Version May 25, 2014

Policy Diagnostics Report South Africa

UK Department for International Development (DFID)
‘Innovation and Growth’ Research project

Funded by DFID

Partners:

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Policy Diagnostics Report South Africa
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For: The UK Department for International Development (DFID)
‘Innovation and Growth’ Research Project

A project with partners from:
Tilburg University, Radboud University Nijmegen, Africa Study Center, Technopolis Group
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Preamble

DFID’s mission is to help eradicate poverty in Low Income Countries (LICs). Following current trends in development literature, DFID explores the economic perspective on poverty alleviation through supporting fundamental research in raising productivity of firms in LICs through innovation leading to economic growth. Although innovation theory and policy have been subject of attention in advanced economies’ context for quite some time, there is an emerging interest in innovation in LICs as a way forward for economic growth, since growth is considered as a precondition for poverty reduction (Gellynck et al., 2011; Dollar and Kraay, 2002). Economies can grow through the accumulation of capital, labor and other factors of production - land and natural resources - with a given ‘technology’; however it is innovation raising productivity that ultimately drives long-run growth of income per capita (World Bank 2010). The generation, transfer, adoption and adaptation of knowledge to LICs therefore constitute an important issue for economic growth.

Against this background, DFID commissioned a research project entitled ‘Coordinated Case Studies – Innovation for Productivity Growth in Low Income Countries’ (CCS-I4PG) to Tilburg University and the Dutch and Southern partners in aiming at understanding innovation in the manufacturing sector (SMEs) in LICs, its processes and critical factors for its diffusion supported amongst others by innovation policies and governmental institutions. The DFID research project takes an ‘economics’ perspective on innovation, and involves econometric analysis of a set of variables concerning barriers at firm, regional and national levels and their causalities with the innovation capacity of firms. The research is implemented in a group of 10 countries in Africa and Asia and envisages to produce a series of scientific articles on the one hand and innovation policy relevant reports for the countries of study on the other.

Innovation in LICs

Kline and Rosenberg (1986) note that ‘it is a serious mistake to treat an innovation as if it were a well-defined homogeneous thing that could be identified as entering the economy at a precise date’. Indeed, exploring the theoretical underpinnings of innovation - with the ultimately idea to alleviate poverty – reveals a multi-faceted challenge since because innovation theory evolves within various scientific disciplines; technology, economics, business administration and management, geography and sociology to name but a few. Consequently, various research approaches, angles of analysis and definitions as well as policy approaches and mechanisms and societal impacts have been attached to innovation in western advanced economies; it does not only concern science, technological development or inventions, it involves innovation capacity and behavior of economic agents as well as institutional actors embedded in an innovation system that shape particular political and socio-economic contexts (Lundvall, 1992).

Consequently, the definition and measurement of innovation is not consistent and universally agreed. A variety of innovation definitions have been proposed over the past decades since Schumpeter (1934), departing from the economic equilibrium theory, first explicitly referred to innovation, as ‘the introduction of new or improved products, production techniques, and organization structures as well the discovery of new markets, and the use of new input factors. Nelson and Winter (1982) proposed that economic growth through innovation could be understood as an evolutionary process, which is the endogenous outcome of an economic system. Innovation is broadly considered as the ‘putting into practice of inventions’ (Fagerberg et al., 2005). Such inventions are perhaps most often technological but can also include the exploitation of new markets and the development of new ways to organize business.

In LICs, the issue has been raised whether western-based notions of innovation should apply for defining and measuring innovation such as the number of new products and patents or R&D expenditures as proposed in the Oslo manual for instance (OECD, 2005). Innovation with positive impacts on poverty alleviation in particular may
materialize differently in those contexts, not necessary implying high technological breakthrough, but more incremental adoption and adaption of existing technologies, below-the-radar adaptation or new combinations of existing technologies (Szirmai et al. 2011). For understanding innovation, some argue that distinguishing high technology from low technology is not very useful, particularly in low- and medium income countries (World Bank, 2010). High technology may not generate jobs and wealth, while low-technology development and exploitation of indigenous knowledge can lead to significant growth and improve welfare. Essential both in advanced economies and LICs is that firms create competitive advantage and raise productivity by 'perceiving or discovering new and better ways to compete in and bringing them to market', which is, according to Porter (1990), the ultimate act of innovation.

**Innovation systems**

In the '90s, Lundvall (1992) and Edquist (1997) argued that innovation and the diffusion of technology should be researched, analyzed and understood, not only in terms of a process of new and better techniques, but rather as a co-evolutionary mechanism or system of technologies, organizations and institutions. Freeman (1987) and Lundvall (1992) advanced the innovation system theory arguing that the innovation process and innovative capacities of firms evolve in a network of public and private sectors institutions. It focuses on interactive learning and emphasizes human interactions and inter-dependence and the central role of institutions (Edquist 1997).

The innovation systems theory forms the conceptual foundation of most innovation policies of governments in western advanced economies today, usually bundled under the universal 'Science, Technology and Innovation’ (STI) label (Molas-Gallart and Davies, 2006). The associated policies aim at strengthening the complex of formal institutions of the innovation systems including technology development and research centers, universities and technical education and training, finance and regulatory patent officers and frameworks (OECD, 2013). STI policies focus on hi-tech inventions, radical innovation and advanced technological breakthroughs. The input and success of STI policy and the ‘government’ innovation system are measured by data such as productivity growth, competitiveness indices, R&D investments, number of patents but also human capital and knowledge infrastructure indicators. These data are collected by general statistical bureaus and typically concern formally established large and medium-sized firms in those countries.

The World Bank (2010) recently issued the ‘Innovation Policy: A Guide for Developing Countries’ presents other perspectives on the innovation system and innovation policy. The scientific and technology ideology, reflected in the STI approach, promoted the idea that technology derives naturally from science so that governments need do no more that build a good science and technology base innovation system. The alternative market ideology considers that innovation occurs naturally in a good business climate and most of all interactions in the business system. Thus, innovation thus is fundamentally the task of the private sector and entrepreneurs, which occurs through business horizontal and vertical linkages, spill-over and actors’ networks involving subcontracting, interactive learning within suppliers and buyer value chains and foreign direct investment. In fact, a lot of the innovation in LIC concerns adoption and technology transfer that comes from the foreign firms and investments and larger firms. Innovations come from the entrepreneurs who make them happen and ultimately depend on a society's receptiveness. Innovation, therefore, is fundamentally a social process (World Bank, 2010).

Meeus, Oerlemans and Hage (2001) have reported that indeed interactive learning is a function of the complexity of innovative activities of collaborating companies in business systems. Their theoretical model best fits the interactive learning of small-and medium-sized innovator firms. Interactive learning with customers is positively associated with the complexity and structuring of innovative activities, and with moderate scores of the cross-product term of 'complexity of innovative activities and the strength of knowledge resources'.
The market ideology is in line with the 'economics' research angle of the DFID project; the focus on understanding and strengthening the economic and innovative behavior/capabilities of SME entrepreneurs, the underlying idea policy principle is that the ownership of the innovation process in the hands of these entrepreneurs. From that perspective, economic agents need a broader context than a government innovation policy that provides incentives, information, confidence, trust and stability that directly and indirectly support take risk and make investment and innovation decisions.

One of the founding fathers of the innovation systems theory, Lundvall et al. (2009) have also challenged the STI policy approach in the LICs context. Applying the innovation system analysis to economic development, assuming the narrow 'formal institution-focused' understanding of the innovation system, is of limited value for understanding and explaining innovation in LICs. In many African and Asian LIC contexts, the private and informal adoption practices supported by informal institutions are more important than those supported by the public and formal innovation policy efforts. Lundvall et al. (2009) suggested that an approach based on Doing, Using and Interacting (DUl) involving learning, human interactions, participation, tacit and localized knowledge, experiential and social learning (Kolb, 1984; Leeuwis and Van der Ban, 2004) is more useful for building a broader understanding of innovation systems in developing countries. DUI focuses on innovations, on interactive and on the job learning through informal structures and relationships, which Lundvall considers highly relevant for developing countries. Informal institutions may include, personal and family contacts, community and social networks, informal credit for incremental innovation and adoption.

In sum, literature distinguishes three institutional dimensions of the innovation system supporting the innovation capacity of firm:

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1 In innovation systems literature, these issues are addressed economic sub-disciplines such as political economy, institutional economics, transaction costs theory, bounded rationality. In fact, these sub-disciplines are underlying theoretical pillars of the innovation systems theory.
DFID project research and policy development approach

‘Innovation systems’ is one of the focused themes within the DFID project for the research and the associated policy development. DFID proposed a set of research question related to innovation systems for the quantitative economic analysis in the countries of study. This involves a reductionist and deductive approach in defining variables for analysis (ceteris paribus) in which the impact of individual factors on innovation is assessed by applying econometric methods. However, developing a set of variables in a complex and fuzzy economic and institutional reality in LICs turn out to be not that easy to understand. One may overlook and miss certain essential factors that have not been acknowledged in existing theory because innovation materializes differently in LICs. For that reason an initial and holistic understanding of the institutional context and in the innovation system in the countries of study will strengthen the definition and validation of relevant variables for the analysis.

Moreover, the DFID research project aims to interpreting and translating research outcomes into meaningful policy implications. The understanding of the status of the innovation system dimensions in the respective country, including practices and actors, will serve as a ‘baseline’ facilitating the development and dissemination of the research findings and policy implications later on. A key challenge of Tilburg University and project partners, therefore, is to gain understanding and insights in the three institutional dimensions.

The formal STI institutions dimension in the countries of study is addressed by Technopolis, one of the Dutch DFID project partners specialized in innovation policy analysis. As the result of a series of interviews with policy makers in the countries of study, an innovation policy stakeholder meeting and dataset of key indicators of the formal STI innovation system through the so-called ‘country fiche method’, Technopolis developed the current Policy Diagnostic Report, which presents an overview of the formal institutions of the STI innovation system and the innovation policy framework of the government and state agencies in the countries of study.

