SKILLS SUPPLY AND DEMAND IN SOUTH AFRICA

higher education & training

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Higher Education and Training
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LABOUR MARKET INTELLIGENCE PARTNERSHIP

THE
LABOUR MARKET INTELLIGENCE PARTNERSHIP
is a collaboration between government and a national research consortium that aims to build a credible institutional mechanism for skills development IN SOUTH AFRICA.

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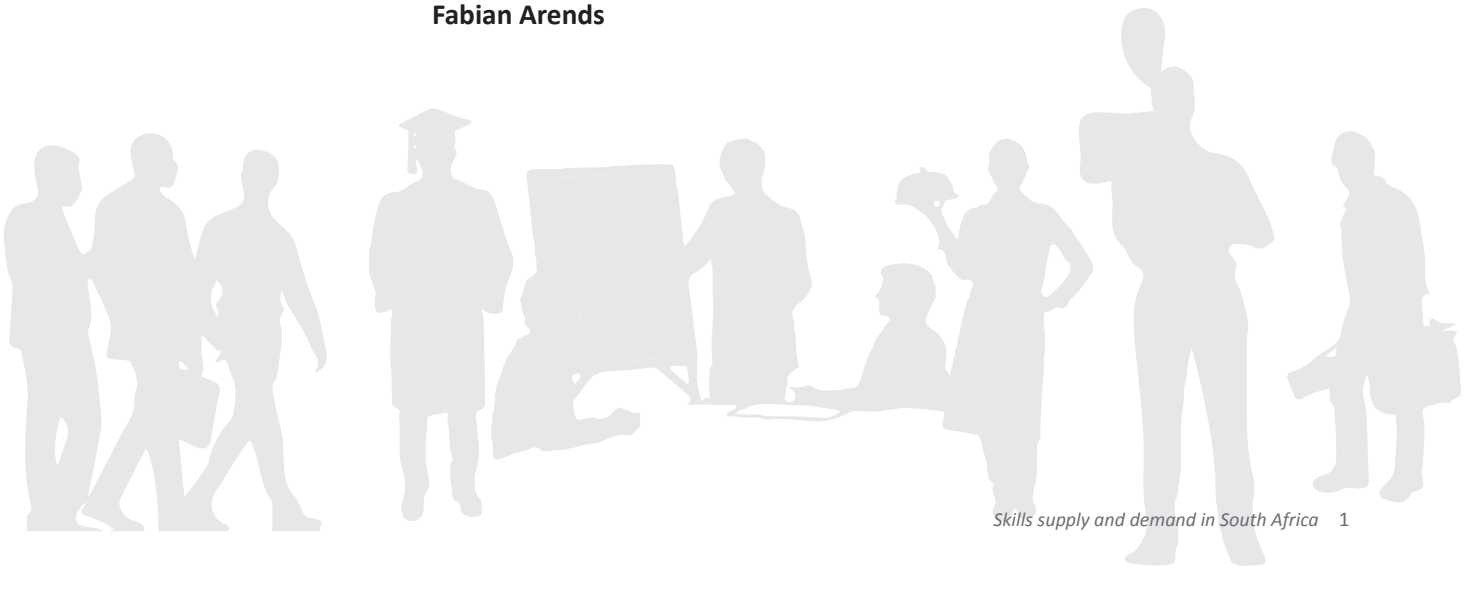

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ACRONYMS AND ABBREVIATIONS

AEO	African Economic Outlook
APDP	Automotive Production and Development Programme
BankSETA	Banking Sector Education and Training Authority
CAGR	Comparison of Average Annual Growth Rate
CESM	Classification of Educational Subject Matter
CHE	Council on Higher Education
CRDP	Comprehensive Rural Development Programme
DAFF	Department of Agriculture, Forestry and Fisheries
DBE	Department of Basic Education
DEA	Department of Environmental Affairs
DED	Department of Economic Development
DHA	Department of Home Affairs
DHET	Department of Higher Education and Training
DoL	Department of Labour
DPRU	Development Policy Research Unit
DTI	Department of Trade and Industry
ECD	Early Childhood Development
FASSET	Financial and Accounting Services SETA
FDI	Foreign Direct Investment
FET	Further Education and Training
GDP	Gross Domestic Product
GHS	General Household Survey
HE	Higher Education
HEI	Higher Education Institution
HEMIS	Higher Education Management Information System
HRDC	Human Resource Development Council
HRD-SA	Human Resources Development Strategy for South Africa
HSRC	Human Sciences Research Council
IDZ	Industrial Development Zone
ISCED	International Standard Classification of Education
ISETT	Information Technologies, Electronics, and Telecommunication Technologies
LFS	Labour Force Survey
LMIP	Labour Market Intelligence Partnership
MiWORC	Migrating for Work Research Consortium
MoE	Ministry of Education
MRV	Most Recent Value
NATED	National Accredited Technical Education Diploma
NCV	National Certificate Vocational
NDP	National Development Plan
NGP	New Growth Path
NPC	National Planning Commission
NPHE	National Plan for Higher Education
NQF	National Qualifications Framework
OECD	Organisation for Economic Co-operation and Development
OFO	Organising Framework for Occupations
OHS	Ordinary Household Survey
PISA	Programme for International Student Assessment
PIVOTAL	Professional, Vocational, Technical and Academic Learning
QLFS	Quarterly Labour Force Survey
RSA	Republic of South Africa
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SETAs	Sector Education and Training Authorities
SIPs	Strategic Integrated Projects
SME	Small and Medium-sized Enterprises
StatsSA	Statistics South Africa
STEM	Science, Technology, Engineering and Mathematics
TETA	Transport Education and Training Authority
TIMSS	Trends in International Mathematics and Science Study
TVET	Technical Vocational Education and Training
UKCES	UK Commission for Employment and Skills
UNICEF	United Nations Children's Emergency Fund
UNISA	University of South Africa
UNU-WIDER	United Nations University – World Institute for Development Economic Research
UoT	University of Technology
WB	World Bank

FOREWORD FROM DHET

It is my pleasure to present to you the first report on Skills Supply and Demand in South Africa. The Department of Higher Education and Training has identified the provision of credible information, analysis and signals on the demand and supply of skills as an important contribution to the establishment of the institutional mechanism for skills planning in South Africa.

This report is a product of the Labour Market Intelligence Partnership, which is undertaken by a consortium of research organisations led by the Human Sciences Research Council, in partnership with the Department.

The report is an important resource to inform the planning and provisioning of education and training, as well as to assist individuals to make appropriate career and educational choices. The report is expected to contribute to the improvement of the responsiveness of the post-school education and training system to the needs of the economy and society more broadly, by supporting decision-making on matters pertaining to skills planning. It is expected to be used as a strategic resource to inform supply-side planning in post-school education and training particularly in relation to the allocation of funds, development of strategies and prioritisation, development of qualifications and programmes that are relevant to the needs of the labour market and information for career development.

It is hoped that planners, funders, policy makers, education and training institutions, skills development providers, employers as well as the media will use this report to guide them on matters pertaining to skills planning and the provision of education and training.

The Department will strive to improve the accuracy of this report and be more responsive to stakeholders' needs. Your feedback, including suggestions for improvement, can be emailed to khuluvhe.m@dhet.gov.za.

Mr GF Qonde
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EXECUTIVE SUMMARY

This report provides a holistic understanding of the current supply and demand for skills in South Africa, and represents one of the first attempts to analyse how the two interact to inform future skills policy to support an inclusive economic growth path. The analytical approach used in this report represents a radical departure from manpower forecasting and attempts to understand the complexities and intricacies around how supply and demand interact, and the corresponding implications for reform.

Under this approach, using largely data for the 2010 to 2014 period from the StatsSA Labour Force Surveys and the Higher Education Management Information System, signals on current and intermediate demand for skilled, semi-skilled and low-skilled occupations are interpreted. The understanding of skills demand involved an exploration of the three inter-related aspects: the state of the economy; the characteristics of the employed and unemployed who make up the labour force; and current and intermediate demand from the analysis of changes in the structure of employment. We juxtaposed the signals of demand against the supply of skills from out of the formal school education system, the post-secondary education and training systems and also the workplace. The interaction between supply and demand provides the basis for interpreting signals on the nature and extent of skills shortages and mismatches facing South Africa. Only through understanding the complexities of how demand and supply interact is it possible to guide future investment and interventions, as well as support a move towards a more inclusive skills development path.

The South African labour force is made up of 15 million employed and 7.5 million unemployed people. Three quarters of the employed and 90% of the unemployed are from the African population group. Youth unemployment is particularly high at 45% and increasing as more young people join the labour force. 11.75 million persons of the labour force have less than a grade 12 certificate.

KEY TRENDS IN SKILLS SUPPLY AND DEMAND IN SOUTH AFRICA

- The South African economy has been characterised by low economic growth rates, leading to poor employment growth. This employment growth has not been sufficient to absorb the large numbers of youth coming onto the labour market for the first time. The end result is an escalating unemployment rate.
- A key constraint to sustainable job creation in South Africa is the structural mismatch between labour demand and supply. Under this mismatch the economic growth has favoured high-skilled workers, despite the fact that the majority of the employed and the unemployed have low level skills.
- The South African labour force is made up of 15 million employed and 7.5 million unemployed people. Three quarters of the employed and 90% of the unemployed are from the African population group. Unemployment is also particularly high amongst youth (15 to 34 years) and this is increasing as more young people join the labour force.
- The education level and skill base of the labour force is lower than that of many other productive economies. Of the employed population, 20% has a tertiary qualification, 32% has completed secondary education, and close to half of the workforce do not have a grade 12 certificate. Sixty percent of the unemployed has less than a grade 12 certificate. This translates to 11.75 million of the labour force with less than a grade 12 certificate.

- The sectors in which people work and the types of jobs available are changing. In contrast to pathways followed by other recently industrialised economies there is an absence of low-wage jobs in the manufacturing sector that could absorb the vast majority of unemployed who are looking for work. There has been a structural shift towards a service economy and a high dependence on high-skilled financial services. The former sector contributes towards growing the country's GDP, but offers negligible opportunities for employment growth. The only sector experiencing significant employment growth is the state sector and this is not sustainable.
- Access to schools, universities, and TVET colleges has improved. However, quality remains elusive, leading to low progression through programmes in all types of educational institutions, as well as low completion rates from schools, TVET colleges, and universities.
- A critical constraint on the education and training system and the labour market is the inadequate quality of basic education. Success in the school subjects of Languages, Mathematics and Science forms the basis for participation and success in technical subjects in post-school education and training institutions, and in the workplace. Presently, each year around 140 000 grade 12 students complete the matriculation examination with a bachelor's pass, and of these only around 50 000 students pass Mathematics with a score higher than 50%. The pool of students who can potentially access university and Science based TVET programmes is very small, in comparison to the skill demands in the country.

A critical constraint on the education and training system and the labour market is the inadequate quality of basic education.

- The university and TVET college sub-systems are the largest components of the post-school education and training system. In 2014, there were around 1.1 million students in the university sector and 0.8 million students in the TVET sector. Since 2010 the TVET sector has been expanding at an average rate of 23% per annum and the university sector has been expanding at an average rate of 2.1% per annum.
- Completion rates at both universities and TVET colleges are less than desirable in that in 2014 there were 185 000 completers from the university sector, 21 000 NCV4 and 57 000 NATED6 programme completers from the TVET sector.
- In both the university and TVET sectors the share of female enrolments is higher than the male enrolments. However the qualification differences support gender stereotypes in the literature, in that males are likely to study for the so-called masculine science, technology, and engineering-based subjects, whereas females are focused on so-called feminine subjects, such as Health, Education, and Social Sciences.
- Skills mismatch denotes the types of imbalances that occur between the types of skills developed and those needed in the world of work. Analysis of imbalances and mismatches provides signals to inform a skills policy response. In South African context, we can categorise mismatches into three main types: demand mismatch, educational-supply mismatch and qualifications-job mismatch.

In 2014 there were 185 000 completers from the university sector. 21 000 NCV4 and 57 000 NATED6 programme completers from the TVET sector.

  - *Demand mismatch* examines the shape and trajectory being followed by the economy, the types of jobs being created, and the skills set and expectations of the working-age population. A structural mismatch between labour demand and supply is the most significant type in the South African context, in that the economy and labour market show a demand for high-skilled workers, but there is a surplus of low-skilled workers.
  - *Educational supply mismatch* examines the type of skills produced by different levels of education and training systems, and the degree to which they respond to skills demand in specific occupations. Our analysis of the education supply mismatch currently experienced highlights the need to enrol and graduate higher numbers of STEM graduates from both universities and TVET colleges. Further, there is a need for higher enrolments and completions rates in the building and construction, metal machinery and related trades programmes.

Skills planning must take into account the challenges of economic growth and inclusive development. The skill planning focus goes beyond the small number of skilled people in the workplace, but also on the unemployed, the youth, the low skilled, the marginalised and the vulnerable.

– *Qualification-job mismatch* is comprised of two dimensions: firstly, the qualification gap which examines the match between the type of qualifications required by workers in medium and higher level occupations to perform their job effectively, and the actual type of qualifications held by those in such occupations. Secondly, it traces the sectors and occupations that the educational qualifications are absorbed into. This analysis revealed that there is a qualification gap in that less than half of managers, senior officials, technicians and associate professionals had a tertiary level qualification. Regarding the educational qualification-job mismatches, the evidence showed that higher education graduates tended to be employed in high-skilled occupations as managers, professionals, and technicians, and associate professionals. In contrast only a minority of those with TVET qualifications worked as technicians and associate professionals. Significantly, the data also revealed that nearly half of the higher education graduates are employed in the community, social and personal services sector. Finally, a high proportion of the Science and Engineering graduates, from both higher and technical vocational education sectors, prefer to work in the financial services sector, as opposed to the manufacturing sector.

KEY RECOMMENDATIONS FROM THE ANALYSIS OF SKILLS SUPPLY AND DEMAND

Our recommendations are based on an approach to skills planning that takes into account the challenges of economic growth and inclusive development in South Africa. The skills planning focus is not only on a small number of skilled people in the workplace, but also on the unemployed, the youth, the low-skilled, the marginalised, and those in vulnerable forms of employment, including the self-employed. The dilemma facing policy makers is how to respond to these diverse sets of development and occupational pathways, and decide how resources should be targeted for inclusive skills development. These imperatives may seem paradoxical, but each is essential to achieve a more inclusive growth and development trajectory.

We make five key recommendations:

CHALLENGES FOR ECONOMIC GROWTH AND DEVELOPMENT

Recognising that the South African jobs and skills history profile is different from the East Asian or European contexts, the economy must respond to the twin challenges of participating in a globally competitive environment which requires a high skills base and a local context that creates low-wage jobs (with supported training) to absorb the large numbers who are unemployed or in vulnerable jobs. The economy should start moving towards more labour-intensive forms of growth in order to absorb the growing levels of people, particularly young people, as first time labour market entrants. This will require significant changes to both industrial policy and the development pathways being pursued by the country.

STRONGER CO-ORDINATION BETWEEN GROWTH AND INDUSTRIAL POLICIES AND SKILLS POLICIES

More government co-ordination is needed, including stronger integration of government departments' growth strategies and strategies targeting skills development and education. Currently there are many national and provincial-level strategies that aim to promote local economic development and deal with unemployment. These growth plans must take into account skills requirements, or they will likely experience difficulties in implementation. Therefore, government departments must realistically estimate the skills needed for the implementation of the strategy and plan their human resource strategy in advance.

IMPROVED LEVELS OF EDUCATION AND SKILLS

A key constraint for improving skills levels of the population is the quality, progression, and completion within the basic education sector. It is clear that the quality of basic education, progression rates through the system and educational outcomes must improve. We recommend the following regarding education and skills.

- Students who do access post-school educational institutions must receive a quality education and achieve progress through the system and achieve higher educational outcomes.
- Given the high numbers of the employed and unemployed with less than a grade 12 education, SETAs must play a role in facilitating occupationally directed programmes targeting this group. Among the priority areas is the unemployed youth group, especially those with less than a grade 12 education.
- The post-school education and training sector must respond by increasing the supply of Science, Engineering and Technology graduates; teachers, especially secondary school Mathematics and Science teachers as well as Early Childhood Development professionals.
- At the technician level there is an under supply of Engineering technicians and associate professionals, as well as building and construction, metal, machinery, electronic and electrical and related trades.
- The NPHE targets and fundings should be reviewed to increase the shares of SET enrolments in university courses from the present 30% to 35%, especially in the areas of Engineering and Health Professions. The TVET sector must develop enrolment targets in line with skills needed for the labour market, and we recommend a target of 45% for NCV4 and NATED6 (N6) Engineering courses.

IMPROVED MATCH BETWEEN FIELD OF STUDY AND LABOUR MARKET DESTINATION

Over half of the country's graduates enter the Community and Social Services sector, which is dominated by the public sector. These positions offer graduates a relatively good salary, job security and other social benefits, such as healthcare and pensions. Unfortunately, this is distorting the labour market and not attracting graduates to the private sector labour market. The South African private sector must review its human resource strategies to attract more graduates to the sector.

IMPROVE THE EVIDENCE BASE FOR FUTURE REPORTS

The Department of Higher Education and Training must work closely with Statistics South Africa and the other relevant government departments to collect data for skills planning using their administrative data sets. This can be accomplished by participating and engaging in the National Statistics System (NSS) of StatsSA. Going forward, data on vacancies, immigration and emigration (including data about educational levels, employment sectors and occupations) must be included in future reports. Future reports must furthermore include skills forecasting models based on contextually appropriate methodologies.

The South African economy must respond to the twin challenges of participating in a globally competitive environment which requires a high skills base and a local context that creates low-wage jobs.

CHAPTER 1

INTRODUCTION TO THE REPORT FOR SKILLS SUPPLY AND DEMAND IN SOUTH AFRICA

A challenge for any government is to estimate and anticipate the education and skills required to support societal development, and a productive and inclusive economic growth path.

Since 1994 there have been efforts to plan for skills needs, but these efforts are fragmented and the performance of the skills planning mechanism is imperfect as evidenced by continued skills shortages. There is therefore a need for a more co-ordinated, coherent, and responsive skills planning system. In 2009, the South African government prioritised skills planning through government priority Outcome 5.1.1 to "establish a credible institutional mechanism for skills planning" (DHET, 2010a).

To meet the Outcome 5.1.1 objectives, in 2012 the Department of Higher Education and Training (DHET) initiated a collaboration with an HSRC-led consortium (Human Sciences Research Council, University of Cape Town and University of Witwatersrand) to establish the Labour Market Intelligence Partnership (LMIP) project. In 2012, when Minister Nzimande launched the LMIP, he requested that it provides a scientific basis to "set up systems for reliable data indicating skills need, supply and demand in our labour market in a manner that will enable our country, including government and businesses, to plan better for the human resources development needs of our country". This sentiment is endorsed in the White Paper for Post-School Education and Training which observes that, "although South Africa has put in place a range of ambitious measures to improve skills planning, the system has neither produced good information about skills needs, nor increased the quality of provision in areas needed by the economy" (DHET, 2013).

The LMIP has conducted a number of research studies and produced research reports to inform skills planning in South Africa. One of the research projects[1] of the LMIP was to propose a framework and set of indicators for skills planning[2] which then informed the Government Gazette, No. 39319, 23 October 2015. *The Framework for the Annual Report on Skills Supply and Demand in South Africa* (RSA, 2015). This framework formed the basis for the report on Skills Supply and Demand in South Africa.

This report provides a holistic understanding of the current supply and demand for skills in South Africa, and represents one of the first attempts to analyse how the two interact to inform the future skills policy to support inclusive growth. The analytical approach used in this report represents a radical departure from manpower forecasting and attempts to understand the complexities and intricacies around how supply and demand interact, and the corresponding implications for reform.

This report must be viewed as a prototype, as LMIP was tasked with producing a skills planning conceptual framework that is relevant to South African realities and priorities, while wading through the terminology and definitions to make meaning for this context, and working within the parameters of available data. The information and intelligence generated in this report should inform skills policy and skills planning. The engagements from this report will also inform the refinement of the report structure and methodologies for future analyses to produce subsequent reports on skills supply and demand in South Africa.

DESCRIBING SOUTH AFRICA

Countries which have explicitly embarked on skills planning have approached this task informed by the realities and challenges facing their countries. The South African context and challenges associated with this is best described through the National Planning Commission (NPC) expression, "the triple challenges of poverty, inequality and unemployment". Thus, the South African government's response to build a skilled and capable workforce for inclusive development is a critical principle in informing our approach. The effects of the historical legacy of apartheid and disadvantage experienced continue to bedevil our society, especially the African population group. We will describe the characteristics of the South African society in relation to racial groups, gender, education, employment levels, poverty and inequality. This demographic context will inform the approaches and direction of skills planning.

In 2014 the South African population of 54 million was made up of 51% females. The population was 80% Africans, 9% Coloureds, 8.5% Whites and 2.5% Indians/Asians[3]. South Africa is a youthful country, with two-thirds of the population under the age of 35 years. As is the case with other low-income countries, there is youth bulge, with one third of the population being between the ages of 15 and 34 years.

The education levels of the population have been improving since 1994. When looking at the highest level of education amongst South Africans

[1] *See lmip.org.za.*

[2] *See Reddy and Powell (2015) A Framework for Skills Planning Indicators. LMIP Publication.*

[3] *Definitions according to StatsSA.*

who are 20 years and older, 11.8% have Higher Education as their highest level of education, 28.9% have grade 12, 33.9% have some secondary education, and 25.5% have completed primary level or less as their highest level of education (StatsSA 2012b).

In 2014 there were 22 million people of working age, and of these, 15 million were employed and 8 million were not. Close to three quarters of the employed population are African and 90% of unemployed persons are African. Two thirds of the employed reside in the provinces of economic powerhouses namely Gauteng, Western Cape and KwaZulu-Natal.

While poverty levels have decreased since 1994, there is still a high number of South Africans living in poverty. In 2014, 21.5% of South Africa's population were described as living below the extreme poverty line (StatsSA 2016). South Africa's income inequality, as measured by the Gini coefficient, is consistently between the values of 0.66 and 0.69, making it one of the most unequal countries in the world (StatsSA 2014c).

RATIONALE FOR AND APPROACH TO SKILLS PLANNING

There is growing consensus regarding the skills problems facing South Africa. Key strategy documents like the *Human Resource Development Strategy for South Africa, National Skills Development Strategy III, National Development Plan* and *White Paper for Post-School Education and Training* all draw attention to the risks associated with the poor supply of skills from the education and training system and the misalignment between skills supply and demand for the implementation of economic growth strategies (HRDC, 2009; DHET, 2010b; NPC, 2011; DHET, 2013). As a response to these concerns. South Africa decided on a more structured and co-ordinated approach to skills planning.

The South African approach to skills planning has evolved over time. During the apartheid era, the then government adopted manpower planning models for skills planning. Post-1994, this was replaced by more flexible approaches to skills planning. The current philosophy underpinning a credible skills planning mechanism in South Africa is that the state, as opposed to the market, will take a role in directing economic development, facilitating employment, and determining the type of skills that people require in order to obtain decent and productive employment. This developmental approach is a departure from the reliance only on the market, and attempts are now being made by the state to track skills changes and demands in the labour market and the society, and respond accordingly with changes in supply. In addition, the state will help to ensure alignment is achieved between the government's trade and investment strategies and economic growth initiatives, and those for education and training. Adopting such an approach will put the government in the driving seat, helping to ensure a more strategic approach to developing the country's human resources.

Post-1994, there were attempts to understand the demand for skills. The first attempt involved a basic analysis of the supply and demand of skills and the publishing of scarce and critical skills lists by the Department of Labour (DoL, 2003). Recently, the DHET published the *Lists of Occupations in High Demand* for both 2014 and 2015 and the Department of Home Affairs (DHA) published the *Critical Skills List* (DHA, 2014; DHET, 2014a, 2015a).

Internationally, debates around the responses and policy reform for skills development have tended to focus on one of two approaches: matching transitions of economic growth with types of skills, or moving towards a higher growth trajectory characterised by increased investment in higher-level skills. The matching transitions debate tends to draw on lessons from East Asian economies and how the transitions in growth stages from Agriculture to the Manufacturing and Services sector should be accompanied by corresponding changes in the types of skills developed as the country moves up the value chain. Debates surrounding the high-skill trajectory have come from European countries, especially Britain and other English-speaking countries where discourse has focused on how to move or maintain a high-skilled path to development, particularly in light of competition from other middle-income countries.

The matching transitions and high skill debates mainly apply to countries that have a defined development pathway, and these countries have located their competitive development strategy in the global economy. South Africa's population is also characterised by low levels of numeracy and literacy, and skills development (and occupations in high demand), focuses on a small section of the labour force and the skills required in response to change or competition.

Developing an appropriate skills strategy for South Africa involves assessing the relationship between the changing structure of the economy and the type of skills required to support that economy. With the high level of unemployment there is also a need to consider both the structure of the economy and the skills of the unemployed so that we achieve inclusive growth.

AIMS AND OBJECTIVES OF THE REPORT ON SKILLS DEMAND AND SUPPLY IN SOUTH AFRICA

The primary aim of the Report on Skills Demand and Supply in South Africa is to inform planning and provisioning of education and training, as well as to assist individuals in making appropriate career and educational choices. The report is expected to contribute to the responsiveness of the post-school education and training system to meet the skills needs of the economy and society. It is also intended to be used as a strategic resource to inform supply-side planning in post-school education and training institutions, funding norms, and the development of qualifications and programmes that are relevant to the needs of the labour market and information for career development.

The key objective of the report is to analyse the current and future demand of skills[4], as well as the skills supply from the schooling system, post-school institutions, and the workplace, in order to propose a set of recommendations for skills development in post-school institutions and in the workplace. The approach in this report is to bring together the different signals for the demand for skills, and examine the responses from the skills supply system, in order to provide guidance for planners, managers, and stakeholders in the skills arena.

The investment to establish a credible skills planning mechanism for South Africa is important for a number of reasons, including:

- To provide a better understanding of skills supply and demand, especially for skilled and semi-skilled occupations, and this information can be used to plan the size and shape of the post-school education and training system (enrolment planning, new programmes and the infrastructure investment needed);
- To provide a better understanding of the skills set of the unemployed and this information can be used to plan appropriate training programmes for the unemployed;
- To support government's economic development strategy and target resources to education and skills areas most in need, thus tackling skills shortages;
- To provide credible information to direct government resources at those skill areas where people are likely to gain employment, thus reducing unemployment; and
- To improve South Africa's economic competitiveness and contribute to poverty alleviation.

METHODOLOGY AND METHODOLOGICAL ISSUES

The over-arching methodological approach guiding the analysis is shown in Figure 1.1. In this approach we interpret the signals for current and future demand for skilled, semi-skilled and low-skilled occupations[5]. The understanding of skill demand involved four inter-related areas: the state of the economy, the characteristics of the employed and unemployed who make up the labour force, current and future demand. Correspondingly we need to interpret the signals of skills supply from school and post-school institutions. The interaction between supply and demand provides signals of skills shortages and mismatches.

In writing this report a number of methodological issues had to be considered, relating to the definition and measurement of skill, time periods of the analysis, and data availability. In this first prototype report, we developed a skills planning model that is appropriate for the South African context. We have taken pragmatic decisions in writing this report – to focus on the high-level arguments, analysing available data to provide signals for skills planning and not to be paralysed by the range of definitional terms. We outline our approach below.

DEFINING SKILL

In writing the *National Strategic Skills Audit for England*, 2010 the authors say that "skills can be difficult to define and measure at an aggregate level. Skills are socially constructed, intangible and unobservable. Research uses a number of different measures to assess the quantity, level and content of skills possessed and deployed in the workplace" (UKCES, 2010, page 9). In practical terms, skills can often be measured in terms of qualifications or occupations. In this report we analysed the educational qualifications as a proxy for skill. Low skills refer to those qualified at pre-matriculation National Qualifications Framework (NQF) levels (1 to 3) or no schooling (less than level 1). Intermediate skill levels are those qualified at NQF levels 4 to 5, and high skills refer to those qualified at NQF levels 6 to 10.

UNDERSTANDING SKILLS DEMAND

The estimates of skills demand involve the analysis of four inter-related areas: the state of the economy, the profile of the labour force, current demand, and future demand.

We analysed the economy by describing economic performance, savings and investments, export growth and diversification, and the related impact on employment and unemployment levels.

The South African labour force (both employed and unemployed) is described in relation to racial group, gender, age, and level of education. There is special reference to youth unemployment.

The analysis of current skill demand focuses on sectoral growth and the age profile of workers within the sector, occupational changes, and changes of skills within an occupation. In addition, we include an analysis of the occupations in high demand, skills needed to support government growth initiatives, and the perceptions of employers of skill needs.

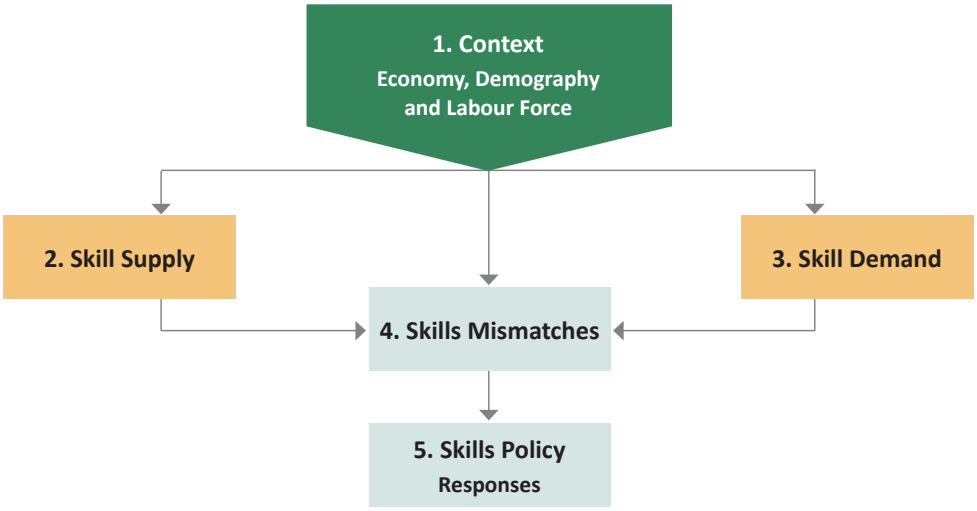
This report does not include an analysis of future demand. Subsequent reports will provide an analysis of the projections on skills demand, including supply forecasted through the linked macro education model developed as part of the LMIP project[6].

[4] *While the intention was to include future demand, we were unable to include this information in this report. It will be included for subsequent reports.*

[5] *Skilled refers to professionals, managers, and technician and associate professional occupations; semi-skilled refers to clerical support workers and sales and services workers, skilled agricultural, craft and trade workers and plant and machine operators; and low-skilled refers to elementary and domestic workers.*

[6] *The Real Centre at the University of Witwatersrand has worked with Applied Development Research Solutions to create a Linked Macro-Education Model for South Africa.*

Figure 1.1: Framework for the analysis of skills supply, demand and mismatches



The key data source for our analysis was the Quarterly Labour Force Survey and Labour Market Dynamics from Statistics South Africa.

UNDERSTANDING SKILLS SUPPLY

We analysed skills supply and potential skills supply from the schooling sector, the Technical Vocational Education and Training (TVET) sector and the University sector. We focused on trends in enrolment and completion rates for each of the three educational levels, and in keeping with the transformational agenda, we highlight race and gender trends. The key data sources were from the examinations databases of Department of Basic Education (DBE) and the Higher Education and Training Management Information System (HETMIS) database from the DHET.

UNDERSTANDING SKILLS MISMATCHES

Due to the large number of unpredictable variables influencing demand, the process of identifying skills shortages and skills mismatches is not a formulaic or algorithmic science, in that it is not possible to calculate the exact numbers of people needed in the different occupations or sectors. Instead, it is only possible to provide signals on where demand outstrips the supply for specific occupations at a particular point in time.

The approach used to understand skills mismatches was derived from methodologies used in a number of other studies, most significantly being the techniques used for The National Strategic Skills Audit for England 2010 (UKCES, 2010). However, there was a need to adjust to South African conditions and to conduct analyses with available data. At the time of writing this report there was no available survey data from enterprises to understand the extent or nature of skill gaps faced by employers[7]. Despite this limitation, a number of other data sources were available to help build a picture of mismatches in South Africa.

Following our analysis of skills supply and demand, we identified three types of mismatches, being demand mismatch, education supply mismatch, and qualification-job mismatch.

LIMITATIONS OF OUR APPROACH

This is the first report analysing skills supply and demand at a national level, and there are a number of conceptual and methodological limitations. At a conceptual level it is important to understand that matching supply and demand is not a perfect science. There are many unpredictable factors that can influence this process, making it difficult to anticipate exact future imbalances or mismatches. At best, it is possible to gather evidence on different signals and to understand occupational areas where imbalances or mismatches may occur. Using this evidence, it is then possible to provide guidance to planners and managers on what interventions are available over the immediate, or short to medium term to tackle mismatches. It is not possible with any degree of accuracy to recommend what can be done over the longer term, as deliberate estimates of exact numbers of skills required over the long run are rarely correct or useful to policy makers.

At a methodological level, the most severe limitations are the scarcity and quality of data. It would have been preferable to compare data between the 1994 and 2014 period, which would have helped to provide a measure of changes over the post-apartheid period. Where possible, attempts were made to compare trends between the two periods. Unfortunately, this was not possible for most indicators due to the fact that time series data was not collected. There are also limitations to the current approach for understanding skills shortages and mismatches. Most of the evidence has relied on data from household surveys, especially the Quarterly Labour Force Survey (QLFS)[8].

[7] *As part of the LMIP project. researchers at the Development Policy Research Unit (DPRU), at the University of Cape Town piloted an enterprise survey administered by the SETAs. See lmip.org.za for further details.*

[8] *Refer to the following paper for further discussion of data limitations: Gustafsson M. (2015). Enrolment ratios and related puzzles in developing countries: Approaches for interrogating the data drawing from the case of South Africa.* International Journal of Educational Development, *42: 63 to 72.*

In South Africa there have been a number of changes in definitions of broad occupational categories, and the use of surveys has changed. This makes it difficult to track trends over time and to see how demand has or hasn't changed as the case may be. A further limitation is that the sample size is not large, making it difficult to get accurate occupational data beyond two digit levels, which prevents us from providing details about demand for specific occupations beyond two digits. Another limitation is that our approach failed to accurately understand demand or changes that are occurring within enterprises.

Despite the limitations above, attempts have been made to make the best use of available data. Where possible, our analysis draws on a number of different data sources, helping to triangulate findings and add to the validity of our findings; this provided the basis for our recommendations.

THE STRUCTURE OF THE REPORT ON SKILLS DEMAND AND SUPPLY IN SOUTH AFRICA

This report is the first of a series of reports produced by DHET in partnership with the HSRC, as part of the LMIP. The structure of this report is as follows:

CHAPTER 2

On economic growth and employment in the South African economy briefly outlines South Africa's economic performance between 1994 and 2014, and explores the structural and policy constraints that continue to impede the country's path towards inclusive growth.

CHAPTER 3

Provides an overview of the South African labour force (the employed and unemployed) for the 2010 to 2014 period through an analysis of the demographics (spatial location, gender, racial group, age, and education level) for both groups. Given the high levels of youth unemployment, we highlight this group, giving special attention to its education levels.

CHAPTER 4

Describes the supply and potential supply of skills from the Schooling sector, the TVET sector, and the university sector. This provides the basis for identifying the types of skills that people acquire when they move through the education system and enter the labour market. This chapter focuses on trends in enrolment and completion rates for each educational level.

CHAPTER 5

Examines the changes in the structure of employment and skills from 2010 to 2014 in the standard industrial sectors and occupational categories. We also analyse the skills needed to support the government growth projects, employers' perceptions of skills needed in their firms, and outline the analysis to identify the list of occupations in high demand. Together, this data helps us to build a picture of the demand for occupations and skills, and provides a signal to the education and training system on areas of supply to be prioritised.

CHAPTER 6

Extends the analysis of the demand for skills and provides an understanding of the mismatches that exist in the labour market. Skills mismatches is an encompassing term which refers to the various types of imbalances between skills offered and skills needed in the world of work and how the jobs respond to present skill levels. This analysis provides policy makers with signals for interventions to tackle skills mismatches.

