

INNOVATION IN SERVICES: THE POTENTIAL TO CONTRIBUTE TO STRUCTURAL ECONOMIC TRANSFORMATION?

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Contrary to the view that diversification and structural change only result from industrialisation, there is growing consensus that the services sector can contribute to economic transformation in emerging economies. This is *potentially* good news for South Africa given the growth of the services sector to 65% of GDP by 2014, and the proliferation of Industry 4.0.

This Research Brief uses data from the Business Innovation Survey 2010-2012 to illuminate the character of innovation activities* in two key services sub-sectors: wholesale and retail trade (WRT), and finance, real estate and business services (FI). These sub-sectors are now central to the South African economy in terms of their contribution to GDP growth, and their advancement is therefore a key consideration for economists, lobbyists, business leaders, and policy makers alike.

***Note:** Readers are cautioned that the survey's data does not represent the population of all firms in the selected services sectors, but reflects the realised survey sample: 179 enterprises for WRT and 107 for FI. Moreover, firms in these two very different services sectors may have very different interpretations of innovation that impact on the trends reported. While this data is purely descriptive, it can provide important insights on the nature of innovation activities, from which we can identify spaces for innovation policy intervention.

New pathways to structural change?

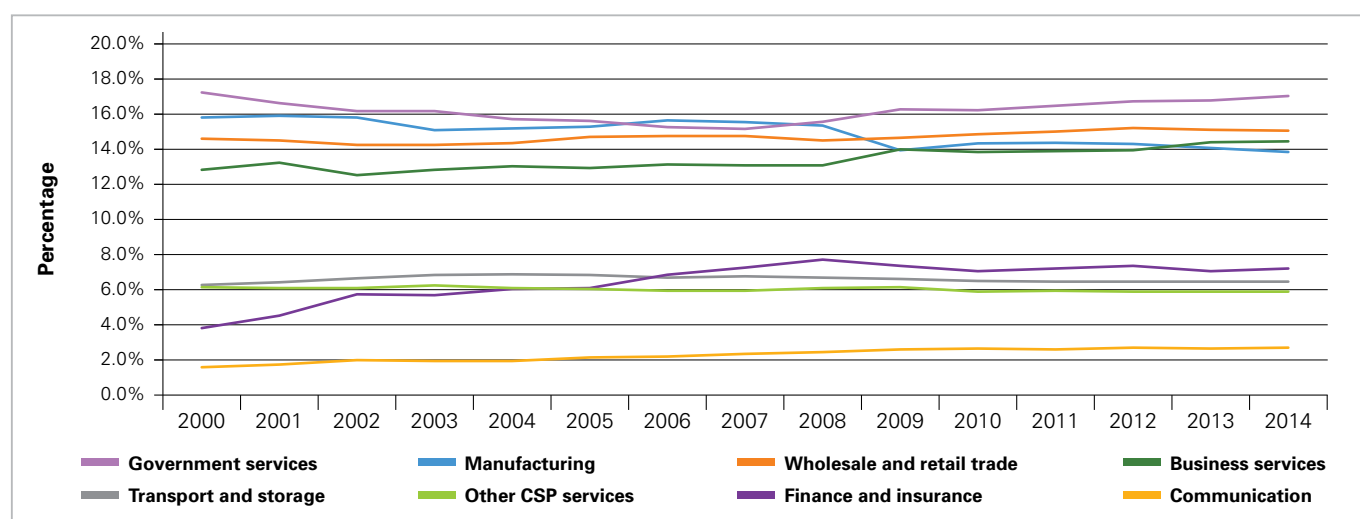
There is growing consensus that the services sector can contribute to economic transformation in emerging economies, contrary to the long-held orthodoxy that diversification and structural change only result from industrialisation. This is *potentially* good news for South Africa, given the growth of the services sector to 65% of GDP by 2014—growth that has occurred at the expense of the manufacturing and mining sectors. The risk is that growth in services may reflect new ways of increasing asset values through new types of speculative financial products that have a high GDP effect, but little effect on positive structural economic change. Borat et al (2016) therefore ask the core developmental question: Can South African exploit this shift to build globally competitive, employment-creating firms that can drive structural economic transformation?

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Traditionally, South Africa's services sector has involved low tech activities such as food, personal or legal services, limited to direct contact in domestic markets, and hence, non-tradable or exportable. Technology has enabled the emergence of a modern, tradable set of services industries that are delivered electronically, such as financial and ICT services. The rapid growth and technological disruption of traditionally non-tradable service industries by firms such as Takealot, Get Smarter, and of course, Uber and Airbnb, serve as models that may catalyse more widespread use of ICTs in line with global trends towards Industry 4.0.