The informal institutional context and the business system will be explored and analyzed in subsequent studies by the researchers of the ‘Innovation Systems’ theme group and PhD researchers of the DFID project. These will lead to a series of scientific publications of the multi-level studies into the national, regional and firm-level characteristics. In particular, the barriers of the innovation system that SMEs (manufacturing) face and how this affects performance and growth rates.

Towards the end of the project, the analyses of the various innovation systems dimensions will be brought together in a country case study synthesis reports and policy briefs. These documents aim to provide new and original insights as well as implications innovation policy with a view of raising productivity of firms through innovation leading to economic growth and poverty alleviation LICs.

Jaap Voeten (Tilburg University, Coordinator Policy Development and Dissemination DFID/CCS-I4PG)

References


1. Introduction

1.1 The Innovation and Growth Research project

In August 2011, DFID published a tender for the research project Co-ordinated Country Case Studies: Innovation and Growth, Raising Productivity in Developing Countries’ (from now: the “Innovation and Growth Research Project”. In January 2012, DFID selected Tilburg University to carry out the study together with its (local) partners, the University of Nijmegen and its subcontractors the African Study Center and Technopolis Group.

The overall aim of the project is to identify policies and institutions that help increase productivity and promote economic growth in developing countries through innovation. The project will:

• Identify the factors, institutions and policies that can increase the rate of innovation and productivity in developing countries, by doing case studies.

• Identify the country characteristics that determine the effectiveness of alternative policies for promoting innovation in developing countries to evaluate the effect of existing policies and institutions in developing countries.

Case studies will be carried out in 10 countries, with a focus on two themes: ‘Innovation systems’ and ‘Finance for Productivity Growth’.

Although the project mainly focuses on countries in Africa and Asia that according to the OECD categorisation ‘Least Developed Countries’ or ‘Other Low Income Countries’ (Kenya, Ethiopia, Tanzania, Uganda, Bangladesh), some other countries have been selected for reasons of comparability or to find contrasting cases. South Africa is such a country since it is regarded a ‘Middle Income Country’. Furthermore, Ghana, India, Vietnam and Indonesia are considered ‘Lower Middle Income Countries’.

The research process per country will consist of three phases:

• Exploration phase. General country descriptions for identifying the relevant research questions: Economic situation, poverty, interesting developments Description of the country in terms of innovation manifestations, policy measures, enabling environment, innovation capacity, societal innovation, policy context. This will be the first part of the case study report.

• Analysis of factors determining innovation and its effects. Hypothesis development from the general country descriptions. Data collection (secondary data review + primary data review) Data processing. Identification Analysis of factors, institutions determining innovation and macro-economic effects. This will be second part of the country case report.

• Dissemination: Compilation of the 1 and 2nd parts into the country case report and Interpretation and academic reporting into journals. Policy dissemination: policy papers and valorisation meetings.

The role of Technopolis in this project focuses on the second theme: ‘Innovation systems’.

1.1.1 The ‘innovation systems’ research theme

This project aims to understand the process of innovation, the diffusion of technology and productivity growth within a particular group of developing countries in Africa and Asia. In particular, it focuses on the barriers that SMEs and larger firms are confronted with related to these processes and how this affects their performance and
growth rates. On the basis of the case studies, cross-country comparisons will be made with regard to innovation and economic growth within a country.

This project aims to understand furthermore why different levels of innovative performance and economic growth exist across firms in developing countries. It also tries to understand the impact of regional characteristics (such as physical infrastructures, quality of the educational system, the strength of property right protection, presence of specialized suppliers, presence of regional collaborative networks, presence of multinational firms, and so on) on the innovative performance of firms. By using enterprise level surveys (based on the Community Innovation Survey) the Innovation Systems Research team initially identified the following research questions to be addressed:

1. What firm, regional and national-level factors hinder or foster the engagement of firms in innovative activities?

2. What factors hinder or foster the extent to which firms can successfully commercialize the outcomes of their innovative activities?

3. What is the impact of in-house innovation activities versus collaborative innovative activities or technology acquisition activities on the innovative performance of firms in developing countries?

4. What is the role of economic spillovers within clusters of firms in fostering economic growth and innovation?

5. What are the most critical barriers to the process of innovation in low income country setting

6. What types of links between the public/private sectors, universities, governments, NGOs and the private sector are more conducive to innovation activity?

7. What is the role of intermediaries to bring producers and user of innovation/knowledge together? What is the role of technology brokers, for example or other institutional mechanisms to increase such flows?

8. How can entrepreneurial firms capitalize on those resources that relate to distinctive capabilities to achieve superior innovative performance?

9. Which distinctive firm-level capabilities are conducive to innovation in developing countries?

For the research team to perform their surveys and research however, to have a good overview of a national system of innovation and the issues at play that foster innovation, key players in these systems need to be known, as well as profiling policies, institutions and infrastructure in place that govern the overall system and the linkages to global innovation systems. This analysis will be part of the general country descriptions of countries and innovation manifestations, policy measures and policy context that are being developed during the exploration phase of the research project.

1.1.2 Policy development approach

Different teams will work on this research project’s ‘Policy development approach’. The African Study Center will provide general country descriptions and analyse so-called ‘innovation manifestations’ based on deskwork. Technopolis Group will describe existing policy frameworks and innovation systems that promote manufacturing SMEs innovation capabilities. The following table and subsequent figure show the interdependence between the different teams.
Figure 1 Overall policy development approach: key questions, data and involvement of project partners

<table>
<thead>
<tr>
<th>Key questions and data</th>
<th>Project partner</th>
</tr>
</thead>
</table>
| **What is the economic situation - with particular reference to productivity - in the country of study? How did the economic situation evolve? Focus on macro:**  
  - Economic structure and sectoral changes (agriculture, manufacturing, services);  
  - Enterprise composition (informal, SMEs, Large, MNC);  
  - Economic growth figures (GDP);  
  - Productivity trends/figures;  
  - Development indices;  
  - Particularities of manufacturing SMEs. | ASC (General country descriptions) |
| **What innovation manifestations - raising productivity – in manufacturing SMEs in LICs lead (have led) to economic growth and development?**  
  - Innovation manifestations/manifestations of innovative sectors (micro/meso) | |
| **What are existing policy frameworks and innovation systems that promote manufacturing SMEs innovation manifestations?**  
  - What are the current innovation system elements (country fiche data)?  
  - What (evidence-based) policy approaches have been developed in documents, academic articles etc. for the country?  
  - What (direct and indirect) innovation policies have been formulated and implemented?  
  - What innovation policy lessons?  
  - What are the policy issues (obstacles, factors) that hinder/prevent manufacturing SMEs to innovate? | Technopolis (stakeholder meetings/policy issues reports) |
| **What causalities exist between obstacles/factors and innovation/productivity in manufacturing SMEs (firm level)?**  
  - Outcomes of quantitative analyses of theme 1 and theme 2 group | Dutch, African and Asian researchers (articles) |
| **What specific or additional policies and conditions are needed to ensure that manufacturing SMEs innovation contributes to inclusive development (sustainable development, job creation, poverty alleviation)?**  
  - What insights have been developed in the countries of study?  
  - What theoretical insights have been developed (academic fields, DFID)?  
  - How can this relate to the concept of transformational innovation and structural change? | JV concepts paper |
| **What policies promote manufacturing SMEs innovation manifestations?** | Policy papers |

The underlying idea of the policy development and dissemination component of the project is to formulate innovation policy involving the research evidence while strengthening the evidence-based policy making capacity within the African and Asian partner universities. Essential is the investigation of the local innovation policy issues (in the context of existing policy frameworks) as input for understanding the problem and articulating the research questions and hypotheses for the research. The understanding of the status of the innovation policy making in the respective country, including practices and actors, will serve as a 'baseline' facilitating the dissemination of the research findings in policy debates later on.

1.2 Our conceptual understanding of ‘innovation systems and policy’

The research carried out in this study should provide evidence and knowledge that can be used as input to improved policies on the national level to foster innovation and productivity. The research questions areas covered are:

- Understanding the process of innovation
- Identification of the factors that can increase innovation and analyse consequences for macroeconomic development

Several definitions could be referenced in this respect as developed by the OECD (OECD, 1997) amongst others: 'The network of institutions in the public and private sectors whose activities and interactions initiate, modify and diffuse new technologies (Freeman, 1987)'; 'Elements and relationships which interact in the production, diffusion and use of new and economically useful, knowledge and are either located within or rooted inside the borders of a nation (Lundvall, 1992)'; 'A set of institutions whose interactions determine the innovative performance .. of national firms (Nelson, 1993), and; 'The national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country (Patel and Pavitt, 1994)'.

Technopolis has worked for many years on the practical implementation and analysis of these concepts to learn about national and regional innovation systems. In this respect, the INNO Policy TrendChart (TrendChart), ERAWATCH and the Innovation
Union Scoreboard (IUS) initiatives that have been supported by Technopolis' input for many years have been instrumental in providing information and data on national innovation policies and a comparative assessment of innovation performance. More than ten years of data collection offer evidence-based policy lessons on the effectiveness of innovation policies.

However, this work does not want to pretend that there is a direct relationship between innovation policy measures and innovation performance indicators. As was stated in a recent report for the European Commission by Kincső Izsák, Pareas Markianidou (Technopolis Group Belgium) and Slavo Radošević (Professor of Industry and Innovation Studies at University College London)\(^2\) “Innovation performance is the outcome of a large set of factors and policies of which direct (normative) innovation policy represents only one among others”.

Furthermore, their report provides a good overview of the theories and concepts of innovation systems Technopolis Group uses in its daily work. A short summary of these concepts is provided below and this forms the basis for the work done by Technopolis’ consultants in the current Research for Growth project.

- Although innovation policy is one of the major factors affecting the innovation system, its effects are difficult to grasp. Policy instruments affect innovation activities of firms, and they in turn interact with market mechanisms and vice versa. The literature review in the above-mentioned report by Technopolis consultants mentions for instance Lundvall’s and Nelsons’ analyses on the complex nature of the relationship between the different elements of the innovation system, and the interactive nature of knowledge accumulation through links between the actors involved in the innovation process, which was in the years afterwards further emphasized by for instance Boekholt and al in 2001\(^3\).