CHAPTER 7

Provides the key findings and recommendations from the analyses. These findings and recommendations are rooted in contextually appropriate skills planning models that take into account the challenges of economic growth and inclusive development and the structural inequalities in the society.


example
ceremony
academy
innovations
community college
study
graduate
students
community
high-school
school
project
course
acadaemia
motivation
teach
faculty
diversity
youth
graduating
mind
degree
principle
lecture
lab
know
language
score
mba
faculties
understand
technology
skills
institutions
arts character
uni
college
principal
history
literacy
graduation
heritage
multimedia
e-learning
presenting
grade
studying
lecture hall
academic degree
values
training
qualitative
developments
celebration
creative
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tertiary
success
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scientist
business
development
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science
learning
examination
audio
graduates
mathematics
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private
accomplish
media
auditorium
classical
textbook
program
building
educate
academia
data
lesson
information
institution
test
classroom
achievement

CHAPTER 2

ECONOMIC GROWTH AND EMPLOYMENT IN THE SOUTH AFRICAN ECONOMY: A BRIEF OVERVIEW

This chapter provides a context for skills planning by outlining South Africa's economic performance between 1994 and 2014, and exploring the structural and policy constraints that continue to impede the country's path towards inclusive growth. This chapter draws substantially from a paper by Bhorat, Cassim and Hirsch (2014) entitled *Policy co-ordination and growth traps in a middle-income country setting: the case of South Africa*, produced under the United Nations University – World Institute for Development Economic Research (UNU-WIDER).

Since 1994, the South African economy has been characterised by positive, but low levels of economic growth, persistently high levels of (pre-1994 driven) unemployment, and rising household income inequality. While some noticeable gains have been made in reducing household poverty, improving access to social services, and delivering housing and other linked infrastructural services – the gains from economic growth remain concentrated in households at the upper end of the income distribution. Comparisons with other emerging market countries highlight South Africa's poor economic performance. While several middle-income countries have achieved rapid economic growth in the last two decades. South Africa appears to be trapped in what can be considered a middle-income country growth trap (Bhorat et al, 2014).

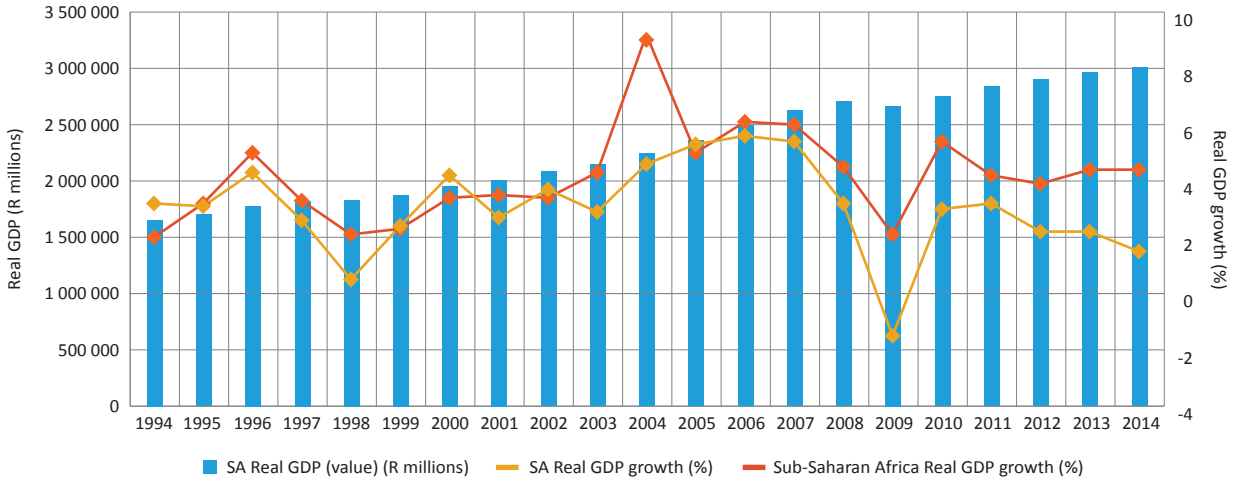
ECONOMIC GROWTH

By comparison with other middle-income countries, South Africa's economic growth experience over the last few years has been poor. Between 1994 and 2007, the economy grew at an average rate of 3.6%, despite experiencing growth rates of above 5% between 2005 and 2007. Rapid gross domestic product (GDP) growth during the 2005 to 2007 period partly reflects strong growth in resource exports as a result of the global commodity boom, driven in large part by China's fast-paced levels of economic growth and intensive demand for natural resources. The South African economy was, however, heavily affected by the global financial crisis in 2007, and growth rates have not yet recovered to pre-crisis levels. Figure 2.1 illustrates that between 2008 and 2014, average growth stood at 1.9%, indicating that weakened commodity prices, as well as domestic constraints, continue to hinder post-crisis growth.

The low and volatile growth rates experienced since 1994 reflect an economy that has become vulnerable to external shocks, and one that remains largely driven by trends in global growth and demand. As shown in Figure 2.1, the sharp declines in growth in 1998 and 2009 reflect the aftermath of the East Asian financial crisis and the global financial crisis, respectively. In both instances, the contagion effect of these crises appears to have had a relatively more significant impact on growth in South Africa compared with other emerging markets, and certainly most other Sub-Saharan African countries. However, this disparity is also due to the fact that the financial sector in South Africa is significantly more developed and globally connected, and thus more susceptible to the impact of turmoil in international financial markets.

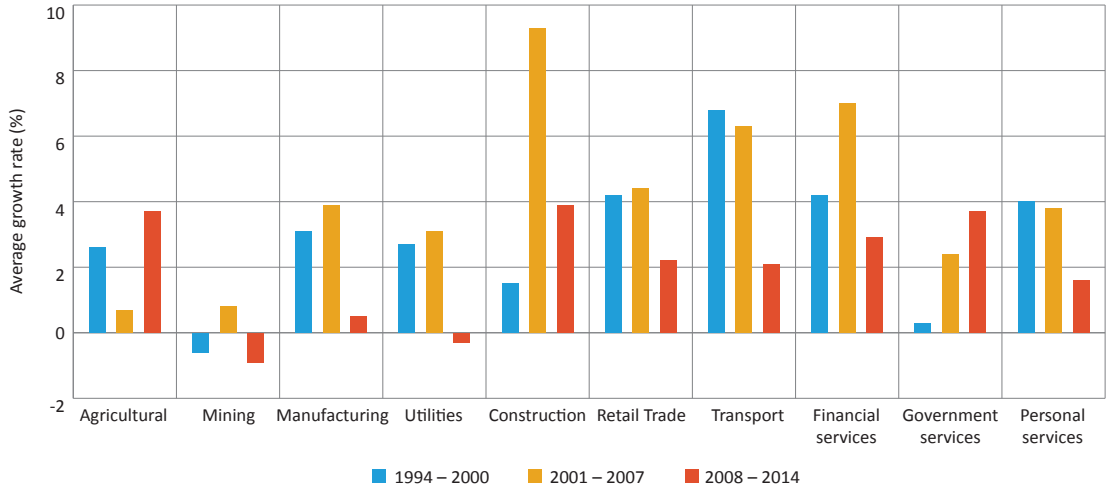
Nevertheless, the South African economy sustained positive and increasing levels of growth between 2001 and 2007. This was partly a result of growing domestic demand – largely due to rising household consumption expenditure, as well as an expansion in the Manufacturing, Construction, and Financial Service sectors. As shown in

Figure 2.1: Trends in absolute value of GDP and real GDP growth, 1994 to 2014



Source: Statistics South Africa (2016); World Bank (2016)

Figure 2.2: Trends in sectoral GDP growth rates, 1994 to 2014



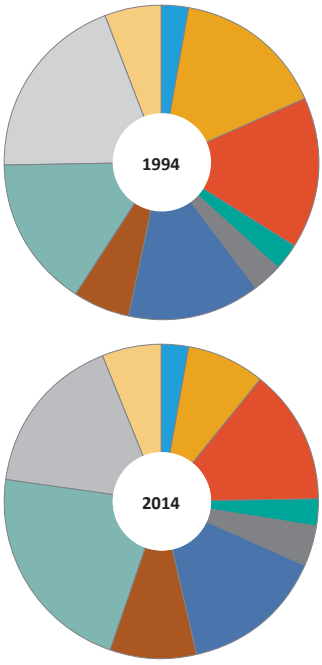
Source: Statistics South Africa (2016a) and authors' calculations

Figure 2.2, manufacturing output grew by an average rate of 3.1% between 1994 and 2000, and 3.9% between 2001 and 2007, as trade liberalisation policies, combined with a favourable exchange rate, began to boost South Africa's manufacturing exports. Construction output grew significantly, at an average rate of 9.3% between 2001 and 2007, largely on account of preparations for the 2010 Football World Cup. Average output growth of 7.0% in the Financial Services sector reflected growing retail banking and insurance services. Similarly, positive output growth in the Mining sector between 2001 and 2007, following negative growth in the previous period (1994 to 2000), further indicates China's strong demand for natural resources.

The mild boom in sectoral output in the early 2000s was, however, brought to a halt in 2008 following the global economic recession. In particular, manufacturing output growth declined to an average rate of 0.5% between 2008 and 2014; and mining output fell by 0.9% over the same period. While agricultural output increased fairly significantly, by 3.7% during the period, this was mainly due to the steep rise in food prices in 2008. Trends in output growth at the sectoral level also highlight South Africa's weak economic growth experience, and reflect an economy that has become underpinned by a declining primary sector, sluggish growth in manufacturing, and a continued reliance on commodity exports.

Economic growth in post-apartheid South Africa, while modest, has been driven largely by capital-intensive industries, retail trade, and financial services, rather than productive and labour-intensive sectors such as Agriculture and Manufacturing. In faster-growing middle-income countries, there has been a tendency to follow a development pathway characterised by a shift in economic activity and employment from low-productivity sectors, such as Agriculture, to high-productivity sectors, such as Manufacturing, and ultimately towards high-skilled services sectors (Bhorat et al, 2014). This growth path leverages new technologies, builds a skilled labour force, and raises productivity – which together lead to higher levels of growth and employment. In South Africa, however, this has not been the case. The contribution to GDP by Manufacturing has declined over time, while that of Financial Services, Transport, and Government services has increased (see Figure 2.3).

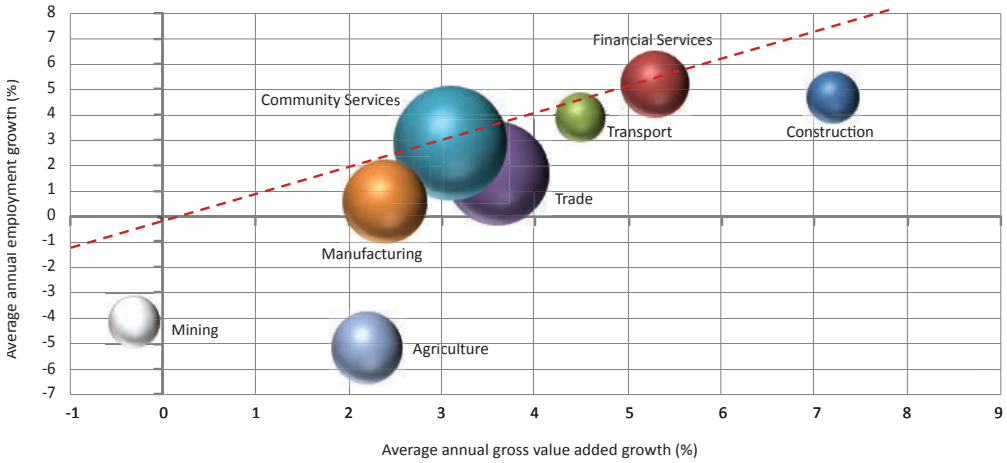
Figure 2.3: Sectoral contribution to GDP, 1994 and 2014



	1994	2014
	%	%
Agriculture	3	3
Mining	16	8
Manufacturing	16	14
Utilities	3	3
Construction	3	4
Wholesale and Retail Trade	14	15
Transport	6	9
Financial and Business Services	16	22
Government Services	20	17
Personal Services	6	6

Source: Statistics South Africa (2016a)

Figure 2.4: Sectoral gross value-added and employment growth, 2001 to 2012



Source: Bhorat et al, 2014

The contribution of Mining to GDP declined significantly from 16% to 8%, while the Manufacturing sector's share of GDP declined from 16% in 1994 to 14% in 2014. The contribution of Agriculture to GDP remained stagnant, while the share of GDP held by the Financial and Business Services sector grew substantially from 17% to 22% over the period.

The above suggests very clearly that the collapse of the mining industry, the weak performance in agriculture, and crucially – the collapse of manufacturing output in South Africa – have essentially generated a growth path starved of regular, low-wage jobs. Into this growth lacuna, output generation (expanded on further below) has been forced into a high-skills-biased employment trajectory dependent on the financial services sector for growth, and the retail and public sectors for jobs.

The growth and employment trajectory can be seen in the interaction between the sectoral contribution to GDP and employment growth, as shown in Figure 2.4. Each bubble represents a sector, and the size of the bubble indicates the relative size of employment in that sector in 2001. The co-ordinates of the centre of each bubble therefore indicate the sector's output and employment growth over the period. Bubbles above the 45-degree line show sectors whose employment growth exceeded output growth, and vice versa for bubbles below the line. Sectors with positive output growth are expected to have positive employment growth, while declining sectors are expected to shed jobs (Bhorat et al, 2014).

Specifically, no sectors are above the 45-degree line, indicating that employment growth was less than output growth for all sectors of the economy for the period 2001 to 2012. Mining and Agriculture fared particularly poorly during the period: output growth was negative for mining (-0.3%) and a low positive for agriculture (2.2%); employment declined considerably, falling by 4.1% in the Mining sector, and by 5.1% in the Agriculture sector. Employment growth in the Manufacturing sector was near zero over the period, despite a positive output growth rate of 2.4%. Conversely, the Construction and Financial Services sectors showed relatively high output and employment growth during the period.

The growth in the secondary and tertiary sectors has not been sufficient to absorb new entrants into the labour market, including those who have lost jobs in the Agriculture and Mining sectors since 2001 (See Table 2.1). Between 2001 and 2012, the primary sector shed 719 000 jobs, while the secondary sector added 537 000 jobs, driven mainly by the construction industry. Overall, community services (including government services) were responsible for the bulk of employment growth over the period, adding 1 million jobs to the economy, and reflecting the dominance of the public sector in employment generation.

It is clear from Table 2.1, an albeit brief empirical overview, that post-apartheid South Africa has, thus far, delivered an economy characterised by an eroding primary sector and an un-dynamic Manufacturing sector. In turn, however, the modest growth levels since 1994 have been marked by a rise in Financial and Business Services, as well as Wholesale and Retail Trade. In short, this post-apartheid growth path has been built around South Africa's sophisticated and globally competitive financial sector and its consumer-driven domestic aggregate demand.

According to Bhorat et al (2014), sustained low levels of economic growth over the past decade have, in turn, had a muted impact on employment, perpetuating high levels of unemployment and household income inequality. Longer-term growth at appreciably higher levels, which underpins employment and rising living standards, would have to involve a far broader spectrum of the economy than the tertiary sector. The weakness of mining, agriculture, and in particular manufacturing, hinders the longer-term ability of the South African economy to grow, generate employment and improve living standards.

Table 2.1: Employment growth by sector, 2001 to 2012[9]

	Employment growth		Employment shares (%)		Share of change
	Absolute	Relative	2001	2012	2001 – 2012
Primary	**(719 232)**	**(2.6)**	**0.15**	**0.07**	**(0.28)**
Agriculture	(514 468)	(2.7)	0.10	0.04	(0.20)
Mining	(204 764)	(2.2)	0.05	0.02	(0.08)
Secondary	**537 376**	**1.0**	**0.21**	**0.21**	**0.21**
Manufacturing	112 149	0.3	0.14	0.12	0.04
Utilities	10 774	0.5	0.008	0.008	0.004
Construction	414 453	2.5	0.05	0.07	0.16
Tertiary	**2 720 821**	**1.6**	**0.63**	**0.71**	**1.08**
Wholesale and Retail Trade	513 572	0.9	0.21	0.21	0.20
Transport	288.364	2.1	0.04	0.06	0.11
Financial Services	782 108	2.8	0.09	0.13	0.31
Community Services	1 041 524	2.1	0.17	0.22	0.42
Private households	95 253	0.4	0.09	0.08	0.04
Total	**2 497 763**	**1.0**	**1.0**	**1.0**	**1.0**

Source: Bhorat et al, 2014

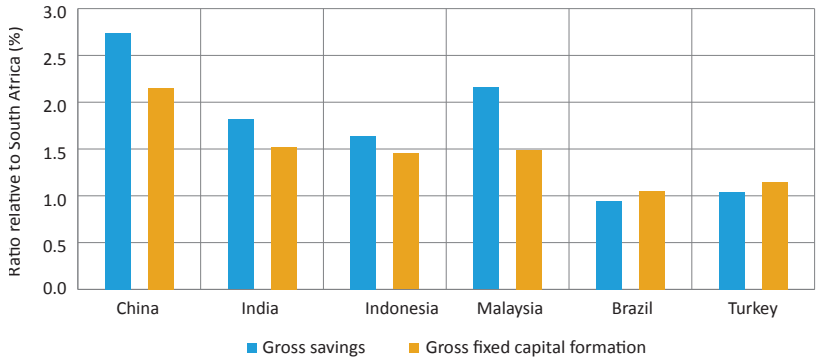
[9] *Relative employment growth is measured by %ΔEj/%ΔΣjEj and share of change is measured by ΔEj/ΔΣjEj.*

FIXED INVESTMENT AND SAVINGS

High investment and savings rates have traditionally been considered key drivers of economic growth, at least in the fast-growing emerging markets in Asia. China, for example, stands out with investment and savings rates well above 30% over the last two decades (WB, 2016). In contrast, South Africa's investment and savings rates have been relatively low. Between 1994 and 2014, gross savings and gross fixed capital investment averaged 16.4% and 18.1%, respectively. Figure 2.5 displays the ratio of average investment and savings rates of middle-income countries relative to South Africa. Countries with similarly low growth rates, such as Brazil and Turkey, have shown similar low investment and savings rates. Conversely, investment and savings rates in the fast-growing Asian economies have been at least 1.5 times greater than South Africa over the period.

Low savings rates in South Africa are a result of various factors. Persistent low economic growth and low per capita income growth, high unemployment, and low public savings are among the factors impeding domestic savings, creating a cycle of insufficient savings and economic stagnation (Loazya et al, 2000). The low savings rate also partly explains South Africa's low fixed investment rate. Other constraints to investment include perceived political risks, lack of competition in highly concentrated industries, and a scarcity of skills in the labour market (Bhorat et al, 2014). These constraints have hindered growth in both foreign and domestic investment in South Africa, despite the fact that returns to capital have been favourable, and often similar to other emerging markets (WB, 2011). In particular, real returns averaged around 15% between the 1994 and 2008 period, while nominal returns were 22% in the 2005 to 2008 period – the same as in China, albeit over a longer period. Returns have been substantially higher than the prime lending rate, which is particularly surprising given the modest growth experienced by the South African economy. However, as returns increased, investment levels tapered off. It is possible that domestic and foreign investors in South Africa may be inelastic with respect to the return on capital, but somewhat elastic to other factors such as perceived political risks, structural impediments, and low national savings rates. Structural barriers include low levels of industrial

Figure 2.5: Ratio of savings and investment relative to South Africa, 1994 to 2014



Source: World Bank (2016) and Bhorat et al (2014) calculations

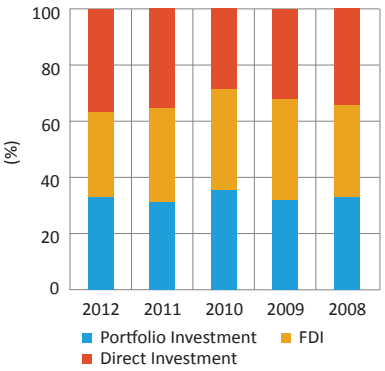
competition because of concentrated industries with high barriers to entry, and volatile labour relations that are essentially a tax on investment and the scarcity of skills. The latter serves to raise the cost of doing business, which may outweigh the high investment returns available in the South African market.

Where investment has grown, it has been driven by the private sector, while government and public enterprise expenditure tends to be fairly low. Private investment has made up between 65% and 75% of total investment, and has been facilitated through large-scale capital expenditure projects in the Mining, Platinum, Automotive, Chemical Manufacturing, Retail, Real Estate and Tourism sectors. It is worth noting that industries that attracted investment were invariably capital-intensive in nature, so reinforcing the economy's growth trajectory (Figure 2.6).

The national savings rate is arguably much lower than comparator economies because of the persistently high levels of youth unemployment (currently around 36%), low levels of GDP growth, `and low levels of public savings (WB, 2011). In contrast, faster-growing middle-income countries are generally characterised by higher levels of national savings, as shown in Figure 2.6.

South Africa's low savings rate has meant that financing investment has necessitated a fairly large current account deficit. Financing of the deficit has largely been through portfolio investment instead of foreign direct investment (FDI), the latter being the more stable and consistent capital flow option for emerging markets. To put this into context, portfolio investment in South Africa has averaged around double the proportion of FDI annually (Figure 2.7).

Figure 2.7: Investment flows to South Africa, 2008 to 2012[10]



Source: South African Reserve Bank (2014) and Bhorat et al (2014) calculations.

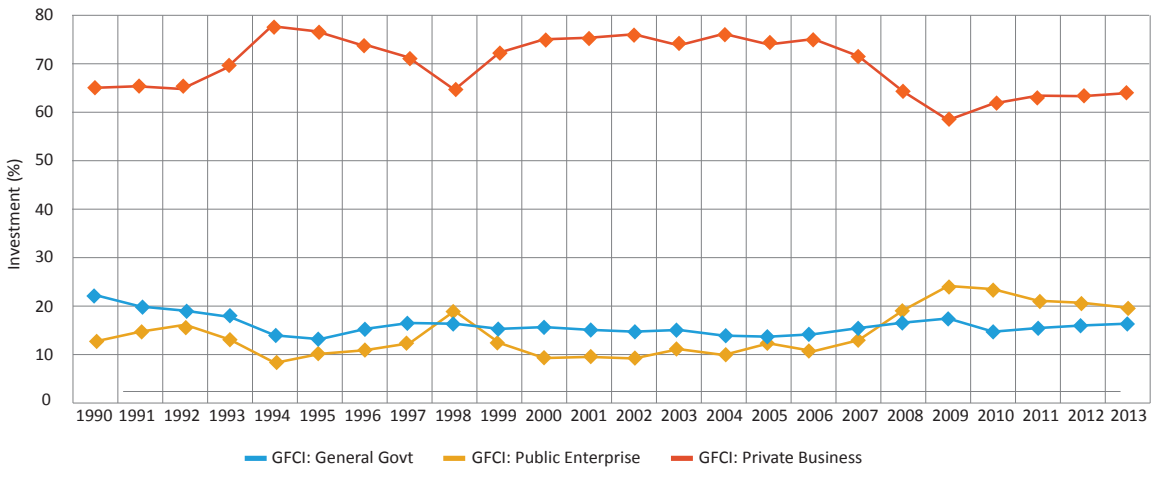
[10] *While external investment flows may include other sources. we have only included FDI and Portfolio Investment for the purpose of this analysis.*

EXPORT GROWTH AND DIVERSIFICATION

In addition to high savings and investment rates, fast-growing middle-income countries have generated sustained high growth and employment rates by growing export capacity, boosting international competitiveness, and more importantly, diversifying their basket of export goods and services. In China and India, for example, export capacity increased by an average rate of 15.7% and 12.9% per year, respectively, between 1994 and 2014. In South Africa, exports grew by a mere 3.5% per year, on average, during the same period. Despite relatively low growth in exports, South Africa's trade capacity appears to be in line with several other middle-income countries, reflecting the recent boom in commodity export revenues (see Figure 2.8).

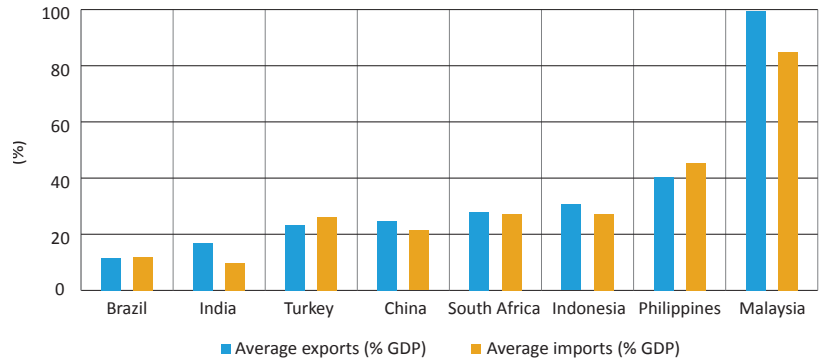
Nevertheless, Figure 2.8 indicates that in the fast-growing Asian economies, such as India and China, the GDP share of exports has been higher than that of imports over the period. In South Africa, Brazil and Turkey, where

Figure 2.6: Gross fixed capital investment trends in South Africa, 1990 to 2013 Q1



Source: South African Reserve Bank (2014) and Bhorat et al (2014) calculations

Figure 2.8: Export and import capacity (as % of GDP), 1994 to 2014



Source: World Bank (2016) and Bhorat et al (2014) calculations

Table 2.2: Comparison of basket of export goods and services, 2005 to 2013

	High-technology exports (% of manufacturing exports)	Insurance and financial services (% of commercial service exports)
South Africa	5.52	6.99
Brazil	11.41	7.46
China	27.52	1.58
India	6.98	5.52
Indonesia	7.05	2.02
Malaysia	46.94	1.71
Philippines	59.65	1.15
Turkey	1.78	3.38
Average	**21.32**	**3.73**
	Manufacturing exports (% of merchandise exports)	**Food exports (% of merchandise exports)**
South Africa	49.87	8.80
Brazil	42.06	29.67
China	93.19	2.81
India	64.86	9.28
Indonesia	39.98	15.70
Malaysia	66.17	10.62
Philippines	78.48	7.80
Turkey	79.91	10.06
Average	**64.31**	**11.84**
	Ores and metals exports (% of merchandise exports	**Agricultural raw materials exports (% of merchandise exports)**
South Africa	28.43	1.83
Brazil	13.81	3.71
China	1.59	0.47
India	5.78	1.75
Indonesia	8.61	6.05
Malaysia	1.94	2.48
Philippines	4.71	0.72
Turkey	3.69	0.50
Average	**8.57**	**2.19**

Source: World Bank (2014) and Bhorat et al (2014) calculations

economic growth has been relatively low, exports have made up a similar, if not lower, share of GDP than imports. This suggests that, on the one hand, a trade orientation tilted towards exports is critical to high economic growth, but on the other hand, a key factor in the inability of slow-growing middle-income countries to "catch up" to the Asian economies has been limited diversification of exports towards manufacturing and high-technology exports (Bhorat et al, 2014).

As outlined in Table 2.2, South Africa's export base has remained dominated by mineral resources exports and services exports, particularly financial services. Specifically, ores and metals exports have, on average, made up 28.4% of merchandise exports over the 2005 to 2013 period. This ranks the highest among other middle-income countries in the sample, and almost five times higher than the sample average. Similarly, South Africa's insurance financial services exports have also been high, at 7.0% of commercial services exports during the period, coming second only to Brazil. In contrast, manufacturing exports lagged behind, although not the lowest in the sample of middle-income countries. Manufacturing exports comprised 49.9% of merchandise exports, significantly below China's average of 93.2%, as well as the sample average of 64.3%. High-technology exports were also extremely low compared to other middle-income countries. These exports made up 5.5% of manufacturing exports, compared to the sample average of 21.3%.

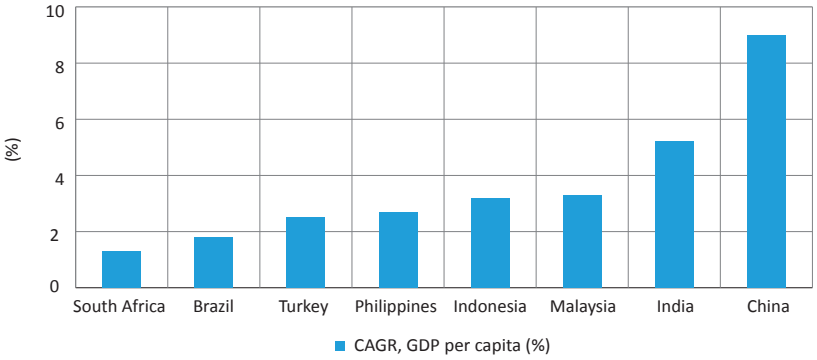
In summary, after the advent of democracy in 1994, South Africa re-entered the global economy through a rapid process of trade liberalisation. While imports and exports increased relatively sharply. South Africa lagged behind its emerging-market peers, who had better production methods and a more diversified basket of goods. While sanctions had encouraged domestic diversification of production in South Africa, management, skill and technology levels were not comparable to other developing countries. In addition, liberalisation led to greater import penetration than export diversification, although

it is true that in the earlier years of liberalisation it appeared that South African producers were able to respond to export opportunities. South African competitiveness was, however, hampered by several factors including skills constraints and a notoriously volatile exchange rate. In addition, investment is biased towards heavy manufacturing as opposed to light manufacturing industries. As a result, the composition of exports is still made up of a large share of commodity exports (ores and metal exports). Furthermore, manufactured exports still rely heavily on primary commodity inputs. As such, South Africa's export profile continues to be capital-intensive in nature and driven by natural resources (Bhorat et al, 2013). The only evident and significant diversification in exports is through insurance and financial services (4% average annual growth) and perhaps tourism.

MIDDLE-INCOME COUNTRY COMPARISON

When compared with similar middle-income countries, South Africa's economic performance adds weight to the argument that the country may be trapped in a vicious cycle of low, single-digit growth. A comparison of GDP per capita growth rates illustrates that South Africa has failed to converge to the high growth levels experienced by several other middle-income countries. As shown in Figure 2.9, China sustained high levels of GDP per capita growth between 1994 and 2014, with an average annual growth rate of 9%.

Figure 2.9: Comparison of average annual growth rates of GDP per capita, 1994 to 2014

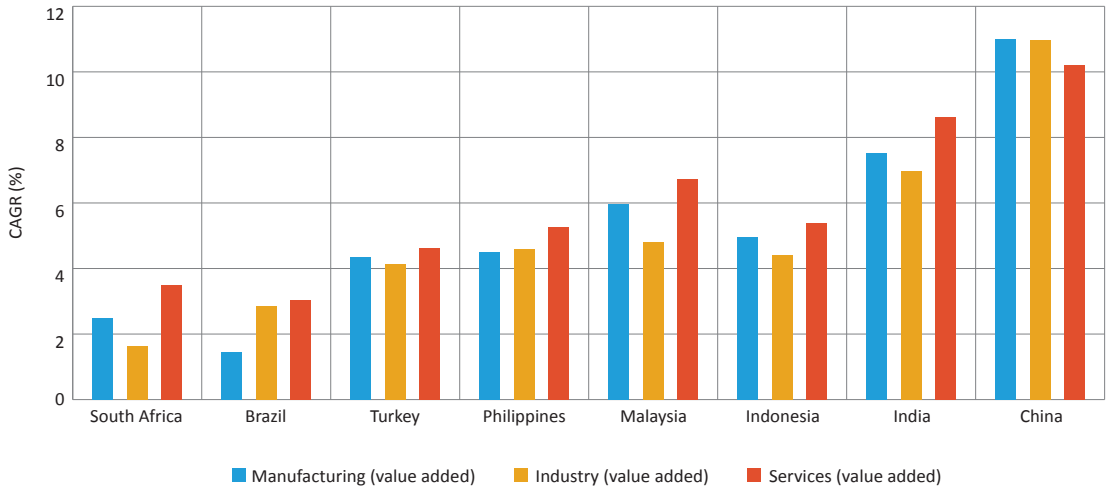


Source: World Bank (2016) and calculations by Bhorat et al (2014)

In the same vein, India, Malaysia and Indonesia have achieved GDP per capita growth rates above 3%. However, both Brazil and South Africa have, on average, failed to achieve per capita growth rates above 2%. GDP per capita growth in South Africa averaged a mere 1.3% over the period, which was the lowest growth rate among other middle-income countries.

A cross-country comparison of sectoral growth rates between 1994 and 2014 also indicates that South Africa's productive sectors have lagged severely behind that of the fast-growing Asian economies in the last 20 years. As illustrated in Figure 2.10, during the 1994 to 2014 period, manufacturing value added grew by an annual average rate of 11.0% in China, 7.5% in India, 6.0% in Malaysia, and 5.0% in Indonesia. While Brazil had the lowest annual average growth rate in manufacturing value added (1.5%). South Africa was not far behind at 2.5%. Output growth in industry and services also lagged behind other middle-income countries,

Figure 2.10: Comparison of average annual growth in value added by sector, 1994 to 2014



Source: World Bank (2016) and Bhorat et al (2014) calculations

despite these two sectors being the drivers of growth, albeit at modest levels, in South Africa.

The gains from rapid growth in Asian economies, particularly in the manufacturing sectors, are also reflected in the stable and low unemployment rates sustained by these economies between 1994 and 2014. As displayed in Table 2.3, South Africa stands out among its middle-income country peers, with an unemployment rate in excess of 20% over the period. Even when compared to similarly slow-growing countries, like Brazil (with an even poorer-performing manufacturing sector) South Africa's unemployment rate is extraordinarily high.

Table 2.3: Middle-income country comparison of employment and unemployment rates, 1994 and 2014

	Unemployment rate (%)	
	1994	2014
South Africa	20.0	25.1
Brazil	6.0	6.8
Turkey	8.6	9.2
Malaysia	3.8	2.0
Philippines	8.4	7.1
Indonesia	5.0	6.2
India	3.7	3.6
China	4.3	4.7

Source: World Bank (2016)

Thus, it appears that the South African economy has diverged significantly from other middle-income countries, especially those in Asia. The post-apartheid economy has become increasingly susceptible to external shocks on global growth and demand, which appear to reverse the modest growth gains experienced by the economy immediately following the end of apartheid, as well as renewed growth in the early 2000s. While external events have placed significant pressure on the South African economy, internal constraints are largely to blame for low growth and high unemployment. These constraints include the continued reliance on resource-based exports, and a growth path built on capital-intensive rather than labour-intensive industries (Bhorat et al, 2014). South Africa lags behind other middle-income countries in key areas such as fixed investment and savings, export diversification, and most importantly, in the development of a diverse and dynamic Manufacturing sector. These bottlenecks present a significant and drawn-out challenge to economic growth and sustained employment generation in South Africa.

EMPLOYMENT TRENDS

One of the key deleterious consequences of South Africa's low and volatile growth rates is the poor outcomes in the labour market, particularly for low-skilled workers and previously disadvantaged racial groups. As indicated in Table 2.4 below, employment growth since the end of apartheid has not been sufficient to absorb the rapidly growing supply of workers: the economy generated 5.6 million jobs between 1995 and 2014, while the labour force grew by almost twice this quantum, resulting in 9.8 million new entrants into the labour market. A consequence of labour force growth in excess of employment growth, over the period, was a large expansion in the number of unemployed individuals, as well as an increasing number of discouraged job seekers. Unemployment roughly doubled, by the broad definition[11], from 4.2 million people in 1995 to 8.4 million people in 2014, and the number of discouraged job seekers increased from 2.2 million in 1995 to 3.3 million in 2014, Table 2.4.

Table 2.4: Trends in employment, unemployment and labour market participation, 1995 to 2014

Category	1995 (Oct) ('000)	2005 (Sept) ('000)	2014 (Sept) ('000)	Change (1995 – 2014)		Target growth rate (1995 – 2014)	Employment absorption rate (1995 – 2014)
				Absolute ('000)	Percent (%)		
Broad definition estimates							
Employment	9 515	12 301	15 117	5 602	58.88		
Unemployment	4 239	7 800	8 436	4 197	99.01	102.97	57.17
Labour force	13 754	20 100	23 552	9 798	71.24		
Narrow definition estimates							
Employment	9 515	12 301	15 117	5 602	58.88		
Unemployment	2 032	4 487	5 151	3 119	153.49	91.66	64.24
Labour force	11 547	16 788	20 268	8 721	75.53		

Source: OHS (1995), QLFS (2008:3), QLFS (2014:3) (Statistics South Africa) and Bhorat et al (2014) calculations

[11] *Two standard definitions of unemployment are used in this section, namely the narrow definition (used as the official definition by Statistics SA) and the broad (or expanded) definition of unemployment. According to Statistics South Africa (2016a), individuals are narrowly unemployed if they "(a) did not work during the seven days prior to the interview, (b) want to work and are available to start work within a week of the interview, and (c) have taken active steps to look for work or to start some form of self-employment in the four weeks prior to the interview". The broad (or expanded) definition of unemployment does not include criterion (c), and therefore includes discouraged workers.*

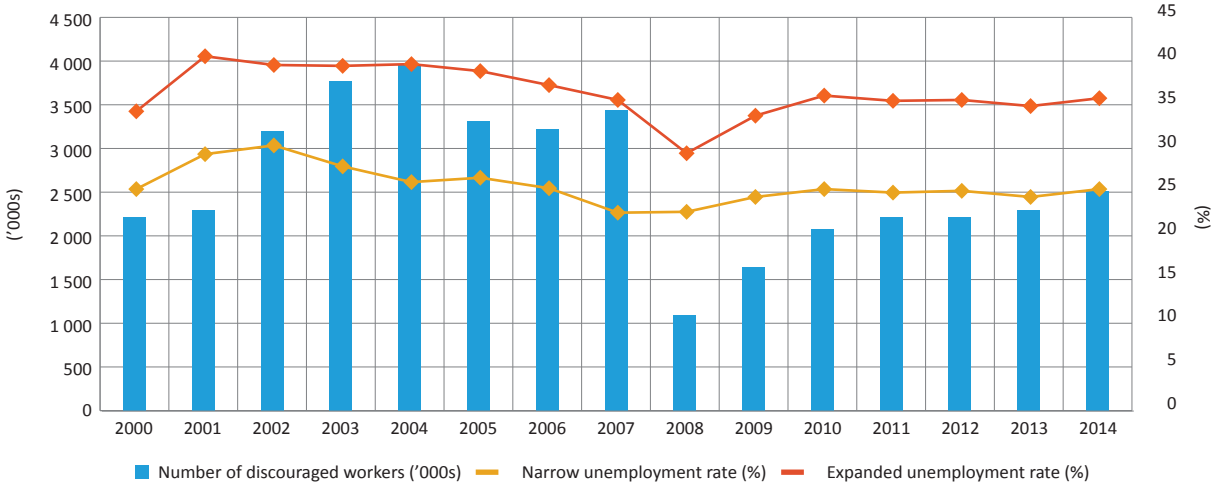
A basic litmus test of these labour market trends can be done using two simple performance indicators: the target growth rate and the employment absorption rate (Bhorat, 2006). The target growth rate measures how fast employment would have had to expand in order to provide work for all new entrants to the labour market over a given period[12], and the employment absorption rate (which is the ratio of actual employment growth and the target growth rate) indicates the proportion of the net increase in the labour force that finds employment. An absorption rate equal to 100 denotes a situation where the increase in labour force is fully accounted for by an increase in employment; and an absorption rate of greater than 100 indicates a situation in which unemployment falls in absolute terms. Therefore, the closer the absorption rate is to 100, the better the actual employment performance is, relative to the desired performance.

