprises	%
Enterprises with organisational innovation	51	54.8
Enterprises with marketing innovation	26	28.0
Innovative enterprises with organisational and/or marketing Innovation	47	82.5
Product Only Innovative enterprises	6	10.5
Process Only Innovative enterprises	12	21.1
Product and Process Innovative	29	50.9
Non-Innovative enterprises with:		
Organisational innovation only	8	22.2
Marketing innovation only	1	2.8
Organisational or marketing Innovation	10	27.8
Organisational and marketing Innovation	1	2.8

Source: Appendix 4 Table A20

Figure 5.3.11 provides more detail on the organisational and marketing innovations undertaken by innovation-active enterprises. More enterprises reported organisational innovations activities than marketing innovation activities. Around 65% of enterprises reported involved in creating ‘knowledge management systems to better use or exchange information’ whilst almost 53% on enterprises reported that they made ‘major changes to the organisation of work’. The ‘design or packaging of goods or services .and changes in ‘sales distribution methods’ were reported by 33.3% and 22.8% of marketing innovators respectively.

Figure 5.3.11 Percentage of innovation-active enterprises in the transport, storage and communication sector that introduced organisational or marketing innovation, 2010-2012



Source: Appendix 4 Table A 13.2

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Innovation is widely recognized as one of the key drivers of sustained economic development and growth. However, even though the concept of R&D measurement is easy to understand, the same cannot be said for innovation, as it is complex, dynamic and non-linear, making its measurement a challenging and continuous learning process. Although the findings of the analysis in the current report are not at national level, they can assist policy makers with information on how to further stimulate growth through innovation in the selected services sectors (WRT; FI; TSC). The following conclusions were made.

6.1 Innovation is pervasive

An innovation is an implementation by putting on the market a new or significantly improved product (goods or services) or process or a new organizational or marketing method. In all the selected services sectors (WRT; FI; TSC), the majority of enterprises introduced product, process, organisational or marketing innovations. The majority of enterprises had technological (product and/or process) innovation activity including abandoned and/or ongoing innovation activities (innovation active). The proportions of innovation-active enterprises that implemented product and process innovations were high. Of all enterprises, 43.0%, 69.2% and 59.1% for WRT, FI, and TSC, respectively, had successful technological innovations (i.e., did not have only abandoned and/or ongoing innovation activities), while 40.8%, 61.7% and 54.8% introduced organizational innovations, and 30.2%, 40.2% and 28.0% introduced marketing innovations.

6.2 Some innovations did not succeed

A total of 2.8, 4.7 and 2.2% of all enterprises that had innovation activity (with product and/or process innovations) for WRT, FI, and TSC, respectively, had abandoned and/or ongoing innovation activities only. It should be noted, however, that innovations take considerable time to implement and some may have started towards the end of the reference period.

6.3 Acquiring machinery and intramural R&D accounted for the largest share of expenditure on innovation

The innovation activities that took the largest proportions of expenditure on innovation were intramural R&D (95.5%) for the WRT sector, extramural R&D (51.0%) followed by intramural R&D (23.0%) for FI, and acquiring machinery, equipment and software (87.1%) for TSC. This could be indicative of the commitment to innovation.

6.4 A significant number of enterprises undertake R&D to innovate

An important finding for the development of innovation policy is that more enterprises innovated than did intramural R&D. More specifically, 93.9%, 93.7% and 96.5% of enterprises with innovation activity in WRT, FI, and TSC had successful innovations versus 51.2%, 77.2% and 54.4% that performed intramural

R&D. This could indicate that some enterprises had alternative ways of implementing innovations than through R&D, which is important for developing innovation policy.

Innovation-active and non-innovation-active enterprises were aware of government funding for innovation but only a few manage to receive such funding: The proportions of enterprises with innovation activity (46.3%, 50.6% and 29.8% for WRT, FI, and TSC, respectively) and those with successful innovations (43.9%, 46.8% and 29.8%) that were aware that government funds innovation activities were much higher than the corresponding proportion of enterprises with no innovation activity (2.4%, 3.8% and 0.0%) and those with abandoned and/or ongoing innovation activities (4.1%, 7.1% and 5.6%). The government should sharpen its awareness campaign programmes to ensure that the entire business community is well aware of such funding.