- The review further describes the important influence of Arnold and Kuhlmann (2000\(^4\)) in this respect, who define an innovation system as being composed of demand side innovation, framework conditions for innovation (such as the regulatory framework, education system, intermediaries, infrastructures, IPR regime, venture capital and standards, et cetera). The elements can both enforce or block each other. The following figure shows these connections and the framework of Arnold and Kuhlmann. The relationships are not one-way interactions. Moreover, when influencing one part of the system, others might foster the same change and therefore effects are very difficult to attribute to a single policy or instrument. In the innovation policy thinking, this concept has evolved into the thinking about a portfolio of instruments or ‘policy mix’ rather than introducing individual instruments or measures to stimulate a change. The challenge is therefore to put in place and effective mix of policies that stimulate learning processes and links and that takes into account the positive and negative effects of different interventions.

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\(^2\) Lessons from a decade of innovation policy, European Union, June 2013
Figure 3 Research and innovation policy system and interventions


- Hekkert and al in 2006\(^5\) added to this that from a systems perspective innovation is the result of competition between innovation systems of sub-systems and cooperation between the systems. Furthermore, the policy mix is only as good as its implementation is. According to several authors, there is no single optimal policy model. According to the OECD, who has done various national innovation policy systems reviews, “finding an optimal policy mix is not a one-off exercise but a continuous process that adjusts to the dynamics of innovation systems”.\(^6\) Moreover, the governance and institutions that are in place very much influence the success of the policy mix.

Thus, according to this overview and our opinion, policy mixes are the first layer of direct incentives to innovation. Second, the institutions and actors and structural factors in an economy and society, the governance and so on, form an important factor of the success of innovation and productivity growth.

Our approach in this research project will focus on the first layer: the identification of the policy actors, the policy instruments and the policy mix. However, the full picture will only be obtained while taking into account the work done by the Africa Study Center and the Research Groups filling in the other factors influencing the innovative capacities of firms and institutions in the case countries.

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1.3 Our activities and contribution to the project

One of the objectives of the ‘Innovation for Growth’ project is to strengthen evidence-based policy making on innovation and productivity issues in developing countries. This implies “an increased use of high-quality evidence as the basis for developing innovation policies through stimulating researchers to emphasize the policy consequences of their research and making policy makers aware of the research results”.

Technopolis was asked to provide for each of the ten countries a good overview of a national system of innovation and the issues at play, key players, profiling policies, institutions and infrastructure in place.

Technopolis therefore was asked to support the Research Project on a number of different levels:

1. Support the ‘Innovation Systems’ theme researchers’ group in the conceptual understanding, research design and development of research questions.

2. Develop a ‘policy country fiche format’ as data collection approach for innovation systems, innovation policies and institutions and train and facilitate local researchers to populate these fiches

3. Make an inventory of ‘Innovation systems’ policy issues on location through the organisation of stakeholder meetings. These meetings also have the objective to: i) reach and involve user groups, ii) build relationships with them, iii) generate a better understanding of good practices and gaps in the system, iv) gain insight in the environmental factors and conditions influencing innovation and productivity

4. Develop ‘Innovation systems’ policy issues reports (now renamed: Policy Diagnostics Reports) for each country based on the input provided in the policy country fiche, scoping and background documents that were used as input for the stakeholder meeting, and the input obtained during the stakeholder meetings.

5. Contribute to the ‘recommendations’ sections of the final country case report drafted by the Innovation Policy research group.

The major contribution therefore of Technopolis is related to the ‘exploration phase’ leading to the organisation of the stakeholder meetings, the country fiche development and finally the Policy Diagnostics Reports.

1.3.1 The country fiches: the innovation policy systems

The Policy Diagnostics Reports (see next section) will be based, amongst more, on the ‘country fiche’ work done by local researchers. This fiche provides a good basic understanding of the countries’ systems, the policy measures and mixes in place, and more general information on the innovation policy actors, institutions and activities. These fiches are based on a well-structured template with clear definitions of the data and information to be gathered.

This template includes:

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8 This template is provided separately in the training package to the researchers
- Highlights: covering important and recent developments in the research policy / or national politics that highly affect the national RDI policy and system;
- Country characteristics: providing basic characterisations of the national and regional research and innovation systems and policies;
- Collection of research and innovation policy documents: covering all authoritative documents setting out R&D policy or influencing its development and implementation;
- Mapping of research and innovation policy support measures: covering relevant research programmes and other instruments being developed and implemented by national governments to achieve their policy objectives;
- Organisations: covering all major institutional policy actors and intermediaries engaged in the development, implementation, funding and review of R&D policy;
- Sources of information: covering the authoritative national sources of information on research related activities;

The local researchers are trained by the Technopolis consultants in a one-day training and are carefully monitored in the following weeks and supported where needed.

1.3.2 Mapping the innovation policy issues: The Policy Diagnostics Reports

The policy Diagnostics Reports are based on the outcomes of the meetings and field trips. As was stated in the inception report: “The country policy issues reports should include information on:

- Existing innovation policy measures/frameworks (possible variables include subsidies, programs, campaigns);
- Present enabling environment and elements of broader institutional context (possible variables include regulatory frameworks, institutional and policy reforms);
- Innovation capacities/behaviour (possible variables include critical skills, entrepreneurship characteristics and trust);
- Societal innovation policy results with regard to innovations, increased productivity with positive impact for poverty alleviation and sustainable development (possible variables include innovations, jobs, business set-up, equally distributed value creation).

These reports were to be drafted within 2 working days, which demonstrates the need for the reports to be very focused and tailored to the specific situation of the country. They principally focus on the input that was received during the stakeholder meeting. However, Technopolis consultants also used secondary literature as background and context information, and suggested to organise a number of individual interviews with the stakeholders on location to collect the information on policy issues in a most effective way. Although the country diagnostics reports reflect the differences in the data availability, contributions of the stakeholders in the different case countries, and the inputs delivered through the country fiches by the local researchers, they are all structured following a general template.
Figure 4 Template for the Policy Diagnostics Reports

1. Introduction

2. Brief overview of country trends (political, economic, innovation, etc) relevant for the current policy situation

3. Existing policy framework and innovation systems promoting innovation and productivity in SMEs
   i) Existing innovation policy actors
   ii) Existing innovation policy mix
   iii) Present enabling environment and elements of broader institutional context (possible variables include regulatory frameworks, institutional and policy reforms) with focus on SMEs

4. Policy challenges and obstacles for innovation and productivity for SMEs and larger companies

5. Lessons for innovation policy research (and hypothesis for policy research questions)

The reports thus will provide a thorough description of the policy environment, and provide an overview of the issues that have been identified during the stakeholder meetings and in the country fiche reports. It is however not in the scope of this work to provide a complete review of the innovation (policy) system nor the linkage to best practice innovation systems since this would require a in-depth analysis of the issues at stake, a larger set of interviews and further background research of the documentation. Especially in low and middle income countries ‘best practices’ as learned from Western countries with regards to innovation systems policies should be handled with great care, due to the local context, the political situation, and so forth. Partly this contextual work will be carried out by the Africa Study Center who will for instance focus on how key strengths in the innovation systems have led to the development of certain key industries (so-called ‘innovation manifestations’). However, these reports have not been used as input to these Country Diagnostics Reports and shall therefore be separately integrated in the final country case reports.

Nevertheless, the focus of these Policy Diagnostics Reports is clearly on supporting the Innovation System research team with identifying the most interesting and challenging research questions for the particular country and understanding the contextual factors in the innovation (policy) system better. It should provide the team with sufficient background understanding and knowledge to understand the outcomes of the fieldwork better and put them into perspective.

1.4 The South Africa Policy Diagnostics Report

The present report summarises the results of the field visit in South Africa in November (25-29) 2013 by the Technopolis team, Wieneke Vullings and Matthias Ploeg.

We would like to acknowledge the great support provided by the University of Pretoria in South Africa, and in particular: Prof. Tinus Pretorius, Prof. John Mugabe, Prof. H.C. (Bok) Marais of the Graduate School of Technology Management, University of Pretoria; the two researchers Kibii Komen and Patrick Kaya Agu and all interviewees and participants to the stakeholder meeting.

This report summarizes the findings of this visit. The ideas, the issues, the realities of the policy makers in South Africa are critical as input to feed into the research process.

The report is based on
- The scoping and background documents that were used as input for visit;
- The outcomes of the stakeholders’ meeting organised on 29 November, 2013;
- The outcomes of interviews the team had with innovation stakeholders from 25-29 October, 2013;
- The country fiche prepared by the South African researchers

The report presents a brief overview of country trends in terms of innovation performance and macro-economic development (2), the existing innovation policy framework and innovation policy mix (3), the main policy challenges and barriers to innovation discussed with the stakeholders (4), and the lessons learned for innovation policy research (5). It also includes in the Appendices the agenda of the stakeholder meeting and the list of participants.
2. Brief overview of country trends

2.1 Political trends

South Africa is a multi-racial democracy. Since 1994, The African National Congress (ANC) drives the policy agenda. The ANC is the governing party with the support, in a tripartite alliance, of the smaller South African Communist Party (SACP) and the Congress of South African Trade Unions (COSATU); other parties include Congress of the People (Cope; formed by ex-members of the ANC), the Democratic Alliance (DA), the Inkatha Freedom Party (Inkatha or IFP) and the Independent Democrats (ID). Jacob Zuma (ANC) is the current President. In 2014 new elections are planned.

2.2 Economic trends

The South African economy is the largest in Africa, and accounts for about 24% of the total gross domestic product of the continent in terms of purchasing power parity. The World Bank ranked it as an upper-middle income economy, which makes it the most economically advanced country of the ten case countries of this research projects. South Africa has achieved some remarkable performances. Its GDP per capita was around US$ 6,003 in 2012 and not different from some of the emerging countries such as Brazil with a GDP per capita of US$ 5,721 and China US$3,348 for the same year. It has a rich infrastructure with a connected road and railway network. The financial sector is well developed and comprises commercial and investments banks, pension funds and a stock exchange. The mobile telephony penetration is growing rapidly with 135 mobile subscriptions per 100 people in 2012.