The results in Table 2.4 on page 29 illustrate, however, that while employment grew by 58.9% between 1995 and 2014, employment would have had to grow by 103% – almost double the actual rate – to ensure that all new entrants into the labour market (by the broad definition) were able to find employment. Additionally, the absorption rate indicates that by the broad definition, the economy was only been able to generate 57 jobs for every 100 economically active individuals that entered the labour market between 1995 and 2014. Even by the narrow definition, the number of jobs created for every 100 new entrants into the labour market increased only marginally, to 64 jobs per 100 economically active individuals.

These statistics indicate that South Africa's dire labour market performance is in many ways a consequence of a rapidly growing labour force, or at least an opening up of the labour market to individuals who, during apartheid, were previously restricted from fully participating in the economy (Bhorat, 2006). Furthermore, the racial discrimination and segregation policies of the apartheid era, which are reflected in poor educational attainment and skills levels, as well as spatial disparities between housing and economic activity for predominantly disadvantaged population groups, perpetuate the barriers to employment. This labour market outcome, i.e. one characterised by a rapid influx of low-skilled workers, combined with economic growth that has not been able to generate enough low-skill, low-wage jobs at the same pace, has resulted in stubborn and persistently high rates of unemployment. As illustrated in Figure 2.11, unemployment rates have remained above 25% since 2000.

With economic growth continually reliant on a volatile Mining sector, and a growing tertiary sector, much of the labour force remained excluded from South Africa's post-apartheid growth path. The economy appears to be trapped in a sectoral growth vs employment trap, reflecting a critical mismatch in labour demand and supply.

Figure 2.11: Trends in unemployment rate, 2000 to 2014



Source: LFS (2000: Q3 – 2007: Q3). QLFS (2008:Q3 – 2014:Q3) (Statistics South Africa)

[12] *The target growth rate captures the growth required to provide employment to only new entrants, and is independent of the rate or level of unemployment in the base year (e.g. 1995). Employment growth at the target rate would result in a reduction in the overall unemployment rate, Bhorat (2006).*

CONCLUDING COMMENTS AND IMPLICATIONS FOR SKILLS PLANNING

The first part of this chapter provided an overview of South Africa's post-apartheid economic performance, while highlighting some of the key constraints to rapid and inclusive growth, as well as employment. Since 1994, the South African economy has been characterised by low and volatile growth rates, extremely high unemployment, and rising inequality. Despite having one of the strongest economies on the African continent. South Africa has not only performed poorly relative to its continental peers, but has also lagged behind other fast-growing middle-income countries. While the advent of democracy in 1994 resulted in South Africa's re-entry into the global economy, it also resulted in a domestic economy that has become increasingly vulnerable to external shocks, and heavily reliant on natural resource exports and a globally competitive Financial Services sector for growth.

The volatile state of the economy, combined with a lack of high growth, have had dire outcomes in the labour market. Employment growth has not been sufficient to absorb a rapidly growing labour force – with the result being an inordinately high unemployment rate. This chapter argues that a key constraint to sustainable job creation in South Africa is the structural mismatch between labour demand and supply: the post-apartheid period has delivered an economy characterised by an eroding primary sector, and a weak and un-dynamic Manufacturing sector. Growth has instead been built on large capital-intensive industries, and a rapidly growing Services sector. Economic growth, while modest, has thus favoured high-skilled workers, despite the fact that the majority of the unemployed population is low-skilled. Failure to grow the Agricultural and, in particular, the Manufacturing sectors, has therefore resulted in an economy starved of low-skill, low-wage jobs. This has impacted the youth, partly magnified by the increasing number of individuals coming into the labour market.

The key implication from this analysis is that the skills planning cannot be seen in isolation from the economic growth and employment trajectories. The South African labour force is made up of high and low-skilled workers, and the challenge for the trajectory of the economy is to respond with the supply of high and low-skilled jobs, while still trying to improve productivity and grow the economy.

CHAPTER 3

THE SOUTH AFRICAN LABOUR FORCE

An engaged and productive society and economy is dependent on an educated citizenry and a skilled and capable workforce. The working-age population, in turn, expects to find decent jobs, earn a livelihood, and make a contribution to the society and the economy. The South African labour force has been and continues to be shaped by the aftermath of apartheid, leading to two major contemporary challenges: the challenge to grow the skills and capability levels of the workforce which started from a very low base; and to reduce one of the highest unemployment rates in the world. This chapter, like Chapter 2, provides contextual information to inform skills planning.

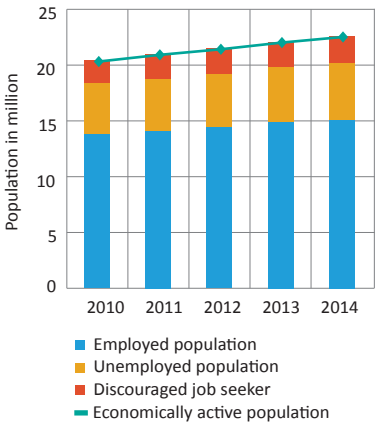
In this chapter we provide an overview of the South African labour force[13] (the employed and unemployed) for the 2010 to 2014 period through an analysis of demographic variables (spatial location, gender, population group, age and education level), and examine the trend over this period. This will provide signals to both post-school education and training, and workplace training programmes on how they organise the education and training programmes. Given the high levels of youth unemployment in the country, we have chosen to highlight this group, especially with regard to its education levels. In describing the labour force we will also examine the characteristics of immigrants to the labour force as a further signal of the skills need in the country.

OVERVIEW OF THE SOUTH AFRICAN LABOUR FORCE

The South African employed population in the labour force increased from 13.8 million in 2010 to 15.1 million in 2014, hence an additional 1.3 million jobs were created. In the same period, the official number of unemployed persons rose from 4.6 million to 5.1 million (Figure 3.1). Further, much of the working-age population has resigned itself to the state of unemployment (discouraged job seekers) and are not looking for jobs, this group rose from 2 million to 2.4 million for the same period[14]. Thus, the jobs deficit (the gap between the unemployed working-age population and the employed population) increased by 1.1 million from 2010 to 2014. From 2010 the total number of working-age persons has increased, but the rate of growth of the working-age population is twice the rate of the growth of employment. This high level of unemployment contributes to South Africa's continued status as one of the most unequal societies in the world.

South Africa experiences high levels of unemployment and this is a major threat at the personal, social, and economic level of the country. The official unemployment rate in 2001 was 26.2%, and this figure decreased to the lowest rate yet in 2008, the start of the recession, when the rate was 22.5%. Unfortunately, the unemployment levels started increasing in 2010 at 24.9%, and reached a rate of 25.1% in 2014. Based on the expanded unemployment definition, 35.4% and 35.3% of the economically active population was unemployed in 2010 and 2014 respectively.

Figure 3.1: Jobs deficit: Gap between working-age population and employed population (million)



	2010	2011	2012	2013	2014
Employed population	13.8	14.1	14.4	14.9	15.1
Unemployed population	4.6	4.6	4.8	4.9	5.1
Discouraged job seeker	2	2.3	2.3	2.3	2.4
Economically active population	20.4	21	21.5	22.1	22.6

Source: Authors' own calculations based on the Labour Market Dynamics data, StatsSA (2014b)

[13] *The labour force is defined as the number of people aged 15 years and older in the population who are either employed or unemployed (StatsSA 2016a). It does not include those who are unable or those not seeking to work (e.g., persons in institutions, retirees, full-time students).*

[14] *There are two unemployment measures: the unemployed looking for jobs (official) and the unemployed not looking for jobs i.e. discouraged workers (expanded).*

The following sections provide an analysis of the employed and unemployed by spatial location, population group, gender, age group, and highest level of education. The information about unemployment in the following sections is based on the expanded definition of unemployment.

WHO ARE THE EMPLOYED AND THE UNEMPLOYED?

SPATIAL LOCATION OF THE EMPLOYED AND THE UNEMPLOYED

There are significant variations among different provinces in South Africa, which impacts on employment and further exacerbates inequalities, Figure 3.2 confirms that economic growth is concentrated in three provinces: Gauteng, KwaZulu-Natal, and Western Cape. In contrast, the economically poorer-performing provinces are the Northern Cape, Free State, Limpopo, Eastern Cape, North West and Mpumalanga. There is a need to address regional disparities, but this is made difficult by the lack of economic and employment opportunities in the poorer-performing provinces.

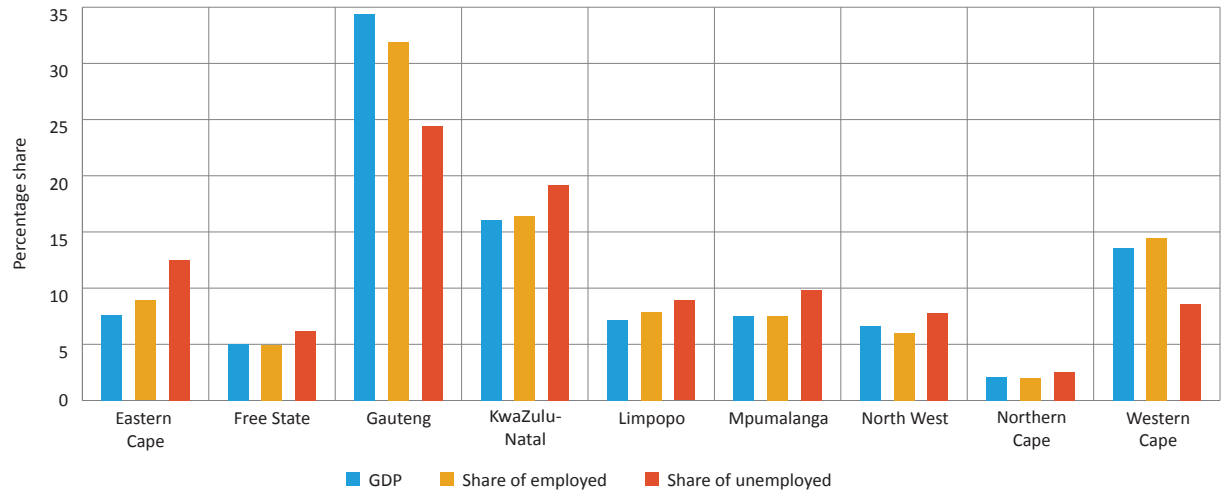
In 2014 the Gauteng province contributed just over one third (34%) to South Africa's GDP, and the KwaZulu-Natal and Western Cape provinces together contributed close to one third of the GDP. The other six provinces, Eastern Cape, Limpopo, Mpumalanga, North West, Free State, and Northern Cape, combined contributed just over a third of the GDP.

The shares of the employed population by province mirror the provincial GDP shares. One third of the employed reside in Gauteng, with close to one-sixth each residing in the Western Cape and KwaZulu-Natal. The shares of the employed population in the provinces have been fairly constant since 2010, except in KwaZulu-Natal where there was a decrease by three percentage points, and an increase by two percentage points in Gauteng between 2010 and 2014.

All provinces experience unemployment, and the shares of the unemployed are lower than the shares of employed in only Western Province and Gauteng. In all other provinces the shares of the unemployed are higher than the shares of the employed. This presents challenges to provinces in terms of how new jobs will be created to absorb the unemployed.

South Africa experiences high levels of unemployment and this exacerbates inequalities. The challenge is how new jobs will be created to absorb the unemployed.

Figure 3.2: Provincial GDP, employment and unemployment, 2014



	Eastern Cape	Free State	Gauteng	KwaZulu-Natal	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape
GDP	7.6	5.0	34.4	16.1	7.2	7.5	6.6	2.1	13.6
Share of employed	8.9	4.9	31.9	16.4	7.9	7.5	6.0	2.0	14.5
Share of unemployed	12.5	6.2	24.4	19.2	8.9	9.8	7.8	2.5	8.6

Source: Employment shares based on StatsSA's QLFS and the share in GDP, StatsSA (2014b)

GENDER AND POPULATION GROUP OF THE EMPLOYED AND UNEMPLOYED

Given the past discrimination policies, both by population groups and gender, it is important to track the changes for these variables. The gender and population group distribution data of the employed population is illustrated in Figures 3.3 and 3.4, and for the unemployed in Figures 3.5 and 3.6 from 2010 to 2014.

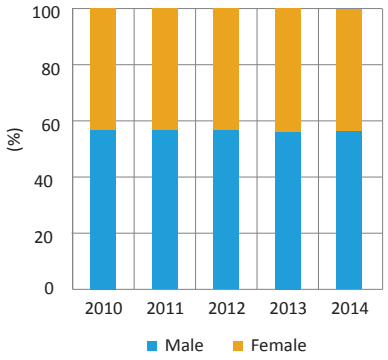
From 2010 to 2014, the shares of the employed African population group increased by three percentage points from 70% to 73%, the shares of the Coloured group remained constant, and the shares of Whites and Indians/Asians have slightly decreased. The levels and rates of unemployment are racialised, and in 2014 the majority of the unemployed population was African at 89%. This was followed by the Coloured group at 8%, and the White and Indian/Asian groups both made up the other 3%.

There are fewer women than men participating in the labour market, but the trend analysis shows that the participation patterns are improving. Between 2010 and 2014 the participation of women increased marginally by 0.6 percentage points, from 43.2% to 43.8%. For all population groups, the employed female shares are lower than male shares, and the largest difference between males and females is in the African group, suggesting that the most disadvantaged group are African females. Similarly, more females than males were unemployed across the five-year period and again the share of unemployed females decreased by 1.3 percentage points from 52.6% in 2010 to 51.3% in 2014.

AGE DISTRIBUTION OF THE EMPLOYED AND UNEMPLOYED POPULATION

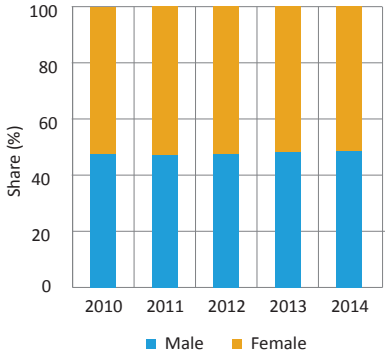
Close to two thirds of the South African population is under the age of 34 years. This important demographic poses major social, skills and employment challenges. The age pattern of the employed provides an indication of who is able to get into jobs and the pipeline of skills to meet replacement demand

Figure 3.3: Employed population by gender, 2010 to 2014



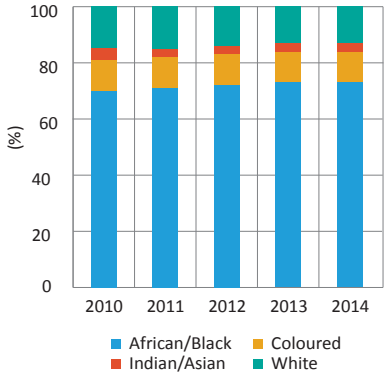
	2010	2011	2012	2013	2014
Male	56.8	56.6	56.6	56	56.2
Female	43.2	43.4	43.4	44	43.8

Figure 3.5: Unemployed population by gender, 2010 to 2014



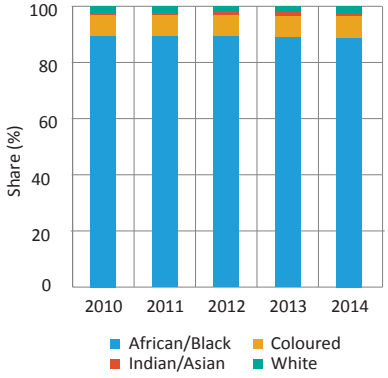
	2010	2011	2012	2013	2014
Male	47.4	47.2	47.6	48.2	48.7
Female	52.6	52.8	52.4	51.8	51.3

Figure 3.4: Employed population by population group, 2010 to 2014[15]



	2010	2011	2012	2013	2014
African/Black	70	71	72	73	73
Coloured	11	11	11	11	11
Indian/Asian	4	3	3	3	3
White	15	15	14	13	13

Figure 3.6: Unemployed population by population group, 2010 to 2014

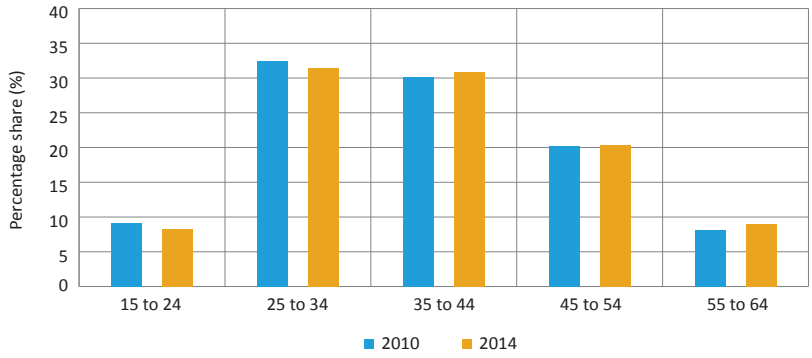


	2010	2011	2012	2013	2014
African/Black	89.4	89.3	89.2	88.9	88.7
Coloured	7.3	7.4	7.6	7.6	7.6
Indian/Asian	0.9	1.0	1.1	1.3	1.2
White	2.3	2.3	2.1	2.3	2.4

Source: StatsSA (2014b)

[15] *In 2010 Africans made up 79.3% of the population and Whites 9.2%. In 2014 Africans made up 80.0% of the population and Whites 8.5%.*

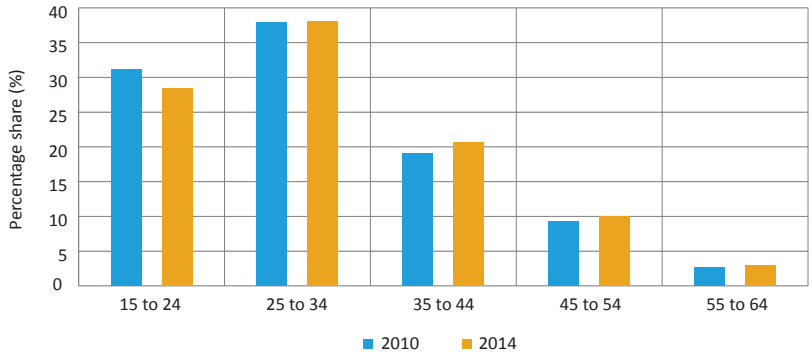
Figure 3.7: Age distribution of the employed population, 2010 and 2014



	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64
2010	9,2	32,4	30,1	20,2	8,1
2014	8,3	31,4	30,9	20,3	9,0

Source: StatsSA (2014b)

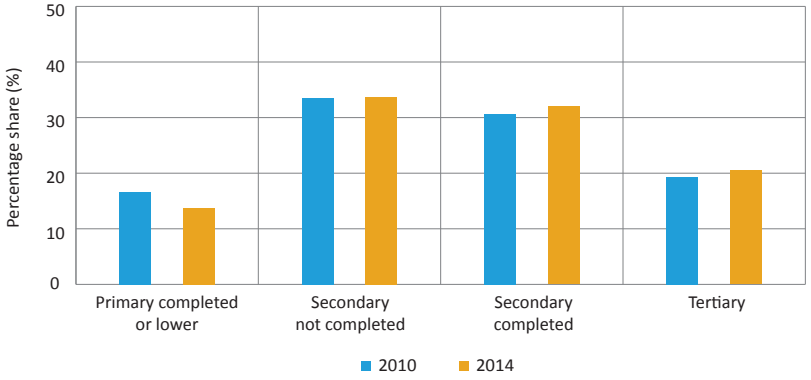
Figure 3.8: Age distribution of the unemployed population, 2010 and 2014



	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64
	31.2	37.9	19.0	9.3	2.6
	28.4	38.0	20.6	10.0	2.9

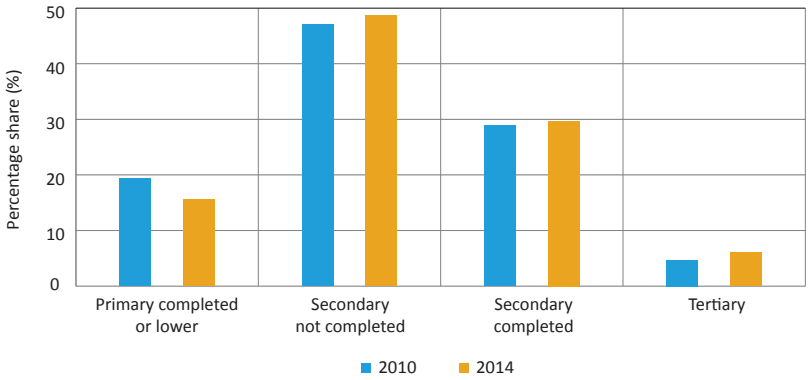
Source: StatsSA (2014b)

Figure 3.9: Highest education level of the employed population, 2010 and 2014



	Primary completed or lower	Secondary not completed	Secondary completed	Tertiary
	16.6	33.5	30.6	19.3
	13.8	33.7	32.0	20.5

Figure 3.10: Highest education level of the unemployed population, 2010 and 2014



	Primary completed or lower	Secondary not completed	Secondary completed	Tertiary
	19.4	47.0	28.9	4.7
	15.6	48.7	29.7	6.0

Source: StatsSA (2014b)

i.e. who will be able to take over jobs as others retire. The age pattern of the unemployed points to vulnerable groups in the labour force and signals where to direct training efforts. The age distribution of the employed and unemployed population is presented in Figures 3.7 and 3.8, respectively.

Figure 3.7 shows that close to 60% of the employed are above the age of 35 years; the shares of employment for people aged 35 years and older have increased slightly (by almost two percentage points), and those for the younger generation have decreased similarly. This is a concern as South Africa is a youthful country, and employment for the youth should be increasing. More than two thirds of the unemployed are in the 15 to 34-year age group (categorised as youth), and it is encouraging that this ratio has decreased by 2.7 percentage points from 69.1% in 2010 to 66.4% in 2014. However, this high level of unemployment for the youth group presents a major social and skills challenge for the country.

EDUCATION LEVEL OF THE EMPLOYED AND UNEMPLOYED POPULATION

It is universally recognised that higher levels of educational attainment are associated with better health and well-being, higher employment rates, better labour market opportunities, and higher earning. We report on the educational qualifications of the labour force from 2010 and 2014, which we acknowledge is only one measure of skills.

The education level of the employed population is increasing (Figure 3.9). From 2010 to 2014 the shares of the employed with a matriculation certificate or higher increased by 2.6 percentage points from 49.9% to 52.5%. The shares of the employed with a tertiary education increased from 19.3% in 2010 to 20.5% in 2014. The number and share of the employed with 'primary completed or lower' education, although decreasing, was still over 2 million workers in 2014. This group constituted 16.6% of the employed in 2010 and 13.8% in 2014. The majority of these 2 million workers

are over 35 years of age, close to 90% are from the African population group, and just over 10% are from the Coloured population group.

Figure 3.10 represents the distribution of the highest level of education of the unemployed population for 2010 and 2014. Close to two thirds of the unemployed have an education level that is less than a secondary education certificate. This analysis confirms other research on the returns to the educational investment, and that those with less than a grade 12 certificate are extremely vulnerable in the labour market (Bhorat et al, 2015).

Another important indicator for any emerging industrialised country is the level of tertiary education[16] and degree of graduate attainment of the population. The employed population with a tertiary education is gradually increasing in numbers and constituted 20.5% of the employed population in 2014 compared to 19.3% in 2010.

Table 3.1: Trends in tertiary and degree graduate qualifications among the employed (rounded to thousands)

	2013[17]	2014
Tertiary employed	3 041 000	3 072 000
Employed with HE qualifications[18]	1 178 000	1 201 000
Employed with diploma and certificate qualifications	1 863 000	1 871 000

Source: StatsSA (2014b)

Table 3.1 provides the rounded off numbers of employed persons with tertiary education. In 2014 those employed and having tertiary education qualifications were made up of 1.2 million (39%) higher education (HE) graduates and 1.8 million (61%) diploma and certificate completers.

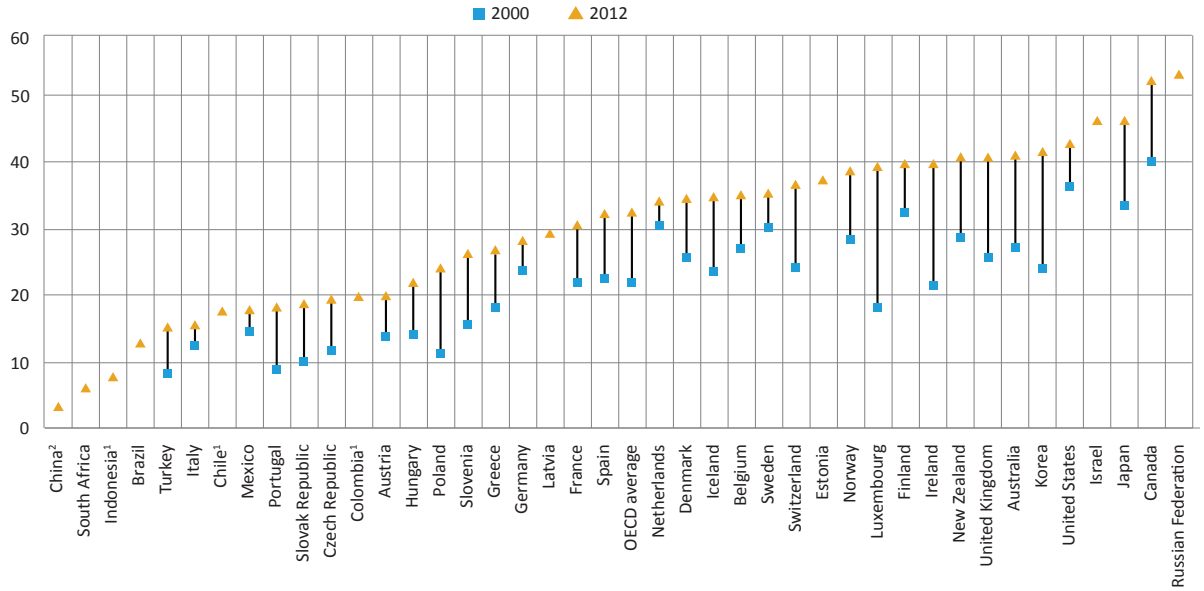
As South Africa aspires to improve its level of education and skills, it is important to benchmark our education and skills level against other countries. Figure 3.11 provides the comparative statistic for tertiary education for 25 to 64-year-olds in a number of countries.

[16] *StatsSA (2016a) has used the following definition to categorise tertiary education: individuals who have obtained an undergraduate or post-graduate degree or have completed secondary school and, in addition, obtained a certificate or diploma of at least six months' full-time duration.*

[17] *Reliable data for previous years was not available.*

[18] *Closer examination of the StatsSA data revealed that there were some inconsistencies in the categorisation of the TVET and HE qualifications in relation to study fields, and for more accurate skills estimates we suggest further cleaning of the data related to qualifications and study fields data (Q1.7 and Q1.8 in QLFS).*

Figure 3.11: Percentage of tertiary educated 25 to 64-year-olds in 2000 and 2012



[1.] *Year of reference 2011.*
[2.] *Year of reference 2010.*
Countries are ranked in ascending order of the percentage of 25 to 64-year-olds who have attained tertiary education in 2012 (or latest available year).
Source: OECD. Table A1.4a. See Annex 3 for notes (www.oecd.org/edu/eag.htm)
Source: OECD. (2014)[19]

[19] *OECD defines tertiary education as an ISCED 5A programme which provides access to research-based programmes and professions with high skill requirements. This is different from the definition used by StatsSA.*

Among the countries compared, South Africa has one of the lowest levels of tertiary education in its population. In Brazil, 13.0% of the 25 to 64-year-old population had attained a tertiary education qualification in 2012, compared to South Africa where 6.4% attained the same qualification. While it is acknowledged that South Africa started off in 1994 from low levels of education, it is imperative that the level of tertiary education of the population and labour force is increased to support growth and productivity of the economy.

YOUTH EMPLOYMENT AND UNEMPLOYMENT

South Africa has a fairly young population, with almost two thirds of the population under the age of 34 years. A total of 37% of the South African population is categorised as youth (15 to 34 years of age). The profile of youth in terms of the working-age population, and the official unemployment rates, is provided in Table 3.2. Unemployment, and in particular youth unemployment, is a major concern in South Africa. Close to half of the youth is neither in education, employment, nor training, and this trend has been consistent over the last few years. The unemployed youth are made up of almost equal proportions of males and females, 87% of the unemployed youth are African and 8% are from the Coloured population group. This presents a major social, policy, and skills challenge.

South Africa is a youthful country with two thirds of the population under the age of 35. This youth bulge could result in either a youth dividend or a youth bomb.

Table 3.2: Youth by employment status, 2011 to 2014

	2011		2012		2013		2014	
	Number	%	Number	%	Number	%	Number	%
Youth	18 908 974	36.7	19 139 816	36.6	19 367 380	36.6	19 582 969	36.5
Working-age population (15 to 34 years)	10 499 797		10 675 735		10 852 215		10 982 462	
Employed working-age population (15 to 34 years)	5 771 360	55.2	5 867 779	54.9	6 008 030	55.3	6 021 178	54.8
• 15 to 24 years	1 271 608		1 241 850		1 277 125		1 263 226	
• 25 to 34 years	4 499 752		4 625 928		4 730 906		4 757 951	
Youth neither in education, employment, training (official unemployment)	3 205 253	30.5	3 270 917	30.6	3 294 877	30.3	3 376 843	30.7
• 15 to 24 years	1 286 015		1 329 173		1 352 093		1 330 180	
• 25 to34 years	1 919 238		1 941 744		1 942 784		2 046 662	
Discouraged youth job seekers	1 523 185	14.5	1 537 039	14.4	1 549 307	14.3	1 584 441	14.4

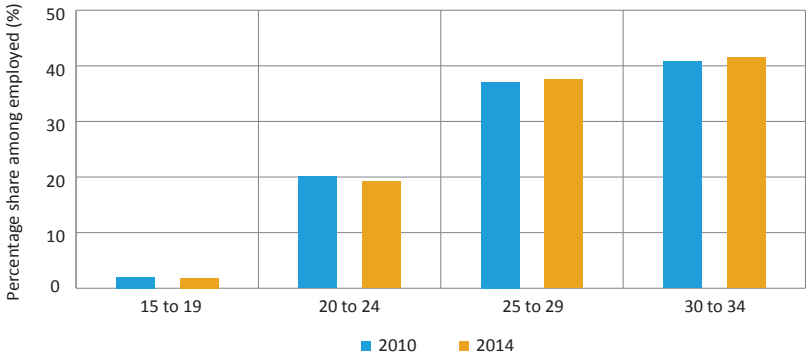
Source: StatsSA (2014)

THE AGE PROFILE OF YOUTH

The population group and gender profile of economically active youth in 2014 was as follows: 82% African, 9% Coloured, 2% Indian/Asian, and 6% white, and comprised 54.0% male and 46.0% female. The age distribution of the employed and unemployed youth is presented in Figure 3.12 and Figure 3.13 respectively.

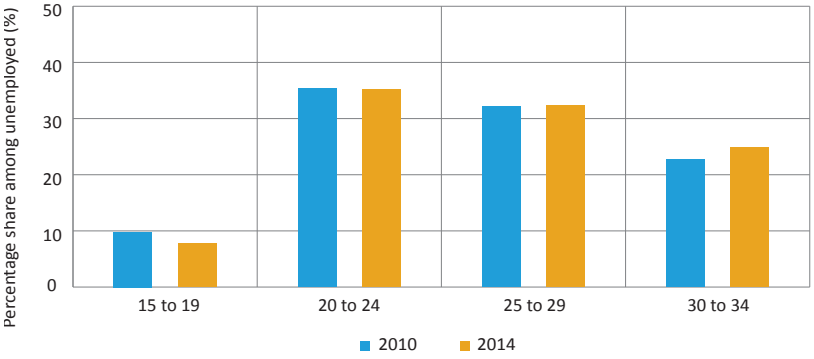
Among the youth group, the employment participation increases with age, and very few 15 to 19-year-olds participate in the labour market. Youth in the 25 to 34-year age group claim 79% of the shares of the youth employed. Youth unemployment is higher for those under the age of 30, and the group aged 20 to 30 years makes up two thirds of the unemployed youth.

Figure 3.12: Share of age groups of employed youth, 2010 and 2014



	15 to 19	20 to 24	25 to 29	30 to 34
2010	2.0	20.1	37.1	40.8
2014	1.8	19.2	37.5	41.5

Figure 3.13: Share of age groups of unemployed youth, 2010 and 2014



	15 to 19	20 to 24	25 to 29	30 to 34
2010	9.8	35.3	32.2	22.7
2014	7.7	35.1	32.4	24.8

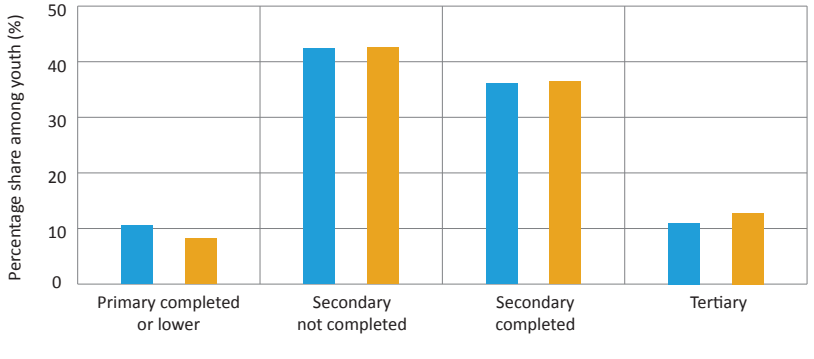
Source: StatsSA (2014b)

THE EDUCATION LEVEL OF YOUTH

The distribution of the economically active youth by highest level of education achieved is presented in Figure 3.14.

The education level among the economically active youth increased slightly from the period 2010 to 2014. The share of tertiary education qualifications increased by 1.8 percentage points from 11.0% in 2010 to 12.8% in 2014. The share of the youth group with less than a grade 12 education, though still very high, decreased marginally from 52.9% in 2010 to 50.7% in 2014.

