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SOUTH AFRICA'S BIG FIVE: BOLD PRIORITIES FOR INCLUSIVE GROWTH

SEPTEMBER 2015



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SOUTH AFRICA'S BIG FIVE: BOLD PRIORITIES FOR INCLUSIVE GROWTH

SEPTEMBER 2015



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PREFACE

In the two decades since South Africans worked together to transform their political landscape and usher in a new democracy, the country has made remarkable progress, nearly doubling its GDP in real terms, lifting millions of people out of poverty and into the middle class, and greatly expanding access to services. Yet South Africa remains beset by high levels of unemployment, and in recent years its growth has fallen well behind the rest of sub-Saharan Africa. Given the country's vibrant public life and dynamic business sector, South Africa has no shortage of ideas, but a tone of pessimism is growing as many worry that the economy is stuck in a low-growth trap.

Our analysis, set out in this report, suggests that there are grounds for much greater optimism—and that South Africa is well positioned to accelerate growth and job creation and take major steps towards eradicating poverty. The report focusses on five opportunities that, if prioritised by government and business, could add one trillion rand (\$87 billion) to annual GDP by 2030 and create 3.4 million new jobs.¹

The “big five”—selected from a much longer list of opportunities—are creating a globally competitive hub in advanced manufacturing; making infrastructure investment more productive to enable growth across the economy; harnessing natural gas for power generation and industrial development; boosting exports of services to the rest of Africa and the world; and unlocking South Africa's full agricultural production and processing potential. The big five are mutually reinforcing, and their successful implementation will benefit many other sectors of the economy. All of them depend on two critical enablers, though: building South Africa's skilled labour force through a dramatic expansion of vocational training, and forging a true development partnership between government and business.

This project builds on a body of previous McKinsey Global Institute (MGI) research on the potential of African economies. Recent publications in this series include *Lions on the move: The progress and potential of African economies*; *Nigeria's renewal: Delivering inclusive growth in Africa's largest economy*; *Africa at work: Job creation and inclusive growth*; and *Lions go digital: The Internet's transformative potential in Africa*. Research for this report was led by MGI principal Susan Lund and MGI director Richard Dobbs, along with McKinsey directors David Fine and Acha Leke, and principals Nomfanelo Magwentshu and Christine Wu. The project team was managed by Paul Jacobson and included Agnes Allotey, Jonathan Haenen, Eduardo Doryan Jara, Nomfundo Magudulela, Jonathan Reader, Karin Remmelzwaal, and Bontle Senne. Thanks go to Janet Bush, Colin Douglas, and Lisa Renaud for editorial support, and to other members of the MGI communications and operations team—including Tim Beacom, Marisa Carder, Matt Cooke, Deadra Henderson, Marlynie Moodley, Julie Philpot, and Margo Shimasaki—for their contributions. We also extend thanks to our MGI and McKinsey colleagues around the world who contributed their expertise, analysis, and support, including Ziyad Cassim, Ryan McCullough, Jan Mischke, Carlos Molina, Xolile Msimanga, Rob Palter, Moira Pierce, Sree Ramaswamy, Jaana Remes, Janine Schuter, and Vivien Singer.

We are grateful to the academic, policy, and industry experts and advisers whose insights enriched the report: Sir Paul Collier, CBE, Co-Director, Centre for the Study of African Economies and Professor of Economics and Public Policy at the Blavatnik School of

¹ At an estimated 2015 average exchange rate of 11.52 rand per dollar.

Government, Oxford University; Rudolf Gouws, former Chief Economist of Rand Merchant Bank; and Neil Morrison, an external adviser to McKinsey & Company, Johannesburg.

We are also grateful to a number of individuals from the private and public sectors for being willing to be interviewed and for offering their opinions and insights in frank discussions. We thank Dr. Iraj Abedian, Chief Executive, Pan-African Capital Holdings; Martin Ackermann, Director, Scavenger Manufacturing; Dr. Rob Adam, Director Designate, Square Kilometre Array, South Africa; Adrienne Bird, Deputy Director-General for Special Projects, Department of Higher Education and Training; Carl Bothma, Thermal Process Manager, The Combustion Group; Graham Braby, Divisional Chief Executive, Grindrod Terminals; Helen Brown, Head Office, Strategy & Research, merSETA; Anati Canca, Managing Director, Malangana Innovation Advisory; Dr. Anja du Plessis, project leader of the Water Conservation and Management Focus Group, UNISA; Sean Flanagan, construction industry consultant; Lungisa Fuzile, Director-General, National Treasury; Enoch Godongwana, in his private capacity on the economy; Patrick Gordon, Head of Marketing & Communications, BPeSA Western Cape; Prish Govender, Programme Director, Group Capital Division, Eskom; Robert Houdet, Executive Director (recently retired), National Association of Automotive Component and Allied Manufacturers; Professor David Kaplan, Professor of Economics at the University of Cape Town; Michael Katz, Chairman of ENSafrica and Honorary Professor at the University of the Witwatersrand; Rob LeBlanc, Chief Operating Officer, Awethu; Dr. Litha Magingxa, Group Executive, Agri-Economics and Capacity Development, Agricultural Research Council; Evelyn Mahlaba, Regional Director Africa, Tourism South Africa; Neva Makgetla, in her private capacity on the economy; Dan Marokane, in his private capacity on infrastructure; Aldo Mayer, Director: Global Manufacturing and Engineering, Bell Equipment; Margaret Meagher, Grace Kalisha, and their colleagues at African Leadership Academy; Lynette Milne, PICC Technical Task Team Coordinator at Economic Development; Dr. Phil Mjwara, Director-General Science and Technology; Kuben Naidoo, Deputy Governor, South African Reserve Bank; Jeff Nemeth, President and CEO at Ford Motor Company of sub-Saharan Africa; Tshepo Ntsimane, General Manager, Infrastructure Finance, Development Bank of Southern Africa; Stephen Okelo-Odongo, in his private capacity on manufacturing; Kishan Pillay, Director, Primary Minerals, Department of Trade and Industry; Gareth Pritchard, Chief Executive Officer, BPeSA Western Cape; Neil Rankin, Associate Professor, Department of Economics, Stellenbosch University; Monale Ratsoma, Head of Economic Policy, National Treasury; Dr. Sizeka Rensburg, director and owner, SMR Consulting; Peter Rosewarne, Principal Hydrogeologist, SRK Consulting; Donald Sibanda, Data Analyst, Financial and Fiscal Commission; Sinazo Sibisi, Group Executive, Infrastructure Delivery, Development Bank of Southern Africa; Sherry-Lee Singh, Supplier Development Lead, Massmart; Ben Smit, Professor of Economics and Director, Bureau for Economic Research, Stellenbosch University; Alex Smith, Chief Financial Officer, Altron; Garth Strachan, Deputy Director-General, Industrial Development Division, Department of Trade and Industry; Kgathatso Tlhakudi, Deputy Director-General, Manufacturing Enterprises, Department of Public Enterprises; Erika van der Merwe, CEO of the Southern African Venture Capital & Private Equity Association; Dhiren Vanmali, Head of Governmental Affairs, sub-Saharan Africa (ME&A) at Ford Motor Company; Professor Nick Vink, Department of Agricultural Economics, Stellenbosch University; Maurits Waardenburg, in his private capacity on agriculture; Lesley Wentworth, Programme Manager for Economic Diplomacy Programme, South African Institute of International Affairs; Mike Whitfield, Managing Director, Nissan

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This report aims to provide a fact base on the priorities for accelerated growth and job creation in South Africa. We hope that it will spark a conversation between government, business, and academic leaders and help South Africa achieve its full economic potential. As with all MGI research, this report is independent and has not been commissioned or sponsored in any way by any business, government, or other institution.

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A complete technical appendix describing the methodology and data sources used in this research and a separate appendix of country insights are available at www.mckinsey.com/mgi.

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IN BRIEF

SOUTH AFRICA'S BIG FIVE: BOLD PRIORITIES FOR INCLUSIVE GROWTH

South Africa has travelled a remarkable road in the two decades since its transition to democracy. Since 2008, however, average annual GDP growth has slowed to just 1.8 percent, while unemployment has stubbornly remained at 25 percent. This report identifies five bold opportunities that can reignite South Africa's progress. If the country's government and businesses prioritise them, the "big five" could increase GDP growth by 1.1 percentage points per year, adding one trillion rand (\$87 billion) to annual GDP by 2030 and creating 3.4 million new jobs.¹ These opportunities include:

- **Advanced manufacturing.** South Africa can draw on its skilled labour to grow into a globally competitive manufacturing hub focussed on high-value added categories such as automotive, industrial machinery and equipment, and chemicals. To realise this opportunity, however, South African manufacturers will have to pursue new markets and step up innovation and productivity.
- **Infrastructure productivity.** South Africa is investing heavily in infrastructure, but big gaps remain in electricity, water, and sanitation. By forging a true partnership, the public and private sectors can together drive three strategies to make infrastructure spending up to 40 percent more productive: making maximum use of existing assets and increasing maintenance; prioritising the projects with greatest impact; and strengthening management practices to streamline delivery.
- **Natural gas.** South Africa's electricity shortage has constrained growth, and despite new capacity, another shortfall is projected between 2025 and 2030. Natural gas plants—which are fast to build, entail low capital costs, and have a low carbon footprint—can provide an alternative to diversify the power supply. With the necessary regulatory certainty, we estimate that South Africa could install up to 20GW of gas-fired power plants to diversify base-load capacity by 2030. Gas can be provided through imports, local shale gas resources (if proven), or both.
- **Service exports.** South Africa has highly developed service industries, yet it currently captures only 2 percent of the rest of sub-Saharan Africa's market for service imports, which is worth nearly half a trillion rand (\$38 billion). With the right investments, service businesses could ramp up exports to the region; and government can help by promoting regional trade deals. In construction, the opportunity ranges from design to construction management to maintenance services. In financial services, promising growth areas include wholesale and retail banking and insurance.
- **Raw and processed agricultural exports.** With consumption rising in markets throughout sub-Saharan Africa and Asia, South Africa could triple its agricultural exports by 2030. This could be a key driver of rural growth, benefiting the nearly one in ten South Africans who depend on subsistence or smallholder farming. Capturing this potential will require a bold national agriculture plan to ramp up production, productivity, and agro-processing.

Successfully delivering on these priorities will move South Africa closer to realising its long-held vision of a "rainbow nation" characterised by shared prosperity for all. But first the country will need to embrace some fundamental changes to become more globally competitive; not least, it will have to address a serious skills shortage through a dramatic expansion of vocational training. Tackling such foundational issues will require business and government to come together in a new partnership characterised by shared vision, collaboration, and trust.

¹ At an estimated 2015 average exchange rate of 11.52 rand per dollar.

Seize the potential in South Africa

THERE IS TREMENDOUS OPPORTUNITY

- ② Second-largest economy in Africa (after Nigeria)
- ② Six dynamic, upwardly mobile cities
- ② Good business environment compared to peers
- ② Growing consumer class

BUT

THERE ARE SYSTEMIC CHALLENGES

- Poor growth
- Slowing investment
- Poor job creation
- Enduring poverty

— Growing pessimism both domestically and internationally —

REVERSE THESE TRENDS

South Africa can set an ambitious new agenda that will deliver:



= R 540B*
1.5M JOBS

Advanced manufacturing
Build a competitive export hub, focusing on autos, machinery, and chemicals



= R 260B*
660K JOBS

Infrastructure
Make spending more productive and build for the future



= R 250B*
330K JOBS

Natural gas
Diversify the energy mix, unlock a new set of industries




3.4 million

New jobs



4.7% by 2030

Higher GDP



= R 160B*
490K JOBS

Agricultural value chain
Expand agricultural exports, focusing on high-value crops and food processing



= R 245B*
460K JOBS

Service exports
Capture the African growth opportunity through exports of services

* R = RAND; B = BILLION IN ADDITIONAL GDP



Support these efforts with vocational skills training to build the labour force that South Africa needs for tomorrow.

Goal: 40–60% of labour force with increased skills through apprenticeship programmes by 2030





EXECUTIVE SUMMARY

It has been just over two decades since South Africa's transition from apartheid to democracy captured the world's imagination and brought Nelson Mandela to power as president. Since then, the country's GDP has almost doubled in real terms, millions have emerged from poverty, and an ambitious infrastructure development programme has widened access to water, sanitation, electricity, and transport.

The signs of economic progress are most evident in South Africa's major cities, which are hubs of development and innovation. Many of the country's largest companies have become successful global players, and key industries from agriculture to financial services to telecommunications have achieved impressive growth as part of Africa's economic renaissance.

But a great deal of South Africa's promise remains unrealised, as the country's government and business leaders acknowledge. The economy has slowed dramatically in recent years, and job creation has been disappointing. Since 2008, South Africa has posted average annual GDP growth of just 1.8 percent, less than half the growth rate experienced from 2004 to 2007. The nation's unemployment rate remains among the highest in the world, at 25 percent. Youth unemployment stands at 52 percent, diminishing prospects for the next generation of South Africans.

Accelerating growth and job creation are critical imperatives for South Africa—and the good news is that this goal is attainable. The country has a number of strengths on which to build, including a highly rated business environment, a strong legal and governance framework, excellent transport links, robust investment, and competitive firms. All of these factors position South Africa to boost long-term growth, raise employment, and create a vibrant, inclusive, globally competitive economy for the 21st century.¹

This report identifies five bold priorities that can reignite South Africa's progress. Together, they have the potential to raise annual GDP growth by 1.1 percentage points², adding one trillion rand (\$87 billion) to annual GDP by 2030 and creating 3.4 million new jobs over the same period.³ These opportunities are creating a globally competitive hub in advanced manufacturing; making infrastructure investment more productive to enable growth across the economy; harnessing natural gas for power generation and industrial development; boosting exports of services to the rest of Africa and the world; and unlocking South Africa's full agricultural production and processing potential. Once the country has awakened these "big five", they will stir new life and growth into the entire economy.

This report is the result of a six-month joint research project by the McKinsey Global Institute (MGI) and McKinsey & Company's Johannesburg office, building on our earlier research on Africa's growth and job creation prospects. We have conducted a detailed microeconomic

¹ Other perspectives on South Africa's growth include Ricardo Hausmann, *Final recommendations of the International Panel on ASGISA*, CID working paper number 161, Harvard University Center for International Development, May 2008; *The Oxford companion to the economics of South Africa*, Haroon Borat et al., eds., Oxford University Press, 2014; Nicky Oppenheimer and Jonathan Oppenheimer, *South Africa: Our nation delivers*, The Brenthurst Initiative, 2003; *Two decades of freedom: What South Africa is doing with it, and what now needs to be done*, Goldman Sachs, 2013; and *National Development Plan 2030: Our future—make it work*, Government of South Africa.

² This is over and above consensus estimates that forecast a return to 3.6 percent growth per annum by 2030.

³ At an estimated 2015 average exchange rate of 11.52 rand per dollar. All further dollar figures are based on this exchange rate and reported in brackets after the rand value.

analysis of the growth potential of different sectors in South Africa and have interviewed dozens of leaders and experts across government, business, and academia. One common theme stood out in these conversations: to move South Africa onto a path of accelerated growth, the public and private sectors will need to undertake a coordinated and sustained effort to raise productivity and strengthen competitiveness. Moreover, to prepare millions of young people for the jobs of the future, South Africa needs to reshape its system for developing human capital—and, in particular, drive a massive expansion of vocational training programmes that build both the technical and personal skills needed in a more competitive world.

DESPITE MUCH PROGRESS SINCE 1994, SOUTH AFRICA'S GROWTH AND JOB CREATION RECORD HAS BEEN DISAPPOINTING

Since South Africa's historic transition to democracy, its GDP has almost doubled, from 1.6 trillion rand (\$139 billion) in 1994 to 3.0 trillion rand (\$261 billion) in 2014.⁴ However, real growth during this period averaged only 3.0 percent per year, one-third lower than the 4.5 percent growth rate achieved by sub-Saharan Africa as a whole and far below emerging Asia's 8.1 percent growth.⁵ Income growth has also been anaemic: GDP per capita has averaged just 1.3 percent annual growth since 1994. Perhaps even more worrisome is South Africa's recent loss of momentum. From 2004 to 2007, the economy averaged brisk annual growth of 5.4 percent (Exhibit E1). This period saw an unprecedented confluence of several positive factors: rising commodity prices, a boom in consumer spending, and increased levels of foreign investment. Since 2008, however, while other emerging markets have maintained good growth, albeit at lower levels, South Africa's growth has stalled at just 1.5 percent in 2014.⁶

South Africa's performance on job creation has also been poor. Its unemployment rate of approximately 25 percent is among the highest in the world—but that number alone does not capture the full extent of the issue. Using a broader definition of unemployment that includes discouraged workers would bring the rate to 35 percent.⁷ More worrying still, 52 percent of South Africans between the ages of 15 and 24 are unemployed, which not only creates economic hardship today but limits their earnings prospects over their entire lifetimes. South Africa's economy has created 2.8 million net new jobs since 2000, but this has simply not been enough to keep pace with growth in the size of the country's labour force, which has expanded by 4.1 million over the same period. Moreover, South Africa's labour force participation—which includes those who are working or looking for work—is low by international standards, at just 57 percent. Low participation is a major driver of poverty: 20 percent of South Africans struggle to get by on less than 15 rand (\$1.30) per day.⁸ Joblessness also contributes to South Africa's status as one of the most unequal societies in the world.

⁴ All rand values are quoted in 2010 prices. All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

⁵ *World development indicators 2015*, World Bank, July 2015. Growth in these two regions has declined since the 2004–07 period, but they still grew faster from 2008 to 2014 than they did before 2004.

⁶ *Ibid.*

⁷ Discouraged workers are people of working age no longer looking for work. Unemployment statistics do not include them. Statistics South Africa, *Quarterly Labour Force Survey: Quarter 1, 2015*, Statistics South Africa, May 2015.

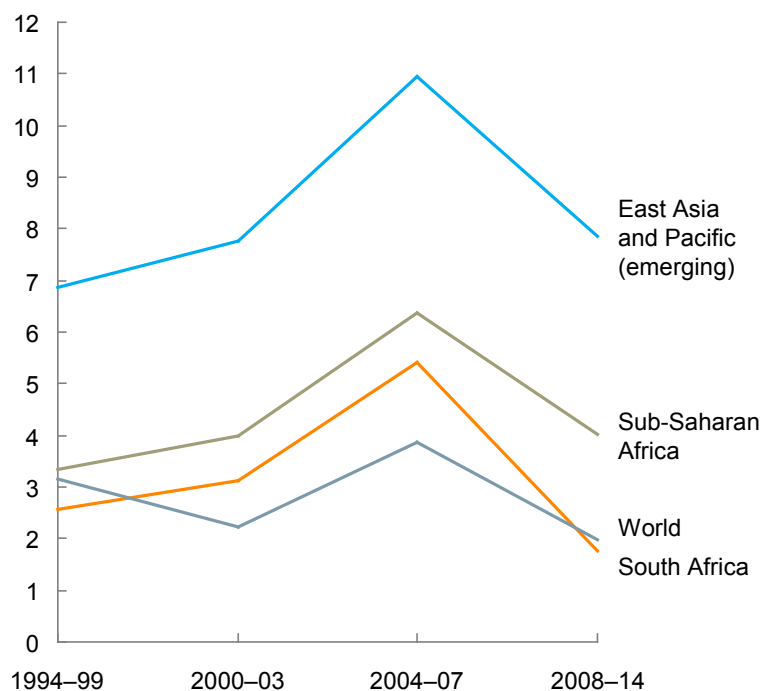
⁸ *Poverty trends in South Africa*, Statistics South Africa, April 2014.

Exhibit E1

South Africa's growth and job creation records have been disappointing

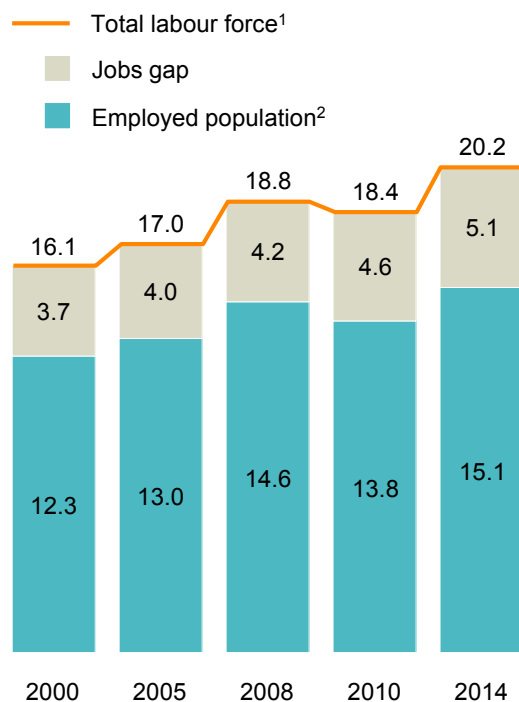
Real GDP growth rate

Compound annual growth rate, % per year



The job deficit: Gap between working-age population and employed population

Million



1 Does not include discouraged job seekers.
 2 Adults and youth.
 NOTE: Numbers may not sum due to rounding

SOURCE: World Bank; Statistics South Africa (Stats SA); McKinsey Global Institute analysis

SOUTH AFRICA HAS REAL STRENGTHS TO BUILD ON

South Africa has no time to waste in jumpstarting economic growth if it hopes to meet its national goals for eliminating poverty and substantially reducing inequality by 2030—and it can build on a number of clear strengths to do so (Exhibits E2 and E3). With 2014 GDP of 3.0 trillion rand (\$261 billion), South Africa is the continent's second-largest economy (after Nigeria); in fact, its economy is larger than that of Malaysia or Chile, two other pivotal emerging markets. South Africa also has one of Africa's most diversified economies. Services, including a sophisticated financial services sector, account for some 62 percent of GDP, although manufacturing is weak at just 13 percent of GDP (in real prices). South Africa's overall economic productivity compares well to that of many of its peers and is similar to China's and Brazil's. Moreover, South African equities and bonds are attractive to international investors. In 2013, the equity market capitalisation of South African companies stood at 132 percent of GDP. This is higher than the figure in most advanced economies, ranking tenth in the world; the level of investment reflects the country's many globally competitive firms. Overall, South Africa has attracted foreign direct investment inflows equalling 2 percent of GDP, and it is the eighth-largest outward investor on the African continent.⁹

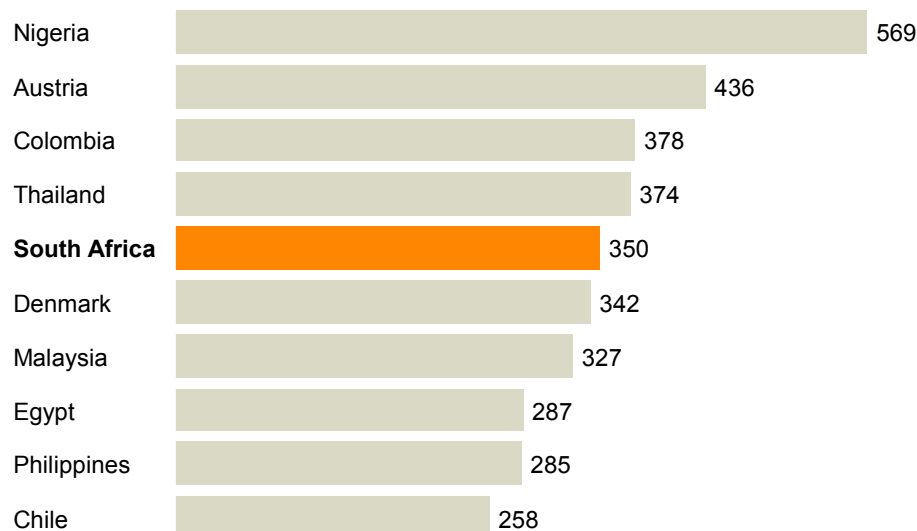
⁹ *Inward foreign direct investment flows 2007–2012*, Economist Intelligence Unit, February 2015; *Greenfield and merger and acquisition FDI flows 2003–2013*, Dealogic and FDI Markets databases, February 2015.

Exhibit E2

South Africa: A snapshot

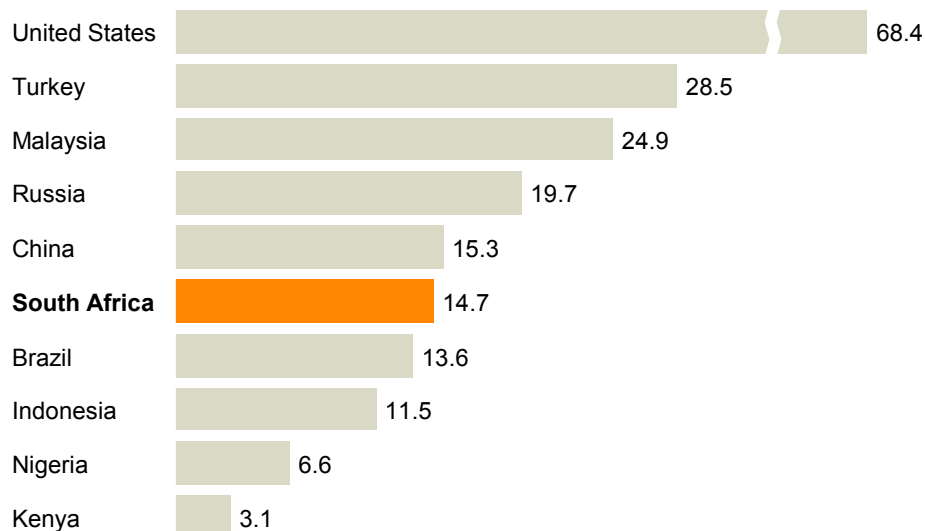
South Africa's economy is the second-largest in Africa, larger than those of Malaysia and Chile

Nominal GDP, 2014 (\$ billion)¹



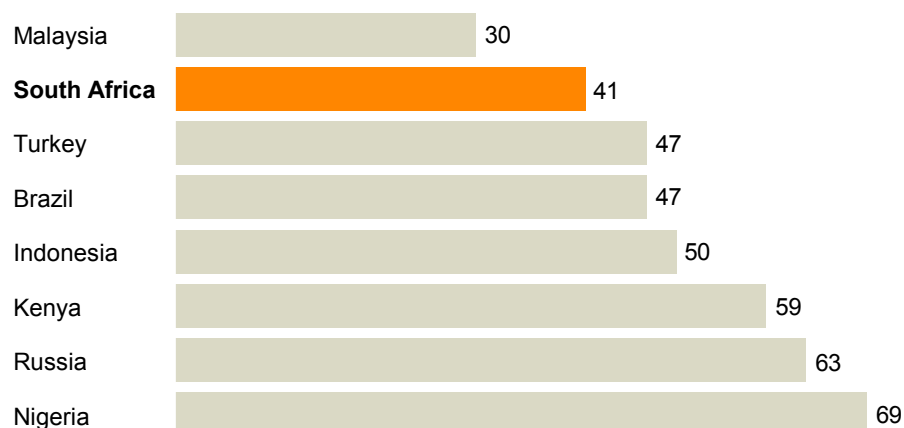
South Africa has comparable productivity to China and Brazil

Real productivity, 2012 (\$ thousand PPP per employee)²



South Africa has a good environment for business compared to its peers³

Overall risk, January 2015 (Lower score = less risk)



¹ South Africa's GDP in 2014 was \$350 billion in nominal terms and \$261 billion in real terms (or 3 trillion rand converted to dollars at an estimated 2015 average exchange rate of 11.52 rand per dollar).

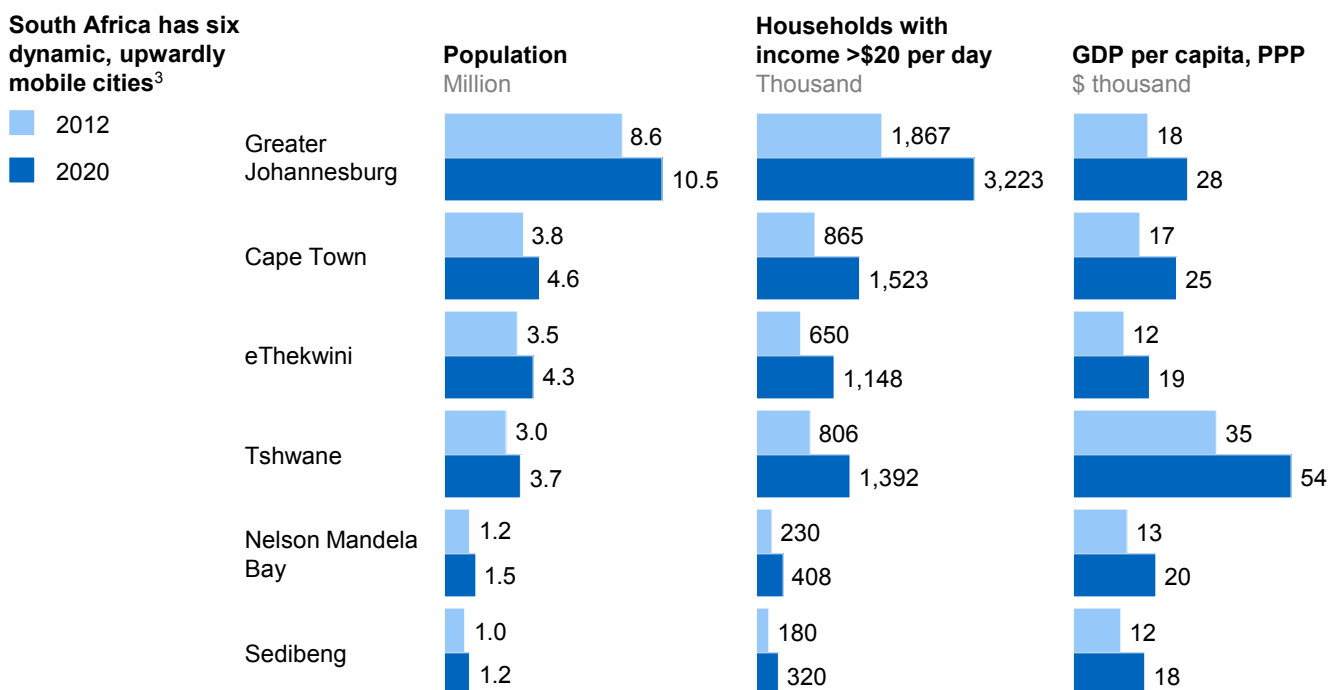
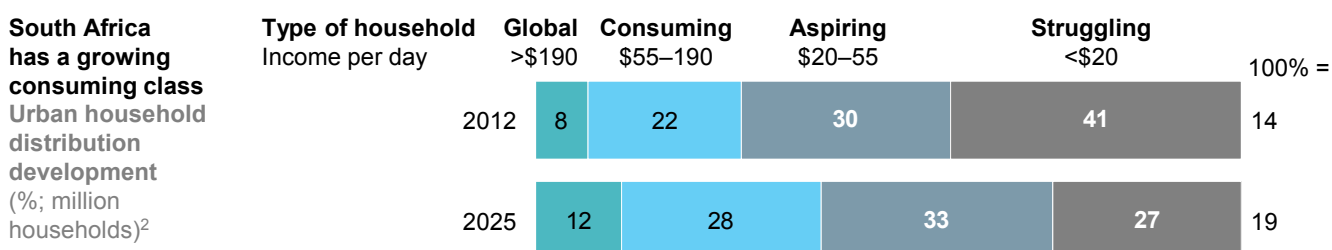
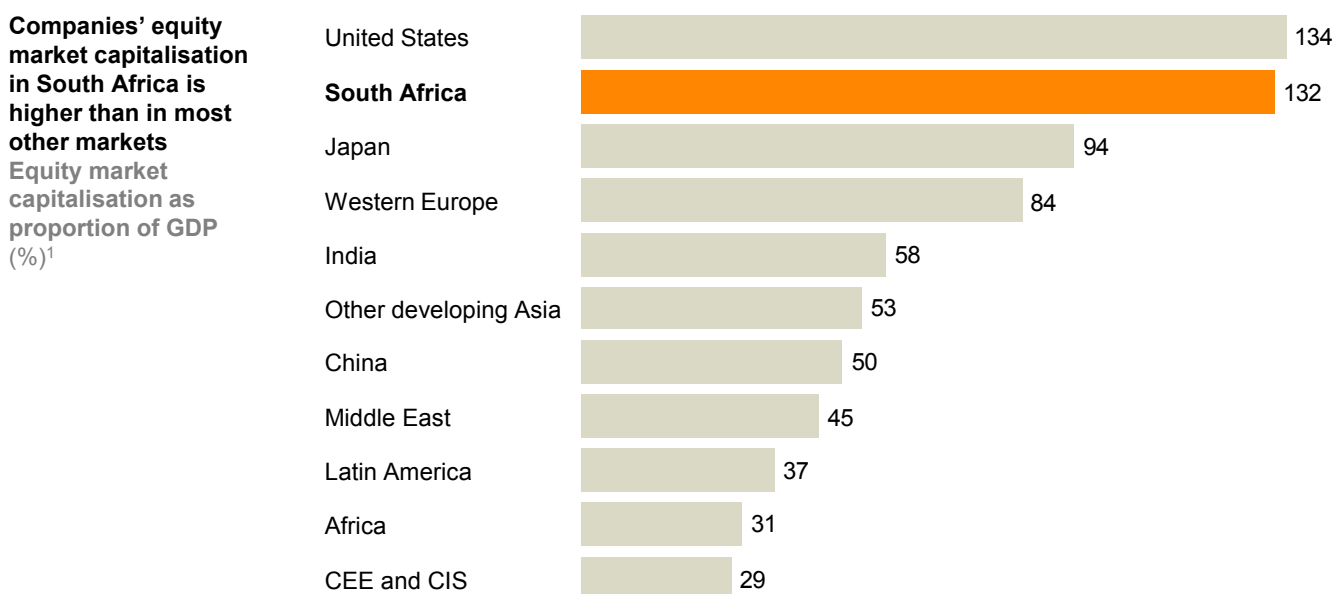
² Productivity is based on GDP contribution per employee; levels in real 1990 purchasing power parity dollars.

³ South Africa's peers are the other emerging markets that are popular with investors.

SOURCE: World Bank World Development Indicators; Economist Intelligence Unit; McKinsey Global Institute analysis

Exhibit E3

South Africa: A snapshot (continued)



1 Western Europe includes the United Kingdom. CEE = Central and Eastern Europe; CIS = Commonwealth of Independent States.
 2 Based on data for the 16 largest cities in South Africa, applying a global measure of consumer status.
 3 Johannesburg includes City of Johannesburg, Ekurhuleni, and the West Rand. eThekweni is the metropolitan area encompassing Durban city. Tshwane includes Pretoria. Nelson Mandela Bay is the metropolitan area encompassing Port Elizabeth. Sedibeng is the municipal area encompassing Vereeniging.

SOURCE: McKinsey Global Institute Capital Markets database; McKinsey Global Institute Cityscope 2.55; McKinsey Global Institute analysis

South Africa has forged new regional and global ties since 1994. O. R. Tambo International Airport, near Johannesburg, is the biggest and busiest freight and passenger hub on the continent. Johannesburg is the only city in sub-Saharan Africa that ranks in the top 100 destinations for international tourists, with 4.5 million arrivals in 2013.¹⁰ Overall, South Africa ranks 49th out of 131 countries on MGI's Global Connectedness Index and has risen four places since 1995.¹¹ Because stronger global connections correlate with faster growth, it will be critical to continue deepening the country's participation in global flows of goods, services, finance, people, and data and communications.

Moreover, South Africa has built a solid business environment. It was the highest-performing economy in sub-Saharan Africa for overall competitiveness in the latest World Economic Forum global rankings. It also tops the global rankings for strength in auditing and reporting standards and for regulation of securities exchanges. South Africa ranks seventh in the world for the development of its financial markets and ninth in the world for the efficiency of its legal framework.¹² This environment underpins the country's thriving service sector. A number of competitive local companies have expanded across the continent and internationally; some are listed both in Johannesburg and on the London or New York stock markets. Some prominent South African companies, such as MTN, SABMiller, DeBeers, Sasol, Standard Bank, and Shoprite, have established an international presence.

A growing share of urban households have joined the consuming class, meaning that they have reached a level of income that allows for discretionary spending; the trend is expected to continue, with the number of "struggling" households expected to decrease by a third by 2025. This upward mobility has become the country's biggest driver of growth; private consumption accounted for three percentage points of the 4.3 percent real GDP growth seen between 2000 and 2008 and for almost all of the 1.8 percent real GDP growth seen between 2008 and 2014. Moreover, South Africa has six vibrant, dynamic cities with populations of at least one million people. By 2025, nearly three-quarters of urban households will be members of the consuming class.¹³

FIVE PRIORITIES COULD COMBINE TO RAISE SOUTH AFRICA'S GDP BY ONE TRILLION RAND AND CREATE UP TO 3.4 MILLION NEW JOBS BY 2030

South Africa has immense potential to build on these foundations. We assessed many avenues for growth and ultimately identified five priorities as the most promising. They are creating a globally competitive hub of advanced manufacturing; raising infrastructure productivity; harnessing natural gas for a reliable power supply; increasing service exports; and raising growth along the agricultural value chain. For more detail on our criteria, see Box E1, "How we identified the big five priorities".

¹⁰ *Top 100 city destinations ranking*, Euromonitor International, January 2014.

¹¹ MGI's database of global flows of goods, services, finance, people, and data and communications covers 195 countries between 1980 and 2012. The McKinsey Global Institute Connectedness Index measures each country's level of integration into the global network of flows for 131 countries. See *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

¹² The Global Competitiveness Index Historical Dataset, 2005–2014, World Economic Forum.

¹³ McKinsey Global Institute Cityscope 2.55.

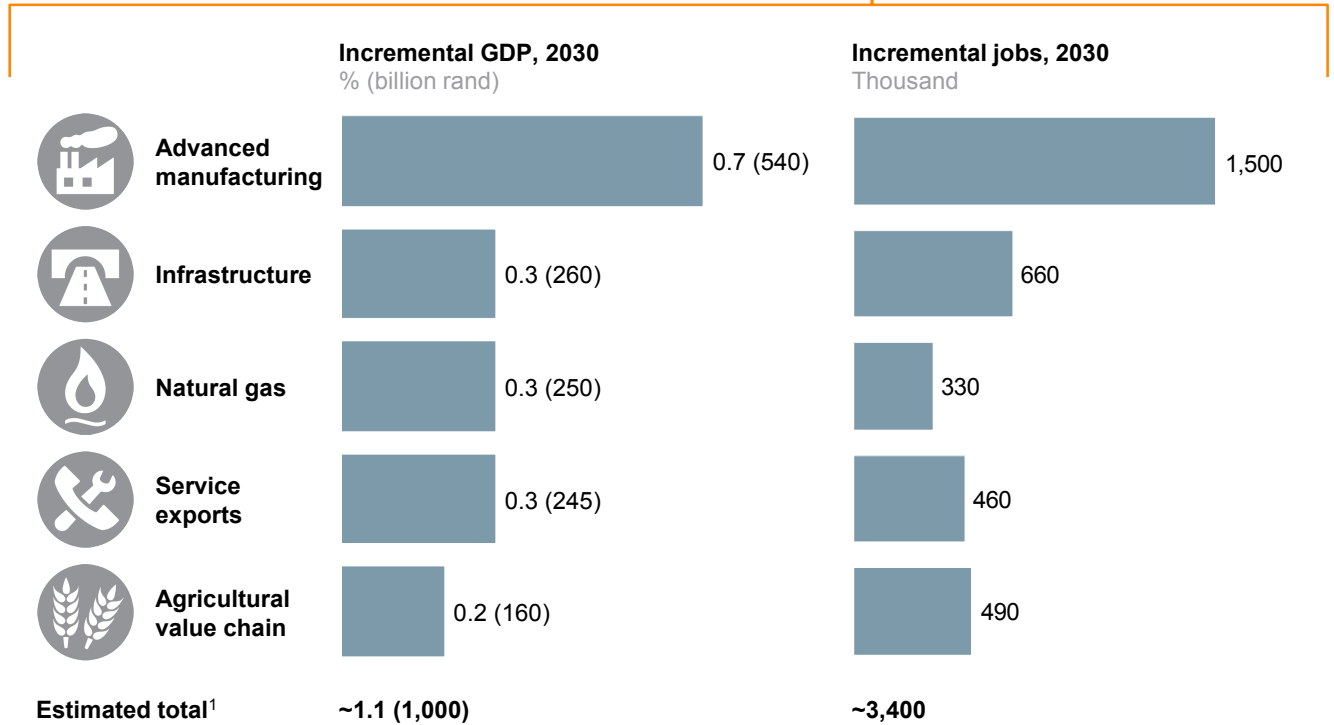
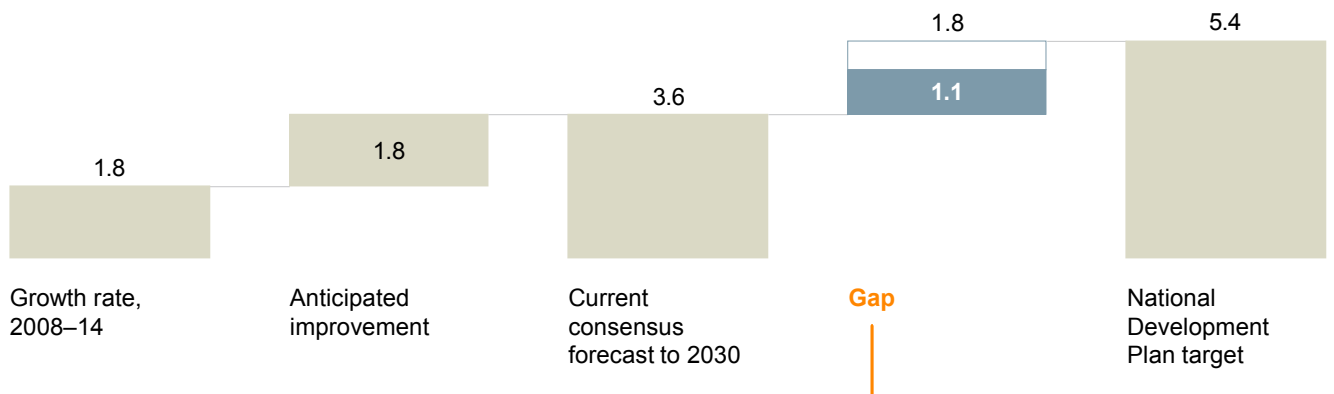
Discussions with economists led us to the conclusion that South Africa's formula for growth, which for many years has been based on increasing domestic consumption, has lost momentum. Raising investment and increasing exports are crucial for accelerating and sustaining growth. The "big five" priorities are aligned with this thinking. Individually, each of them has the potential to boost economic growth significantly and create many thousands of new jobs by 2030 (Exhibit E4). They will also generate substantial additional tax revenue that could be directed to priorities such as increased funding for infrastructure, educational programmes, or welfare grants—all of which are important for creating a more inclusive society and improving South Africans' quality of life.

Exhibit E4

The big five priorities will grow the economy and create jobs

Real GDP growth rate

%



¹ Gap numbers do not sum. The potential impact of each of the "big five" was modelled in isolation from the others. Because we did not calculate the dynamic interactions between them, we cannot estimate their collective GDP impact by simply adding them.
NOTE: Waterfall numbers may not sum due to rounding.

SOURCE: Oxford Economics; Economist Intelligence Unit; IHS Economics; McKinsey Global Institute analysis

We modelled the potential impact of each of the “big five” in isolation from the others. Because we did not calculate the dynamic interactions between them, we cannot arrive at their collective GDP impact by simply adding them. A rough estimate suggests that the combined GDP impact would likely exceed one trillion rand (\$87 billion) by 2030, which would boost annual GDP by 19 percent above consensus forecasts for that year. This would increase real GDP growth by 1.1 percentage points per year through 2030, lifting it from the current consensus forecast of 3.6 percent to 4.7 percent.¹⁴ Moreover, the five priorities together could create 3.4 million additional jobs by 2030, making major strides in reducing unemployment and poverty.