Figure 1 reflects the sub-sectoral disaggregation in South Africa, showing that the two largest contributors to GDP over the past ten years are traditionally non-tradable: government services, and wholesale and retail trade (which has overtaken the manufacturing sector since 2009). A modern tradable sector has grown steadily, with the fastest growth in the financial and insurance services sub-sector, a significant contribution from transport and storage, and the smallest contribution from the communications sub-sector.

Figure 1. Contribution of manufacturing and services to GDP, 2000-2014



Source: Borat et al, 2016

Box 1. Towards innovation policy interventions for globally competitive, employment-creating services firms

Innovation in services is quite different from the very tangible innovation in products and processes typical of manufacturing industries. It has a strong human, non-technological dimension; selling and marketing are critical, as are new delivery processes; and it typically requires close customer integration. Such innovation is also often tacit and intangible, which makes it difficult to standardise or to protect through patents (Hipp and Grupp, 2005), and it increasingly requires the use of 'big data' and data analytics as core to competitive advantage.

The role of science, technology and innovation has become critical to whether South Africa is able to exploit the potential of the services sector to drive structural transformation and economic development. In order to identify spaces for policy intervention, we need to establish what is the scale and nature of innovation in South African services sector firms, and what are the barriers.

Innovation is pervasive in retail and finance

The Business Innovation Survey 2010-2012 (BIS) defined an innovation as the implementation into the market of a new or significantly improved product (goods or services) or process, or a new organisational or marketing method.

Table 1. **Key Innovation indicators 2010-2012 for WRT and FI**

Indicator	Wholesale and Retail	Financial Intermediation, Real Estate and Business Services
Innovative enterprises (with <i>successful</i> technological innovations)	43.0%	69.2%
Technological innovations		
Enterprises that produced new to the market products	26.4%	16.1%
Non-technological innovations		
Enterprises with marketing innovations	30.2%	40.2%
Enterprises with organisational innovations	40.8%	61.7%
Inputs		
Expenditure on innovation activities	R 495.8 million	R 3 424.4 million
Innovation expenditure as % of turnover	0.08%	0.55%
Enterprises with <i>successful</i> innovations that engaged in intra-mural R&D activities	54.9%	73.4%
Outputs		
Turnover from sales of new to the market products (product innovators)	17.6%	17.4%

Source: Moses et al. 2017

On first glance at the key innovation indicators presented in Table 1, firms in the FI sub-sector appear to be more innovative. Almost 70% of the firms in the FI sub-sector reported the successful implementation of an innovation in the period 2010-2012, which means that the innovation was introduced to the market and increased the firm's productivity or turnover. A far lower proportion, 43%, of the WRT firms reported that they had innovated successfully.

The FI firms spent a larger total amount on innovation, and a higher proportion of their turnover on innovation, in contrast to the proportion spent by WRT firms. FI firms were more likely to introduce non-technological organisational (62%) and marketing innovations (40%), and a large set of 72% of firms with successful innovations conducted R&D activities within the enterprise itself.

However, further analysis shows significant innovation activity in the WRT sector, with perhaps greater financial benefits. While the FI firms spent almost seven times more on innovation activities, the innovative WRT firms achieved almost the same turnover from sales of new to the market products, both around 17.5%, suggesting a greater return on investment for WRT firms.

Firms in the FI sub-sector were more likely to report an increased range of products (FI 47%; WRT 35%), and improved quality of products (FI 43%; WRT 31%), as benefits of innovation activity; but there was little difference between the two sub-sectors in terms of process outcomes, or meeting government regulatory requirements.

Innovation takes a range of forms

Significantly, WRT firms were also more likely to report the introduction of new-to-the-market technological innovations: 26% of WRT firms, as opposed to 16% of FI firms. This likely reflects the trend that South African retailers have invested heavily in high-tech systems, allowing them to efficiently control stock and monitor trading density. Traditional retailers have also expanded into online trading.