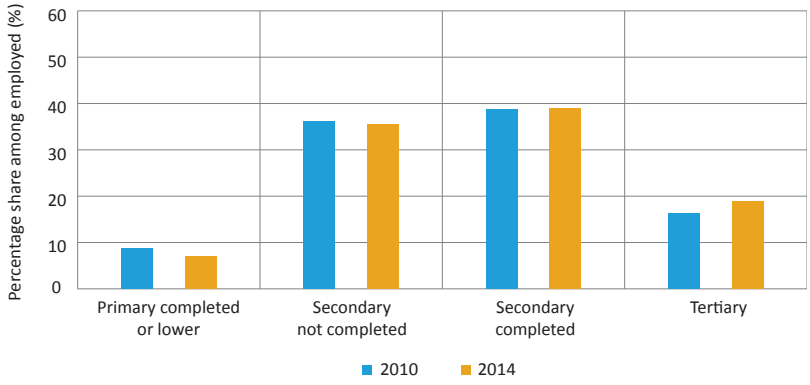
Figure 3.14: Distribution of youth by highest level of education for 2010 and 2014



	Primary completed or lower	Secondary not completed	Secondary completed	Tertiary
2010	10.5	42.4	36.1	11.0
2014	8.2	42.5	36.5	12.8

Source: StatsSA (2014b)

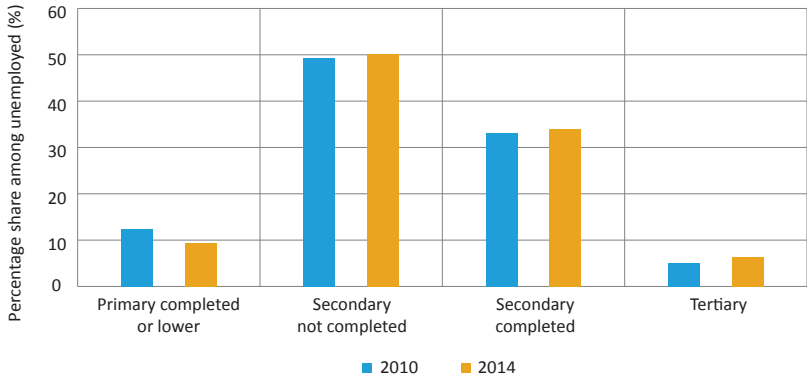
Figure 3.15: Share of education levels of employed youth, 2010 and 2014



	Primary completed or lower	Secondary not completed	Secondary completed	Tertiary
2010	8.7	36.1	38.7	16.4
2014	7.0	35.4	38.9	18.8

Source: StatsSA (2014b)

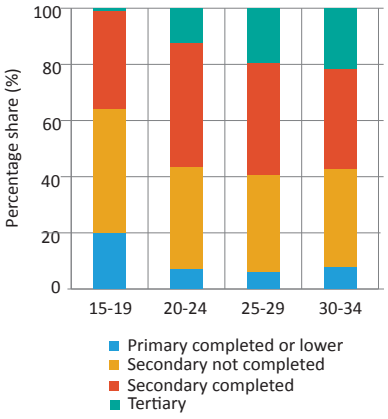
Figure 3.16: Share of education levels of unemployed youth, 2010 and 2014



	Primary completed or lower	Secondary not completed	Secondary completed	Tertiary
2010	12.4	49.4	33.2	5.0
2014	9.4	50.2	34.0	6.4

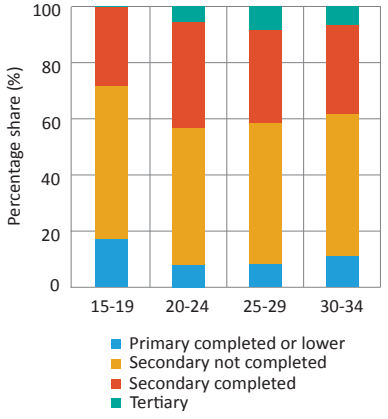
Source: StatsSA (2014b)

Figure 3.17: Share of education levels of employed youth by age group, 2010



	15 to 19	20 to 24	25 to 29	30 to 34
Primary completed or lower	19.6	7.0	5.8	7.5
Secondary not completed	44.2	36.3	34.8	35.0
Secondary completed	35.1	44.3	39.6	35.9
Tertiary	1.1	12.4	19.8	21.6

Figure 3.18: Share of education levels of unemployed youth by age group, 2014



	15 to 19	20 to 24	25 to 29	30 to 34
Primary completed or lower	17.0	8.0	8.1	10.9
Secondary not completed	54.8	48.6	50.3	50.9
Secondary completed	27.8	37.9	33.3	31.4
Tertiary	0.4	5.5	8.3	6.9

Source: StatsSA (2014b)

The general conception is that youth are unemployed as a result of the low education levels, Figures 3.15 and Figure 3.16 present the distribution of the economically active employed and unemployed youth by highest level of education for the years 2010 and 2014. The following analysis will highlight differences between the results presented in the two graphs.

Figures 3.15 and Figure 3.16 mirror the pattern for the general population (See page 37, Figure 3.9 and 3.10). The employed youth have higher levels of educational attainment than the unemployed youth. The education level of the employed youth increased from 2010 to 2014, and 60% of the unemployed youth have not completed their secondary education. This signals an opportunity where the education and skill level of the majority of the unemployed youth should be increased to a grade 12 or equivalent level NQF level 4).

Figures 3.17 and Figure 3.18 illustrate the shares of education levels of the employed and unemployed youth by age group for 2014, respectively. Across all age groups, those with less than a grade 12 certificate are most vulnerable in the labour market.

IMMIGRANTS IN THE LABOUR FORCE

An analysis of the educational level of immigrants in the labour force could provide a signal of skills demand and shortages. Immigrants entering the country for work have to apply for a work permit at the Department of Home Affairs (DHA). South Africa as yet does not have a credible dataset about immigrants to South Africa to provide credible information for skills planning (Paterson et al, 2015). We will knit together Census 2011 data, information from StatsSA, and an analysis of the Quarterly Labour Force Survey (QLFS) data by the Migrating for Work Research Consortium (MiWORC) to form a picture of immigrants and foreign workers in the labour force (Budlender, 2014).

Census 2011 reported that 2 199 871[20] people living in South Africa were born outside the country, and of these, close to three-quarters are from other African countries (Census, 2011; GHS, 2012). The MiWORC analysed the QLFS 2012 data. They reported that the majority of foreign born individuals (59%) had education levels below grade 12. 24% attained a grade 12 level qualification, and 13% a tertiary qualification (Budlender, 2014). The study showed that individuals with secondary and higher education levels had higher employment rates than those who had not completed the secondary schooling phase (Budlender, 2014).

Foreign-born individuals were more likely to be employed in private enterprises (82%) and private households (12%), where they were primarily employed as domestic workers, gardeners, or child care workers. Foreign-born individuals were likely to be working as service and sales workers, and as craft-related (skilled) workers. The wholesale and retail trade industry provided the highest employment opportunities (30.1%), with smaller proportions employed in services (12.8%), construction (11.6%), private households (11.2%), finance (10.5%), and manufacturing (10.1%).

StatsSA produced reports for documented immigrants in South Africa in 2012, 2013 and 2014 (StatsSA 2012, 2013, 2014a), and information was extracted from these reports to quantify the number of work permits allocated by DHA for each preceding year. StatsSA used the data generated by the DHA for temporary and permanent work permit[21] applications and renewals to describe the relevant characteristics of South Africa's immigrants. In 2013, the largest number of temporary permits was issued to nationals from the following five countries: Zimbabwe (18.5%), Nigeria (10.1%), India (7.7%), China (6.7%), and Pakistan (5.6%).

Table 3.3 summarises the number of the work permits and business permits issued by the DHA. Unfortunately, data about the educational level and occupations of immigrants who receive work permits has not been collected, and therefore this data does not accurately represent skills demand.

The analysis of the number of work permits seems low in relation to the number of immigrants living in South Africa. This limited data provides a very weak signal of skills demand. Effective skills planning requires up-to-date information about work permits allocated to immigrants, and should also include data about educational levels, employment sectors, and occupations of the recipients of the work permits.

Table 3.3: Number of work and business permits awarded by Department of Home Affairs, 2011 to 2013

	2011	2012	2013
Temporary residence			
Work permits	20 673	33 253	24 027
Business permits	1 346	1 585	1 911
Permanent residence			
Work permits	2 060	441	2 152
Business and finance permits	316	94	176
Total	**24 395**	**35 373**	**28 266**

Source: StatsSA (2012a, 2013, 2014a)

[20] *These are documented immigrants. There may be a small number, most probably with low skill, that are undocumented. The documented immigrants constitute 4.2% of the population.*

[21] *Work and business permits constituted 25% of all permits issued by DHA.*

CONCLUDING REMARKS AND IMPLICATIONS FOR SKILLS PLANNING

This overview described the characteristics of the employed and the unemployed, especially youth who are unemployed. There are 15 million people employed and 7.5 million unemployed. Three quarters of the employed and 90% of the unemployed are from the African population group. Close to half of the employed population of South Africa is between the ages of 30 and 44 years. The highest level of unemployment is for the youth group (15 to 34 years) where 45% of the group is either unemployed or a discouraged job seeker.

While the education level in the country increased slightly between 2010 and 2014, this is too low to stimulate the economy. About 20% of the employed population has a tertiary qualification, 32% has completed secondary education, 33% has some secondary education, and 14% has some primary education. A total of 60% of the unemployed has less than a grade 12 certificate. Of the 2.2 million documented immigrants in South Africa, close to 60% also has less than a grade 12 certificate.

Given the differentiated educational levels and labour market status of the working-age population, there must be multiple skills policy responses to raise the education and skills levels of the labour force. On the one hand, for an expanding, innovative and productive labour market, the shares of tertiary level workers must be increased. The high number of workers with less than a grade 12 certificate calls for responses to improve educational qualifications, as well as to provide structured workplace training opportunities to improve workers' skill levels to meet the challenges of the changing workplace conditions.

Offering differentiated skills programmes for the unemployed must become a priority, especially those with less than a grade 12 certificate. For those who have a grade 12 certificate there should be more occupational directed programmes, especially for those areas needed in the labour market.

CHAPTER 4

SKILLS SUPPLY IN SOUTH AFRICA

This chapter describes the supply and potential supply of skills from the formal schooling, TVET, and university sectors. This provides the basis for identifying the types of skills that people acquire when they move through the education system and enter the labour market. The topic that this report tackle, is whether or not South Africa is producing the appropriate skills and qualifications at each level, and the extent to which this facilitates inclusive employment. At a general level, this chapter focuses on trends in enrolment and completion rates for each of the three broad educational levels. More detailed analysis is undertaken on pertinent labour market issues at these three institutional stages of human capital accumulation.

When looking at the schooling sector, Mathematics performance is analysed, as well as the number of bachelor passes, and how these have changed over time. Understanding these trends is important as these skills provide the basis for entry into the next level of the education system. At the TVET level, patterns of enrolment levels by the study fields of Engineering, Services, and Business are analysed. At the higher education level, the analysis is focused on enrolment and completion rates for Business, Science, Engineering, and Technology and Humanities study fields. Together, this evidence provides the basis for identifying whether or not South Africa is developing the knowledge base to tackle current and future demand, as well as to help solve the growing skills shortages and mismatches being experienced.

An outcome of the apartheid government's policy is a low-quality and unequal schooling system, leading to a post-school education system that is not accessible to those with poor levels of schooling.

THE SCHOOLING SYSTEM

An outcome of the apartheid government's policy is a low-quality and unequal schooling system, leading to a post-school education system that is not accessible to those with poor levels of schooling. Education is a key priority, and the country has invested enormous resources to improve the schooling system. The state has improved access to schooling (notably at the primary level), but positive outcomes, notably in Mathematics and Science subjects, remain elusive. As we shall see later, this poor foundation impacts negatively on the types and quality of skills entering the labour market.

The key measure of the wellbeing of our educational system is the achievement of learners. Analysis of the performance of the South African schooling population using the results from national (Annual National Assessments), regional (Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ)), and international (Trends in International Mathematics and Science Study (TIMSS)) assessments all point to the following (Reddy and Juan, 2014):

- The national Mathematics, reading, and Science average scores are consistently low over time and across different grades. TIMSS 2011 showed that, although South African scores are still low, there has been some improvement in Mathematics and Science performance between 1996 and 2011.
- The education system is unequal and, in general, only 25% to 30% of learners across all grade levels achieve the minimum competence in Mathematics and Science.

The throughput rate of learners from grades 1 to 12 is of concern, with low numbers of learners proceeding to achieving a secondary school certificate. This is best illustrated by the following results: 1.27 million learners began school in grade 1 in 2003; nine years later in 2011, 1.05 million learners were in grade 9 (end of the compulsory basic education phase), and three years later 0.57 million learners wrote the grade 12 examination (matriculation exit examination). Less than 40% of the learners who reach grade 9 complete the matriculation examinations (Branson et al, 2014; Isdale et al, 2016).

The quality of the matriculation (grade 12) pass rates, and in particular the indicator of the number of bachelor's passes[22], provides an indication of the potential pool available to enter post-school education and training institutions, especially in technical areas. Figure 4.1 shows the trend for the period 2010 to 2014. In this period there has been a 19% increase in the number of learners completing grade 12 with a bachelor's pass.

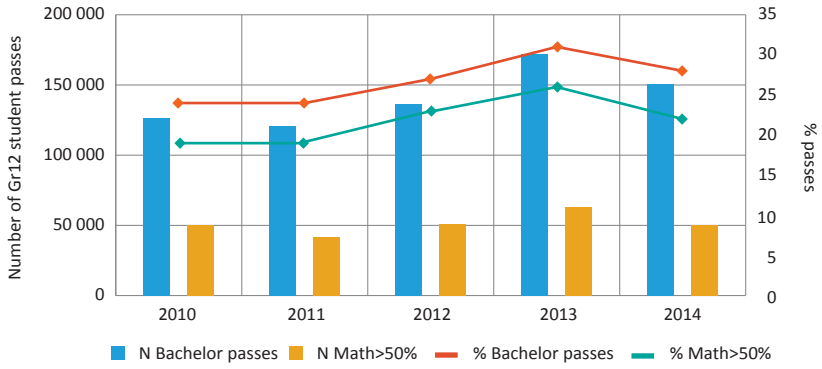
The low quality of Mathematics performance throughout the education system results in a low number of high-quality Mathematics passes in the matriculation examination. While the country boasted an average of 141 000 bachelor's passes in the 2010 to 2014 period, the average number of learners who passed with Mathematics scores greater than 50% for the same period is 51 300. This is the pool of school leavers who could access the Science, Engineering, and Technology and Health-related tertiary level courses.

The South African gross enrolment rates at primary and secondary schools are high, and comparable with other countries (Table 4.1). Similarly,

[22] *Minimum requirement to register for a qualification at a university.*

The low quality of Mathematics performance throughout the education system results in a low number of high-quality Mathematics passes in the matriculation examination. This is the pool of school leavers who could access the Science, Engineering, and Technology and Health-related tertiary level courses.

Figure 4.1: Number and percentage of learners achieving matriculation with a bachelor's pass and Mathematics passes at higher than 50% from 2010 to 2014



	2010	2011	2012	2013	2014
N Bachelor passes	126 371	120 767	136 047	171 755	150 752
N Math>50%	50 195	41 586	51 231	63 151	50 365
% Bachelor passes	24	24	27	31	28
% Math>50%	19	19	23	26	22

Source: Author's calculation from DBE National Senior Certificate Technical Report 2014

expenditure for South African education (as a percentage of GDP) is comparable with other middle-income countries. However, achievement in Mathematics is lower than the other countries, suggesting a diminishing return with regard to the South African education spend. In addition, participation in pre-primary education is lower than other countries, and recent research points to the importance of good foundational skills for future successes.

PROFILE OF THE UNIVERSITY AND TVET SECTORS

The main institutions offering post-school qualification programmes are the Higher Education Institutions (HEIs) (public and private)[24], public Technical and Vocational Education and Training (TVET) colleges, and private Further Education and Training (FET) colleges. A key challenge of the post-school education and training sector is to find ways to accommodate students with poor schooling outcomes, especially poor performance in secondary school Mathematics, languages and Science.

Table 4.1: Comparative country performance education statistics[23]

	Gross enrolment ratio: 2013			Mathematics achievement scores		Education expenditure
	Pre-primary	Primary	Secondary	PISA 2012	TIMSS 2011	% GDP
Brazil	No data	95%#	75-79%#	391	Did not participate	6.3% (2012)
Malaysia	84*	No data	71*	421	440	5.9% (2011)
South Africa	76	101	111	Did not participate	352	6.3% (2013)
Thailand	119	96	86	427	427	4.9% (2012)
Vietnam	82	105	No data	511	Did not participate	6.3% (2012)

Note 1 (*): Most Recent Value (MRV) if data for the specified year or full period is not available.
Note 2 (#): The only data available is for Net Enrolment Ratios for the period 2008 to 2013.

Source: DBE (2014), UNICEF (2013), World Bank (2015)

[23] *Gross enrolment ratio: ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. PISA is a worldwide study by the OECD in member and non-member nations of 15-year-old school learners' scholastic performance in Mathematics, Science, and reading – mean score set at 500. The TIMSS is an international study which measures the performance at grade 8 or 9 level and sets the mean score at 500.*

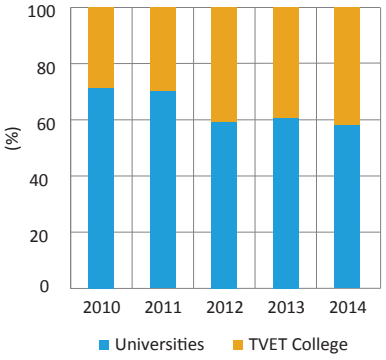
[24] *These are differentiated into traditional, comprehensive and Universities of Technology (UoTs).*

In 2013[25], the university sector comprised 23 public universities and 113 private universities, with 85% of all Higher Education students enrolled in public universities (DHET, 2016). The TVET sector is comprised of 50 public and 296 private institutions[26], with 80% of all TVET students enrolled in public institutions. The Higher Education sector has an established data and information system (HEMIS), but the TVET data and information system is in a fledgling state, therefore the quality and integrity of the data is being improved. The data on private education and training institutions is incomplete and being consolidated, and must therefore be treated cautiously. The enrolments at public and private universities and TVET colleges for the 2010 to 2014 period are presented in Table 4.2.

From 2010 to 2014, enrolments have increased in both universities and TVET colleges. Public university enrolments increased by 8.5% during this period. The National Development Plan (NDP) is to enrol 1.6 million students in public Higher Education Institutions (HEIs) by 2030 and, with the current trend (provided that the schooling system provides university eligible school completers) this target is on track to be met. The TVET sector enrolments have fast expanded from 2010 to 2014, with enrolments at public TVET colleges doubling. The enrolment target in public TVET colleges is 1 million by 2016 and 2.5 million in 2030 NDP.

Figure 4.2 compares the enrolment patterns in the University and TVET sector for the period from 2010 to 2014. The increased share of the TVET sector reflects the state's investment in education and training at intermediate and technical levels.

Figure 4.2: Changing enrolment patterns in the University and TVET sector, 2010 to 2014



	2010	2011	2012	2013	2014
Universities	71.4	70.1	59.2	60.6	58
TVET College	28.6	29.9	40.8	39.4	42

Source: Author's calculations from DHET (2016)

A key indicator to track the transformation in the post-school education and training is reached by analysing enrolment by gender and population group. As shown in Table 4.3, in the last four years, female students constituted 58% of the shares of university enrolments; additionally, in the TVET sector, shares of female enrolments have been increasing, and since 2013 have surpassed male enrolments, reaching 54% in 2014 (Table 4.3).

Africans recorded the highest enrolment figures at universities and TVET colleges, with increases in the shares every year from 2010 to 2014. The 2014 statistics show that around 70% of the university enrolments are African, 17% are White, 6.3% are Coloured and 5.5% are Indian/Asian. The TVET sector is made up of 84% African, 6% Coloured, 2% White and 0.5% Indian/Asian[28].

TVET COLLEGES: COURSES, QUALIFICATIONS AND SKILLS

Public TVET and private FET colleges offer a number of qualification types: certificates, diplomas, and short courses. The qualification types that lead to a certificate are the National Certificate Vocational (NCV) and NATED Report 191 N1-3 courses[29]. It is difficult to provide definitive headcount figures for all courses and programmes offered at TVET colleges as there are many types of programmes, short courses, qualifications, and routes to qualifications, as well as part-time and full-time students. The TVET information systems are being consolidated, and as the data improves we could provide more nuance and detail to this curriculum information. Table 4.4 describes the enrolments by different vocational qualification types for public TVET and private FET colleges for the period 2011 to 2014.

The enrolments in public TVET colleges are significantly higher than enrolments at private FET colleges. In line with the resistance to the NCV courses and demand for the National Accredited Technical Education Diploma (NATED) courses (Nzimande, 2011), the enrolments for NATED 1 to 6 courses have increased by 187% in public TVET colleges between 2010 and 2014, and these enrolments constitute the highest shares (69% in 2014) of all enrolments. Data for 2012 and 2013 shows that two thirds of all NATED enrolments are for courses at the N4 to N6 levels, and just over 40% of all public TVET enrolments are for courses at NQF level 5 and 6 (N4 to N6). This means that 40% of TVET enrolments are categorised as being above NQF level 4.

[25] *Two new universities, Sol Plaatjie University and University of Mpumalanga, with small enrolments started in 2015.*

[26] *The colleges offer a range of qualifications from Engineering, to Business, to Nursing, to skills for a company. For more information, see: http://www.dhet.gov.za/Registers_DocLib/Register%20of%20Private%20Colleges%20(0 1%20October%202015).pdf*

[28] *The racial profile of the South African population in 2014 was: 80% African, 9% Coloured, 2.5% Indian/Asian and 8.5% White.*

[29] *The minimum requirement for admission to the NCV and N1 programmes is grade 9, and for N4-6 grade 12, NCV courses are offered in the Engineering, Business and Services subject areas. The NATED 1 to 6 courses are offered in Engineering areas only. At the end of N3, a student completes with a certificate in Engineering (NQF level 4). They could then progress to N4 courses, N4 to N6 courses are largely in Business and Services subject areas, with a few Engineering programmes offered. Upon completion of the N6 programme, which includes work place-based learning, a student qualifies with a diploma (NQF level 5).*

Table 4.2: Enrolments at public[27] and private universities and TVET colleges, 2010 to 2014

	Public universities	Private universities	University total	Public TVET colleges	Private FET colleges	TVET Total
2010	892 936	90 767	983 703	358 393	46 882	405 275
2011	938 201	103 036	1 041 237	400 273	134 446	534 719
2012	953 373	97 478	1 050 851	657 690	115 586	773 276
2013	983 698	119 941	1 103 639	639 618	154 632	794 250
2014	969 155	142 557	1 111 712	702 383	78 995	781 378

Note: Included is data from UNISA – a distance education institution. with many part-time students.

Source: DHET (2016)

[27] In 2013 and 2014 foreign students constituted 7.5% of all registrations in public universities. This was made up of 55% contact students and 45% distance education students.

Table 4.3: Shares in enrolment in public universities and TVET colleges by gender and population group, 2010 to 2014

	Year	2010	2011	2012	2013	2014
By gender						
University	Female	57	58	58	58	58
	Male	43	42	42	42	42
TVET	Female	48	49	50	52	54
	Male	52	51	50	48	46
By population group						
University	African	66.7	68.3	69.5	70.1	70.1
	Coloured	6.5	6.3	6.2	6.2	6.3
	Indian/Asian	6.1	5.8	5.5	5.5	5.5
	White	20.0	18.9	18.1	17.5	17.1
	Unknown	0.7	0.7	0.8	0.8	0.9
TVET	African	81.6	83.0	86.9	89.0	83.8
	Coloured	9.7	8.5	8.1	6.7	6.3
	Indian/Asian	1.2	1.5	1.3	1.0	0.5
	White	4.8	5.2	3.5	3.1	1.7
	Unknown	2.8	1.7	0.2	0.2	7.8

Note: The Annual survey data was used for 2014, similar to previous years. It is not clear why there was an increase in missing information about population groups for TVET colleges.

Source: Author's calculations from DHET (2016).

Table 4.4: Enrolment by vocational qualification type for public TVET and private FET, 2010 to 2014

	2010	2011	2012	2013	2014	% change 2010 to 2014
Public TVET colleges						
NC(V)	130 039	124 658	140 575	154 960	166 433	28%
Report 191 (N1 to N6)	169 774	222 754	359 624	442 287	486 933	187%
N1 to N3			125 096	164 815		
N4 to N6			234 528	277 472		
Occupational qualifications	23 160	20 799	62 359	19 000	19 825	(14%)
Report 550/NSC	3 916	1 128	1 715	1 693	428	(89%)
Other	31 504	30 934	93 417	21 678	28 764	
Total	**358 393**	**400 273**	**657 690**	**639 618**	**702 383**	**95%**
Private FET colleges						
NC(V)	2 615	1 816	4 181	5 012	3 928	50%
Report 191 (N1 to N6)	6 685	19 524	16 127	19 467	29 700	344%
Occupational qualifications	37 582	63 394	47 156	58 400	23 128	(38%)
Report 550/NSC		5 180	4 222	71 753	22 239	
Other		44 532	43 900			
Total	**46 882**	**134 446**	**115 586**	**154 632**	**78 995**	**69%**

Source: Author's calculations from DHET (2016)

Many TVET students enrol for a course that leads to an NQF level 4 qualification (matric equivalent). Anecdotal and past research evidence shows that students enter these qualification routes after completing a matriculation examination and thus following a "zig-zag", rather than a linear educational trajectory (Kruss et al, 2012).

In private FET colleges, occupational (38% in 2013) and the mix of "other" qualifications constitute the highest share of enrolments. Private FETs have higher numbers of students registering for occupational qualifications than public TVETs.

Just over 90% of students who register for TVET programmes remain in the programme for the year and sit for the year-end examination. It is an encouraging signal that there is a high retention level of students in the TVET system. The concern is that, of all students who wrote the certificate examinations, only 40% of those in public institutions and 33% in private institutions pass all subjects in the year to gain their relevant certificate (DHET, 2016). In Table 4.5 we examine the patterns of enrolments in examinations and completion rates in the NCV 4 and NATED 6 programmes (leading to a certificate and diploma respectively). We have categorised the programmes into the following disciplines: Engineering, Services and Business, the focuses of the TVET sector[30].

From 2010 to 2014 there was a general increase in the numbers of students writing the NCV 4 and NATED 6 Engineering study field examinations. However, only one in four students who sat for the examination was successful in completing the NCV 4 qualification, and one in two students who sat for the examination was successful in completing the NATED 6 qualifications.

Participation in the Services study field for both NCV 4 and NATED 6 has increased from 2010 to 2014, and completion rates are between 40% and 60% in most courses, apart from the Transport and Logistics course and the Public Relations course. Participation in the Business Studies courses is high and increasing, especially in the NATED 6 programmes, but completion rates for most courses are disappointing at less than 40%.

While pass rates have been improving since 2010, this analysis underscores the fact that many students who have registered for courses and participated in the year programme have not been successful in completing the courses. The TVET sector has successfully improved access, but now it is critical to improve the quality of the TVET experience and pass rate for these courses so that students complete and receive their certificates and diplomas.

UNIVERSITIES: ENROLMENTS, QUALIFICATIONS, AND SKILLS

The National Plan for Higher Education (2001) recommended that enrolments in fields of study at universities should comprise 40% Humanities, 30% Business and Commerce, and 30% Science, Technology and Engineering (SET)[31]. The potential skills gain for the labour market from university enrolments and completers is best understood through an analysis of the Classification of Educational Subject Matter (CESM) field of the qualification. The traditional categorisation of the CESM fields is Business, Science, Engineering and Technology, and Humanities. For the purposes of skills planning, we have further categorised the SET field into Science and Technology, Engineering and Health Sciences. We have also

Table 4.5: Examination enrolments and completions in NCV4 and NATED 6 programmes in public TVET colleges, 2010, 2013, 2014

	2010		2013		2014		2010	2013	2014
	Number writing exams	Number completed	Number writing exams	Number completed	Number writing exams	Number completed	% completed	% completed	% completed
NC(V) Level 4 programmes: NQF level 4									
Engineering	4 207	1 060	8 187	2 099	7 559	1 628	25.2	25.6	21.5
Services	1 285	662	3 451	1 750	4 107	1 953	52	51	48
Business	4 084	1 894	9 743	4 110	9 799	3 824	46	42	39
N6 Programmes: NQF Level 6									
Engineering			18 642	8 611	15 928	7 925		46	49.8
Services			2 226	786	4 628	2 367		35	57
Business			21 722	5 737	36 053	13 886		26	39

Source: Author's calculations from HEMIS (2010 to 2014) and National Examinations Database (November 2013)

[30] *See Appendices 1 and 2 for the details relating to specific courses.*

[31] *Pre-2001, the university enrolments were 49% in the field of Humanities and Social Sciences, 26% in Business and Commerce, and 25% in SET.*

Table 4.6: Total enrolment in universities by type of CESM field of study, 2010 to 2014

	Numbers					Shares				
CESM FIELDS	**2010**	**2011**	**2012**	**2013**	**2014**	**2010**	**2011**	**2012**	**2013**	**2014**
BUSINESS. ECONOMICS AND MANAGEMENT STUDIES	**278 843**	**288 487**	**282 299**	**279 954**	**272 409**	**31.2**	**30.8**	**29.6**	**28.5**	**28.1**
SCIENCE. ENGINEERING AND TECHNOLOGY	**251 334**	**264 447**	**273 279**	**283 622**	**287 221**	**28.0**	**28.0**	**28.0**	**29.0**	**29.6**
Science	129 545	135 826	140 517	146 325	158 742	14.5	14.4	14.7	14.9	16.3
Engineering	71 172	77 150	78 128	81 336	82 433	8.0	8.2	8.2	8.3	8.5
Health Professions and Related Clinical Sciences	50 614	51 468	54 635	55 962	56 074	5.7	5.5	5.7	5.7	5.8
HUMANITIES	**362 749**	**385 266**	**397 792**	**420 122**	**409 525**	**41**	**41**	**42**	**43**	**42.3**
Visual and Performing Arts	12 669	13 571	13 375	13 510	13 573	1.4	1.4	1.4	1.4	1.4
Education	145 413	164 939	168 608	172 991	166 099	16.3	17.6	17.7	17.6	17.1
Other Humanities and Social Sciences	204 662	206 739	215 797	233 622	229 853	22.9	22.0	22.6	23.7	23.7
Total	**892 936**	**938 201**	**953 373**	**983 698**	**969 155**	**100**	**100**	**100**	**100**	**100**

Source: Author's calculations from HEMIS (2010 to 2014)

disaggregated the Humanities field into Arts, Education, and Other Humanities and Social Sciences. The enrolment patterns by CESM fields of study from 2010 to 2014 are provided in Table 4.6[32].

Over the last five years (2010 to 2014), the share of enrolments for the CESM Humanities category increased from 41% to 42.3%; the Business, Economics and Management Studies share decreased slightly from 31.2% to 28.1%; additionally, enrolments in Education held a noteworthy share of the total enrolments (17.1% in 2014). The SET enrolment share (key skills to support the growth of the economy) increased from 28% in 2010 to 29.6% in 2014. Within the broad SET category, the enrolments in Engineering (both at UoTs and traditional universities) grew from approximately 71 000 in 2010 to 82 500 in 2014 (a 16% increase); enrolments in the Science subjects grew from approximately 130 000 to 159 000 (a 22% increase); and the Health and Health-related subjects grew from 51 000 to 56 000 (an 11% increase). This shift towards higher numbers and shares in the SET subject areas is a move in the right direction, as these skills are key to supporting economic growth.

While South Africa has improved the access to and enrolment rates at universities, it has not done as well with regard to the progression of students and completion of the relevant qualifications. This is well documented in the Council on Higher Education's (2013) Report of the Task Team on Undergraduate Curriculum Structure. The report found that one in four students in contact institutions graduate in regulation time. Completion rates are especially low in Engineering and Science degrees and diplomas, as well as the Professional Commerce degrees, all of which have particular significance for economic development.

The completion rates for these qualifications are as follows: Bachelor of Engineering 23%. Bachelor of Science 23%. Engineering diplomas 5%. Science diplomas 14%. and four-year Commerce degrees 26%[33].

Access to schools, universities and TVET colleges has improved. However, quality remains elusive, leading to low progression through programmes in all types of educational institutions, as well as low completion rates from schools, TVET colleges and universities.

[32] *See Appendix 3 for the details relating to specific courses.*

[33] *The analysis in the CHE report was based on detailed longitudinal cohort studies data of all first-time entering students in the 2005 and 2006 intakes into all three- and four-year degree and diploma programmes. The completion rate applied in the CHE (2013) report refers to the (Cohort) completion rate, which is the percentage of a given student intake, or cohort, that graduates (a longitudinal measure).*

Table 4.7: Number (and shares) of students who fulfilled the requirements for a degree or diploma according to CESM field of study, 2010 to 2014

	Numbers					Shares				
CESM field of study	**2010**	**2011**	**2012**	**2013**	**2014**	**2010**	**2011**	**2012**	**2013**	**2014**
BUSINESS, ECONOMICS AND MANAGEMENT STUDIES	**41 657**	**44 155**	**46 044**	**49 051**	**50 381**	**27.2**	**27.5**	**27.7**	**27.1**	**27.2**
SCIENCE, ENGINEERING AND TECHNOLOGY	**42 760**	**46 100**	**48 848**	**53 176**	**55 574**	**27.9**	**28.7**	**29.4**	**29.4**	**30.0**
Science	21 356	23 282	25 196	27 525	28 931	14.0	14.5	15.1	15.2	15.6
Engineering	10 200	11 084	11 696	13 284	14 077	6.7	6.9	7.0	7.3	7.6
Health-related Professions	11 201	11 733	11 958	12 368	12 567	7.3	7.3	7.2	6.8	6.8
HUMANITIES	**68 908**	**70 363**	**71 096**	**78 596**	**79 420**	**44.9**	**43.8**	**42.8**	**43.5**	**42.8**
Arts	2 867	2 908	3 154	3 042	3 098	1.9	1.8	1.9	1.7	1.7
Education	37 892	37 879	35 478	38 212	37 076	24.7	23.6	21.4	21.1	20.0
Other Humanities and Social Sciences	28 149	29 574	32 463	37 342	39 247	18.4	18.1	19.6	20.7	21.2
Total	**153 325**	**160 623**	**165 986**	**180 823**	**185 385**	**100**	**100**	**100**	**100**	**100**

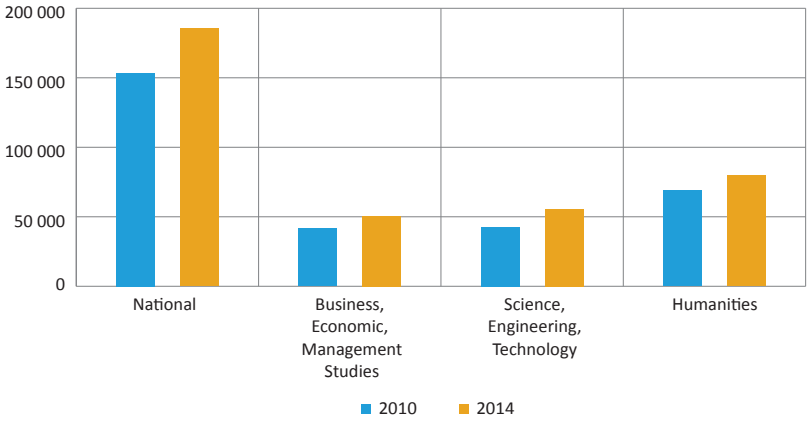
Source: Author's calculations from HEMIS (2010 to 2014)

Table 4.7 analyses the trends from 2010 to 2014 of students who fulfilled the requirements for a degree or diploma according to the CESM field of study[34].

Just over 153 000 individuals graduated with diplomas or degrees from South African universities in 2010. This number increased to just over 185 000 in 2014 i.e. a 21% increase (Figure 4.3). In 2014, the Business, Economics, and Management Sciences graduates contributed 27.2% to the shares of university completers; the SET completers constituted 30% of the shares, and the Humanities completers accounted for 42.8% of the shares (Education made up 20% of these shares).

From 2010 to 2014, the number of university students completing Engineering qualifications increased by 39%, Health Science completers increased by 12%, and Computer and Information Sciences completers increased by 43%. This growth is commendable, however, as we are starting from a low base there is a still a way to go in order for the supply to meet the demand in these critical subject areas.