Between them, the “big five” will also bring important broader societal and economic benefit—such as stimulating investment, increasing productivity, raising innovation, and accelerating rural development—as well as significant direct and indirect impact on other sectors of the economy (Exhibit E5). The “big five” are also mutually reinforcing in nature, and there are likely to be cumulative effects between them. For instance, better infrastructure will be critical to enabling more exports of agricultural products; gas and power will support the energy needs of a growing manufacturing sector; and the infrastructure programme will support short-term job creation.

¹⁴ Consensus is based on forecasts from IHS Economics, Oxford Economic Forecast, and Economist Intelligence Unit, February 2015.

Box E1. How we identified the big five priorities

We selected the five priorities in this report from a list of more than a hundred ideas, using a rigorous three-stage process. First, we undertook macro-economic analysis of South Africa’s growth prospects, which indicated that the country needed to focus on areas that would raise investment and increase exports, rather than relying on domestic consumption and diversification. Second, based on this framing, we generated ideas to boost growth and job creation, drawing on extensive research and discussions with experts and public- and private-sector leaders. Third, we applied in-depth economic modelling, along with further discussions, to prioritise these ideas using criteria that reflected South Africa’s complex priorities. These criteria included balancing short-term impact with long-term economic benefits; strengthening South Africa’s competitive position; reducing poverty and inequality; raising innovation and entrepreneurship; and promoting rural development.






There are many significant economic sectors not featured in this report, but this is not to ignore their important contribution. Mining is a case in point: the sector is crucial for South Africa’s economy today, accounting for 8 percent of GDP. A healthy mining industry will still be essential for South Africa’s exports, and should play a shaping role in unlocking globally distinctive capabilities in other sectors, such as in manufacturing, construction and engineering services. Nonetheless, given the projected negative employment outlook in the mining sector, South Africa needs to look to other opportunities if it is to unlock a step change in both growth and job creation.

Exhibit E5

The big five priorities: Benefits and impact

The big five priorities will benefit multiple sectors of the economy

■ Direct ■ Indirect

Sectors of the economy	GDP, 2014 ¹ Billion rand	Jobs, 2014 Thousand	Advanced manufacturing	Infra-structure	Natural gas	Service exports	Agri-cultural value chain
							
Agriculture, forestry, fishing	72	702					■
Mining, oil and gas	227	428	■	■	■	■	
Knowledge-intensive manufacturing ²	138	407	■	■	■		
Resource-intensive manufacturing ²	124	632	■	■	■		
Labour-intensive manufacturing ²	39	343					
Regional manufacturing ²	78	378				■	■
Utilities	68	117	■	■	■	■	
Construction	103	1,249		■	■	■	■
Wholesale, retail, and trade	386	2,625				■	■
Catering and accommodation	25	577		■		■	
Transport and communication	253	932	■	■	■	■	■
Finance, real estate, business services	591	2,030		■		■	
Government	465	3,351		■	■		■
Personal services	160	1,237					

... and have broad societal and economic impact

■ Primary ■ Secondary ■ Other

Economic impact	Impact on GDP by 2020	■	■	■	■	■
	Impact on GDP by 2030	■	■	■	■	■
	Increases productivity	■	■	■	■	■
	Improves trade balance	■	■	■	■	■
	Stimulates investment	■	■	■	■	■
	Stimulates secondary industry development	■	■	■	■	■
Societal impact	Broadens empowerment	■	■	■	■	■
	Stimulates innovation in the economy	■	■	■	■	■
	Develops rural areas	■	■	■	■	■
	Builds workforce capabilities	■	■	■	■	■
	Creates jobs by 2020	■	■	■	■	■
	Creates jobs by 2030	■	■	■	■	■

1 GDP values in real 2010 prices. All GDP and jobs data are the average of 2014 quarterly figures; the breakdown of manufacturing subsectors and the split of trade from catering and accommodation are based on historical information.

2 Knowledge-intensive manufacturing examples include automobiles, machinery, and chemicals. Resource-intensive manufacturing examples include metals and pulp. Labour-intensive manufacturing examples include apparel and furniture. Regional manufacturing examples include food and beverages.

SOURCE: Stats SA; McKinsey Global Institute analysis

Advanced manufacturing: Creating a global hub

South Africa's manufacturing sector has been shrinking for years; its share of GDP has fallen by almost half since 1990, reaching 13 percent of GDP in 2014. While this is on par with the contribution of manufacturing in some advanced economies, such as the United States and the United Kingdom, it is far below the average of 20 percent of GDP in other major developing economies such as Brazil, India, Indonesia, Mexico, Thailand, and Turkey.

MGI's analysis suggests that South Africa has the potential to develop a more globally competitive manufacturing base—one focussed on the market for more sophisticated goods such as automobiles; transportation equipment; machinery, process and electrical equipment and parts; and chemicals.¹⁵ These advanced manufacturing industries produce high-value added products that require skilled labour, technology, and a strong business environment, all of which count among South Africa's competitive advantages.¹⁶ They thus provide an opportunity for South Africa to develop a successful global manufacturing niche, despite labour and other input costs that are higher than in many other emerging markets.

South Africa's exports of advanced manufacturing products were valued at more than 190 billion rand (\$16 billion) in 2013, or 44 percent of total manufactured exports that year.¹⁷ Our analysis suggests that by 2030, exports of these products could triple to more than 700 billion rand (\$61 billion). Some 250 billion rand (\$22 billion) of this opportunity is in the market for machinery, equipment, and appliances; 230 billion rand (\$20 billion) is in motor vehicles and transportation equipment; and 220 billion rand (\$19 billion) is in chemicals. This would double South Africa's overall manufactured exports, boosting GDP by 540 billion rand (\$47 billion) and creating some 1.5 million jobs in the broader economy (Exhibit E6).¹⁸

A number of factors position South Africa's advanced manufacturing industries to capture this growth. First, they have a history of global competitiveness. Exports of their products have grown in the past decade, and while South Africa does not have world-leading productivity in these industries, its performance is on par with that of other major emerging markets. Second, the countries that South Africa already exports to are projected to enjoy robust growth through 2030. The other member states of the Southern African Development Community account for 36 percent of current demand for South Africa's advanced manufacturing exports, while Asia-Pacific accounts for 14 percent; both are rapidly growing regional economies.

Finally, these industries will find that the largest share of growth will come from moving into adjacent products, many of which can utilise the same or similar capabilities and production techniques as existing products. We estimate that these adjacencies could account for two-thirds of South Africa's export growth potential in advanced manufacturing. Consider a hypothetical manufacturer of process equipment that focusses on making centrifuges

¹⁵ We also considered South Africa's other manufacturing industries. These can be categorised into regional processing, labour-intensive goods, and energy- and resource-intensive commodities. Labour-intensive goods were not considered further because the opportunities were much smaller, and labour costs in South Africa are not competitive with those in the rest of sub-Saharan Africa. Energy- and resource-intensive commodities were excluded because of their relatively low value added, as well as prevailing power limitations (although in the long term, opportunities such as ferrochrome may prove promising). Some regional processing opportunities do show potential and are discussed as part of the agricultural value chain opportunity.

¹⁶ *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute, November 2012.

¹⁷ In 2010 prices.

¹⁸ We translate the increase in exports into value add to the economy using multipliers from an input-output table for the South African economy (from 2000). This multiplier includes the direct impact on the sector as well as the indirect effect on upstream industries and the induced effect of increased consumption on the broader economy. A similar analysis is done for job creation. See the Technical Notes for more detail on the methodology.

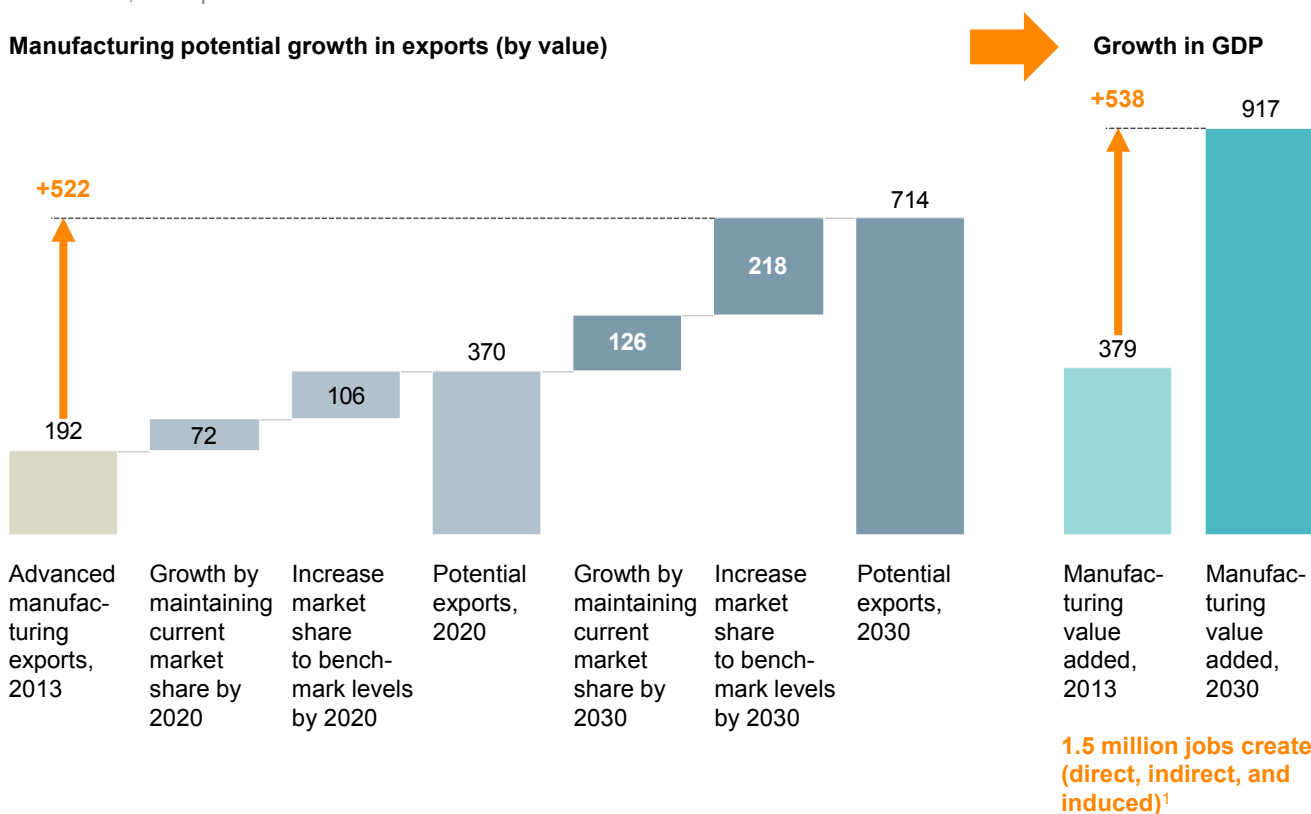
for the mining industry.¹⁹ First, it could expand to a broader range of equipment, including columns and reactors. Then it could diversify further by working with a network of related companies, such as makers of valves and instrumentation, to manufacture complete packages for processing plants. It could then expand into new industries, including oil and gas or petrochemicals, developing a range of new products and forming a dynamic supplier network.

Exhibit E6

Increased advanced manufacturing exports could account for 540 billion rand in GDP and 1.5 million jobs by 2030

Billion rand, 2010 prices

Manufacturing potential growth in exports (by value)



¹ Jobs created include 340,000 direct jobs in manufacturing, and 1,153,000 indirect and induced jobs in the broader economy.
NOTE: Numbers may not sum due to rounding.

SOURCE: World Bank WITS; IHS Global Insight; McKinsey Global Institute analysis

To realise the full opportunity, advanced manufacturing businesses and the sector as a whole must focus on increasing economies of scale. For business, this means aggressively pursuing export markets, investing in capital equipment, and becoming more innovative in products, manufacturing processes, and materials. For the sector, it means building up strong, close-knit manufacturing clusters with increased depth and cost competitiveness in supply-chain networks; government support through well-designed Special Economic Zones (SEZs) on the coast will be essential. This, in turn, will require both companies and research institutions to step up investment in R&D and create tighter and more collaborative networks with their suppliers, as well as to build up South Africa's skills base. Government can play a role in supporting these initiatives by expanding trade agreements, international partnerships, and technical alliances.²⁰

¹⁹ Process equipment includes fabricated metal equipment such as pumps, centrifuges, and storage vessels. Chemical and mining companies typically use these products in their production plants.

²⁰ Achieving growth in the organic chemicals industry will require greater access to regional gas supplies and means to transport the gas to coastal processing facilities to make logistics costs competitive.

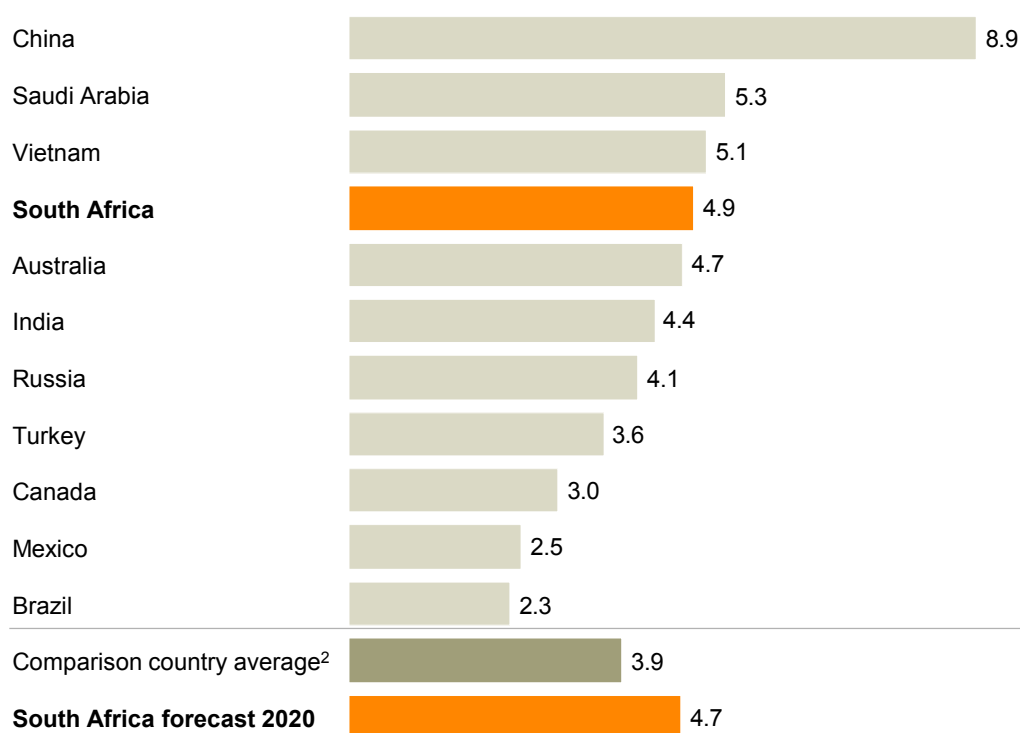
Infrastructure: Partnering for productivity

South Africa has made infrastructure delivery a policy priority. Its investment in infrastructure as a percentage of GDP, at 4.9 percent, is among the highest in the world (Exhibit E7). Its transportation infrastructure compares favourably to that of peer economies in the latest World Economic Forum competitiveness rankings; the modern airports in its major cities score particularly well. But there are still major gaps in electricity supply and access to clean water and sanitation facilities. The country plans to sustain its focus on infrastructure investment for the foreseeable future, with a 2.2 trillion rand (\$191 billion) commitment over the next decade.²¹ However, several barriers could hamper the delivery and economic impact of these planned infrastructure investments: constrained public finances, a pattern of cost and schedule overruns in key projects, and a lack of trust between government and its implementing partners in the private sector.

Exhibit E7

South Africa's infrastructure spend level exceeds that of most other economies

Infrastructure spend as percentage of GDP, 1992–2012¹



1 Considers only the four major asset classes—power, water, telecom, and transport.

2 Average excludes South Africa and China.

SOURCE: RSA National Treasury; PwC South Africa; McKinsey Global Institute analysis

South Africa can pursue three major strategies to ensure that its infrastructure spending is as productive as possible, translating into successfully completed projects that support growth. First, it can work harder to make maximum use of existing infrastructure. Second, it can optimise its capital portfolio, prioritising the projects with the greatest social and economic impact and bringing greater rigour to planning and monitoring the chosen projects. Third, it can streamline the delivery of projects by adopting more effective management approaches and practices. MGI research into this issue at the global

²¹ All values are quoted in real 2010 prices.

level shows that this three-pronged approach could save 40 percent of the worldwide infrastructure bill.²²

In South Africa, the impact of smarter infrastructure delivery would be tremendous. The country could save up to 1.4 trillion rand (\$122 billion) over the next decade and boost annual GDP by 260 billion rand (\$23 billion) by 2030 if it invests these savings in additional infrastructure, creating up to 660,000 jobs. A more effective approach to domestic infrastructure delivery would also build the capabilities needed to support expanded exports of construction services to the rest of Africa, as outlined above.

To realise this opportunity, however, South Africa will need a true partnership between government and business. The public sector must make its priorities and project pipeline more transparent; build its own capabilities for better specification, project planning, and oversight; and put more effective tendering processes in place. These changes should, in turn, give the private sector greater leeway and incentive to propose innovative solutions, take on greater project management responsibility, and push for better productivity performance in construction projects. In some asset classes, public-private partnerships could also open an important channel for greater private investment.

Natural gas: Powering South Africa's future

South Africa's chronic shortfall in electricity supply has been a constraint on growth. The state-owned power utility, Eskom, is building two new coal-fired power plants that are likely to secure the country's energy needs through 2020. At the same time, the government has plans to diversify the country's energy mix, adding new coal and nuclear power plants to increase its base load, together with some gas and renewable plants. Even with these projects coming on line, however, MGI projects that South Africa will face a power gap of 6GW to 10GW by 2025, as 14GW of aging coal power plants are decommissioned between 2020 and 2030, and electricity demand rises in line with a growing economy.

In this context, natural gas represents an important opportunity for South Africa to meet its power generation needs and support growth across the economy. Natural gas plants could be ready to meet the projected base-load gap within a decade (while the other options remain viable for timelines from 2030 onwards). Compared to other base-load plants, gas-fired plants are faster to build, entail lower capital costs, and have a smaller carbon footprint than coal. Like hydropower plants, they complement renewable energy because of the ease with which production can be ramped up or down to offset fluctuations in renewable energy production. While gas is currently a more expensive fuel, projected increases in coal prices and potential carbon taxes, combined with a potential reduction in gas prices, would reverse this equation, making gas viable for base-load capacity.

MGI estimates that South Africa could gain roughly 20GW of gas-fired power generation capacity by 2030, to provide flexibility to at least 10GW of renewables capacity. This would create demand for one trillion cubic feet of gas annually (similar to Malaysia's demand); to meet that demand, the country could use imports, its own shale gas resources (should they be proven), or both. If these supply options materialise at this scale, they could eventually drive gas prices down—and if prices decrease by 40 percent or more, gas could become a viable commodity for use in downstream petrochemical industries, significantly increasing the scale of the economic opportunity.²³

²² *Infrastructure productivity: How to save \$1 trillion a year*, McKinsey Global Institute and the McKinsey Infrastructure Practice, January 2013.

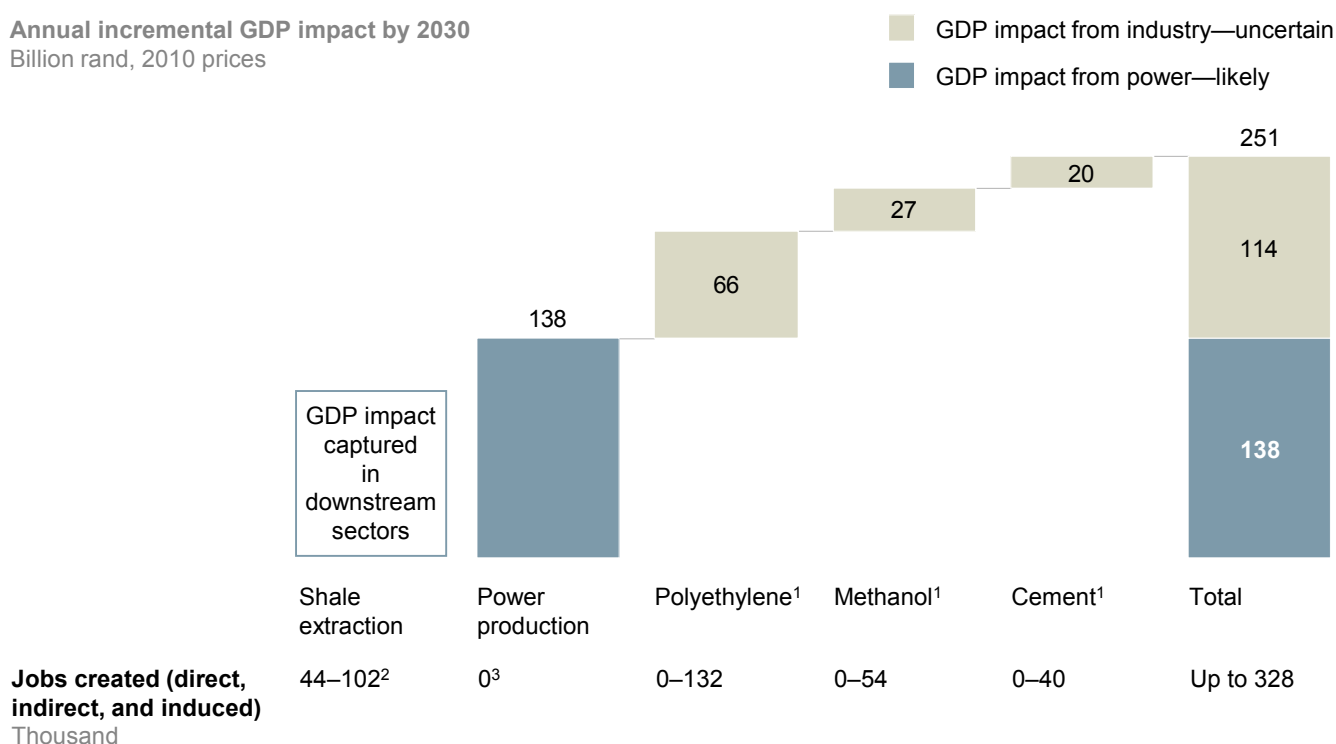
²³ Liquefied natural gas price forecasts average \$10 per million British thermal units for the next five years, which would be a suitable price for power production economics; estimates indicate a price below \$6 per million British thermal units will be needed to encourage the development of gas-based industries.

Under this scenario, we estimate that the gas-fired power generation opportunity alone could add 140 billion rand (\$12 billion) to South Africa's GDP.²⁴ If the price level becomes favourable, downstream opportunities in gas-based industries and the chemicals sector could add another 110 billion rand (\$9.5 billion) to GDP and create up to 230,000 jobs. Although South Africa's own shale gas resources are yet to be proven or developed, they could potentially create an additional 40,000 to 102,000 jobs (Exhibit E8).

Exhibit E8

By 2030, the gas industry could boost GDP by 140 billion to 250 billion rand annually and create up to 330,000 jobs

Annual incremental GDP impact by 2030
Billion rand, 2010 prices



- 1 These three examples are indicative of the range of opportunities for potential downstream gas use, but none has been confirmed. The downstream use realised after 2030 depends on gas market prices and regional and global demand for final products. Polyethylene and methanol would both be exported; cement would either be consumed locally or exported to neighbouring countries.
- 2 Assumes an annual production range of 0.3 trillion to 0.7 trillion cubic feet.
- 3 Assumes that jobs will be transferred from existing plants.
- NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute analysis

The first key step to pursuing the natural gas opportunity is securing sufficient supply. South Africa could tap many emerging supply options, although uncertainty surrounds the details and viability of some possibilities. One option is to import natural gas from Mozambique, potentially as liquefied natural gas (LNG) initially, or through a pipeline that would need to be built for this purpose.²⁵ Fast action by South Africa could make this a reality by the early 2020s. South Africa could also import LNG from the global market as an attractive short- to medium-term option.

²⁴ Assumes that jobs will merely be transferred from existing plants.

²⁵ Both the LNG and pipeline options would need to be assessed and compared based on operational, technical, and cost considerations. The Rovuma fields in the north of Mozambique are remote.

South Africa could also pursue the development of its own shale gas, although these technically recoverable resources still need to be proven, and no full appraisal programme—including pilot well drilling, seismic data acquisition and geological mapping—is yet in place. To go this route, the government would need to quickly finalise and publish the Mining and Petroleum Resources Development Act and amended technical regulations on hydraulic fracturing, issue permits for pilot wells to prove the resources, and simultaneously complete environmental impact assessments. The government could also guarantee purchase of the gas as an end-user for a number of years, given that early production costs are expected to be higher than the costs of LNG imports. In the long run, as South Africa builds up its extraction capabilities, these prices could decrease to sustainable levels. If successful, this approach could yield first gas production by the mid-2020s.

Although developing its own natural gas industry could be a major economic opportunity for South Africa, the investment required for such a programme would be immense. An estimated 600 billion to one trillion rand (\$52 billion to \$87 billion) would be needed by 2030 to drill wells and to build pipelines, LNG facilities, and new gas and renewables power plants. This would make private-sector capital critical, and to attract it, the government would need to take decisive steps to create certainty about demand and regulations. This investment could create 820,000 temporary jobs during the construction phase of the pipelines and power plants.

Service exports: Riding the wave of Africa's growth

South Africa has highly developed service industries, which currently generate 62 percent of the country's total GDP and have created 2.7 million jobs since 2004. Key segments include banking and other financial services, construction services, transportation, telecommunications, and legal and other business services. The country has an opportunity to boost exports of many of these services to meet rising demand in the rest of Africa.

Service imports by sub-Saharan Africa grew at an average of 7.1 percent from 2002 to 2012, reaching 536 billion rand (\$46 billion) in 2012, with the greatest value in transportation, construction, and business and financial services.²⁶ However, South African exports account for only 2 percent of the region's service imports. By contrast, Brazil—which accounts for a comparable share of GDP in its region—commands a 26 percent market share in providing service imports to Latin America.²⁷

South Africa has an opening to become a leading service provider to the continent. We calculate that service exports to sub-Saharan Africa could grow from 10 billion rand (\$868 million) in 2012 to 120 billion rand (\$10 billion) in 2030, while international service exports could grow by 75 billion rand (\$6.5 billion). This would generate some 245 billion rand (\$21 billion) in additional GDP and up to 460,000 jobs by 2030 (Exhibit E9). Developing these industries could have even wider benefits. By showcasing a strong South African brand, it could promote intraregional flows of people, services, and goods, even contributing to increased exports of manufactured goods.

²⁶ UN Service Trade database. Figures include South African demand; service imports in 2012 were 439 billion rand (\$38 billion) when excluding South Africa.

²⁷ Figures exclude tourism and government services.

Exhibit E9

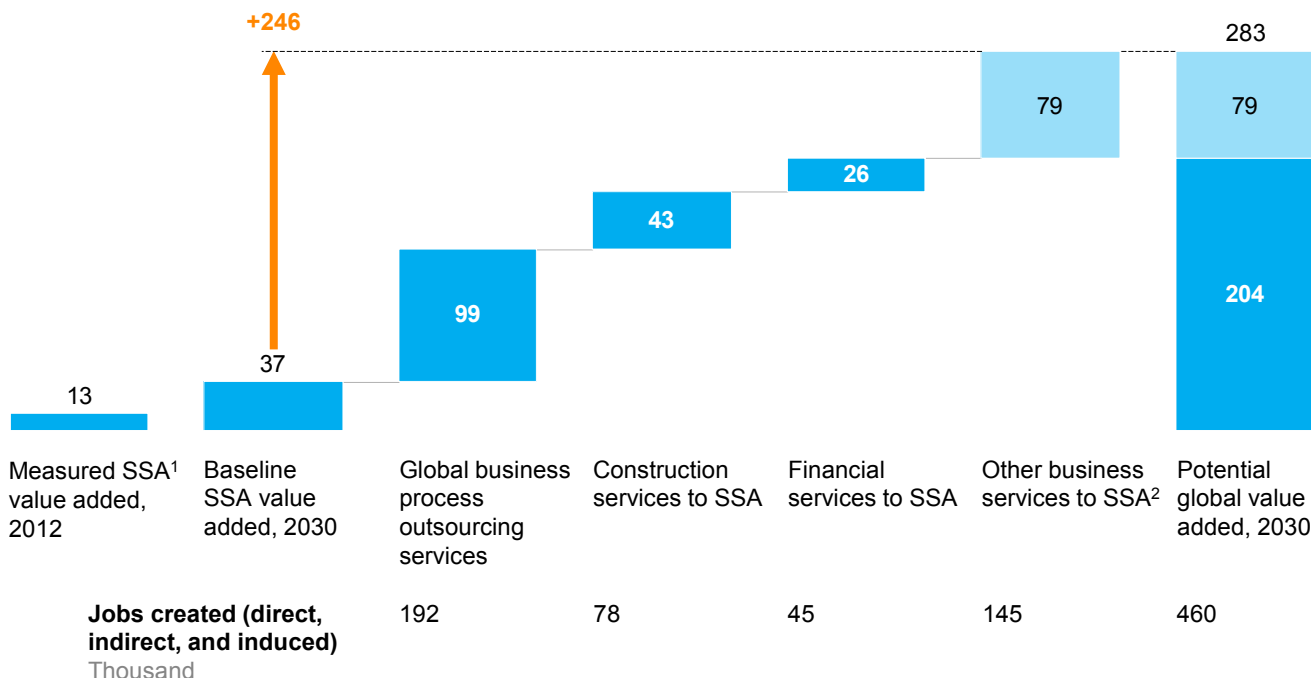
Expanding service exports could increase value added to GDP by 245 billion rand and create 460,000 jobs by 2030

Estimated annual incremental value added of service exports to GDP by 2030

Billion rand, 2010 prices

GDP impact

- High-level estimate
- Assessed in detail



1 Sub-Saharan Africa.

2 Includes trade, catering, accommodation, transport, storage, communication, real estate, and business services.

NOTE: Numbers may not sum due to rounding.

SOURCE: Stats SA; IHS Economics; UN Service Trade; Gartner; Government of India National Development Council; McKinsey databases: Panorama Global Banking Pools, Global Insurance Pools; Infrastructure Projects Analytical Tool; McKinsey Global Institute analysis

South Africa has many well-regarded service companies, such as MTN in telecommunications and Standard Bank in financial services. It also has skilled talent in fields that are in high demand, including engineers, actuaries, and architects, and the labour costs associated with these professions in South Africa are relatively low compared to those in the developed world. Moreover, the domestic business and financial services environment provides a strong base of operations.

Our analysis focusses on two major opportunities: exporting services to the construction industry in the rest of Africa, and providing financial services across the continent. It also considers the growth potential in building on South Africa’s record of providing business process outsourcing services to global markets.

In providing services to the construction sector, South Africa has a capable domestic industry and already exports its services at a modest scale; total exports were worth 509 million rand (\$44 million) in 2013. But its current market share of foreign-built sub-Saharan African projects stands at only 7 percent. China currently captures 32 percent, although many of its deals involve the trade of infrastructure project delivery for resources or are linked to foreign direct investment. However, a fragmented group of countries win the remaining two-thirds of projects, and South Africa can compete more aggressively for a larger share of these. Capturing roughly one-third of them would yield a market share of 20 percent.

South Africa may be able to achieve this growth if its construction and financial services firms can take a page from China's playbook and package their offerings to both finance and construct projects. Given the significant levels of foreign direct investment already flowing outwards from South Africa, this approach could be feasible. We project that South Africa could capture some 100 billion rand (\$8.7 billion) in project value by 2030, contributing 43 billion rand (\$3.7 billion) to annual GDP.²⁸ The opportunity spans the full range of construction offerings, from design to consulting to maintenance services. To achieve this growth, the construction industry will need to make a concerted effort to develop local market intelligence and expand its footprint across Africa by pursuing local partnerships and sending its best talent into the region.

In financial services, South African firms are ideally positioned to serve the fast-growing demand for banking and insurance in sub-Saharan Africa. There are exciting opportunities in corporate and investment banking that could be worth 320 billion rand (\$28 billion) by 2030, should South African banks increase their market share in sub-Saharan Africa from 12 percent today to 20 percent in 2030. This is also a key moment for South African banks to expand their presence across the continent; we expect retail banking to grow at 16.7 percent per year (in rand terms) in the rest of sub-Saharan Africa. If institutions broaden their offerings to reach low-income customers, particularly through digital channels, the opportunity could be worth 435 billion rand (\$38 billion) by 2030.²⁹ The nascent corporate and retail insurance markets represent a 225 billion rand (\$20 billion) opportunity in premiums for South African firms, which are well positioned to execute bold acquisition moves.³⁰ Although expansion in African banking and insurance would not translate directly into GDP impact for South Africa, it would allow local firms to provide headquarters and shared services for much more extensive operations across the continent. MGI estimates that these combined financial services opportunities could add as much as 26 billion rand (\$2.2 billion) to annual GDP by 2030 while creating up to 45,000 jobs in South Africa.

South Africa's business process outsourcing (BPO) industry posted 18 percent annual growth between 2010 and 2012, and it now commands an estimated 1 percent of the global market. It offers the country's largest job creation potential across all service sectors. Based on benchmarking with other BPO hubs, MGI estimates that South Africa could quadruple its global market share to 4 percent by 2030, adding 100 billion rand (\$8.7 billion) to GDP and creating 190,000 jobs. To do so, industry and government will need to work together by establishing an academy system that could train up to 13,000 people a year in the necessary skills.

²⁸ This is the potential impact coming back into the South African economy by providing both services to the construction industry and managing construction projects in the rest of Africa.

²⁹ This is an estimate of total revenue earned in nominal terms. Not all of it will have a direct impact on GDP.

³⁰ This is an estimate of total premiums in nominal terms. Not all of it will have a direct impact on GDP.

Agriculture: Unlocking the full value chain

South Africa has productive, internationally competitive agriculture and agro-processing sectors. It is a leading exporter of fruit, nuts, cereals, wine, and fruit juices; its total agricultural exports were worth 67 billion rand (\$5.8 billion) in 2012. Moreover, several of South Africa's existing export markets—notably sub-Saharan Africa and Asia—are growing rapidly as large populations join the consuming class, creating a 145 billion rand (\$13 billion) opportunity (Exhibit E10).

Against this backdrop, MGI estimates that South Africa has the potential to triple its agricultural exports by 2030. This would in turn double the GDP impact of the entire value chain, adding 160 billion rand (\$14 billion) to annual GDP and creating up to 490,000 jobs. This growth would be the result of increased demand in leading export markets as well as South Africa's ability to replicate its current success in particular countries by expanding its market into the wider surrounding region. Increased agricultural exports would be a key driver of rural job growth in addition to representing important societal impact, given that nearly one in ten South Africans depends on subsistence or smallholder farming.

Capturing this potential will require a bold, integrated national agriculture plan focussed on achieving major gains in production and productivity. It will also require a strong shift towards processed products, which create significantly greater GDP impact than agricultural production alone. The opportunity lies primarily in fruits, beverages, animal products, and cereals. South Africa is reasonably cost-competitive in these products, particularly in the rest of sub-Saharan Africa, where it is establishing a strong formal retail presence. But to capture increased market share in Europe and Asia-Pacific, South Africa needs to become more competitive in select products, such as poultry.

To meet the goal of increased exports, South Africa needs to take several steps to make farming more productive. Commercial farms, which account for close to 90 percent of the country's cultivated farmland, should invest in cutting-edge technology and farming techniques to raise the productivity of crops such as maize and sugar cane, where South Africa's yields currently lag behind those of benchmark countries. Smallholder farmers also have an important role to play in expanding South Africa's agricultural production. They will need support to form cooperatives for better market access and to transition to higher-value crops to strengthen their financial viability.

To support higher production goals, the government will need to clarify land rights, consider models for farm consolidation, strengthen irrigation and water management, and assess opportunities to bring additional unused land into production.

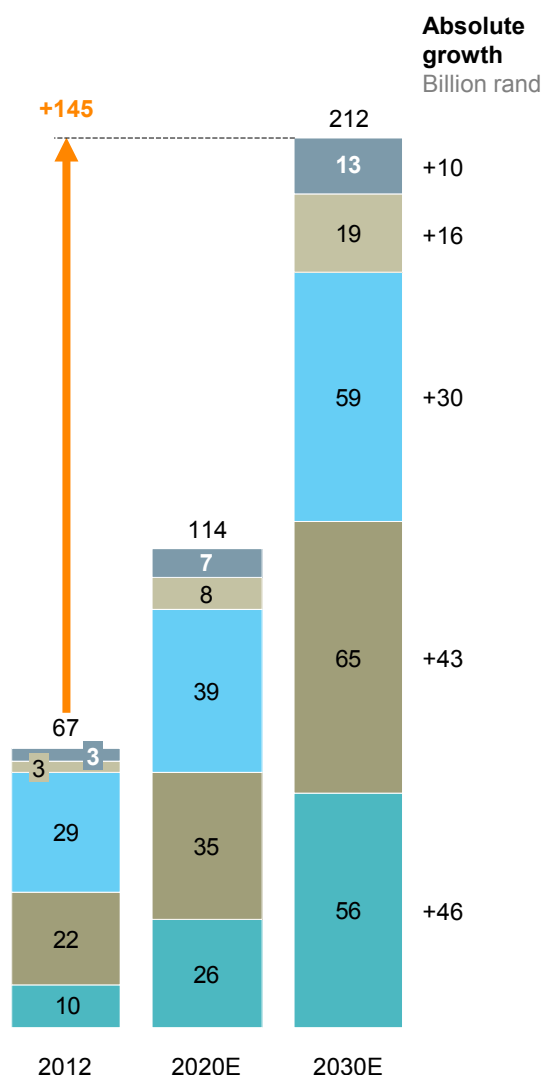
In agro-processing, growth will come from a business focus on market access and diversification, taking South African products beyond the country's immediate neighbours and into sub-Saharan Africa more broadly. Government will need to focus on access to energy, water, and logistics in rural areas. An expanded cold chain will also be critical to the success of exporting fruit and animal products. South African agro-processing businesses should also look for opportunities to bring agricultural production from across the region into their supply chains.

Exhibit E10

South African agricultural exports could reach 210 billion rand by 2030

Estimated export potential of agro-processing and agricultural products¹

Billion rand, 2010 prices



South African share of imports %		2012	2020E	2030E
	North Africa and Middle East	0.5	0.8	1.2
	Sub-Saharan Africa (excluding SADC) ²	1.4	3.4	5.5
	Europe	0.5	0.6	0.7
	SADC (excluding South Africa)	38.8	47.1	60.6
	Asia-Pacific	0.4	0.6	0.9

¹ Based on products South Africa already exports; excludes Latin America and North America, which have lower export prospects.

² Southern African Development Community.

NOTE: Numbers may not sum due to rounding.

SOURCE: IHS Economics; World Bank WITS; McKinsey Global Institute analysis

EQUIPPING SOUTH AFRICANS FOR THE JOBS OF THE FUTURE

The big five priorities identified in this report offer tremendous growth potential across the economy. They could also create an additional 3.4 million jobs, contributing to solving South Africa's persistent unemployment challenge. Yet the reality is that much of today's workforce will not be able to fill those jobs. Just 22 percent of the new jobs envisaged in this report will be suitable for people with only a school leaving ("matric") certificate, or secondary education, while an additional 48 percent will require additional trade or clerical skills. The remaining 30 percent of the jobs will require technical, managerial, or professional skills and tertiary education.

Interviews conducted by MGI indicate that employers overwhelmingly find the average South African school leaver unprepared to enter the workforce. They describe verbal and written language skills, mathematics and science proficiency, and general problem-solving capabilities as inadequate, while workplace skills such as teamwork are also often lacking. Employers often deem the risk of hiring someone with these skill deficiencies too high.

Economic growth and employment growth must go hand in hand. Unless South Africa can create the workforce to fill the jobs it creates, manufacturing and services companies will struggle to grow their businesses and may leave new opportunities on the table as a result. And without growth, businesses will be unwilling to hire. Growth and skills development will need to move in tandem to break this cycle.

Building an employment-ready workforce will require investment from both government and the private sector. Five interventions, each with a proven record in other countries, could begin to address this issue quickly and could be scaled up:

- **Expanding vocational training.** Based on an assessment of the scale of skills development needed, we estimate that 40 to 60 percent of South African youth should graduate through such programmes by 2030.³¹ This would represent a dramatic increase from the 8 percent of 15- to 24-year-olds who completed such programmes in 2013.³²
- **Boosting the quality of education.** South Africa can enhance the quality of school leaving qualifications for those remaining in the traditional educational system, with a strong focus on strengthening language skills, mathematics, and science.
- **Improving the "soft skills" of South Africa's youth.** The country can achieve this through coaching on workplace behaviour, interview preparation, customer relations, and communication skills as well as initiatives such as job shadowing. There are also opportunities to foster entrepreneurship among young people; South Africa has among the lowest rates of new business creation in the world. Existing initiatives tackling these issues should be scaled up across the country.
- **Inviting business to play a greater role in education and training.** The most obvious step of this intervention is to create more apprenticeships, particularly to ensure that vocational training programmes are meaningful for participating youth. Business should also participate in designing curricula.

³¹ The South African government has announced its intention to pursue this type of strategy, with a target of four million scholars by 2030. This is five times the number in 2013.

³² *Statistics on post-school education and training in South Africa: 2013*, Department of Higher Education and Training, March 2015; *Education statistics in South Africa 2013*, Department of Basic Education, March 2015.

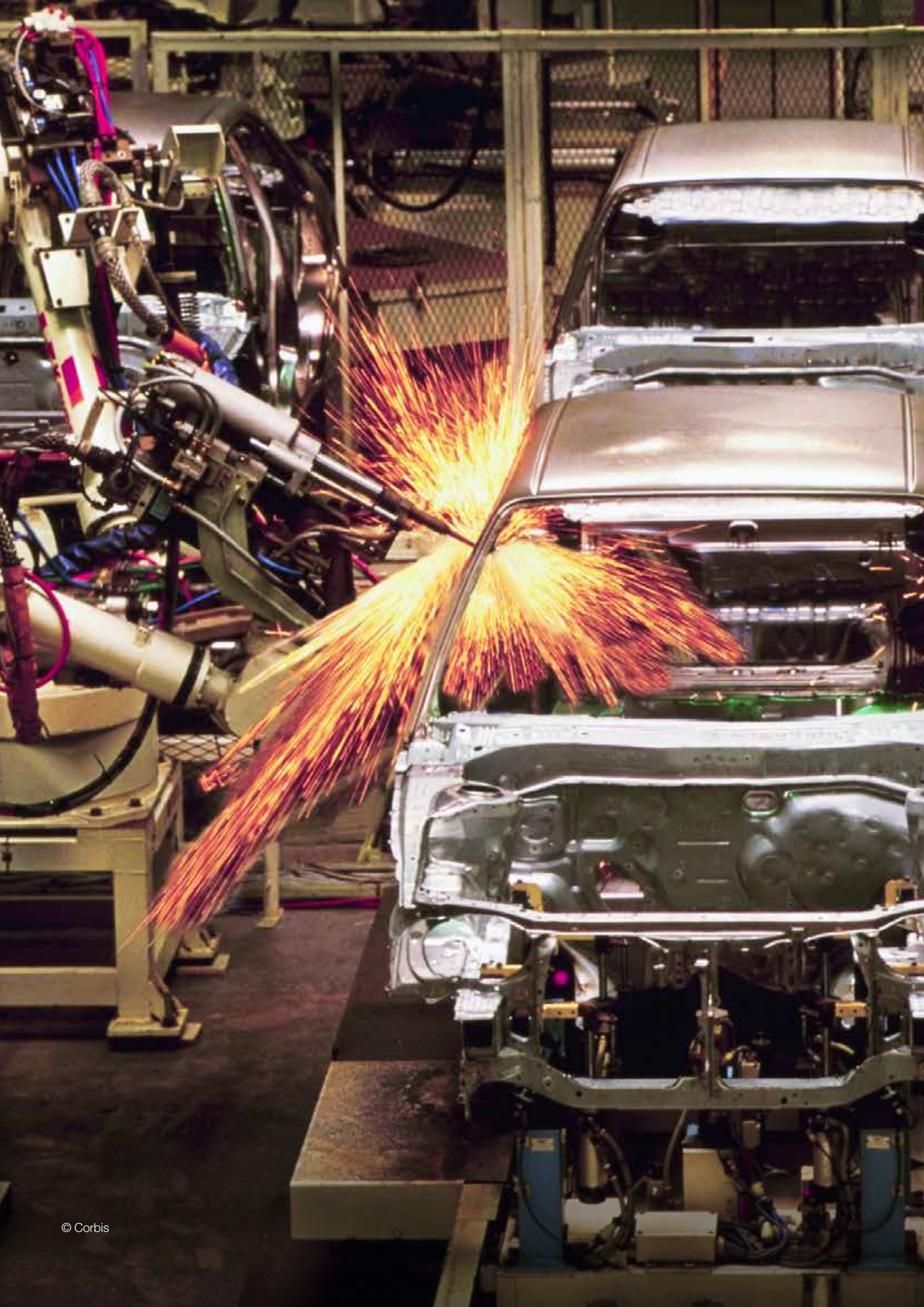
- **Applying technology solutions to connect job seekers to employment.** In particular, we estimate that wider use of digital labour platforms, which link unemployed people with vacancies, could greatly increase labour market efficiencies and result in an additional 860,000 people finding jobs.