For the WRT sectors and the FI sector, greater proportions of enterprises reported that they had received government funding for innovations from the *dti* (2.4% and 10.1%, respectively) and the DST (2.4% and 6.3%) than other government departments (1.2% and 7.6%). Not many enterprises in the TSC sector received government funding for their innovations (each 1.8% of enterprises from both DST and the *dti*)

6.5 To some extent, enterprises find an incentive to innovate, from procurement contracts to provide goods or services for the South African public sector

Although there were considerable proportions (12.2%, 26.6% and 14.0% for WRT, FI, and TSC, respectively) of enterprises that had procurement contracts to provide goods or services for international public sector organisations, larger proportions (26.8%, 44.3% and 26.3%) of enterprises had such contracts for South African public sector organisations. Some of these enterprises undertook innovation as part of a procurement contract or voluntarily (7.3%, 13.9% and 3.5%), larger proportions (18.3%, 26.6% and 19.3%) did not undertake innovation activities as no innovation was required.

6.6 Innovation is a connected activity

Aside from the firm or enterprise group itself (46.3%, 68.4% and 36.8% for WRT, FI, and TSC, respectively), ideas about innovation were principally sourced from clients or customers (56.1%, 62.0% and 38.6%) followed by suppliers of equipment, materials, components and software (39.0%, 39.2% and 36.8%). Institutional sources, such as universities or higher education institutions (7.3%, 13.9% and 0.0%), and government or public research institutions (4.9%, 10.1% and 1.8%), ranked low. This pattern held for all the world's geographic regions with higher proportions of enterprises that cooperated with partners from South Africa and Europe than the rest of the world. Therefore, improving the ability for bidirectional exchange of information and the ability of higher education institutions and public research institutions to engage with the private sector, entrepreneurs and communities become important policy objectives (Kruss, 2012; Kruss et al, 2013).

6.7 Innovation has impact

In terms of product outcomes, the principally perceive benefit of innovation was 'increased range of products (goods or services)' (35.4% and 46.8% for WRT and FI, respectively), followed by 'improved quality of products' (30.5% and 43.0%). The same outcomes of innovation were the principal product outcomes for the TSC sector, though the dominance in the rating was reversed between these two outcomes (24.6% for increased range of products and 28.1% for 'improved quality of goods'). Among process outcomes, the most prominent was 'improved flexibility of production or service provision' (23.2% and 22.8% for WRT and FI, respectively), followed by 'increased capacity of production or service provision' (20.7% and 20.3). The same outcomes were the most dominant among processes outcomes for TSC, except

that the dominance was reversed between these two outcomes (31,6% for 'improved flexibility of production or service provision' and 33.3% 'increased capacity of production or service provision'). Among other outcome, 'met governmental regulatory requirements' was the principally perceived benefit of innovation (23.2%, 20.3% and 24.6% for WRT, FI, and TSC).

6.8 There are barriers to innovation

All cost factors were prominent hampers of innovation, particularly among enterprises with innovation activity. However, 'lack of qualified personnel' dominated among knowledge factors, with 19.5%, 27.8% and 14.0% of enterprises with innovation activity in the WRT, FI, and TSC, respectively, citing this as a highly important hampering factor of innovation. Similarly, 'lack of qualified personnel' was the most prominent knowledge factor among enterprise without innovation activity for the sectors WRT (13.4%) and TSC (10.7%). Among market factors, 'market dominated by established enterprises' was principally cited by both enterprises with innovation activity and enterprises without innovation activity, except for enterprises with innovation activity in the FI sector where 'uncertain demand for innovative goods and services' was cited by a higher proportion of enterprises (20.3%). With respect to reasons not to innovate, both the reasons on which enterprises were assessed were cited by the same proportion of enterprises without innovation activity for the FI sector, i.e., 'no need due to prior innovations' (17.9%) and 'no need because of no demand for innovations' (17.9%), However, the former reason was principally cited by the TSC sector (16.7%) while the latter was more predominant for the WRT sector (11.3%).

6.9 Innovations with environmental benefits were produced

Enterprises in the WRT, FI, and TSC sectors introduced goods or services (product), process, organizational and marketing innovations with environmental benefits from the production of goods or services as well as from the after sales use of products. It is also evident that the enterprises introduced these innovations in response to regulations or taxes on pollution as well as governmental financial incentives for environmental innovation. A total of 31.0%, 42.4% 40.0% of the respective innovation-active services sector enterprises had procedures in place to regularly identify and reduce their environmental impact.