Figure 4.3: University completers in 2010 and 2014 by CESM category



	National	Business, Economic, Management Studies	Science, Engineering, Technology	Humanities
2010	153 322	41 655	42 757	68 908
2014	185 394	50 380	55 574	79 749

Source: Author's calculations from HEMIS (2010 and 2014)

[34] *See Appendix 4 for the details relating to specific courses.*

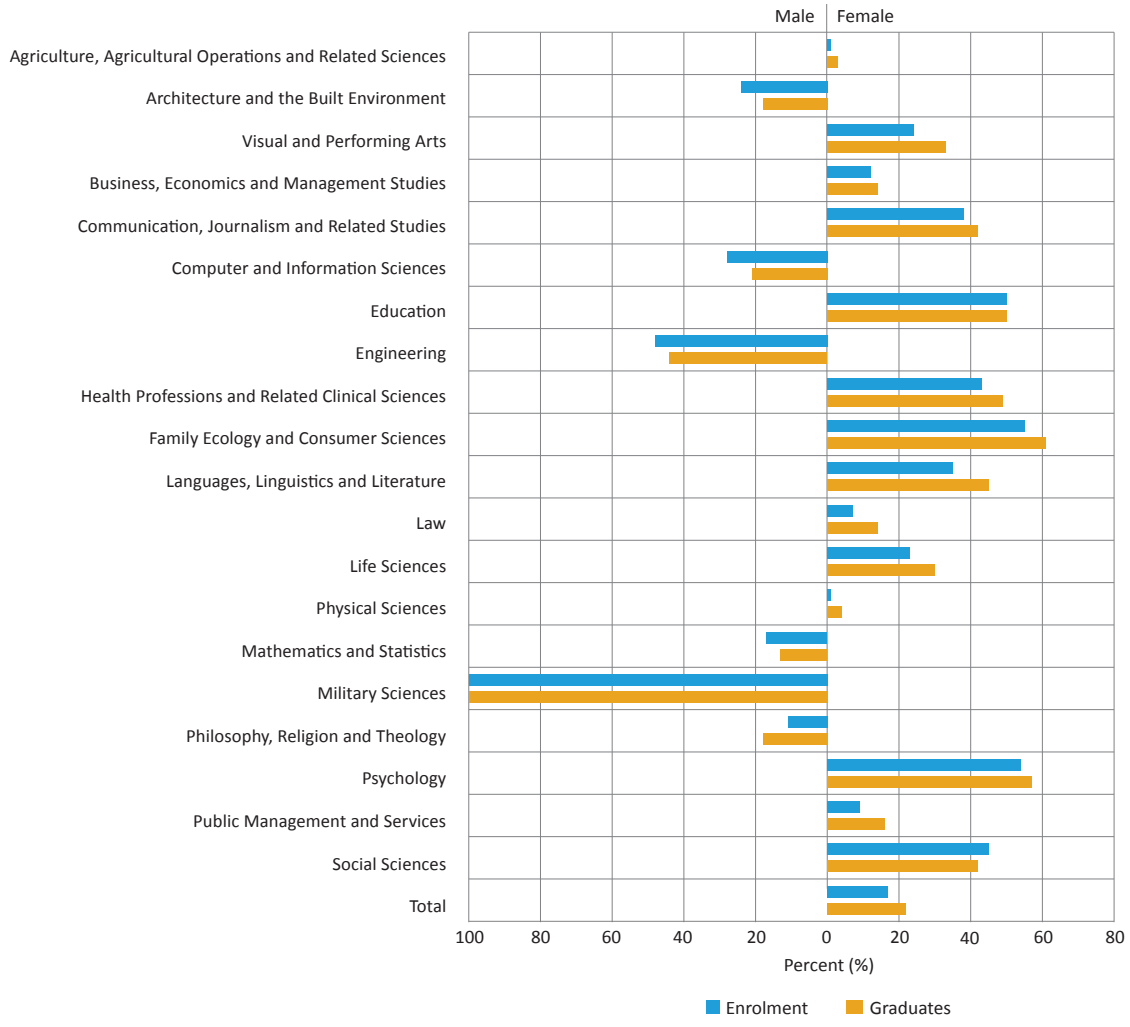
ENROLMENTS AND UNIVERSITY COMPLETION BY GENDER AND RACE

In this section, we examine the enrolment and completion rates by gender, Figure 4.4 illustrates the difference between enrolment rates and completion rates for males and females.

In these 20 CESM categories, male enrolments and graduations are higher in the study fields of Architecture and the Built Environment; Computer and Information Sciences; Engineering, Mathematics and Statistics; Philosophy, Religion and Theology; and Military Sciences, Female enrolments and graduations are higher in Visual and Performing Arts; Business-related studies; Communication and Journalism; Education, Health and Health-related professions; Languages and Linguistics; Life Sciences; Psychology; and the Social Sciences. One of the key findings from this part of the analysis is that qualification differences support gender stereotypes in the literature, in that males are likely to study for Technical, Science, Technology and Engineering-based subjects, whereas females are focused on humanities subjects, such as Health, Education and Social Sciences. Thus, a reformed skills policy must focus on re-ordering this gender bias in relation to particular Higher Education outcomes.

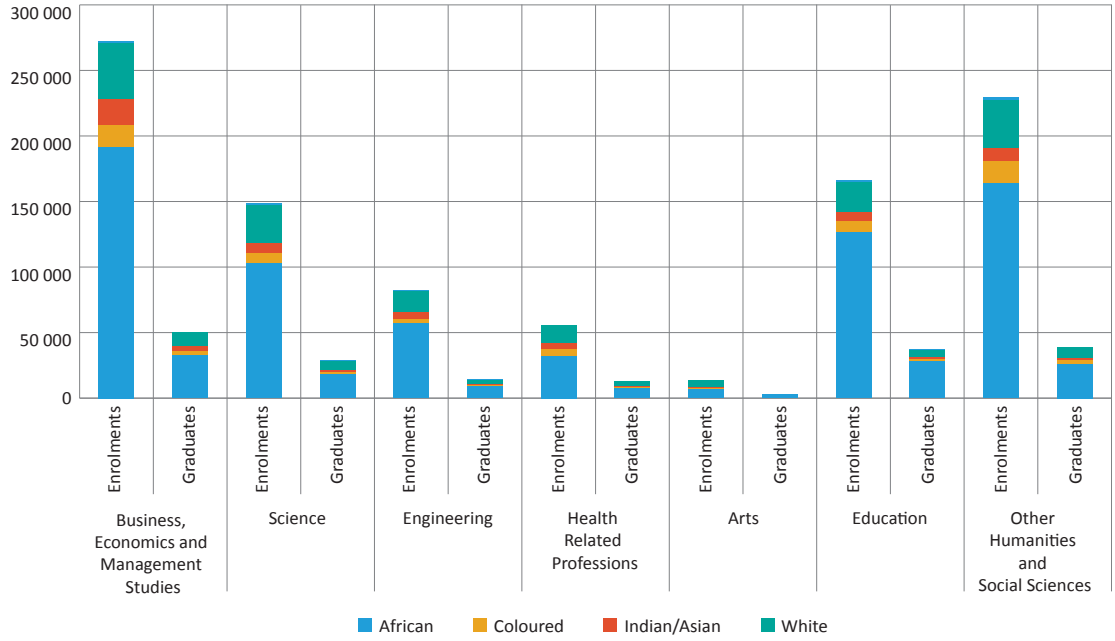
While the shares of female students in both the university and TVET sectors have increased, there are still gender differences in the fields of qualification.

Figure 4.4: Gender difference in university enrolment and completions by type of CESM field of study, 2014



Source: Author's calculation from HEMIS (2014)

Figure 4.5: University enrolment and completions by CESM categories and population group, 2014



Source: Author's calculations from HEMIS (2014)

In this section, we examine the enrolment and completion rates by race categories, as illustrated in Figure 4.5.

Each of the racial groups are enrolled in different CESM categories. Relative to the size of a particular racial group, the enrolments are higher for the White and Indian/Asian groups. Similarly, the completion levels are higher for the White and Indian/Asian groups.

SETA-SUPPORTED LEARNING PROGRAMMES

The Sector Education and Training Authorities (SETAs) have the mandate to provide workplace training to those who are in employment, and to offer training to the unemployed. This section uses the data collated by the Department of Higher Education and Training on the number of workers and unemployed persons who are registered in SETA-supported learning programmes. In Table 4.8 we report on learnerships[35], artisanal learning programmes[36], and skills programmes[37] (Kruss et al, 2012).

The number of learnership registrations has increased from close to 50 000 in 2010 to just over 77 000 in 2014 (an increase of 54%). The participants in learnership programmes are both workers and the unemployed, and a higher proportion of learnerships are awarded to the unemployed. The number of skills programme registrations doubled from 66 000 in 2010 to 138 000 in 2014, and the majority of the participants are workers. There is a smaller number of artisanal learning programme registrations, however, this increased from around 24 000 in 2011 to 28 000 in 2014. Over this time period, the certification rates for learnerships increased from 50% to 73%; artisanal learning programmes increased from 50% to 70%; and for skills programmes certification rates were very high at over 100%.

The total number of workers and the unemployed people participating in SETA-supported programmes is low when considering the educational level of the labour force. Given that close to half of the employed do not have grade 12 (matric) certificates, workplaces should be offering general training to raise the education and skill level, as well as specialised training related to particular work tasks. Analysis of the figures provided in the statistics on post-school education and training in South Africa documents shows that in 2010, 0.74% of the unemployed population attended SETA-supported learning programmes. Participation rose to 1.6% of the unemployed population in 2014. Furthermore, with high levels of youth unemployment, where the majority have only either incomplete or completed secondary education, there is a strong argument for SETAs to facilitate the increase of skills training efforts to the unemployed in general and specifically the unemployed youth.

[35] *Learnerships refer to a learning programme that leads to an occupational qualification or semi-qualification and includes apprenticeships and cadetships.*

[36] *An artisanal learning programmes include apprenticeships, learnerships, internships, cadetships or other programmes undertaken at the workplace in preparation of an occupation that is on the official list of artisan occupations.*

[37] *Skills programmes refer to a semi-qualification as defined in the National Qualifications Framework (NQF) Act, 2008 (Act No 67 of 2008).*

Table 4.8: Number of workers and unemployed persons registered for and certificated in SETA-supported learning programmes. by programme type, from 2010/11 to 2014/15

	REGISTERED			CERTIFICATED		
YEAR	Learner-ships	Artisanal learning programme	Skills programme	Learnerships	Artisanal learning programme	Skills programme[38]
2010/11	**47 649**	**9 316**	**66 133**	**30 864 (65%)**	**3 432 (37%)**	**75 531**
2010/11 Workers	19 308	1 661		10 361	518	
2010/2010 Unemployed	24 261	7 655		18 047	2 914	
2011/12	**43 871**	**24 415**	**87 906**	**29 197 (67%)**	**14 023 (58%)**	**87 527**
2011/12 Workers	16 371		71 656	9 646		71 417
2011/2012 Unemployed	27 679		16 250	19 524		16 110
2012/13	**50 885**	**21 849**	**74 587**	**37 158 (73%)**	**15 277 (70%)**	**86 491**
2012/13 Workers	20 678		64 105	14 399		68 173
2012/2013 Unemployed	30 207		10 482	22 759		18 318
2013/14	**75 782**	**26 670**	**92 508**	**38 796 (52%)**	**18 110 (68%)**	**109 547**
2013/14 Workers	29 614		74 107	14 923		90 694
2013/2014 Unemployed	45 742		18 363	23 823		18 787
2014/15	**77 931**	**28 302**	**137 880**	**40 891 (52%)**	**14 389 (51%)**	**106 459 (77%)**
2014/15 Workers	29 100		105 305	18 685 (64%)		82 536 (78%)
2014/2015 Unemployed	48 831		32 575	22 206 (45%)		23 923 (73%)

Source: Author's calculation from DHET. 2016

[38] *Completion numbers are higher than registrations, probably because some programmes continue to the subsequent year, and are only counted in the year of completion.*

In 2010, 0.74% of the unemployed attended SETA supported training programmes. This doubled to 1.6% in 2014. Given the high levels of youth unemployment, where the majority have less than a secondary certificate, there is a strong argument for SETAs to facilitate skills training for the unemployed.

CONCLUDING COMMENTS AND IMPLICATIONS FOR SKILLS PLANNING

The purpose of this chapter is to identify the types of skills people acquire when they move through the education system and whether or not this corresponds to the needs of the current and future economy.

This analysis confirms findings from other studies that suggest that access to schools, universities, and TVET colleges has improved. However, quality remains elusive, leading to low progression through programmes in all educational institutions, as well as low completion rates from schools, TVET colleges, and universities. The key challenge is improving the quality of the educational experience in both school and post-school institutions, ideally leading to an improvement of the quality and quantity of completers. Thus, skills planning requires more than estimates of numbers needed, and must also include strategies to improve the quality and relevance of educational programmes.

The key constraint for the South African education and training system and labour market is the quality of basic education. The schooling system must improve the quality of the educational experience from the foundation phase of schooling, as well as achievement scores across a number of disciplines, particularly Languages, Mathematics and Science. Success in these subjects forms the basis for participation and success in technical subjects in post-school education and training institutions, and in the workplace. The skills planning process must involve the Department of Basic Education (DBE), and there needs to be a co-ordinated system-wide effort to improve the quality of teaching and learning of Literacy and Languages, and Numeracy and Mathematics.

Currently there is a high number of secondary school non-completers. Most secondary school students follow the single academic pathway. Post-grade 9, the education system should offer a differentiated set of programmes and courses to meet the expectations and abilities of the students. At the moment, the combination of programmes available at TVET and community colleges is very complicated. Although these programmes are being reviewed and consolidated by the DBE and DHET, the results need to be clearly communicated to learners and their families, so that available options are well understood.

The university and TVET college sectors form a big part of the post-school education and training system, and since 2010 the TVET sector has been expanding at a much higher rate (average of 23% per annum) than the University sector, which has been expanding at an average of 2.1% per annum. The TVET sector has grown and the completers from this sector could provide useful skills sets to support the economic growth of South Africa.

While the education system has done well in increasing participation in universities and TVET colleges, it is equally important to interrogate the type and quantity of skills produced at these institutions. Most students remain in their courses and write examinations, but the success rate in examination is of concern. Only 40% of students who write the certificate examinations (NCV) pass to gain the relevant qualification. The NATED 6 programmes achieve higher success, with increased pass rates in the Engineering, Services, and Business fields of learning.

In the University sector, enrolments were guided by the National Plan for Higher Education (NPHE) broad targets of 30% for Business, Economics and Management Sciences; 30% for Science, Engineering and Technology; and 40% for Humanities (MoE, 2001). This may be the time to reconsider the NPHE targets and increase the shares of SET enrolments to 35%, especially in the areas of Engineering and Health Professions.

The TVET sector offers qualifications in the subject areas of Engineering, Business Studies and Services. Currently, there are no guidelines for enrolment targets for each of these study areas. In 2014, for the NATED6 programme, 57% of completers were from Business programmes and 32% were from Engineering programmes. The TVET sector should develop enrolment targets in line with skills needed for the labour market.

While we recognise that the data and information about registration and completions in SETA-supported learning programmes need to be improved, the analysis of the available data reveals that the number of participants in SETA-supported programmes is low. Given that half of the labour force has less than a grade 12 certificate, workplace-supported education and training would be an appropriate mechanism to enhance skills levels. Further, given the high levels of youth unemployment, with the majority having an incomplete secondary education. SETAs could facilitate the relevant occupational training programme to enhance the skills set of individuals to increase their access to the labour market. SETAs need to play a bigger role in skills development programmes for the employed and unemployed.

CHAPTER 5

UNDERSTANDING DEMAND THROUGH CHANGES IN THE STRUCTURE OF EMPLOYMENT

Chapter Two analysed the performance of the economy and the significant changes that have occurred over the past four years. The purpose of this chapter is to analyse changes occurring in the structure of the economy and these analyses then provide signals of demand for skills. At first, this chapter examines the employment and skills changes from 2010 to 2014 in the standard industrial sectors and occupations; secondly, how the government has initiated a number of growth projects to stimulate the economy, which we analysed to ascertain which skills are required to successfully implement these growth projects; thirdly, we report on employers' perceptions of skills needed in their firms; and lastly we outline the analysis to identify the list of occupations in high demand. Together, this data helps us to build a picture of the demand for occupations and skills, and provides a signal to the education and training system on areas of supply to be prioritised.

EMPLOYMENT DISTRIBUTION BY INDUSTRIAL SECTOR

In order to understand demand, it is necessary to look at changes within individual industrial sectors of the economy. Table 5.1 provides an overview of the structure of employment and the trends from 2010 to 2014.

The sectors that employed the largest numbers of people in South Africa in 2014 are as follows: Community, Social and Personal Services sector (23%); followed by the Wholesale and Retail sector (21%); and then the Financial Services sector (13%). In addition, the number of people working in the Community, Social and Personal Services sector over the 2010 to 2014 period increased by 773 400. Within the Financial Services and Wholesale and Retail Trade sectors, the number of workers increased by 378 300 and 276 100 respectively. The Electricity sector (1%) and the Mining sector (3%) employed the fewest number of workers.

The sectors that experienced the highest relative employment changes from 2010 to 2014 were the Mining and Quarrying sector (2.5%) and Electricity sector (1.9%). However, these are both relatively small employment sectors. The sectors with the lowest relative employment change for the same period were Manufacturing (0.07%) and Agriculture (0.6%). Manufacturing is the fourth largest sector of employment, and thus needs to support the creation of new jobs to absorb new entrants to the labour market.

Figure 5.1 provides an analysis of the age profile of workers in each of the sectors. The majority of the workforce is between the ages of 25 and 44 years. The age analysis provides an understanding of sectors with higher ageing populations and thus a signal of workers with particular skills required to replace those who will be retiring in the near future. Almost all sectors have around 10% or less of the workers in the 55 to 64-year age group, and twice the number of workers in the 45 to 54-year-old age group. The Electricity, Gas and Water sector may be vulnerable to changes due to retirements, as 15% of the workforce is between the ages of 55 and 64 years and 17% are in the 45 to 54-year age group.

To understand the longer-term employment trends and the details of changes within each of the industrial sectors, further analysis is presented below.

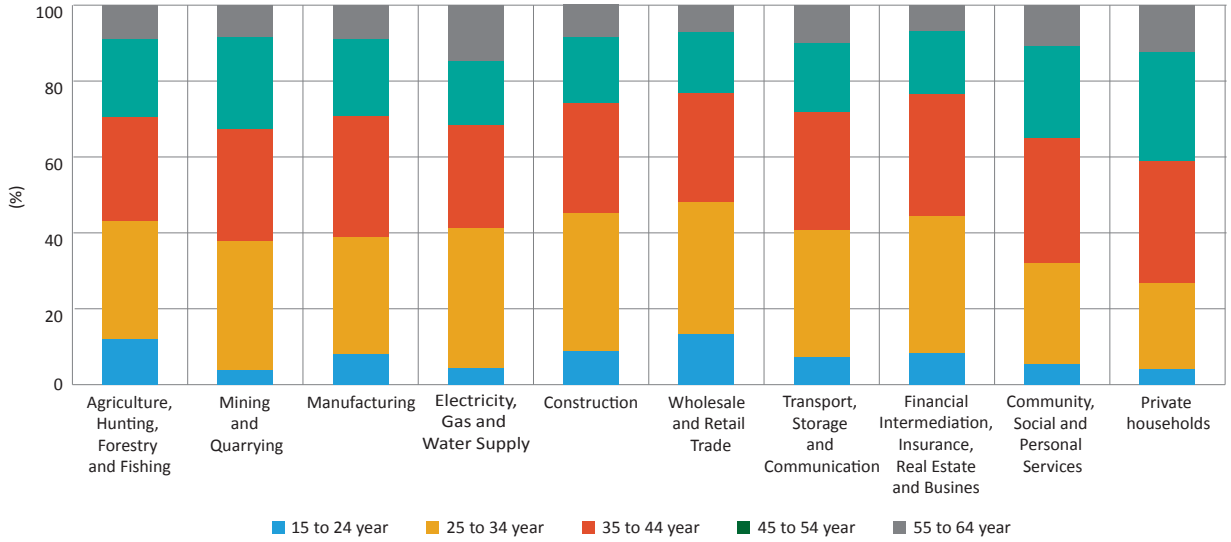
Table 5. 1: Changes in employment by sector between 2010 and 2014 period

	Shares of employment in 2010 (%)	Absolute changes: 2010 to 2014	Percentage change:	Relative employment shift[39]	Shares of employment in 2014
Agriculture, Hunting, Forestry and Fishing	5	61 068	9.4	0.6	5
Mining and Quarrying	2	120 681	32.2	2.5	3
Manufacturing	13	18 883	1.1	0.07	12
Electricity, Gas and Water Supply	1	26 859	29.6	1.9	1
Construction	8	190 250	17.8	1.1	8
Wholesale and Retail Trade	22	276 113	9.3	0.6	21
Transport, Storage and Communication	6	158 964	20.3	1.3	6
Financial Intermediation, Insurance, Real Estate and Business	13	378 294	22.5	1.4	13
Community, and Social and Personal Services	21	773 393	28.1	1.8	23
Private households	9	87 702	7.6	0.5	8
Nationally	**100**	**2 092 574**	**15.8**		**100**

Source: StatsSA (2014b)

[39] *This refers to how each sector shifts relative to the average and is calculated by percentage change of each sector divided by percentage change nationally.*

Figure 5.1: Shares of employment by age and sector, 2014



	Agriculture, Hunting, Forestry and Fishing	Mining and Quarrying	Manu-facturing	Electricity, Gas and Water Supply	Construc-tion	Wholesale and Retail Trade	Transport, Storage and Communication	Financial Intermediation, Insurance, Real Estate and Business	Community, Social and Personal services	Private households
	12.0	3.8	8.1	4.3	8.8	13.4	7.3	8.3	5.4	4.2
	31.1	34.1	30.7	37.0	36.3	34.7	33.4	36.1	26.5	22.5
	27.2	29.3	31.9	27.0	29.1	28.6	31.1	32.2	33.1	32.1
	20.7	24.4	20.4	17.0	17.2	16.3	18.2	16.5	24.2	28.9
	9.0	8.4	8.8	14.7	8.7	7.1	10.0	6.9	10.8	12.2

Source: StatsSA (2014b)

AGRICULTURE

While the number of workers in the Agricultural sector has increased by 61 000 from 2010 to 2014, the shares of those employed in this sector has remained fairly stable at around 5%. This must be viewed against a longer-term picture, as the percentage of those working in this sector at the beginning of the century was around 15% of total employment. The falling share of employment in this sector has implications for South Africa's status as a net food producer as well as employment opportunities for low-wage earners.

MINING AND QUARRYING

The Mining and Quarrying sector contributes a significant amount to the country's GDP, but its role in supporting employment is negligible. This sector is predominantly semi-skilled, and professionals and managers make up only 7% of those employed in the sector. Employment numbers for the 1990 to 2012 period show that the number of workers in the Gold sector declined by 350 000 (DPRU, 2013). However, it is pleasing to note that the number of workers employed in the sector increased by 120 700 over the 2010 to 2014 period. The increase in employment in this sector has come from the slight expansion in coal and platinum production.

MANUFACTURING

The growth of employment in the Manufacturing sector over the 2010 to 2014 period has remained fairly negligible, with an increase of only 18 900 employees. This sector contributes 12% of the country's GDP and the changes in the numbers employed are relatively small, reflecting the capital-intensive nature of certain sub-sectors. The most capital-intensive sub-sectors are those which convert primary resources into semi-processed products. This covers steel, chemical and aluminium products, and due to these products' technological economies of scale there are few incentives to expand employment. In contrast, potential employment opportunities can be found in the Clothing and Footwear sub-sectors. However, these are not likely to expand due to competition from lower cost producers in the Far East (Zalk, 2014). The sub-sector with perhaps more potential for employment growth is Automotive. This sub-sector has been given momentum by the government's Automotive Production Development Programme (APDP) which aims to increase employment, and expand automotive production to 1.2 million vehicles by 2020 (DTI, 2015). It is hoped that this will be achieved by a combination of inward investment and an expansion in component suppliers. According to the DTI (2015), around 30 000 people are employed directly in the sector, and a further 80 000 employed by suppliers. However, these numbers are not large enough to respond to the job needs, and the sector has also been subject to recent

industrial disputes, raising questions about whether the domestic purchasing power is enough to drive such an expansion, all of which will directly influence employment levels. Thus the flat-lining of the Manufacturing sector is part of a broader structural growth problem for the South African economy.

ELECTRICITY, GAS AND WATER SUPPLY

Employment levels in the Electricity, Gas and Water Supply sector represent a small percentage (1%) of the country's total employment, but numbers employed in this sector have increased by nearly 30% over the 2010 to 2014 period. The overwhelming majority of workers in the sector are employed in the generation and distribution of electricity (83%), followed by collection, purification and distribution of water (12%), and manufacturing and distribution of gaseous fuels (5%).

Despite the small numbers employed in this sector, it makes a significant impact due to its importance to other sectors. There are two main employment issues affecting the sector, the first being a lack of technical skills and experience amongst those employed in the sector. A second employment issue, and one that could impact positively on future employment, is the move towards greener forms of energy. The Green Economy Accord signed in 2011, promised to create a minimum of 300 000 jobs in activities that contribute to greening the economy by 2020 (DED, 2011).

CONSTRUCTION

The number of jobs in the Construction sector has grown by nearly 200 000 over the 2010 to 2014 period. The majority of these jobs are contract-based and temporary, and close to 90% of those employed are males. In contrast to other sectors, employment is cyclical in nature and the numbers employed will depend on the stages of the economic cycle. This means that employment is volatile, and significant numbers are working in the informal sector due to the contract nature of the work.

Like most other countries, the government and public sector are the key drivers of investment and employment in the sector. The key government macro-strategies including the National Development Plan (NDP), the New Growth Path (NGP), Industrial Development Zones (IDZs), Strategic Integrated Projects (SIPs), and the Comprehensive Rural Development Programme (CRDP). These will have a positive impact on employment in the sector. Expenditure for the SIPs is estimated to be in the region of R4 trillion over the next 15 years, and the employment requirements have been identified by DHET (2015b). If the National Treasury is able to support this investment it could lead to job creation. However, the concern is that the public investment may not materialise due to a low-growth environment.

WHOLESALE AND RETAIL TRADE

The Wholesale and Retail sector is the second largest employer, at 21% of workers in all sectors in 2014, and numbers increased by 276 000 for the 2010 to 2014 period. The Wholesale and Retail sector is one of the most important employment sectors in South Africa. It is important to highlight that there is a growing informality in the sector, with 67% of people in formal employment and the remainder in informal employment. This sector is made up of 51% men and 49% women, with 6% of the workforce classified as "highly skilled" (DHET, 2014b).

Although the numbers employed in this sector are high, future growth prospects are uncertain. In part, this is due to lack of business confidence in the sector. Key factors in shaping business opinions have been the large-scale strikes in South Africa over the past few years, the contraction of the primary sector, and the dampening of consumer demand, all of which will influence employment levels in the sector.

On the positive side, the recent optimism in the global economy could have an impact on consumer demand in the sector. The potential for employment is also driven by a number of key retail chains which have established networks and branches in neighbouring countries. Prospects for future growth in the Retail sector across the African continent are encouraging in that this will contribute towards the expansion of employment in the sector (AEO, 2015).

TRANSPORT, STORAGE AND COMMUNICATION

The Transport, Storage and Communication sector is the seventh largest sector for employment in South Africa, with the sector increasing by 159 000 employees over the 2010 to 2014 period. There are two major sub-sectors, namely Transportation and Storage, and Communications.

The Transport and Storage sector employs around 774 000 people according to the Transport Education and Training Authority (TETA). In contrast to many other service sectors, this sector is dominated by males, with women representing only 20% of those working in the sector. This is also a relatively low-skilled sector, with around 55% workers categorised as having low-skilled occupations.

Communications, the third key sub-sector, employed around 143 000 people in 2010 according to the Information Technologies, Electronics, and Telecommunication Technologies (ISETT) SETA (ISETT-SETA, 2011). There is not much detailed analysis of this sub-sector, but it is expected that technological advancements in networking technologies will mean that more high-skilled workers are required in this sector.

FINANCIAL INTERMEDIATION, INSURANCE, REAL ESTATE AND BUSINESS

The Financial Intermediation, Insurance, Real Estate, and Business sector is the third largest source of employment in South Africa. The number of workers employed in this sector has grown by 378 000 over the 2010 to 2014 period. Within this sector there are two main sub-sectors generating most of the employment, each with different characteristics.

One of the key sub-sectors for employment is Finance, Real Estate, and Banking Services. According to the Finance and Accounting Services SETA (FASSET), the number employed in this sub-sector grew from around

115 000 in 2010 to 135 000 in 2013 (FASSET, 2014). It is important to note that 92% of companies in the sector are small and medium-sized enterprises (SMEs), employing fewer than 50 people. Another important characteristic of this sector is the fact that 56% of those employed are women.

The second key sub-sector is Banking, The Banking SETA, BankSETA, estimates that for 2014, around 161 000 people were employed in the sector, 60% being women. What is equally significant is that around 50% of those in professional and managerial positions are women (BankSETA, 2013). The employment prospects for the Banking sector look stable. The sub-sector is strong by international standards, being ranked number two in the global competitiveness report out of 142 countries), and on the verge of expanding across the African sub-continent, all of which factors should be good for future employment prospects. Of concern is that many of those who are employed in the sector are employed through the temporary employment services, creating vulnerable jobs.

COMMUNITY, SOCIAL AND PERSONAL SERVICES

More people are employed in this sector than any other sector. The number of workers employed in this sector increased by 773 400 over the 2010 to 2014 period, and represents the highest growth numbers of any sector in South Africa. This sector comprises a number of sub-sectors, including Public Administration, Defence, Compulsory Social Services, Education, Human Health, and Social Work. This Public sector-led employment creation is a concerning trend as it will not contribute directly to economic growth in the country.

TRENDS IN THE OCCUPATIONAL STRUCTURE IN THE LABOUR MARKET

One of the key policy issues to understand is the way in which demand is impacting the occupational structure of the labour market, and what types of skills are needed. Changes in the occupational structure of the South African labour market between 2010 and 2014 are shown in Table 5.2. The most significant absolute change over the 2010 to 2014 period is the growth in the number of workers in elementary occupations by 572 100[40], and service and sales workers (461 800), as well as managers and senior officials (276 000), craft and trade workers (223 000), and clerical support workers (210 200). This reflects the trend that the longer-term structural shift is towards a service-orientated economy and low-skilled workers.

The largest percentage change and highest relative employment shift in the number of jobs was for managers and service and sales workers. Moreover, there were relatively small increases in the professional and technicians and associate professional categories, with a relative employment shift of 0.7 and 0.4 respectively. The interesting question would be whether the slow growth in these occupations is due to a lack of jobs, or a lack of workers.

The most significant absolute change over the 2010 to 2014 period is the growth in the number of workers in elementary occupations and service and sales workers. This reflects the trend that the longer-term structural shift is towards a service orientated economy.

Table 5.2: Changes in the occupational structure of the employed labour force between 2010 and 2014

Main occupation (OFO-1digit)	2010	2014	Absolute change	Percentage change	Relative employment shift[41]
Managers and senior officials	1 087 645	1 363 640	275 995	25.4	1.6
Professionals	1 225 579	1 363 185	137 606	11.2	0.7
Technicians and associate professionals	999 443	1 067 497	68 054	6.8	0.4
Clerical support workers	1 459 140	1 669 339	210 199	14.4	0.9
Service and sales workers	1 881 146	2 342 970	461 824	24.6	1.6
Skilled agricultural, forestry, fishery, craft and related trades workers	1 704 629	1 915 983	211 354	12.4	0.8
Plant and machine operators and assemblers	1 120 966	1 275 800	154 834	13.8	0.9
Elementary occupations	3 745 725	4 317 828	572 103	15.3	1.0
Total	**13 224 273**	**15 316 242**	**2 091 969**	**15.8**	

Source: StatsSA (2014b)

[40] *While these numbers are increasing, it is not enough to match the increase in the number of new entrants to the labour force who have low skills.*

[41] *This is calculated by percentage change for an occupation divided by total percentage change.*

SPECIFIC CHANGES IN THE OCCUPATIONAL STRUCTURE OF THE EMPLOYED

More details of changes in occupational demand can be seen by investigating how the two-digit level occupations[42] have grown over the 2010 to 2014 period. The 20 occupations that experienced the largest growth in employment numbers between 2010 and 2014 are shown in Table 5.3.

The 20 largest growth occupations consist of four each from occupations classified as elementary and those classified as service and sales workers, three from occupations for trades workers, and two each from the occupations classified as clerical support workers, plant operators, professionals and managers. There was one occupation in the associate professional category.

Skills associated with elementary occupations, plant operators, service and sales workers and clerical support workers can be developed relatively quickly. The occupations which are experiencing significant growth are as follows: administrative and commercial managers; production and specialised service managers; teaching professionals; business and administration professionals; science and engineering associate professionals; building and related trades workers; electrical and electronics trade workers; and metal, machinery, and related trades workers. Skills within these occupations take a while to develop and are signals for the direction of education and training priorities, assuming that the economy continues to develop as it did over the 2010 to 2014 period.

THE EMPLOYED BY SECTOR AND OCCUPATION

The overall structure of employment in South Africa by sector and occupation is shown in Figure 5.2. The sector which employs the largest number of people is the Community, Social, and Personal Services (23% of jobs), and thus one in four jobs in the labour market is generated by the government. This is followed by jobs in the Wholesale and Retail sector (21% of jobs), and Financial Sector (13% of jobs). The Manufacturing sector accounts for one job in eight, and the Construction sector accounts for one job in 12.

The low-skilled elementary occupations, 28% of all jobs, employ the largest number of people in the labour force. The three higher-skilled occupational groups (managers, professionals,

Table 5.3: Changes in employment levels at two-digit level occupations between 2010 and 2014

Two-digit occupations	2010	2014	Absolute change	Percentage change
Administrative and commercial managers	633 603	919 162	285 559	45.1
Cleaners and helpers	1 508 682	1 755 956	247 274	16.4
Refuse workers and other elementary workers	115 337	270 070	154 733	134.2
Labourers in mining, construction, manufacturing and transport	775 318	927 480	152 162	19.6
Personal care workers	240 872	381 653	140 781	58.5
Protective services workers	673 565	799 875	126 310	18.8
Personal services workers	384 852	507 287	122 435	31.8
Drivers and mobile plant operators	695 824	816 102	120 278	17.3
Other clerical support workers	526 054	644 010	117 956	22.4
Agriculture, forestry and fishery labourers	799 149	900 189	101 040	12.6
Building and related trades workers	690 021	789 741	99 720	14.5
Sales workers	581 857	654 155	72 298	12.4
Electrical and electronics trades workers	226 709	295 351	68 642	30.3
Teaching professionals	582 672	649 943	67 271	11.5
Stationary plant and machine operators	391 538	438 567	47 029	16.7
Metal, machinery and related trades workers	403 625	450 124	46 499	11.5
Science and engineering associate professionals	250 103	291 804	41 701	16.7
Business and administration professionals	234 885	273 142	38 257	16.3
Numerical and material recording clerks	321 552	358 254	36 702	11.4
Production and specialised service managers	37324	73 210	35 886	96.1

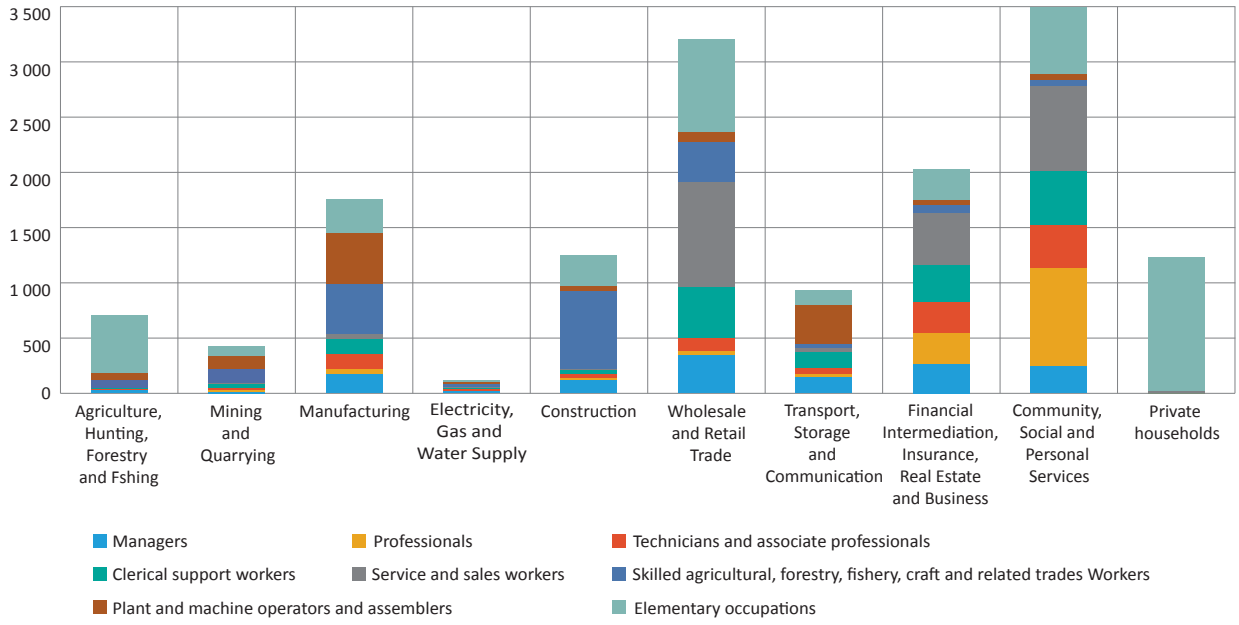
Source: StatsSA (2014b)

[42] *The Organising Framework for Occupations (OFO) classifies occupations on the basis of skill level and skill specialisations.*

and associate professionals and technicians), together, account for one quarter of all jobs[43]. Managers and senior officials account for 8.8% of jobs, professionals 8.9% of jobs, and technicians and associate technicians 7% of all jobs. A further 12.5% of the employed work in skilled and related trades occupations. One quarter of all jobs are in the clerical support workers, and service and sales workers occupation – again signalling the growth of the Services sector.