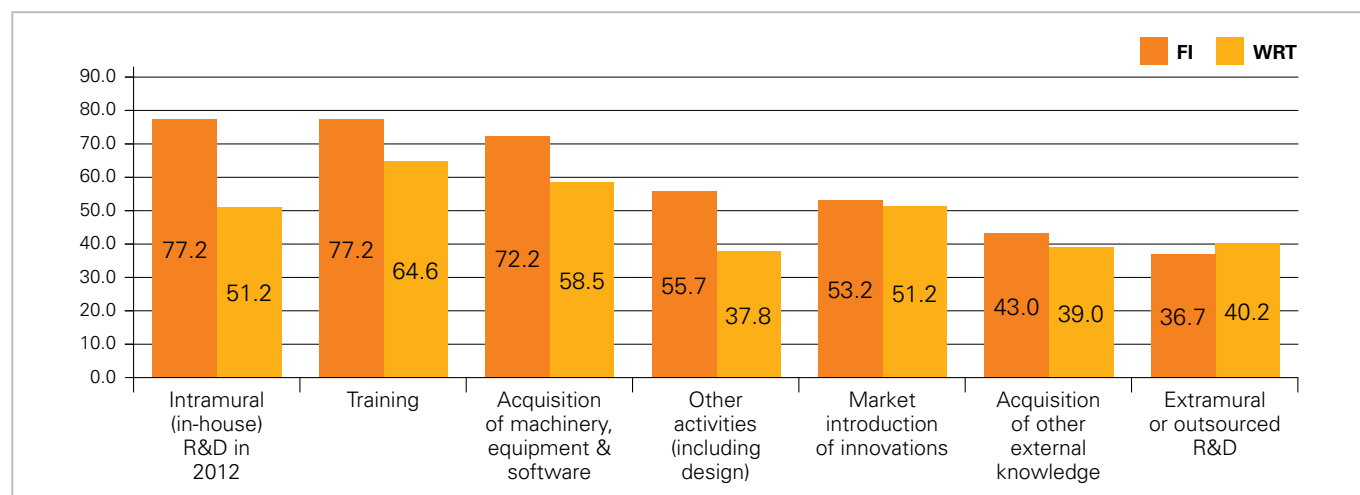
Such a dynamic is evident when we examine the main forms of innovation expenditure by WRT firms (Figure 2 overleaf). The most common channel of innovation expenditure was training (65%) and the acquisition of machinery, equipment and software (58%). Training could be by the suppliers of new machinery, equipment and software to ensure effective adaptation of new machinery, equipment or software within the firm.

The main forms of innovation by WRT firms were thus incremental, related to improvements of product and process, rather than radical, new-to-the-world innovations.

Expenditure on intramural R&D activities, and the market introduction of innovation, were both reported by slightly more than half, 51%, of innovation active WRT enterprises (which includes the 2.8% of firms that reported an ongoing or abandoned innovation). For the WRT sector, 54.9% of successful innovators engaged in R&D. In contrast, in the FI sector, 73.4% of the successful innovators performed intramural R&D.

This is an indication that, apart from using R&D, enterprises, particularly those in the traditionally non-tradable WRT sector, used other methods to innovate successfully.

Figure 2. Main channels of innovation expenditure in WRT and FI



Source: Moses et al, 2017 (Appendix 4 Table A4.2)



Policy Implication: Firms in both the FI and WRT sectors with growth potential have a variety of ways of implementing innovation, other than science-driven research and experimental development.

Innovation is a connected activity

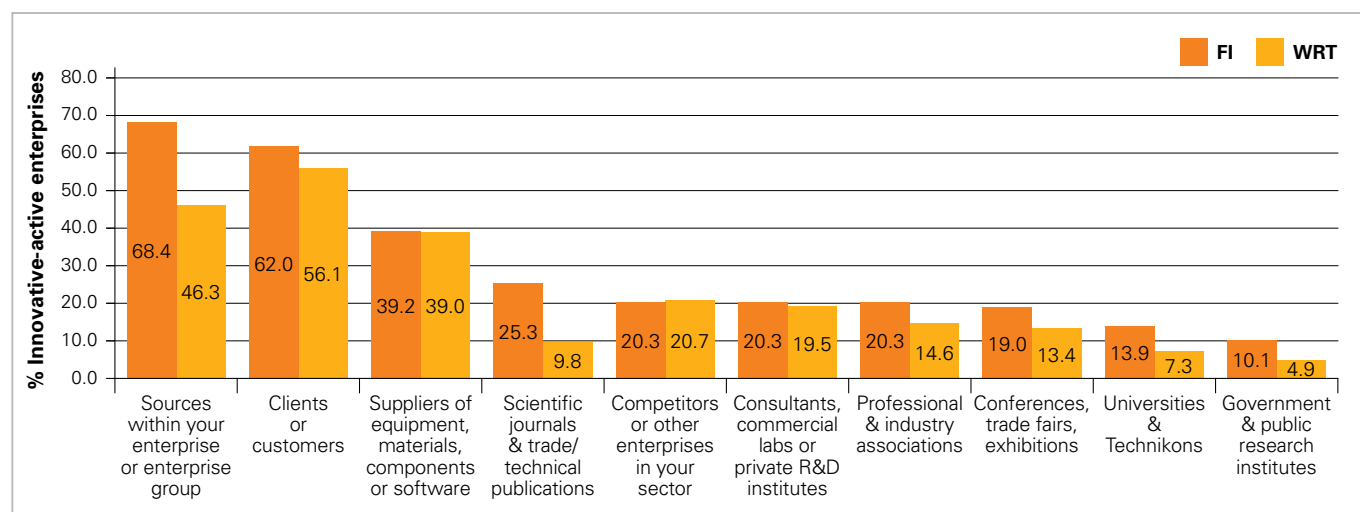
What are the main sources of information and technology for these diverse forms of innovation?