Some 20 years ago, South Africa's transformation from a divided to a democratic society inspired the world. Its leaders set out a vision of freedom, dignity, and shared nationhood. Citizens from every walk of life came together to turn that vision into reality. While South Africa has travelled a remarkable road since 1994, it remains a considerable way from its goal of achieving an inclusive society and creating prosperity for all. In recent years, as growth has slowed and unemployment has risen, that goal has become more elusive. Now is the time to raise new aspirations, and to unleash an economic transformation as profound and far-reaching as the political transformation of the 1990s.

The good news is that, with enormous changes reshaping the global economy and rapid growth under way in much of Africa, South Africa has a new set of opportunities to change the footing of its economy—driving exports of goods and services, unleashing talent and productivity, fostering entrepreneurship, and accelerating growth and job creation. By 2030, South Africa can realistically aim to be a country at the core of Africa's economic engine, with a cohort of innovative, dynamic businesses working hand in hand with government to drive sustainably high rates of GDP growth, and millions of skilled, motivated young people playing their part in a vibrant economy.

The big five priorities for jobs and inclusive growth are dramatic, ambitious, and achievable. South Africans in government, in business, and across society have proven that they can come together, but now is the time to step up and forge a new partnership on critical topics from infrastructure to skills development. Implementing the big five will require South Africans to change the nature of their own dialogue, believe in themselves, and take the right risks to deliver the dream of a "rainbow nation" characterised by shared prosperity for all.



1. ADVANCED MANUFACTURING: CREATING A GLOBAL HUB

Manufacturing should be a major sector in any developing economy, driving productivity gains and R&D, generating a large share of total exports, and delivering significant value added growth. Yet in South Africa today, manufacturing directly contributes only 13 percent to GDP, compared with the 20 percent of GDP more typical in comparable economies.³³ Indeed, the relative contribution of manufacturing has almost halved since 1990, leading to pessimism about the sector's future.

13%

Contribution of manufacturing to South Africa's GDP, vs. a peak of 24% in 1990

Although South Africa is punching below its weight in manufacturing today, our analysis suggests that the country has the potential to develop a globally competitive presence in some of the largest and most economically valuable manufacturing subsectors, including automobiles; transportation equipment; machinery, process, and electrical equipment and parts; and chemicals. These advanced manufacturing industries do not compete on the basis of low wages. Instead, they produce high-value added goods that require skilled labour, technology, and a strong business environment—all of which count among South Africa's competitive advantages.

South Africa's exports of advanced manufacturing products in 2013 were valued at more than 190 billion rand (\$16 billion), or 44 percent of total manufactured exports.³⁴ Our analysis suggests that by 2030, exports of these products could grow to more than 700 billion rand (\$61 billion). This would double the size of South Africa's overall manufacturing exports, boost GDP by 540 billion rand (\$47 billion), and create some 1.5 million jobs in the broader economy.

A manufacturing renaissance will require a concerted effort by both government and the private sector to increase the output and exports of specific competitive industries, through increasing productivity, accessing growing export markets, and increasing the level of innovation. To foster one key enabler of this growth, both government and business will need to invest in skills development to ensure that South Africa maintains and strengthens the productivity of its export industries in an increasingly competitive world.

³³ This is based on 2014 data from Brazil, India, Indonesia, Mexico, Thailand, and Turkey.

³⁴ All rand values are quoted in 2010 prices. All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

CAN SOUTH AFRICA REVERSE THE DECLINE OF ITS MANUFACTURING SECTOR?

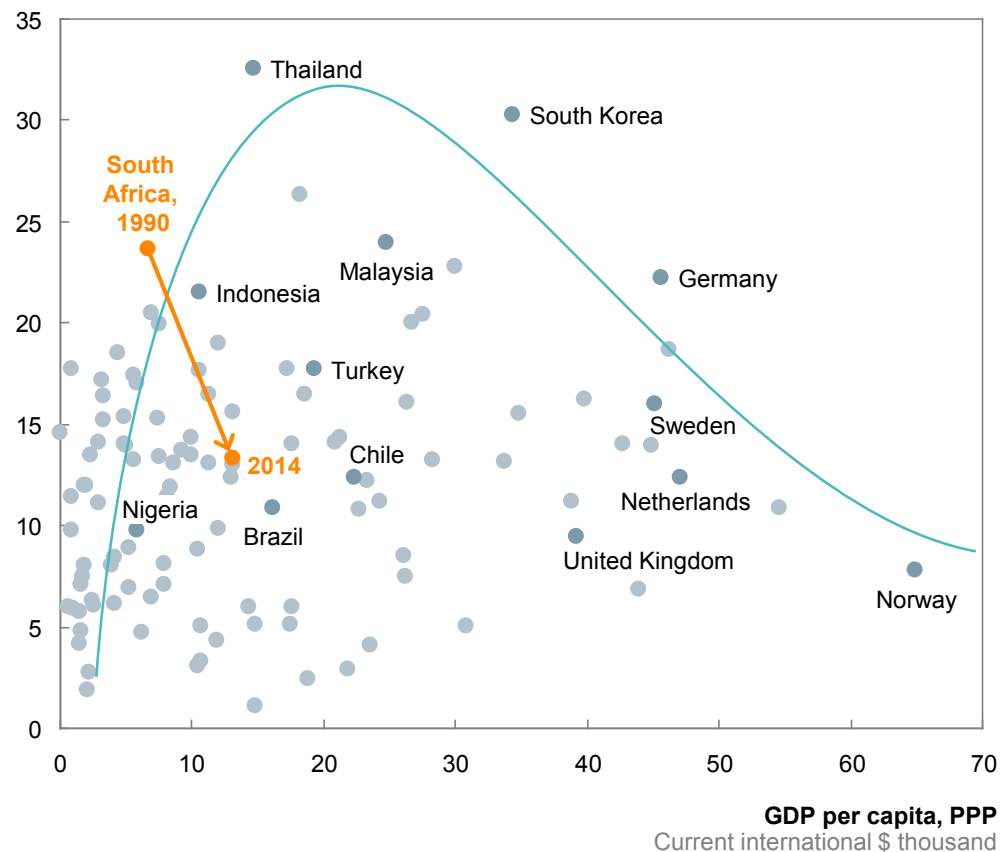
As economies develop and their weight starts to shift towards services, the contribution to GDP from manufacturing typically peaks at 30 to 40 percent, MGI research has shown.³⁵ South Africa has not followed this path. The share of GDP from manufacturing peaked at 24 percent in 1981 and has since almost halved since 1990 (Exhibit 1). In a sample group of emerging economies, manufacturing accounts for 27 percent of employment growth and for 73 percent of exports. In South Africa, however, manufacturing employment declined by 0.4 percent annually between 2004 and 2014,³⁶ and the share of employment in South Africa attributable to manufacturing has not followed the pattern seen in other countries (Exhibit 2).

Exhibit 1

Manufacturing as a share of GDP has halved since 1990, but manufacturing should be a major sector in an economy of South Africa's size

Manufacturing value added as a proportion of GDP
% of GDP

— Development trend¹



1 Not a mathematical fit, but an observed trend that manufacturing peaks at 30–40% of GDP before gradually declining as a country's wealth grows.

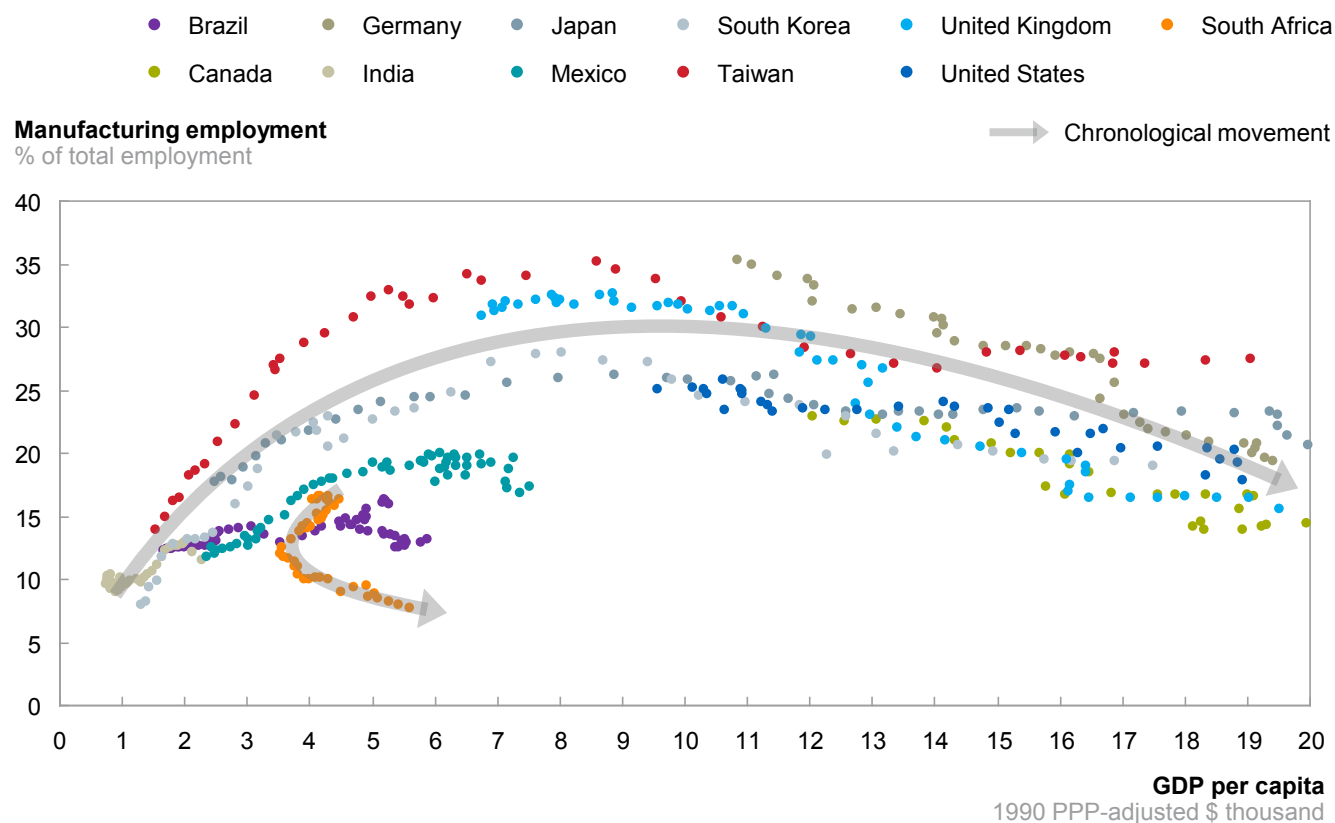
SOURCE: World Bank World Development Indicators; McKinsey Global Institute analysis

³⁵ *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute, November 2012.

³⁶ *Quarterly Labour Force Survey, Quarter 1, 2015*, Statistics South Africa, May 26, 2015.

Exhibit 2

Manufacturing as a share of total employment in most economies follows a consistent pattern as prosperity increases, but not in South Africa



SOURCE: Stats SA; The Conference Board; Oxford Economics; McKinsey Global Institute analysis

The country’s history in large part explains the atypical evolution of manufacturing in South Africa. Apartheid bolstered manufacturing output; some industries were subsidised and protected to create a domestic supply of goods that could not be imported due to international sanctions, while the sanctions inadvertently protected other industries, such as textiles. Once sanctions were lifted in 1990 and trade liberalised, the manufacturing sector was ill equipped to compete in the global export market. The sector came under further pressure during the mid-2000s, when strong global mineral prices and capital inflows (among other factors) bolstered the value of the rand, making exports relatively expensive.³⁷ Consequently, the sector’s share of GDP has steadily declined.³⁸ Today that share stands at 13 percent—compared with 18 percent in Mexico, 24 percent in Malaysia, 32 percent in China, and 33 percent in Thailand.³⁹

Understandably, the marked decline of manufacturing over the past two decades has led to pessimism about the sector’s future, and South Africa’s relatively high input costs underline that pessimism (Exhibit 3). As we argue later in this chapter, the pessimism is overstated, and key South African manufacturing industries do have a robust basis on which to compete internationally. Nonetheless, it is worth noting the cost challenges manufacturers must grapple with.

³⁷ The currency’s average value from 2004 to 2008 was 6.98 rand per dollar; by 2013, it weakened to 9.65 rand per dollar. In the first half of 2015, the rand was approximately 20 to 30 percent weaker than in 2013.

³⁸ For further discussion, see, for example, Anton D. Lowenberg, “Why South Africa’s apartheid economy failed”, *Contemporary Economic Policy*, volume 15, issue 3, July 1997; and David Faulkner and Christopher Loewald, *Policy change and economic growth: A case study of South Africa*, RSA National Treasury, policy paper number 14, October 2008.

³⁹ *World development indicators 2015*, World Bank, April 2015; Statistics South Africa.

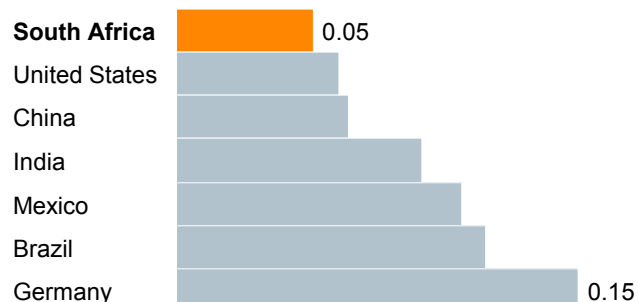
Exhibit 3

South Africa's base cost structure is not a comparative strength

\$ per unit of input

Electricity price (including taxes) for industrial users, 2015

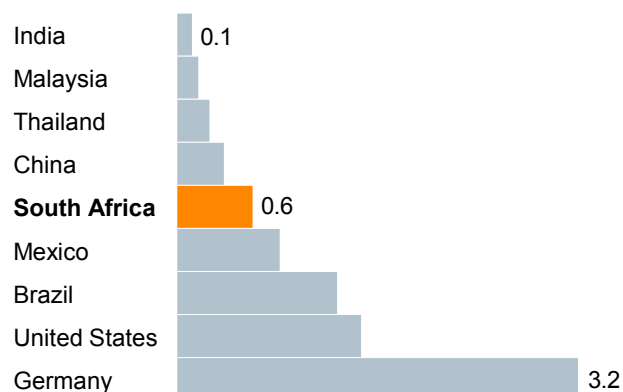
\$ per kWh



Water, 2014

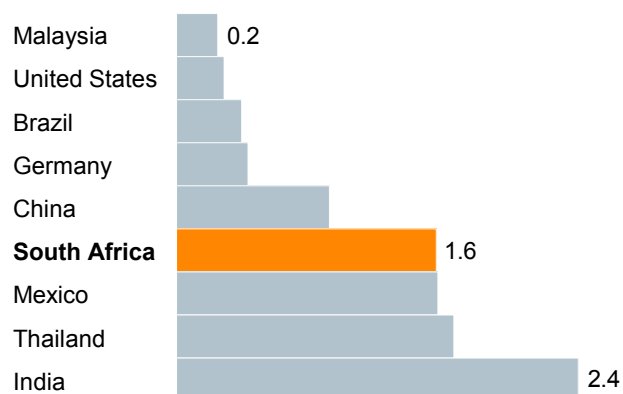
Average rate across most populous cities

\$ per cubic metre



Industrial unit labour costs, 2013¹

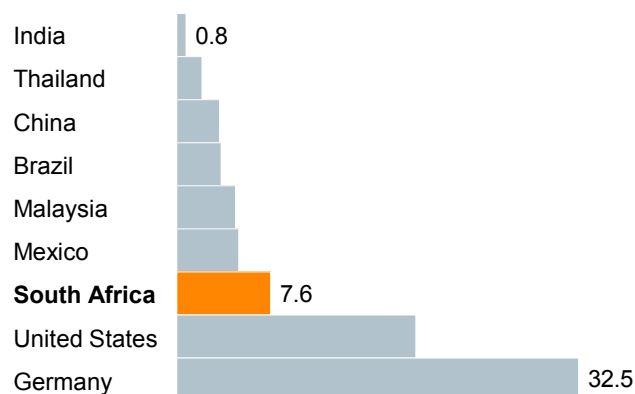
\$ compensation per \$ output



Industrial wages, 2013 average

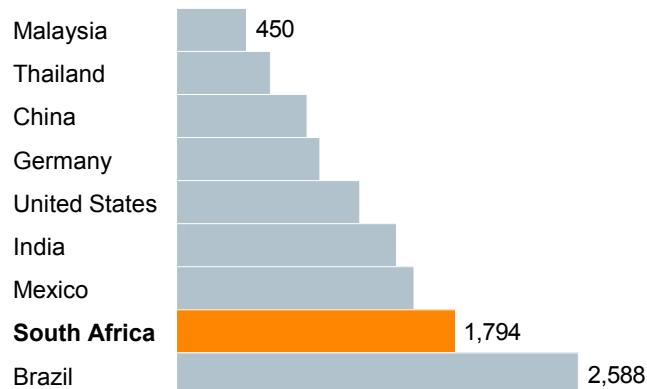
Total hourly compensation in manufacturing (wages plus supplementary benefits)

\$



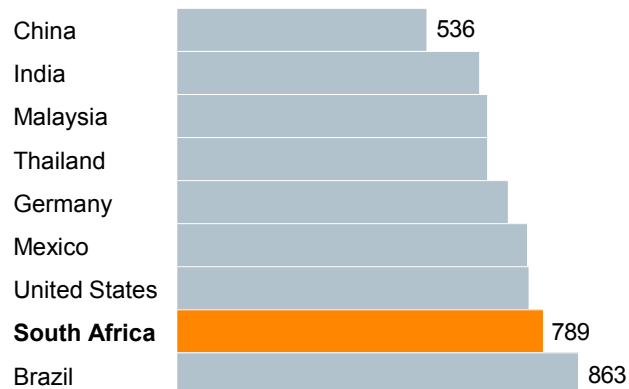
Transport, 2014 average²

\$ per 20-foot container



Steel market price, 2010–14 average³

\$ per tonne



1 2012 for China, 2011 for Brazil.

2 Includes costs of documents, administrative fees for customs clearance and technical control, customs broker fees, terminal handling charges, and inland transport. Assumes shipping from most populous city from a midsized company.

3 Malaysia and Thailand prices based on Hong Kong prices.

SOURCE: Enerdata; World Bank; GWI; Passport GMID; Euromonitor; national sources; McKinsey Global Institute analysis

In raw materials, steel is a case in point. South Africa has abundant iron ore, and its steel industry met 44 percent of Africa's crude steel demand in 2012. However, input costs have been rising, particularly those of energy and capital investment, while imported steel is subject to high inland logistics costs.⁴⁰ In transport, South African manufacturing also faces high costs, a consequence of predominantly inland, domestic-oriented manufacturing activities, limited rail infrastructure from production sites in the interior to ports, and the resulting dependence on road logistics. This leads to relatively expensive inland logistics: the cost of exporting a container from South Africa is \$1,830 before shipping costs, compared with the OECD average of \$1,080.⁴¹

Labour costs represent a further challenge for South Africa's manufacturing sector. Monthly wages are low compared with those in developed economies but are higher than those in other emerging economies, including China and India. South Africa's unit labour costs (a measure of unit compensation per unit output) are comparable with those of Mexico and Thailand but far higher than those of China. South Africa also has a relatively high incidence of industrial action (strikes), which is reportedly a factor deterring investment in manufacturing.

Currently, South Africa's only cost advantage in manufacturing is in energy: it has the lowest cost per kilowatt-hour of any of our sample countries.⁴² Yet even this advantage is eroding, as energy supply is unreliable and planned price increases will keep business margins under pressure.

Given these structural barriers, the question is: can South Africa reasonably hope to build a thriving manufacturing sector? Our analysis suggests that, although the country is unlikely to achieve competitiveness in all segments of manufacturing, it does have significant opportunities in some key industries—"global innovation for local markets", in the parlance of previous MGI research—particularly advanced manufacturing. As we show below, such advanced industries already produce nearly half of South Africa's manufacturing exports and are well positioned to grow both output and employment. South Africa also has potential, albeit smaller, in two other categories of manufacturing: regional processing and energy- and resource-intensive commodities.⁴³ Together, these three categories already account for around 88 percent of the gross value added of South African manufacturing (Exhibit 4). The two remaining categories—global technologies/innovators and labour-intensive traded goods—account for a much smaller share of value added, both in South Africa and globally.

Despite the cost challenges set out above, South Africa has a number of structural advantages that will enable it to compete successfully in advanced industries and other categories of manufacturing. Although it is geographically distant from many important markets, it has the advantage of access to sub-Saharan Africa, the second-fastest-growing region in the world. In addition, South Africa has relatively good infrastructure, particularly compared with the rest of Africa, and access to major shipping lanes.⁴⁴ Historically, South Africa has had a strong culture of developing proprietary technology, including in the gas-to-

⁴⁰ *Manufacture of basic iron and steel*, Who Owns Whom, 2013.

⁴¹ *World development indicators 2015*, World Bank, April 2015. South Africa's overall infrastructure provision is near the global average, ranking ahead of Brazil, China, Kenya, and India, for instance, but behind Chile and Malaysia. Overall year-over-year infrastructure rankings are not improving. See *The global competitiveness report 2012–2013* and *The global competitiveness report 2014–2015*, World Economic Forum.

⁴² Global Energy & CO₂ Data, Enerdata, September 2014; POLES global energy forecasting model, Enerdata, February 2015.

⁴³ *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute, November 2012.

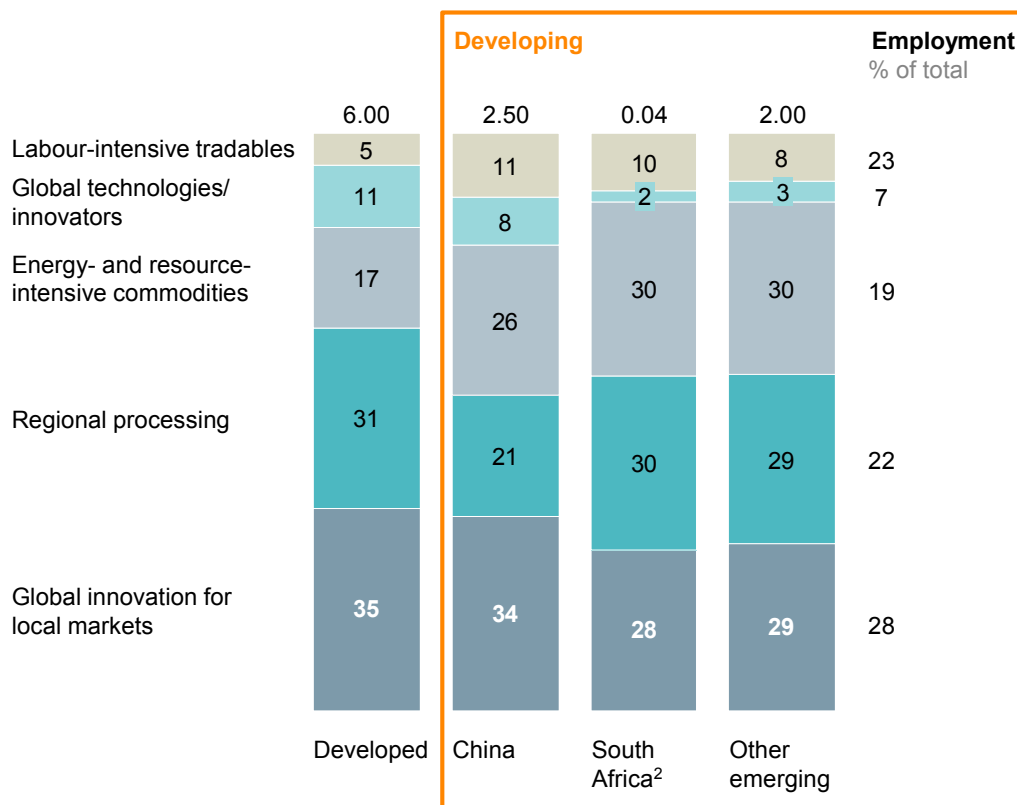
⁴⁴ Juan Trevino and Masafumi Yabara, "Sub-Saharan Africa builds momentum in multi-speed world", *Survey Magazine: Countries & Regions*, International Monetary Fund, May 2013.

liquids and mining sectors. The country has also fostered high-calibre engineering skills and a commitment to engineering excellence at its tertiary institutions.

Exhibit 4

Manufacturing gross value added by group for selected economies, 2010¹

%; \$ trillion



¹ Sample of 75 countries, including 28 developed and 47 developing economies.

² Estimate based on available data; aggregated sector numbers were divided equally between component categories. NOTE: Numbers may not sum due to rounding.

SOURCE: Stats SA; Manufacturing the future, McKinsey Global Institute, November 2012; McKinsey Global Institute analysis

Moreover, although South African manufacturing has higher unit labour costs than those in many peer nations, the overall productivity of the economy across all sectors is comparable (at purchasing power parity) with that of China and Brazil. Its productivity in 2012 was higher than that of Indonesia, Nigeria, and Kenya (Exhibit 5). Interviews with leaders of global manufacturing companies yielded the same finding: South Africa can be productive relative to other emerging markets. However, South Africa will need to maintain its focus on investing in productivity, which is improving at a slower rate than in other emerging economies.⁴⁵

A further advantage is that South Africa is rated as an attractive, relatively low-risk place to invest in terms of tax policy, foreign trade, and payments: among eight comparable emerging markets, Economist Intelligence Unit places South Africa second to Malaysia as a low-risk destination.⁴⁶ Reflecting this, investment trends indicate confidence in the advanced manufacturing sector. Between 2009 and 2013, 76 billion rand (\$6.6 billion) was invested in

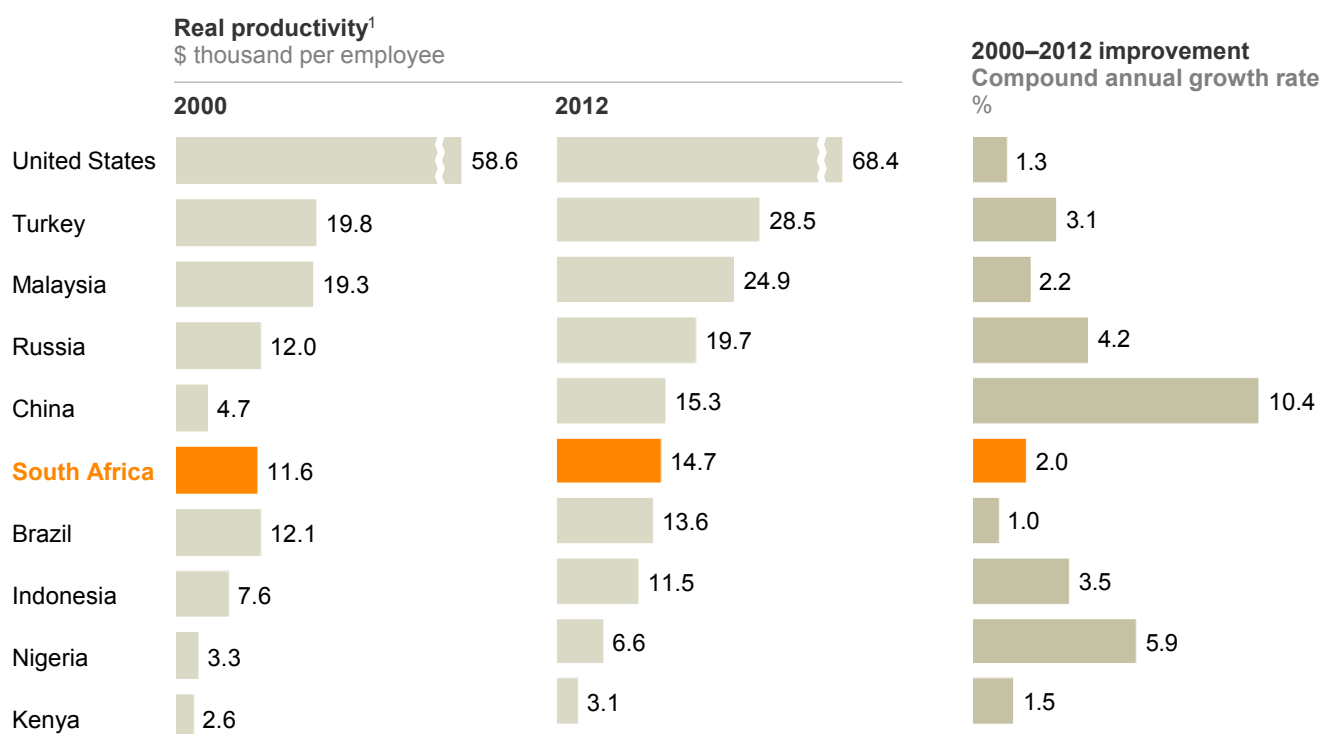
⁴⁵ South Africa's productivity growth between 2000 and 2012 was 2.0 percent a year compared with China's 10.4 percent, Nigeria's 5.9 percent, and Russia's 4.2 percent, for instance.

⁴⁶ Economist Intelligence Unit, 2015. The set of countries comprised Brazil, Indonesia, Kenya, Malaysia, Nigeria, Russia, South Africa, and Turkey.

the transport equipment, chemicals, and metals manufacturing industries.⁴⁷ Manufacturing has received a healthy share of overall capital expenditure, and investment grew in real terms by 5 percent a year between 2003 and 2013.⁴⁸ Although foreign investment inflows are inconsistent, they, too, have been growing in aggregate—and have been focussed on advanced manufacturing industries.⁴⁹

Exhibit 5

South Africa's overall economy has comparable productivity to China and Brazil, but is improving at a slower rate than several other emerging economies



1 Productivity is based on GDP contribution per employee for the overall economy; levels are reported in real 1990 purchasing power parity dollars.

SOURCE: World Bank World Development Indicators; McKinsey Global Institute analysis

Despite the overall decline of manufacturing as a proportion of GDP, several subsectors have taken advantage of these positive factors and grown their output and exports. For instance, exports of basic metals grew at 4.7 percent a year between 2003 and 2013; coke and refined petroleum products by 4.4 percent; machinery and equipment by 4.3 percent; food and beverages by 4.2 percent; chemicals and chemical products by 4.2 percent; and motor vehicles and trailers by 3.5 percent.⁵⁰ These top six categories accounted for 82 percent of South Africa's manufactured exports in 2013; their export growth easily outpaced the GDP growth rate, which averaged 3.3 percent from 2003 to 2013. In general, manufacturing exports have increased faster than domestic manufacturing growth—3.8 percent vs. 2.5 percent a year, respectively—indicating a steady shift to an export-oriented sector.

⁴⁷ Dealogic.

⁴⁸ Database of Capital Expenditures (Investments or CapEx), Real, IHS Global Insight, February 2015.

⁴⁹ World Bank World Integrated Trade Solution; Dealogic.

⁵⁰ World Bank World Integrated Trade Solution, 2015; Statistics South Africa, 2015. All figures based on value of output in real 2010 prices.

ADVANCED MANUFACTURING: SOUTH AFRICA'S OPPORTUNITY TO WIN ON THE GLOBAL STAGE

As the discussion above makes clear, there is much more room for optimism about South African manufacturing than the aggregate figures might suggest. The question, then, is where and how the country can best compete to grow its manufacturing exports. To answer this question, we drew on revealed comparative advantage analysis to assess South Africa's relative competitiveness in each subsector of manufacturing exports, and we compared the results to the forecast global demand growth in those subsectors.

Global demand growth is self-explanatory: for example, food, beverages, and tobacco is among the sectors with the highest estimated demand growth (Exhibit 6). The export comparative advantage requires some explanation: the farther to the right an industry is on the chart, the greater South Africa's comparative advantage in exports.⁵¹ Exports that are particularly competitive and have high forecast growth rates are the most promising; they appear in the top right quadrant.

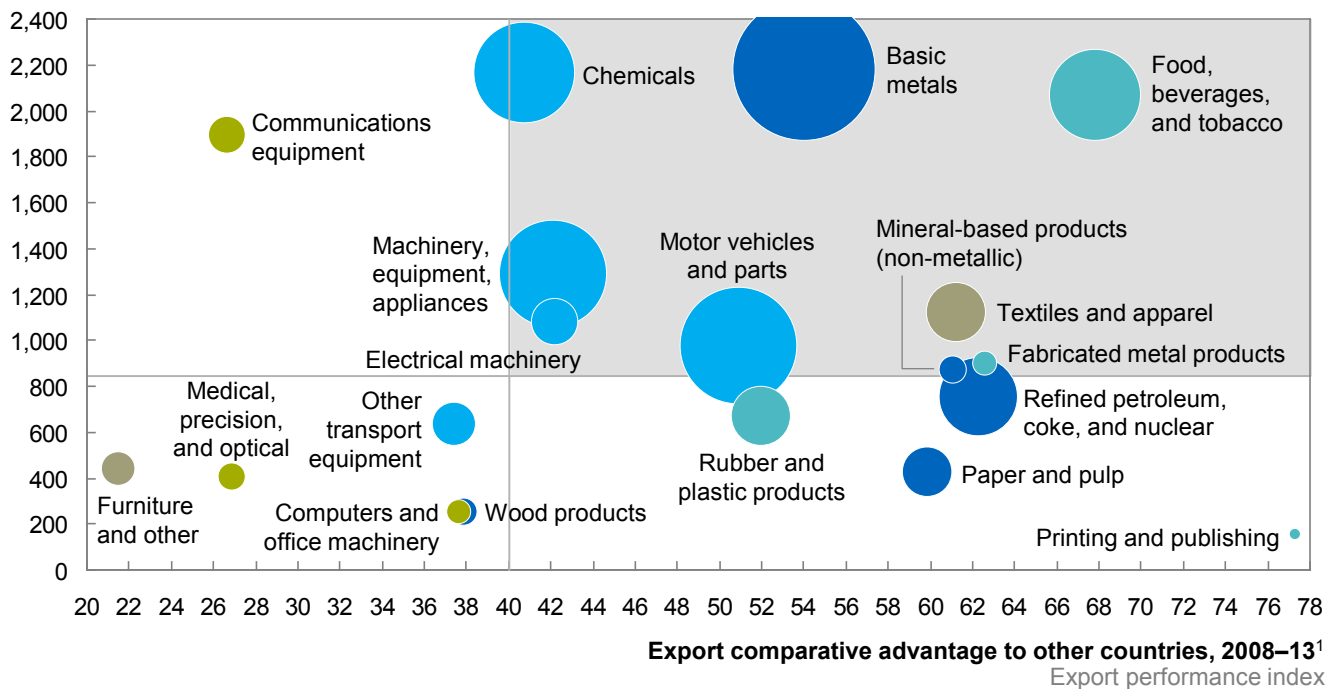
Exhibit 6

Growth potential and comparative advantage in manufactured exports

- Energy-intensive commodities
- Global innovation for local markets (advanced manufacturing)
- Regional processing
- Labour-intensive tradables
- Global technologies/innovators
- Bubble size represents relative magnitude of South African exported products (\$ million)
- High-potential industries

Global demand growth potential of each product by its sector, 2015–25 forecast gross output

\$ billion



¹ Indicates the extent to which South Africa exports this product compared the extent that other countries do.

SOURCE: IHS Economics; ITC Trade Map; Export Promotion Assessment Tool; McKinsey Global Institute analysis

⁵¹ Revealed competitive advantage is calculated by considering the proportion of a product in South Africa's export mix compared with the share that would be expected globally. A higher number suggests that South Africa exports more than would be expected based on global data. Barring subsidies, this indicates that South Africa has a comparative advantage in producing that particular item.

This analysis confirms that, even though South Africa is competitive in several other categories, advanced manufacturing holds the greatest promise, and the sectors with the most potential are chemicals, machinery, and motor vehicles.⁵² Together, these industries already account for nearly half of South Africa's current manufacturing exports (Exhibit 7), and they have similar fundamentals for success. As discussed below, they also have potential to expand into "adjacencies" such as pharmaceuticals, engines and turbines, and motor vehicle parts, as well as into longer-term innovations. Regional processing industries, particularly food, beverages, and tobacco, also have high export comparative advantage and good growth potential; they are discussed in Chapter 5, which focusses on the agricultural value chain.

Although they are significant in scale, energy- and resource-intensive commodities—including basic materials, wood products, and refined petroleum—have more limited growth potential, given their dependence on low-cost materials and cheap, available energy. Labour-intensive tradables are small in scale and depend on competitive labour costs, with select opportunities in textiles being one major exception (see Box 1, "The textile industry in South Africa").

8%

The rate at which exports of engines and turbines grew per year between 2003 and 2013 (real)

Two examples demonstrate the existing achievements and potential of South Africa's advanced manufacturing sector. The first is the motor vehicle industry, which has supplied the domestic market since the 1960s and has access to skills, established export markets, and mature government support.⁵³ Distance from global markets (and particularly from South Africa's manufacturing interior to its ports) hinders cost competitiveness, but the high value of vehicles compensates, and subsidies have helped close the gap. There is still potential to grow this sector, specifically in the manufacture of components. While the production of vehicles increased by 5.6 percent per year in real terms between 1994 and 2014, the production of components grew by only 3.8 percent a year, indicating significant latent potential.⁵⁴ Similarly, while vehicle exports grew at 14 percent a year over the same period, exports of components increased by only 5 percent a year.⁵⁵

Industrial machinery provides another example of the potential of advanced manufacturing. In this subsector, output grew slowly between 2003 and 2013, by 1.4 percent per year, and domestic demand dropped by half during the 2008 global recession and its aftermath.⁵⁶ However, exports have taken up the slack and have been growing rapidly. For instance, between 2003 and 2013, exports of engines and turbines grew at 8 percent a year, and exports of mining and construction machinery grew at 10 percent a year. This growth suggests that these products are competitive in global markets, and that there is further export potential if the industry expands its capacity.

Not all advanced manufacturing industries have similar potential, however. The organic chemicals sector is an example. Globally, demand is expected to grow strongly. However, much of South Africa's organic chemicals production is a by-product of coal liquefaction. Without a greater supply of feedstock (namely gas), the potential to expand output is limited. Even if South Africa had an additional supply of gas as the result of proving and developing shale gas, for instance, the price of gas would need to be low to compete with international producers (as discussed in Chapter 3, on natural gas). The processing plants would also have to be located on the coast to ensure that logistics costs are not prohibitive.

⁵² Data accessed from IHS Economics and ITC Trade Map, databases accessed February 2015. Analysed using the McKinsey Export Promotion Assessment Tool.

⁵³ *Industry vehicle sales, production, export and import data: 2000–2015*, National Association of Automobile Manufacturers of South Africa; Yasmin Mahomed, *Motor vehicle industry*, Who Owns Whom, August 2014.

⁵⁴ IHS Global Insight, Database of Total Sales (Gross Output), Real, accessed February 2015.

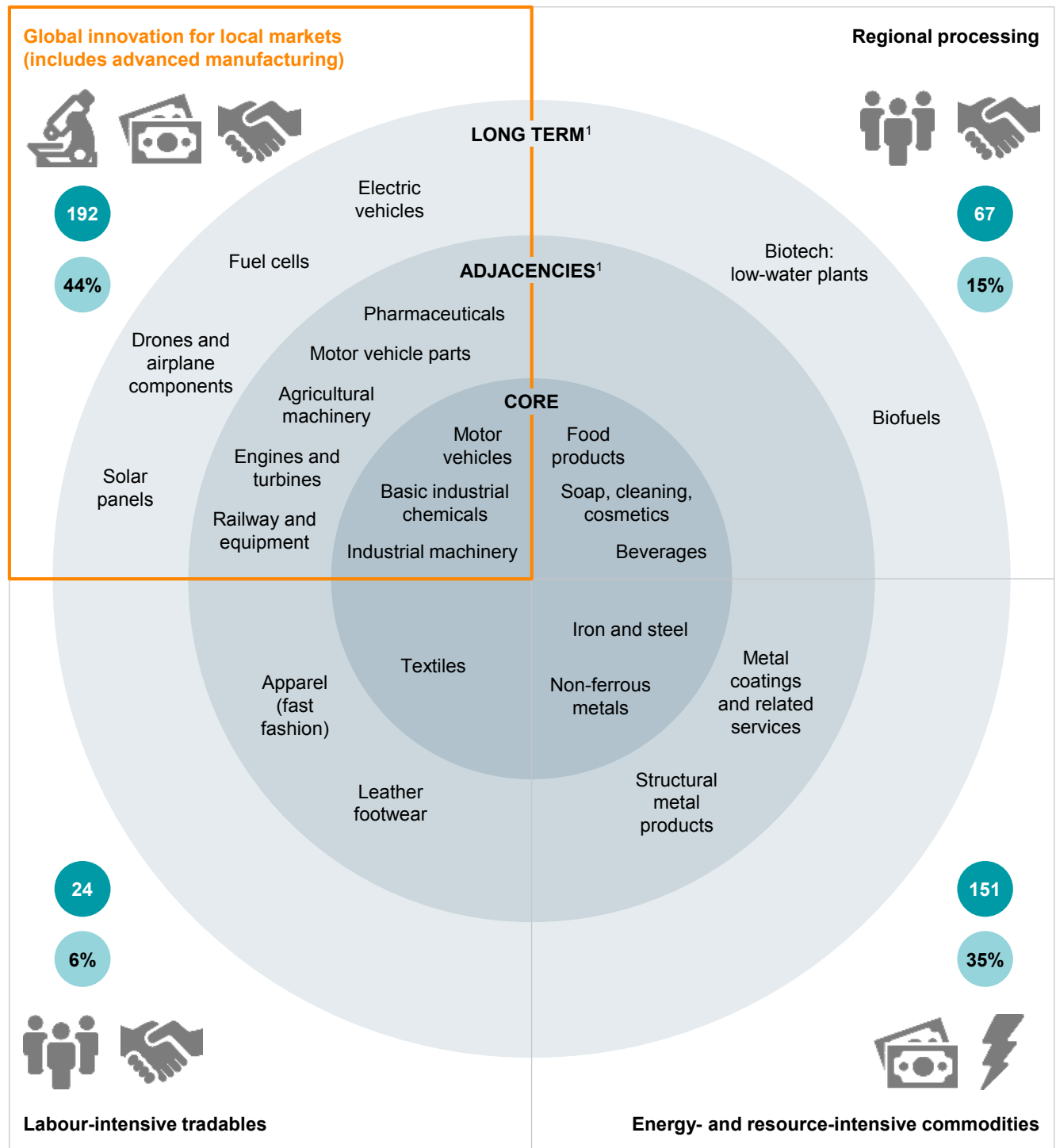
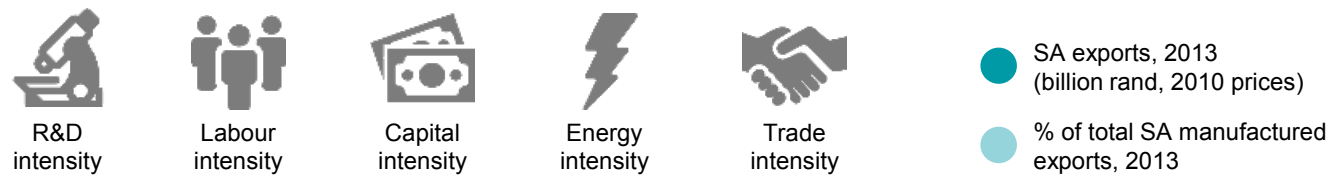
⁵⁵ IHS Global Insight, Database of Exports of Industry Product, Real, accessed February 2015.