The occupational profile for each of the sectors is different, with over 44% of all jobs in the Community, Social, and Personal Services sector in the three higher-skilled occupations. In the Financial sector, 40% of all jobs are higher-skilled occupations. The majority of jobs in private households are for cleaners and helpers, one of the elementary occupations. Three quarters of the jobs in the Agriculture sector, a quarter in the Wholesale and Retail sector, and close to one fifth in the Mining and Quarrying, Manufacturing, and Construction sectors are for elementary occupations.

Figure 5.2: Employed population by main industry sector and occupation (000s), 2014



	Agriculture, Hunting, Forestry and Fishing	Mining and Quarrying	Manu-facturing	Electricity, Gas and Water Supply	Construc-tion	Wholesale and Retail Trade	Transport, Storage and Communication	Financial Intermediation, Insurance, real Estate and Business	Community, Social and Personal Services	Private households
	25	12	169	16	117	343	142	265	243	0
	3	17	54	8	19	37	31	278	893	0
	8	20	130	13	39	122	56	278	387	0
	7	34	137	12	34	459	144	342	482	0
	9	5	47	4	6	952	37	468	777	20
	66	133	446	30	712	358	31	74	47	0
	65	113	464	20	45	97	362	45	56	0
	519	94	314	14	276	834	127	280	608	1 209

Source: StatsSA (2014b)

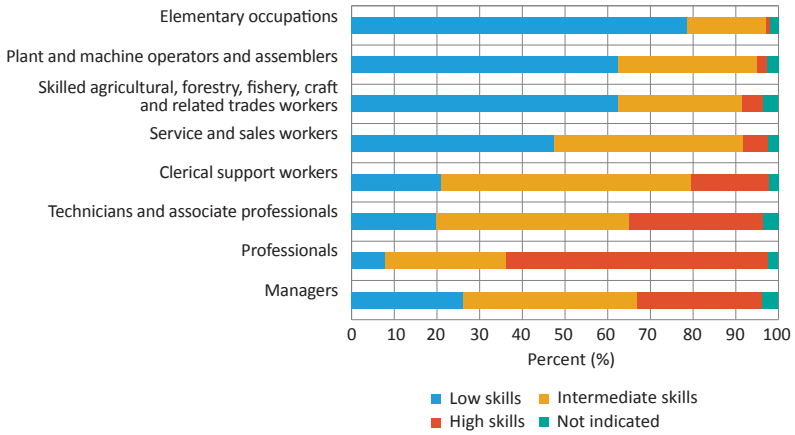
[43] *The comparative share in England is 44% (UKCES, 2010).*

CHANGES IN EDUCATIONAL LEVELS OF OCCUPATIONAL GROUPS

Significant trends in the labour market can be observed by examining differences in educational levels between occupational groupings over the 2010 to 2014 period. The changes in the educational skill levels in occupations between the years 2010 and 2014 are shown in Figures 5.3 and 5.4[44]. At a general level, the data shows that for this period the educational skills level of occupations appears to be rising slightly. High-skilled workers increased by 1% from 16% to 17% from 2010 to 2014, and this is particularly noticeable for the technicians and associate professionals occupational category where the shares of high skills increased by 6% from 2010 to 2014.

Workers with intermediate skills in the workforce increased by 1% from 33% to 34%, and the most noticeable increases occurred for elementary workers, by 2%, for service and sales workers by 3%, and for plant and machine operators by 4%.

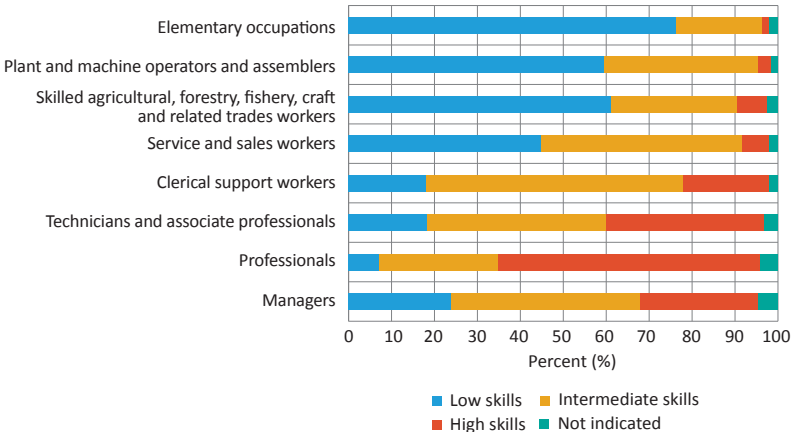
Figure 5.3: Occupational structure and educational skill level in 2010



	Elementary occupations	Plant and machine operators and assemblers	Skilled agricultural, forestry, fishery, craft and related trades workers	Service and sales workers	Clerical support workers	Technicians and associate professionals	Professionals	Managers
Low skills	78.6	62.4	62.4	47.5	20.9	19.8	7.7	26.0
Intermediate skills	18.4	32.4	29	44.1	58.6	45.2	28.5	40.9
High skills	1.0	2.4	4.8	5.9	18.2	31.2	61.2	29.2
Not indicated	2.0	2.9	3.7	2.6	2.3	3.8	2.5	3.8

Source: StatsSA (2014b)

Figure 5.4: Occupational structure and educational skill level in 2014

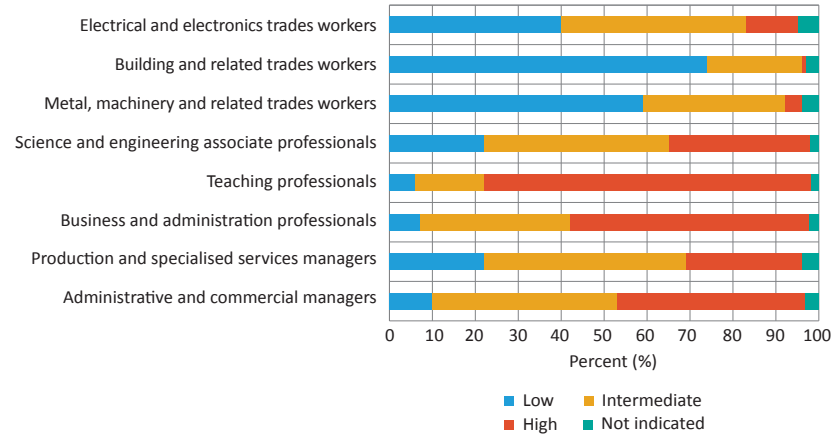


	Elementary occupations	Plant and machine operators and assemblers	Skilled agricultural, forestry, fishery, craft and related trades workers	Service and sales workers	Clerical support workers	Technicians and associate professionals	Professionals	Managers
Low skills	76.3	59.4	61.1	44.8	18.0	18.3	7.1	23.9
Intermediate skills	20.0	35.9	29.3	46.6	59.7	41.6	27.5	43.9
High skills	1.4	2.9	7.0	6.4	20.1	36.8	61.1	27.6
Not indicated	2.2	1.8	2.6	2.2	2.3	3.2	4.2	4.6

Source: StatsSA (2014b)

[44] *We defined "educational skill level" in relation to qualification. Low educational skills refer to those qualified at pre-matriculation NQF levels 1 to 3 or no schooling (less than level 1). Intermediate educational skill levels are those qualified at NQF levels 4 to 5, and high educational skills level refer to those qualified at NQF levels 6 to 10.*

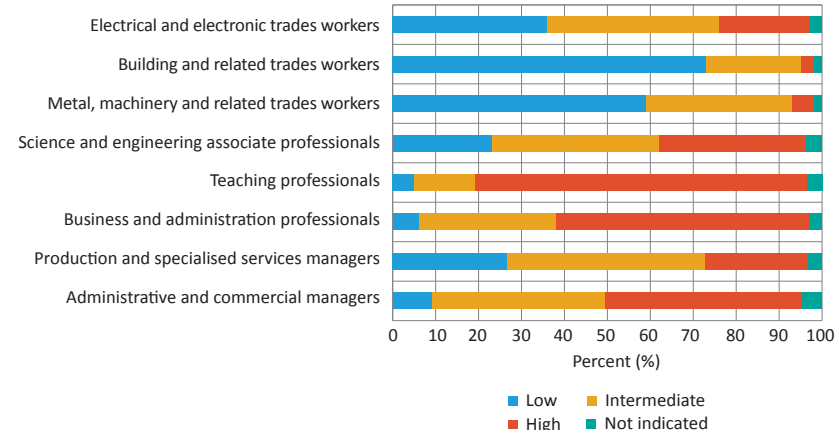
Figure 5.5: Educational skill level of fastest-growing technical occupations, 2010[45]



	Electrical and electronics trades workers	Building and related trades workers	Metal, machinery and related trades workers	Science and engineering associate profes-sionals	Teaching profes-sionals	Business and admini-stration profes-sionals	Production and specialised services managers	Admini-strative and commercial managers
Low	40	74	59	22	6	7	22	10
Intermediate	43	22	33	43	16	35	47	43
High	12	1	4	33	76	57	27	45
Not indicated	5	3	4	2	2	2	4	3

Source: StatsSA (2014b)

Figure 5.6: Educational skill level of fastest-growing technical occupations, 2014



	Electrical and electronics trades workers	Building and related trades workers	Metal, machinery and related trades workers	Science and engineering associate profes-sionals	Teaching profes-sionals	Business and admini-stration profes-sionals	Production and specialised services managers	Admini-strative and commercial managers
Low	36	73	59	23	5	6	26	9
Intermediate	40	22	34	39	14	32	46	41
High	21	3	5	36	78	59	24	46
Not indicated	3	2	2	3	4	3	3	4

Source: StatsSA (2014b)

More details on the educational skill levels can be observed by reference to the skill levels within the 20 largest growing occupations, and how they have changed over the 2010 to 2014 period. From the list of 20 occupations, we focus on eight two-digit occupations that fall within OFO categories 1, 2, 3, and 6 (Figure 5.5 and 5.6). Skills for these occupations are developed at post-school education and training institutions.

The shares of high skills of both the business and administration professionals and teaching professionals increased between 2010 and 2014. The educational skills set of managers is lower than for professionals, and there were no significant changes in skills between 2010 and 2014. Surprisingly, less than half of the administrative and commercial managers, and only one quarter of production and specialised service managers, are categorised as having high skills. Appointment to senior level is likely due to experience and historical advantages. There have not been high levels of upskilling, measured through formal qualifications, in the categories of trades workers, except for the electrical and electronics trades where the shares of high skills rose from 12% in 2010 to 21% in 2014[46]. The workers in the science and engineering associate professional category also experienced an increase in skills level from 2010 to 2014.

[45] *Annual data is derived by pooling together the four quarters of the QLFS and reported numbers are the averages for the year.*

[46] *Issues for trades and artisanal workers may go beyond the supply and demand issues and three research projects in LMIP deal with these issues (Gamble, 2016; Mbatha et al, 2015; Wildschut et al, 2016).*

SKILLS TO SUPPORT GOVERNMENT GROWTH INITIATIVES

In order to stimulate the economy and contribute to job creation, government has initiated a number of economic growth projects. We reviewed a number of government's economic development policies to generate a broad estimate of the current and future skills demand of implementing key development strategies, including programmes that are specifically designed as job-creating projects (Kalina and Rogan, 2016). The review examined 27 major development strategy documents (see Appendix 5) from both the national and provincial governments, as well as the major metropolitan municipalities. Providing an indication of current and future skills needs for the growth projects was challenging in view of the fact that very few of the strategies provide assessments of the skill needs. Where plans do provide some indication of skills requirements, these largely exist in low-skill occupations, such as those required in the productive industries; or in high-skill applications, such as those demanded by SET industries or within the knowledge-based economy.

Overall, the signals from these plans provide a broad indication of the type of skills that would be required to implement government's economic development policies. The following aggregated estimates provide an indication of possible skills requirements:

- The Medium-Term Strategic Framework provides a comprehensive indication of the skills required for their medium-term strategic plan. Its skills development plan provides targets for PhD graduates. Engineering and Science graduates, as well as Health, Natural, and Physical Science graduates. The plan identifies the need for 20 000 new teachers a year.
- The innovation and knowledge-based economy plan for the next 10 years has set a target for 3 000 PhDs in SET fields.
- The Industrial Policy Action Plan requires technical and high-level design skills for manufacturing, the plastics value chain, and broad-based skills within the saw-milling industry.
- The National Development Plan and the New Growth Plan point to the need for high, medium and low skills in the Services sector and manufacturing industry.
- The Department of Rural Development and Land Reform Strategic Plan requires skills in the areas of geomatics and spatial planning.
- The Square Kilometre Array telescope requires skills in the areas of planning, construction, installation of technical equipment, software development, maintenance, and astronomical research.
- Operation Phakisa expects to create up to 1 million new jobs within the "blue economy" by 2033. Skills required include highly skilled professional, such as oceanographers and marine biologists, as well as medium and low-skilled individuals within the Department of Environmental Affairs (DEA) and the Department of Agriculture, Forestry and Fisheries (DAFF) who can assist in monitoring, enforcement and compliance efforts, as well as participants who can be trained and employed by the DEA as field rangers.
- The Eastern Cape Provincial Plan will create the following high, medium, and low-skilled job opportunities: 113 000 jobs in agriculture, 166 000 in manufacturing, 149 000 in construction, 130 000 in tourism, 70 000 in the social economy, and 140 000 in knowledge-based services.
- The Western Cape Government Provincial Strategic Plan emphasises the importance of agriculture skills, with 100 000 planned jobs in agricultural processing and 60 000 high-skill jobs expected in the oil and gas exploration sector.
- The Limpopo Development Plan highlights skills needs in the areas of engineering, healthcare, social development, and research and development.
- The eThekwini Economic Development and Job Creation Strategy and the Human Resource Development Strategy for South Africa (HRD-SA) 2010 to 2030, requires skills in the areas of construction, design, engineering, and manufacturing.
- The City of Cape Town Poverty Alleviation and Reduction Policy Strategy requires low-skill workers for the Expanded Public Works Programme.

Another key signal on skills requirements can be obtained through an analysis of the 18 Strategic Integrated Projects (SIPs). The SIPs are a key part of the government's national infrastructure plan to transform the economic landscape, strengthen the delivery of basic services, and simultaneously create a significant number of new jobs[47]. The SIPs team has developed a methodology, and worked with stakeholders, to estimate the skills needs for the successful implementation of the SIPs, SIPs identified a total of 90 occupations (Appendix 6) where there are skills shortages, and of these, 35 occupations were in the Science, Technology, and Engineering fields.

The evidence of skills needs from the government growth plans and strategies is mixed, as it tends to confirm many of the findings at the national levels. These include a predominance of low-skill job opportunities in the future. These low-skill jobs should be accompanied by further and workplace training opportunities. At the same time, there is also a number of strong signals that must be considered, especially around the demand for STEM skills in higher-level occupations, the demand for teachers, and the increased demand for agricultural skills in the Western Cape. These findings point to another dimension, namely the significance of regional initiatives, the need to understand local demand for skills, and how skills shortages differ from region to region.

[47] *See: DHET (2015b)*

EMPLOYERS' PERCEPTIONS OF SKILLS DEMANDS

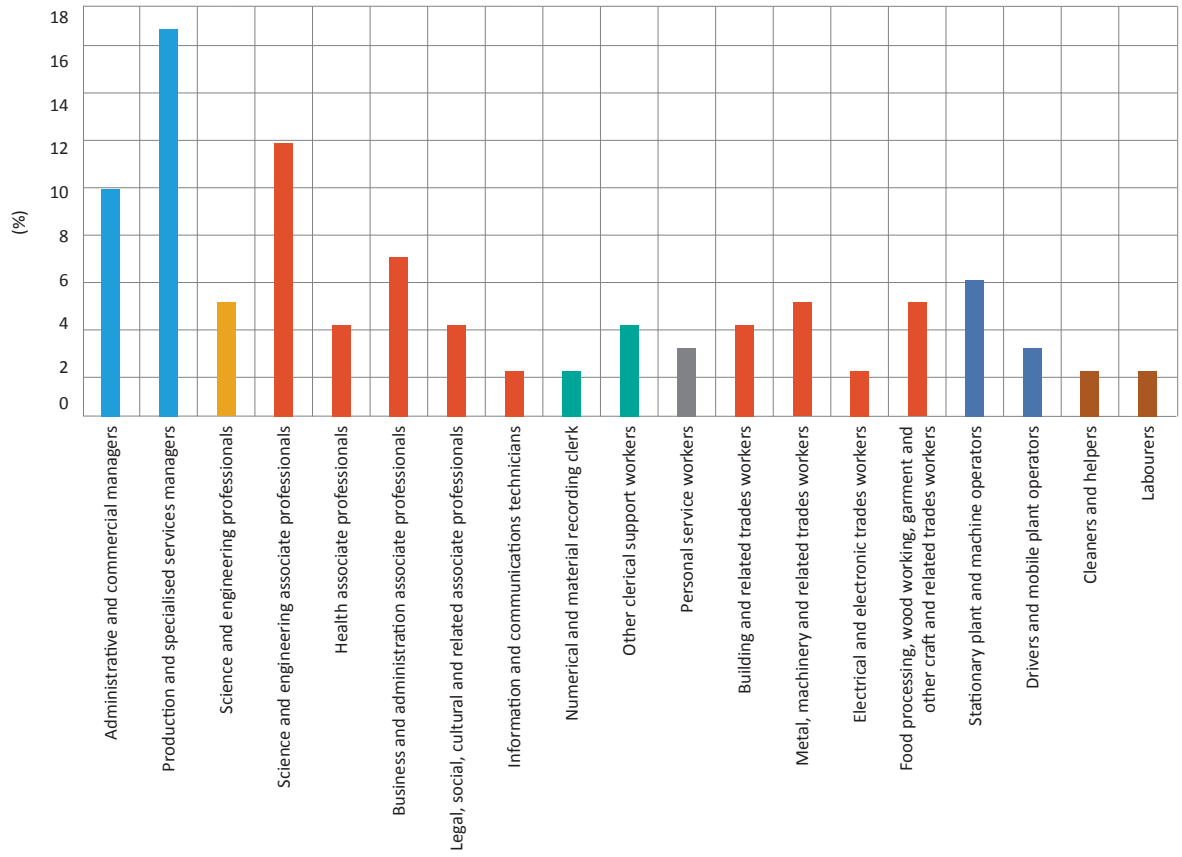
A key part of understanding the types of skills required by the economy is to examine employers' perceptions. This is an important signal, since as employers are the ultimate recruiter of skilled labour and their perceptions provide a more fine-grained picture. The most comprehensive source of employer perspectives in South Africa can be obtained from the SETA's PIVOTAL[48] list. This list is compiled by SETA based on the information collated in the workplace skills plans received from employers, and from surveys of employers in their sector[49].

We collated and analysed the PIVOTAL lists produced by each of the SETAs and found that a total of 144 occupations were identified as being in demand. We counted the number of times each occupation was identified as being in demand. This data allowed us to identify the top 15 occupations perceived by employers as being in demand, and their relative importance in relation to each other (Figure 5.7).

Once again, this figure highlights the fact that managerial positions are perceived as an area where demand outstrips supply, especially for production and service managers, and administrative and commercial managers. The evidence also reveals that technicians and associate professionals are in high demand. This suggests that employers are finding it difficult to recruit for middle-level occupations such as science and engineering associate professionals, health associate professionals, business and administration associate professionals, legal, social, cultural, and related associate professionals, and information and communications technicians.

The next occupational group identified as experiencing a shortage by employers is agriculture, forestry, fishery, and craft workers, especially amongst the different trades. Within this occupational group the shortage areas include: metal, machinery and related trades; electrical and electronic trades workers; building and related trades workers; and food processing, wood working, garment, and other craft and related trades workers.

Figure 5.7: Top 15 occupations in demand identified using SETA PIVOTAL list



Source: Author's calculations from SETA-produced PIVOTAL List

[48] *This refers to the Professional, Vocational and Technical Occupational List.*

[49] *Each SETA constructs its own scarce skills lists, and submission of these lists can provide the basis for funding of occupations that are viewed as being in demand. The top 10 ranked occupations from each SETA were used to create the PIVOTAL list.*

Another significant trend is the dominance of service-level occupations across all the major groups. For instance, within the managers category, the occupations perceived to be in the greatest shortage are production and service-level managers. Similarly, within the technicians and associate level professionals, one of the key identified shortage areas is the business and administrative area.

There is also a significant shortage of science and technology-based occupations, especially at the professional and technician level. It is also important to note that amongst craft occupations there is considerable demand for technically based skills.

OCCUPATIONS IN HIGH DEMAND

In 2014 the Department of Higher Education and Training published the first List of Occupations in High Demand (DHET, 2014)[50]. This list was constructed using a number of data sources and stakeholder consultation. A year later the methodology was refined and the List of Occupations in High Demand 2015 was published (DHET, 2015)[51]. In the 2015 list. In all, 340 occupations (described at the six-digit level OFO code) were identified as occupations in high demand. Using this list, the following two-digit occupations were generated.

Table 5.4: List of occupations in high demand at OFO digit level 2

OFO Code at digit level 2	Name of occupation
1. Managers	
11	Chief executives, senior officials and legislators
12	Administrative and commercial managers
13	Production and specialised services managers
14	Hospitality, retail and other services managers
2. Professionals	
21	Physical, mathematical and engineering science professionals
22	Health professionals
23	Teaching professionals
24	Business and administration professionals
25	Information and communication technology professionals
26	Legal, social and cultural professionals
3. Technicians and associate professionals	
31	Science and engineering associate professionals
32	Health associate professionals
33	Business and administration associate professionals
35	Information and communication technicians
4. Clerical support workers	
42	Customer service clerks
43	Numerical and material recording clerks
5. Service and sales workers	
53	Personal care workers
54	Protective service workers
6. Skilled agricultural. forestry. fishery. craft and related trades workers	
64	Building and related trade workers
65	Metal, machinery and related trade workers
66	Handicraft and printing workers
67	Electrical and electronics trade workers
68	Food processing, wood working, garment and other craft-related trade workers
7. Plant and machine operators and assemblers	
71	Stationary plant and machine operators
72	Assemblers
73	Drivers and mobile plant operators

There is a significant shortage of science and technology based occupations at both the professional and technician level.

[50] *List of Occupations in High Demand 2014. No 38174 Government Gazette. 4 November 2014.*

[51] *List of Occupations in High Demand 2015. No 39604 Government Gazette. 19 January 2016.*

CONCLUDING COMMENTS AND SKILLS IMPLICATIONS

The demand for skills is a derived demand determined by structural changes in the economy. Through the analysis of different data sources we were able to signal the changes in employment and education skill levels. The data shows that the country is experiencing slow growth and, while this is impacting on employment, it is not having a significant influence on unemployment reduction. The South African economy is characterised by shortages for high-skilled jobs and high levels of unemployment for those with lower levels of education and training. Many of the government-supported growth initiatives have prioritised the creation of low-skill jobs and the development of high-level skills, especially in the SET areas.

The sectors in which people work and the types of jobs available are changing. At national level, the data reveals that there is a structural shift towards a service economy. This changing structure of the economy reveals the absence of low-wage jobs in the manufacturing sector and a high dependence on the high-skilled financial services. Into this breach has stepped a public sector, with the unintended consequence that it, along with labour brokers, have become key nodes of employment generation in the South African economy. This pattern of growth and its attendant employment outcomes are not sustainable.

The impact of the structural shift for occupations is surprising. For the skilled occupational level, the relative demand for managers is increasing. No significant demand is apparent for other professional occupational areas, suggesting that this might be a result of the overall demand for high-end skills being low, or that there are high vacancy levels, signalling a shortage of these skills. There is also no significant growth in the number of jobs for technicians and associate level professionals. However, for employers, occupations in the technicians and associate professionals category are a high priority.

The demand for semi-skilled level occupations was highest for services and sales workers, where there was a 25% growth over the 2010 to 2014 period. In the case of skilled agriculture, forestry, and trade workers, as well as plant operators, the growth in demand was higher than for professional-level occupations. The evidence also points to a demand for certain types of trade occupations (e.g. building and related trades workers, electrical and electronics trade workers, metal, machinery and related trades workers). The demand for trade workers is corroborated by employers.

The age profile of workers by the industrial sectors reassures the labour market that there is a pipeline of workers at different age levels, in almost all sectors, to replace the workers who will be retiring. The most vulnerable sector when it comes to replacement demand is the Electricity, Gas, and Water sector, where 15% of the workforce is between the ages of 55 and 64 years and 17% is between 45 and 54 years.

CHAPTER 6

UNDERSTANDING SKILLS MISMATCHES

Skills planning must respond to the needs of the labour market and the society. An effective and efficient labour market requires that the skills of the workforce match those required by employers, and that the type of skills produced by the different levels of the education system should respond to market demand. Further, the types of jobs created must also match the skills of the population, especially the unemployed. Skills mismatch is an encompassing term which refers to various types of imbalances between skills offered and skills needed in the world of work.

The preceding chapters focused on understanding how different factors influenced the demand for skills, through an analysis of the performance of the economy and changes in the labour market. This chapter takes the analysis further and provides an understanding of the types of mismatches and where mismatches exist in the labour market. This analysis will then provide policy makers with signals for interventions to tackle skills mismatches.

TYPES OF SKILLS MISMATCHES

A just and inclusive society requires that there are job opportunities for all, and that workers possess the requisite skills to do the job. When workers' skills do not match what is required by employers and the education and training system fails to produce skills needed by the labour market, there is a mismatch. When the type of skills required for a job and the skills of the working age do not match, there is a mismatch. When employees do not work in the sectors and occupations they have studied for then there is mismatch.

We adopted a comprehensive approach to estimate mismatches and identified three types of mismatches in the South Africa context. In this preliminary analysis we identified three types of mismatches: demand mismatch, educational supply mismatch and qualification-job mismatch.

- *Demand mismatch* examines the shape and trajectory of the economy, the types of jobs that are being created, and the skills set and expectations of the working-age population. In this analysis we estimated the types of skills required by the jobs in the economy (measured by the type of occupations and the sectors being developed) and the skills set of the majority of the country's population (measured by the education level).
- *Educational supply mismatch* examines how supply responds to areas of skills demand. For the educational supply mismatch, we analysed the relationship between skills demand and the skills currently produced by the education system. For instance, if mechanical engineers were identified as being in demand, then our analysis investigated the extent to which the current post-school education and training system is producing mechanical engineers. If the supply is not producing the type of qualification identified as a demand, an educational supply mismatch is assumed to exist.
- *Qualification-job mismatch* examines the qualification gaps for skilled jobs and then traces the sectors and occupations that the educational qualifications are absorbed into. For the qualification gap we examined the qualification level of workers in skilled occupations and the changes over time. To determine where the qualifications are absorbed, we examined the subject area qualification (higher or technical vocational education) for those with a tertiary education in the workplace. This data was then analysed against the occupational areas and sectors in which the same people worked. There is an assumption that those who studied a particular subject area would be employed in a sector and occupation relevant to their qualification. For instance, if a person studied for an engineering TVET qualification, there is an assumption that they would be employed as a technician and would probably work in the Manufacturing or Construction sector. When this does not occur, there is a qualification-job mismatch.

SIGNALS ON SKILLS MISMATCHES

Estimating the mismatch for each of the three categories identified involves different approaches and assumptions. Each of these categories is not mutually exclusive and there is a degree of interaction between the mismatches.

SIGNALS ON DEMAND MISMATCHES

The South African developmental challenge is to both grow the economy and to create jobs for the majority of the population. The South African economy and labour market is characterised as one where there is a demand for high skill, but a surplus of low-skilled workers (Bhorat and Jacobs, 2010). The first and perhaps the most significant mismatch, the demand mismatch, is that between the trajectory and skills demand of the economy and the skills set and expectations of the labour force.

Economic growth in post-apartheid South Africa, while modest, has been driven largely by capital-intensive industries, retail trade, and financial services, rather than labour-intensive sectors such as Agriculture and Manufacturing. As outlined earlier, development in most middle-income countries is characterised by a move away from low-productivity Agricultural sectors, towards the labour-intensive Manufacturing sector, then to technologically advanced manufacturing, and eventually to the high-skilled Services sector. Under such a developmental trajectory, technological advances will result in productivity improvements in the Agricultural sector, and the displaced rural workers are then absorbed into the labour-intensive and semi-skilled Manufacturing sector. This growth path leverages new technologies, builds a skilled labour force, and raises productivity – which together lead to higher levels of growth and employment. In the case of South

Africa, this transition has not occurred in this manner, and development has therefore been characterised by stagnation in the Agricultural sector and a decline in the Mining sector. The labour-intensive Manufacturing sector has failed to materialise and is instead dominated by capital-intensive work.

The South African development trajectory appears to have skipped a stage and moved into a skills-biased employment trajectory which is dependent on the Financial Services sector for growth, and on the Wholesale and Retail, and public sector for jobs. This growth is not sufficient to absorb new entrants into the labour market, including those who have lost jobs in the Agriculture and Mining sectors since 2001. Overall, Community Services (including Government Services) were responsible for the bulk of employment growth over the period, adding 750 000 jobs from 2010 to 2014 to the economy, and reflecting the dominance of the public sector in employment generation.

At the same time, the growth trajectory needs to be considered against what is happening in society. The country is experiencing continuous rises in unemployment. Currently, the country has a labour market of 15 million people and 8 million people are unemployed. Of the 8 million unemployed, around 5 million are between the ages of 15 and 34 years. From 2010 the total number of the working-age population has been increasing but the rate of growth of the working-age population is twice the rate of the growth of employment. It is predicted that a significant number of people will enter the labour force in the next five years, and it is questionable whether or not they can be absorbed into the current labour market.

Presently close to half of the employed and 60% of the unemployed populations have not completed their secondary education. While the educational levels are a barrier to access and progression in the labour market, the policy challenge remains to create low-wage jobs to absorb the unemployed and to design appropriate workplace training programmes for the employed to improve their skills level and progress in the labour market.

SIGNALS ON EDUCATIONAL SUPPLY MISMATCHES

Signals on educational supply mismatches are derived from the analysis of skills demand. This involves identifying where immediate medium and long-term action is required to tackle skills mismatches[52]. Within each of these categories there is an assumption that certain occupations are strategic to the country's development and that there is a corresponding risk of not investing in skills, skills which are critical to supporting the economy. These are classified as "red" skills or occupations as presented in Table 6.1. These skills demands are not being met due to their severe shortage or the fact that they require a long lead time to produce. The second skill or occupational category is classified as "pink". These are viewed as critical to the economy, but the magnitude of the demand is not high, and they require a shorter time to develop. The final category is "amber", which occupations are experiencing a demand, but are not viewed as critical to national growth and development, and can be met in the short to medium term by increasing supply.

Table 6.1, on page 76, lists the occupations identified as being in demand by the extent of demand, red being severe demand, pink not as severe, and amber less severe demand. In the left column of the table are the occupations in demand. This is categorised from the perspective of skilled and semi-skilled occupations. Typically, skilled occupations are managers, professionals, or technicians and associate professionals, who in most instance would require qualification at NQF levels 5, 6 or 7 to perform their job effectively. The semi-skilled comprise clerical support, service and sales workers, and skilled agricultural, forestry and trades workers, as well as plant operators. The qualifications for these occupations would normally be at NQF level 4 or 5.

The right column of the table provides evidence on the supply from the education and training system, i.e. completers in the corresponding qualifications from the universities and TVET colleges in 2014. This leads to the analysis of the degree of matches between the demand for specific occupations and evidence on supply. As would be expected, completely accurate information is not available to determine the level of matches, however, it does provide a signal for skills planning requirements.

What then do these signals tell us about educational supply mismatches:

- There is a demand for managers, but the demand exists for managers with particular technical subject knowledge and expertise, not just general managers.
- At the professional level the key signals for policy makers are related to the significant demand for Science, Technology, and Engineering graduates. There are around 55 000 Science, Technology, Engineering, and Mathematics (STEM) graduates each year, and this does not appear to be enough to match the existing demand. STEM graduates are needed for management occupations, engineering professions and occupations, medical professions, as well as for teaching professions. The nature and extent of STEM occupation demand is clearly identified in a number of sources, including the list of occupations in high demand. What is also clear is that the number of STEM qualifications will have to expand considerably in order to meet demand. As we shall see in the next section STEM graduates are flexible and versatile, and can be readily employed in other sectors.
- For teachers, the analysis highlighted a number of specific mismatches. Analysis of replacement demand points to needing at least 25 000 new teachers a year to offset those

[52] *We draw upon the methodology developed for the 2010 Skills Audit for the UK (UKCES, 2010).*

Table 6.1: Occupations in demand and response of educational supply

DEMAND FOR QUALIFICATION				SUPPLY OF QUALIFICATIONS
Occupational area	**Red classification: Severe demand**	**Pink classification: Moderate demand**	**Amber classification: Less severe**	**Signals on current supply. 2014**
SKILLED				
Managers	Production and service managers Administrative and commercial managers	Health managers Hospitality, retail and other service managers	Health and safety managers Legal and ICT managers	• 11 366 N6 TVET qualification in Business-related qualifications • 50 380 Business and Management graduates • 7 270 Law graduates
Professionals	Teachers: early childhood development and Mathematics and Science STE professionals Business and administrative professionals	Social welfare professionals Health and social service professionals, especially medical doctors	Accounting and finance professionals Mining engineers Life scientists	• 17 000 new Education graduates • 14 077 engineers graduated from universities • 6 800 ICT graduates annually from University sector • 12 500 Health Profession graduates • 7 270 Law graduates • 29 000 Science graduates
Technicians and associate professionals	Business and administrative associate professionals STE and associate professionals Food and beverage technicians	Health associate professionals Mining and engineering technicians Mining technologists	Legal, social, cultural and related associates Information and communication technicians	• 3 824 Business and Administrative completers at NCV level 4 • 1648 Engineering completers at NQF level 4 • 130 ICT completers at NQF level 4 • 8 000 NATED6 Engineering completers from TVET colleges.
SEMI-SKILLED				
Clerical support workers and service and sales workers			Sales workers Personal care workers Personal service workers	
Skilled agricultural and trade workers	Building and trade-related workers Metal machinery and related trades Electrical and electronic trades workers	Food processing Wood working	Garment, craft and related trade workers	• 329 Civil, Building and Construction; 520 Engineering-related design; and 595 Electrical Infrastructure Construction Engineers completed at NQF level 4
Plant and machine operators and assemblers		Drivers and plant operators	Assemblers	• 5 process plant operators completed courses at a TVET college

Source: Analysis from the previous chapters

retiring. The supply system is increasing the supply each year, with the 2014 figures showing that 17 000 new teachers graduated from the tertiary institutions that year alone. There are shortages, in particular, for Early Childhood Development (ECD) practitioners and for Mathematics and Science secondary school teachers.

- For the skilled technician level, the demand areas are for business and administrative associate professionals, and STEM associate professionals. There were 50 000 Business and Management completers from universities and 8 000 N6 Engineering completers from TVET colleges.
- For workers in the semi-skilled trades, there is demand in the building and construction, metal machinery and related trades, as well as electrical and electronic trades. The numbers produced for each of the areas by the TVET colleges are only a few hundred. This points to a significant educational supply mismatch.

SIGNALS ON QUALIFICATION-JOB MISMATCHES

The qualification-job match analysis attempts to obtain signals on whether the right number and types of qualifications are being produced to meet the needs in the workplace, and whether or not individuals are working in sectors and occupations linked to their tertiary education and training. In this approach, qualifications are used as a proxy for measuring skills, and we will focus on workers with tertiary qualifications. Two different approaches, the qualification gap and the job mismatch, are used to understand the qualification-job mismatch.

The approach to estimate the qualification gap is, firstly, to analyse the shares of workers in the labour market employed in high-skilled occupations, namely managers, professionals, technicians and associate professionals, in order to understand demand[53] and to track how this has changed over time. Secondly, we estimate the skill level of workers in these occupations by calculating the shares of workers with tertiary qualifications (Table 6.2).

The evidence reveals that the demand for high-skilled managerial occupations increased by 0.8% percentage points from 8.0% in 2010 to 8.8% in 2014; the demand for high skilled professional occupations has dropped slightly (from 9.3% in 2010 to 8.9% in 2014); and the demand for technicians and associated professional occupations has decreased slightly from 7.4% to 7.0%. In addition, the analysis of the change in skill level (from 2010 to 2014) in the high-skilled occupations revealed that: tertiary qualifications of managers increased by 2.4 percentage points; tertiary qualifications of professionals increased by 3.7 percentage points; and for technicians and associate professionals this increase was 5.3 percentage points.

These findings highlight the fact that workers in professional level occupations are much more likely to have a tertiary level qualification than those in managerial or technical occupations. The qualification level of managers and technicians is surprisingly low, given the status of these occupations and that, in recent years, around 200 000 new tertiary qualifications have been produced each year from the university and TVET college sectors.