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APPENDICES*

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Appendix 1: The Community Innovation Survey 2006 Methodological Recommendations

Appendix 2: South African Business Innovation Survey 2010- 2012 Questionnaire

Appendix 3: Frequently Asked Questions booklet

Appendix 4: List of A Tables

Table A1.1: Number and percentage of enterprises, 2010-2012

Table A1.2: Summary of number and percentage of enterprises, 2010-2012

Table A1.3: Innovation activities, 2010-2012

Table A2: Number and percentage of employees, 2012

Table A3: Turnover, 2012

Table A4.1: Enterprises with innovation activities: expenditure on innovation, 2012

Table A4.2: Number and percentage of innovative enterprises having engaged in specific innovation expenditure, 2012

Table A5.1: Product (goods and services) innovators: number breakdown of turnover by product type, 2012

Table A5.2: Product (goods and services) innovators: percentage breakdown of turnover by product type, 2012

Table A5.3: Product (goods and services) innovators: Number of enterprises by product type, 2012

Table A5.4: Product (goods and services) innovators: Percentage of enterprises by product type, 2012

Table A6: Innovative enterprises: responsibility for the development of product innovations, 2010-2012

Table A7: Origin of product innovation, 2010-2012

Table A8.1: Highly important effects of innovation on outcomes for enterprises (number), 2010 - 2012

Table A8.2: Highly important effects of innovation on outcomes for enterprises (%), 2010 - 2012

Table A9.1: Enterprises with innovation activity: number of enterprises that introduced new goods or services, 2010-2012

Table A9.2: Enterprises with innovation activity: percentage of enterprises that introduced new goods or services, 2010-2012

Table A10.1: Innovative enterprises that received financial support for innovation activities from government sources (number), 2010 - 2012

Table A10.2: Innovative enterprises that received financial support for innovation activities from government sources (%), 2010-2012

Table A11.1: Sources of information for innovation rated as 'highly important' by innovative enterprises (number) 2010-2012

Table A11.2: Sources of information for innovation rated as 'highly important' by innovative enterprises (%) 2010-2012

Table A12: Enterprises with innovation activity citing problems with their innovation activity, 2010-2012

- Table A13.1: Highly important factors that hampered innovation activities of innovative enterprises (number), 2010-2012
- Table A13.2: Highly important factors that hampered innovation activities of innovative enterprises (%), 2010-2012
- Table A13.3: Highly important factors that hampered innovation activities of non-innovative enterprises (number), 2010-2012
- Table A13.4: Highly important factors that hampered innovation activities of non-innovative enterprises (%), 2010-2012
- Table A14.1: Number of innovative and non-innovative enterprises that introduced organisational or marketing innovations, 2010-2012
- Table A14.2: Percentage of innovative and non-innovative enterprises that introduced organisational or marketing innovations, 2010-2012
- Table A15.1: Number of enterprises that secured a patent in SA or applied for at least one patent outside SA, 2010-2012
- Table A15.2: Percentage of enterprises that secured a patent in SA or applied for at least one patent outside SA, 2010-2012
- Table A16.1: Number of enterprises that made use of intellectual property rights, 2010-2012
- Table A16.2: Percentage of enterprises that made use of intellectual property rights, 2010-2012
- Table A17.1: Geographic distribution of goods and services sold by innovative and non-innovative enterprises (number), 2010-2012
- Table A17.2: Geographic distribution of goods and services sold by innovative and non-innovative enterprises (%), 2010-2012
- Table A18: Innovative enterprises that introduced organisational innovation and rated results as having a 'high' level of importance, 2010-2012
- Table A19: Innovative enterprises that received financial support for innovation activities from government sources, 2010-2012
- Table A20: Number and percentage of staff with a degree or diploma, 2012
- Table A21: Enterprises with organisational and/or marketing innovations, 2010-2012
- Table A22.1: Collaborative partnerships for innovation activities by type of, 2010-2012
- Table A22.2: Collaborative partnerships for innovation activities by type of partner and their location (%), 2010-2012
- Table A22.3: Collaborative partnerships for innovation activities by type of partner and their location (%), 2010-2012
- Table A23: Innovative enterprises performing process innovations, 2010-2012
- Table A24: Innovative enterprises performing specific process innovations, 2010-2012
- Table A25: Responsibility for process innovations, 2010-2012
- Table A26: Origin of process innovations, 2010-2012
- Table A27: Enterprises that introduced new or improved products to the market or firm as a percentage of enterprises engaged in innovation activity by sector, 2010-2012
- Table A28: Number and percentage of enterprises that stated they were part of a larger group, 2010-2012
- Table A29: Enterprises that introduced product (goods or services), process, organisational or marketing innovation with environmental benefits, 2010-2012
- Table A30: Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods or services, 2010-2012
- Table A31: Enterprises that had procedures in place to regularly identify and reduce their environmental impact, 2010-2012