⁵⁶ *Ibid.*

Exhibit 7

Advanced manufacturing dominates South African manufactured exports, but new product adjacencies should be sought

South African manufactured exports



¹ Illustrative examples.

SOURCE: IHS Economics; ITC Trade Map; McKinsey Global Institute analysis

Box 1. The textile industry in South Africa

South Africa's textile industry, after a period of decline, shows signs of a revival. Since 2003, the industry has shed more than half of its jobs. Today it employs only an estimated 30,000 people, 0.2 percent of the country's overall employment.¹ Despite this, however, its share of GDP remained constant at 0.4 percent from 2003 to 2014.² Over the same period, the sector increased its productivity by some 12 percent per year, much faster than South Africa's average productivity growth of 2.0 percent per year.

This performance appears to distinguish textiles from other labour-intensive industries in South Africa that have not been competitive with their counterparts in China or Mauritius, for instance, due to rising local input costs and lack of access to capital for productivity-improving machinery. In this regard, the textile industry's success provides some useful lessons for other subsectors. They include:

- **Recapitalisation.** The government's Production Incentive Programme provides a grant for competitiveness improvements and a working capital facility, which paid the textile industry 639 million rand (\$56 million) in the 2011–12 fiscal year. For example, a cotton-spinning operation invested in new equipment to reduce energy use and improve its bottom line.
- **New market opportunities.** Although South Africa's textile exports declined from 10.7 billion rand (\$929 million) in 2003 to 7.2 billion rand (\$625 million) in 2013 in real terms, exports to the rest of Africa increased by 1.2 billion rand (\$104 million) over the same period, indicating that the industry has made efforts to align its products to demand in African markets.³ To build on this growth, the industry will need to target several niche opportunities. Fast fashion, a sector in which time to market is critical for getting seasonal products to consumers, could be one attractive option. Short time to market, which reduces competition from low-cost countries such as China and India, underpins the textile sector in Portugal and Spain.⁴ Two particularly important levers are the ability to design new products within days and improved supply-chain lead times, through supply-chain operational efficiencies and good knowledge of target markets.
- **Higher productivity.** To sustain its rapid productivity growth, the industry should continue to look to switch to higher-value niche markets and unique products.⁵ Products that saw exports increase from 2003 to 2013 included textiles made from fine animal hairs as well as bedding.⁶ Focussing on unique elements of South African design and raw materials will help businesses compete internationally and export more goods. In addition, new operational models—including outsourcing to smaller and more agile cut-make-and-trim enterprises—have boosted flexibility. (Much of the labour force works on a temporary or contract basis for such enterprises, allowing businesses more flexibility during times of low demand and helping sustain firms that are susceptible to cyclical markets.)

¹ Imrie, Kim, *The textile industry, Siccocode 311, Who Owns Whom*, September 2013.

² *Annual gross domestic product by industry at constant 2010 prices*, Statistics South Africa, 2015.

³ UN Comtrade.

⁴ Stephanie O. Crofton and Luis G. Dopico, "Zara-Inditex and the growth of fast fashion", *Essays in Economic & Business History*, volume 25, 2007.

⁵ Mike Morris and Lyn Reed, *A sectoral analysis of skills gaps and shortages in the clothing and textile industry in South Africa*, Human Sciences Research Council, February 2008.

⁶ *Ibid.*

MULTIPLYING GROWTH: EXPANDING BEYOND CORE MANUFACTURING INTO ADJACENT PRODUCTS

Despite South Africa's strong starting position in advanced manufacturing, increasing its market share of core products in the sector will not be enough to achieve significant growth. Rather, companies will need to move beyond products that are proven export successes, such as vehicles and centrifuges, to adjacent products with potential for rapid growth. Such "adjacencies" build on the strengths of core competencies to produce a diverse range of goods for export. The example of Taiwan in the electronics sector is instructive. Having become leading producers of microchips in the 1980s, its manufacturers moved into display units and storage, which complemented the original product. Taiwan is now contemplating expanding into other microelectronics such as communication tools, as well as biotech.⁵⁷

Adjacent products account for 31 percent of South Africa's advanced manufacturing exports today, but globally they account for 58 percent of advanced manufacturing imports. This suggests that adjacencies have major growth potential and could account for two-thirds of South Africa's export growth potential in advanced manufacturing.

To illustrate how South Africa could use its core strengths as a springboard to capabilities that are competitive in global markets, consider two examples: vehicles and industrial machinery and equipment.

- **Vehicles.** As discussed above, South Africa is relatively productive and successful in assembling and exporting motor vehicles.⁵⁸ The industry could provide a platform for expansion into manufacturing of components such as exhaust sets, electrical machinery, knockdown vehicle kits, and engine parts. With growing regional demand, manufacturers should have significantly more export-oriented alternatives on a suitable scale in the next 15 years. Today, South Africa manufactures catalytic converters but does not complete the value chain by creating a full exhaust set—and therefore reimports its own converters. The country also takes limited advantage of other high-value components such as automotive electronics. With growing interest in assembling cars in markets such as Nigeria, South Africa could export more specialised subassemblies and increase its scale and reach. If South Africa were to expand its capacity to make and assemble automotive parts, these capabilities could eventually enable the manufacture of more parts for aircraft, mining, agricultural vehicles, and domestic appliances. Its automotive industry could become a net exporter and create more value in components and subassemblies than in assembled vehicles. Logistics costs, which would be an important consideration in realising this opportunity, are discussed later.
- **Industrial machinery and equipment.** Manufacturers of industrial machinery and equipment, particularly centrifuges, could expand their product ranges to include columns and other vessels. As these businesses become more sophisticated, they could manufacture associated components such as instrumentation, valves, and even motors, offering complete bundled technical packages to their customers. South Africa is a well-regarded producer of heavy-cast machinery for agriculture, mining, and construction, and it could become the supplier of choice for growing industries in sub-Saharan Africa. Existing examples of successful policy changes supporting this development include legislation requiring procurement of local valves, which has boosted investment in local valve-manufacturing plants.

⁵⁷ *Taiwan's economic situation and outlook*, Council for Economic Planning and Development, March 2006.

⁵⁸ Part of this success has been attributed to subsidies that encourage original equipment manufacturers to export completed cars from South Africa. This report does not assess the impact of these subsidies, but subsidies (direct in South Africa, indirect in some other parts of the world) are not uncommon. The debate should focus on how to leverage this strong industry further.

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Potential increase in advanced manufacturing exports by 2030 (real)

Beyond adjacent products, there is an opportunity to move into innovative advanced products whose manufacture is less established in South Africa. Such products may have small markets today, but these opportunities have potentially high growth rates. South Africa has proven its ability to be a world-beating innovator. An example is Airbus Optronics—formerly owned by the South Africa’s state-owned defence contractor, Denel—which has developed technology for submarine periscopes.⁵⁹

With the world’s largest reserves of platinum, South Africa could also become a leading producer of fuel cells—a global market worth 28 billion rand (\$2.4 billion) in 2014, and expected to grow at 25 percent a year to 173 billion rand (\$15 billion) in 2022 (almost half of which will come from demand from the auto industry).⁶⁰ One South African research project backed by the government has ambitions for the nation to capture one-quarter of the market by 2023.⁶¹

Finally, greater focus on advanced products should not come at the expense of other successful sectors such as agro-processing and metal beneficiation. South Africa supplies 39 percent of neighbouring countries’ manufactured food, tobacco, and beverage imports.⁶² This sector could take more advantage of a productive commercial agriculture sector, good infrastructure, established factories, and a strong retail sector (see Chapter 5, on the agricultural value chain, for more detail). Metal beneficiation, too, has received a great deal of attention. There is a large amount of underused capacity globally, and the industry is highly energy-intensive, both of which may make international investors cautious. However, there does appear to be scope to expand production of ferrochrome given that South Africa has 74 percent of global chromite reserves.⁶³ Roughly 80 percent of value in the ferrochrome value chain is created during beneficiation rather than during ore extraction. Producing ferrochrome rather than exporting ore creates twice the number of jobs and four times the GDP.⁶⁴

SOUTH AFRICA COULD DOUBLE OVERALL MANUFACTURED EXPORTS, ADDING 522 BILLION RAND TO EXPORTS BY 2030 AND CREATING 1.5 MILLION JOBS

By focussing on expanding exports of advanced manufactured goods and increasing the output of adjacent products, South Africa has the potential to add 522 billion rand (\$45 billion) to GDP through manufacturing exports by 2030. We arrived at this estimate through a benchmarking analysis.⁶⁵ We looked at the potential created simply by maintaining market share (given that forecast growth in global imports outstrips forecast growth in production in South Africa) and the additional potential created by increasing market share to benchmark levels. These benchmark levels are high, and, for this reason, we assumed a gradual increase in output over a ten-year period. If South Africa were to achieve both—maintaining market share and boosting exports to regional benchmark

⁵⁹ Airbus Defence and Space, www.defenceandsecurity-airbusds.com; Leon Engelbrecht, “Carl Zeiss Optronics buys Denel division”, *Defenceweb*, March 16, 2007. The South African subsidiary specialises in the design, development, and manufacture of electro-optical products as well as after-sales support for the airborne, laser, and helmet head tracker systems for the commercial and military markets. Denel retains 30 percent ownership.

⁶⁰ “Fuel cell technology market worth \$5.20 billion by 2019”, press release, Markets and Markets Analysis, September 2014; *World fuel cells: Industry study with forecasts for 2017 & 2022*, The Freedonia Group, 2014.

⁶¹ “Mission and objectives of the Hydrogen South Africa (HySA) Systems Competence Centre”, *Fuel Cells Bulletin*, October 2013.

⁶² IHS Global Insight.

⁶³ Gerhard C. Pariser, “Chromite: World distribution, uses, supply & demand, future”, presented at Prospectors and Developers Association of Canada convention, March 3–6, 2013.

⁶⁴ *Maximising South Africa’s chrome ore endowment to create jobs and drive sustainable growth*, Merafe Resources, 2012.

⁶⁵ South Africa’s success in exporting a product to one country within a region, using market share of imports into that country as a proxy, can be used as a benchmark of what is possible in the rest of the region. We assume that the competitiveness of South African manufacturers is comparable within a particular region and simplify for any differences in standards, regulations, and preferences in other regions.

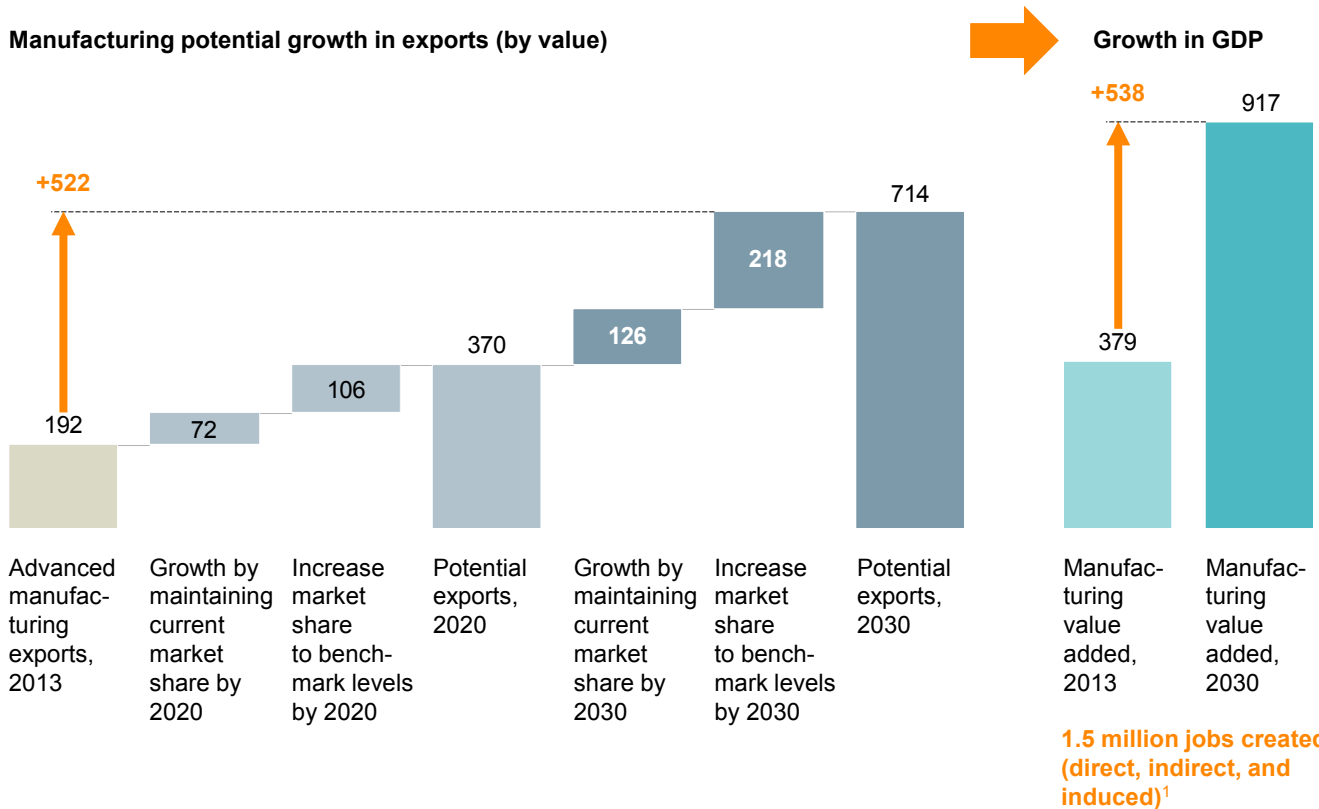
levels—it could achieve exports of 370 billion rand (\$32 billion) by 2020 and 714 billion rand (\$62 billion) by 2030, from a base of 192 billion rand (\$17 billion) in 2013 (Exhibit 8).⁶⁶ In 2030, this would boost the manufacturing share of GDP to 14 percent. It could potentially add 1.5 million jobs to the South African economy by 2030, in both manufacturing and the broader economy.⁶⁷

Exhibit 8

Increased advanced manufacturing exports could account for 540 billion rand in GDP and 1.5 million jobs by 2030

Billion rand, 2010 prices

Manufacturing potential growth in exports (by value)



1 Jobs created include 340,000 direct jobs in manufacturing, and 1,153,000 indirect and induced jobs in the broader economy.
NOTE: Numbers may not sum due to rounding.

SOURCE: World Bank WITS; IHS Global Insight; McKinsey Global Institute analysis

The distribution of the opportunity is spread among the four main categories of products discussed above (Exhibit 9). The majority of the value would come from machinery, equipment and appliances. Chemicals, motor vehicles, and other transportation equipment and parts represent the remainder of the opportunity. The target market potential varies by category. Of the overall potential, 44 percent comes from sub-Saharan African countries—highlighting South Africa’s strong regional presence—and 24 percent from Asia-Pacific. The Southern African Development Community as a region remains an important market for all products, while Asia-Pacific and Europe are also significant.

⁶⁶ This analysis of the export market share is influenced by the currency exchange rates in those years. South Africa’s exchange rates have weakened since 2013. A number of experts believe that resource prices will be weaker in the next decade than they were in the previous decade, and that a weaker exchange rate will continue for some time, which could further bolster exports. We did not account for those possibilities.

⁶⁷ This is not a net effect on the manufacturing sector, which will still see overall declines in employment due to productivity improvements. Employment creation and GDP growth estimates are based on both the direct impact on the sector and the impact on the broader economy.

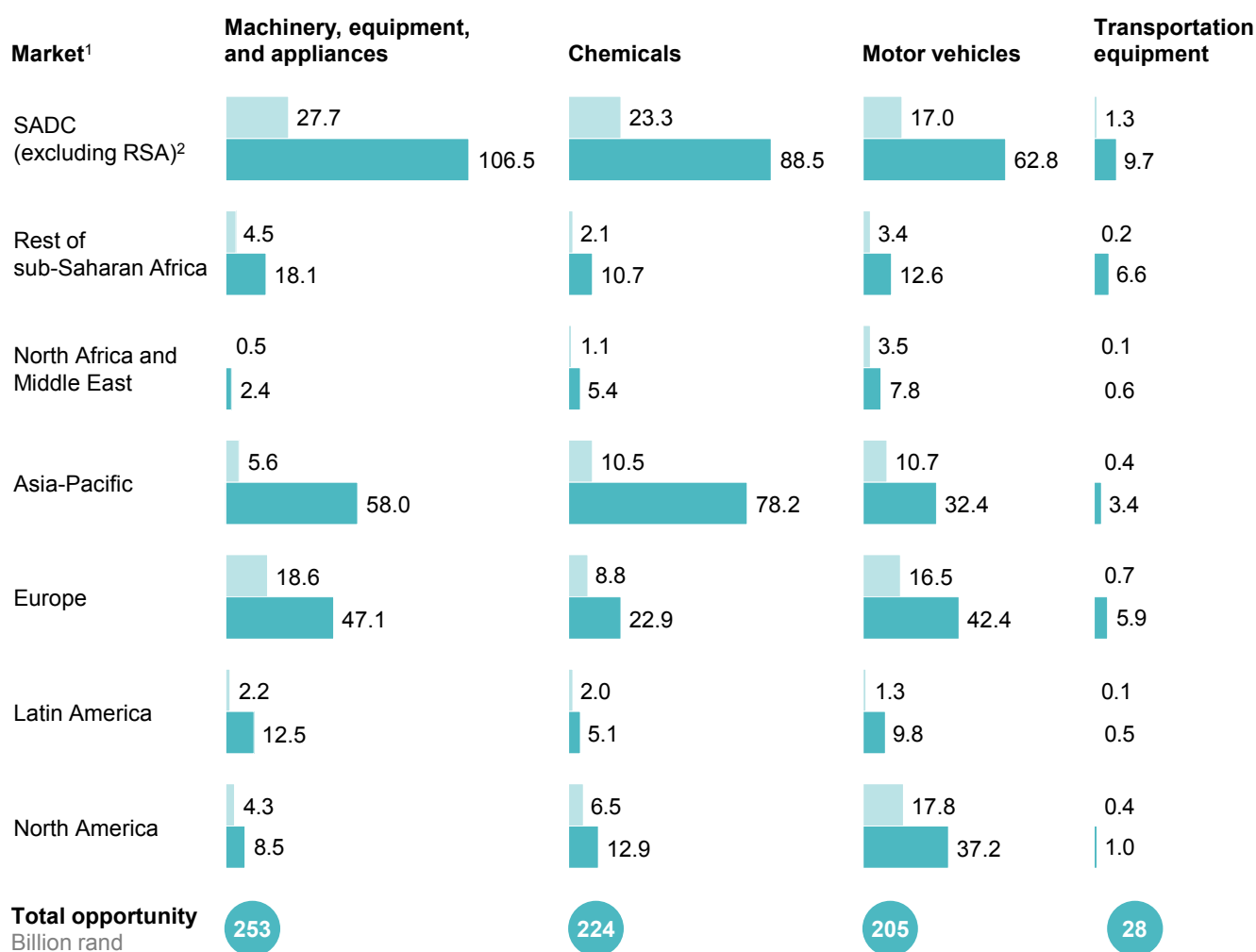
Exhibit 9

The rest of Africa and Asia-Pacific are large potential export growth markets

Exports in 2013 and potential in 2030

Billion rand, 2010 prices

2013 2030



Exports growth rate per year

%

2003–13	4.3	4.2	3.5	n/a
2015–30	9.0	9.2	6.8	14.9

¹ Analysis based on exports to existing markets, factoring in growth and benchmarked to 10 percentile best market share in that product in that region.

² Southern African Development Community (excluding South Africa).

NOTE: Numbers may not sum due to rounding.

SOURCE: World Bank WITS; IHS Economics; McKinsey Global Institute analysis

Achieving export growth of this magnitude does not look unrealistic. Indeed, it is a smaller improvement than that observed in other emerging economies. South Africa could learn from other countries' experiences. For instance, manufacturing in Thailand grew from 15 percent of GDP in 1967 to 24 percent in 1987, reaching a peak of 36 percent of GDP in 2010. The sector in Mauritius grew from 15 percent of GDP in 1980 to 25 percent of GDP in 1988.⁶⁸ From the 1980s onwards, Thailand promoted exports and encouraged the presence of multinational corporations through tools such as export-credit financing, government

⁶⁸ *World development indicators*, World Bank. Database accessed March 2015.

incentives for investors, and export incentives such as bonded warehouses and export-processing zones. Thailand also made a strategic decision to encourage a shift to highly capital-intensive industries such as iron, steel, and petrochemicals.⁶⁹ Mauritius also used export-processing zones alongside aggressive trade diplomacy.⁷⁰

GOVERNMENT, BUSINESS, AND ORGANISED LABOUR MUST WORK TOGETHER TO IMPROVE PRODUCTIVITY AND ENCOURAGE MORE ENTRANTS

To unlock the growth potential of advanced manufacturing, it is important that government work with industry and labour on a well-directed basket of policies that encourage more entrants into manufacturing and strengthen the competitiveness of existing manufacturers. Such policies could include strengthening Special Economic Zones to encourage new entrants, and driving innovation and economies of scale to improve the productivity South Africa's manufacturing sector.

Strengthen Special Economic Zones with capital incentives and labour experimentation to encourage new entrants

Manufacturers typically lack scale in two ways. Small manufacturers lack scale within their businesses, so they struggle to finance major capital investments that would improve productivity. Secondly, clusters of manufacturers may also lack scale, in that their networks and supply chains may be incomplete (requiring increased imports), or complementary players in their supply chain may be too distant to be cost-effective. Special Economic Zones can help address both challenges. They can encourage risk-taking and provide support necessary to help “early success” operations scale to “world leading” businesses, and they can foster an environment that encourages a close network of interlinked manufacturers to develop, creating the scale to encourage industry-level productivity growth and innovation.

SEZs are increasingly popular in emerging economies around the world as a way to boost manufacturing exports but, as of 2008, only 9 percent of these zones were in Africa. Moreover, only zones in Kenya, Lesotho, Madagascar, Mauritius, and Nigeria have created high levels of employment.⁷¹ Successful zones encourage specialisation and coordinate with regional markets to avoid duplication of production.⁷² They are particularly successful when they are established as interdependent clusters rather than a sprinkling of dispersed production zones, so that industry can use them to set up a well-connected network of suppliers close to major export ports.⁷³ Also, policy that has a narrow focus but offers committed support is more effective than that which is broadly focussed but shallow in support.

South Africa's attempt to create such zones—initially named Industrial Development Zones—has had limited success. Since 2002, three coastal zones have attracted 51 investors, raised 4.8 billion rand (\$416 million), and created about 7,000 permanent manufacturing jobs. This investment is less than 4 percent of total investment in industry

2x

The value of total manufactured exports could double

⁶⁹ See Somboon Siriprachai, “Export-oriented industrialisation strategy with land abundance: Some of Thailand's shortcomings”, *Thammasat Economic Journal*, volume 16, number 2, June 1998; Mingsarn Kaosa-ard, “Economic development and institutional failures in Thailand”, *TDR Quarterly Review*, volume 13, number 1, March 1998; Apisek Pansuwan, “Industrial decentralization policies and industrialization in Thailand”, *Silpakorn University International Journal*, volume 9–10, 2009–10; and Barbara Leitch LePoer, ed., *Thailand: A country study*, Library of Congress, Federal Research Division, 1989.

⁷⁰ Katsiaryna Svirydenka and Martin Petri, *Mauritius: The drivers of growth—can the past be extended?* IMF working paper number 14/134, 2014.

⁷¹ Howard Stein, “Africa, industrial policy and export processing zones: Lessons from Asia”, in *Good growth and governance in Africa: Rethinking development strategies*, Akbar Noman, Kwesi Botchwey, Howard Stein, and Joseph E. Stiglitz, eds., Oxford University Press, 2011.

⁷² Ibid.

⁷³ *Industrial development report 2009: Breaking in and moving up: New industrial challenges for the bottom billion and the middle-income countries*, United Nations Industrial Development Organization, 2009.

between 2002 and 2014.⁷⁴ In comparison, export-processing zones in Mauritius, a country with a fraction of the population of South Africa, have created more than 35,000 jobs.⁷⁵

After a performance review in 2007, the South African Department of Trade and Industry renamed these areas SEZs, increased their number, and extended the government's support beyond basic infrastructure.⁷⁶ However, of the ten zones due to be launched in 2015, seven are in South Africa's interior and therefore face exaggerated transport costs.⁷⁷ Existing manufacturers are unlikely to move to these zones because of the high capital investment. Moreover, the intended focus of these zones is on petrochemicals, agro-processing, renewable energy, and textiles, with little emphasis on the types of products that can bring large export growth (that is, industrial machinery and vehicles). SEZs should be developed near ports and prioritise making South African manufacturers competitive. These zones should have guaranteed basics such as power and water provision with long-term maintenance plans in order to encourage confidence among investors.

The government can help to develop these zones through the provision of capital incentives for investment, which will be necessary if South Africa is to expand manufacturing exports. A government rebate, in the form of tax credits, to companies that export a minimum proportion of their outputs would encourage the increase of capacity in a productive way. Small manufacturers in the zones should also be given more access to free financial and strategic advice to help them scale their businesses and negotiate bureaucratic matters.

In addition, the government could use SEZs to experiment with labour agreements on a small and risk-free scale. For example, the zones could encourage cross-skilling of workers to see whether this leads to higher productivity, higher wages, and ultimately business expansion. Extended probation periods for employees could allow companies to attempt expansion without the risk of being left with an unsustainable workforce in the case of failure.

Improve productivity with economies of scale and innovation

Relatively slow growth in labour productivity, partly due to low skill levels, and underdeveloped capital productivity because of a lack of scale, is constraining competitiveness in South African manufacturing.

Industry needs a new management vision focussed on becoming globally competitive. To find scale markets, businesses need to export more of their products. This requires business to develop an aggressive commercial export approach at the board level. Relationships between unions, government, and business also need to be completely revisited so that all three can work together to both increase South Africa's output and ensure higher wages in manufacturing and more employment in the broader economy.

Capital productivity would improve if manufacturing had greater scale. MGI interviews revealed that some manufacturers tend to switch to export markets when local market demand is poor, but that there is little focussed attention on building permanent export capacity. Government can help by negotiating trade agreements to open up export markets but it has a poor record. As an illustration, South Africa currently has far fewer regional

1.5M
Potential job
creation, including
340,000 jobs in
manufacturing
itself

⁷⁴ *Special Economic Zone (SEZ)*, RSA Department of Trade and Industry website, www.dti.gov.za/industrial_development/sez.jsp; Wendy Nyakabawo, *The geographic designation of Special Economic Zones*, Trade and Industrial Policy Strategies, November 2014; IHS Global Insight, Database of Capital Expenditures, Real, accessed March 2015.

⁷⁵ Ibid. Howard Stein, "Africa, industrial policy and export processing zones", 2011.

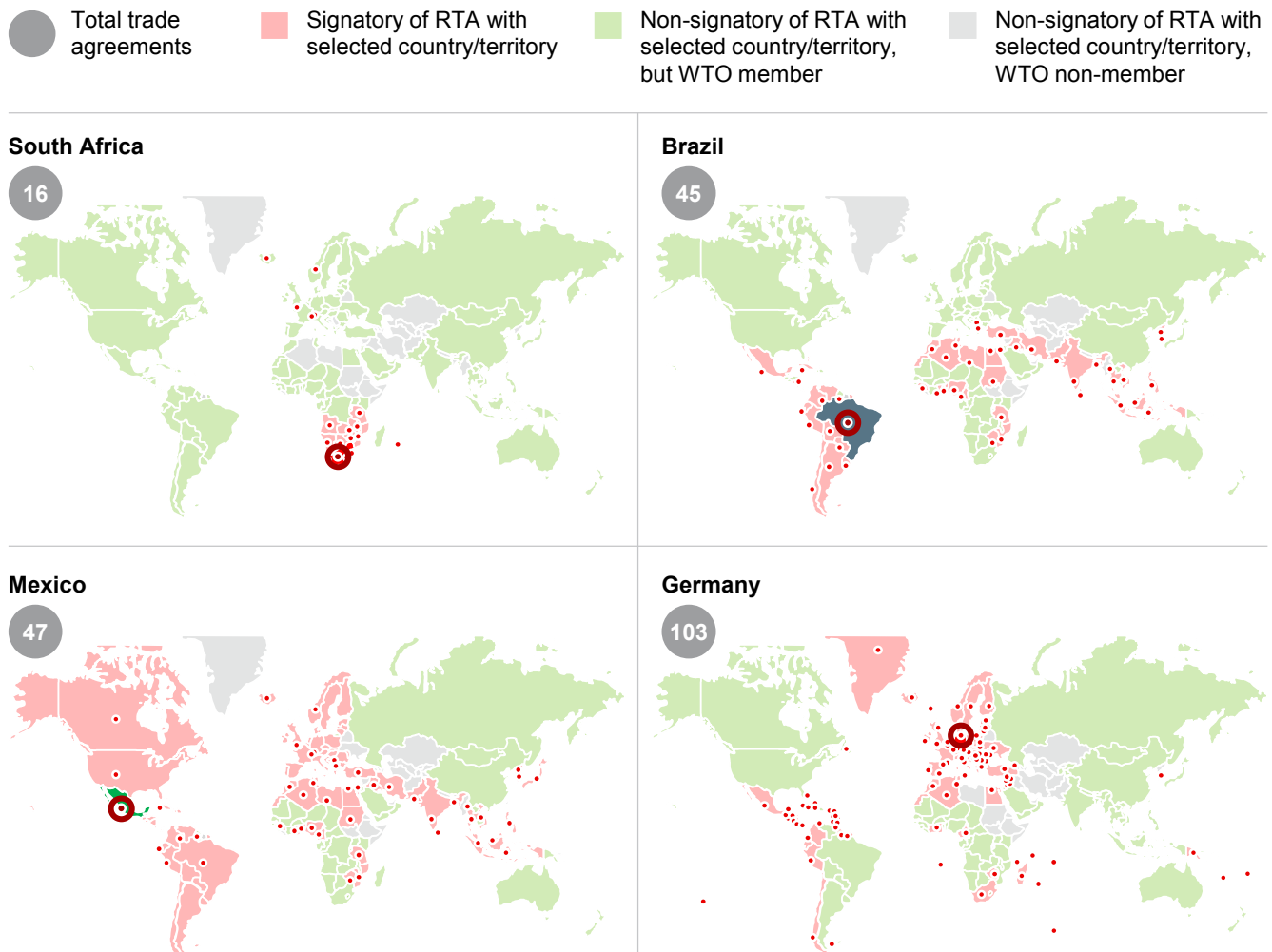
⁷⁶ Sean Woolfrey, *Special Economic Zones and regional integration in Africa*, Tralac working paper number 10/2013, July 2013.

⁷⁷ *Positioning Special Economic Zones to support economic development in South Africa's urban economic regions*, Economies of Regions Learning Network, June 2014.

trade agreements than comparable emerging markets such as Brazil or Mexico, or than successful manufacturing exporters such as Germany (Exhibit 10).⁷⁸

Exhibit 10

Three prominent economies have more regional trade agreements (RTAs) than South Africa



SOURCE: WTO; McKinsey Global Institute analysis

The government could make proactive use of trade attachés and step up its diplomatic marketing to enhance South Africa's advanced manufacturing brand in foreign markets. In particular, it could seek out niche opportunities in markets in Latin America such as Brazil, Argentina, and Chile (given their proximity to South Africa and their demand for resource extraction equipment) or in East Asia. Government can also help by brokering new partnerships between South African companies and international firms that would allow domestic players to capture more of the value chain and obtain more experience in providing integrated solutions to customers at the same time that they gain access to broader markets. Equally, business needs to reach out and collaborate with government. This will help focus efforts on winning high-value deals.

⁷⁸ World Trade Organization.

Local procurement policy in South Africa has too often prompted concerns about higher costs. However, some success stories show that domestic industry can be boosted by creating localisation requirements. The Preferential Procurement Policy Framework Act in South Africa now requires that companies source valves and actuators from local suppliers. Additionally, the framework supports adjacencies in the valve supply chain: 70 percent of the material used to make these valves also needs to be sourced locally.⁷⁹ Business was concerned that valves would not be of sufficient quality, but South African manufacturers have been exporting them successfully. Exports in 2012 were valued at 1.9 billion rand (\$168 million), compared with 357 million rand (\$31 million) in 2002.⁸⁰ South Africa mainly exports valves to the rest of Africa, but there is also demand from Australia, Europe, and North America. As a result of legislative support and new export markets, local producers have been able to expand capacity. This shows that the model can work in certain cases. The government should initiate studies to assess the feasibility and implications of expanding the approach to other commodities.

Innovation can have a major impact on costs and revenue—and therefore productivity—in manufacturing. Research and development into special techniques is therefore valuable. One example of the impact research can have is the government's investment in additive manufacturing (such as 3-D printing) of titanium at the Titanium Centre of Competence. This new technique could be used to create parts for aircraft and help South Africa add value to its titanium rather than export the raw substance.⁸¹ Potential spin-offs include exporting powdered titanium, which can be used in printing and is cheaper to forge than titanium ingots,⁸² upgrading existing manufacturing plants with new, more productive techniques, and reducing new plants' startup costs by eliminating the need to buy costly moulds.

Between the financial years 1993/94 and 2007/08, gross domestic spending on R&D increased in real terms from 6.5 billion rand to 16 billion rand (\$564 million to \$1.4 billion), growth of 6.6 percent a year. In 2012/2013, however, spending fell back to 14 billion rand (\$1.2 billion).⁸³ Research funding should be maintained or increased and targeted at innovations that can support existing industry in South Africa, or encourage a shift towards adjacent products. A proportion of funds should be ring-fenced for use in SEZs and granted to entrepreneurs or business R&D teams to encourage continued improvement in technology. The government should continue supporting central research institutions that pursue a longer-term innovation strategy.

As discussed in the final chapter of this report, South Africa will need to invest in improving its educational outcomes in order to ensure that it provides adequate training to individuals who can join the manufacturing sector. In particular, business and government need to work together to develop scarce skills by providing basic education and apprenticeships. Skilled managers and workers are in short supply, and cross-skilling of labour is rare, creating high turnover, concerns about quality, and constraints on expansion.⁸⁴ This is important because, globally, manufacturing tends to have no more than half of its workforce in the low-skilled category, and that share is much lower in advanced manufacturing.⁸⁵

⁷⁹ "Invitation and evaluation of bids based on a stipulated minimum threshold for local production and content for valves products and actuators", South African National Treasury, February 2014.

⁸⁰ Observatory of Economic Complexity; values are nominal.

⁸¹ Willie du Preez, "Beneficiation of South Africa's titanium resource: A long term vision is the key to success", presentation to the Portfolio Committee on Trade and Industry, October 21, 2014.

⁸² Not yet commercialised.

⁸³ *National Survey of Research and Experimental Development: Main analysis report 2012/13*, Human Sciences Research Council, January 2015.

⁸⁴ The majority of around five million unemployed South Africans are unskilled: 64 percent have less than a secondary qualification, 15 percent have only a secondary qualification, and only 9 percent have a tertiary qualification. The remaining respondents are listed as "Other". See *Quarterly Labour Force Survey*, Statistics South Africa.

⁸⁵ World Input-Output database.

Hands-on, in-company apprenticeships should be favoured over technical colleges and university degrees. Workers can learn the skills that will help manufacturers create complex, quality products through structured three-year apprenticeships that lead to a stable career with good wages. Companies are concerned about the cost and risk involved in establishing large-scale programmes such as these, especially given the high staff turnover and wage inflation in the manufacturing industries. Government should help by directing funds from less successful colleges to partially fund apprenticeship programmes in partner businesses.

Find new opportunities to expand the revenue pool

Opportunities exist for business to increase revenue in ways that do not rely exclusively on boosting output of existing products and services. One way to increase value in the manufacturing sector is by generating more revenue from existing deals. To take an example, industrial machinery is often sold as part of a broader set of equipment (for example, conveyors, pumps, control systems). If they are not already doing so, South African companies could enhance their revenue by offering packaged integrated solutions and bundling long-term service and maintenance contracts with engineering, procurement, and construction firms—a model automotive manufacturers currently use.

Some companies are already experiencing success in these strategies. Multinationals such as Barloworld are seeking joint ventures to provide agricultural machinery to the rest of Africa, starting with Zambia.⁸⁶ One manufacturer interviewed for this report discussed a partnership with a company that complements its core equipment and helped the company sell an end-to-end solution to more markets, secure service-level agreements, and, in some cases, win contracts to operate the equipment. The fact that the service and equipment all came from a single company helped market the product.



South Africa's advanced manufacturing industries are positioned to capture growth opportunities in sub-Saharan Africa and beyond, building on their successful record of global competitiveness. By harnessing South Africa's skills and technology base, they could also unleash a wave of adjacent products, many of which can utilise the same or similar capabilities and production techniques. Together, these steps could double South Africa's manufactured exports, significantly increasing GDP, creating jobs, and diversifying the country's exports away from a dependence on basic materials.

To realise the full opportunity, individual advanced manufacturing businesses, as well as the industry as a whole, will need to focus on increasing their economies of scale. This means aggressively pursuing export markets, building close-knit supply chains and manufacturing zones, and becoming more innovative in products, manufacturing processes, and materials. Government has a key role to play in supporting these initiatives—by strengthening SEZs, expanding trade agreements, deepening international partnerships, enhancing investor confidence, and boosting technical and vocational skills development.

⁸⁶ *Interim report of the BayWa Group*, 1 January until 31 March 2015.





2. INFRASTRUCTURE: PARTNERING FOR PRODUCTIVITY

Infrastructure has been a policy priority since the advent of democracy in South Africa in 1994. In that year, only 60 percent of households had access to clean water supply; today more than 95 percent do. Likewise, only 50 percent of households had access to electricity in 1994, whereas today the figure exceeds 85 percent; over the past 20 years, some 5.8 million poor households have been connected to the grid. In transport, roads, rails, ports, and airports have seen major capacity upgrades.⁸⁷ Yet much remains to be done: South Africa has chronic power outages, low Internet penetration, and inadequate logistics to support manufacturing and exports.

Taken together, South Africa's infrastructure investments have amounted to nearly 5 percent of GDP over the past 20 years, one of the highest proportions in the world.⁸⁸ In the next decade, the government envisages continued high levels of infrastructure spending, with over 200 billion rand (\$17 billion) a year earmarked for projects targeted to improve South Africans' quality of life and to spur growth and job creation.⁸⁹ They range from urban transport systems, power stations, and transmission lines to schools, universities, and fibre-optic networks.

These infrastructure investments represent a tremendous economic opportunity for South Africa, both in direct job creation in the development phase and in the much broader impact of successfully delivered infrastructure on the rest of the economy. Yet several barriers could block progress. South Africa's public finances are under pressure, making it critical that the country judiciously prioritise new projects based on their social and economic impact. At the same time, cost and schedule overruns have been all too common, making it essential to plan the chosen projects rigorously and streamline delivery. Finally, a widely observed "trust deficit" between government and business—particularly the construction sector—hampers every stage of infrastructure development.

Given current fiscal constraints and the imperative of raising growth and job creation, the country will now need to maximise the economic impact of every rand invested. We estimate that, by applying a few key levers, South Africa could save 1.4 trillion rand (\$122 billion) in infrastructure costs over the next decade and boost GDP by 260 billion rand (\$23 billion) per year by 2030. These levers include making better use of existing infrastructure, optimising the project portfolio, and strengthened assessment and execution skills. A smarter approach to domestic infrastructure delivery will also build the skills and solutions needed to unlock the Africa-wide opportunity in construction services, discussed in Chapter 6.

To make this happen, though, the government and the private sector will need to forge a true partnership on infrastructure delivery. The government must create a high degree of transparency on its priorities and project pipeline; invest in building the capabilities needed for better specification, project planning, and oversight; and put in place more effective tendering processes. This, in turn, should prompt the private sector to be more proactive in proposing innovative solutions, taking on greater project management responsibility, and

⁸⁷ *South Africa: Twenty year review, 1994–2004*, The Presidency, March 2014.

⁸⁸ McKinsey & Company Infrastructure Spend and Stock database, 2015. This analysis covers only the four major asset classes—power, water, telecommunications, and transportation.

⁸⁹ All rand values are quoted in 2010 prices. All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

driving greater productivity. In some asset classes and project stages, this new compact could also open up important opportunities for greater private investment.

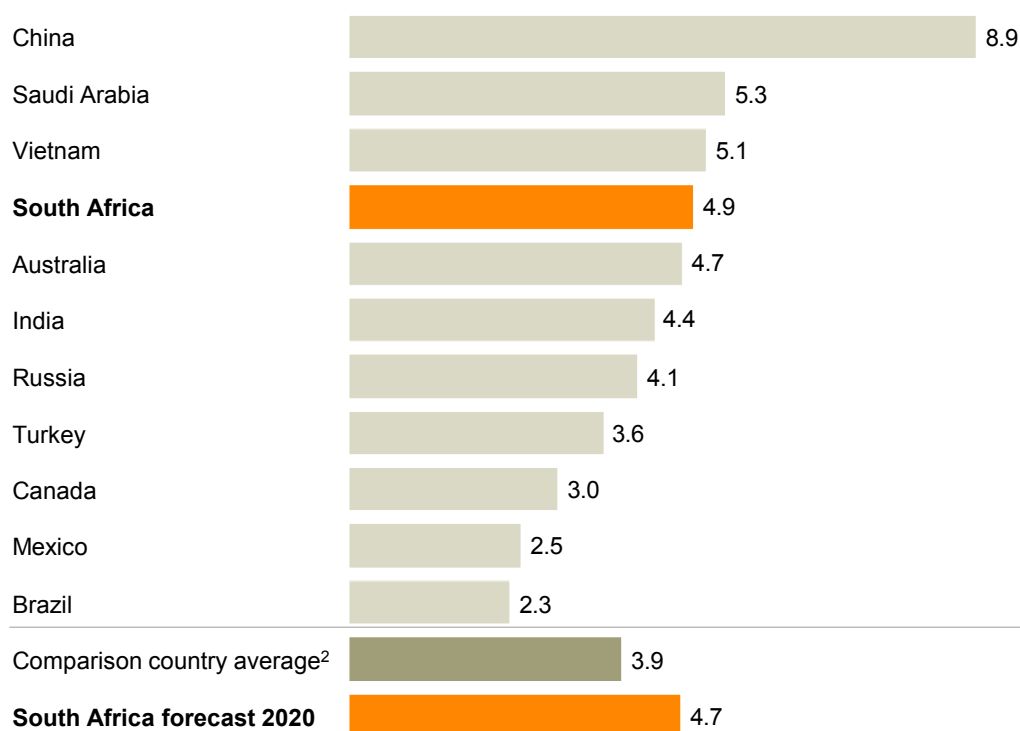
SOUTH AFRICA HAS AMONG THE HIGHEST INFRASTRUCTURE SPENDING LEVELS IN THE WORLD

Developing South Africa’s infrastructure has been a cornerstone of government policy. Between 1992 and 2012, the country spent 4.9 percent of GDP on infrastructure, exceeding the proportion in most other economies (Exhibit 11). Brazil, India, Mexico, Russia, and Turkey spent an average of 3.4 percent of GDP during this period. Only China has spent a considerably greater share of GDP on infrastructure, at 8.9 percent.⁹⁰ In the long term, this policy should create a comparative advantage for South Africa over peer countries in the region and potentially globally, because infrastructure has such an important enabling effect on the rest of the economy.

