

Preliminary results of the South African Innovation Survey, 2005

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INNOVATION IS WIDELY RECOGNIZED AS one of the most important mechanisms through which technology can be leveraged to create wealth, leap-frog developmental backlogs and contribute towards a better quality of life.¹

Innovation surveys indicate the extent of innovative activity in the business sector and provide information on various other measures, including the importance of different sources of information for innovation, barriers to innovation, and the benefits of innovative products and processes. The South African Innovation Survey was commissioned by the Department of Science and Technology (DST) and undertaken by the Centre for Science, Technology and Innovation Indicators (CeSTII) of the Human Sciences Research Council (HSRC) during 2005 and 2006.

The survey is comparable with the fourth round of the European Community Innovation Survey (CIS4), covering 2002–04. CIS4-based surveys were also carried out in several other countries including Australia, Japan and China.

Methods

The survey design was informed by the Organisation for Economic Cooperation and Development (OECD)/Eurostat Oslo Manual 2005,² Eurostat guidelines for CIS4 (see Box 1 for definitions of innovation) and the Statistics South Africa business register. A random, stratified sample of enterprises (by sector and size of enterprise) was drawn from the official business registry database. Based on the resources available for the survey and on the advice of Statistics South Africa, a sample of 3087 enterprises, with appropriate weights for each of the 120 strata, was obtained from the September 2004 business register of Statistics South Africa. Fieldwork entailed a postal survey with at least two telephonic and two written follow-ups as well as a subsequent non-response survey consisting of three short questions on innovation activities.³ A non-response survey is important to determine whether companies that do not

respond to a survey have different characteristics from those that do reply.

After refining the final questionnaires and sample database, a tally of 979 completed questionnaires was realized, providing an overall return rate of 37%, based on the corrected sample. To control for possible bias in innovation propensity, a non-response survey of a simple random sample of 15% of non-respondents was undertaken and this received a response rate of 89%. The small bias detected was corrected by slightly adjusting the weightings for the strata. The final results were extrapolated to the target business population based on the weighted and cleaned sample.

Results

The survey indicates that 52% of South African business enterprises were engaged in innovation activities between 2002 and 2004.⁴ Figure 1 shows that this rate compares favourably with countries such as

Sweden, the U.K. and Portugal, in which 50%, 43% and 41% of companies are innovative, respectively. According to CIS4 results, Denmark, Ireland and Austria are among the most innovative countries, with a 52% share of enterprises recording innovative activities.⁵ Germany demonstrates the highest rate of innovation, with 65% of businesses being innovative. In a previous unofficial innovation survey in South Africa, covering the period 1998–2000, about 44% of the enterprises surveyed produced technological innovations,^{6,7} which was the same as the average incidence of innovation recorded by CIS3 in EU countries at that time.⁸

South African businesses (Fig. 2) spent nearly R28 billion on innovation activities in 2004, which represents about 2.4% of the total turnover of all companies covered in the survey. The bulk of this expenditure (65%) was devoted to the acquisition of new machinery, equipment and software. Expenditure on in-house research and experimental development (R&D) accounted for 20% of total innovation expenditure, similar to that recorded for the same sectors in the 2004/05 national R&D survey.⁹ Surveys in other countries show that mismatches between R&D expenditures recorded in innovation surveys and those measured in more detailed R&D surveys are common.

The survey results indicate that the

Box 1. Definitions of innovation.

Innovation was defined as the introduction of new or significantly improved goods or services (products) to the market or the use of new or significantly improved processes for the production or supply of goods or services. Innovations must be new to the enterprise concerned but need not necessarily be new to the business sector or market.

A **product innovation** is the introduction to the market of a new good or service or a significantly improved good or service with respect to its capabilities, such as improved user-friendliness, components or sub-systems.

A **process innovation** is the use of new or significantly improved methods for the production or supply of goods and services.