The second approach for investigating qualification matches is to analyse the sectors and occupations in which the graduates are employed. Qualifications are traditionally classified into the three Classification of Educational Subject Matter (CESM) categories: Business, Commerce and Management Studies; Science, Engineering and Technology; and Humanities. To produce more textured information for the skills planning processes, we disaggregated the three CESM categories further into six categories: Business, Commerce and Management studies; Science; Engineering or Engineering Technology; Healthcare or Health Sciences; Visual and Performing Arts; Education, Training and Development; and Other Humanities and Social Sciences.

Table 6.2: Qualification gap for high-skilled occupations

	Demand for higher skills level (estimated by the shares of employed persons in the occupational area)		Education skill level of employers in high-skilled occupations[54]	
	2010	2014	2010	2014
Managers	8.0%	8.8%	42.9%	45.3%
Professionals	9.3%	8.9%	74.5%	78.2%
Technicians and associate professionals	7.4%	7.0%	38.2%	43.5%

Source: Author's calculations from QLFS and Labour Market Dynamics (2010. 2014). StatsSA

[53] *This is a blunt indicator of demand as we have not estimated the number of vacancies. The number employed in a particular occupation plus the number of vacancies will provide a better estimation of demand.*

[54] *Estimated by shares with a tertiary qualification.*

Table 6.3: Employed population with Higher Education qualifications by study field and main industry sector, 2014

	NUMBERS								
Main industry sector	Business, Commerce, Manage-ment studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Develop-ment	Other Humanities and Social Sciences	Undefined (Other)	Total
Agriculture, Hunting, and Forestry and Fishing	1 671	4 321	293	0	0	0	357	1 428	**8 070**
Mining and Quarrying	5 987	2 488	6 470	249	0	1 045	2 339	727	**19 305**
Manufacturing	32 593	7 892	27 115	4 083	2 861	1 224	11 749	10 881	**98 398**
Electricity, Gas and Water Supply	5 887	259	4 910	0	0	838	0	530	**12 424**
Construction	7 894	1 405	18 185	596	1 620	815	3 721	269	**34 505**
Wholesale and Retail Trade	32 643	4 251	6 678	5 328	2 428	4 342	11 389	5 920	**72 979**
Transport and Storage, and Communication	19 576	3 982	8 125	1 425	1 068	2 810	14 892	1 547	**53 425**
Financial Intermediation, Insurance, Real Estate, and Business	128 790	37 726	37 214	2 988	6 161	6 638	69 252	13 474	**302 243**
Community, Social and Personal Services	81 704	31 486	9 675	93 116	6 834	236 543	113 641	25 479	**598 478**
Private households	71	0	0	0	141	381	0	0	**593**
Other	0	0	0	0	0	0	565	0	**565**
Total	**316 816**	**93 810**	**118 665**	**107 785**	**21 113**	**254 636**	**227 905**	**60 255**	**1 200 985**

Source: Labour Market Dynamics, StatsSA (2014b)

Table 6.4: Employed population with Higher Education qualifications by study field and main occupation (1-digit), 2014

	NUMBERS								
Occupation (OFO classification)	Business, Commerce, Manage-ment studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Develop-ment	Other Humanities and Social Sciences	Undefined (Other)	Total
Managers	117 328	24 649	44 047	7 914	6 407	28 688	54 338	13 359	**296 730**
Professionals	118 401	51 158	47 808	66 853	7 459	212 525	88 844	21 463	**614 511**
Technicians and associate professionals	27 325	8 572	12 688	24 654	3 694	5 552	37 981	14 555	**135 021**
Clerical support workers	39 756	3 872	1 559	3 921	1 333	3 447	30 773	5 162	**89 823**
Service and sales workers	7 360	2 697	2 586	3 218	272	2 985	8 413	3 928	**31 459**
Skilled agricultural. forestry, fishery, craft and related trades workers	579	2 506	7 658	1 087	1 792	777	1 966	1 355	**17 720**
Plant and machine operators, and assemblers	1 840	0	1 731	138	0	0	1 675	431	**5 815**
Elementary occupations	4 224	357	588	0	154	665	3 918	0	**9 906**
Total	**316 813**	**93 811**	**118 665**	**107 785**	**21 111**	**254 639**	**227 908**	**60 253**	**1 200 985**

Source: Labour Market Dynamics, StatsSA (2014b)

	SHARES								
	Business, Commerce, Manage-ment studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Develop-ment	Other Humanities and Social Sciences	Undefined (Other)	Total
	1	5	0	0	0	0	0	2	**1**
	2	3	5	0	0	0	1	1	**2**
	10	8	23	4	14	0	5	18	**8**
	2	0	4	0	0	0	0	1	**1**
	2	1	15	1	8	0	2	0	**3**
	10	5	6	5	12	2	5	10	**6**
	6	4	7	1	5	1	7	3	**4**
	41	40	31	3	29	3	30	22	**25**
	26	34	8	86	32	93	50	42	**50**
	0	0	0	0	1	0	0	0	**0**
	0	0	0	0	0	0	0	0	**0**
	100	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

	SHARES								
	Business, Commerce, Manage-ment studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Develop-ment	Other Humanities and Social Sciences	Undefined (Other)	Total
	37	26	37	7	30	11	24	22	**25**
	37	55	40	62	35	83	39	36	**51**
	9	9	11	23	17	2	17	24	**11**
	13	4	1	4	6	1	14	9	**7**
	2	3	2	3	1	1	4	7	**3**
	0	3	6	1	8	0	1	2	**1**
	1	0	1	0	0	0	1	1	**0**
	1	0	0	0	1	0	2	0	**1**
	100	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 6.3, on page 78, presents information about the sectors in which graduates with a Higher Education qualification work, and Table 6.4, on page 77 presents information about the occupations in which these graduates work.

The stark result is that three quarters of all Higher Education graduates work in two sectors – 50% of the graduates work in Community, Social and Personal Services, followed by 25% in the Financial Services sector, and a smaller proportion (8%) works in the Manufacturing sector.

The Community, Social and Personal Services sector includes a number of government services. It is pleasing to note that 93% of the Education, Training, and Development graduates and 86% of Healthcare and Health Sciences graduates work in the public sector. Half of all Humanities graduates are employed in this sector, in addition to one third of Science graduates and a quarter of the Business graduates.

Another important trend is that 40% of Science graduates and 31% of Engineering graduates work in financial services. This pattern of STEM graduates working in the Financial Services sector is found in many countries. It seems that skills gained in studying the STEM-based subjects are transferable to a number of sectors and occupations, and the conditions in the Financial Services field have acted as a magnet for graduates. This phenomenon has created shortages in the STEM sectors. All of this indicates some degree of qualification-job mismatch, i.e. people are not directly using their technical knowledge in sectors where they work.

Other sectors have a closer match with relevant qualifications, including Business and Commerce graduates, where 41% work in Financial Services. In general, the data on Higher Education graduates shows a mixed picture, with some qualification-job mismatches occurring for Science and Engineering graduates, but for the vast majority of graduates, their qualifications appear to be fit for purpose in that they are employed in positions that match their broad skill areas.

In order to further explore the qualification-job match for Higher Education graduates, the analysis turned to the type of occupations in which graduates are employed and how this relates to the subject they studied (see Table 6.4). The data in Table 6.4 shows that nearly 90% of graduates are employed in managerial, professional or technician and associate level positions, with the majority (51%) in professional positions. This is to be expected, and confirms there is a strong match

Table 6.5: Employed population with TVET qualifications by study field and main industry sector, 2014

	NUMBERS								
Main industry sector	Business, Commerce, Manage-ment studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Develop-ment	Other Humanities and Social Sciences	Undefined (Other)	Total
Agriculture, Hunting, and Forestry and Fishing	2 856	8 202	3 623	303	0	264	1 374	2 098	**18 720**
Mining and Quarrying	9 640	1 145	35 749	1 638	0	1 204	3 155	6 830	**59 361**
Manufacturing	48 216	14 072	70 745	4 128	3 258	7 054	13 599	19 392	**180 464**
Electricity, Gas and Water Supply	4 787	1 965	20 548	204	0	264	483	2 580	**30 831**
Construction	16 738	7 601	49 854	2 609	0	2 164	5 218	6 619	**90 803**
Wholesale and Retail Trade	83 754	19 235	38 385	10 168	4 839	11 503	37 722	28 973	**234 579**
Transport and Storage, and Communication	32 111	4 737	35 907	1 447	271	3 346	19 064	13 077	**109 960**
Financial Intermediation, Insurance, Real Estate, and Business	139 277	29 090	72 928	5 928	5 000	9 716	37 869	36 173	**335 981**
Community, Social and Personal Services	130 761	34 460	52 611	148 306	6 948	258 740	109 412	58 351	**799 589**
Private households	3 765	322	985	681	0	926	1 037	1 532	**9 248**
Other	–	205	1 392	0	0	0	0	0	**1 597**
Total	**471 905**	**121 034**	**382 727**	**175 412**	**20 316**	**295 181**	**228 933**	**175 625**	**1 871 133**

Source: Author's calculations from Labour Market Dynamics. StatsSA (2014b)

between the type of qualifications obtained by Higher Education graduates and the occupations in which they are employed.

More significant trends are apparent when we look at the destination of graduates by their qualification subject areas. For Business and Commerce graduates, the overwhelming majority is either employed as managers (37%), professionals (37%) or clerical support workers (13%). Of the Science graduates, 55% are employed as professionals and 26% as managers. Half the Engineering and Technology graduates are employed as either professionals (40%) or technicians and associate professionals (11%). For Health graduates, a similar trend is apparent in that graduates are employed as either professionals (62%) or as technicians and associate professionals (23%).

These findings suggest that most Higher Education graduates are employed at the occupational level for which they have been trained. However, there is a mismatch particularly in the sectors in which Engineering and Science graduates work. Aside from this trend, there are no significant qualification-job mismatches for graduates, and their type of employment in most instances reflects the qualification they obtained.

In order to further explore the qualification-job match for TVET graduates, the analysis turned to sectors and the type of occupations in which graduates are employed and how this relates to the area in which they completed their studies (see Table 6.5 and Table 6.6).

We will examine the mismatch between the qualification graduates obtain and the job in which they are employed.

The cost of developing a TVET graduate is more than for a Business or Services graduate, due to the higher cost of the capital equipment involved in training. Therefore, a qualification mismatch in the TVET sector can have implications on how efficiently resources have been used. Data on the subject areas of TVET graduates and the sector in which they are employed is shown in Table 6.5. Overall, only 10% of TVET graduates are employed in the Manufacturing sector, with the majority being employed in Community, Social, and Personal Services sector (43%) and the Financial Services sector (18%). This data points to a qualification-job mismatch.

At the level of specific qualifications, some significant qualification-job mismatches can also be found.

Similar proportions of Science (12%), Engineering (18%), and Visual and Performing Arts (16%) TVET graduates

	SHARES								
	Business, Commerce, Management studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Development	Other Humanities and Social Sciences	Undefined (Other)	Total
	1	7	1	0	0	0	1	1	**1**
	2	1	9	1	0	0	1	4	**3**
	10	12	18	2	16	2	6	11	**10**
	1	2	5	0	0	0	0	1	**2**
	4	6	13	1	0	1	2	4	**5**
	18	16	10	6	24	4	16	16	**13**
	7	4	9	1	1	1	8	7	**6**
	30	24	19	3	25	3	17	21	**18**
	28	28	14	85	34	88	48	33	**43**
	1	0	0	0	0	0	0	1	**0**
	0	0	0	0	0	0	0	0	**0**
	100	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 6.6: Employed population with TVET qualifications by study field and main occupation (1 digit), 2014

	NUMBERS								
Occupation (OFO classification)	Business, Commerce, Management studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Development	Other Humanities and Social Sciences	Undefined (Other)	Total
Managers	128 483	20 558	63 278	8 631	6 060	19 835	33 215	26 530	**306 590**
Professionals	42 775	23 095	50 268	37 511	3 215	233 349	26 221	17 067	**433 501**
Technicians and associate professionals	64 623	24 207	69 577	90 618	5 091	9 726	31 444	28 229	**323 515**
Clerical support workers	153 574	21 506	36 764	10 474	2 518	11 708	64 032	27 822	**328 398**
Service and sales workers	43 084	14 162	17 460	20 945	2 077	11 845	52 315	39 059	**200 947**
Skilled agricultural, forestry, fishery, craft and related trades workers	8 675	6 574	104 772	1 960	811	2 771	7 439	18 572	**151 574**
Plant and machine operators, and assemblers	7 705	4 057	22 972	1 354	545	1 109	5 226	8 641	**51 609**
Elementary occupations	22 977	6 867	17 628	3 917	0	4 842	9 042	9 711	**74 984**
Total	**471 896**	**121 026**	**382 719**	**175 410**	**20 317**	**295 185**	**228 934**	**175 631**	**1 871 118**

Source: Author's calculations from Labour Market Dynamics, StatsSA (2014b)

work in the manufacturing sector. One would have expected that higher shares of Science TVET graduates would work in the Manufacturing sector than those who studied the performing arts. Science and Engineering TVET graduates also work in the Wholesale and Retail Trade sector, Financial Services sector, and Community, Social and Personal Services sector.

The occupations in which TVET graduates are employed are shown in Table 6.6. What is surprising is that a significant proportion of TVET graduates is employed as professionals (23%), clerical workers (18%), and managers (16%), compared to those employed as technicians (17%), suggesting a qualification-job mismatch. Ideally, more TVET graduates should work as technicians or associate professionals.

When we analyse the specific qualifications of TVET graduates and the specific occupation in which they are employed, a number of important trends can be seen. It is crucial to highlight that half of those with Health Science qualifications and 20% of those with Science qualifications are employed as technicians, indicating a reasonable qualification match.

The picture surrounding the qualification-job match of those with TVET qualifications is complex and requires more research. Attention must be drawn to the fact that the majority of those with TVET qualifications are not employed as technicians or associate professionals.

CONCLUDING COMMENTS AND IMPLICATIONS FOR SKILLS PLANNING

The current approach for understanding skill mismatches must be seen as an exploratory analysis and the development of a prototype. This process will be refined in subsequent analyses. This approach attempted to provide a foundation and framework for policy makers to start understanding the nature of skills demands and skills mismatches facing South Africa, and the extent to which these mismatches occur at the three identified levels. The adoption of such an approach provides a basis for policy makers to start targeting resources and making significant reforms. The evidence also highlights that the reform agenda is about demand and supply, as well as the ways in which they interact. The introduction of only supply measures will not solve South Africa's employment and skills challenges.

The mismatches within the South African economy occur at three levels. The starting point for reform is to consider the mismatches that are occurring at the demand level. There are many people who need to find employment but have limited skills. At the same time, a considerable proportion of new jobs are elementary and in vulnerable forms of employment. This is not a long-term sustainable future for inclusive growth. The growing number of unemployed people needs to be absorbed in sectors where there are more labour-intensive forms of employment.

In the case of the educational supply mismatch, the picture is mixed. For managers, there is a need to increase

	SHARES								
	Business, Commerce, Manage-ment studies	Science	Engineering or Engineering Technology	Health Care or Health Sciences	Arts, Visual or Performing	Education, Training or Develop-ment	Other Humanities and Social Sciences	Undefined (Other)	Total
	27	17	17	5	30	7	15	15	**16**
	9	19	13	21	16	79	11	10	**23**
	14	20	18	52	25	3	14	16	**17**
	33	18	10	6	12	4	28	16	**18**
	9	12	5	12	10	4	23	22	**11**
	2	5	27	1	4	1	3	11	**8**
	2	3	6	1	3	0	2	5	**3**
	5	6	5	2	0	2	4	6	**4**
	100	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

the supply of graduates in certain technical subjects. However, this should be supported by improved professional workplace experience and mentorships. Other professions where mismatch occurred included STEM graduates. It is clear that STEM graduates have a set of versatile skills and therefore they are able to, and do, work in different sectors. The implication for education and training is that there is a need to enrol and graduate higher numbers of STEM students than are required by STEM occupations. With regard to teachers, there were specific mismatches, particularly in the area of secondary school Mathematics and Science teachers and ECD professionals. At the technician level, there appears to be an under-supply of engineering technicians and associate professionals, as well as building and construction, metal, machinery, and related trades. The evidence points to a mismatch that can be addressed by increasing the supply of jobs.

Finally, regarding the qualification-job mismatches, three issues need to be highlighted with regard to which sectors and occupations tertiary level graduates enter. Firstly, Higher Education graduates tended to be employed in high-skilled occupations as managers, professionals, and technicians and associate professionals. In the case of those with TVET qualifications, it is a surprise to see that only a minority worked as technicians and associate professionals. Secondly, nearly half of the Higher Education graduates are employed in the Community, Social and Personal Services sector. Thirdly, a high proportion of the Science and Engineering graduates, from both higher and technical vocation education sectors, prefer to work in the Financial Services sector, as opposed to the Manufacturing sector. This raises uncertainty about the use of skills resources, and about whether or not more career guidance and an understanding of the nature of workplaces are required to match qualifications and occupations more closely.

CHAPTER 7

SKILLS SUPPLY AND DEMAND: KEY FINDINGS AND RECOMMENDATIONS

The findings from the analysis of skills supply and demand and the interaction of supply and demand signals provide skills planners with signals for credible skills planning. The argument has been made that we need contextually appropriate models for skills planning that take into account the challenges of economic growth and inclusive development in South Africa. Given the multiple development pathways confronting South Africa, skills planning is not only about matching supply and demand in the formal private and public sector more effectively (which is a difficult task in and of itself, given the data challenges in SA), but also about taking into account past structural inequalities on the basis of race, gender and spatial location. The skills planning focus is not only for a small number of skilled people in the workplace, but also on the unemployed, the youth, low-skilled people, the marginalised, and those in vulnerable forms of employment, including people who work for themselves. At the heart of the response is the need to deliver skills that respond to the current and future economic trajectory being followed by South Africa (and not only the critical or scarce skills that are targeted at a minority of the country's population).

The policy reform agenda must consider how to respond to skills demands and mismatches for different groups; initiate wider reforms in the education and training system; raise demand to support employment growth; raise skill levels in targeted sectors of the economy; as well as respond to the development trajectory being followed by South Africa. This includes a formal sector with a large number of semi-skilled and low-skilled jobs, and a smaller number of high-skilled jobs. The number of people without work is increasing, especially the youth, for whom education and skills development as well as creation of jobs which match their skill level are priorities. The dilemma facing policy makers is how to respond to these diverse sets of development pathways, and deciding how resources should be targeted for skills development. These imperatives may seem paradoxical, but all are essential for more inclusive growth and development.

This chapter begins with a summary of key skills supply and demand issues facing South Africa and then presents key recommendations for skills planning, followed by specific recommendations to follow a more inclusive approach to skills development.

KEY TRENDS IN SKILLS SUPPLY AND DEMAND IN SOUTH AFRICA

We documented the state of the economy, described the characteristics of the employed and unemployed who make up the labour force, examined changes in the structure of the economy to provide signals on the nature and extent of skills in demand. This was followed by an analysis of the supply and potential supply of skills resulting from formal education, universities and the Technical Vocational Education and Training (TVET) colleges system. Thereafter, we examined the interaction between skills supply and demand to understand mismatches in the shape of the economy, in the educational skills produced and about the labour market destinations of those with post-school qualifications.

What have we learnt?

Since 1994, the South African economy has been characterised by low growth rates, persistent high unemployment rates and rising inequality

This has led to dire outcomes in the labour market. Employment growth has not been sufficient to absorb a rapidly growing labour force, with the result being an inordinately high and noticeably inertial unemployment rate. A further constraint to sustainable job creation in South Africa is the structural mismatch between labour demand and supply. The post-apartheid economy has delivered an economy characterised by an eroding primary sector, and a weak and un-dynamic Manufacturing sector; growth has instead been built on large capital-intensive industries, and a rapidly growing Services sector. Economic growth, while low, has favoured high-skilled workers, despite the fact that the majority of those in employment and the unemployed population are semi-skilled or low-skilled. The failure to grow the Agriculture and, in particular, the Manufacturing sector, has therefore resulted in an economy starved of low-skill, low-wage jobs. Into this breach has stepped a public sector, with the unintended consequence that it has become a key node of employment generation in the South African economy. This pattern of growth and its attendant employment outcomes are neither desirable nor sustainable.

South Africa has a high and growing level of unemployment, especially among the youth

The South African labour force is made up of 15 million employed and 7.5 million unemployed people. The most recent data shows 87% of unemployed people are from the African population group, 60% of the unemployed have less than a grade 12 certificate, and 45% are between the ages of 15 and 34 years. The rate of growth of the working-age population is twice the rate of growth of new entrants to the labour market. This has especially impacted the youth, and is partly magnified by new entrants (with less than a completed secondary education) coming into the labour market. Unemployment presents a major social and skills challenge.

The level of education in South Africa is lower than in most economically productive countries

Since 1994, access has expanded in the basic and post-school education and training levels. Now, the challenge facing the education and training system is completion levels and

quality outcomes. By all achievement measures, the quality of basic education, although slowly improving, is still low, and the challenge to raise the levels of literacy and numeracy remains. This is a major concern considering that even in an economy based on a low-skill trajectory, a workforce that has completed its school-leaving certificates and gained basic numeracy and literacy skills is required. While South Africa has improved its educational outcomes in the last decade, the pace of this improvement is not commensurate with the level of investments made by both the state and private sector for education.

Poor-quality outcomes in the schooling system create significant problems for those entering TVET colleges and universities. Within both these sectors there have been improvements to access, with enrolment levels expanding across all subject areas. TVET sector enrolments have grown much faster than the University sector, and TVET completers could provide a useful skill sets to support economic growth. However, the completion rates at both universities and TVET colleges are low. This is exacerbated for Science and Engineering degrees and diplomas, as well as the professional Commerce degrees, qualifications which are key for economic development. The low number of school completers with high-quality passes and the poor completion rates of those who register for tertiary qualifications lead to a low supply of skilled tertiary education completers to the labour market.

In addition to the poor levels of educational outcomes from the school and post-school sectors, the education level of the present working-age population is also low. One fifth of the employed have a tertiary qualification. For a competitive economy, South Africa must raise the educational level of the workforce.

Presently, around 140 000 grade 12 students complete the matriculation examination with a bachelor's pass, and of these around 50 000 students pass Mathematics with a score higher than 50%. This forms a relatively small pool of students who can potentially access university and Science-based TVET programmes, in comparison to the skill demands in the country.

In 2014, there were around 1.2 million students in the University sector and 0.8 million students in the TVET sector. By all accounts, significant proportions of students do not progress successfully through their courses and programmes. The low progression and success rates mean that there is an even smaller pool of graduates to form the future highly skilled workforce.

Of the labour force, close to half of the employed (7.25 million) and 60% of the unemployed (4.5 million) do not have a grade 12 (matric) certificate. This means that 11.75 million of the labour force have less than a grade 12 certificate. This represents a large portion of the population who could benefit from education and training programmes. In 2014, only 1.6% of the unemployed participated in SETA-supported learning programmes.

From our analysis we identified three types of mismatches related to skills and the economy.

Skills mismatch refers to various types of imbalances between skills offered and skills needed in the world of work. For South Africa we categorised mismatches into three types: demand mismatch. educational-supply mismatch and qualifications-job mismatch. *Demand mismatch* examines the shape and trajectory of the economy, the types of jobs that are being created, and the skills set and expectations of the working-age population. *Educational supply mismatch* examines how supply responds to areas of skills demand. *Qualification-job mismatch* examines the qualification gaps for skilled jobs and then traces the sectors and occupations that the educational qualifications are absorbed into.

At the *demand level,* as referred to earlier, there is a structural mismatch between labour demand and supply, in that the South African economy and labour market is characterised as one where there is a demand for high skill, but a surplus of low-skilled workers.

The implication from the *education supply mismatch* is the need to enrol and graduate higher numbers of STEM graduates at both universities and TVET colleges. Further, there is a need for more higher enrolments and completions in the building and construction, metal, machinery and related trades programmes.

The *qualification-job mismatch* reveals that there is a qualification gap in that less than half of managers, senior officials, technicians and associate professionals had a tertiary level qualification. Secondly, the evidence highlights the sectors and occupations workers with tertiary qualifications enter. The Higher Education graduates tended to be employed in the high-skilled occupations as managers, professionals, and technicians and associate professionals. In the case of those with TVET qualifications, it is a surprise to see that only a minority worked as technicians and associate professionals. Nearly half of the Higher Education graduates are employed in the community, Social and Personal Services sector, which is dominated by the public sector. A high proportion of the Science and Engineering graduates, from both higher and technical vocational education sectors, prefer to work in the financial services sector, as opposed to the manufacturing sector.

A structural mismatch between labour demand and supply is the most significant type in the South African context, in that the economy and labour market show a demand for high skilled workers, but there is a surplus of low-skilled workers.

Progress on race and gender transformation

The shares of African and female workers in the workforce have been increasing, but African females are still the most disadvantaged group. With the present data we cannot, with confidence, comment about shifts in participation by race and gender at the occupational level.

The levels of education of the workforce, especially for the African population, have been increasing. The enrolment and graduations, by population group, at both universities and TVET colleges has been increasing and is now closer to South Africa's demographic profile.

From 2010 to 2014 shares of female students in both the University and TVET sectors increased, and recently surpassed the shares of male enrolments. However, an analysis of university completers shows that qualification differences support gender stereotypes in the literature, in that males are likely to study for the so-called masculine science, technology, and engineering-based subjects, whereas females are focused on so-called feminine subjects, such as health, education, and social sciences. Thus a reformed skills policy must focus on re-ordering this gender bias in higher educational outcomes.

Improving data for an accurate picture of supply and demand for informed skills planning

The analysis of skills supply and demand requires appropriate and credible data. The key data sources used in this report are the StatsSA Quarterly Labour Force Survey (QLFS) and Labour Market Dynamics data, as well as the Higher Education Management Information Systems data (data for the Higher Education system is more reliable than data for the TVET sector). We recognise that these datasets are being updated and our findings must be interpreted in that context.

For scientifically credible and reliable estimates we were only able to report on occupations at the 2-digit level for certain years. It should be noted that, in our estimations of the employed and signals of shortages in sectors and occupations, we have not factored in vacancies. Thus our analysis may give an incomplete and, in some instances, may not provide a comprehensive picture of skills demand.

South Africa does not as yet have a credible enterprise survey, which creates a major data gap. A credible enterprise survey could have provided richer information about employees and the types of workplace training that occur. Other key labour market data that is essential for skills planning is student tracking and destination studies, and skills requirements for both private sector expansion and government growth plans.

KEY RECOMMENDATIONS FOR SKILLS SUPPLY AND DEMAND

Our recommendations are based on an approach to skills planning that takes into account the challenges of economic growth and inclusive development in South Africa. The skills planning focus is not only on a small number of skilled people in the workplace, but also on the unemployed, the youth, low-skilled people, the marginalised, and those in vulnerable forms of employment, including the self-employed. The dilemma facing policy makers is how to respond to these diverse sets of development and occupational pathways, and decide how resources should be targeted for inclusive skills development. These imperatives may seem paradoxical, but all are essential to achieve a more inclusive growth and development trajectory.

We make five key recommendations.

CHALLENGES FOR ECONOMIC GROWTH AND DEVELOPMENT

Recognising that the South African jobs and skills history profile is different from the East Asian or European contexts, the economy must respond to the twin challenge of participating in a globally competitive environment, which requires a high skills base and a local economy that creates low-wage jobs (with supported training) to absorb the large numbers of persons who are unemployed or in vulnerable jobs.

The economy should start moving towards more labour-intensive forms of growth in order to absorb the growing numbers of people, particularly young people, entering the labour market in search of jobs. This will require significant changes to both industrial policy and the development pathways being pursued by the country.

STRONGER CO-ORDINATION BETWEEN GROWTH AND INDUSTRIAL POLICIES AND SKILLS POLICIES

More government co-ordination is needed, including stronger integration of government departments' growth strategies and strategies targeting skills development and education. Currently there are many national and provincial-level strategies that aim to promote local economic development and deal with unemployment. These growth plans take into account skills requirements, or they will likely experience difficulties in implementation. Therefore, government departments must realistically estimate the skills needed for the implementation of the strategy and plan their human resource strategy in advance.

IMPROVED LEVELS OF EDUCATION AND SKILLS

The Education and Training sector has a triple responsibility: To improve the levels of education of the population, to improve the skills sets of the youth, to increase supply in areas identified as in demand for the present and future economy and to support inclusive growth. We recommend the following regarding education and skills.

- Improve the quality of basic education. The key constraint to higher levels of education is the quality of basic education, especially in the Numeracy/Mathematics and Literacy/Languages areas. The Department of Basic Education must improve the quality of educational experiences leading to improved educational outcomes.
- At the professional level there is a demand for STEM graduates. STEM graduates are needed for management occupations, engineering professions, medical professions, as well as for teaching

professions. It is clear that STEM graduates have a set of versatile skills and therefore they can, and do, work in different sectors. The implication for education and training is that there is a need to enrol and graduate higher numbers of STEM graduates than are required by current levels of STEM occupations. We must increase the number of teachers particularly in the area of secondary school Mathematics and Science teachers as well as ECD professionals.

- For managers, there is a need to increase the supply of graduates in certain technical subjects. These graduates should then be supported by improved professional workplace experience and mentorships to gain management skills.
- At the technician level, there is an under-supply of engineering technicians and associate professionals, as well as building and construction, metal, machinery, electronic and electrical and related trades.
- With high levels of youth unemployment, the majority having either incomplete or completed secondary education, there is a strong argument to prioritise appropriate skills training for this group. The SETAs are mandated to play a key role in this process, especially for those who have minimal skills and face difficulties gaining employment.
- The National Plan for Higher Education targets and fundings should be reviewed to increase the shares of SET enrolments in university courses from the present 30% to 35%, especially in the areas of Engineering and Health Professions.
- The TVET sector must develop enrolment targets in line with skills needed for the labour market, and we recommend a target of 45% for NCV4 and NATED6 (N6) Engineering courses.

IMPROVED MATCH BETWEEN FIELD OF STUDY AND LABOUR MARKET DESTINATION

Over half of the country's graduates enter the Community and Social Services sector, which is dominated by the public sector. These positions offer graduates a relatively good salary, job security and other social benefits, such as healthcare and pensions. Unfortunately, this is distorting the labour market and not attracting graduates to the private sector labour market. Globally, the private sector is a key generator of jobs and growth, and the South African private sector must review its human resource strategies to attract more graduates to the sector.

IMPROVE THE EVIDENCE BASE FOR FUTURE REPORTS

The Department of Higher Education and Training must work closely with Statistics South Africa and the other relevant government departments to collect data for skills planning using their administrative data sets. This can be accomplished by participating and engaging in the National Statistics System (NSS) of StatsSA. Going forward, data on vacancies, immigration and emigration (including data about educational levels, employment sectors and occupations) must be included in future reports. A credible enterprise survey could have provided richer information about employees and the types of workplace training that occurs. Other key labour market data that is essential for skills planning is student tracking and destination studies, and skills requirements for both private sector expansion and government growth plans. Future reports must furthermore include skills forecasting models based on contextually appropriate methodologies.

SPECIFIC RECOMMENDATIONS FOR THE EDUCATION AND TRAINING SECTOR

IMPROVED EDUCATION AND SKILLS LEVELS OF THE POPULATION

- *Improve the quality of basic education.* The key constraint to higher levels of education is the quality of basic education, especially in the Numeracy/Mathematics and Literacy/Languages areas. The Department of Basic Education must improve the quality of educational experiences leading to improved educational outcomes.

The education supply mismatch currently experienced highlights the need to enrol and graduate higher numbers of STEM graduates from both universities and TVET colleges.

- *Expand the provision of Community Education and Training (CET) college programmes:* We should increase the education level of the population so that higher levels of the population achieve NQF level 4 qualification. Given the high numbers of the employed and unemployed with a less than NQF level 4 qualifications, these groups must be targeted to have their skills upgraded through CET programmes.
- *Enhance the capacity of CET colleges to deliver basic skills training linked to the labour market:* A national policy for community colleges was developed in 2014. However, many community colleges do not have effective capacity or staff to deliver effective basic skills training. An initiative for improving the capacity of teachers to deliver the CET college programmes must be fast-tracked, and appropriate learning materials developed, including innovative mechanisms for delivery. This must be supported with improved planning at CET colleges so that basic skills training is more closely aligned to the local economic situation.

EDUCATION AND QUALIFICATION LEVELS TO SUPPORT HIGH-SKILLED OCCUPATIONS

- *Enrolment targets for STEM areas must be raised:* There is a growing demand for higher-level skilled workers. Specific growth is being experienced in the STEM level occupations. These graduates are vital for innovation and technical

advancement. Our recommendation is that enrolment levels for STEM subjects at universities should be expanded. Currently, enrolment level targets at universities are set at 30% for STEM-based subjects and 40% for Humanities. We recommend a change in the funding formula to 35% for the STEM category of subjects, 35% for Humanities and 30% for the Business and Management category.

- *Expand enrolment levels for certain education professionals:* Evidence highlights that demand for education professionals in particular subject areas is increasing. This has been driven by two factors: present shortages in the education system; and the numbers of those expected to retire over the next five years. Specific occupations that need to be developed include ECD experts, Science teachers, and secondary school teachers. According to the available evidence, 20 000 school teachers need to be trained each year to meet current and future demand.

Qualification-job mismatch revealed that nearly half of the higher education graduates are employed in the Community, Social and Personal Services sector and a high proportion of the Science and Engineering graduates, from both higher and technical vocational education sectors, prefer to work in the Financial Services sector, as opposed to the manufacturing sector.

The Funza Lushaka programme that supports students registered to become teachers must continue and be expanded for specific subject disciplines.

- *Management programmes at the Higher Education level should target technical areas and encompass a workplace development component:* Demand for managers is increasing and is especially high for the following areas: production and services, administrative and commercial managers, health, hospitality, retail, health and safety. Management programmes at universities should be designed for these technical areas and not only generic management or business degree programmes. However, effective managers in these areas cannot be developed through degree-level programmes alone. There is a need for continual development and mentorship within the workplace for specific managers. This should be facilitated by SETAs and involve improved engagement between universities and employers in priority service sectors.
- *Upgrade the skills of existing managers through customised programmes involving TVET colleges:* Managers have been one of the highest growing occupational areas over the past four years. They are vital for improving the effectiveness and performance of organisations in the public and private sectors. Currently, only around 45% of managers have a tertiary level qualification. This is low by international standards and needs to be raised. SETAs can play a key role in bringing employers and TVET colleges together to develop continuous, accredited professional development programmes for managers in the workplace.
- *Establish attainment targets for technicians to obtain tertiary level qualifications:* Outside of managers, one of the highest areas of demand is for technician and associate professionals. In the past, this group was regarded as semi-skilled, but in the global context they are recognised as skilled workers. Unfortunately, in South Africa only 44% of technicians have a tertiary level qualification. This is low by international standards and attainment targets must be established for these workers to obtain tertiary level qualifications.

EDUCATION AND QUALIFICATION LEVELS TO SUPPORT SEMI-SKILLED OCCUPATIONS

- *Raise the qualification level of programmes delivered by TVET colleges:* At present only 40% of enrolments at TVET colleges are for programmes leading to NQF level 5 and 6 qualifications. This number is low, and reflects that many colleges are attempting to redress the failures of the formal school system. While this effort is commendable, emphasis within the tertiary education system should also be on raising qualification levels to beyond NQF level 4.
- *Develop targets for the technical subjects studied at intermediate level:* The data for 2014 shows that at NQF level 4, only 35% of students are enrolled in Engineering programmes. The majority is enrolled in either Business (46%) or service-level programmes. At NQF level 6, a lower amount (28%) of students were enrolled in Engineering programmes for 2014. Programmes leading to technician level qualifications should be tailored more towards technical subjects, and hence enrolment targets need to be set by DHET. We suggest that 45% of the TVET enrolments should be in Science and Engineering programmes.
- *Improve pass rates for technical subjects studied at the intermediate skill qualification level:* Available evidence suggests that there is much wastage occurring in the training of people at an intermediate level. On average, around 60% of students fail to complete their programmes and obtain a qualification. The failure rate for those in N6 Engineering programmes is around 50%. Attention must be given as to why the failure rate is so high and how it can be adjusted, especially for technical-based subjects.

- *Improve the placement of those with TVET qualifications into technician positions:* Currently, only a minority of those with TVET qualifications enter technician jobs. The evidence shows that only 17% of those with a TVET qualification work as technicians, and 18% as clerical workers. A better match must be achieved between those studying for a TVET-based qualification and the proportion entering technician positions. SETAs must play an improved role in linking colleges with potential employers, and facilitating TVET graduates into technician positions.
- *SETAs must play a more active role in supporting the development of intermediate skills:* Currently, there are around 7.5 million workers and 4.8 million unemployed persons in the labour market with less than a grade 12 qualification. This group is in urgent need of upskilling and represents the bulk of the workforce that could benefit from training. In 2014, SETAs only supported 77 000 workers and the unemployed through learnerships. This represents a very small percentage of the total workforce who could benefit from training. SETAs must work more effectively with education and training providers and employers to deliver this training. The recent White Paper on post-school education and training identified this as a new priority role for SETAs.