The South African GDP grew steadily over the past 10 years (3.2% each year on average) to $ 384 billion in 2012. However, also South Africa suffered from the global financial backdrop and unemployment rates are still high (almost 25% with even a rate of 50% between 15-24 years). According to the World Bank, “the potential for faster growth has been held back by industrial concentration, skill shortages, labor market rigidities, chronically low savings and investment rates and spatial barriers from the former apartheid system”.

In 2013, the African Development Bank and OECD released alarming data showing a reduction in GDP growth lower than 1% and the prospects were not good, according to an Economist article in the same year.

The government has focused on pro-poor oriented public spending and the Millennium Development Goals (MDG) on primary education; gender, health and environment might be achieved. Much has been invested in social infrastructure and environmental management for instance. However, one of South Africa’s more
distinct historical legacies is the persistence of extreme inequality that manifests in a dual economy, where a highly-developed financial and industrial economy coexists with the large segment of poor rural and urban population living in the informal economy (this latter employs 24% of the labour force including domestic workers).

The top decile of the population accounts for 58% of the country’s income, while the bottom decile accounts for 0.5% and the bottom half less than eight percent. The Gini index for South Africa decreased slightly from 67.4 in 2006 to 63.1 in 2009. It however still shows higher inequality levels than measured before 2000 by the WorldBank and it is still the highest of all countries assessed by the WorldBank. Land distribution is a major issue with 55,000 white farmers owning 85% of the agricultural land. Despite all public efforts, there is poor quality of public health, education and infrastructures services, and there are modest job growth prospects leading to strikes in different sectors for instance. The laws make it costly to fire workers, which means there is strong bargaining power for the ones with a job and they are not affected by the jobless who would want to work for lower wages. The existing poor labour relations make hiring employees not very attractive for new and existing businesses.

Since only 28% of the adult South Africans has access to credit, entrepreneurship and growth are not much fostered\(^\text{13}\). Life expectancy of the average South African was in 2012 60 years due to high HIV, AIDS and TB infection rates.

Manufacturing is one of the key sectors in South Africa. The 2013 Country Manufacturing Competitiveness Index rankings in the Deloitte Manufacturing Competitiveness Report\(^\text{14}\) shows that South Africa scores 25\(^{\text{th}}\) out of 38 countries assessed.

The Manufacturing industry in South Africa, according to this report by Deloitte, employs around 1.7 million people and is currently the second-largest sector in the economy, accounting for 17% of GDP in 2012. The dominant Manufacturing activities in South Africa by value are petroleum and chemical products (25%), food and beverages (25%), iron steel and metal (20%), motor vehicles (10%) and wood products (8%). Manufacturing activity also has a multiplier effect on other sectors in South Africa. Historically, South Africa used to be seen as an attractive Manufacturing destination because of relatively low unit labour costs, cheap energy (until recently South Africa had one of the lowest electricity tariffs in the world) and relatively good transport and logistics infrastructure and a large natural resource endowment\(^\text{15}\). In line with structural changes in many economies, the finance, real estate and business services sector have increased its relative importance of 17 per cent in 1993 to approximately 24 per cent in 2012. In the available information no recent data have been found about the firm sizes within the manufacturing industry with specific attention to SMEs. However, it has been estimated by Statistics South Africa in 2000 that there were at that time over 1.6 million SMEs in South Africa, 10% of which were in the manufacturing sector.

### 2.3 Competitiveness trends

Since the DFID Research Project focuses on growth and competitiveness and the role of innovation, a few words should be written about the current state of competitiveness of South Africa. In the Global competitiveness Index of the World Economic Forum, South Africa ranks 52\(^{\text{nd}}\) and highest on the list of all African countries, together with

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Mauritius which shows again its advanced economical state compared to the other case countries. South Africa ranks slightly below the Southeast Asian average but higher than India and Russia\textsuperscript{16}. South Africa of all African countries scores in this WEF index high on Higher Education and training; Goods and market efficiency; Financial market development; Technological Readiness; Market Size; Business sophistication and Innovation. This could imply that there are fewer barriers for innovation and innovative behaviour of firms in South Africa than in the other case countries. South Africa also ranks high compared to other African countries in terms of development ‘ease of doing business’, which could be an indicator for the ease for small and medium size companies to start up their business. However, some problems may arise while starting up a business. It is especially hard for job-creating (growing) new enterprises to emerge because of the bureaucracy (red tape) and the stringent labor laws.

2.4 Science, technology and innovation trends

In terms of innovation, South Africa has achieved some remarkable scientific successes such as the first heart transplant and a vaccine against yellow fever. The amount of Gross Expenditure in R&D (GERD) increased steadily between 1997 and 2008 from 0.60% to 0.93% of GDP thanks to a positive economic growth and a rise spending on R&D in nominal terms due to the injection of public money, since 2002, as part of the National R&D strategy. The recent global crisis halts that pace as GERD fell from 0.92% in 2009 to 0.87% in 2010 making it difficult to reach the short-term target of 1%. The business sector is the largest funder and performer of R&D with 58.60% and 53.16% of research performed in 2009 and 2010 respectively. However, due to the global crisis, the BERD decreases as well\textsuperscript{17}. South Africa has the highest GERD amongst all Sub-Saharan African countries.

The country has established universities with five of them ranked among the top 100 universities of emerging economies, the University of Cape Town arriving at number three. Various entities such as the Human Science Research Council (HSRC) which conducts large scale, policy-relevant, social-scientific projects and has various programmes ranging from science, technology and innovation to HIV/AIDS and TB; the Council for Scientific and Industrial Research (CSIR) which undertakes directed and multidisciplinary research, technological innovation and industrial and scientific developments to improve the quality of life of the country’s people. In the African continent, South Africa dominated scientific production in 2008 with 47,000 papers published between 1999 and 2008.

The R&D expenditure by business enterprises has increased and constitutes a large fraction of GERD. The county has technologically strong, innovation performing business enterprises.

There is a real Government commitment, as expressed in the 2013 budget, to increase R&D expenditures. The research policy is guided by the White paper on science and technology of 1996, the National Research and Development Strategy (of 2002 and the 10-year innovation plan (2008-2018). These are policies to increase innovation for growth and development and to transform the country towards a knowledge-based economy.

R&D competences are highly concentrated in the two industrial provinces: Gauteng and the Western Cape (Erawatch, 2012).

\textsuperscript{16} The Africa Competitiveness Report 2013, WEF
\textsuperscript{17} Excerpt from the country fiche South Africa and based on the ERAWATCH country report 2012. http://erawatch.jrc.ec.europa.eu/
## Figure 5: Key Indicators

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GDP growth rate</strong></td>
<td>-1.5%</td>
<td>3.1%</td>
<td>3.5%</td>
<td>2.5%</td>
<td>OECD</td>
</tr>
<tr>
<td><strong>Input measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditure as % of GDP (GERD)</td>
<td>0.92%</td>
<td>0.87%</td>
<td></td>
<td></td>
<td>Erawatch country reports 2012: South Africa</td>
</tr>
<tr>
<td>Government expenditure on R&amp;D as % of GDP GBAORD</td>
<td>0.92%</td>
<td>0.87%</td>
<td></td>
<td></td>
<td>HSRC. <a href="http://www.dst.gov.za">www.dst.gov.za</a></td>
</tr>
<tr>
<td>BERD as % of GDP</td>
<td>0.54%</td>
<td>0.46%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School institutions (% gross) enrolment in tertiary</td>
<td>837,779</td>
<td>892,936</td>
<td>938,201</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent applications (per million inhabitants)</td>
<td>822</td>
<td>821</td>
<td>656</td>
<td></td>
<td>World bank</td>
</tr>
<tr>
<td>Scientific and technical journal articles (per million inhabitants)</td>
<td>2,864</td>
<td>2,915.5</td>
<td></td>
<td></td>
<td>Trading Economics</td>
</tr>
<tr>
<td>High-technology exports (as % of GDP)-current USD</td>
<td>0.48%</td>
<td>0.39%</td>
<td>0.47%</td>
<td></td>
<td>World bank. Own calculations</td>
</tr>
<tr>
<td>FDI in US dollar (millions)</td>
<td>5,353</td>
<td>1,224</td>
<td>5,889</td>
<td></td>
<td>World Bank</td>
</tr>
</tbody>
</table>

R&D: Research and Development GDP = Gross domestic Product; GERD = Gross expenditure on R&D; GBOARD = Government Expenditure on R&D; FDI = Foreign Direct Investment; Business expenditure on R&D = BERD

There are however also many hindrances to innovation and the innovation system and some of them are due to the country’s history. A few have been listed here.

First, the legacy of exclusion of the majority of the population from educational opportunities and the belief of the existence of educational fields reserved to a specific population group for such a long period persist in the form of very limited human resources. The quality of education remains poor across the entire value chain due to a lack of resources, facilities and qualified teachers, especially for institutions in remote areas.

Second, IT infrastructures are lagging behind. As an illustration, the number of fixed broadband Internet subscribers was around 2 per 100 inhabitants in 2012 despite a high penetration of mobile telephony.

Third, the ageing of the white population of researchers and engineers has further weakened the skills base. There is a pronounced human resource shortage at all levels in mathematics, science and technology; and a constrained availability of skilled labour that affects negatively the production of goods and services in the whole economy. The percentage of labour force with tertiary education was 16.5% in 2011 compared to 39% for Belgium or 32% for France for the same year.  

Fourth, besides its social costs, HIV AIDS poses a threat by reducing the supply of teachers. It disrupts the schooling of a whole generation due to the loss of family...  