For both WRT and FI sub-sectors, innovation is a connected activity and firms primarily rely on information from their clients and customers, which is a common global trend. We only need to think of the example of Google, for whom their customers' data provides the foundation for their business model, in grasping the significance of customer data..

For the WRT firms, information and knowledge for innovation were principally sourced from clients or customers (56%), within the firm itself (46%), and from suppliers of equipment (39%) (Figure 3 overleaf). FI firms were slightly more likely than WRT firms to source information from within their group (68%), which reflects their greater expenditure on intra-mural R&D, and hence, stronger internal innovation capacity (Figure 3).

Formal institutional knowledge sources, such as universities (WRT 7.3%; FI 13.9%), and public research institutions (WRT 4.9%; FI 10.1%) were not highly significant, particularly for WRT firms. Where firms did cooperate with knowledge partners, more reported drawing on partners from South Africa and Europe, than the rest of the world.

Figure 3. Sources of information for innovation rated as “highly important” by innovation-active enterprises in WRT and FI



Source: Moses et al, 2017 (Appendix 4 Table A11.2)



Policy Implication: It is critical to improve firms’ capabilities for knowledge exchange, and conversely, the ability of higher education and public research institutions to engage with firms. Investment in big data analytical capabilities is becoming a crucial dimension of what firms in both services sub-sectors and knowledge institutions require to innovate, and this in turn requires linkages and networks of collaborating partners.

There are complex barriers to innovation

The BIS asks both firms that do and do not innovate to reflect on the different types of barriers they experience to their innovation activities. Cost factors tended to be the most predominant barrier reported by all firms, but there were marked differences evident in WRT and FI firms (Table 2).

Table 2. Highly important factors that hampered innovation activities of innovation-active and non-innovation-active firms 2010-2012 for WRT and FI

Factors	Innovation-active WRT	Non-Innovation-active WRT	Innovation-active FI	Non-Innovation-active FI
Cost factors				
Lack of funds within your enterprise or group	19.5	9.3	24.1	17.9
Lack of finance from sources outside your enterprise	14.6	3.1	17.7	17.9
Innovation costs too high	12.2	7.2	16.5	21.4
Knowledge factors				
Lack of qualified personnel	19.5	13.4	27.8	10.7
Lack of information on technology	7.3	5.2	15.2	3.6
Lack of information of markets	6.1	4.1	12.7	3.6
Difficulty in finding co-operation partners	9.8	7.2	7.6	3.6
Market factors				
Market dominated by established enterprises	12.2	11.3	16.5	25.0
Uncertain demand for innovative goods or services	8.5	9.3	20.3	25.0

Sources: Moses et al, 2017 (Appendix 4 Table A12.2, and A12.4)

FI firms that did not innovate over the period 2010-2012 were most restricted by market factors—competition and uncertain market demand (25%). These firms identify innovation costs that are seen as too high (21%) and inadequate internal and external funding sources (18%), as constraints on innovation.

However, those who did innovate experienced a lack of qualified personnel as the greatest barrier (28%), together with a lack of funds (24%) and the uncertainty of market demand (20%).

For WRT firms who did not innovate, the lack of qualified personnel (13%) was the most serious barrier reported as highly important, together with market competition (11%), lack of funds (9%) and uncertain demand (9%). For those WRT firms that did innovate, cost and knowledge factors (lack of qualified personnel) were equally significant barriers (20%). Cost and knowledge factors meant that innovation activities were not prioritised as part of the WRT firms' strategy to grow market share.



Policy Implication: Market uncertainty and sectoral competition are critical barriers preventing firms from innovating on a larger scale, but these factors can only be indirectly reduced and influenced by government, through setting appropriate macro-economic policy. Cost and knowledge barriers inside the firm are more amenable to direct public policy interventions and support to incentivise innovation. Promoting collaborative networks and optimising knowledge flows is a critical factor toward lowering barriers to business innovation activity.