Exhibit 11

South Africa’s infrastructure spend level exceeds that of most other economies

Infrastructure spend as percentage of GDP, 1992–2012¹



¹ Considers only the four major asset classes—power, water, telecom, and transport.

² Average excludes South Africa and China.

SOURCE: RSA National Treasury; PwC South Africa; McKinsey Global Institute analysis

Previous MGI research found that countries should invest sufficiently to maintain an optimal infrastructure stock of around 70 percent of GDP, less the effects of depreciation. South Africa is already near this level, with stock at 68 percent of GDP.⁹¹ MGI finds that, to support GDP growth, South Africa needs to spend 4.3 percent of GDP a year on infrastructure. The

⁹⁰ This analysis of spending levels covers only the four major asset classes: power, water, telecoms, and transport.

⁹¹ This benchmark was developed through an examination of the value of infrastructure stock in developed and emerging economies such as Canada, China, Germany, India, Italy, Poland, South Africa, Spain, the United Kingdom, and the United States. See *Infrastructure productivity: How to save \$1 trillion a year*, McKinsey Global Institute and the McKinsey Infrastructure Practice, January 2013.

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Spend over the next decade (estimated)

government's aspiration, as set out in the National Development Plan (NDP), is to spend at more than double this level—10 percent of GDP annually, or 3.7 trillion rand (\$321 billion) over the next decade.⁹²

However, funding for public infrastructure has to date largely come from the public purse, and South Africa's public finances are under pressure: the country has maintained a budget deficit level of between 4.5 percent and 5.3 percent of GDP since 2010, and gross government debt stands at 47.9 percent of GDP.⁹³ South Africa's sovereign credit rating has recently been stable after downgrades in 2014.⁹⁴ In view of this, South Africa has prudently scaled back its ambitions for infrastructure spending for now. Extrapolating from cumulative planned capital expenditure figures contained in South Africa's Medium Term Expenditure Framework, it appears that the public sector has budgeted to spend 2.2 trillion rand (\$191 billion) over the next decade. This is equivalent to 4.7 percent of GDP a year until 2020 or 4.9 percent of GDP a year until 2030—still a significant level of investment, and higher than the level in most peer nations.⁹⁵

We should note that, while South Africa is spending large amounts on infrastructure, there are questions about its quality. In 2014, the World Economic Forum ranked South Africa 59th in the world on the quality of its infrastructure.⁹⁶ This is a better ranking than other emerging economies with similar per capita GDP at purchasing power parity, including Brazil and Mexico. However, South Africa's performance is weak in specific infrastructure asset classes. For instance, it ranks only 99th on the quality of its electricity infrastructure, due to insufficient capacity, and 82nd on water, for similar reasons. South Africa ranks 68th on the quality of information and communications infrastructure—a vital enabler of future economic growth.⁹⁷

Moreover, historical backlogs have left a legacy of inadequate provision of basic infrastructure in most provinces. Apartheid created huge disparities in capital expenditure and infrastructure quality between “white” and “black” areas; despite the progress made in the past 20 years, much work remains to close this gap. While areas in Gauteng and the Western Cape provinces have world-class infrastructure across all asset classes, provinces such as the Eastern Cape and Limpopo are still trying to address significant backlogs in the provision of generally poorly constructed infrastructure.

We find that decisive steps to ensure effective prioritisation, planning, and delivery of projects could raise the economic impact of South Africa's planned infrastructure investments by almost 40 percent.

⁹² *National Development Plan: Vision for 2030*, RSA National Planning Commission, November 11, 2011.

⁹³ South African Reserve Bank, 2015; *World Economic Outlook: Legacies, clouds, uncertainties*, IMF, October 2014.

⁹⁴ In 2014, the major credit rating agencies all downgraded South Africa. Standard and Poor's lowered the country's credit status to BBB, one place above non-investment grade, in June. Also in June, Fitch retained its BBB rating but lowered its ratings outlook to negative. Moody's downgraded South Africa to Baa2 from Baa1 in November, changing its outlook from stable to negative. In 2015 (Moody's in May, Standard & Poor's and Fitch in June), the agencies kept their ratings unchanged.

⁹⁵ The RSA National Treasury has published infrastructure spending plans to 2017/18; the rest was extrapolated, taking into account the 2015/16 national budget and input MGI received from the Presidential Infrastructure Coordinating Commission. All values reported as 2010 real prices.

⁹⁶ *The global competitiveness report 2014–2015*, World Economic Forum, 2014.

⁹⁷ McKinsey and MGI have undertaken extensive research on the link between the penetration of digital and mobile technologies and growth. See *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011; *Online and upcoming: The Internet's impact on aspiring countries*, McKinsey & Company, January 2012; and *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

R260B

Potential annual GDP impact of partnering for productivity

THREE LEVERS TO MAKE INFRASTRUCTURE SPENDING GO FURTHER

Given the combination of substantial capital outlays and existing quality gaps, it is vital that South Africa invests as wisely and productively as possible. This is also critical if infrastructure is to play its full role in accelerating growth and job creation across the economy. The country has three available levers for maximising the productivity of its infrastructure spending. First, it can work harder to make maximum use of existing infrastructure. Second, it can optimise its capital portfolio, prioritising the projects with greatest social and economic impact and bringing greater rigour to planning and monitoring the chosen projects. Third, it can streamline the delivery of projects by adopting more effective management approaches and practices.

Globally, MGI research has found that these three levers together could trim \$1 trillion a year from the worldwide infrastructure bill—a saving of 40 percent—which in turn could boost economic growth by about 3 percent, or more than \$3 trillion, by 2030.⁹⁸ In South Africa, too, the gains from optimising infrastructure spending and delivery could be substantial. If the government spends its budgeted 2.2 trillion rand (\$191 billion) over the next decade on infrastructure without any productivity improvements, this could add 616 billion rand (\$54 billion) to GDP and create one million jobs. By boosting infrastructure productivity, there is scope to add an additional 260 billion rand (\$23 billion) to GDP—or 40 percent in incremental economic value—and create an additional 660,000 jobs.⁹⁹

The further boost to GDP and job creation is based on the assumption that this same level of spending could deliver more infrastructure. If this happens, we estimate two levels of opportunity. If the productivity savings of the budgeted spend of 2.2 trillion rand (\$191 billion) are realised and reinvested into more infrastructure, that would add another 163 billion rand (\$14 billion) to the economy. If the productivity savings were to be applied to the full 3.7 trillion rand (\$321 billion) of infrastructure spend envisaged in the NDP, that would add a further 95 billion rand (\$8.2 billion) to GDP (Exhibit 12). The boost to GDP would not be a short-term stimulus associated with construction, but a long-term injection of growth that would come from productive, operational infrastructure. An alternative scenario would be that the same quantity of infrastructure could be delivered for less money, in which case the GDP impact would have to be assessed based on how government decides to allocate the funding.

Moreover, if South Africa were to pull all the levers set out above, it could achieve dramatic savings in its infrastructure budget over the next decade. Assuming the 3.7 trillion rand (\$321 billion) of spending pencilled into the NDP as an aspiration, we estimate that levers to boost infrastructure productivity could net South Africa savings of 1.4 trillion rand (\$122 billion)—bringing the total cost of the envisaged infrastructure projects much closer to the 2.2 trillion (\$191 billion) rand earmarked by the National Treasury (Exhibit 13).¹⁰⁰

In reality, the NDP's spending aspirations are high level and, apart from the 2.2 trillion rand (\$191 billion) budgeted for infrastructure, have not yet been defined into concrete projects. However, there are many potential projects that are unfunded, including the oil and gas infrastructure outlined in Chapter 3 and the additional power infrastructure needed to 2030. Achieving savings of the order of magnitude we estimate would allow such projects to be funded and delivered. Alternatively, government could apply the savings from higher productivity to redirect finances elsewhere in the economy.

⁹⁸ *Infrastructure productivity: How to save \$1 trillion a year*, McKinsey Global Institute and the McKinsey Infrastructure Practice, January 2013.

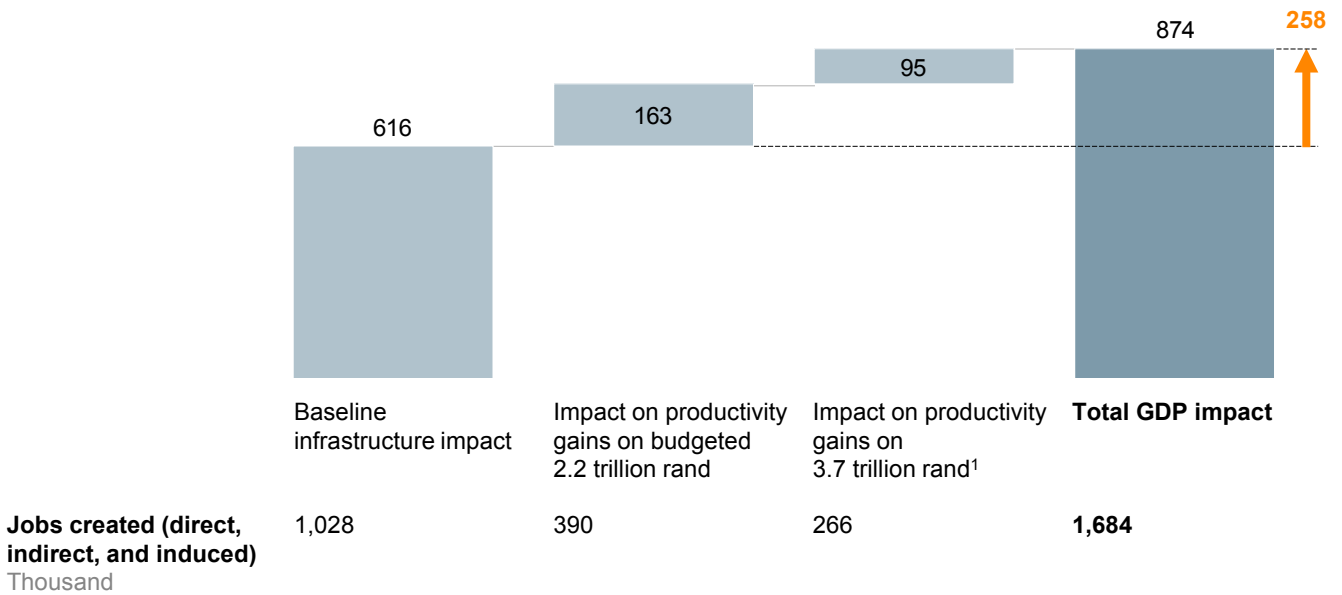
⁹⁹ These estimates include both direct jobs in construction and the indirect and induced jobs created in the broader economy. Approximately 52 percent of the jobs are directly in the construction sector.

¹⁰⁰ The RSA National Treasury has budgeted 4.9 percent of GDP for infrastructure spending from 2012 to 2017. We assumed that this level of spending will continue to 2030.

Exhibit 12

By 2030, the impact of infrastructure productivity gains could add 260 billion rand per year to GDP and create up to 660,000 new jobs

Annual incremental GDP impact by 2030
Billion rand, 2010 prices



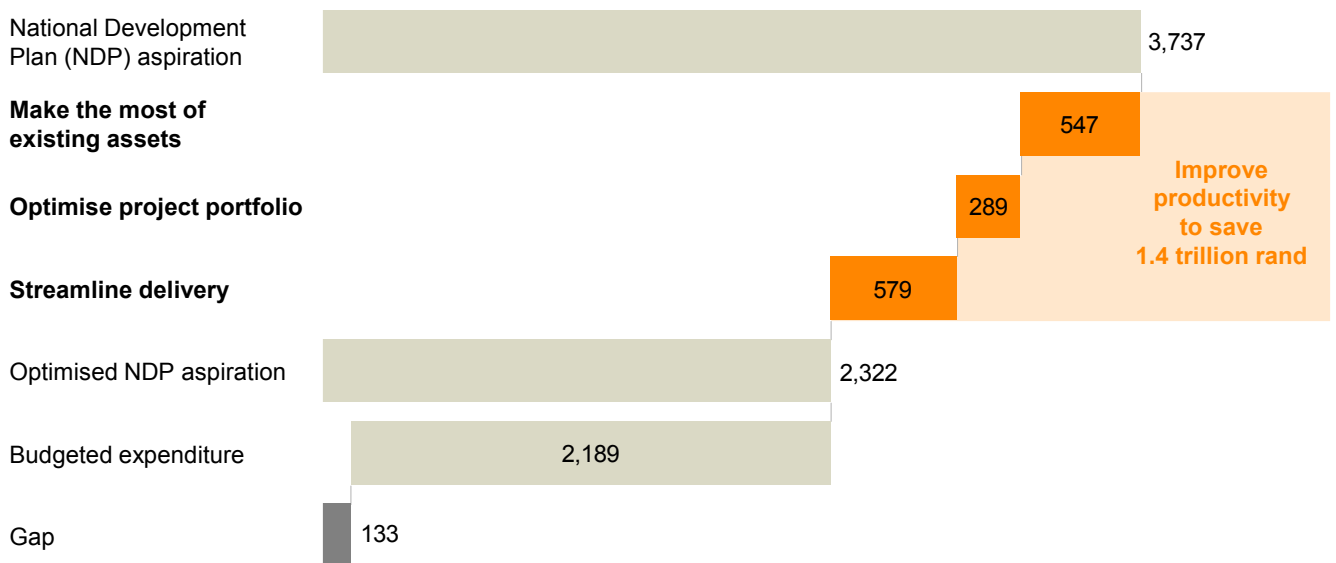
1 The National Development Plan calls for the government to spend 10% of GDP, or 3.7 trillion rand (real 2010 prices) from 2016 to 2025. NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute analysis

Exhibit 13

Improving the productivity of South Africa’s infrastructure expenditure could result in a spend optimisation of 1.4 trillion rand by 2025

Infrastructure investment and how it could be optimised
Cumulative 2016–25, billion rand, 2010 prices



NOTE: Numbers may not sum due to rounding.

SOURCE: National Development Plan; RSA National Treasury; McKinsey Global Institute analysis

Realising this immense opportunity requires changes, outlined in the next sections, within both the government departments that commission infrastructure and the private sector that builds it. While the opportunity from making these changes is clear, the incentive to do so will require dialogue and thought about which policies and incentives will lead to the appropriate outcomes, and which capabilities are needed to motivate and enable the private and public sectors to deliver.

Make the most of existing infrastructure through operational improvements and increasing spending on maintenance

R1.4T
Potential savings from improved productivity

As a first, vital step in optimising its infrastructure productivity, South Africa should audit its existing stock. The country must ensure that it does everything it can to improve its current operations and maintenance, to ensure that it utilises spare capacity and even to exceed nameplate capacity (where possible).

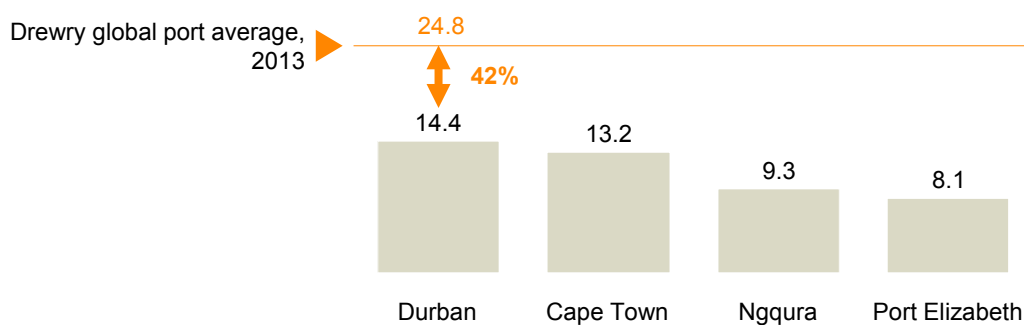
As an illustration of the scope for improvement, consider the case of container terminals. Container volumes in the Southern African region are forecast to grow by up to 6.1 percent per annum from 2015 to 2018, highlighting potential demand for increased port throughput.¹⁰¹ Benchmarking of South African port throughput against the Drewry global port average in 2013 implies potential to increase throughput by up to 40 percent¹⁰² (Exhibit 14). Another example, a comparison between the ports of Durban, South Africa, and Santos, Brazil, showed that Durban moved 2.8 million TEUs in 2010 with a 185-hectare terminal area, a 2,600-metre berth length, and 22 cranes. Santos moved 2.7 million TEUs with only 65 hectares, berths of 1,900 metres, and 16 cranes. Santos moved 42 thousand TEUs per hectare per year, well above the global average. South African ports might aim to achieve the global average port performance of 25 thousand TEUS per hectare per year.

Exhibit 14

Opportunities exist to optimise productivity of existing infrastructure before investing in more capacity, as illustrated by container terminals

International port utilisation performance benchmarking, 2013/14

Thousand container TEUs¹ moved per hectare per year



¹ 20-foot equivalent units, a standard container size.

SOURCE: Drewry Maritime Research; Ports Regulator of South Africa; McKinsey Global Institute analysis

Options to increase capacity could include investigating how to shift demand and throughput from overburdened to underutilised ports, and identifying specific levers to improve the performance of ports. A detailed comparison of performance metrics, such as container moves per ship per hour or TEUs moved per crane per year, would point the way to operational improvements, targeted capital investments, or both.

¹⁰¹ *Container market annual review and forecast 2014/15*, Drewry, October 2014.

¹⁰² *Benchmarking South African ports: Container and automotive terminals 2014/2015*, Ports Regulator of South Africa; *SA port terminals: Capacity and utilization review 2014/15*, Ports Regulator of South Africa.

R49B

Estimated underspend on maintenance each year across the economy

Improving the maintenance of existing infrastructure to boost lifespan and utility is another imperative before building new stock. Today, MGI estimates that South Africa underspends by at least 49 billion rand (\$4.3 billion) per year on maintenance, based on comparison with benchmarks of what is necessary to keep each asset class up to par. Addressing this gap will significantly reduce replacement and repair of existing infrastructure, with substantial cost savings.

To improve operational efficiency, the infrastructure operator needs to benchmark its existing performance levels to understand where bottlenecks are, then set higher performance targets and bring in skilled operators as needed. To improve maintenance levels, it needs to develop detailed maintenance plans where there are none, integrate all public-sector maintenance plans, then budget for and maintain appropriate spend levels.

Optimise the capital project portfolio to drive social and economic impact

Selecting the right infrastructure projects is vital to focus South Africa's infrastructure effort on investment only in the most important, value adding projects. The country's project portfolio and pipeline are very large. Take water infrastructure as an example. The regional bulk water infrastructure investment plan for the next ten years contains more than 150 megaprojects with annual spending of more than 400 million rand (\$35 million) each.¹⁰³

Given a project portfolio of this size, an effective prioritisation process is essential to ensure the execution of the right projects at the right time. As a first step, such a process verifies that each planned project will address a real problem or opportunity and is supported by a properly defined business case. It is also vital that the benefit of each project is clearly classified and compared on a like-for-like basis. For example, some projects are truly mandatory in that they are required for legal compliance. By creating complicated financial arguments for such projects, their true purpose can be lost. Next, a "scrubbing" process rigorously tests whether planned projects will actually deliver the intended social or economic benefit.¹⁰⁴

The criteria for selection and prioritisation of discretionary projects, together with their relative weighting, should be settled at the start of the scrubbing process. Given the critical role of infrastructure as an enabler for the rest of the economy, one key criterion will be the projects' impact on GDP and jobs in sectors of the economy prioritised based on their high growth potential. This, in turn, will require a clear understanding of the growth strategy in each of those sectors. Additional criteria to consider include improving access to basic services, improving the well-being of communities, safeguarding the environment, and using resources more sustainably. The private sector and civil society have a role to play in bringing their own recommendations to the table and in actively engaging government in assessing and identifying priorities.

Other countries have established special institutions to apply a robust, transparent set of selection criteria across the national portfolio of infrastructure projects. For example, Chile put in place a National Public Investment System, which is responsible for scrubbing and monitoring the country's infrastructure project portfolio.¹⁰⁵ This institution maintains an online database of projects and performs multistage evaluations using a range of pre-defined filters. As a result, projects are often reworked and optimised before launch—and 25 to 35 percent that do not meet the selection criteria are deprioritised or cancelled, creating significant savings.

¹⁰³ Department of Water and Environmental Affairs Strategic Plan, 2013/14 to 2017/18.

¹⁰⁴ "Scrubbing" is a term McKinsey & Company uses to describe a process used to improve the impact of project spending.

¹⁰⁵ Andrés Gómez-Lobo, "Institutional safeguards for cost benefit analysis: Lessons from the Chilean national investment system", *Journal of Benefit-Cost Analysis*, volume 3, issue 1, January 2012.

South Africa needs to consider which institution could oversee a more effective system for selecting infrastructure projects and integrating multiple plans in a way that takes into account issues and constraints that cut across projects. Although the Presidential Infrastructure Coordinating Commission is already in place, South Africa could consider ways to strengthen and deepen its role. The commission or a related body should ideally be responsible for assessing the quality of infrastructure planning and intervening where necessary to ensure that planning is of consistently high quality. This body should also be responsible for monitoring progress achieved and comparing actual against planned spend. It would provide regular, detailed reports to senior government leaders and would act pre-emptively to identify potential delays or overspending.

Municipalities could also benefit from reforms to project selection and planning. The Municipal Infrastructure Grant is an indirect allotment that often underperforms in terms of the expected impact of the expenditure because many municipalities consistently underbudget their infrastructure needs. This example of insufficient or optimistic planning, and the consequent incorrect projections of project costs, results in constant revisions by the Treasury to its allocations (revisions ranged from 17 percent to 67 percent in 2014).¹⁰⁶

Streamline delivery—and reduce infrastructure delivery costs by up to 29 percent

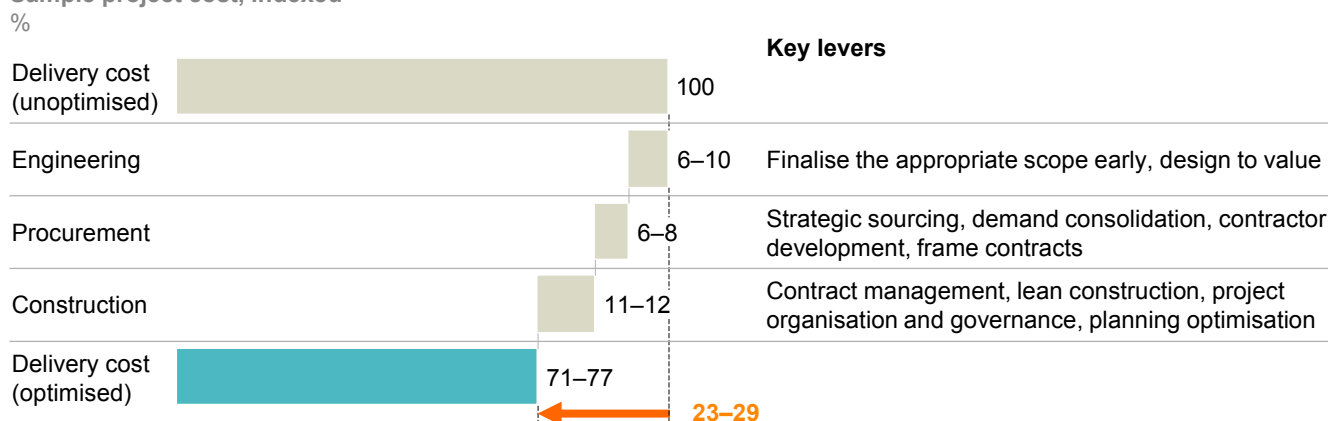
South Africa has an important opportunity to streamline the delivery of projects by adopting more effective management approaches in the engineering, procurement, and construction phases before they begin. It can also ensure the broad application of good project management practices, such as defining clear project roles and responsibilities, use of “stage gate” project management, and maintaining a clear, real-time understanding of project progress and performance.

In the course of nearly 40 capital productivity studies undertaken over the past two decades, MGI has found that these disciplines can reduce typical delivery costs of infrastructure projects by up to 29 percent (Exhibit 15).

Exhibit 15

Streamlining engineering, procurement, and construction has the potential to optimise up to 29 percent of infrastructure project costs

Sample project cost, indexed¹



1 Based on nearly 40 capital productivity studies, 1994–2012.
NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute analysis

¹⁰⁶ “Municipal Infrastructure Grant (MIG) projects and funding”, RSA Department of Cooperative Governance and Traditional Affairs, presentation to the Standing Committee on Appropriations, February 2015.

15%

Range of budget revisions to municipal plans each year

Consistent application of best-practice project management helps the infrastructure asset owner—typically the public sector—avoid many of the frequent causes of excessive spending, including overdesign or “gold plating”, late design or scope changes, inefficient procurement practices, and poorly planned and executed construction site activities. Cost savings can be realised in all three phases of the execution of a project: design and engineering, procurement, and construction.

Just as important, the application of sound project management practices helps asset owners deliver projects on schedule. As an indication of the scale of this opportunity, consider the fact that between 2004 and 2014, all spheres of government in South Africa underspent their allocated infrastructure budgets by an average of 15 percent—a clear result of challenges in progressing and completing projects on time.

The specific opportunities for streamlining delivery in each of the three phases of project execution are as follows:

- **Design and engineering.** In the pursuit of design and engineering excellence, projects can all too often be “overdesigned”, leading to excessive complexity and cost. Alternatively, project specifications can be vague and leave too much to interpretation, triggering costly changes in project scope in later phases. To avoid these issues, asset owners should invest in defining the project scope very clearly—which requires a detailed understanding of what a project actually needs to deliver. It is important that the owner appoint a suitably qualified contractor for the design work, and specify and incentivise the use of design-to-value principles. This approach reviews the project’s needs and cost targets, then makes appropriate trade-offs to arrive at a final design. In an assessment of progress on South Africa’s New Multi-Product Pipeline project, the Ministry of Public Enterprises emphasised the need to apply these principles. A new engineering, procurement, and construction contractor had come on board 18 months into the front-end engineering design phase, and scope changes were made after the phase ended, disrupting the delivery of the project.¹⁰⁷
- **Procurement.** South Africa needs to overcome a number of challenges in procurement, including complex regulations at the municipal level and shortcomings in the metrics used during procurement. One example of the former was the Integrated National Electrification Programme, once it was transferred from Eskom to municipalities; prolonged procurement processes at the municipal level have led to many delays. In addition, supply-chain management regulations often inhibit the purchase of materials and equipment prior to the start of a contract, making it difficult to negotiate bulk purchase discounts or purchase long-lead items in time.¹⁰⁸ To address this issue, the government could consider a multi-round bidding process to ensure that it obtains the best achievable contract terms and awards contracts to those tenders offering the highest-value solution rather than simply the lowest-cost option. Another step to optimise procurement is to increase the weighting of experience and expertise in evaluating bids; currently, most public-sector procurement focusses heavily on price. Government should also consider retaining contractors for structured training and advisory programmes.

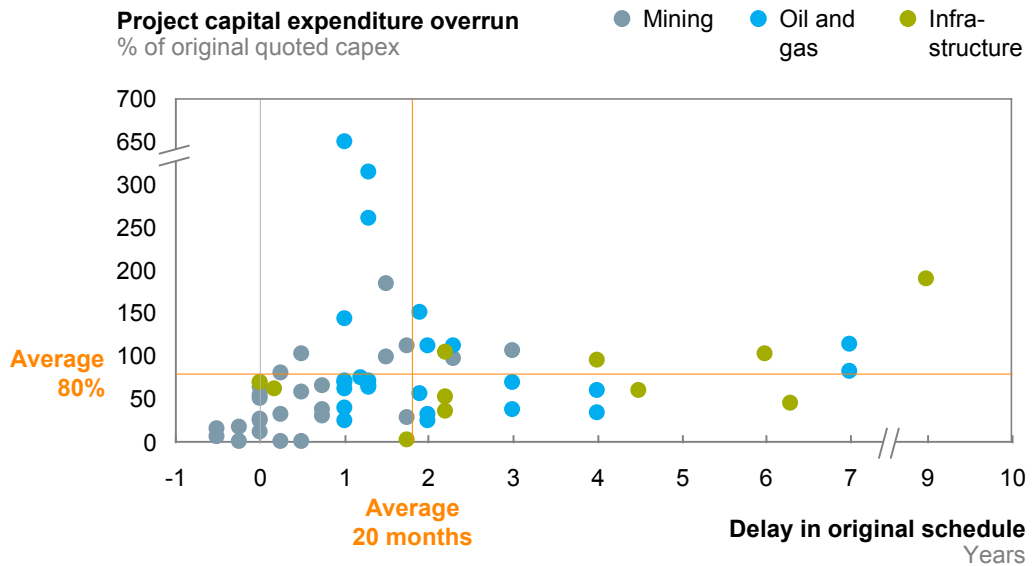
¹⁰⁷ “Statement by Minister Gigaba on NMPP review”, Department of Public Enterprises, November 29, 2012.

¹⁰⁸ Health infrastructure is an example of too few metrics being taken into account. In 2011, South Africa’s auditor-general noted the poor delivery of health infrastructure, highlighting the fact that the capacity and expertise of contractors did not figure sufficiently in metrics deployed during the procurement process. It subsequently emerged that some contractors could not meet agreed-upon quality and progress terms, and they had to be replaced, increasing costs and causing delays. *Report: The auditor-general of South Africa on a performance audit of the infrastructure delivery process at the provincial departments of health*, Parliamentary Monitoring Group, May 23, 2012.

- Construction.** All around the world, many large construction projects run into delay and cost overrun problems (Exhibit 16). To avoid such costly outcomes, the government should support the development of excellence not only in construction but also in the management of contracts, and it should take action to support and enable the development of the construction industry in general. The construction industry needs to learn new techniques for managing its field activities and take on greater co-ownership with government for successful outcomes.

Exhibit 16

All over the world, cost overruns of 80 percent and delays of nearly two years are not uncommon in capital expenditure projects



SOURCE: IHS Herold Global Projects database; annual reports; press releases; McKinsey Global Institute analysis

Specific steps that South Africa can take to streamline the construction phase include:

- Support excellence in construction and contract management.** The private sector can increase its efficiency in the construction of projects through the greater use of lean construction techniques and lean-management systems that help to eliminate activities that do not add value. On-site managers need to be as transparent as possible about problems as they arise, set daily and weekly milestones, and practice daily planning techniques. Government needs to be more stringent in its management of contractors and regularly track progress. For instance, owners need to regularly collect a range of information during a project, including detailed monthly schedules, progress reports checked against key performance indicators, and claims and change order data.¹⁰⁹ One approach that South Africa could emulate to create transparency around project performance is the *Gray Notebook* published quarterly by the Washington State Department of Transportation in the United States, which provides the public with the latest information on the performance of construction projects.

¹⁰⁹ Either the contractor or the employer can generate change orders. The purpose of the change order is to capture a change (increase or reduction) to the project scope. Contractor claims are submitted for changes in project execution or construction conditions outside the contractor's control. Employer claims are submitted for delays and direct costs incurred due to poor performance or noncompliance to scope by the contractor. Both can be costly because they imply a change to the execution plan, and resources would have had to be diverted to resolve or process the claim.

- **Enable the development of a sustainable construction sector.** A growing construction sector, capable of sustaining the jobs it creates despite the seasonality of construction work, is largely a function of creating a steady pipeline of new builds. The government’s Strategic Integrated Programme comprises 18 infrastructure programmes with hundreds of projects due to begin construction over the next decade.¹¹⁰ However, encouraging greater private-sector responsibility will require the government to be more transparent about the number, scope, cost, and revenue streams of these projects, which are not consistently available.
- **Build technical and managerial skills in procurement and construction.** Measures to improve productivity are likely to fail unless South Africa enhances the sector’s skills. The existing skills deficit in the general construction workforce promises to worsen because matriculating students typically lack the practical, technical skills needed in the construction sector. This can be solved through a shift in the focus of secondary education from certification to skills development.¹¹¹ Vocational training in the secondary education system should be encouraged (as discussed in Chapter 6). Stronger links between vocational training colleges and industry will enhance the value of these courses. Government needs to align its curriculum with industry requirements and ensure that bodies such as the Construction Education and Training Authority accredit these updated courses. At the same time, government and industry together need to work to increase enrolment in artisan apprenticeships at a rapid pace. One approach that could be used to achieve this incorporates “Model Factories”, which simulate how a trainee would work in the “real world”; the auto and education sectors have used this approach successfully.¹¹²

By applying the three productivity levers set out above, South Africa could achieve substantial savings in its infrastructure spending, free up funds for areas of critical need, and target investments much more precisely to the projects that will deliver the greatest economic and social impact. One of the many asset classes in which these levers would achieve major impact is water (see Box 2, “Maximising productivity: The case of South Africa’s water infrastructure”).

¹¹⁰ “A summary of the South African National Infrastructure Plan”, Presidential Infrastructure Coordinating Commission, 2012.

¹¹¹ Grade 12, or “matric”, qualifications and university degrees are valued above other competencies needed for infrastructure. The consequence is insufficient enrolment in vocational skills programmes. South Africa has considerable scope to improve its provision of technical and vocational education and training, and reap the economic rewards as Germany, for instance, has done. Germany has an artisan apprentice model with about 350 recognised training occupations in more than 20,000 companies and 650 schools for 43,000 candidate artisans. Today, Germany has a highly respected core of skilled artisans, while South Africa has a shortage. See *Berufsbildungsbericht 2006*, Bundesministerium für Bildung und Forschung, 2006; and Alexander Schnarr, Sun Yang, and Kai Gleißner, *Vocational education and training and the labour market: A comparison of China and Germany*, International Centre for Technical and Vocational Education and Training (UNEVOC), November 2008.

¹¹² Model Factories typically use Internet-based simulation applications, with evaluation and coaching taking place in the field.

Box 2. Maximising productivity: The case of South Africa's water infrastructure

South Africa is a dry country and faces a major gap between water demand and supply (Exhibit 17).¹ Sufficient supply of water is critical to support new growth opportunities in industries such as shale gas, manufacturing, and agriculture. The government estimates that 670 billion rand (\$58 billion) of investment will be needed to close the gap.²

Water is a good case study of applying the principles of making maximum use of existing infrastructure and carefully prioritising the projects with greatest impact. As in other infrastructure asset classes, making the most of the existing water infrastructure is vital. One way to do this would be for South Africa to increase tariffs to a level that incentivises more careful use of water by households (while keeping a policy of some free water for those in need). A national campaign to educate citizens on water usage and the need to reduce consumption could also be adopted. The public and private sectors can work together through the Strategic Water Partners Network, for instance, to help cut consumption and boost the productivity of water-using sectors such as agriculture and industry. In agriculture, efficiency could be

enhanced through irrigation scheduling, no-till agriculture, and waterless processing. In the latter, processing improvements include water pressure management, reduction in leakages, and the reuse of wastewater.

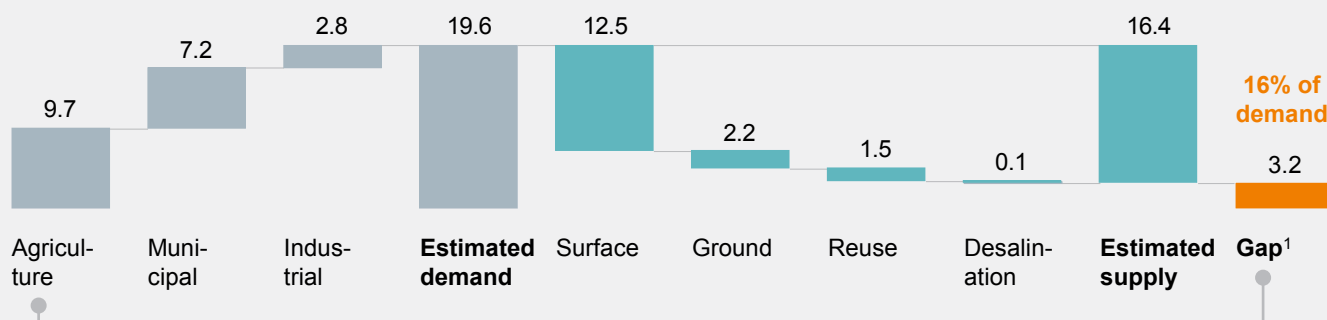
A related point is maintenance, an urgent need. The National Water Resources Strategy estimates that 14 billion rand (\$1.2 billion) would be needed to meet the refurbishment backlog. One approach with proven results (including job creation and the transfer of skills) is social franchising, which was piloted in the Eastern Cape between 2009 and 2012 in the maintenance of water and sanitation in 400 schools.³

Project portfolio scrubbing and optimisation could play a useful role in reducing the cost of water infrastructure. The Department of Water and Sanitation needs to undertake a broad review of all projects, prioritising and proceeding with those that deliver the largest impact on overall water availability and quality for the cost involved. The department could also consider allowing the private sector to construct its own water infrastructure to support specific industrial zones.⁴

Exhibit 17

The gap between water demand and supply in 2035 is estimated at 3.2 billion cubic metres and will require a 670 billion rand investment

Billion cubic metres, 2035



Irrigated agriculture is expected to be the largest single consumer

Government estimates that 670 billion rand will be required over 10 years to meet this gap²

1 The 2030 Water Resources Group estimates this gap at 2.9 billion cubic metres in 2030.

2 National Water Resource Strategy.

NOTE: Numbers may not sum due to rounding.

SOURCE: Institute for Security Studies; National Water Resource Strategy; 2030 Water Resources Group; McKinsey Global Institute analysis

¹ Water demand already exceeds supply by one billion cubic metres a year, or 6 percent of current demand, according to the Institute for Security Studies African Futures Project. Constraints on supply include low levels of highly seasonal rainfall at about half the global average, insufficient aquifers, and a dependency on water between basins and from other countries (South Africa purchases about one-quarter of its water from Lesotho). Yet consumption per capita is 235 litres per person per day, compared with a global average of 173 litres. This suggests that South Africa is failing to manage its water consumption. Moreover, the water system has quality problems, including contamination from mining and industry; an example is the problem of acid mine drainage in Gauteng.

² *Report of the Portfolio Committee on Water and Sanitation on the consideration of the 2014–2015 strategic plans, annual performance plans and budget allocation of the Department of Water Affairs*, July 2014.

³ The model requires a franchisor and franchisee. The franchisor has a high level of skills and is capable of handling serious repairs. Franchisees are local microenterprises with the skills to carry out standard maintenance. Franchisors are government-funded (the government itself can play this role) and in turn contract franchisees. This model creates jobs in communities and transfers skills over time. Ultimately, franchisees become self-sufficient and can be contracted directly by government.

⁴ *Reverse the curse: Maximizing the potential of resource-driven economies*, McKinsey Global Institute, December 2013.

AN ENHANCED ROLE FOR THE PRIVATE SECTOR

Countries that have succeeded in delivering ambitious infrastructure development agendas have typically seen a high degree of alignment between government and business at every stage of the process. They demonstrate clarity and joint commitment on national infrastructure priorities, collaboration and idea sharing on planning and design, shared focus on capability building, and in many cases a significant level of private-sector financial investment and risk sharing.

Realising South Africa's ambitious goals will require both sides to build trust and alignment around national infrastructure priorities. In doing so, they can draw on some highly successful examples. These include the Square Kilometre Array project. South Africa's successful bid to host this piece of astronomy mega-infrastructure on behalf of eight African countries was the result of nearly a decade of combined effort by government, academic, and private stakeholders. The international selection committee found South Africa's bid superior on technical, scientific, planning, and cost dimensions to those of several other nations. The Square Kilometre Array is expected to attract some nine billion rand (\$781 million) in foreign investment during the first phase alone and at least 50 billion rand (\$4.3 billion) in the second phase.¹¹³

Another equally instructive example of success—and one that has involved an even broader range of stakeholders—is South Africa's renewable energy programme, which has “crowded in” 161 billion rand (\$14 billion) in private-sector investment from more than 100 investors along with broad and deep expertise (see Box 3, “South Africa's renewables procurement programme”).¹¹⁴

¹¹³ “The world's largest radio telescope takes a major step towards construction”, Square Kilometre Array, March 9, 2015.

¹¹⁴ Eberhard et al., *South Africa's renewable energy IPP procurement program: Success factors and lessons*, World Bank Public-Private Infrastructure Advisory Facility, May 2014.

Box 3. South Africa's renewables procurement programme

South Africa's Renewable Energy Independent Power Producer Procurement Programme, launched in 2009, has been praised for its clarity and transparency. It could be a useful model for private funding of other types of infrastructure projects, and it can act as a signalling device of the government's capacity to “crowd in” private-sector funding with the correct preparation.

The programme facilitates a bidding process in which private producers compete to provide capacity to the grid at a certain price. To date, three rounds of bidding have been completed, with 161 billion rand (\$14 billion) committed for 3,922 megawatts of renewable power. More than 100 investors, including commercial banks, pension funds, and development-finance institutions, took part in the first 64 projects; 86 percent of the debt has been raised in South Africa.

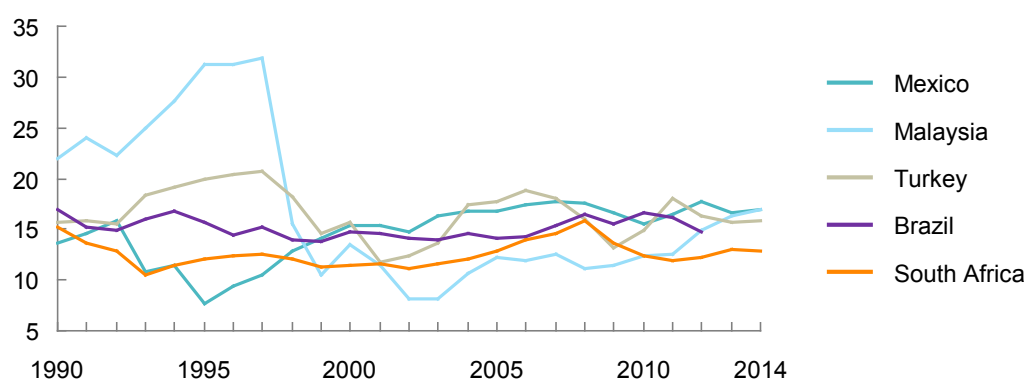
Five factors have contributed to the success of the programme. First, a dedicated Department of Energy unit with technical expertise in renewables and independent power producers runs it. Second, the competitive bidding process has ensured realistic but competitive prices while building confidence over multiple rounds. Third, exemptions from national public-private partnership regulations and the Preferential Procurement Policy Framework Act have reduced costs for investors. Fourth, the programme has been extremely transparent, with all rounds made public in a timely manner through a dedicated website. Finally, financial backing (particularly long-term debt) from South Africa's deep financial market has been strong.

As one marker of the scope for change, and in light of the public sector's fiscal constraints, it is worth focussing on the opportunity for greater private-sector financial investment. Globally, more funding for infrastructure is available today than ever before, and, with strong financial markets, South Africa is well placed to attract a greater share of it. Interviews with private investment bodies have confirmed an interest in infrastructure investment, while private equity funding in South Africa dedicated 38 billion rand (\$3.3 billion) to infrastructure in 2013.¹¹⁵ However, gross private-sector capital formation is lower than in other emerging economies, suggesting scope for increased private spending on infrastructure (Exhibit 18).

Exhibit 18

South Africa's private sector lags behind its peers in fixed gross capital formation, suggesting that there is room for increased private spend

Private-sector gross fixed capital formation % of GDP



SOURCE: World Bank World Development Indicators; McKinsey Global Institute analysis

Unlocking greater private-sector investment and boosting alignment between the public and private sectors will require both a broader meeting of minds and some specific steps. For example, government must invest in packaging projects to make them more attractive to private investors. The private sector is likely to engage actively with projects that solve a clearly identified need and make economic sense on their own, typically with reliable revenue streams and a clear return on investment. Global best practice in this regard is to focus on front-end loading—defining very clearly a project's business case and scope, including its objectives, target completion date, specifications, and design requirements—before seeking funding, rather than simply defining projects in economic or budgetary terms. Today, however, front-end loading is not common enough in South African projects.