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18 Excerpt from Country Fiche South Africa
members and erodes the country’s efforts to build a stronger and demographically restructured human resource base.
3. Existing policy framework and innovation system

3.1 The 2030 National Development Plan (NDP)

The current government in South Africa is aware of the huge challenges ahead to improve the society at large. Its vision and priorities are outlined in the 2030 National Development Plan (NDP).\(^9\) Released in 2012, the report is the product of extensive nationwide consultations led by the National Planning Commission, an independent advisory body consisting of 26 eminent people drawn largely from outside government, appointed by the current administration to draft a vision and development plan for the country. The National Development Plan aims to eliminate poverty and reduce inequality by 2030 by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society. The NDP was embraced by the ANC at their 2012 National conference as a platform for united action by all South Africans to eradicate poverty, create full employment and reduce inequality. The Cabinet has also endorsed the NDP as the country’s overarching strategic plan to implement its development vision. It also underpins the 2014 Budget. The two main strategic goals framed by the NDP 2030 vision are to double the GDP by 2030 and eliminate poverty, and reduce inequality, as measured by the income Gini coefficient, from 0.70 to 0.60.

The NDP is an answer to a number of identified challenges in the South African society in the ‘Commission’s Diagnostic Report’ of June 2011. It identified a failure to implement policies and an absence of broad partnerships as the main reasons for slow progress, and set out nine primary challenges:

1. Too few people work
2. The quality of school education for black people is poor
3. Infrastructure is poorly located, inadequate and under-maintained
4. Spatial divides hobble inclusive development
5. The economy is unsustainably resource intensive
6. The public health system cannot meet demand or sustain quality
7. Public services are uneven and often of poor quality
8. Corruption levels are high
9. South Africa remains a divided society.

The NDP therefore prioritizes three objectives: i) raising employment through faster economic growth, ii) improving the quality of education, skills development and innovation, and iii) building the capacity of the state to play a developmental, transformative role.

Developing SMEs is a key focus of the NDP, since they are seen as central to job creation efforts. However, empirical data on SMEs structurally seem to lack, although there are some good reports written, such as the SBP ‘SME Growth and Competitiveness Index report’\(^20\) that tracked a sample of 500 SMEs in three sectors.

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\(^9\) http://www.npconline.co.za/pebble.asp?relid=25
that with high-growth potential (manufacturing, business services and tourism). This is an interesting opportunity for the researchers of this research project to focus on since there is still a need for further empirical data, which can be provided through this research project, to understand better what factors hamper or foster innovation in those firms.

### 3.2 Innovation policy and strategy promoting innovation and productivity in SMEs

The end of apartheid in 1994 marked a new era for South Africa’s STI policies. These were redefined within a National Innovation Systems approach\(^{21}\). This system is currently populated by a growing number of public institutions, advisory bodies and funding agencies, guided by multiple strategies and policies that steer STI activities.

#### 3.2.1 STI policies

The Department of Science and Technology (DST) is responsible for STI policy formulation; The Department of Trade and Industry (DTI) has also a number of programmes in place to support innovation. The Department of Higher Education and Training (DHET) funds the largest part of the research. Furthermore, the National advisory councils such as the one for Innovation (NACI) and the Research foundations that operate programmes of the Departments play a role, as well as the Technology Innovation Agency (TIA), to name a few of the important organizations (further information on the NIS stakeholders will follow in the next section).

Current policies build on the initial White Paper on Science and Technology (1996) and the subsequent South Africa’s National Research and Development Strategy NRDS\(^{22}\) (2002) gives priority to a few technology platforms in key sectors (biotechnology, ICT, advanced manufacturing, and poverty alleviation).

In 2007, the Cabinet adopted the National Industrial Policy Framework\(^{23}\) (NIPF) of DTI. It contains an Innovation and Technology Strategic Programme. The Industrial Policy Action Plan II (DTI) prioritises sectors to enhance manufacturing as one of the key driving levers of economic growth and job creation.

In 2008, DST launched a Ten-year Innovation Plan\(^{24}\) to guide transition toward a knowledge-based economy. The purpose of this Ten-Year Innovation Plan is to help drive South Africa’s transformation towards a knowledge-based economy, in which the production and dissemination of knowledge leads to economic benefits and enriches all fields of human endeavor. The plan builds on previous work undertaken by the Department of Science and Technology (DST). It is a high-level presentation of the principal challenges identified by the DST.

The core projections for 2018 are summarised as South Africa’s “grand challenges” in science and technology.

These grand challenges are:

- The “farmer to pharma” value chain to strengthen the bio-economy. Over the next decade, South Africa must become a world leader in biotechnology and the pharmaceuticals, based on the indigenous resources and the expanding knowledge base.

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\(^{21}\)This is the formal name of the policy approach that was taken.  
\(^{22}\)http://www.dst.gov.za/  
\(^{23}\)http://www.sarpn.org/documents/d0002722/  
South Africa should become a key contributor to global space science and technology, with a National Space Agency, a growing satellite industry, and a range of innovations in space sciences, earth observation, communications, navigation and engineering.

- The race is on safe, clean, affordable and reliable energy supply and; South Africa should meet its medium term energy supply requirements while innovation for the long term in clean coal technologies, nuclear energy, renewable energy and the promise of the 'hydrogen economy'.

- Global change science with a focus on climate change. South Africa position will enable the country to play a leading role in climate change science.

- As a leading voice among developing countries, South Africa should contribute to a greater global understanding of shifting social dynamics and the role of science in stimulating growth and development.

The plan is built on the foundation of the national system of innovation (NSI). It recognizes that South Africa's prospects for improved competitiveness and economic growth rely largely on science and technology. It states that the NSI must become more focused on 1) long-range objectives, 2) commercialization of the results of scientific research, and 3) inadequate production (in both a qualitative and quantitative sense) of knowledge workers capable of building a globally competitive economy. Drivers for progress are:

- Human capital development
- Knowledge generation and exploitation
- Knowledge infrastructure
- Enablers to address the innovation chasm between research results and socioeconomic outcomes.

In 2009, the Technology Innovation Agency (TIA) was established, and in 2010 the Economic Development Department (EDD) adopted the 'New Growth Path' as the framework for future economic policies. STI policy is in practice solely a national competence, leaving no explicit role for it at regional level. However, each province implements economic development initiatives that attract investment and potential research, such as the Gauteng Province with its Innovation Strategy of 2010. Also, for different sectors strategies have been developed, such as for the advanced manufacturing sector (AMTS). This is a Cabinet-approved national strategy of the DST.

The AMTS is hosted by the Council for Scientific and Industrial Research (CSIR) and implements the strategy currently directed towards the technology needs identified by the automotive and aerospace industries relying on dynamic collaboration between industry, academia and science councils. AMTS invests in the development of technology platforms that increase competitive advantages. These partnerships have culminated in a portfolio of projects on i.e. production technologies, light-weight materials; advanced electronics, advanced production technologies - including mechatronics, robotics and digital and micro-manufacturing - as well as human capital development and technology transfer interventions.

These STI policies are applicable to all actors in the South African ‘innovation system’, including SMEs in the less developed zones of South Africa. Obviously, some specific policies have set eligibility criteria that exclude or include specific organisations,

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3.2.2 Evaluation and reviews of the National System of Innovation

In 2002 the Centre for Science, Technology and Innovation Indicators (CeSTII) was established in the Human Sciences Research Council (HSRC) and commissioned by the DST to conduct annual R&D Surveys and regular Innovation Surveys. The aim was to establish a baseline set of indicators for DST to monitor progress in achieving the National System of Innovation and R&D Strategy goals, to provide inputs for policy makers and a basis for international comparison.

The two main surveys are the National R&D survey\(^{27}\) and the South African Innovation Survey\(^{28}\). The former is an annual survey of national research and experimental development inputs while the latter is an effort to establish a baseline set of S&T indicators for monitoring, reporting on and fine-tuning the National System of Innovation. A wide range of internationally comparable indicators and data can be developed from the two surveys comprising official S&T statistics for the National Statistical System. These data are also submitted to the Organisation for Economic Cooperation and Development (OECD) for publication.

Moreover, the establishment of the Dept. of Performance monitoring and evaluation in 2010 supported the development of an extensive reporting system of all actors in the system.

These two initiatives, the African Science, Technology and Innovation Indicators (ASTII) initiative and the HSRC/ Cestii (Center for science, technology and innovation indicators) are important entrances for the study on innovation systems and the evidence-based policy making efforts that will be carried out during this DFID research programme.

The National System of Innovation has been reviewed a number of times in the past years. One example is the OECD Review of 2007 that identified a number of challenges, such as the following. First, although the NIS perspective has gained influence in the policy community, it has had little focus on the role of businesses in the system and for innovation, and the key role played by innovation-generating activities other than R&D such as in the services sector. Second, resources have been allocated to many different activities, leading to sub-critical investments. Third, the OECD mentions the lack of connection between strategies and their implementation. Fourth, there is little specialisation and differentiation between the roles of the actors in the system. Fifth, the roles between the different actors should be clarified better, and the oversight was lacking at the time of publication of this assessment. Also, and finally, the links between national and local level policies were lacking which poses a challenge on the South African NIS\(^{29}\).


ESASTAP Workshop, East London, 27 May 2013 Winston Baatjies, Innovation Planning and Instruments, DST

In 2012, a Ministerial Review Committee has been given the mandate to appraise and make recommendations on the current STI landscape in South Africa led by Professor Loyiso Nongxa. This report provides a critical and comprehensive review of the national system of innovation, providing concrete recommendations to address identified constrains in five areas: (1) governance of the national system of innovation (NSI), (2) enabling environment for innovation in the private and social sectors, (3) human capital, (4) monitoring and evaluation, and (5) financing of the NSI. The outcomes of this review will be discussed further in the chapter on policy challenges and obstacles for innovation.

The performance of public organisations, including public research institutes, higher education institutions and science councils is monitored and published in their annual reports. Some capacities to monitor research performance have been developed in the two advisory councils: NACI and CHE are responsible for advising the DST and DHET respectively. CHE has a Monitoring and Evaluation Directorate, responsible for monitoring the activities of higher education institutions. Its functions relate exclusively to the assessment of the quality of teaching and learning programmes rather than research activities.

3.3 Existing innovation policy actors

3.3.1 Government bodies

At the political level, the key actor is the Parliament, which legislates on all policy matters and budget. It is advised by the portfolio of committee on science and technology. The Presidency oversees accountability and is assisted by the National Planning Commission (NPC) and the Department of Performance Monitoring and Evaluation, which provide oversight for all policies across all national government departments.