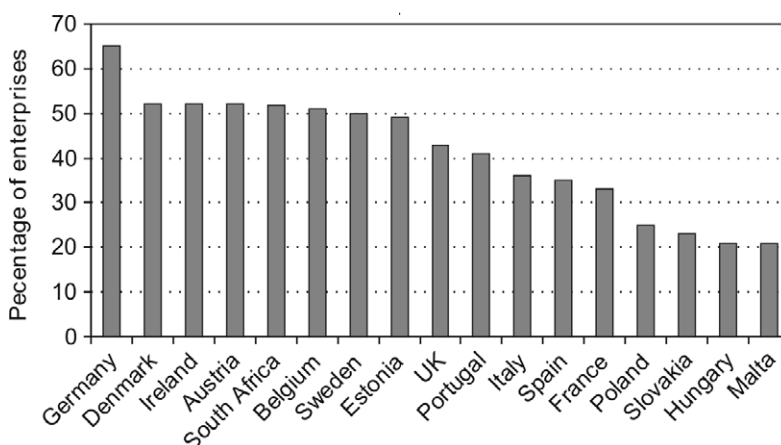


Fig.1. Percentage of business enterprises with innovation activity, 2002–2004.

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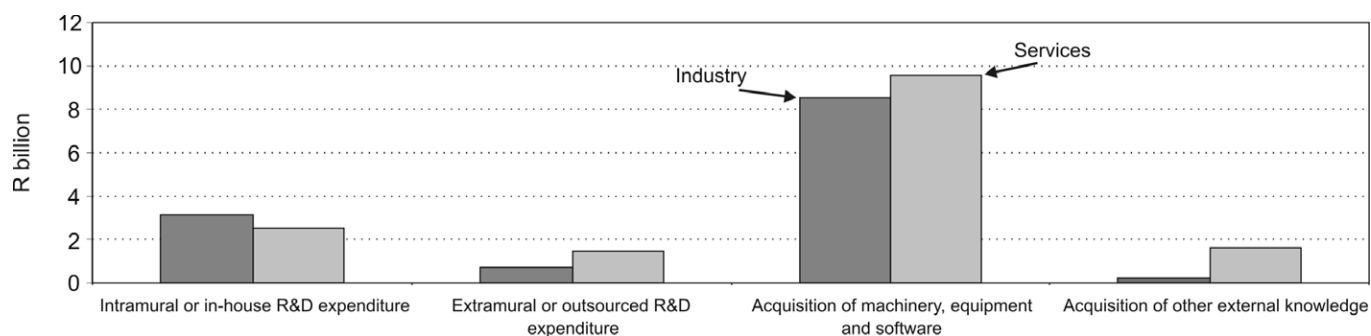


Fig. 2. Total expenditure by enterprises on innovation activities including in-house R&D, 2004.

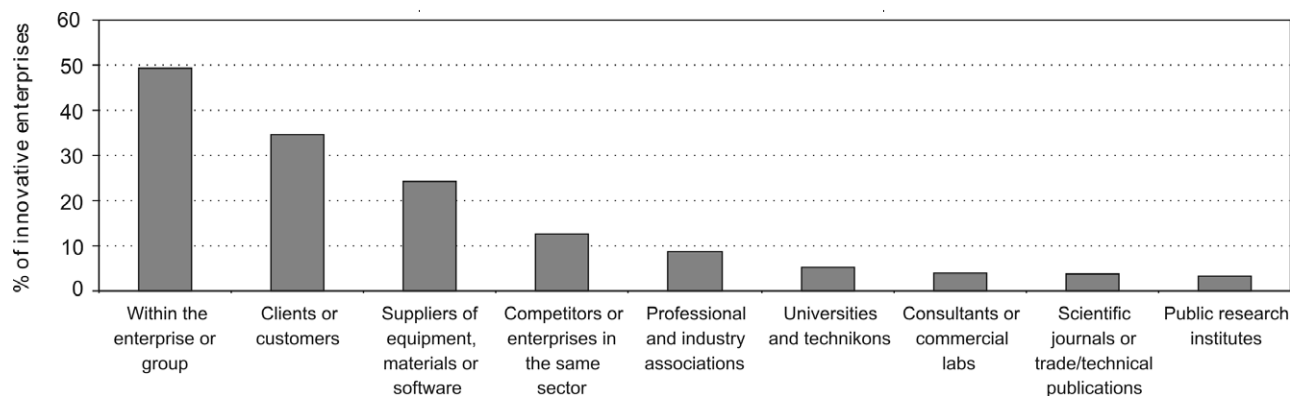


Fig. 3. Sources of information for innovation activities rated as highly important by innovative enterprises, 2002–2004.