Appendix 5: List of B Tables

- Table B1.1: Number and percentage of enterprises, 2010-2012
- Table B1.2: Summary of number and percentage of enterprises, 2010-2012
- Table B1.3: Innovation activities, 2010-2012

Table B2: Number and percentage of employees, 2012

Table B3: Turnover, 2012

Table B4.1: Enterprises with innovation activities: expenditure on innovation, 2012

Table B4.2: Number and percentage of innovative enterprises having engaged in specific innovation expenditure, 2012

Table B5.1: Product (goods and services) innovators: number breakdown of turnover by product type, 2012

Table B5.2: Product (goods and services) innovators: percentage breakdown of turnover by product type, 2012

Table B5.3: Product (goods and services) innovators: Number of enterprises by product type, 2012

Table B5.4: Product (goods and services) innovators: Percentage of enterprises by product type, 2012

Table B6: Innovative enterprises: responsibility for the development of product innovations, 2010-2012

Table B7: Origin of product innovation, 2010-2012

Table B8.1: Highly important effects of innovation on outcomes for enterprises (number), 2010-2012

Table B8.2: Highly important effects of innovation on outcomes for enterprises (%), 2010-2012

Table B9.1: Enterprises with innovation activity: number of enterprises that introduced new goods or services, 2010-2012

Table B9.2: Enterprises with innovation activity: percentage of enterprises that introduced new goods or services, 2010-2012

Table B10.1: Innovative enterprises that received financial support for innovation activities from government sources (number), 2010-2012

Table B10.2: Innovative enterprises that received financial support for innovation activities from government sources (%), 2010-2012

Table B11.1: Sources of information for innovation rated as 'highly important' by innovative enterprises (number), 2010-2012

Table B11.2: Sources of information for innovation rated as 'highly important' by innovative enterprises (%), 2010-2012

Table B12: Enterprises with innovation activity citing problems with their innovation activity, 2010-2012

Table B13.1: Highly important factors that hampered innovation activities of innovative enterprises (number), 2010-2012

Table B13.2: Highly important factors that hampered innovation activities of innovative enterprises (%), 2010-2012

Table B13.3: Highly important factors that hampered innovation activities of non-innovative enterprises (number), 2010-2012

Table B13.4: Highly important factors that hampered innovation activities of non-innovative enterprises (%), 2010-2012

Table B14.1: Number of innovative and non-innovative enterprises that introduced organisational or marketing innovations, 2010-2012

Table B14.2: Percentage of innovative and non-innovative enterprises that introduced organisational or marketing innovations, 2010-2012

Table B15.1: Number of enterprises that secured a patent in SA or applied for at least one patent outside SA, 2010-2012

Table B15.2: Percentage of enterprises that secured a patent in SA or applied for at least one patent outside SA, 2010-2012

Table B16.1: Number of enterprises that made use of intellectual property rights, 2010-2012

Table B16.2: Percentage of enterprises that made use of intellectual property rights, 2010-2012

Table B17.1: Geographic distribution of goods and services sold by innovative and non-innovative enterprises (number), 2010-2012

Table B17.2: Geographic distribution of goods and services sold by innovative and non-innovative enterprises (%), 2010-2012

Table B18: Innovative enterprises that introduced organisational innovation and rated results as having a 'high' level of importance, 2010-2012

- Table B19: Innovative enterprises that received financial support for innovation activities from government sources, 2010-2012
- Table B20: Number and percentage of staff with a degree or diploma, 2012
- Table B21: Enterprises with organisational and/or marketing innovations, 2010-2012
- Table B22.1: Collaborative partnerships for innovation activities by type of, 2010-2012
- Table B22.2: Collaborative partnerships for innovation activities by type of partner and their location (%), 2010-2012
- Table B22.3: Collaborative partnerships for innovation activities by type of partner and their location (%), 2010-2012
- Table B23: Innovative enterprises performing process innovations, 2010-2012
- Table B24: Innovative enterprises performing specific process innovations, 2010-2012
- Table B25: Responsibility for process innovations, 2010-2012
- Table B26: Origin of process innovations, 2010-2012
- Table B27: Enterprises that introduced new or improved products to the market or firm as a percentage of enterprises engaged in innovation activity by sector, 2010-2012
- Table B28: Number and percentage of enterprises that stated they were part of a larger group, 2010-2012
- Table B29: Enterprises that introduced product (goods or services), process, organisational or marketing innovation with environmental benefits, 2010-2012
- Table B30: Enterprises that introduced environmental innovation in response to environmental benefits from the production of goods or services, 2010-2012
- Table B31: Enterprises that had procedures in place to regularly identify and reduce their environmental impact, 2010-2012