At the operational level, the key actor is the DST, under which the National Research Foundation (NRF) and the Technology Innovation Agency (TIA) function. The National Advisory Council on Innovation is a legislative entity. The Council for Scientific and Industrial Research (CSIR) is committed to
supporting innovation in South Africa to improve national competitiveness in the global economy. Science and technology services and solutions are provided in support of various stakeholders, and opportunities are identified where new technologies can be further developed and exploited in the private and public sectors for commercial and social benefit.

Public funding of research and development is mainly executed by the National Research Foundation (NRF), indirectly executed through the New Funding Framework of the Education of the Department of Higher Education and Training, direct funding flows from DST, the Medical Research Council (MRC) and the TIA. Other relevant research funders include the South African Water Research Commission (WRC) and the South African National Energy Development Institute (SANEDI).

The primary objective of the Human Sciences Research Council (HSRC) is to initiate, undertake and foster strategic basic research and applied research in the human sciences, and to gather, analyse and publish data relevant to developmental challenges in South Africa, elsewhere in Africa and the rest of the world, especially by means of projects linked to public sector-oriented collaborative programmes.

The Africa Institute of South Africa (AISA) that is now incorporated into the HSRC had as objectives to produce and encourage knowledge production and dissemination on African current affairs, to increase the reservoir and quality of researchers and develop and implement capacity-building programmes.

Other important funding agencies include the Small Enterprise Development Agency (SEDA) – that manages the Technology Transfer Fund (TTF) for small enterprises, and the Industrial Development Corporation (IDC), the WRC, the SANEDI, and the MRC.
3.3.2 Universities and Research institutes

The key actors that perform R&D in South Africa are the business sector, the public research institutes and the universities.

The performance of research and innovation is spread across 23 universities, 9 science councils and some fifty public research institutions including museums and government departments with research capacities, the business sector and the non-governmental organisation sector.

South African has 23 public universities from which:

- 11 institutions academically oriented traditional universities providing undergraduate and postgraduate degrees and research capacity;
- 6 vocationally oriented universities of technology;
- And 6 that offer undergraduate and postgraduate degrees with research capacity.
In addition to these universities, there are 109 registered private higher education institutions focused on instruction rather than research, 50 public and 491 private further education and training (FET) colleges offering post secondary qualifications below the level of Higher Education Institutions (HEIs) with a combined enrolment of more than 325,000 in 2012. Scientific publications emerge mainly from the top five research-intensive universities (Cape Town, Witwatersrand, Pretoria, KwaZulu-Natal and Stellenbosch University), which account for about two thirds of all publications in the country.

It is worth mentioning that international collaboration in scientific publications have also been on the rise, with an observed higher co-publication with foreign parties (mainly Universities in Europe and the US) – including prolific collaborating institutions with top universities such as Oxford, Harvard, Columbia Universities and the London School of Tropical Medicine in health-related publications focused on infectious diseases.

3.3.3 Vocational Education, Polytechnics and Training Institutes

In addition to these universities, South Africa has further education and training (FET) colleges that offer post-secondary qualifications below the level of HEIs. There were in 2009 275 public FET colleges and 344 private FET colleges with combined enrolment of 280,000 (DHET, 2009).

3.3.4 Business

Cross-sector funding is substantial: business funds 11% of the R&D performed by Universities, government funds over 20% of BERD, and foreign sources fund 11% of the R&D performed by businesses, government research institutes and higher education respectively (NACI 2009). The contribution of foreign funding to R&D in South Africa has grown from almost zero in 1994 to over 10% in 2008/09.

In the private sector, SASOL (an energy and chemicals company) is the single largest R&D performer in the business sector (5% of total BERD), mostly involved in research on conversion of coal and liquid natural gas to oil, polymers and fertiliser. Secondly, Eskom (the state-owned electricity generator and distributor), was developing the Pebble Bed Modular Reactor (PBMR) since the early 1990s (to be completed in 2018), with R&D expenditures that peaked at about €100m (1b Rand) per annum before the project was abandoned in 2011. A major pull in the demand for knowledge will be the implementation of the SKA project, an international cooperation project with a total budget of €1.5 billion that is expected to attract further R&D investment and technical skills from both local and foreign sources.

From the government perspective, specifically the Industrial Development Corporation (IDC) and its Small Enterprise Finance Agency (SEFA) are supporting (small) business in the country. The SME Growth & Competitiveness Index 2014 shows that, based on a sample of 500 SMEs, the aggregate annual increase in turnover was 13% across the sample, which is a small growth above inflation.

30 Excerpt from Country Fiche South Africa
31 Excerpt from Country Fiche South Africa and Erawatch 2012.
32 SBP (2014) Growth & Competitiveness For Small Business in South Africa
3.4 Existing innovation policy mix

It has often been said in the policy documents, reviews and evaluations mentioned before that South Africa has an extensive NIS in place, but has not (yet) been able to implement the strategies that has been developed to full length. For an extensive overview of the existing policy mix it is advised to read the Erawatch 2012 report. Much of the content of this chapter has been derived from this report, in addition to the country fiche information and interviews held with policy makers and the background information they have provided. We have focused here on those instruments and policy measures that are mainly relevant for innovation and competitiveness and the SMEs in South Africa.

3.4.1 Governance & horizontal research and innovation policies

In 2009/2010, the Government funded 32% of all R&D expenditures. A large share of the funds was among science councils. Government to government funding for R&D accounted for 58% of public R&D expenditures while government funding of the private sector R&D accounted for a further 21% of public R&D funding. In-house government R&D expenditures were divided among public research institutes 52%, provincial departments 23%, national departments 22% and museums 3%.

Through the National Research Foundation (DST), research is being funded through thematic calls. Also, technology assistance of innovative procurement to state companies is being given.

3.4.2 Knowledge (traditional and technological) transfer

The TIA has grants available to support R&D investment targets and associated commercialisation of outputs. Based on the Ten Year Innovation Plan, collaborative work along value chains is being encouraged, for instance through the DST Centres of Excellence (CoE) programme that should stimulate public-private partnerships.

3.4.1 Improvement of skills and education

The Technology and Human Resources for Industry (THRIP) creates opportunities for postgraduates to work with industry while finishing their higher degrees or PhDs, opening prospects for future employment of researchers in the private sector. The funds for such student support are shared between government and industry. THRIP is designed to foster collaboration among industry, HEIs and SETIs by: (a) funding business research projects where project leaders are on the academic staff of universities, (b) matching investments by industry in projects where researchers from Science, Engineering and Technology Institutions (SETIs) serve as project leaders and students are trained through the projects, and (c) promoting the mobility of researchers through the Transfer of People (TIPTOP) schemes that promote the mobility of researchers and students between the industrial participants, HEIs, and SETIs. This programme is currently being evaluated through an impact assessment.

The Youth Technology Innovation Fund introduced by TIA in 2012 offers vouchers for young clients to access technology innovation support from service providers. It provides financial and non-financial support.
3.4.2 Innovative enterprise creation and growth

The government provides funding to R&D performing firms through the **R&D tax incentive programme** introduced in 2007 and amended in 2012, which gives a 150% tax deduction for expenditure on eligible scientific or technological R&D undertaken by enterprises or individuals.

The **Tshumisano programme** supported R&D in SMEs through technology stations programme based at Universities of Technology across the country. The Support Programme for Industrial Innovation assists South African industry through competitive bidding on financial assistance for technology development. In 2010 the Tshumisano Technology Thrust was integrated in **TIA** together with other agencies such as the Advanced Manufacturing Technology Strategy (AMTS) implementation unit, BioPad, LifeLab, Cape Biotech, PlantBio, the National Bioinformatics Network, and the Innovation Fund. According to the Erawatch report, there are indications of an existing degree of entrepreneurial and interactive capability that can create spin-off firms, as well as some government support for such initiatives. Through FY2012, a total of 1,918 SMEs had received technology support through the Technology Stations Programme (DST, 2012c).

In addition, the **SEDA STP Technology Incubators programme** helps to incubate start-ups in the so-called second economy. In STP, a number of initiatives have been integrated: GODISA; the three dti incubators; the National Technology Transfer Centre (NTTC); the Technology Advisory Centre (TAC); the technology transfer activities of the Technology for Woman in Business Programme and the SMME support activities of the South African Quality Institute (SAQI). Currently, 42 incubators have been supported, 376 SMMEs and 2301 new jobs were created.

3.4.3 Markets and innovation culture

The **Support Programme for Industrial Innovation (SPII)** assists South African industry through competitive bidding on financial assistance for technology development after the basic research phase and through until pre-production of a prototype. It has implemented matching and partnership schemes and supports the small and large industry until the production of prototypes. It is managed by the Industrial Development Corporation (IDC). In 2011, 20 projects were funded, of which about 40% were SMEs. Historically, a strong focus has been put on the ICT sector. IDC also support early stage venture funding and capacity building (coaching). It founded in 2012 The Small Enterprise Finance Agency (SEFA) with access to R1.4 billion for South African small businesses over the next three years. Its challenge is now to identify entrepreneurs and build capacity in order to receive good business plans and build a pipeline of good proposals.

DST and other government departments contribute to the government’s **Competitive Supplier Development Programme (CSDP)**. The programme aims to increase the participation of local companies in procurement opportunities from large state owned enterprises.

In order to put a mechanism in place to encourage, monitor and quantify intellectual property resulting from publicly funded R&D, DST established a **National Intellectual Property Management Office (NIPMO)** in 2011. It supports the development of the TTOs at universities and public research organisations. According to the Erawatch report, In development of TTO capacity, NIPMO supports institutions with funding of €1,7million over a three-year period, IP analysis tools, and training (DST, 2012b). The TIA should complement NIPMO by actively promoting

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33 Excerpt from ERAWATCH report.
commercialisation and technology transfer by and at South African research institutions.