majority of innovative enterprises in South Africa undertake small amounts of R&D, costing R1 million or less annually and typically in the region of about R300 000. It is important that government recognizes the role of these smaller R&D enterprises and supports and encourages them. The new R&D tax incentives announced by the National Treasury in 2006 are broad-based and aimed at encouraging more firms to undertake R&D with innovation in mind.¹⁰

Product innovators, of both goods or services, accounted for the majority of innovators in the survey. About 10% of the turnover of product innovators was contributed by goods that were new to the market, equivalent to about R67.8 billion. A further 11.8% of turnover (equivalent to about R79.2 billion) was accounted for by sales of goods and services that were new to the firm but not necessarily new to the market. The return to companies on their investment of about R28 billion in innovation activities is thus substantial. This is the first South African survey to show economic returns from public investment in R&D and innovation expenditure in the country. About 6.5% of enterprises reported receiving public funding for their innovation activities. These businesses reported sales of products that were new to the market worth R7.1 billion, and a further R6.6 billion in sales of products that were new to the firm. This is a useful

avenue to explore when looking for tangible evidence that investments in R&D and innovation have a 'pay off' for the investors, both private and public.

Enterprises were asked to rank various sources of information. Most (49%) innovative businesses in this country tend to rely mainly on their own internal sources of information for innovation activities (Fig. 3). The second-most important source of information (35%) was customers or clients, while suppliers accounted for about 24% of important sources of information. Competitors (or companies operating in the same sector) were cited as being highly important by 13% of respondents. Universities and technikons (5%) and public sector institutes, including science councils (3%), appeared to be less important sources of information for innovation, although formal collaboration with these organizations on R&D projects is fairly common (unpublished R&D Survey 2004/05 data). These findings are consistent with those for European countries in CIS4, where, on average, only 3% and 2% of innovative enterprises recorded universities and public research institutes, respectively, as highly important sources of information for innovation activities.¹¹

Cooperative partnerships for innovation were mostly limited to the business sector itself, with 46% of enterprises claiming that the most important collaborations were with customers or clients

(Fig. 4). Suppliers and competitors (or firms operating in the same sector) were also important partners for collaboration in innovation activities, accounting for 45% and 38% of collaborations, respectively. Partnerships with public bodies such as universities and government research institutes appeared to be of lesser importance, and even less so as sources of information for innovation (Fig. 4). These patterns indicate that South African enterprises are well attuned to both the demand and supply aspects of the market.

More than a quarter of enterprises (26%) reported that innovation was hampered by domination of the market by established businesses, making it difficult to break in. A quarter of the firms also reported that a lack of funds within the enterprise or group hampered innovation, whereas 20% indicated that the costs of innovation were too high. Lack of qualified personnel was a highly important restraining factor for about 17% of respondents.

Discussion

This article reports on only a few of the results of the latest innovation survey. The DST and the HSRC will publish a more comprehensive report in the next few months. Eurostat will also release more extensive results from CIS4 for EU member states and other participating

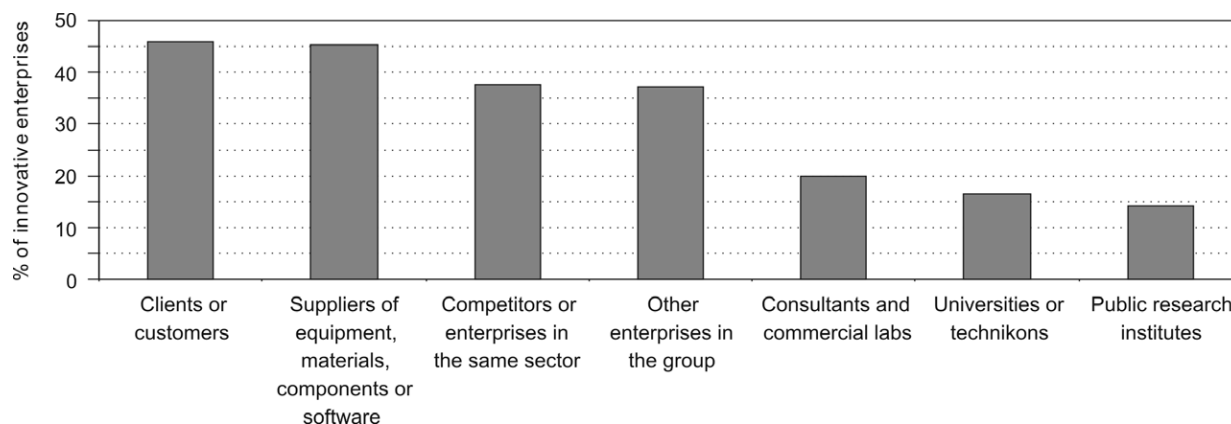


Fig. 4. Co-operative partnerships for innovation.