The space for direct and indirect innovation policy interventions?

There is significant potential for globally competitive and local job-creating services firms to stimulate the South African economic development trajectory. The National Development Plan promotes a phased, cumulative approach to building a 'knowledge economy' in South Africa, which will support the growth of both traditional, low-wage local services firms, and modern, IT-enabled export-oriented services firms. To drive structural transformation, the South African services sector needs to become more export oriented to access larger global markets (Bhorat et al 2016). Currently, South Africa lags behind other emerging economies, but a shift towards more high-technology exports will require more innovation and knowledge-intensive firm activities, which in turn, requires strategic support from public funds.

The Department of Science and Technology (DST) is currently designing a new White Paper on Science, Technology and Innovation, to provide a framework to grow the national system of innovation over the next decade. What are the insights from these data trends, for the ways in which the public sector can intervene to support and foster firm innovation in services firms that builds on and extends their current patterns?

Analysis of the 2010-2012 innovation data suggests a healthy scale of innovation in South African services sector firms, particularly, but not only, in the modern, tradable FI services. There are significant innovation trends in the traditionally non-tradable WRT sub-sector that illustrate the potential across services as a whole.

The comparison of the nature of innovation in the two services sub-sectors highlights that enterprises in sectors with growth potential have a variety of ways of implementing innovations. Incremental innovation is more prevalent in the WRT firms, and a high proportion of the FI firms also spend on incremental innovation. Non-technological design, marketing and organisational innovation is particularly prevalent in both of these services sub-sectors. Current STI policy tends to support R&D-driven innovation most strongly, for example, through an R&D tax incentive. But is there sufficient public support for the full spread of innovation activities? In addition, are new incentives that support non-technological innovation, such as incentives for improvements in production systems, branding and marketing activities, as well as export promotion, sufficient?

Understanding the specific configuration of cost, knowledge and market barriers that promote or constrain innovation activities in services firms can further inform spaces for intervention (Table 3 overleaf).

Table 3. **Indirect and direct interventions to improve framework conditions for innovation**

INDIRECT INTERVENTIONS	DIRECT INTERVENTIONS
<p>At the national and regional level, policy coordination to ensure alignment between STI policy, and macro- and micro-economic, industrial and trade policy initiatives to promote and grow the services sector, both modern tradable and traditional non-tradable, could be valuable.</p> <p>A key intervention is growing the quality of education and training, to ensure the availability of a greater pool of qualified personnel to meet firm needs, given the large number of firms that identified skills as a significant barrier.</p>	<p>Firms themselves suggest the significance of making available a larger pool of external public funding, but this needs to target all forms of innovation by firms, technological and non-technological, radical and incremental.</p> <p>Firms tend to draw on their own internal sources or on customers and clients, as sources of innovation. However, there is much that potentially can be achieved in partnership and collaboration with local universities and public research institutes. The policy frameworks to promote partnerships, collaboration and interaction between universities and firms exist, but instruments need to be re-interrogated, and new mechanisms need to be identified, which can take into account the specific nature of technological and non-technological innovations in more firms across the full range of services sub-sectors.</p>



Policy Implication: *Indirect interventions* that aim to improve the framework and institutional conditions for innovation are relevant, but there are also opportunities for *direct intervention* to promote innovation.

Ideas for policy

1 Science-driven R&D is not the only route to innovation. Policy makers need to gain a stronger appreciation of how innovation takes place at firm level.

2 Big data analytical capabilities and capabilities to leverage industry-higher education knowledge linkages are key requirements for innovation. Policy makers need to focus on supporting the establishment of linkages and networks of collaborating partners.

3 There are many barriers to innovation that firms face—from market uncertainty to cost and knowledge barriers. Policy makers need to deepen their understanding of these barriers, in order to be able to apply the appropriate measures to reduce these barriers.

4 The framework and institutional conditions for innovation can be influenced in direct and indirect ways. Policy makers need to develop a close appreciation of where these 'levers' are in order to use them effectively.

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About the Series

The Centre for Science, Technology and Innovation Indicators (CeSTII) is a statistical and policy research institute based at South Africa's Human Sciences Research Council (HSRC). CeSTII performs national surveys that underpin benchmarking, planning and reporting on R&D, innovation and technology transfer in South Africa. Our Research Briefs are concise papers based on our ongoing work. Their goal? To provide empirical evidence and informed opinion that policy- and decision-makers can use to strengthen the quality of their thinking and action.

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