3.5 Initiatives specific to SMEs or general support applicable to SMEs
The SBP Growth & Competitiveness For Small Business in South Africa Report of 2014 provides a nice overview of the state support instruments that can be used by SMEs to increase their competitiveness. Many of these instruments have already been mentioned in the previous sections, and they mainly range from direct financing to grant funding and tax incentives. Recurring topics are: young entrepreneurs, black-owned SMEs, early stage financing, technical support, internationalisation, cooperation, training and skills development. The instruments are listed below:
Figure 8  State support for SMEs

**Initiatives specific to SMEs**

- Small Enterprise Finance Agency (SEFA) direct lending: financing to SMEs and cooperatives.
- Small Enterprise Finance Agency (SEFA) indirect lending: financing to intermediaries, joint venture, partnerships and other collaborative relationships.
- National Youth Development Agency (NYDA) grant funding: grants to young entrepreneurs.
- National Empowerment Fund (NEF) funding: various funding instruments to promote black-owned SMEs.
- National Empowerment Fund (NEF) non-financial support: technical support and assistance to SMEs.
- Small Enterprise Development Agency (SEDA) general support: technical support to SMEs.
- SEDA (Small Enterprise Development Agency) Technology Programme (STP): support to technology-based SMEs, with a stress on preventing early stage failure.

**General support applicable to SMEs**

- DTI 12i: Tax allowance for environmentally friendly manufacturing investments.
- DTI Manufacturing Development Programme Incentive: establishment cash grants.
- DTI Small and Medium Manufacturing Development Programme: part of the Manufacturing Development Programme, but applicable to SMEs only.
- DTI Manufacturing Investment Programme: part of the Enterprise Investment Programme: cash grants.
- DTI Co-operatives Incentive Scheme: cash grants to co-operatives in manufacturing, retail and services.
- DTI Small and Medium Enterprise Development Programme (SMEDP): manufacturing: cash grants for investment by offering SMEs in manufacturing and tourism.
- Export Market and Investment Assistance (EMIA): cash grant to promote exports of South African goods.
- IDC/DTI Support Programme for Industrial Innovation (SPIII): manufacturing: cash grants to private enterprises and SMEs in IT and manufacturing projects.
- DTI/CSIR National Foundry Technology Network: provides services, skills and R&D to develop a globally competitive foundry industry.
- DTI/IDC Manufacturing Competitiveness Enhancement Programme (MCEP): cash grant to encourage manufacturers to upgrade their production facilities.
- DTI Business Process Outsourcing and Offshoring (BPO and O) Investment Incentive: investment cash grants.
- DoL Business Process Outsourcing and Offshoring (BPO and O) Training and Skills Support Grant: cash grant for training purposes.
- DTI Small and Medium Enterprise Development Programme: Tourism (SMEDP): cash grant for capital investment: cash grant to expand existing facilities.
- DST Innovation Fund (IF): cash grant for companies doing R&D
- IDC/DTI Support Programme for Industrial Innovation (SPIII): information technology: cash grants to support technical development in IT and manufacturing
- DTI Small Enterprise Development Agency Technology Programme: supports early stage ventures in technology.
- NRF Technology and Human Resources for Industry Programme (THRIP): cash grant supporting research, technology and training.
- DTI Black Business Supplier Development Programme (BBBBDP): cash grant for black-owned businesses to gain access to business development services.
- Export Credit Insurance Corporation: underwriting export credit loans and investments outside the country.
- DTI Small Enterprise Development Agency: non-financial services and support.
- DTI Sector Partnership Fund (SPF): cash grant for partnerships in manufacturing, agro-processing and ICT sectors.
- DTI Critical Infrastructure Programme (CIP): cash grant for enterprises investing in infrastructure.

4. Policy challenges and obstacles for innovation and productivity for SMEs and larger companies

Many studies have been published already about the policy challenges and obstacles for innovation and productivity in South Africa. Recent examples are the already mentioned Erawatch report 2012, and the Final Ministerial Report of the Review Committee on Science and Technology published in May 2012. Not all will be discussed here to avoid repetition. However, based on these and other reports, the interviews and the stakeholder meetings a number of major policy challenges and obstacles have been identified relevant to this research project.

At the policy level:

- High unemployment and in the same time skills shortages remains a major challenge, exacerbated by trade union demands for higher pay and stricter labour laws. Moreover, inflation, health and poverty reduction are major challenges. Moreover, speeding land reform will remain a challenge. Persistent inequality and clustering of R&D in industrial regions limits R&D investment opportunities to geographic and demographic minorities.

- Looking at the different policies implemented to improve STI, there is much focus on the role of public institutions. However, the important role of the enterprises for innovation, training and education, scientific development and innovation seem to be less visible in the NSI.

- Three quarters of business R&D in South Africa is performed by large corporations in the formal sector, such as foreign multinationals and State corporations like Denel, Eskom, Transnet, and Sasol. The Ministerial review report points out the need to strengthen the linkages between business enterprises, government and research organisations, as well as increase the response of the system to the demand signals from businesses. However, according to the participants in the stakeholder meeting, STI policy currently seem not to level with SMMEs, but only with big companies that already have an R&D department. There is in general a large gap between the formal and informal sector in South Africa.

- Interdepartmental cooperation for innovation remains a challenge. The Ten Year Innovation plan is a DST plan and not a ‘national’ plan with all stakeholders involved. According to the stakeholders, leadership needs to be taken up on the national level in order to move away from working in silos. The departments have been working in silos, but slowly start to work in clusters. The strategies in place are sometimes even competing, and the implementation of agencies and instruments exist side by side but do not always connect. The roles in this value chain of the different actors and programmes could be much clearer, argue the stakeholders.

- There seem to be a tendency, according to the Erawatch report, to focus on medium and high-tech despite South Africa possessing low-tech and medium tech manufacturing competitiveness. The minerals-energy-complex also has significant research capabilities and competitive human capital capable of contributing significantly to R&D investments if supported systematically by South Africa's R&D policy.

- There is a small pool of researchers in South Africa. Transformation of inferior education systems and retention within the research system are major challenges in the provision of researchers.

At the implementation level:
A large number of organisations and programmes exist to support STI, with the risk of spreading the scarce resources over large number of activities. An often-mentioned challenge for South Africa is that there is a disconnection between the articulation of important technological and innovation priorities and their implementation.

Based on a survey amongst 500 SMEs in South Africa, a number of growth barriers have been identified. These are 1) a lack of skilled staff, 2) burdensome regulations, and 3) poor local economic conditions. Furthermore, it can be stated that 40% of the exporters identified currency volatility as one of the greatest shocks they had experienced in 2013 influencing their competitiveness.

Figure 9 Important growth barriers for SMEs

![SME competitiveness index 2014 – SBP](chart.png)

The manufacturing industry depends heavily on the local administration to attract people to specific locations. The high-growth SMEs seem to be most concerned about the skills shortages and the regulatory burden, reflecting challenges in the education and training system of South Africa. For manufacturing business specifically, labor law was the greatest hindrance mentioned in the survey, including the inability to dismiss staff. This was also mentioned in the interviews during the visit to South Africa a number of times. However, the survey also shows that SMEs are positive about the prospects for innovation in South Africa and that over half of the SMEs in the panel had introduced new products or services in the past year. In the interviews it was also stated that technical skills are often lacking. Even though there are many entrepreneurs, they do not often know basic management principles.

Commercialisation and translation of knowledge has always been a real challenge and still is so. However, improvements have been made according to the stakeholders and the foundation of TIA should be crucial in the further improvement. However, it seems that much pressure is being laid on TIA, who also is now responsible for the Regional Innovation Strategies but does not seem to be at full strength yet. This is an example of where plans are ready but implementation is still to be concluded.

Firms do not understand the policy system (of ‘jungle’ as they called it), according to the stakeholders. They are very confused and don’t know how to access the
different funding schemes and activities. This has some basic reasons such as the absence of access to Internet but also the complexity of the application procedures, internal processes and so forth. Many government organizations are aware of this challenge and try to build capacities at the level of the SMEs or larger firms, or develop user guides.

More precisely, these barriers define three main challenges that have been discussed during the stakeholder workshop making a strong consensus among the participants.

1. Challenges of implementation of all the strategies and policies
2. Insufficient capacity to put innovations in the market place and capitalise for further growth, but also reluctant users
3. Finance seems to be available, but getting access to it is a challenge, due to lack of awareness and capabilities
5. Lessons for innovation policy research (and hypothesis for policy research questions)

The initial key research questions were presented at the stakeholders’ workshop in South Africa as follows:

- Firm-level and regional-level factors hinder or foster the engagement of firms in innovative activities?
- Firm-level and regional-level factors hinder or foster the extent to which firms can successfully commercialize the outcomes of their innovative activities.
- Policy issues with regard to impact of in-house innovation activities versus collaborative innovative activities or technology acquisition activities on the innovative performance of firms.
- Issues concerning economic spillovers within clusters of firms in fostering economic growth and innovation.
- Policy issues regarding critical barriers to the process of innovation and the diffusion of technology.
- Identification of relevant policies to overcoming these barriers. Some innovation systems are more productive, measured by patent or other innovation measures for a given outlay.
- The issue of commercializing research for innovation. Links between the public/private sectors, universities, governments, NGOs and the private sector that are more conducive to innovation activities. The role of Universities for facilitating/propagating innovation in LICs.
- The role of demand side versus supply side policies (e.g. AMC, tax credit on R&D, techno parks, export processing zones, trade preferences) and the sectors/contexts in which they can be applied.

Additional research questions and issues have been discussed with the stakeholders:

- One should look at regional developments (cross-country), since infrastructure is very important for developing countries. Also, in the national level variables the international perspective should be taken into account. Many companies have international links. In addition, the perspective of the users should be taken into account in the research.
- An important issue is: what is defined as a firm? In developing countries you will only find few ‘formal’ firms but there is much activity in the formal sector. A dynamic perspective should be taken here. Also, when firms are referring to innovation, they often are referring to technology adoption, not radical innovation. This should be taken into account as well and fits with the definition of innovation in this research projects ‘something that is new to the firm’.
- The research project should capitalise on the data that has been collected in the specific policy programmes, such as THRIP, SEDA and SPII. TIA is an actor that should be involved in the research as well, although the organisation was not present at the stakeholder meeting and seems to have some problems. Their ultimate goal is to translate the outputs of the research in to innovation and results.
- Important issues and questions in the interviews were also:
- How are how firms can make better use of policy incentives and instruments?
- How can the links between large and smaller firms be strengthened?
- What would be interesting sectors to build these networks around? Examples given were advanced manufacturing, textile, medical devices, and food processing.
- How to accelerate growth of SMMEs through capitalisation on innovation?
- How can the firm’s innovation capabilities be further strengthened?
- How to further link ‘social innovation’ with technological innovation both on a policy level as well as on a firm level
- How to learn more about the outcomes of the policies? How to develop a theoretically sound M&E framework?