EDUCATION AND QUALIFICATION LEVELS TO SUPPORT TRADE OCCUPATIONS

- *Introduce the workforce with under grade 12 qualifications to trade occupations:* Some signals highlighted the demand for trade workers, particularly for building and trade-related workers, metal, machinery and related trades, and electrical and electronic trades. At the same time, there is a significant number of people with under grade 12 qualifications, both in the workplace and that are unemployed. This target group should be directed into trade occupations, as these skills can be developed in a shorter period of time. The responsible party for directing people into such training and occupations is SETAs.
- *Increase the share of government funds to trade-related skills by formal accredited providers:* Currently a higher number of short-term occupationally directed training is provided by private FET colleges. The SETAs must make funds available to support provision and regulation of this training, either directed through public TVET colleges or through competition among private providers.
- *Facilitate the expansion of on-the-job training for trade occupations:* Many government interventions and public resources have supported on-the-job training, but this tends to focus on higher-level skills, leading to qualifications above grade 12 (and not trade skills). A significant proportion of the trades can only be developed through on-the-job training, and this must be supported.

CONCLUDING REMARKS

The identification of skills demand and mismatches, and the corresponding policy response, have focused on increasing supply through improved funding to education and training providers and the workplace. For nearly all occupational areas there are structures in place to increase supply.

For certain occupations, our recommendations pointed to the importance of introducing changes to the workplace. The nature of work has changed, and the way workplaces are organised, including human resources strategies, therefore also need to adapt to the needs of our complex economy. But not only that, these strategies should also be aligned to the individual needs and preferences of the labour force. Within the private sector, there is a need to ensure that the appropriate attraction and retention strategies are in place. Many researchers in the skills field have also pointed out that such measures should be accompanied by attempts to raise demand in the workplace, helping companies to improve productivity and support moves up the value chain. These are commendable arguments, but given the existing educational quality problems, emphasis should be on improvements at existing levels before attempting to raise demand.

The skills demands identified in this report have focused on occupations that are in high demand now or will be in the near future. Studies from other countries emphasise the need to focus on the longer term and anticipate the future demand for skills. This would seem like a good idea, but the reality is more complex. It is important to construct appropriate skills forecasting methods and tools and, given the unpredictability of the global and national economies, recognise the limitations associated with these forecasts.

This document is one of the first attempts in South Africa to undertake a comprehensive analysis of the demand and supply of skills, attain understanding about priority areas, and develop corresponding responses. There are a number of shortcomings in this work, but the present research will provide a template for moving forward and undertaking a more detailed analysis in the future. For the next report on Skills Supply and Demand in South Africa, we need to re-visit Government Gazette No 39319 (The Framework for the Annual Report on Skills Supply and Demand in South Africa), and modify the framework in relation to the conceptual framework and learnings from this report and in relation to available data.

ANNEXURES

APPENDICES AND ADDITIONAL INFORMATION

APPENDIX 1

Examination enrolments and completions in NCV4 programmes in public TVET colleges (2010, 2013, 2014)

	2010		2013		2014		2010	2013	2014
	Number who wrote exams	Number completed	Number who wrote exams	Number completed	Number who wrote exams	Number completed	% completed	% completed	% completed
Civil Engineering, Building and Construction	741	135	1 510	398	1 471	329	18.8	27	22.4
Electrical, Infrastructure and Construction	1 444	433	2 682	778	2 489	595	30.0	29	23.9
Engineering and Related Design	1 419	376	2 533	593	2 368	520	26.5	24	22.0
Information Technology and Computer Studies	603	116	1 227	254	1 041	130	19.2	21	12.5
Mechatronics			191	56	157	49		30	31.2
Process Plant Operations			44	20	33	5		46	15.2
Engineering	**4 207**	**1 060**	**8 187**	**2 099**	**7 559**	**1 628**	**25.2**	**25.6**	**21.5**
Education and Development			431	263	491	288		61	58.7
Hospitality	518	199	1 169	429	1 343	532	38.4	37	39.6
Safety in Society	210	118	789	388	845	336	56.2	50	39.8
Tourism	557	345	1 062	670	1 268	748	61.9	63	59.0
Transport and Logistics					160	49			30.6
Services	**1 285**	**662**	**3 451**	**1 750**	**4 107**	**1 953**	**52**	**51**	**48**
Finance, Economics and Accounting	901	314	1 793	506	1 773	412	34.9	29	23.2
Management	538	219	1 127	499	1 012	447	40.7	45	44.2
Marketing	419	191	1 138	441	1 112	381	45.6	39	34.3
Office Administration	2 226	1 171	5 685	2 664	5 902	2 584	52.6	47	43.8
Business	**4 084**	**1 894**	**9 743**	**4 110**	**9 799**	**3 824**	**46**	**42**	**39**
Primary Agriculture	327	98	549	155	711	219	30	29	30.8
Other	**327**	**98**	**549**	**155**	**711**	**219**	**30**	**29**	**30.8**

Source: HEMIS (2010 to 2014). National Examinations Database (November 2013)

APPENDIX 2

Examination enrolments and completions in NATED6 programmes in public TVET colleges (2010, 2013, 2014)

	2010		2013		2014		2010	2013	2014
	Number who wrote exams	Number completed	Number who wrote exams	Number completed	Number who wrote exams	Number completed	% completed	% completed	% completed
Engineering Studies			18 642	8 611	15 928	7 925		46	49.8
Engineering			**18 642**	**8 611**	**15 928**	**7 925**		**46**	**49.8**
Educare			727	349	1 924	1 310		48	68.1
Hospitality and Catering Services			514	154	1 010	455		30	45.0
Public Relations			603	132	892	220		22	24.7
Tourism			382	151	802	382		40	47.6
Services			**2 226**	**786**	**4 628**	**2 367**		**35**	**57**
Financial Management			4 118	1 131	6 820	2 910		27	42.7
Marketing Management			2 343	496	3 902	1 443		21	37.0
Public Management			1 630	554	2 599	1 046		34	40.2
Human Resources Management			5 485	1 393	8 698	3 503		25	40.3
Business Management			4 900	877	8 356	2 388		18	28.6
Farming Management			110	29	233	76		26	32.6
Legal Secretary			5	1	8	3		25	37.5
Management Assistant			3 131	1 256	5 437	2 516		40	46.3
Business			**21 722**	**5 737**	**36 053**	**13 886**		**26**	**39**
Art and Design			118	70	244	131		59	53.7
Clothing Production			92	43	126	70		47	55.6
Popular Music: Performance			23	12	16	6		50	37.5
Popular Music: Studio Work			18	9	19	12		50	63.2
Other			**251**	**134**	**405**	**219**			

Source: HEMIS (2010 to 2014). National Examinations Database (November 2013)

APPENDIX 3

Total enrolment in universities by type of CESM field of study 2010 to 2014

	NUMBERS					SHARES				
CESM FIELDS	**2010**	**2011**	**2012**	**2013**	**2014**	**2010**	**2011**	**2012**	**2013**	**2014**
BUSINESS. ECONOMICS AND MANAGEMENT STUDIES	**278 843**	**288 487**	**282 299**	**279 954**	**272 409**	**31.2**	**30.8**	**29.6**	**28.5**	**28.1**
SCIENCE, ENGINEERING AND TECHNOLOGY	**251 334**	**264 447**	**273 279**	**283 622**	**287 221**	**28.0**	**28.0**	**28.0**	**29.0**	**29.6**
Science	**129 545**	**135 826**	**140 517**	**146 325**	**158 742**	**14.5**	**14.4**	**14.7**	**14.9**	**16.3**
Agriculture, Agricultural Operations and Related Sciences	14 514	16 915	18 110	18 277	28 787	1.6	1.8	1.9	1.9	1.9
Architecture and the Built Environment	11 624	10 804	11 022	11 141	11 262	1.3	1.2	1.2	1.1	1.2
Computer and Information Sciences	38 075	36 891	39 369	40 871	40 613	4.3	3.9	4.1	4.2	4.2
Family Ecology and Consumer Sciences	2 641	2 967	3 120	3 384	3 390	0.3	0.3	0.3	0.3	0.3
Life Sciences	22 044	22 093	24 700	26 087	27 683	2.5	2.4	2.6	2.7	2.9
Physical Sciences	24 769	24 752	27 846	28 948	30 165	2.8	2.6	2.9	2.9	3.1
Mathematics and Statistics	15 835	21 359	16 331	17 525	16 839	1.8	2.3	1.7	1.8	1.7
Military Sciences	43	45	19	92	3	0.0	0.0	0.0	0.0	0.0
Engineering	71 172	77 150	78 128	81 336	82 433	8.0	8.2	8.2	8.3	8.5
Health and Related Clinical Sciences	50 614	51 468	54 635	55 962	56 074	5.7	5.5	5.7	5.7	5.8
HUMANITIES	**362 749**	**385 266**	**397 792**	**420 122**	**409 525**	**41**	**41**	**42**	**43**	**42.3**
Visual and Performing Arts	12 669	13 571	13 375	13 510	13 573	1.4	1.4	1.4	1.4	1.4
Education	145 413	164 939	168 608	172 991	166 099	16.3	17.6	17.7	17.6	17.1
Other Humanities and Social Sciences	204 662	206 739	215 797	233 622	229 853	22.9	22.0	22.6	23.7	23.7
Communication, Journalism and Related Studies	21 628	21 591	20 765	22 452	21 393	2.4	2.3	2.2	2.3	2.2
Languages, Linguistics and Literature	24 109	18 594	18 971	21 587	21 910	2.7	2.0	2.0	2.2	2.3
Law	47 084	49 577	51 923	55 489	56 723	5.3	5.3	5.4	5.6	5.9
Philosophy, Religion and Theology	5 835	5 842	6 183	6 722	6 709	0.7	0.6	0.7	0.6	0.7
Psychology	33 601	31 110	29 788	33 927	32 465	3.8	3.3	3.1	3.4	3.3
Public Management and Services	30 663	31 443	33 750	34 878	33 152	3.8	3.4	3.5	3.5	3.4
Social Sciences	41 742	48 582	54 417	58 567	57 501	5.0	5.0	6.0	6.0	5.9
Total	**892 936**	**938 201**	**953 373**	**983 698**	**969 155**	**100**	**100**	**100**	**100**	**100**

Source: HEMIS (2010 to 2014)

APPENDIX 4

Number and shares of students who fulfilled the requirements for a degree or diploma per CESM field of study, 2010 to 2014

	NUMBERS					SHARES				
CESM FIELD OF STUDY	**2010**	**2011**	**2012**	**2013**	**2014**	**2010**	**2011**	**2012**	**2013**	**2014**
BUSINESS. ECONOMICS AND MANAGEMENT STUDIES	41 657	44 155	46 044	49 051	50381	27.2	27.5	27.7	27.1	27.2
SCIENCE, ENGINEERING AND TECHNOLOGY	42760	46100	48848	53 176	55 574	27.9	28.7	29.4	29.4	30.0
Science	**21 356**	**23 282**	**25 196**	**27 525**	**28 931**	**14.0**	**14.5**	**15.1**	**15.2**	**15.6**
Agriculture, Agricultural Operations and Related Sciences	2 580	3 029	3 320	3 703	3 878	1.7	1.9	2.0	2.0	2.1
Architecture and the Built Environment	2 907	3 106	3 055	3 172	3 226	1.9	1.9	1.8	1.8	1.7
Computer and Information Sciences	4 756	5 145	5 887	6 564	6 796	3.1	3.2	3.5	3.6	3.7
Family Ecology and Consumer Sciences	479	543	554	637	699	0.3	0.3	0.3	0.4	0.4
Life Sciences	4 405	4 583	5 272	5 731	6 070	2.9	2.9	3.2	3.2	3.3
Physical Sciences	4 188	4 428	4 939	5 223	5 749	2.7	2.8	3.0	2.9	3.1
Mathematics and Statistics	2 036	2 436	2 162	2 492	2 512	1.3	1.5	1.3	1.4	1.4
Military Sciences	5	12	7	3	1	0.0	0.0	0.0	0.0	0.0
Engineering	10 200	11 084	11 696	13 284	14 077	6.7	6.9	7.0	7.3	7.6
Health	11 201	11 733	11 958	12 368	12 567	7.3	7.3	7.2	6.8	6.8
HUMANITIES	**68 908**	**70363**	**71096**	**78 596**	**79420**	**44.9**	**43.8**	**42.8**	**43.5**	**42.8**
Arts	2 867	2 908	3 154	3 042	3 098	1.9	1.8	1.9	1.7	1.7
Education	37 892	37879	35478	38 212	37076	24.7	23.6	21.4	21.1	20.0
Other Humanities and Social Sciences	28 149	29 574	32 463	37 342	39 247	18.4	18.1	19.6	20.7	21.2
Communication, Journalism and Related Studies	2 983	3 244	3 557	3 916	4 038	1.9	2.0	2.0	2.2	2.2
Languages, Linguistics and Literature	2 523	2 795	3 121	3 654	3 595	1.6	1.7	1.9	2.0	1.9
Law	5 290	5 560	5 989	6 721	7 270	3.5	3.5	3.6	3.7	3.9
Philosophy, Religion and Theology	1 201	1 219	1 297	1 349	1 341	0.8	0.8	0.8	0.7	0.7
Psychology	5 259	5 235	5 654	6 756	6 853	3.4	3.3	3.4	3.7	3.7
Public Management and Services	4 619	5 205	5 623	6 327	6 369	3.0	3.2	3.4	3.5	3.4
Social Sciences	6 274	6 316	7 224	8 620	9 781	4.1	3.9	4.4	4.8	5.3
Total	**153325**	**160623**	**165986**	**180 823**	**185385**	**100**	**100**	**100**	**100**	**100**

Source: Author's calculations from HEMIS (2010 to 2014)

APPENDIX 5

Skills requirements from major national, provincial and metropolitan development strategies

Policy document	Type of skills required	Skills category	Skills requirements
City of Cape Town Poverty Alleviation and Reduction Policy	Skills relevant to the Expanded Public Works Programme (EPWP)	Low	Unspecified
Department of Rural Development and Land Reform Strategic Plan 2015 – 2020	Geomatics and spatial planning skills	High	Unspecified
Department of Trade and Industry Strategic Plan	Unspecified	Unspecified	Unspecified
Eastern Cape Vision 2030 Provincial Development Plan	Agriculture, manufacturing, construction, tourism, social economy, knowledge-based services	High, medium, low	113 000 jobs in agriculture 166 000 in manufacturing 149 000 in construction 130 000 in tourism 70 000 in social economy employment 140 000 in knowledge-based services
eThekwini Economic Development and Job Creation Strategy	Construction, engineering	Low, high	Unspecified
eThekwini Integrated Development Plan (IDP)	Unspecified	Unspecified	Unspecified
Gauteng Province Department of Economic Development Strategic Plan	Unspecified	Unspecified	Unspecified
Human Resource Development Strategy for South Africa (HRD-SA) 2010 to 2030	Design, engineering and artisanship, particularly skills critical to the manufacturing, construction and cultural industries	High	Unspecified
Industrial Policy Action Plan	Technical and high-level design skills for manufacturing Skills across the plastics value chain, Broad-based skills within the saw-milling industry	High, medium, low	Unspecified
Innovation Towards a Knowledge-Based Economy, Ten-Year Plan for South Africa (2008 to 2018)	Science, engineering and technology	High	3 000 SET PhDs graduated in South Africa per year
Jo'burg 2040 Growth and Development Strategy	Unspecified	Unspecified	Unspecified
KwaZulu-Natal Provincial Growth and Development Strategy	Business management, finance and entrepreneurship for SMEs	Low	Unspecified
Limpopo Development Plan 2015 to 2019	Engineering, healthcare, social development, research and development	High	Unspecified
Medium-Term Strategic Framework	Artisans PhD graduates Engineering science human and animal health Natural and physical sciences Teacher graduates	Medium High High High Medium	18 110 in 2013 to 24 000 per annum by 2019 from 1 870 per year in 2013 to 2 400 per year by 2019 57 000 over the five-year period – 9 974 were produced in 2012 (45 000 over the five-year period – 8 015 were produced in 2012) 36 000 over the five-year period – 6 366 were produced in 2012 20 000 by 2019, an increase from 13 740 in 2012
National Department of Tourism Strategic Plan	Unspecified	Unspecified	Unspecified

Policy document	Type of skills required	Skills category	Skills requirements
National Development Plan	Labour-intensive services and industry	Predominantly low, but also some medium and high skills	5.9 million jobs by 2020 and 11 million jobs by 2030
National Skills Development Strategy III	Unspecified	Unspecified	Unspecified
New Growth Path	Positions within the manufacturing industry. Otherwise unspecified. Some demand in the services sector for finance, public administration, and business management skills	High, medium, low	330 000 low skilled 860 000 medium skilled 13 000 highly skilled openings
North West Provincial Development Plan	Advanced agricultural	Unspecified	Unspecified
South African National Infrastructure Plan	Job creation in construction, supply and productive sectors. Skills demand in engineering, planning, architecture, and public administration	Low, high, medium	Shortages in 90 OFO occupations, 35 of which were in the SET fields: five were in management, 30 for professions, 14 for technician and associate professionals, two for services and clerical, 16 for trades workers, seven for plant or machine operators, 16 for elementary workers
South African Tourism Strategic Plan	Unspecified	Unspecified	Unspecified
Support for Astronomy and the SKA Facility	Job creation at the SKA facility in the capacity of planning, construction, installation of technical equipment, software development, maintenance, and astronomical research	High	Unspecified
Tourism Development Framework for the City of Cape Town	Tourism, SME management	Unspecified	Unspecified
Tshwane Vision 2055	Unspecified	Unspecified	Unspecified
Western Cape Government Provincial Strategic Plan	Agri-processing skills, engineering and technical skills for oil and gas exploitation	High, medium and low for agri-processing, high for oil and gas	100 000 jobs across all skill levels in agri-processing 60 000 high skill jobs in oil and gas exploration
Youth Enterprise Development Strategy	Entrepreneurial skills, business management	Medium, low	Unspecified

APPENDIX 6

Number of occupations in demand for the implementation of the strategic integrated projects (SIPs)

Major OFO	Number of occupations in total	Number of skills in total	Number of scarce occupations	Number of scarce skills total	Possible shortage
1: Managers	33	16 799	5	14 486	1 100
2: Professionals	57	19 917	30	15 697	5 300
3: Technicians and associate professionals	45	26 433	14	14 804	3 300
4: Clerical and support workers	16	7 611	2	5 370	450
5: Service and sales workers	5	1 353	0	0	0
6: Trades	51	62 642	16	32 254	7 250
7: Plant and machine operators	20	28 654	7	15 368	1 250
8: Elementary occupations	22	41 919	16	3 400	6 400
Total	**249**	**205 329**	**90**	**101 379**	**25 050**

Source: DHET (2015b) Skills for and through SIPs

GLOSSARY OF TERMS

Term	Definition
Artisanal learning programme	Includes an apprenticeship, learnership, internship, cadetship or other programme undertaken at the workplace.
Bachelor pass	A specific matriculation pass category which qualifies a learner who has completed the National Senior Certificate examination to enter a bachelor degree at a university.
Certification	Formal recognition of a qualification or part qualification awarded to a successful learner.
Classification of Educational Subject Matter (CESM)	The Classification of Educational Subject Matter (CESM) defines the basis used in the Higher Education Management Information System (HEMIS) and each institution's instruction and research activities must be related to it. CESM categories provide a single, coherent system for classifying subject matter regardless of the level of instruction, type of institution, or source of support.
Completers	Individuals who successfully completed a qualification including certificates, diplomas, courses, programmes or degrees.
Completion rate	Refers to a percentage of a given student intake, or cohort, that graduates.
Discouraged work seekers	Person without work, who wants to work but has not taken active steps to seek work in the reference period.
Documented immigrants	A citizen of another country who enters the country with a view to residing permanently, and has been granted or has applied for permanent residence of that country.
Economically active	Persons of working age who are available for work, and are either employed or unemployed but have taken active steps to find work in the reference period.
Economically inactive	People who are not available for work, such as full-time scholars and students, full-time homemakers, those who are retired and those who are unable or unwilling to work.
Economy	A large set of inter-related production and consumption activities that aid in determining how scarce resources are allocated. It encompasses all activities related to production, consumption and trade of goods and services in an area.
Employed	People aged between 15 and 64 years who, during the reference week, did any work for at least one hour, or had a job or business but were not at work (i.e. were temporarily absent).
Gender	Social distinction between males and females.
Graduate	In the current report refers to a student who has satisfied all the requirements of a degree for which he/she was registered.
Graduation rates	Graduation rates are calculated by dividing the total number of qualifications awarded at an institution by the total number of students enrolled in that year.
Gross domestic product	The value of a country's overall output of goods and services (typically during one fiscal year) at market prices, excluding net income from abroad. GDP can be estimated in three ways: expenditure basis: how much money was spent; output basis: how many goods and services were sold; and income basis: how much income (profit) was earned.
Gross enrolment ratio	Ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.
Higher education	Is used to refer to the education that normally takes place in universities and other higher education institutions, both public and private, which offer qualifications on the Higher Education Qualifications Framework (HEQF).
Job deficit	A gap between the working age population and the employed population.
Labour force	All employed and unemployed persons of working age (excluding not economically active persons).
Labour market	All persons aged 15 to 64 years who are employed, unemployed and not economically active (inactive).
Labour/employment Absorption Rate	Refers to the proportion of the working-age population that is employed.
Learner	Any person receiving basic education or who is obliged to receive education in terms of the South African Schools Act, 1996. The current report also refers to a learner as a person receiving education or training in a learnership, apprenticeship and internship

Term	Definition
Learnership	Refers to a learning programme that leads to an occupational qualification or part-qualification and includes an apprenticeship and cadetship.
Learning programme	A structured set of learning offerings and related assessment and attainment requirements.
Low skilled occupations	Refers to elementary and domestic work.
Main occupations (OFO) classification	Refers to the one digit level code of an occupation classified on the Organising Framework of Occupations (OFO). (Note: SASCO classification of occupations as used by StatsSA in the QLFS was recoded to the OFO classification. OFO classification is thus used in the report.)
Major field of study	The subject area(s), according to CESM classification, in which a student may specialise in the final year of study for a degree/diploma/certificate instructional programme.
Matriculation	Refers to completing the final year of high school (grade 12). The matric certificate is received as a qualification on graduating from high school.
Migration	Refers to the movement of people from one country to another.
Occupation	The type of work a person does according to the Organising Framework of Occupations (OFO), irrespective of the industry.
Primary sector	Includes Mining and Quarrying, Agriculture, Forestry and Fishing.
Qualification	Successful completion of a level of education or organised course of study, usually denoted by the acquisition of a certificate, e.g. school-leaving certificate, diploma, degree or professional title.
Secondary sector	Includes Manufacturing, Electricity, Gas and Water (utilities) and Construction.
Sector	A defined portion of social, commercial or educational activities used to prescribe the boundaries of an Education and Training Quality Assurance body (ETQA).
Semi-skilled occupations	Includes clerks, sales, skilled agriculture, craft, and machine operators grouped.
Skill levels	Skill is defined in relation to qualifications. Low skills refer to those qualified at pre-matriculation NQF levels (1-3) or no schooling (less than level 1). Intermediate skill levels are those qualified at NQF levels 4-5 and high skills levels refer to those qualified at NQF levels 6-10.
Skilled occupations	Refers to professionals, managers and technician level occupations grouped.
Skills programmes	Skills programmes refers to a part-qualification as defined in the National Qualifications Framework (NQF) Act, 2008 (Act No. 67 of 2008).
Target growth rate	The target growth rate measures how fast employment would have had to expand in order to provide work for all new entrants to the labour market over a given period.
Tertiary education	Individuals who have obtained an undergraduate or post-graduate degree or have completed secondary school and in addition obtained a certificate or diploma of at least six months' full-time duration.
Tertiary sector	Refers to Trade, Transport, Finance, Community and Social Services, and private households.
Unemployment	Two standard definitions are used, 1) Narrow definition of unemployment: Unemployed persons as individuals aged between 15-64 who a) did not work during the seven days prior to the interview, (b) want to work and are available to start work within a week of the interview, and (c) have taken active steps to look for work or to start some form of self-employment in the four weeks prior to the interview. The broad (or expanded) definition of unemployment does not include criterion (c), and therefore includes discouraged workers.
Unskilled employees	Persons who have not undergone any formal training or of whom no minimum level of education is required.
Vacancies	Available funded positions/posts for immediate filling on the survey reference date and for which recruitment action had been taken.
Workforce	In the current report refers to people who are currently in employment.
Working age population	Comprises everyone aged 15 and above who fall into each of the labour market components (employed, unemployed, not economically active during the reference week).
Youth	Refers to persons aged from 15 to 34 years.

WORKS CITED

AEO (2015) *South Africa 2015*. African Economic Outlook. Available at: http://www.africaneconomicoutlook.org/en/countries

BankSETA (2013) *Banking Sector Skills Plan 2013 to 2014*. Available at: http://www. bankseta.org.za/downloads/Banking_ Sector_Skills_Plan_2013-14.pdf

Bhorat, H., Cassim, A., and Hirsch, A. (2014) *Policy Co-ordination and Growth Traps in a Middle-income Country Setting: The Case of South Africa.* Working Paper Series. World Institute for Development Economic Research (UNU-WIDER).

Bhorat ,H., Cassim, A., and Tseng, D. (2015) *Higher education. employment and economic growth: Exploring the interactions.* LMIP Report 5. Available at: http://www.lmip.org.za/document/lmip-report-5-higher-education-employment-and-economic-growth-exploring interactions

Bhorat, H., Hirsch, A., Kanbur, R., and Ncube, M. (2013) *Economic Policy in South Africa Past. Present. and Future.* Oxford Companion to the Economics of South Africa. Oxford University Press.

Bhorat, H. and Jacobs, E. (2010) *An Overview of the Demand for Skills for an Inclusive Growth Path.* Development Bank of Southern Africa. Available at: http://www.dbsa.org/EN/About-Us/Publications/Documents/An%20overview%20of%20 the%20demand%2for%20skills%20for%20an%20inclusive%20growth%20path%20by%20Haroon%20Bhorat%20and%20 Eln%C3%A9%20Jacobs.pdf

Bhorat, H and Oosthuizen, M. (2006) *The Post-Apartheid South African Labour Market.* DPRU Working Paper 05/93. Cape Town: University of Cape Town.

Branson, N., Hofmeyr, C. and Lam, D. (2014) Progress through school and the determinants of school dropout in South Africa. *Development Southern Africa.* 31(1). 106-126.

Budlender, D. (2014) *Migration and employment in South Africa: Statistical analysis of the migration module in the Quarterly Labour Force Survey. third quarter 2012.* African Centre for Migration & Society. University of the Witwatersrand.

CHE (2013) *A proposal for undergraduate curriculum reform in South Africa: The case for a flexible curriculum structure.* Report to the Task Team on Undergraduate Curriculum Structure. Council on Higher Education. Discussion Document. Council on Higher Education.

DBE (2014) *National Senior Certificate Technical Report.* Department of Basic Education. Available at: http://www.education. gov.za/Portals/0/Documents/Reports/NSC%202014%20Technical%20Report%20.pdf?ver=2015-01-05-083624-000

DED (2011) *New Growth Path (NGP) Accord 4: Green economy accord.* Department of Economic Development. Available at: http://www.info.gov.za/view/DownloadFileAction?id=159756

DHA (2014) *Skills or Qualifications determined to be critical for the Republic of South Africa in Relation to an application for Critical Skills Visa or Permanent Residence.* Department of Home Affairs. Government Gazette No. 37716. Available at: http://www.vfsglobal.com/dha/southafrica/pdf/immigration_critical_skills_160416.pdf

DHET (2010a) *Delivery Agreement 5: A Skilled and Capable Workforce to Support an Inclusive Growth Path.* Department of Higher Education and Training. Available at: http://www.dpme. gov.za/publications/Outcomes%20Delivery%20Agreements/ Outcome%2005%20Skills.pdf

DHET (2010b) *National Skills Development Strategy IIII (2010 -2016).* Department of Higher Education and Training. Available at: http://www.dhet.gov.za/Booklets/NSDS%20III%20 Progress%20Report%20-%207%20October%202013%20-%20V11.pdf

DHET (2013) *White Paper for Post-School Education and Training: Building an Expanded. Effective and Integrated Post-School System.* Department of Higher Education and Training. Available at: http://www.dhet.gov.za/SiteAssets/Latest%20News/ White%2 0paper% 20for% 20post-school%20 education% 20and%2 0training.pdf

DHET (2014a) *List of Occupations in High Demand, 2014.* Department of Higher Education and Training. Government Gazette No. 38174. Available at: http://www.gov.za/sites/www.gov. za/files/38174_gon863.pdf

DHET (2014b) *Wholesale & Retail Seta Sector Skills Plan Update 2014 to 2015.* Department of Higher Education and Training. Available at http://wrlc.org.za/wp-content/uploads/2014/12/WRSETA-Sector-Skills-Plan-Update-2014-15_ FinalReport_30092014.pdf

DHET (2015a) *List of Occupations in High Demand, 2015.* Department of Higher Education and Training. Available at: http://www.dhet.gov.za/DHET%20Statistics%20Publication/List%2 0of%20Occupations%20in%20High%20 Demand%202015%20.pdf

DHET (2015b) *Skills for and Through SIPs: Progress report March 2015.* Department of Higher Education and Training. Available at: https://sip-skills.onlinecf.net/SKILLSforandthroug hSIPs/Documents%20Skills%20for%20and%20through%20 SIPs%20Report%202014/Skills%20for%20and%20through%20SIPs%20Progress%20Report%20March%202015.pdf

DHET (2015c) *Statistics on Post-School Education and Training in South Africa: 2013.* Department of Higher Education and Training. Available at: http://www.dhet.gov.za/DHET%20Statistics% 20Publication/Statistics%20on%20Post-School%20 Education%20and%20Training%20in%20Sout h%20Africa%202013.pdf

DHET (2016) *Statistics on Post-School Education and Training in South Africa: 2014.* Department of Higher Education and Training. Available at: http://www.justice.gov.za/commissions/FeesHET/docs/2014-Statistics-Post-School-ET-SA.pdf

DoL (2003) *State of skills in South Africa.* Skills Planning Unit. Department of Labour. Available at: http://www.stafftraining. co.za/downloads/state_of_skills.pdf

DPRU (2013) *Employment in the Mining and Quarrying Industry in South Africa.* Factsheet 10. May 2013. Available at http://www.dpru.uct.ac.za/sites/default/files/image_tool/images/36/2013-06-11%20Mining%20Factsheet_0.pdf

DTA (2015) *Presentation on SA Automotive Sector.* EDD parliamentary Portfolio Committee. Department of Trade and Industry. Available at: https://www.thedti.gov.za/parliament/2015/SA_Automotive_Sector.pdf

FASSET (2014) *FASSET Sector Skills Plan Update for the Period 1 April 2015 to 31 March 2020.* The Finances and Accounting Services SETA. Available at: http://www.fasset.org.za/downloads/SSP_2015-2016-DRAFT-15_November_2014_For_ Submission.pdf

Gamble J. (2016) *Work and Qualifications Futures of Artisans and Technicians.* Labour Market Intelligence Partnership Report 19. Soon to be available at: http://www.lmip.org.za.

HRDC (2009) *Human Resource Development Strategy for South Africa (2010-2030).* Human Resource Development Council. Available at: http://www.cathsseta.org.za/wp-content/uploads/2013/0 4/hrds-sa-edited-final.pdf

Isdale, K., Reddy, V., Winnaar, L., and Zuze, L., (2016) *Smooth, Staggered or Stopped: Educational Transitions in the South African Youth Panel Study.* Labour Market Intelligence Partnership Publication. Human Sciences Research Council.

ISETT-SETA (2011) S*ector Skills Plan 2011-2016.* ISETT-SETA. Available at: https://www.mict.org.za/downloads/Isett_Seta_ Sector_Skills_Plan_2011_2016_Jan_2011_Version_v2p1.pdf

Kalina, M. and Rogan, M., (2016) *Estimating the current and future skills demand of government's national growth and development policies.* LMIP Report. Soon to be available at: http://www.lmip.org.za.

Kruss, G., Wildschut, A., Janse van Rensburg, D., Visser, M., Haupt, G., and Roodt, J. (2012) *Impact Assessment of National Skills Development Strategy II: developing skills and capabilities through the learnership and apprenticeship pathway systems: synthesis report: assessing the impact of learnerships and apprenticeships under* NSDSII. Department of Labour. Available at: http://www.hsrc.ac.za/en/research-outputs/ktree-doc/13800

Loazya, N., Schmidt-Hebbel, K., and Servén, L. (2000) *Savings in Developing Countries: An Overview.* The World Bank Economic Review. Vol. 14. No. 3: 393–414

Mbatha, N., Wildschut, A., Mcnwango, B., Ngazimbi, X., and Twalo T. (2015) *Towards understanding the distinctive nature of artisan training. Implications for skills planning in South Africa.* Labour Market Intelligence Partnership Report 2. Available at: http://www.lmip.org.z a/document/lmip-report-2-towards-understanding-distinctive-nature-artisan-training-implications-skills.

MoE (2001) *Draft National Plan for Higher Education in South Africa.* Ministry of Education. Available at: http://www.unisa.ac.za/contents/projects/docs/National%20Plan%20Higher %20Education.pdf

NPC (2011) *National Development Plan: Vision for 2030.* National Planning Commission. Available at: www.npconline.co.za. 01/12/2012 – 014/01/2013

WORKS CITED continued

Nzimande, B. (2011) *DHET Ministers 2011 Budget Speech.* Department of Higher Education and Training. Available at: https://pmg.org.za/briefing/18905/

OECD (2014) *Education at a Glance 2014: OECD Indicators.* OECD Publishing. Available at: https://www.oecd.org/edu/Education-at-a-Glance-2014.pdf

Paterson, A., Visser ,M., Arends, F., Mthethwa, M., Twalo, T., and Nampala, T. (2015) *High-Level Audit of Administrative Datasets.* Department of Higher Education.

Reddy, V. and Juan, A. (2014) *Quality school mathematics: an elusive aspiration?* In: Meyiwa T., Nkondo M., Chitiga-Mabugu M., Sithole M. & Nyamnjoh F. (eds) *State of the Nation 2014: South Africa 1994-2014: a twenty-year review*. Cape Town: HSRC Press: 296-309.

Reddy, V. and Powell, M. (2015) *Indicators and Data to Support Skills Planning in South Africa.* LMIP Report No. 13.

RSA (2008) *National Qualifications Framework (NQF) Act. 2008.* Act No. 67 of 2008. Available at: http://www.saqa.org.za/docs/legislation/2010/act67.pdf

RSA (2015) *The Framework for the Annual Report on Skills Supply and Demand in South Africa.* Republic of South Africa. Government Gazette. No. 39319 (23 October 2015). Available at: http://www.gov.za/sites/www.gov.za/files/39319_gon1007.pdf.

StatsSA (2012a) *Documented immigrants in South Africa. 2011.* Statistical release P0351.4

StatsSA (2012b) P0301.4: *Statistical release: Census 2011.* Retrieved from http://www.statssa.gov.za/publications/P03014/P030142011.pdf

StatsSA (2013) *Documented immigrants in South Africa. 2012.* Statistical release P0351.4

StatsSA (2014a) *Documented immigrants in South Africa. 2013.* Statistical release P0351.4

StatsSA (2014b) *Labour Market Dynamics in South Africa.* Statistics South Africa.

StatsSA (2014c) *Poverty Trends in South Africa: An examination of absolute poverty between 2006 and 2011.*

StatsSA (2016a) *Labour Force Survey (LFS) (Various Years).* Statistics South Africa.

StatsSA (2016b) *Ordinary Household Survey. 1995 (OHS) (Various Years).* Statistics South Africa.

StatsSA (2016c) *Quarterly Labour Force Survey (LFS) (Various Years).* Statistics South Africa.

UKCES (2010) *Skills for Jobs: Today and Tomorrow.* UK Commission for Employment and Skills. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/339954/national-strategic-skills-audit-for-england-2010-volume-1-key-findings.pdf

UNICEF (2013) *UNICEF Indicators Databank (2013).* United Nations Children's Emergency Fund. Available at: http://www.unicef.org/southafrica/resources_4768.htm

WB (2011) *South Africa Economic Updates.* Issue 1. Washington. DC: World Bank.

WB (2016) *World Bank Indicators Databank (Various Years).* World Bank. Available at: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

Wildschut, A., and Meyer, T. (2016) *The Shifting Boundaries of Artisanal Work and Occupations.* Labour Market Intelligence Partnership Report 20. Available at: http://www.lmip.org.za/sites/default/files/documentfiles/504.%20The%20Shifting%20Boundaries%20of%20Artisanal%20Work%20And%20Occupations_0.pdf.

Zalk, N. (2014) *What is the role of manufacturing in boosting economic growth and employment in South Africa?* Econ3x3.org. Available at: http://www.econ3x3.org/article/what-role-manufacturing-boosting-economic-growth-and-employment-south-africa

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