To access and attract international private investment on a significant scale, South Africa will need to ensure that global investors are comfortable with both the risk profile and the returns of South African infrastructure projects. To manage risk, government can take steps to ensure that projects are bankable, public messages and communications are consistent in tone and content, and tender processes are well run and transparent.¹¹⁶ Currency volatility is also often mentioned as a risk, given South Africa's flexible exchange rate regime. This means that attracting co-financiers who want to receive their return in dollars is unlikely without some guarantees. To improve returns, government can take steps to disaggregate large projects into more attractive offerings, engage public stakeholders to build up a willingness to pay where it might not exist, and improve procurement processes

¹¹⁵ "Private equity funding to bridge Africa's infrastructure deficit", Southern African Venture Capital and Private Equity Association press release, October 1, 2014.

¹¹⁶ A project is considered bankable when it has a business case including a clear rate of return and when it would pass criteria specified by a financial institution to approve debt or other funding.

(as discussed above). This applies to projects at the national, regional, and municipal levels. At the municipal level, it is likely that only metropolitan municipalities will have staff skilled enough to do this, while other municipalities would require support from a regional or national agency.

Beyond providing funding, the private sector can contribute to preparing viable projects. Our experience is that funders need to help assess and define the project scope and business case with the party seeking funding—although this can exclude smaller funders from participating. To tackle this issue, the government can put in place a project preparation company or department to create and properly define the projects that the private sector can then tender to fund. There are also ways to boost the certainty of revenue streams, including long-term offtake agreements, guarantees, and a clear regulatory framework.¹¹⁷ The absence of such a capability has been a challenge, for example, in agricultural infrastructure: the National Treasury does not fund anchor projects under SIP 11.¹¹⁸ To cite another example, the Elundini Wool Processing Hub project in the Eastern Cape did not move forward for six months because no funding had been secured beyond the feasibility phase. Without bankable business cases to attract the private sector, such projects cannot progress.

Even when the revenue stream is clear, there is also a risk that users are not familiar with the practice of paying for use of an asset class. In these cases, more consultation with the users, an understanding of willingness to pay, and transparency in the process and contracts are essential. The highway e-toll system in Gauteng province, where protests and payment boycotts occurred after the infrastructure was already built, provides a vivid example of this need.

Although not all asset classes or project phases are appropriate or attractive for private-sector investment, many exist that would benefit significantly from such investment—and from more focussed application of private-sector expertise, innovation, and delivery responsibility.



South Africa's commitment to infrastructure development is well-proven. However, the country will now need to maximise the economic impact of every rand invested. This will require that the government and the private sector come together in a true partnership to design, deliver, and, where appropriate, fund national infrastructure priorities whose social and economic impact is clear. Together, the public and private sectors can help develop a significantly more productive infrastructure sector by maximising the use of existing infrastructure, strengthening project planning, and boosting assessment and execution skills.

The impact of getting this right will be huge. By itself, more productive delivery of infrastructure could save 1.4 trillion rand (\$122 billion) over the coming decade, freeing up precious capital that could be invested elsewhere to boost growth and job creation. Moreover, successful, cost-effective, on-time delivery of critical infrastructure will create a powerful growth platform for the entire economy—and make a major contribution to achieving the NDP's goal of eliminating poverty and reducing inequality. Finally, an effective approach to domestic infrastructure delivery will build the skills and solutions needed to unlock the export of South African construction services across the continent.

¹¹⁷ Long-term offtake agreements are contracts between the producer and buyer of the services deriving from infrastructure. The long-term nature of the contract reduces uncertainty about pricing and demand.

¹¹⁸ SIP 11 covers agricultural logistics and rural infrastructure. The project aims to improve investment in agricultural and rural infrastructure in order to expand production and create employment. There are 18 SIPs that form part of the national infrastructure plan and are funded through the national budget.



3. NATURAL GAS: POWERING SOUTH AFRICA'S FUTURE

South Africa already faces a challenge in ensuring that its energy supply can keep up with demand, and that equation is becoming more difficult to balance as the economy grows. To address this issue, the country has crafted a long-term energy strategy built on the sensible principle of diversification. It relies on a mix of nuclear power, existing and new coal plants, natural gas, hydropower, and renewables.

The diversification strategy will take time to implement, however, and in the medium term, South Africa remains vulnerable to a power deficit that could constrain growth. The two new coal plants under construction will have a total installed capacity of 9.6 gigawatts, but they will likely secure the country's energy needs only through 2020. By 2025, MGI projects that South Africa will face a power supply gap of six to ten gigawatts due to a combination of the decommissioning of aging coal plants, emissions concerns, reliability challenges in older plants, the balancing capacity needed to phase in renewables, and growth in peak demand.¹¹⁹ Natural gas could play an important role in bridging this gap.

South Africa continues to work towards strengthening its base load by adding nuclear and coal capacity; both of these fuels are currently more cost-effective than gas. However, natural gas could be introduced with a significantly shorter lead time. That means it could play an important role in South Africa's energy portfolio, particularly in terms of meeting the country's base-load energy needs between 2020 and 2030, before more diversified capacity comes into operation.

In addition to building the necessary generation capacity, there is the question of supply. Southern Africa (including Mozambique, Tanzania, and Namibia) has seen important natural gas discoveries over the past decade, although significant action needs to be taken to ramp up production. South Africa has its own technically recoverable gas resources, which represent an exciting prospect—but pilot well drilling, as part of a broader appraisal programme, is needed to determine their precise volume and viability.

The urgency to act on the natural gas opportunity is growing. To pursue domestic production, the government could finalise regulations, issue permits for pilot wells, and simultaneously complete environmental impact assessments. It could also guarantee purchase of the gas as an end-user for a number of years, given that early production costs are expected to be higher than the cost of importing liquefied natural gas. These actions would encourage private investment and domestic exploration. In the interim, imports of LNG could provide a solution. It will be necessary to pilot and pursue multiple natural gas supply options to arrive at the correct economics and ensure that demand can be met securely.

If domestic natural gas production in South Africa does prove viable on a large scale, it could support a low-carbon, cost-effective power sector and allow for greater energy independence. At the right price point, it could even support the development of downstream industries, creating another avenue for economic growth. Combining the potential impact of domestic gas production, power production, and downstream petrochemical production, we calculate that natural gas development could boost South

¹¹⁹ By 2030, peak demand is expected to increase by 11 to 18 gigawatts, in line with expectations for a growing economy. During this same period, 14.4 gigawatts of aging coal capacity is scheduled to be decommissioned. See *Integrated resource plan for electricity (IRP) 2010–2030: Update report 2013*, Department of Energy, 2013.

Africa's GDP by 138 billion to 251 billion rand (\$12 billion to \$22 billion) by 2030.¹²⁰ This could create up to 328,000 direct and indirect jobs.

SOUTH AFRICA APPEARS BOUND FOR AN ENERGY SUPPLY SHORTFALL AFTER 2020

14.4GW

Capacity of coal power plants planned for decommissioning between 2020 and 2030

South Africa is facing an emerging energy supply gap after 2020. Aging coal power plants with some 14.4 gigawatts of capacity are planned for decommissioning between 2020 and 2030.¹²¹ Other supply-side pressures will include continued reliability concerns with older plants (as experienced during 2015 brownouts), emissions concerns for the Return to Service coal power stations (Camden, Grootvlei, and Komati—aged, formerly mothballed facilities), and the balancing capacity needed for operating renewable plants.

Compounding this is the potential for rising energy demand in South Africa. The country's growth trajectory will determine the degree to which demand will rise. Any scenario in which South Africa is able to create jobs in line with its needs will require a significant level of economic growth.¹²² Growth in advanced manufacturing (discussed in Chapter 1) will be particularly energy-intensive. South Africa's population is both expanding and increasing its average standard of living, and energy consumption rises in tandem with incomes. Between 2000 and 2012, the population grew by 1.4 percent per year, and the share of households with access to power increased from 77 percent to 85 percent.¹²³ These upward trends are expected to continue, although improved energy efficiency or a change in personal habits, for example, could mitigate demand growth.

Power demand forecasts can be unreliable at best, but based on available information, MGI estimates that by 2025, peak demand will increase by 11.6 gigawatts; by 2030, it will rise by 18.7 gigawatts (a base case that assumes that demand grows by an average of 2.8 percent annually through 2030).¹²⁴ Given that it is not easy to predict energy consumption, we have considered a range of scenarios. The high case may seem aggressive in relation to the current growth perception, but overall these assumptions are consistent with the objective of staying ahead of demand growth and supporting the goal of 5.4 percent GDP growth stated in the NDP. Although every country has different circumstances, this range is consistent with the energy demand growth observed in other emerging economies of similar income levels.¹²⁵

After taking into account existing and committed sources of supply, including the two new coal plants, Medupi and Kusile, we project that South Africa will be unable to meet demand beyond 2020 and will need to develop new capacity (Exhibit 19). The gap between peak demand and available capacity (before reserve margin) will be an estimated 5.7 gigawatts by 2023, and it will rise to 10.2 gigawatts by 2025 in the base case demand scenario of 2.8 percent growth.¹²⁶ Even in the low case demand scenario of 1.8 percent growth, we

¹²⁰ All rand values are quoted in 2010 prices. All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

¹²¹ An additional 2.1GW of non-Eskom, non-coal assets are slated for decommissioning. See *Integrated resource plan for electricity (IRP) 2010–2030: Update report 2013*, Department of Energy, 2013.

¹²² The National Development Plan discusses achieving and sustaining a 5.4 percent GDP growth rate to 2030.

¹²³ *World development indicators 2015*, World Bank, April 2015; Statistics South Africa.

¹²⁴ *Integrated resource plan for electricity (IRP) 2010–2030: Update report 2013*, Department of Energy, 2013.

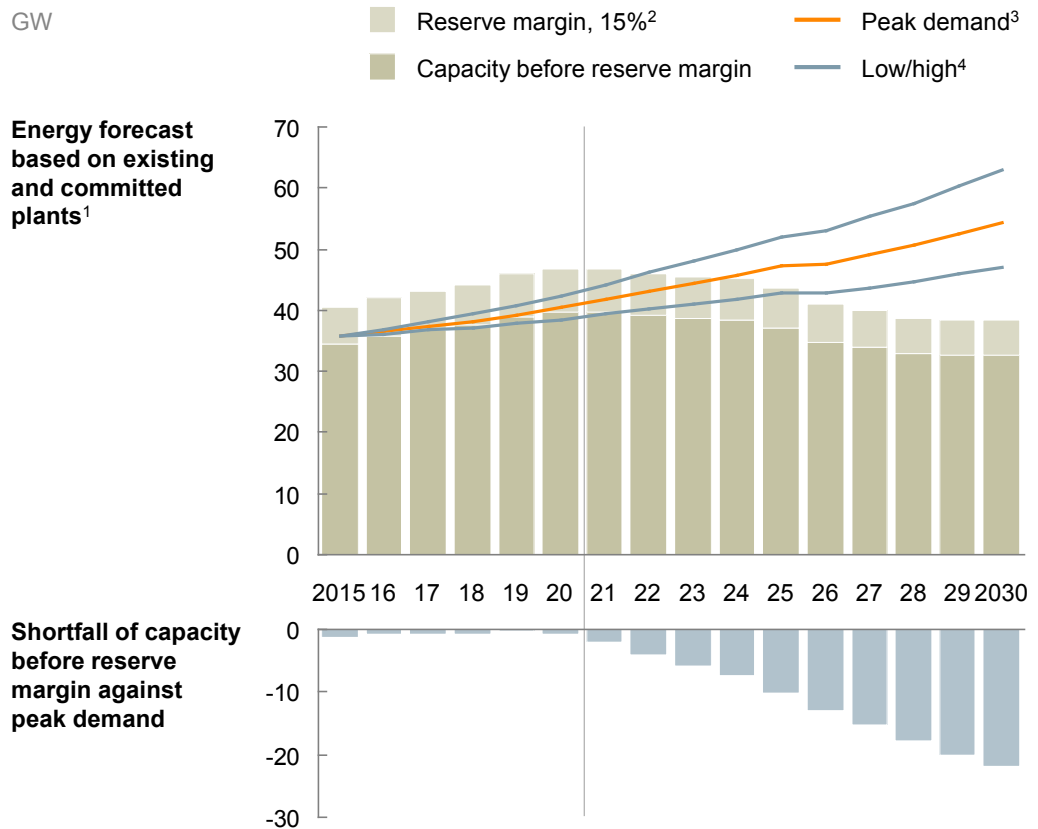
¹²⁵ *World development indicators 2015*, World Bank, April 2015; IHS World Industry Service, July 2015. The link between growing manufacturing output and rising energy consumption has been observed around the world. In Poland, for example, real manufacturing output grew 6.3 percent from 1997 to 2013, while per capita power consumption grew by 1.3 percent. Malaysia's real manufacturing output grew 5.9 percent from 1993 to 2013 and per capita power consumption by 5.9 percent. In the United States and Germany, however, manufacturing output grew by only 0.7 percent and 2.0 percent, respectively, between 2001 and 2011; during the same period, per capita power consumption increased by only 0.2 percent and 0.5 percent, respectively.

¹²⁶ The South African Department of Energy recommends a reserve margin of 15 percent. This is a measure of available capacity that is used to meet spikes in average peak demand or as insurance against sudden losses.

estimate a sizable gap between peak demand and available capacity (before reserve margin) of 5.8 gigawatts by 2025.¹²⁷

Exhibit 19

New power plants will be required after 2020 to balance demand and supply



1 Includes Medupi and Kusile. Assumes an availability factor of 80% for non-renewables and 30% for renewables.
 2 The South African Department of Energy recommends a reserve margin of 15% of peak capacity.
 3 2014 peak demand, escalated at the growth rate set out in the integrated resource plan.
 4 Plus or minus 1% growth from the base case.

SOURCE: Department of Energy Integrated Resource Plan; McKinsey Global Institute analysis

NATURAL GAS IS AN OPPORTUNITY TO SECURE SOUTH AFRICA'S ENERGY NEEDS THROUGH 2030

Gas power can play an important role in securing South Africa's energy needs between 2020 and 2030, providing a crucial bridge until the country is able to diversify its energy mix even further. The different lead times required to bring different power sources online are a key consideration in this equation.

Coal-fired power plants currently have a lead time of approximately eight years in South Africa.¹²⁸ The new Medupi and Kusile coal plants, with a combined installed capacity of 9.6 gigawatts, are likely to secure the country's energy needs through 2020, but after that, the combination of demand growth and the decommissioning of aging coal plants will create a pressing need for new capacity.

Nuclear power is another option for diversifying South Africa's energy mix, but nuclear plants could take significantly longer to build due to the technical complexity, safety requirements,

¹²⁷ Due to uncertainty associated with demand forecasts, we have considered low and high peak demand scenarios, in which expected demand growth is reduced or increased by 1 percent.

¹²⁸ *Outlook for the coal value chain: Scenarios to 2040, technical report*, South African Coal Roadmap, July 2013.

and larger footprints involved. Successfully integrating nuclear power into South Africa's energy portfolio will depend on the comprehensiveness and care that goes into the planning and preparation process. It is worth noting that while South Africa has 30 years' experience in safely running a nuclear plant, it has not built a plant since the Koeberg station was completed in 1985. (South Africa was in a similar situation with coal plants before starting construction on Medupi.)

Considering all this, neither coal nor nuclear energy is likely to be available in time to address the capacity crunch expected between 2020 and 2030, although both remain important for base-load supply beyond this period.¹²⁹

Renewable power is another key component of South Africa's plans. The base case in the Department of Energy's integrated resource plan (IRP) for electricity includes the addition of 12 gigawatts' worth of wind and solar photovoltaic power capacity by 2030, and we have used this assumption as part of the energy opportunity discussed in this chapter.

Natural gas power has to be added on a schedule that would work to bridge the gaps until South Africa can realise its longer-term energy plans. Due to the modular nature of construction, the total lead time required to plan, design, and build a gas plant is two to four years.¹³⁰

In terms of supply, the development of gas resources in the region has already begun, particularly in Mozambique. Sasol first signed an agreement with the Mozambican government to develop gas reserves in 2000, and the resulting natural gas has been supplying the South African towns of Secunda and Sasolburg via a cross-border pipeline since 2004.¹³¹ Other global operators such as Anadarko and Eni have been drilling and testing for additional resources since 2010.¹³² South Africa's own technically recoverable resources must still be proven through an appraisal programme. Pilot drilling, together with ongoing seismic data acquisition and geological mapping, must start before the true extent of these resources is known. The rapid expansion of US shale-gas production has led to major advances in extraction technology. If South Africa imports the improved technology, brings in support from foreign experts, and builds up the necessary skills base, it can accelerate the early exploration stage and determine the viability of large-scale shale gas extraction.¹³³

In addition, while several regional supply options are emerging, international supply options should not be overlooked. In fact, a long-term gas plan will call for imported natural gas for power generation in the near to medium term. South Africa could then capitalise on the momentum created by private investment in this sector to explore domestic production opportunities. But moving now to understand and confirm the opportunity is important (a topic that will be explored later in this chapter).

In the long term, if domestic natural gas production booms in South Africa and prices fall below \$10 per million British thermal units (MMBtu), natural gas could find a sustained role within a new base-load mix. The price of gas would need to drop below \$6 per MMBtu by 2030 to begin to displace coal on the cost curve (Exhibit 20). We acknowledge that there is uncertainty about the viability of shale and offshore gas resources and that the long-term role of natural gas in South Africa will not be clear for many years. But because gas has a

12GW
Planned additional
renewable power
capacity by 2030

¹²⁹ Both power supply options have an advantage in that their feedstocks (uranium reserves for nuclear power and coal reserves for coal power) are readily available in South Africa, which ensures a secure supply.

¹³⁰ *Cost of construction: New generation technology*, WorleyParsons, 2012.

¹³¹ Sasol.

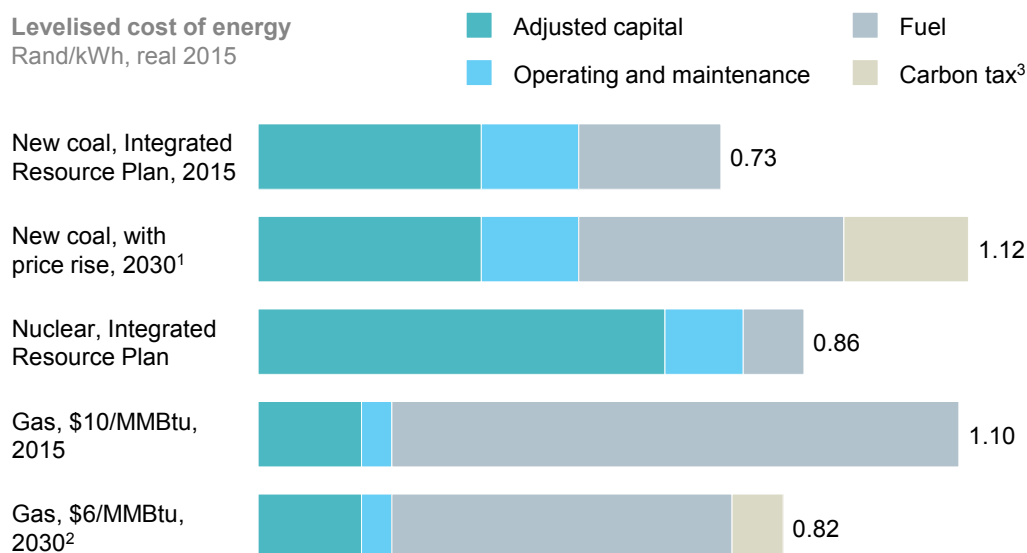
¹³² Company websites.

¹³³ For useful background on the development of the US shale gas industry and the technology involved, see *Game changers: Five opportunities for US growth and renewal*, McKinsey Global Institute, July 2013.

shorter lead time than other fuels, policy makers can have some measure of flexibility in deciding how aggressively to pursue a gas-centred strategy. Additionally, while the current fall in energy prices is likely to delay some gas project developments, it also presents an opportunity to lock in longer-term supply contracts at attractive prices. Ultimately, South Africa must consider and pursue a mix of supply options to ensure its energy security.

Exhibit 20

Gas power is more expensive than coal but will become more competitive as coal prices rise, gas prices fall, and carbon taxes are implemented



1 Assumes coal costs rise by 87% to 2030, per Eskom.

2 Gas price unlikely to drop below \$10/MMBtu until after 2030.

3 Carbon tax is based on 120 rand/ton CO₂ equivalent in 2016, escalated at 10% annually in nominal terms to 2030.

SOURCE: Department of Energy Integrated Resource Plan; Eskom; National Energy Regulator of South Africa; McKinsey Global Institute analysis

GAS COULD PLAY A KEY ROLE IN FORGING A CHEAPER, CLEANER ENERGY FUTURE FOR SOUTH AFRICA

Expanding the role of natural gas in South Africa's energy portfolio could offer a number of advantages, including its relatively favourable carbon footprint. There are three ways to use gas: as a cheaper alternative to diesel power to meet peak demand (for example, during morning and evening hours); as mid-merit (or intermediate) supply that adjusts its power output as electricity demand fluctuates because of demand variation or renewable power supply variation; or as base-load power, which consistently handles the minimum level of demand. In this chapter, we specifically discuss gas as a viable option for base-load power supply.

Gas power has lower initial capital costs than nuclear and coal, at about 8,600 rand (\$747) per kilowatt compared with around 70,900 rand (\$6,155) for nuclear and about 31,500 rand (\$2,734) for coal. However, comparing the levelised costs (that is, the total cost of producing power per unit of output, including fuel, operations, and adjusted capital) associated with each of these three energy sources shows that at today's price of \$10 per MMBtu, gas power has the highest levelised cost of energy of the three sources at 1.10 rand (10 cents) per kilowatt-hour. This compares with 0.73 rand (6 cents) for coal and 0.86 rand (8 cents) for nuclear.¹³⁴

¹³⁴ \$10 per MMBtu is the base price in *Integrated resource plan for electricity (IRP) 2010–2030: Update report 2013*, Department of Energy, 2013.

Three important trends could reduce this gap and create favourable economics for gas between 2020 and 2030. First, South African domestic coal prices are expected to rise in real terms by 4 percent per year through 2030, an increase of 87 percent over this period.¹³⁵ Second, if natural gas prices fall below \$6 per MMBtu, the levelised cost of energy could drop to as low as 0.82 rand (7 cents), making gas the cheapest of the three options.¹³⁶ Third, the government will impose carbon taxes from 2016, at 120 rand (\$10) per tonne CO₂ equivalent, escalating at 10 percent per year.¹³⁷ We estimate that the tax could add 0.08 rand (0.7 cent) per kilowatt-hour to the gas price and 0.20 rand (2 cents) per kilowatt-hour to the coal price by 2030 (real 2015 prices).¹³⁸ In summary, gas at \$10 per MMBtu will be only slightly more expensive than coal in 2030, and it could become the best option for supplementing the base load if long-term price decreases materialise. New gas power plant operators will need to develop their capabilities in currency and commodity price hedging to manage the risks arising from importing a globally traded commodity as a significant portion of their operating cost base.

R708B

Upper estimate of capital required to fund the pipelines and new power plants

Gas also offers advantages from an environmental perspective. New combined-cycle gas turbine plants produce less than half the carbon emissions of new coal plants (at 388 kilograms per megawatt-hour, compared with 947 kilograms for coal), accounting for the significant carbon tax saving already discussed. Comparing purely on emissions, nuclear is an ideal energy source with no emissions but is associated with radioactive waste and high disposal costs.¹³⁹

Furthermore, gas facilitates the adoption of renewables by providing the flexibility to balance the fluctuations in the grid generated by these energy sources, which depend on the amount of sunshine and the strength of wind. Because gas power can be switched on within one hour, it could increase the flexibility already provided by South Africa's existing hydropower capacity and pump storage schemes, such as the Ingula project. In contrast, nuclear and coal cannot ramp up and down to meet fluctuations. This would leave the grid vulnerable when renewable output falls, unless a significant breakthrough in the industrial-scale application of battery technology is developed.

Taking these factors into consideration, a "big gas" approach offers a feasible and promising way to meet South Africa's energy needs through 2030 (Exhibit 21). This strategy would differ from the government's integrated resource plan in three important ways. First, the mix explored below does not include nuclear power because it is likely to remain a work in progress during the period in question (although it can enter the mix in the longer term). Second, our proposed energy mix brings sufficient capacity online to meet demand. We estimate that the IRP base case plan could lead to a 7.2-gigawatt shortfall between available capacity and peak demand by 2030, or it could lower the reserve margin from the 15 percent recommended by South Africa's Department of Energy to just 2 percent. The big gas approach, by contrast, would lead to an estimated shortfall of only 1.3 gigawatts, or a reserve margin of 13 percent, just shy of the recommended ratio. Third, the big gas case involves lower initial capital expenditure (602 billion rand [\$53 billion] for power plant construction, compared with 844 billion rand [\$73 billion]) and a similar levelised cost of energy (1.01 vs. 0.97). We estimate that pipeline costs would range from eight billion rand

¹³⁵ Forecast based on Eskom's third Multi Year Price Determination application to the National Energy Regulator of South Africa. See Eskom, *Part 1 revenue application: Multi-year price determination 2013/14–2017/18 (MYPD 3)*, Eskom, October 2012.

¹³⁶ This is comparable to industrial prices in the United States over the past two years, per 2015 data from the US Energy Information Administration.

¹³⁷ RSA National Treasury carbon tax policy paper, May 2013.

¹³⁸ *Integrated resource plan for electricity (IRP) 2010–2030: Update report 2013*, Department of Energy, November 2013. Assumes typical CO₂ emissions for gas of 0.39 ton per kilowatt-hour and for coal of 0.95 ton per kilowatt-hour.

¹³⁹ *Integrated resource plan for electricity (IRP) 2010–2030: Update report 2013*, Department of Energy, 2013.

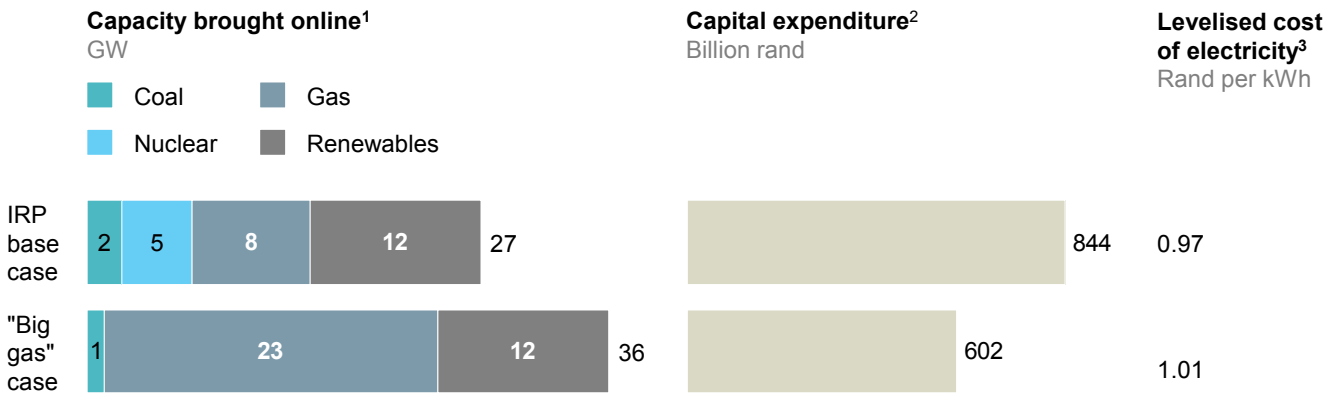
(\$694 million; scenario of LNG imports to Western Cape only) to 106 billion rand (\$9.2 billion; scenario with production from both Mozambique and the Karoo).¹⁴⁰

The big gas approach would reduce the total power generated by coal in 2030 by only about 3 percent—from 271 gigawatt hours in the IRP base case to about 262 gigawatts. Coal will continue to make an important contribution to meeting South Africa’s energy needs, and plans for expansion of the Waterberg Coalfield would not change.

Exhibit 21

We recommend pursuing a “big gas” approach to meeting South Africa’s energy needs from 2015 until 2030

Energy mix: Integrated Resource Plan (IRP) base case vs. “big gas” case



1 Both cases include 1.5GW imported hydro, not shown here.
 2 Capital expenditure of 31,481 rand/kW for coal, 70,891 rand/kW for nuclear, 5,706 rand/kW for open cycle gas turbine, 8,659 rand/kW for combined cycle gas turbine, 19,477 rand/kW for wind, 35,596 rand/kW for solar photovoltaic.
 3 Levelised cost of electricity, based on IRP figures, inflated to 2015, and higher coal power fuel costs of 415 rand/MWh (vs. 222 rand/MWh in the IRP). Assumes gas price of \$10/MMBtu. Comparison does not include carbon tax.
 NOTE: Numbers may not sum due to rounding.

SOURCE: Department of Energy Integrated Resource Plan; McKinsey Global Institute analysis

THE POWER SECTOR IS THE PRIMARY DRIVER OF NATURAL GAS DEMAND

In 2012, South Africa consumed 164 billion cubic feet of natural gas, driven by demand from Sasol at its industrial base in Secunda and by PetroSA at its gas-to-liquids plant in Mossel Bay.¹⁴¹ But this demand level is relatively low: South Africa ranked 60th in the world for its consumption of natural gas, well below other emerging markets. However, the potential for growth in the market for natural gas is substantial.

Our estimate of total demand encompasses both the power sector and industry (Exhibit 22). Based on a price of \$10 per MMBtu, we estimate that demand from the power sector will reach 1.04 trillion cubic feet in 2030.¹⁴² Gas-based industries could also potentially offer a significant demand base. This becomes viable only when gas prices fall below \$6 per MMBtu, based on a willingness-to-pay model, according to the South African Department of Trade and Industry.¹⁴³ Assuming this price range in the long run (if the right supply materialises), we estimate a potential range for industry demand based on a comparison with three peer developing countries that consume one trillion to two trillion cubic feet

¹⁴⁰ The eight billion rand (\$694 million) estimate includes a floating LNG terminal, and a transmission and distribution pipeline network from Saldanha to the Cape Town metropolitan area. The 106 billion rand (\$9.2 billion) estimate includes transmission pipelines from Rovuma to the interior of South Africa and from the Karoo to Gauteng, as well as minor distribution pipelines.
¹⁴¹ US Energy Information Administration.
¹⁴² For more detail, see detailed appendix, available online at www.mckinsey.com/mgi.
¹⁴³ *The potential of gas-based industrialisation*, RSA Department of Trade and Industry discussion document, April 2015..

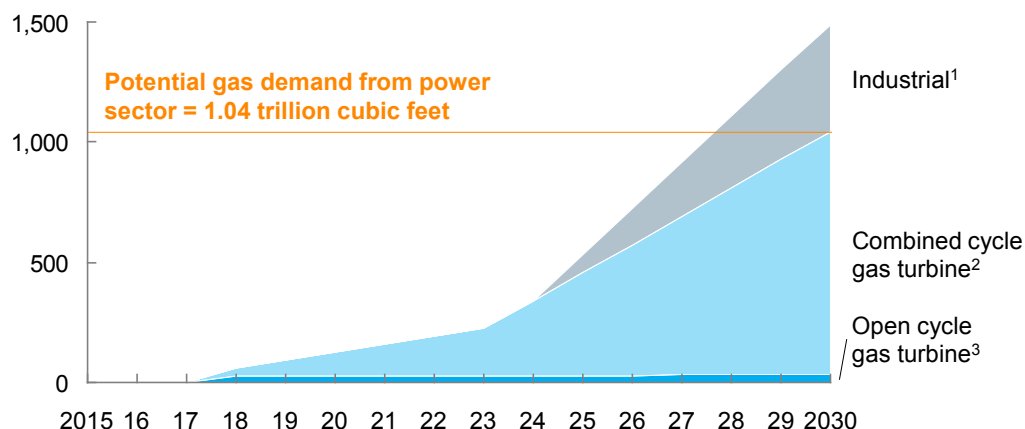
of natural gas.¹⁴⁴ The Department of Trade and Industry approach estimates a range of 0.18 trillion to 0.89 trillion cubic feet. The comparative analysis by this report generates an estimate of 0.45 trillion cubic feet. These numbers will depend entirely on the price of natural gas in 2030 and should be viewed accordingly. To be prudent, we assume an industry demand range of zero to 0.45 trillion cubic feet.

Exhibit 22

If power supply develops as discussed, gas demand for the power sector could grow to >1 trillion cubic feet

Projected gas demand to 2030

Billion cubic feet



- 1 Assumes that industrial consumption could reach 30% of total consumption by 2030, on par with India and Argentina.
- 2 Combined cycle gas turbine; assumes plant efficiency of 50% and utilisation of 80%.
- 3 Open cycle gas turbine; assumes plant efficiency of 40% and utilisation of 10%.

SOURCE: McKinsey Global Institute analysis

HOW FEASIBLE IS IT TO RAMP UP THE ROLE OF NATURAL GAS IN SOUTH AFRICA?

1.04TCF

Potential domestic gas market demand for power by 2030

South Africa will need to exploit new domestic and imported natural gas supply options to meet demand from the power sector. The existing natural gas market is supplied by Sasol, which imports natural gas from the Pande and Temane fields in Mozambique (158 billion cubic feet in 2014), and by PetroSA, which taps gas fields on South Africa's south coast that have small but unpublished resources. Both players consume the majority of the gas they produce. Neither has the opportunity to significantly expand current production because of pipeline constraints and limited reserve size.¹⁴⁵

The scale of the opportunity for gas use in South Africa is immense, with demand from the power sector alone possibly reaching one trillion cubic feet. Fortunately, there are a number of emerging supply options, some with enormous potential. However, many are still unproven. South Africa will need to investigate all potential regional resources to identify options.

The available options include shale gas, offshore gas, coal-bed methane, LNG imports, and unexploited gas resources in Mozambique (Exhibit 23). South Africa's Karoo Basin (shale) and Mozambique's Rovuma Basin (offshore) stand out for their size. Estimates of technically

¹⁴⁴ Enerdata, 2015. The three countries are Argentina, India, and Malaysia. Industry accounts for approximately 30 percent of total demand in these economies. To generate the estimate, we assume that South Africa could reach the same level.

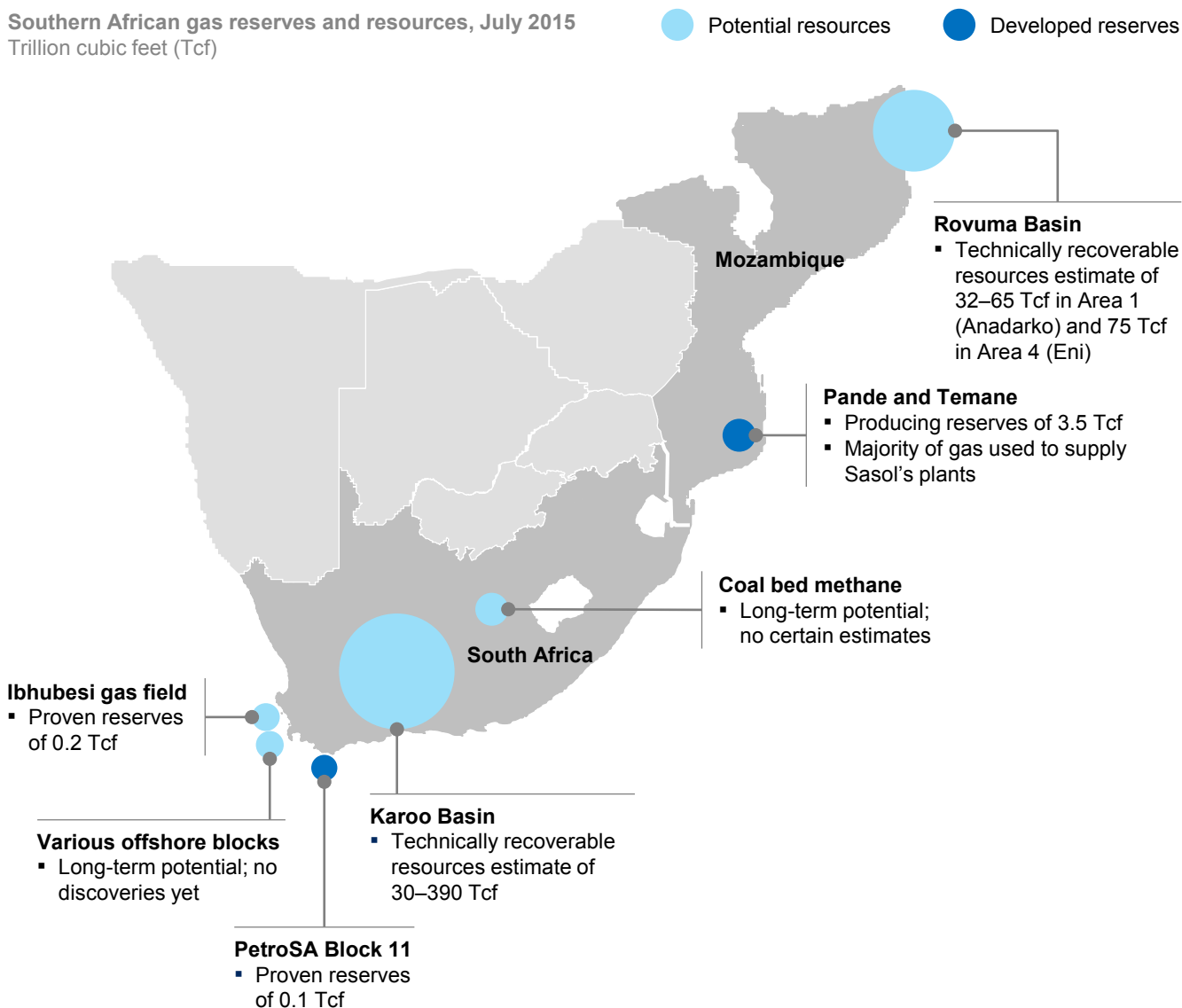
¹⁴⁵ According to Sasol's 2014 Annual Integrated Report, its pipeline is currently being upgraded with a two billion rand (\$174 million) loop-line project, but the increase in capacity will not be on the scale discussed in this report.

recoverable Karoo shale gas range from 30 trillion to 390 trillion cubic feet.¹⁴⁶ The US Energy Information Administration estimates are at the top end of this range; if they are close to the mark, South Africa would rank second in Africa for its oil and gas resources.¹⁴⁷ However, this resource must be proven, and then a cost-effective variation of the extraction process must be developed for South African geology.

Exhibit 23

South Africa and Mozambique have significant gas prospects, some of which are already in production

Southern African gas reserves and resources, July 2015
Trillion cubic feet (Tcf)



SOURCE: Rystad Energy; Petroleum Agency South Africa; US Energy Information Administration

Among the options that South Africa could explore are:

- **Offshore Ibhubesi gas—already planned for use.** The Ibhubesi field has proven reserves of a modest 0.2 trillion cubic feet, which Sunbird Energy and PetroSA are developing. In March, Eskom signed a deal with Sunbird for the supply of 30 billion cubic feet annually for 15 years, with the first production due in 2018.¹⁴⁸ This gas would be used

¹⁴⁶ Petroleum Agency of South Africa; US Energy Information Administration.

¹⁴⁷ Rystad Energy Ucube database.

¹⁴⁸ "Sunbird to supply Eskom with Ibhubesi gas", SouthAfrica.info, March 17, 2015.

for replacing diesel fuel at open cycle gas turbine plants in the Western Cape, but it is not large enough to represent significant additional gas supply.

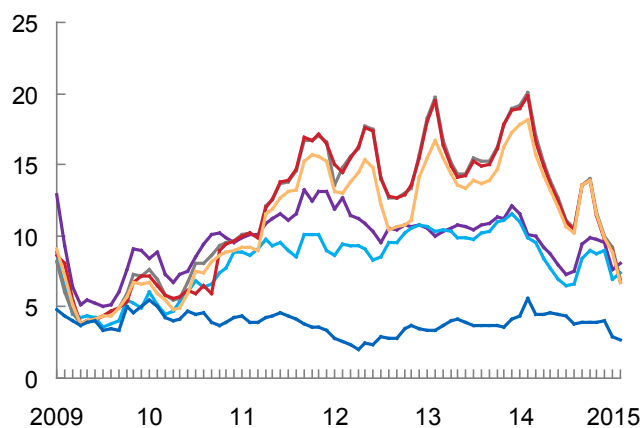
- Liquefied natural gas—a viable near- to medium-term option.** LNG is imported by ship and converted to dry natural gas on an offshore regasification terminal. Prebuilt offshore terminals can be floated into place, so lead times are extremely short. One limiting factor is that these terminals can be placed only in areas with relatively calm sea conditions. In South Africa, the most likely site is at or near Saldanha on the west coast. A terminal with an annual capacity of 170 billion cubic feet would cost approximately 4.4 billion rand (\$382 million) and could be in place by 2018, although the timing would depend on regulatory processes.¹⁴⁹ LNG is currently attractive because global prices have fallen substantially over the past year, largely due to lower oil prices and new US supply (Exhibit 24). Forecasts suggest that prices will remain stable for the next five years.¹⁵⁰ This presents an opportunity for substantial base-load supply in the short to medium term while other supply options can be developed in parallel.

Exhibit 24

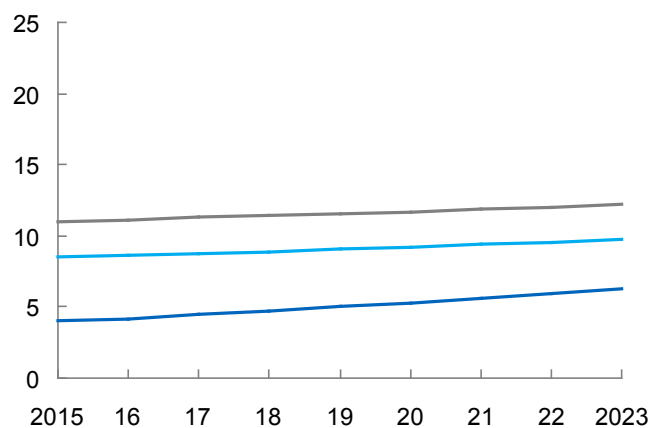
Depressed international prices and a flat outlook make LNG an attractive supply option to 2023

\$ per MMBtu

Front month LNG and spot prices



Gas price forecasts



- | | | |
|-------------------------|---------------------------|---------------|
| Italy (PSV) | China | Japan LNG |
| United Kingdom (NBP) | India | Europe |
| Japan/South Korea (JKM) | United States (Henry Hub) | United States |

SOURCE: World Bank; Platts International Gas Report; McKinsey Global Institute analysis

- Imported gas—expanding the supply base in the medium term.** Imported gas would be transported from Rovuma, Mozambique, to South Africa. There are two main alternatives to access the gas resource: constructing a pipeline from Rovuma and building an LNG facility at the Rovuma fields and importing the gas by barge.¹⁵¹ In principle, a pipeline would deliver cheaper gas to South Africa because it would avoid the liquefaction costs that an LNG facility would incur, but there are other considerations.

¹⁴⁹ Enerdata. Price calculated as the average of recent plants of approximately the same size.

¹⁵⁰ Expert interviews suggest that prices may rise again from 2020 to 2025; we expect domestic or regional supply options to come online by then.

¹⁵¹ Other options might include, for example, using the gas in Mozambique and selling the power to South Africa.

The netbacks earned on the global LNG market may be more attractive than from pipeline gas (although lower LNG prices make this less likely). As a result, Mozambique may prefer to develop an LNG plant and sell its gas on the global LNG market, rather than build and operate a pipeline over a long distance to remote, underdeveloped Rovuma. South Africa would also need to develop a security of supply plan should imported, piped gas become its major source of supply, given the critical need to keep base-load power plants operational. Concerns in this respect would be mitigated by stable intergovernmental relations between South Africa and Mozambique and careful maintenance of the assets. The best solution needs to be investigated.