• Finally, a comment was made to the research team about the terminology of the country. The use of ‘low-income country’ for South Africa was discouraged by the stakeholders.
Appendix A Agenda of the stakeholder meeting

Workshop on Innovation Policy and System in South Africa
Graduate Centre, Hatfield Campus

29 November 2013

Main objectives of the workshop

The main aim is to articulate research questions and hypotheses for research that can contribute to the identification of factors, institutions and policies that can increase innovation and productivity in low-income countries.

Subsidiary Objective a: To get a clear overview and understanding of the current research and innovation system in Kenya, including its main strategies, actors and policy mix

Subsidiary Objective b: To investigate the main drivers and barriers in the NIS in Kenya, gaps in support to innovation for SMEs and larger firms, and barriers for building closer relations between HEI and firms

Subsidiary Objective c: To link the current policy mix with the existing barriers and define - based on identified best practices and gaps - research questions and hypothesis with a focus on improving the policy mix for innovation and productivity
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8.30</td>
<td>Registration, Tea and Coffee</td>
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<tr>
<td>9.00</td>
<td>Welcome Prof. Tinus Pretorius (Director, Graduate School of Technology Management (GSTM) University of Pretoria)</td>
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<tr>
<td>9.15</td>
<td>Dr. Jaap Voeten (Department of Economics, Tilburg University)</td>
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<td></td>
<td>- Introduction of the DFID project: Innovation research and policy development</td>
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<td>- Q&amp;A</td>
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<td>9.45</td>
<td>Dr. Gonzague Vannoorenberghe (Department of Economics, Tilburg University)</td>
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<td></td>
<td>- Explanation of the ‘Innovation Systems’ research framework</td>
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<td>- Q&amp;A</td>
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<td>10.15</td>
<td>Round of introduction of the participants</td>
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<td>10.30</td>
<td>Session 1</td>
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<td>Wienke Vullings and Matthias Ploeg – Technopolis</td>
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<td></td>
<td>Programme of the day</td>
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<td>Presentation on the scope of the work and the innovation systems perspective</td>
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<td>11.00</td>
<td>Tea and coffee break</td>
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<td>11.15</td>
<td>Session 1 continued:</td>
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<tr>
<td></td>
<td>Wienke Vullings</td>
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<td>First findings of the week on South Africa’s national innovation system.</td>
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<td><em>Bok Marais – impact ‘case’ of policy</em></td>
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<td>Reflection of South African policy stakeholder(s) on the NIS and the findings</td>
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<td>Followed by discussion facilitated by Bok Marais and Wienke Vullings</td>
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<td></td>
<td>- What is the current strategy?</td>
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<td>- Who does what in the NIS (actors)</td>
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<td>- What is the policy mix?</td>
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<td>12.15</td>
<td>Lunch</td>
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<tr>
<td>13.30</td>
<td>Session 2: Investigation of current policy issues in the research and innovation areas. Discussion facilitated by Bok Marais and Wie neke Vullings (Technopolis)</td>
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<td></td>
<td>• What are the main drivers and barriers in the NIS?</td>
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<td>• What are the main gaps to support innovativeness in SMEs?</td>
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<td>• What are the main gaps to build closer relationship between SMEs and HEI?</td>
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<td></td>
<td>Prioritisation of the issues</td>
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<td>14.45</td>
<td>Tea and coffee break</td>
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<tr>
<td>15.00</td>
<td>Continuation of session 2: Results of the prioritisation and short discussion facilitated by Bok Marais and Wie neke Vullings</td>
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<td>15.15</td>
<td>Session 3: Implications for policy and policy research</td>
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<td></td>
<td>Discussion facilitated by Bok Marais, Dr. Gonzague Vannoorenberghe and Wie neke Vullings</td>
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<td>• Based on the earlier defined barriers and problems for innovation and productivity, what ideal ‘objectives’ and ‘hypotheses’ can be defined for future policy and policy research?</td>
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<td></td>
<td>• What we can do as a research team (what is feasible)?</td>
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<tr>
<td>15.45</td>
<td>Dr. Jaap Voeten (Tilburg University)</td>
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<td></td>
<td>Summary and concluding remarks</td>
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<tr>
<td>16.00</td>
<td>Dr. John Mugabe (Graduate School of Technology Management, University of Pretoria)</td>
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<td></td>
<td>Closure of the day</td>
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The product of the workshop will be a ‘Innovation Policy Issues and Research Agenda’ report which we will share among the participants. The project will like to maintain in contact to exchange research outcomes on a regular basis with South African innovation policy makers, the ambition is that the policy makers can actually use the policy recommendations and demonstrate impact. The workshop is organized in the framework of the British Department for International Development (DFID) funded research project ‘Co-ordinated Country Case Studies: Innovation and Growth, Raising Productivity in Developing Countries’. The research project aims to identify factors, institutions, and policies that can increase innovation and productivity in African countries. Tilburg University is the lead partner in the project, which further involves Radboud University Nijmegen, Africa Study Centre and Technopolis. Web: http://www.tilburguniversity.edu/dfid-innovation-and-growth
EXPLANATION OF THE RESEARCH PROJECT

The British Department for International Development (DFID) granted Tilburg University (The Netherlands) a research project entitled ‘Co-ordinated Country Case Studies: Innovation and Growth, Raising Productivity in Developing Countries’. The project aims to identify factors, institutions and policies that can increase innovation\(^{34}\) and productivity in low income countries. The project is expected to produce robust research evidence on how to increase innovation so as to raise productivity and to support faster economic growth and job creation. The research will be carried out in close cooperation with African and Asian partner universities, which with the aim to strengthening the evidence-based policy making capacity within the partner universities. The University of Nairobi is the Kenyan partner in the project.

The project will further translate the research evidence into innovation policy insights and suggestions in consultation with policy makers in Africa and Asia. Consequently, an initial step in the research process includes the investigation of the local innovation policy issues as input for understanding the problem and articulating the research questions and hypotheses for the research. This investigation will be initiated through the organization of a stakeholder meeting in 10 African and Asian countries\(^{35}\), an interactive consultation which will bring together some 15 – 20 key policy makers.

Actually, a lot of innovation research and policy development (innovation systems) has been carried out in Kenya. In order to avoid re-inventing the wheel and build on current insights and lessons, the project team is currently analysing existing policy materials. From these the stakeholder discussions will be structured and facilitated by international experts in (European) innovation policy making. Moreover, to focus the discussion, the stakeholder meeting seeks policy issues that relate to the following:

1. Firm-level and regional-level factors hinder or foster the engagement of firms in innovative activities?
2. Firm-level and regional-level factors hinder or foster the extent to which firms can successfully commercialize the outcomes of their innovative activities.
3. Policy issues with regard to impact of in-house innovation activities versus collaborative innovative activities or technology acquisition activities on the innovative performance of firms.
4. Issues concerning economic spillovers within clusters of firms in fostering economic growth and innovation.
5. Policy issues regarding critical barriers to the process of innovation and the diffusion of technology.
6. Identification of relevant policies to overcoming these barriers. Some innovation systems are more productive, measured by patent or other innovation measures for a given outlay.
7. The issue of commercializing research for innovation. Links between the public/private sectors, universities, governments, NGOs and the private sector that are more conducive to innovation activities. The role of Universities for facilitating/propagating innovation in LICs.

\(^{34}\) In exploring innovation in LICs, a broad definition of innovation is implied, encompassing new inventions but also the spread, adaptation and adoption of pre-existing know-how and techniques, services, processes and ways of working in particular in manufacturing SMEs.

\(^{35}\) Kenya, Tanzania, South Africa, Uganda, Ghana, Ethiopia, Vietnam,
8. The role of demand side versus supply side policies (e.g. AMC, tax credit on R&D, techno parks, export processing zones, trade preferences) and the sectors/contexts in which they can be applied.

9. The role of intermediaries bringing producers and user of innovation/knowledge together (the role of technology brokers, for example or other institutional mechanisms to increase such flows).

Tilburg University is the lead partner in this project, which further involves Radboud University Nijmegen, Africa Study Centre and Technopolis. Website: www.tilburguniversity.edu/dfid-innovation-and-growth
Appendix B List of participants to the stakeholder meeting

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Location</th>
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<tbody>
<tr>
<td>Dr Sibongile Gumbi</td>
<td>Technology Innovation Agency (TIA)</td>
<td>Pretoria, South Africa</td>
</tr>
<tr>
<td>Mr. Cheka Mailula</td>
<td>Department of Science and Technology (DST)</td>
<td>Pretoria, South Africa</td>
</tr>
<tr>
<td>Boitshoko Sebogodi</td>
<td>Department of Science and Technology (DST)</td>
<td>Pretoria, South Africa</td>
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<tr>
<td>Dr Mathoto Thaoge</td>
<td>Department of Science and Technology (DST)</td>
<td>Pretoria, South Africa</td>
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<tr>
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<td>Department of Science and Technology (DST)</td>
<td>Pretoria, South Africa</td>
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<tr>
<td>Ms Portia Raphasha</td>
<td>Department of Trade and Industry (dti)</td>
<td>Pretoria, South Africa</td>
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<tr>
<td>Ms Nkuli Shinga</td>
<td>Department of Trade and Industry (dti)</td>
<td>Pretoria, South Africa</td>
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<tr>
<td>Ms Takalani Madima</td>
<td>Department of Trade &amp; Industry (dti)</td>
<td>Pretoria, South Africa</td>
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<td>InnovationHub</td>
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