countries. The content of the questionnaire and methods to be employed by the CIS (in the EU) over the period 2004/06 is essentially identical to CIS4. Some of the European countries with a solid history of innovation surveys will be running shortened versions for statistical purposes. This provides South Africa with an ideal opportunity to tighten up on methods in the next round of its survey, using lessons learned from the first official national survey. This will help strengthen our benchmarking abilities and provide further insights into, for example, how and why the South African business sector shows such similar innovation profiles to some of the more industrialized and competitive EU countries despite our low level of patenting in the EU and US international patent offices. Comparing countries on the results of innovation surveys is not a straightforward exercise, as the questions may reveal differences in national perceptions of what is innovative or important for innovation despite the use of standard definitions. More research is needed on the relationship between the nature of South Africa's and other countries' exports and their levels of patenting activities.

The efforts of national funding agencies of the DST, such as the National Research Foundation, and public support programmes, including the Innovation Fund and the Technology and Human Resources for Industry Programme (THRIP), appear to be becoming noticeable in the innovation activities in the private sector. At least 6% of innovators in industry and 1% of those in the services

sector have received funding from these agencies. National government provided 5% of innovators in industry, and 0.4% of those in services, with funding for innovation activities. These levels of support are low compared to those found in EU countries, where public support programmes and tax incentives for innovation and R&D are on a much wider scale. The DST and Department of Trade and Industry will need to increase the breadth and depth of their support through various programmes to encourage further collaboration and activities in R&D and innovation.

Nearly 45% of innovative enterprises surveyed considered the most important outcome to be improved quality of goods and services. Other highly rated outcomes included increased range of goods and services offered (33%) and penetration of new markets or increased share (23%) of established markets. Reducing labour, material and energy costs were considered less important consequences. About 21% of enterprises claimed that meeting government regulatory requirements was a highly important outcome, indicating that government and international legislation directed at environmental and quality issues are stimulating innovation.

Global competition demands innovation. Together with the quickened pace of economic activity in South Africa, South African enterprises face new national and international opportunities for growth as well as increased threats from competitors in local and foreign markets. These pressures make it vital for South African businesses to innovate.

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1. Extract from a keynote address of the deputy minister of science and technology, Derek Hanekom, delivered in Sandton on 11 April 2007.
2. OECD and Eurostat (2005). *Oslo Manual: Guidelines for collecting and interpreting innovation data*, 3rd edn. OECD Publishing, Paris.
3. A copy of the questionnaire can be viewed at <http://www.hsrc.ac.za/CCUP-59.phtml>
4. Department of Science and Technology (2007). *South African Innovation Survey 2005: Highlights*. Pretoria.
5. Gaudé M. (2007). Eurostat – From the CIS3 to the CIS 2008. Keynote paper presented at the 32nd CEIES seminar (Innovation Indicators—More than technology), Aarhus, Denmark, 5–6 February 2007.
6. Oerlemans L.A.G., Pretorius T.P., Buys A. and Rooks G. (2004). *Industrial innovation in South Africa, 1998–2000*. University of Pretoria, Pretoria.
7. Rooks G., Oerlemans L., Buys A., and Pretorius T. (2005). Industrial innovation in South Africa: a comparative study. *S. Afr. J. Sci.* **101**, 149–150.
8. European Commission (2004). *Innovation in Europe: Results for the EU, Iceland and Norway. Data 1998–2001. Panorama of the European Union, 2004 Edition. Theme 9: Science and Technology*, Eurostat.
9. Department of Science and Technology (2006). *National Survey of Research and Experimental Development (R&D): 2004/05 Fiscal Year*. Centre for Science, Technology and Innovation Indicators, Human Sciences Research Council, Cape Town.
10. Republic of South Africa. *Revenue Laws Amendment Act*, Act No. 20, 2006.
11. Eurostat (2007). Community Innovation Statistics: weak link between enterprises and public research institutes/universities. *Statistics in Focus: Science and Technology* 81/2007.