Should the pipeline prove feasible, we estimate that it would take six years to plan and construct. If planning began in 2017, completion could be by 2023.¹⁵² The estimated capital expenditure is 76 billion rand (\$6.6 billion). Annual capacity would be determined by the size of the pipeline (for instance, a 36-inch pipeline would deliver approximately 400 billion cubic feet a year). The price of Mozambique piped gas would reflect the underlying wellhead cost plus the cost of pipeline transport, totalling \$6 to \$11 per MMBtu.¹⁵³ Alternatively, should Rovuma gas be imported by means of LNG barge, South Africa could balance its security of supply against that of other suppliers of LNG. Although the pipeline may be more economically attractive because of the substantial additional costs of liquefying gas and the relatively cheap costs of importing from Rovuma, at this early stage it is worth keeping a number of options open.

- **Shale gas—an option to secure the supply base in the long term, contributing to energy independence.** Given the estimated size of technically recoverable shale resources, we forecast that annual production could reach one trillion cubic feet or more if even a fraction of the resources prove viable. Shale is likely to be expensive in the early development phase, at more than \$10 per MMBtu, but the price would then decrease as operators learn more about its extraction (likely only after 2030).¹⁵⁴ The experience of the United States shows that shale production can reach scale quickly, with associated decreases in price, when an existing skills base, a fast learning curve, and improvements in technology can be brought to bear. Importing the best technology from the United States and an international skills base would be important to support the early stages of exploration in South Africa. The most important step though, is to prove these resources through an appraisal programme, particularly starting with pilot well drilling, while resolving legislative and environmental questions.
- **Offshore and coal-bed methane—options with unknown viability.** It is difficult to establish the price and potential capacity of these two sources. Their prospects will depend on the quality and location of future discoveries.

GAS-BASED POWER AND INDUSTRY COULD ADD 138 BILLION TO 251 BILLION RAND TO GDP BY 2030

By 2020, a shift towards natural gas could add 16 billion rand (\$1.4 billion) to South Africa's annual GDP, reflecting capital expenditure on pipelines and power plants as well as the value of power produced. At this point, 9,500 temporary jobs in the construction of pipelines and plants could be created. By 2030, natural gas could add 138 billion to 251 billion rand (\$12 billion to \$22 billion) to South Africa's GDP as power and industrial output increase (Exhibit 25).¹⁵⁵ These power and industrial output value add estimates include the value add

¹⁵² Potential delays may arise because this is a cross-border pipeline and Mozambique does not yet have its petroleum policy in place, while low LNG prices may delay interest in producing at Rovuma.

¹⁵³ David Santley, Robert Schlotterer, and Anton Eberhard, *Harnessing African natural gas: A new opportunity for Africa's energy agenda?* World Bank, January 1, 2014.

¹⁵⁴ *Unconventional play service analysis: South Africa/Karoo Basin/shale*, Wood Mackenzie, November 2012.

¹⁵⁵ Both 2020 and 2030 GDP estimates include direct, indirect, and induced effects across the broader economy.

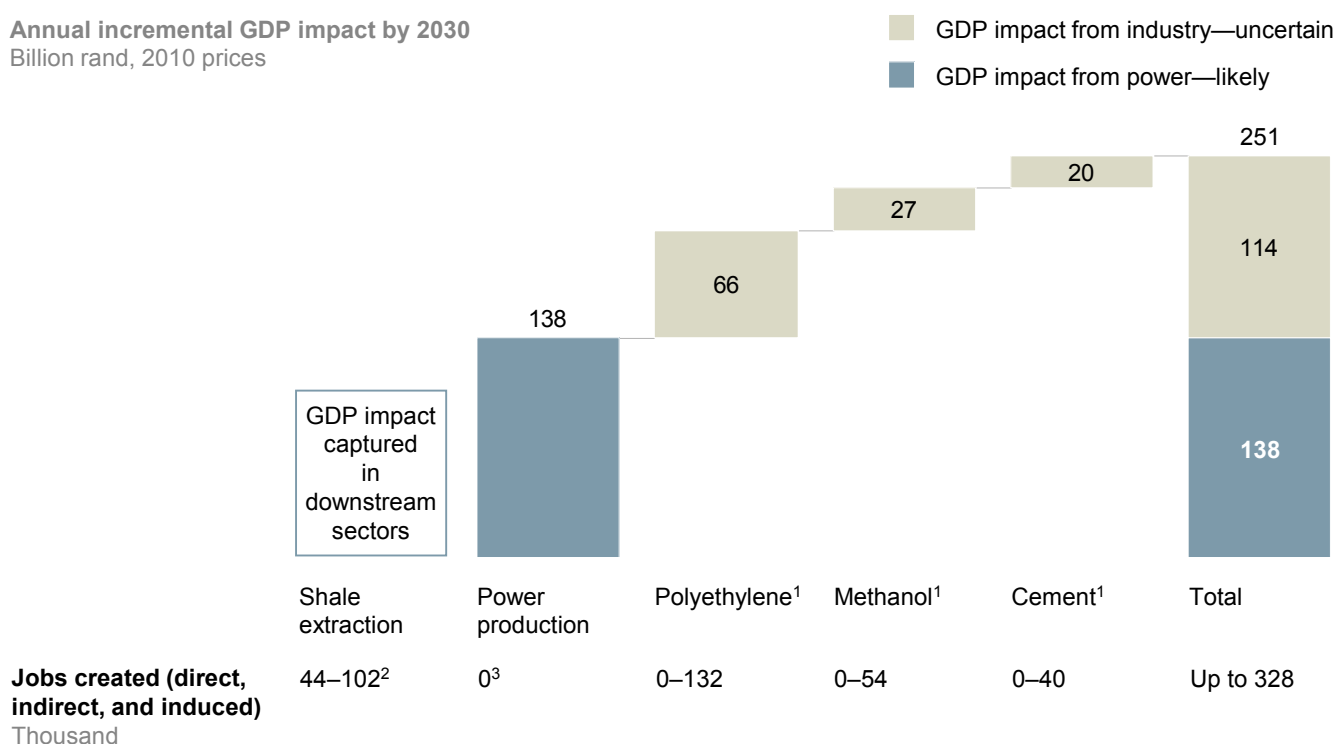
of the extraction of the gas. Thus, if shale gas is proven and its extraction is realised, its GDP impact is already embedded in this estimate.

Exhibit 25

By 2030, the gas industry could boost GDP by 140 billion to 250 billion rand annually and create up to 330,000 jobs

Annual incremental GDP impact by 2030

Billion rand, 2010 prices



¹ These three examples are indicative of the range of opportunities for potential downstream gas use, but none has been confirmed. The downstream use realised after 2030 depends on gas market prices and regional and global demand for final products. Polyethylene and methanol would both be exported; cement would either be consumed locally or exported to neighbouring countries.

² Assumes an annual production range of 0.3 trillion to 0.7 trillion cubic feet.

³ Assumes that jobs will be transferred from existing plants.

NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute analysis

We estimate that 44,000 to 102,000 permanent jobs could be created in the shale-extraction industry, and that depending on the price of natural gas, an additional 226,000 jobs could be generated in downstream industries; these could total as many as 328,000 jobs. By 2030, all of this investment in development could create up to 820,000 temporary jobs during the construction phase of the pipelines and power plants.

THE GOVERNMENT HAS A KEY ROLE TO PLAY IN DELIVERING A BIG GAS ENERGY FUTURE FOR SOUTH AFRICA

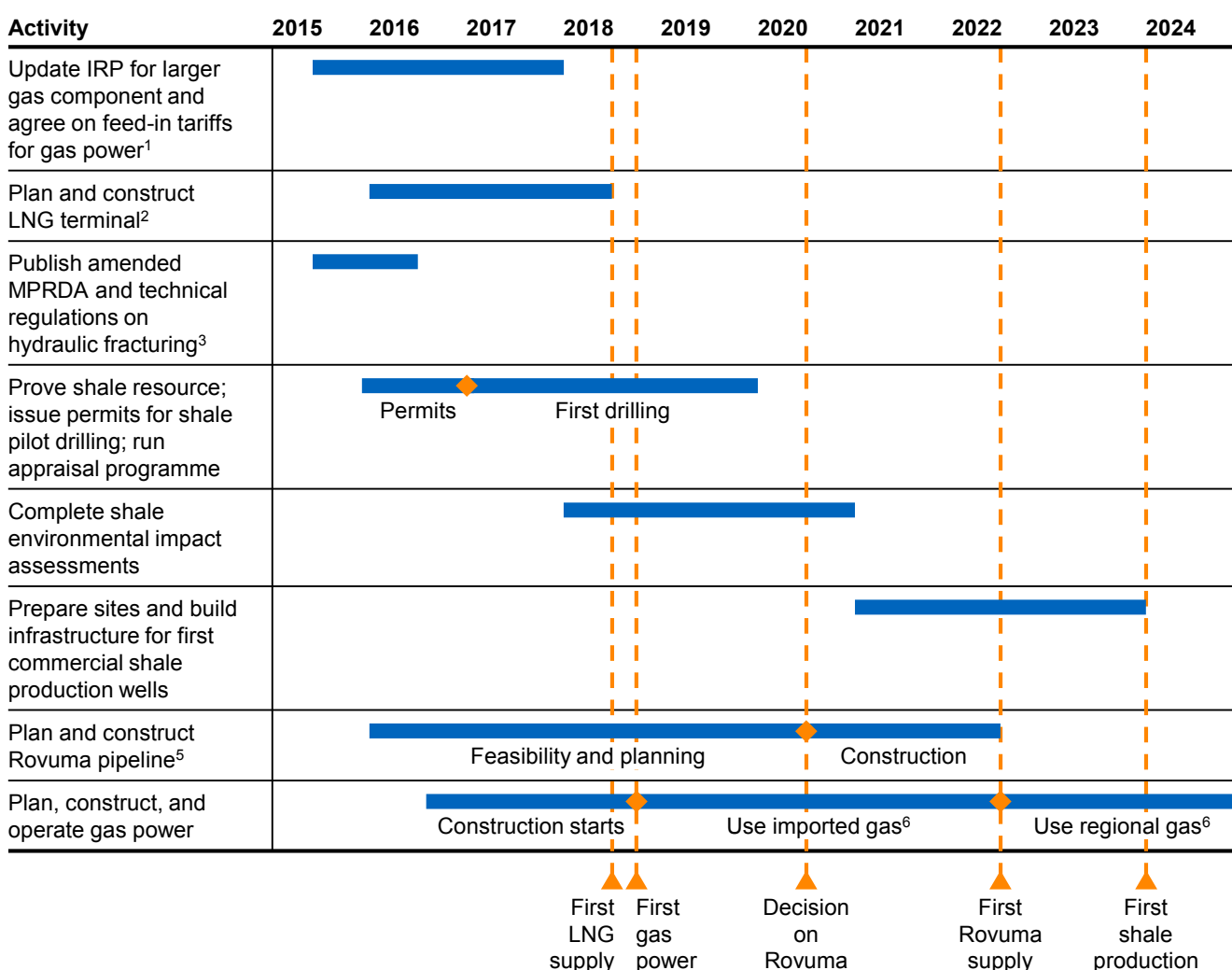
It will take action on several fronts to unlock the full potential of gas, with initial steps by government to enable private-sector involvement. Regulation can encourage private-sector investment, facilitate the construction of infrastructure, and support efforts to develop the necessary skills (Exhibit 26). Beyond focussing on the industry's longer-term development, however, it is especially urgent to create an attractive environment for early appraisal programmes that can determine the viability of South Africa's resources. Granting pilot licences and kick-starting demand for gas are critical steps to give these programmes momentum.

Significant capital is needed to bring natural gas online. Between 2015 and 2020, South Africa would need to invest 4.4 billion rand (\$382 million) in an LNG terminal at Saldanha

and 4.1 billion rand (\$356 million) in pipelines connecting the terminal to nearby sources of demand. Between 2020 and 2030, 76 billion rand (\$6.6 billion) in investment could bring a pipeline from Rovuma to the South African coast (an additional 22 billion rand [\$2 billion] could potentially add a pipeline from the Karoo Basin to Johannesburg or to the South African coast). More pipeline investments will be needed as the market grows. There will also need to be substantial investment in shale drilling, although it is difficult to quantify because the future magnitude of shale extraction is so uncertain.

Exhibit 26

By acting now, government can unlock private-sector investment



- 1 Assumes that Eskom will build and start operation of the first gas plants by mid-2018 and the integrated resource plan would cater for this scale of gas power; to achieve the large-scale base-load gas power use outlined in this chapter would require a comprehensive update of the IRP.
- 2 Unit pre-built and imported. Exact lead time is uncertain and will be determined by length of regulatory processes.
- 3 Mineral and Petroleum Resources Development Amendment; draft regulations published by the minister of mineral resources in 2013.
- 4 Shell estimates that the pilot phase would involve 24 wells drilled over three years.
- 5 Major gas pipelines typically require four to six years from announcement to completion of construction.
- 6 Gas power stations fuelled by imported LNG in early years and by regional gas in later years (either regional supply from Rovuma or domestic shale).

SOURCE: Shell; McKinsey Global Institute analysis

To generate this investment, the government can take several steps. The first involves moving quickly to establish the playing field and develop regulations to provide private investors with clarity and confidence. This can start with finalising the Mineral and Petroleum Resources Development Act, including a process that addresses private-sector concerns over the government’s proposed 20 percent free carry (free profit share). Alternatives to

2017

Year when pilot drilling will need to start to prove the shale resource is viable

consider might include applying this provision only after companies recover their initial investment and allowing the government's share of profits to rise in better years and shrink in weaker years.

Another area of regulatory focus should be finalising the Proposed Technical Regulations for Petroleum Exploration and Exploitation, which were released in initial form in 2013. South Africa should seek technical support from US shale experts to ensure that regulations reflect the latest industry knowledge. This would pave the way for an efficient permitting process that would allow interested parties to upgrade technical permits to full exploration licences. There are also two priorities for adjusting regulation of power generation. First, the integrated resource plan, which already makes provision for a big gas case, will need to be amended once the potential growth of gas as a power source is clear. Second, the Department of Energy could consider establishing an independent power producer unit for gas power, drawing on its experience of the renewables independent power producer unit (see Box 3 in Chapter 2, "South Africa's renewables procurement programme").

Government involvement is also critical to kick-starting both the demand and supply of natural gas. On the supply side, construction is needed to build two key pieces of infrastructure: the LNG terminal in Saldanha and the pipeline networks the country would need to transport gas from the LNG terminal and potentially from Mozambique. LNG is a primary short-term supply option, but building a terminal requires passing through several regulatory steps. By speeding this process, the government could ensure that supply is available as soon as possible. Pipeline construction in particular is associated with complex environmental and land rights issues, so it will take a concerted effort to ensure that this process does not bog down. Finally, government-to-government negotiations will be required to build a pipeline from Rovuma, Mozambique, to South Africa.

On the demand side, it is important to create an anchor to provide stability to the fledgling market, reducing risk for investors and justifying expansion of supply network infrastructure. The power sector is likely to play this role. But government can provide more certainty by, for example, guaranteeing that it will purchase a certain volume of natural gas for the first five to ten years for use by the national power utility, Eskom. Given the range of parties involved, government would need to coordinate relevant departments and the activities of the private sector with a single team that could be responsible for developing targets, a timeline, and a granular action plan, then working to achieve it.

In the early stages of developing the natural gas market, South Africa would need to import expertise in areas such as drilling and geology (in the case of shale), LNG terminal construction, and pipeline construction. To facilitate this process, the government could investigate a preferential visa arrangement for skilled workers. One potential silver lining of the recent fall in oil and gas prices is that there may be international experts available to hire, given that the industry has shed many jobs in other countries.¹⁵⁶ Skilled hires from overseas could help to build up a skills base for the longer term if apprenticeship schemes are put in place (see Chapter 6 for further discussion about skills development). Simultaneously, domestic industry could look for opportunities to build its skills base by pursuing regional opportunities, and universities could start assessing whether their programmes deliver the correct skills mix for this industry.

Hydraulic fracturing to extract shale gas has raised environmental concerns, and South African regulators and policy makers would need to work with the private sector to mitigate these risks as the industry develops. These concerns include groundwater contamination,

¹⁵⁶ Expert interview.

substantial water use, and fugitive methane.¹⁵⁷ Contamination is a serious concern for communities that rely on groundwater for their water supply, and the issue has given rise to action groups opposing the development of shale.¹⁵⁸ The risk is relatively low during production if well integrity is adequate and fracturing takes place at sufficient depths below freshwater aquifers.¹⁵⁹ However, postproduction risks are unknown. In the very long term (100 years plus), well casings may eventually degrade, and any remaining liquids will be exposed to the surrounding rock, potentially causing contamination. It is therefore important that the government and the private sector work together to monitor long-term risks and take remedial action when necessary—even decades after well closures.

Shale extraction also requires extensive water use. We estimate that annual production of one trillion cubic feet of shale gas would require approximately 7.7 billion litres of water a year. This appears to be a large volume, but it represents only 0.04 percent of South Africa's projected water demand in 2030.¹⁶⁰ We estimate that the cost of accessing groundwater in a way that doesn't compete with local communities would be less than \$0.05 per MMBtu of gas.¹⁶¹ In the long term, recycling could reduce water use.



Power shortages have been disruptive to daily life and to economic growth in South Africa. The country urgently needs to meet today's demand and shore up its energy security in the years ahead. Expanding the role of natural gas in the country's energy portfolio could be a critical part of that equation. The country could accomplish this on a timeline that heads off a looming capacity gap in the coming decade, buying valuable time while it pursues a longer-term plan to diversify its energy sources. But there is a great deal of groundwork to be done, and no time to lose. Development of the natural gas market can create thousands of jobs and provide a jolt of stimulus—and more broadly, it can power the growth of industries across the entire economy.

¹⁵⁷ Groundwater contamination can occur when, during the fracking process, water mixed with chemicals is injected into the ground to free gas, or when wastewater is improperly disposed. Shale extraction requires large volumes of water to fracture wells. Fugitive methane is gas released into the atmosphere during the extraction process.

¹⁵⁸ The most prominent action group is Treasure Karoo.

¹⁵⁹ *Shale gas extraction in the UK: A review of hydraulic fracturing*, Royal Society and the Royal Academy of Engineering, final report, June 2012; Stephen G. Osborn et al., "Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing", *Proceedings of the National Academy of Sciences*, volume 108, number 20, May 2011.

¹⁶⁰ Steve Hedden and Jakkie Cilliers, *Parched prospects: The emerging water crisis in South Africa*, *Institute for Security Studies*, African Futures paper number 11, September 2014. Expert interviews suggest that the Karoo region has sufficient groundwater resources to meet the demand that would come from shale-gas extraction and that much of the water available is saline or brackish and therefore unsuitable for human consumption.

¹⁶¹ This includes the cost of drilling boreholes, installing pumps, and transporting water up to five kilometres to the shale site.



4. SERVICE EXPORTS: RIDING THE WAVE OF AFRICA'S GROWTH

Services constitute 70 percent of GDP globally, and 62 percent in South Africa.¹⁶² Between 2004 and 2014, they contributed four-fifths of South Africa's GDP growth and nearly nine-tenths of new job creation, adding 500 billion rand (\$43 billion) to the country's GDP and 2.7 million people to its employed workforce.¹⁶³ Yet despite a thriving domestic services sector, South Africa's share of exports of services remains small, even within its region.

We estimate that South Africa has only a 2 percent market share of sub-Saharan Africa's service imports, much lower than Brazil's 26 percent share of service imports in Latin America.¹⁶⁴ This represents a major opportunity for growth, given that the market for imported services in sub-Saharan Africa (excluding South Africa) was worth 439 billion rand (\$38 billion) in 2012 and has been growing by 6 percent per year since 2009.¹⁶⁵ We estimate that South Africa can increase its share of sub-Saharan Africa's service imports to 15 percent, which would add 245 billion rand (\$21.3 billion) to its GDP and create 460,000 jobs.

The three largest opportunities for service exports to the region are in services to the construction sector, financial services, and business services; business process outsourcing represents an important opportunity for service exports to global markets. All of these represent near-term opportunities—South African business can move aggressively to claim a major market share by 2030.

This will require support from government, however, which will need to help establish a regional trade environment that will position South African firms to secure contracts. Both parties must work to develop the skills and capabilities needed to power rapid growth in these high-potential sectors, given that successful services businesses depend on skilled people.

SOUTH AFRICA HAS TREMENDOUS SCOPE TO INCREASE ITS SERVICES EXPORTS

The world is becoming ever more connected, and global trade continues to grow at a rapid rate. As previous MGI research showed, the combined value of trade in goods and services, plus financial flows, rose from 23 percent of global GDP in 1990 to 36 percent in 2012.¹⁶⁶

¹⁶² *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

¹⁶³ *Labour force survey 2000–2007*, Statistics South Africa; 2008–2014 data from *Quarterly Labour Force Survey, Quarter 1, 2015*, Statistics South Africa, May 26, 2015; *Annual GDP data 1993–2014*, Statistics South Africa. All rand values are quoted in 2010 prices. All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

¹⁶⁴ UN Service Trade database; International Trade Centre and WTO joint data set. Due to data limitations, it is impossible to tell which developing countries South Africa is exporting to, but we assume that they are mostly African countries; tourism and government services were excluded. South Africa's total global exports, including tourism and government services, were 102 billion rand (\$9 billion) in 2012, while total global exports, excluding tourism and government services, were 32 billion rand (\$2.8 billion) in 2012 (2010 real prices).

¹⁶⁵ UN Service Trade database.

¹⁶⁶ MGI's database of global flows of goods, services, finance, people, and data and communications covers 195 countries between 1980 and 2012. The McKinsey Global Institute Connectedness Index measures each country's level of integration into the global network of flows for 131 countries. See *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

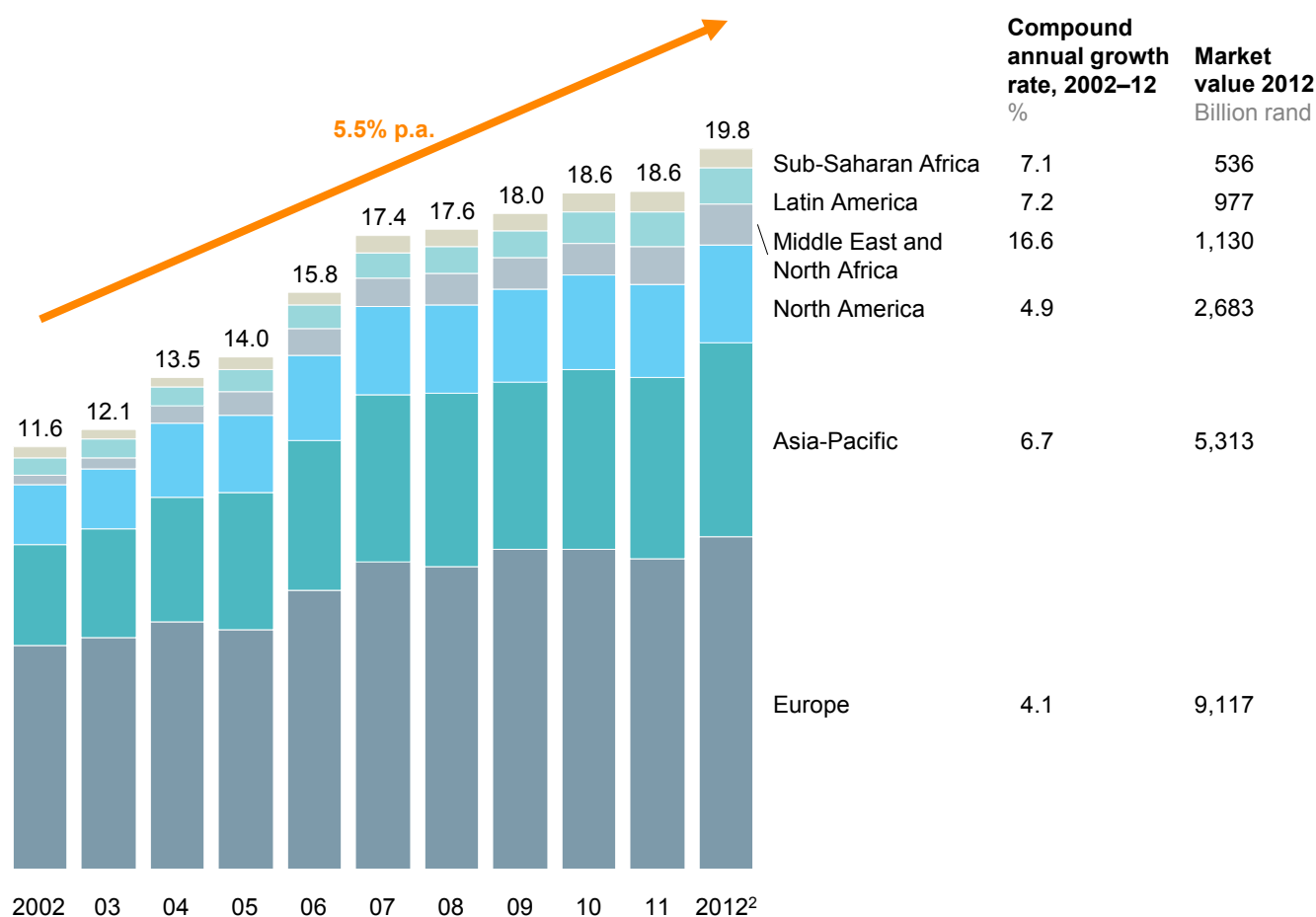
Against this backdrop, there is considerable scope for South Africa to increase services exports, particularly to other African economies.¹⁶⁷ Demand for services in Africa as a whole is booming. Real domestic output in the services industry across Africa grew by 6.7 percent between 2002 and 2012, and service imports into Africa grew by 7.1 percent annually over the same period. The total value of imported services into sub-Saharan Africa reached 536 billion rand (\$46 billion) in 2012, or 439 billion rand (\$38 billion) excluding South Africa.¹⁶⁸ Service imports have also grown rapidly in most other regions, increasing 5.5 percent per year globally in the decade to 2012 and reaching a total value of 19.8 trillion rand (\$1.7 trillion) in that year (Exhibit 27).

Exhibit 27

Global services trade grew at 5.5 percent per year from 2002 to 2012

Global service imports by region, excluding travel and government services¹

Trillion rand, 2010 prices



¹ The rapid rise in service exports could be partially related to annual improvements in service trade data reported by countries.

² 2012 is the latest year for which there is complete data.

SOURCE: UN Service Trade database; McKinsey Global Institute analysis

¹⁶⁷ Trade data track four types of international trade in services: (1) cross-border supply when suppliers of services in one country supply services to consumers in another country without either supplier or consumer moving into the territory of the other; (2) consumption abroad, in which a consumer resident in one country moves to another country to obtain a service; (3) commercial presence, where enterprises in an economy may supply services internationally through the activities of their foreign affiliates abroad; and (4) presence of natural persons, where an individual moves to the country of the consumer in order to provide a service.

¹⁶⁸ There are shortcomings in historical data on services. Data collection began in 2002, and the gradual improvement in the completeness of the recorded data is partially responsible for the growth measured. Many emerging economies do not record detailed data, which has to be estimated by mirroring developed countries' reported data of exports to these regions.

In part due to regulatory, language, and other barriers to the import of services, the trade of services across borders remains relatively low, at an estimated 6 percent of global GDP in 2012; the trade in goods is four times as large.¹⁶⁹ Yet services have become by far the largest part of the world economy over the past decade; by 2012, they accounted for 70 percent of GDP. This makes the overall opportunity in services exports critically important: this is a substantial and fast-growing market.

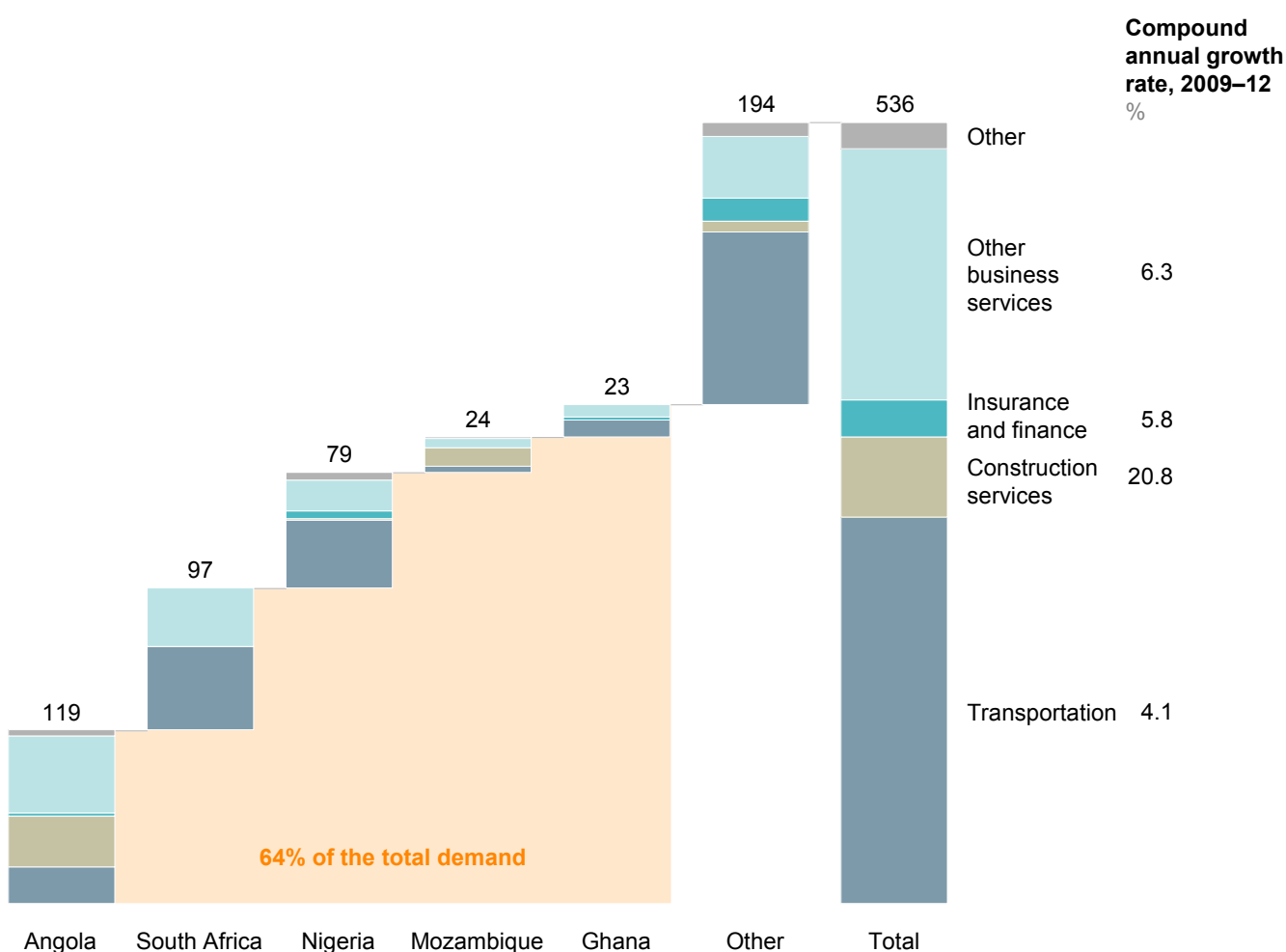
In sub-Saharan Africa, the biggest markets for imported services other than South Africa are Angola, Nigeria, Mozambique, and Ghana (Exhibit 28). These countries are consuming four main imports of services. Of these, services to the construction sector is the fastest-growing segment, with an annual growth rate of 20.8 percent between 2009 and 2012, followed by business services (6.3 percent), finance and insurance services (5.8 percent), and transportation (4.1 percent).¹⁷⁰

Exhibit 28

Five countries import 64 percent of services into sub-Saharan Africa

Imports of services into sub-Saharan Africa, 2012¹

Billion rand, 2010 prices



¹ Excludes travel and government services.
NOTE: Numbers may not sum due to rounding.

SOURCE: UN Service Trade database; McKinsey Global Institute analysis

¹⁶⁹ As discussed in the previous footnote, these figures are estimated, given shortcomings in historical data on services.

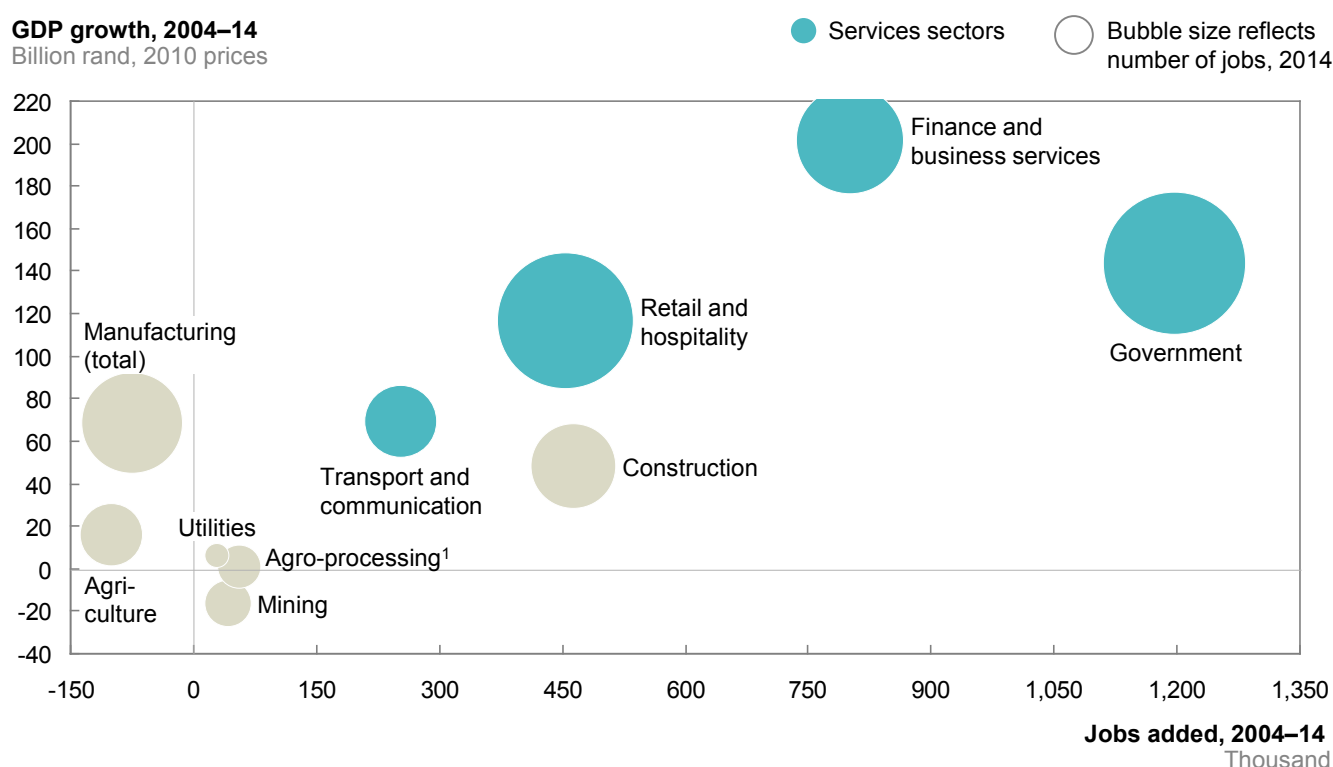
¹⁷⁰ UN Service Trade database, including all countries in sub-Saharan Africa.

South Africa is very well positioned to meet the growing demand for export services in Africa. For one thing, countries tend to have an advantage in supplying services to their near neighbours. Moreover, South Africa has a highly developed domestic services sector, with world-class players in all the major segments in which African services imports are booming. Indeed, domestic services represent 62 percent of South Africa's GDP, a larger share than in several other major service export economies, such as India and the Philippines.¹⁷¹ In the past decade, services have driven most of the growth and job creation in South Africa's economy. The finance and business services segments together grew their GDP contribution by 50 percent between 2004 and 2014, creating more than 800,000 jobs over this period; transportation and communication, and trade (retail and hospitality) also grew significantly over the period (Exhibit 29).

Exhibit 29

Services have contributed the most to GDP and jobs growth in South Africa since 2004

GDP growth, 2004–14
Billion rand, 2010 prices



¹ Agro-processing data available only since 2008.

SOURCE: Stats SA; McKinsey Global Institute analysis

Additionally, South Africa has some strong comparative advantages that could help it export more services. It has relatively low labour costs compared with much of the developed world. This is especially true of highly skilled professions, including engineering, law, and architecture, in which educational quality is similar to the level in the average developed country. For example, salary benchmarking databases indicate that the salaries of engineers are 51 percent lower in South Africa than in a basket of developed countries.¹⁷²

¹⁷¹ Arti Grover Goswami and Sebastián Sáez, "Trade in services competitiveness: An assessment methodology", *Journal of International Commerce, Economics and Policy*, volume 5, issue 1, February 2014.

¹⁷² International Institute for Management Development World Competitiveness Online database, 1995–2015; Career Junction 2014; Robert Walters salary benchmarking 2014. It is difficult to assess whether these benchmarks are comparable, so data should be taken with a grain of salt. A structural engineer was used for the comparison. Comparison countries included Australia, Canada, Germany, Japan, South Africa, the United Kingdom, and the United States.

The country also has a strong domestic business environment and mature financial institutions. This is important because the domestic ecosystem is well set up to support all types of business activities relatively smoothly and skilfully. South Africa also possesses unique skills that are useful when operating in specific sectors in Africa. These include strong technical expertise in industrial operations and mining, and a history of innovation. South African businesses also have a better understanding of the African context than their competitors from other regions.

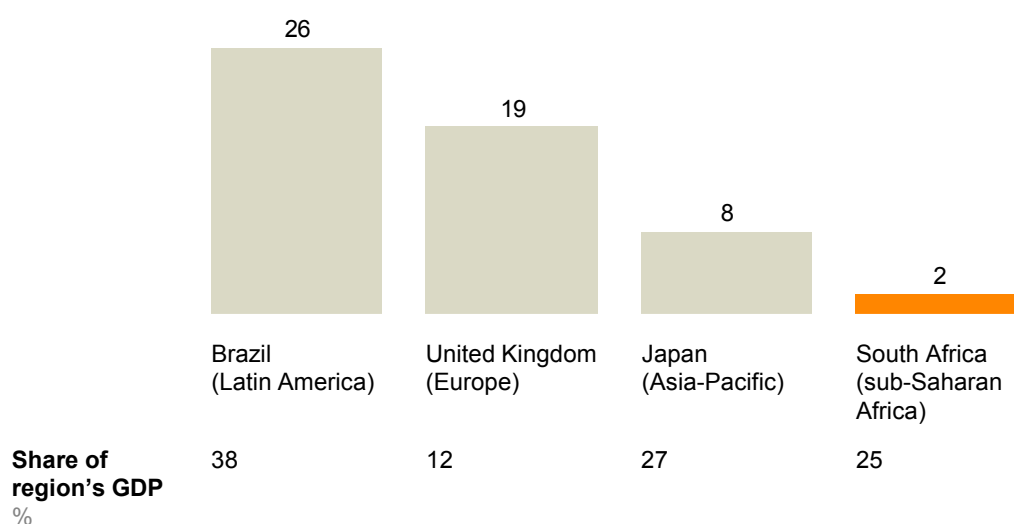
Given all these advantages, South Africa's services exports to the rest of Africa are at surprisingly low levels and have been growing much more slowly than demand. Overall, South Africa's services exports grew by only 0.3 percent a year between 2006 and 2012 in real terms. Of the 32 billion rand (\$2.8 billion) of services exported by South Africa in 2012, 22 billion rand (\$1.9 billion) went to developed economies and 10 billion rand (\$868 million), or 31 percent, to emerging economies.¹⁷³

If we assume that all exports to emerging economies went to sub-Saharan Africa, South Africa would have only a 2 percent share of total services imports in the rest of sub-Saharan Africa (439 billion rand [\$38 billion]). This is significantly lower than the shares attributed to other major service economies, such as Brazil, the United Kingdom, and Japan, in their respective regions (Exhibit 30).¹⁷⁴ The MGI Connectedness Index ranks South Africa 43rd out of 131 countries for goods trade but just 50th on services.¹⁷⁵ It is fair to say that South Africa is punching way below its weight in the export of services to the rest of Africa.

Exhibit 30

South Africa is punching well below its weight in the export of services into sub-Saharan Africa

Each regional powerhouse's market share of services in its home region
%



SOURCE: UN Service Trade database; McKinsey Global Institute analysis

¹⁷³ These figures are in 2010 prices. It should be noted that South Africa's total services exports broadly defined, including tourism and government services, amounted to 102 billion rand (\$8.9 billion) in 2012. However, exports of the services examined in this chapter, including business services, financial services, and construction, came to only 32 billion rand (\$2.8 billion) in 2012—a very low number given the domestic strength in this sector.

¹⁷⁴ UN Service Trade database. Due to data limitations, it is impossible to tell which developing countries South Africa is exporting to, but we assume that they are mostly African countries.

¹⁷⁵ The index ranks 131 countries on total flows of goods, services, finance, people, and data and communication, adjusting for country size. As a comparison, Nigeria ranks 36th in goods, while Egypt and Morocco are 41st and 42nd, respectively, in services (including tourism).

SOUTH AFRICA COULD ADD UP TO 245 BILLION RAND TO GDP FROM SERVICE EXPORTS

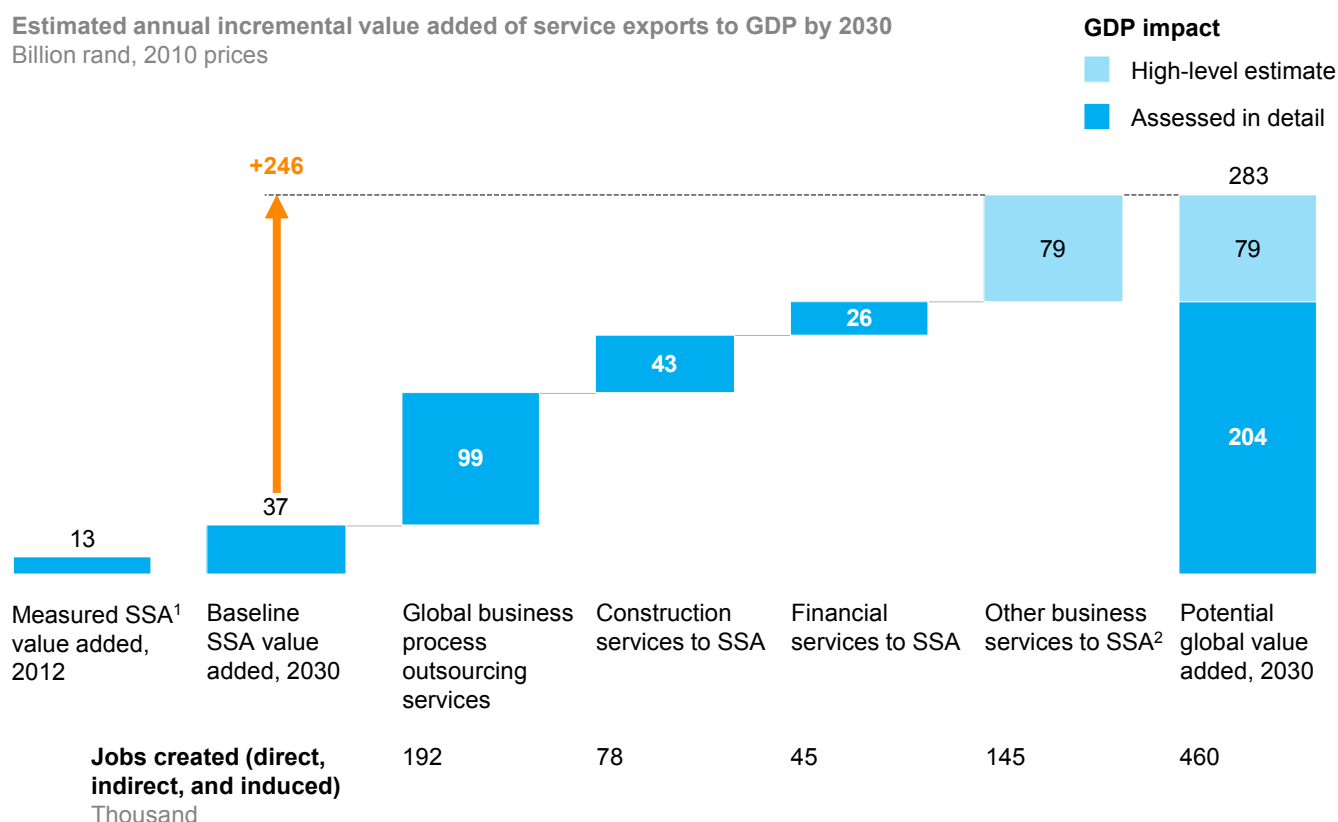
The economic gains from increasing services exports could be substantial. We estimate that South Africa could create an additional 245 billion rand (\$21 billion) in value added in service exports and create an additional 460,000 jobs by 2030 (Exhibit 31). These figures assume that South Africa can boost its global share of business process outsourcing and capture significant growth in construction, financial, and other business services provided to sub-Saharan African countries.

Exhibit 31

Expanding service exports could increase value added to GDP by 245 billion rand and create 460,000 jobs by 2030

Estimated annual incremental value added of service exports to GDP by 2030

Billion rand, 2010 prices



1 Sub-Saharan Africa.

2 Includes trade, catering, accommodation, transport, storage, communication, real estate, and business services.

NOTE: Numbers may not sum due to rounding.

SOURCE: Stats SA; IHS Economics; UN Service Trade; Gartner; Government of India National Development Council; McKinsey databases: Panorama Global Banking Pools, Global Insurance Pools; Infrastructure Projects Analytical Tool; McKinsey Global Institute analysis

We now examine three opportunities in more depth: services for the construction sector, financial services, and business process outsourcing. The first two are the fastest-growing imports in sub-Saharan Africa, while business process outsourcing is a separate, large-scale global opportunity. Beyond these segments, we highlight several other strategic opportunities in service provision, including retail, resource operations, and logistics (see Box 4, “Strategic service opportunities”).

Services for the construction sector

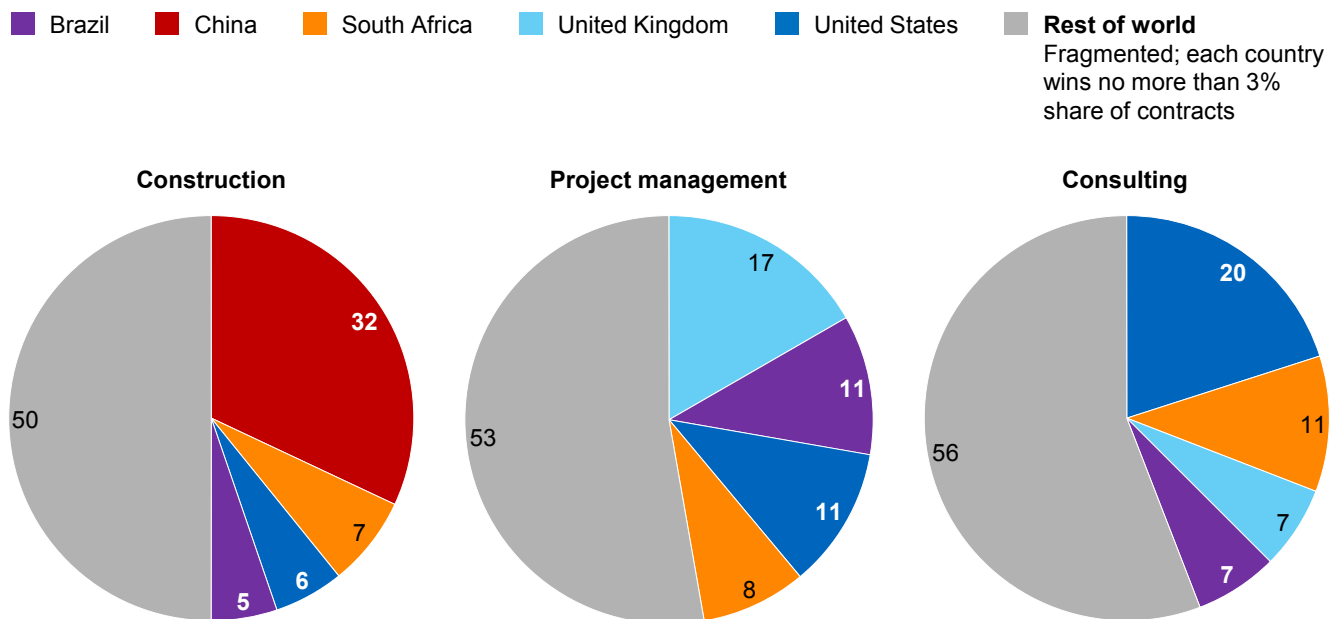
South Africa's construction sector has been exporting its services internationally for some time. Its service exports amounted to 509 million rand (\$44 million) in 2013 and grew at a rate of 6.6 percent per year between 2009 and 2013.¹⁷⁶ Building on this platform, South Africa has an opportunity to target far more construction projects across the African continent. Its domestic construction sector contributed 103 billion rand (\$8.9 billion) to GDP in 2014 (2010 prices) and employed 1.2 million people.¹⁷⁷ However, the full scale of the impact of construction projects is much larger when one considers the equipment installed and other services required, such as engineering, design, and equipment hire. We estimate that the full value of all project contracts in South Africa came to 293 billion rand (\$25 billion) in 2013 (2010 prices) and that contracts worth 318 billion rand (\$28 billion) will be executed in 2015 (2010 prices).

To understand the market share of foreign companies bidding for work in African countries, we have used McKinsey's proprietary database for projects across sub-Saharan Africa, which covers almost 600 contracts.¹⁷⁸ This shows that China has the largest share of construction projects in sub-Saharan Africa, at 32 percent. South Africa is the second-largest contractor, capturing 7 percent of projects. The United States and Brazil are close competitors, while the rest of the market is heavily fragmented (Exhibit 32). Clearly South Africa has an opportunity to capture a greater market share.

Exhibit 32

China has the largest share of construction projects in sub-Saharan Africa

Distribution of foreign contractors¹ winning construction projects in sub-Saharan Africa², 2010–15
%



1 Contractor country determined by the location of company headquarters; includes projects worth \$200 million or more.

2 Excludes projects in South Africa.

NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey's Infrastructure Projects Analytical Tool database; McKinsey Global Institute analysis

¹⁷⁶ International Trade Centre, UN Conference on Trade and Development, and WTO joint data set.

¹⁷⁷ *Quarterly Labour Force Survey, Quarter 1, 2015*, Statistics South Africa, May 2015; Annual GDP data 1993–2014, Statistics South Africa.

¹⁷⁸ McKinsey's Infrastructure Project Analytical Tool databases 3.0.

South African firms have a particular opportunity to pursue midsize projects with a value of between \$200 million and \$1 billion. Examples of such projects include the Katosi Water Plant in Uganda, the Oromia cement factory in Ethiopia, and the 187-kilometre Abuja-Kaduna railway in Nigeria.¹⁷⁹ Projects larger than \$1 billion (for example, a proposed refinery in Akwa Ibom State, Nigeria) are more complex to manage and may require access to specialised skills or technology. That said, South African companies can and do run these larger projects and should continue to pursue them when possible.

We estimate that midsize construction projects across sub-Saharan Africa could be worth 211 billion rand to 261 billion rand (\$18 billion to \$23 billion) in 2015, reaching 440 billion rand to 590 billion rand (\$38 billion to \$51 billion) in 2030.¹⁸⁰ If South Africa were to land a significant portion of the fragmented market—for instance, a third of the market share not

¹⁷⁹ Little data exist in database form for projects smaller than \$200 million.

¹⁸⁰ As a point of comparison for the estimated scale of construction projects, the World Economic Forum estimates that sub-Saharan Africa should have been spending \$90 billion to \$345 billion on infrastructure alone in 2008. *Strategic infrastructure in Africa: A business approach to project acceleration*, World Economic Forum, 2013.

Box 4. Strategic service opportunities

While this chapter focusses on the three largest opportunities in service exports, South Africa has other opportunities that leverage a particular strength or strategic advantage. Acting on these opportunities could help South Africa stimulate growth at home and act as a gateway for other areas of industry to expand further into the rest of Africa and internationally. South Africa is also well positioned in other business services not described in this report; an example is the film sector, which added 3.5 billion rand (\$304 million) to South Africa's GDP in 2012.¹

- **Retail.** Capturing the retail opportunity in sub-Saharan Africa will be a critical enabler for South African industry. South African retailers will always favour South African products as they expand across the continent, given their well-established and trusted quality control management. The agricultural opportunities discussed in Chapter 5 rely heavily on this service industry continuing its expansion across the continent, growing markets for South African produce. Consumer spending in Africa is expected to nearly double to 11.5 trillion rand (\$1 trillion) by

2020, and formal retail is also growing.² South African success stories include Shoprite, with 280 corporate outlets in 14 African countries outside South Africa.³

- **Resource operations.** South Africa has a strong mining sector with its own engineering and operations talent. While the domestic mining environment has seen little growth over the past 15 years, opportunities to apply South African skills exist elsewhere on the continent, particularly in West and Central Africa.⁴ South African mining operators are skilled in logistics, operations, maintenance, and engineering services but will need to demonstrate an understanding of local culture and languages (in particular French). An example of a South African company providing services internationally is Master Drilling, which operates in Chile, Peru, Brazil, and Mexico.⁵
- **Logistics and transport.** South Africa already operates as the regional hub for air transportation: O. R. Tambo International Airport, near Johannesburg, is the biggest and busiest freight and passenger hub in Africa (217,000 planes travelled through it in 2014).

¹ South African Film Industry Economic Baseline Study Report, 2013.

² "African consumer spending expected to double by 2020", *The Wall Street Journal*, August 3, 2014; *Quarterly Labour Force Survey, Quarter 4, 2014*, Statistics South Africa, February 2015; Renier Swanepoel, "Who will be the winners in FMCG in Africa?" UBS Investment Research, June 22, 2012; "Retail sector in Angola set to grow by 8 percent as middle class expands rapidly", Eaglestone Securities press release, September 24, 2014. In 2014, an estimated 70 to 90 percent of overall African retail was informal, compared with 33 to 55 percent in South Africa (33 percent is based on employment figures for trade sector).

³ Shoprite Holdings, December 2014.

⁴ South Africa's real mining GDP contribution between 2000 and 2013 remained flat at 231 billion rand (\$20 billion). *Annual GDP data 1993–2013*, Statistics South Africa. "Middle Africa" refers to sub-Saharan Africa excluding Southern Africa.

⁵ Master Drilling website.

⁶ Airports Company South Africa.

captured by China—it could increase its market share in these projects from 7 percent to 20 percent, and generate 100 billion rand (\$8.7 billion) in contracts a year by 2030. This is a 30 percent increase over the industry’s 2015 South African contracts, worth an estimated 318 billion rand (\$28 billion). We estimate that about 31 percent of the overall contract value, or 31 billion rand (\$2.7 billion), would translate into service revenue for South African companies (Exhibit 33).¹⁸¹

Concerted efforts are required to capture a greater share of these projects. The industry, supported by government, needs a clearer strategy for finding and winning new opportunities. South African firms also need to decide how they wish to differentiate their offering. The sector has several advantages to draw on. It has access to the sophisticated business and financial services needed to underwrite and support the execution of contracts, and it has a high-quality, competitively priced skills base—particularly in

¹⁸¹ Of these contracts, about 31 percent would count as direct services imports for South Africa, including equipment rental, financing, and administrative and enabling expenses. Labour and most materials of construction are likely to be sourced in the country of construction or from nearby suppliers; specialised items, such as turbines, will come from countries with the capabilities and machinery to produce them.

Box 4. Strategic service opportunities (continued)

Our analysis suggests a window of opportunity for the country to become a marine trade hub. Even as other African countries are planning new ports, South Africa has localised excess port capacity at its Ngqura deepwater port. South Africa can utilise this capacity to capture a modest opportunity in transshipment and short sea container shipping services.⁷ Overall, we estimate, this opportunity could add 10 billion rand (\$868 million) to South Africa’s GDP by 2030.

- **Telecommunication and ICT.** South Africa has a leading presence in telecoms in sub-Saharan Africa. This is predominantly in the form of foreign direct investment rather than as a service export. MTN is a well-known example, with 54 percent of its revenue and 81 percent of its subscribers from its six largest African markets outside South Africa. Information and communications technology (ICT) services are a small opportunity today: South Africa exported 2.4 billion rand (\$208 million) of services globally in 2012, 2 percent of its total service exports. Sub-Saharan Africa imported 21.3 billion rand (\$1.9 billion) of ICT services, or 0.6 percent of total service imports, in the

same period. While imports grew relatively slowly at 1.4 percent per year from 2006 to 2012, demand will increase as business and government grow and as South African companies expand in the region.⁸

- **Tourism.** South Africa is a popular destination. Business and leisure tourism in 2013 directly contributed 3 percent of GDP at 103 billion rand (\$9 billion), employed 645,500 people, and accounted for 9.7 million visitors.⁹ Potential lies in emerging market segments, such as China (only 165,000 tourists visited in 2013) and Nigeria.¹⁰ Education tourism is already an area of strength, and South African universities consistently lead Africa in global rankings.¹¹ Medical tourism is an emerging opportunity. Up to 4 percent of African tourists arriving by land and air were registered as medical tourists in 2012.¹² To unlock this opportunity, South Africa would need to actively market itself as a provider of medical services and fast-track visa application processes for this category.

⁷ *Container Market Annual Review and Forecast 2014/15*, Drewry Shipping Consultants, October 2014. Given Ngqura’s limited access to the rest of the country and its d berths, the opportunity has been estimated based on using its additional capacity for transshipment and short sea shipping.

⁸ International Trade Centre, UN Conference on Trade and Development, and WTO joint data set.

⁹ *The economic impact of travel and tourism 2014: South Africa*, World Travel and Tourism Council, March 2014; Euromonitor International, *Travel and tourism in South Africa*, October 2014.

¹⁰ Visa regulations for visitors to South Africa have become more stringent. A 1.4% year-on-year decrease in the number of visitors (March 2014 vs. March 2015) has been attributed to stricter entry requirements.

¹¹ The *Times Higher Education* university rankings 2014–2015; “Minister Blade Nzimande: Higher Education and Training Dept budget vote 2015/16”, Department of Higher Education and Training, May 2015. Foreign students represent 7 percent of university students.

¹² *South African annual tourism report, 2012*, Statistics South Africa; Alexander Chiejina, “47 percent of Indian visas go to Nigerian medical tourists”, *Business Day*, July 18, 2013. In 2012, 47 percent of Nigerians who visited India, or 18,000 people, went to receive medical attention; they spent 3 billion rand (\$260 million).

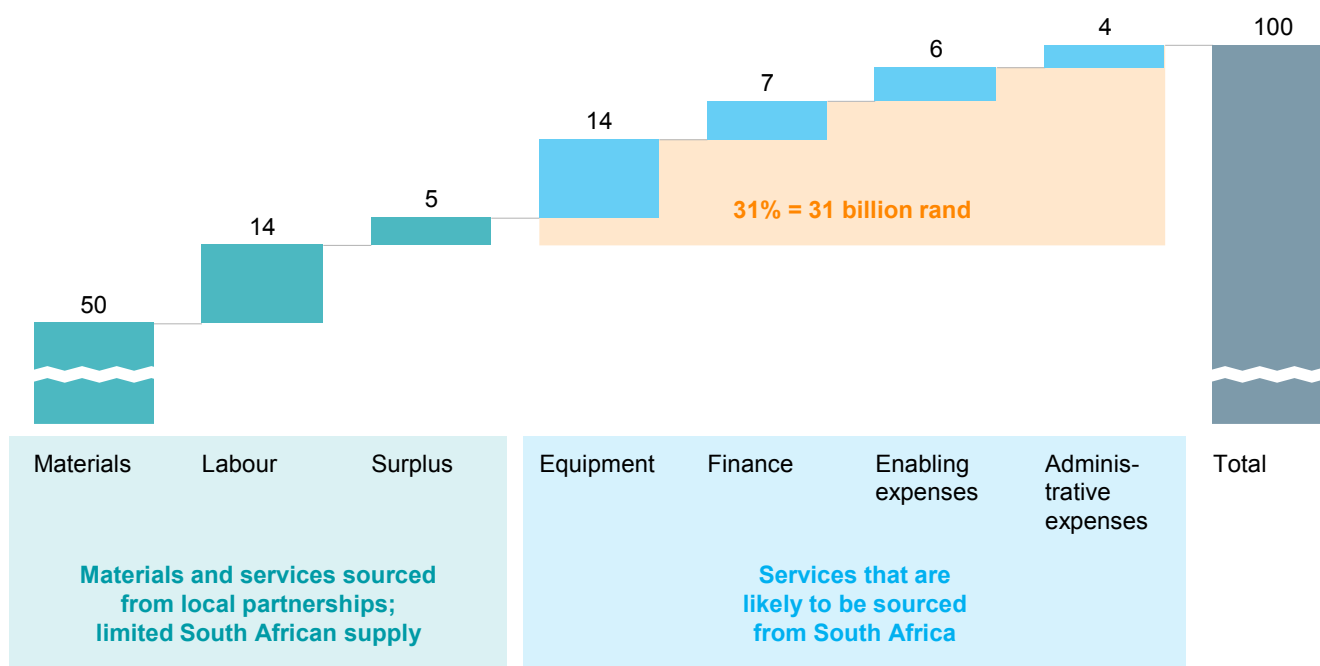
engineering and architecture—that is lacking in many other sub-Saharan African countries. Language is generally not a barrier for South African firms, although it does make Brazilian companies strong competitors in Portuguese-speaking Angola and Mozambique.

Exhibit 33

Construction services revenue opportunities for South African companies lie primarily in equipment rental, finance, and project administration

Estimated typical spend breakdown of potential construction contracts, distributed between South African service providers and local partners¹

Billion rand, 2010 prices



¹ This breakdown estimates the typical components of project expenditure, based on scenarios measured in India (averaged for a number of different types of construction projects, including buildings, roads, railway, and power).

NOTE: Numbers may not sum due to rounding.

SOURCE: Government of India National Development Council; McKinsey Global Institute analysis

South African firms can also build their local country knowledge and networks through partnerships with local firms. Particularly important would be knowledge in managing procurement in countries such as Angola, Nigeria, and the Democratic Republic of the Congo, especially customs delays and costs. An alternative is to form partnerships with specialised companies or technology firms that will provide an advantage in executing complex projects—or perhaps acquire them. This may require better access to talent from the rest of Africa and the world. In this regard, companies will need government support in approving more visas for critical skills and for speeding up the visa-approval process. Construction companies should also expand their service offering to provide additional up-front architectural and engineering design consultation, as well as long-term maintenance contracts; availability of these services is typically limited in other African countries. The focus on offering expanded design services—potentially through acquiring or partnering with specialised technology companies—will provide South African firms with an advantage in executing complex projects and allow them to build up a competitive technology advantage over time. This will build on an existing reputation for expertise in mining projects.

Finally, South African construction firms will need to market their competitive advantages (Exhibit 34). These include local knowledge and networks, experience in complex infrastructure projects, ability to tap labour in the country where construction takes place, and potential access to large pools of capital. This will be critical if South African companies are to increase their market share across Africa; China is the current market leader, but countries such as Brazil (with its recent economic slowdown) and perhaps India will likely step up their efforts.

Exhibit 34

South African construction companies exhibit strengths that are important for success in sub-Saharan Africa

■ Strong ■ Good ■ Average

		South Africa	China	United States/ United Kingdom	Brazil
Knowledge and access	Familiar with geography, language, etc.	Good	Average	Average	Good
	Local network or partner	Good	Average	Average	Good
	Supply-chain knowledge	Strong	Good	Average	Good
	Tap local labour in market	Good	Average	Average	Good
Experience	Quality	Strong	Average	Strong	Good
	Project management	Average	Average	Good	Average
	Construction management	Average	Average	Good	Good
	Specialised technical skills	Good	Good	Strong	Average
Access to capital	Pan-African or local market funding	Good	Good	Average	Average
	Home country funding	Good	Strong	Good	Average
	International funding	Good	Strong	Strong	Good

SOURCE: McKinsey Global Institute analysis

If the South African construction industry were to take these steps to increase its project value across Africa, we estimate that by 2030 it could earn and repatriate as much as 31 billion rand (\$2.7 billion) from the provision of services, up from just 500 million rand (\$43 million) in 2013. This in turn would contribute 43 billion rand (\$3.7 billion) to South Africa's GDP and add 78,000 jobs, creating opportunities for many of the artisans, construction and project managers, and other skilled employees who will become available after the completion of current major South African construction projects such as the Kusile and Medupi coal-fired power stations.

Financial services

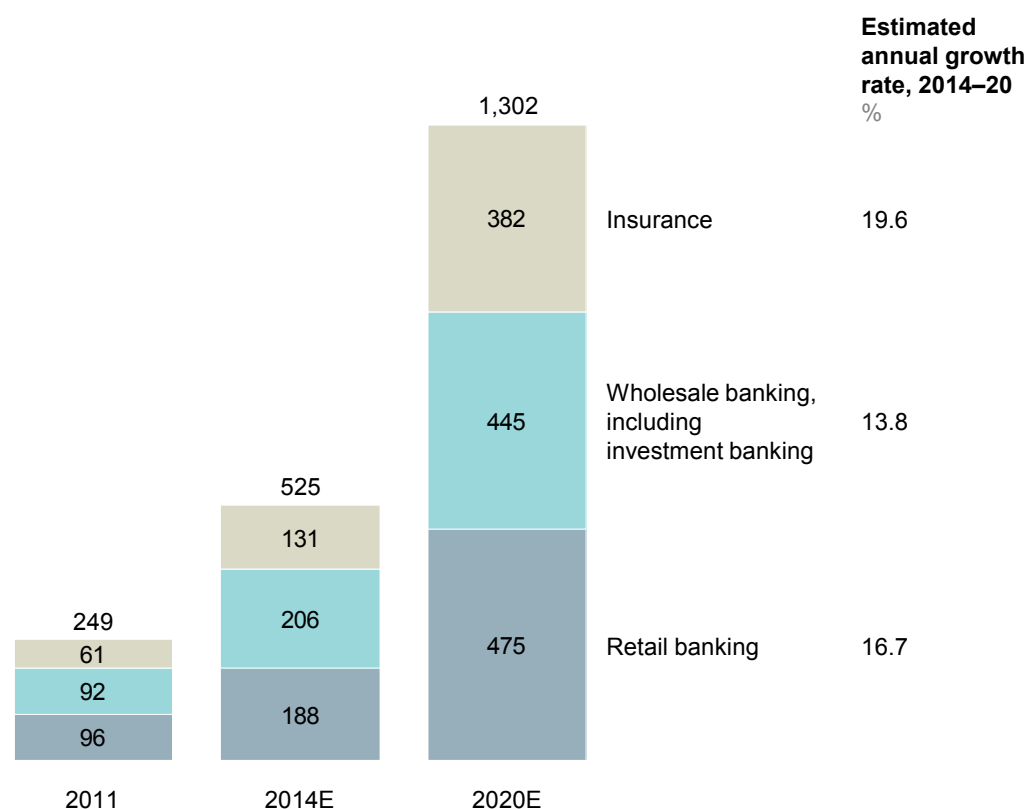
South Africa's financial services industry is broad, deep, and sophisticated—and ideally positioned to serve the fast-growing demand for banking and insurance in sub-Saharan Africa. Driven by the region's economic expansion and urbanisation, a burgeoning business sector and consumer class are making ever-increasing use of formal financial services. The financial services opportunity from sub-Saharan Africa (excluding South Africa) could be worth up to 1.3 trillion rand (\$113 billion) by 2020 in banking revenue and insurance

premiums (Exhibit 35).¹⁸² In this chapter, we have assessed particular opportunities in wholesale and retail banking, and insurance services.

Exhibit 35

Financial services earnings in sub-Saharan Africa are expected to continue to rise

Estimated banking revenues and insurance premiums¹ for sub-Saharan Africa²
Billion rand, nominal



¹ Banking revenue includes fees and interest before risk cost. Insurance premiums are not revenues but are the standard measure of insurance sales growth.

² Excludes South Africa. Exchange rate in each relevant year used; currency effects are therefore not excluded.
NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Panorama Global Banking Pools database; McKinsey Panorama Global Insurance Pools database; McKinsey Global Institute analysis

Banking services

In 2014, South African banks earned about 292 billion rand (\$27 billion in 2014 prices) from all wholesale and retail banking activities in Africa; 17 percent of this came from the rest of Africa. With the exception of the truly pan-African bank, Ecobank, South African institutions are significantly more active outside their home country than their African counterparts are. We estimate that South African banks have 12 percent market share of the sub-Saharan African market outside of South Africa and 45 percent market share when including South Africa (Exhibit 36).¹⁸³

¹⁸² Figures in this section represent the nominal value for that year unless otherwise stated. The banking industry in sub-Saharan Africa is well developed, with many large players, but beyond South Africa, the insurance industry is much less developed. Market fragmentation, emerging regulatory developments, and other variables make accurately estimating the value of the sector challenging. While the scale of the ramp-up is open to discussion, the low penetration rates make it clear that this opportunity can grow to a significant scale.







¹⁸³ This estimate includes Nedbank's 20 percent stake in Ecobank. Collectively, Standard Bank, FirstRand, Barclays Africa, and Nedbank already make 19 percent of their revenue from the rest of sub-Saharan Africa.

Exhibit 36

With the exception of Ecobank, South African banks are more active outside their home country than their African counterparts

Bank revenues earned across sub-Saharan Africa¹

\$ billion, 2014; total estimated at \$59 billion

			Share of revenue earned outside home country %	Market share of sub-Saharan African revenues %
South African banks		27	17	45
Domestic banks		12	0	21
International banks		8	100	14
Nigerian banks		8	13	14
Pan-African banks		2	98	3
Kenyan banks		2	11	3

¹ South African banks: Barclays Africa, Capitec, First Rand, Investec, Nedbank, Standard Bank; Nigerian banks: Access Bank, First Bank Nigeria, Guaranty Trust Bank, United Bank for Africa, Zenith Bank; international banks: Bank of America, Bank of China, Bank of New York Mellon, BNP Paribas, Citi, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan Chase, Morgan Stanley, Société Générale, Standard Chartered, UBS; Kenyan banks: Co-operative Bank of Kenya, Equity Bank, Kenya Commercial Bank. The only pan-African bank is Ecobank, which is headquartered in Togo but operates largely in Nigeria. Twenty percent of Ecobank's revenue was attributed to Nedbank to reflect their investment structure.

SOURCE: McKinsey Panorama Global Banking Pools database; Thomson Reuters; annual reports; McKinsey Global Institute analysis

However, more can be done. Indeed, because growth in South Africa is slow compared to the rest of Africa, South African banks will need to continue to expand into the rest of the continent. By way of example, retail banking in South Africa grew at 5.9 percent from 2004 to 2014, vs. 13.8 percent in the rest of sub-Saharan Africa. We estimate that the region's overall banking revenue could grow to more than 900 billion rand (\$78 billion) by 2020 and more than 3.7 trillion rand (\$321 billion) by 2030.¹⁸⁴

South African banks are well positioned to pursue this opportunity. South Africa has a strong domestic financial services sector, with the largest asset base in Africa (54 percent of assets of the top 31 African banks in 2014).¹⁸⁵ If South Africa can grow its market share of retail and wholesale banking services in the rest of sub-Saharan Africa from the current 12 percent to 20 percent, it could earn an additional 190 billion rand (\$17 billion) by 2020 and 760 billion rand (\$66 billion) by 2030. Taking into account growth in its domestic market, South African banks could be generating at least 40 percent of their earnings from the rest of Africa by 2030.

¹⁸⁴ McKinsey Panorama Global Banking Pools database. This estimate excludes South Africa and is based on an extrapolation to 2030 of growth forecasts for 2014 to 2020. The growth forecast for sub-Saharan Africa (excluding South Africa) for retail banking is 16.7 percent and for wholesale banking is 13.8 percent (in nominal terms).

¹⁸⁵ Philip Alexander, "Top 1000 world banks 2014: Back on track?" *The Banker*, June 30, 2014; S&P Capital IQ database; Bloomberg database. We also searched the annual reports of the 31 top banks in Africa.

17%

Share of banking revenue South African banks earned from rest of Africa in 2014

Wholesale banking is expected to grow by 13.8 percent per year in the rest of sub-Saharan Africa, and could grow from a 206 billion rand (\$18 billion) market in 2014 to 445 billion rand (\$39 billion) in 2020. South African banks have strong expertise in corporate and investment banking products such as cash management, corporate lending and structured financing, and capital market services. These institutions have strong balance sheets and good, relatively inexpensive talent, giving them the ability to grow and take on opportunities in sub-Saharan Africa. South African corporate clients are also expanding across Africa, looking for support from their banking partner as they do so. A small but profitable opportunity within wholesale banking lies in investment banking services. Investment banking revenue in sub-Saharan Africa (excluding South Africa) was an estimated 7.1 billion rand (\$616 million) in 2014.¹⁸⁶

Retail banking has exciting growth potential and is expected to become the biggest market in financial services in sub-Saharan Africa, taking over from wholesale banking. Over the next five years, revenue from retail banking in the rest of sub-Saharan Africa is forecast to rise twice as fast as in South Africa (16.7 percent vs. 8.6 percent) and faster than wholesale banking in the region.¹⁸⁷ It should be noted, however, that this opportunity consists mostly of foreign direct investment, which does not directly contribute to GDP growth and job creation in South Africa.

Insurance services

The insurance services market in sub-Saharan Africa (outside of South Africa) is in its nascent stages. In 2014, penetration was estimated at 0.6 percent for life products and 1.6 percent for non-life products, compared with 13.8 percent and 7.4 percent, respectively, in the South African market. This is changing: pension reforms are in progress in Kenya and Nigeria, and will likely encourage greater investment in financial instruments and insurance.

Against this backdrop, growth in sub-Saharan Africa's insurance markets is forecast to be high—up to 19.6 percent per year to 2020, and 11.4 percent from 2020 to 2030.¹⁸⁸ Total potential premiums would grow from 131 billion rand (\$12 billion in 2014 prices) in 2014 to 1.1 trillion rand (\$96 billion in 2015 prices) in 2030. However, the timing and the exact quantity of these premiums is uncertain and depends on many variables, including liberalisation of economies, regulatory changes, and consumer adoption.

South Africa's current market share of sub-Saharan insurance markets is estimated at 5 to 10 percent, but a target of 20 percent is realistic, given the fragmentation of the market and the start of a wave of merger and acquisition transactions across the continent. Assuming that South African companies can capture a 20 percent market share of the region's fast-growing insurance markets, we estimate that they could command 225 billion rand (\$20 billion) in annual premiums in 2030, up from an estimated 7 billion to 14 billion rand (\$607 million to \$1.2 billion) in 2014.

Capturing the opportunity

South African banks already have well-established operations across the continent, giving them a strong footing from which to accelerate growth. Insurance companies need to look to more aggressive expansion. Overall, South African financial services companies can take several steps to strengthen their competitive position in Africa and to deliver on their full growth potential.

¹⁸⁶ McKinsey Panorama Global Banking Pools database. Investment banks' more typical service offerings—mergers and acquisitions transactions, equity capital markets and debt capital markets underwriting, syndicated lending, and advisory services—came to 1.6 billion rand (\$138.9 million). Onshore structured financing transactions, including project finance and trade and export finance, came to an estimated 5.5 billion rand (\$477 million) in 2014.

¹⁸⁷ McKinsey Panorama Global Banking Pools database.

¹⁸⁸ McKinsey Panorama Global Insurance Pools database.

Both banks and insurers need to be bolder in targeting the right revenue and premiums pools. Companies must establish that they understand local market conditions better than competitors from other countries. This suggests that their executives need to spend more time travelling the continent. They should also hire talent from across Africa; as already mentioned, government support will be needed through more visas for critical skills and a streamlined visa-approval process.

South African banks have already been active in acquiring stakes in banks across the region. They will need to pursue further acquisitions of reputable local firms to scale their in-country presence, as organic growth will not deliver the scale needed. An acquisition brings an existing customer base, along with employees from the acquired bank who know their local markets. These deals will combine local strengths with South Africa's banking know-how and shared services, as well as provide the capital to grow credit services.

In the fragmented insurance market, regulators in Nigeria and Kenya could soon be pushing for a more professionalised industry, implying a potential wave of merger and acquisition transactions. South African insurers may therefore benefit from bold moves to gain local licences. This strategy could be particularly important given the aggressive acquisition strategies some international players and regional players are pursuing. In December 2014, for example, French-based AXA SA bought a majority stake in Mansard Insurance, Nigeria's fourth-largest insurer, for 2.8 billion rand (\$246 million).¹⁸⁹

Investment banking, though a smaller opportunity than other segments, also offers significant growth opportunities and can help ensure that South Africa remains a regional banking hub. South Africa's strong expertise and liquid financial markets also make it an ideal hub for providing structured financing, although its capital exchange control regulations will remain a challenge to the expansion of investment banking in the region. While the laws have been liberalised significantly, the status quo is still more challenging than in countries such as Mauritius, making South Africa less attractive than other countries as an African financial base. Government should be cognisant of this as it seeks ways to support growth in services exports. Banks should also focus on implementing more efficient electronic settlement platforms, to align with global standards.

To serve low-income consumers in sub-Saharan Africa, South African banks need a new, low-cost retail banking service offering. In particular, banks must focus on digital expansion, continuing the trend of finding simple ways to use existing and emerging technology to enable banking in less developed markets. For example, they can make greater use of mobile money accounts, which are the most common way of transferring money in sub-Saharan Africa.

In insurance, South Africa can play from a position of strength with its existing talent (particularly its actuarial capabilities) and its broad product offering, which already targets lower-income segments. As in banking, low-cost distribution models will be important; mobile insurance platforms are one example. A number of large South African insurers have announced plans to invest in sub-Saharan Africa and earmarked funding: Old Mutual bought a 60.7 percent stake in UAP in Kenya in 2015 to complement its operations there, bringing it into the top five in that country; Liberty operates in Kenya under its own name; and Sanlam has a presence in ten countries outside South Africa.¹⁹⁰

¹⁸⁹ Clark, Simon, "AXA Buys Nigerian insurer Mansard", *The Wall Street Journal*, November 28, 2014; Axa.com.

¹⁹⁰ Ndzamela, Phakamisa, "Old Mutual to merge Kenya unit with new acquisition", *BusinessDay*, January 28, 2015; "Old Mutual completes acquisition of 37.3% stake in UAP", *BusinessDay*, June 24, 2015; company websites.

International banks and insurers also have a role to play. Government could actively approach them and encourage them to base their African operations in South Africa. Further, South Africa needs to raise the profile of the strong infrastructure of its financial hub in Johannesburg, while simultaneously continuing to invest in better ICT. It also needs to reinforce its relatively low emerging market risk ranking, relatively stable political environment, and strong corporate governance rankings.¹⁹¹

What does this mean for South Africa?

These banking and insurance opportunities are largely a form of foreign direct investment in other countries. Although they do not directly benefit South Africa's economy or create jobs in the country, growth of this magnitude will be of tremendous indirect benefit. South Africa will cement its position as the banking hub of the continent, while profits repatriated to South Africa will be subject to domestic corporate tax rates.

This revenue will also create growth in South Africa in two forms. First, investment banking based in South Africa is a services export. We estimate that it could bring an additional 4.8 billion rand (\$417 million) in revenue if local and international banks operating out of South Africa can capture a 30 percent market share in the rest of sub-Saharan Africa. Second, corporate and retail banks and insurance companies could provide shared services to their regional branches (headquarters, human resources, IT, finance and so on) out of South Africa. We estimate that banking and insurance together could bring an additional eight billion to 16 billion rand (\$694 million to \$1.4 billion) in service export revenue to South Africa.

Together, this growth would increase South Africa's global financial services exports from 11 billion rand (\$955 million) in 2013 by an additional 13 billion to 20 billion rand (\$1.1 billion to \$1.8 billion) in 2030.¹⁹² We estimate that wholesale banking, retail banking, and insurance services could add 17 billion to 26 billion rand (\$1.4 billion to \$2.2 billion) to GDP by 2030. Investment banking is not expected to add many jobs, but shared services for wholesale and retail banking and insurance could create 12,000 to 22,000 direct jobs in South Africa, with an additional 15,000 to 23,000 indirect jobs in the broader economy.

Business process outsourcing

The global business process outsourcing sector—which includes not just call centres and document processing but also higher-skilled tasks such as film postproduction, animation, and even legal and advisory services—is growing rapidly.¹⁹³ In South Africa, it reportedly grew 18 percent year on year between 2010 and 2012, on an estimated base revenue of 9.5 billion rand (\$825 million) in 2010, making it worth 13 billion rand (\$1.1 billion) in 2012.¹⁹⁴

The Western Cape is South Africa's business process outsourcing and call centre hub, employing two-thirds of the sector's approximately 26,700 outsourcing employees.¹⁹⁵ South Africa's reported 1 percent share of the global business process and information technology outsourcing market in 2012 compares with Russia (4 percent), Brazil and China (6 percent each), and India (68 percent).¹⁹⁶ If South Africa were to capture an additional 3 percent of global demand, equalling Russia's 4 percent, it could export 76 billion rand (\$6.6 billion) a

1%
South Africa's
market share of
global BPO
outsourcing in
2012

¹⁹¹ Economist Intelligence Unit.

¹⁹² The numbers in this last section are reported in 2010 prices to allow comparison against the impact estimated in the other sections.

¹⁹³ This report refers to all opportunities as business processes, including non-process opportunities such as the provision of creative and export services, legal advisory, animation, research, and film postproduction.

¹⁹⁴ Yasmin Mahomed, *Call centre operations*, Who Owns Whom, June 2013; Leslie Willcocks, Andrew Craig, and Mary Lacity, *Becoming strategic—South Africa's BPO service advantage, report 1*, London School of Economics Outsourcing Unit, November 2012.

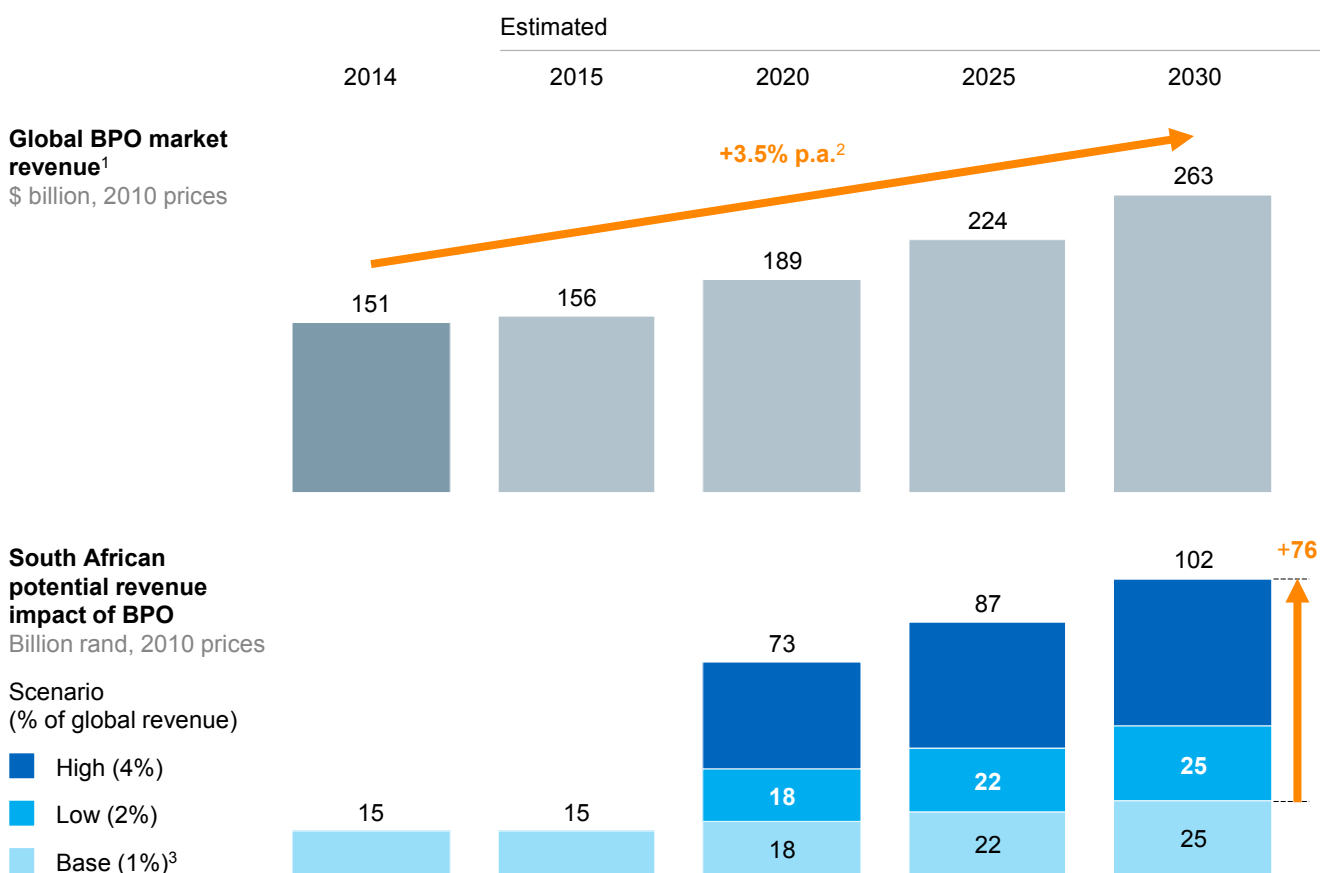
¹⁹⁵ Business Process Enabling South Africa. South Africa also employs 188,700 employees in domestic business processing activities.

¹⁹⁶ Leslie Willcocks, Andrew Craig, and Mary Lacity, *Becoming strategic—South Africa's BPO service advantage, report 1*, London School of Economics Outsourcing Unit, November 2012.

year of such services by 2030 (Exhibit 37). This would increase GDP by up to 99 billion rand (\$8.6 billion) a year by 2030 and create up to 192,000 jobs.

Exhibit 37

South Africa has the potential to capture an additional 76 billion rand in business process outsourcing revenue



1 Based on a breakdown of total revenue spent on BPO services by the finance and insurance, communications, programming, R&D, business services, and related sectors as forecast by IHS Economics. The 2014 revenue estimate is from a Gartner report.
 2 Based on overall growth of industries using BPO services.
 3 Estimated as 1% of global BPO market revenue in each year.
 NOTE: Numbers may not sum due to rounding.

SOURCE: Statista; Stats SA; UNCTAD; IHS Economics; Philippine Statistics Authority; A. T. Kearney Global Services Location Index™; Gartner; McKinsey Global Institute analysis

How does South Africa perform today? In 2014 reports, South Africa and its cities ranked fairly high on location suitability surveys: 47th in A. T. Kearney’s Global Services Location Index; top 30 in Gartner’s top offshoring countries; 20th in Towers Watson’s Services Offshoring Ranking. Johannesburg ranks 21st on Tholon’s Top 100 Outsourcing Destinations, while Cape Town ranks 60th. McKinsey’s Location Readiness Index ranked Cape Town at a similar level to Budapest, but below cities such as Warsaw and Manila (Exhibit 38). While South Africa’s cities rank well in terms of business environment risk and infrastructure, they score poorly when it comes to cost and availability of talent pools.

South African advantages that could act as a platform for the sector’s growth include a favourable business environment, a prevalence of English-speaking adults, and a time zone near Europe’s. While skill levels are not exceptional, costs tend to be competitive with Eastern Europe.

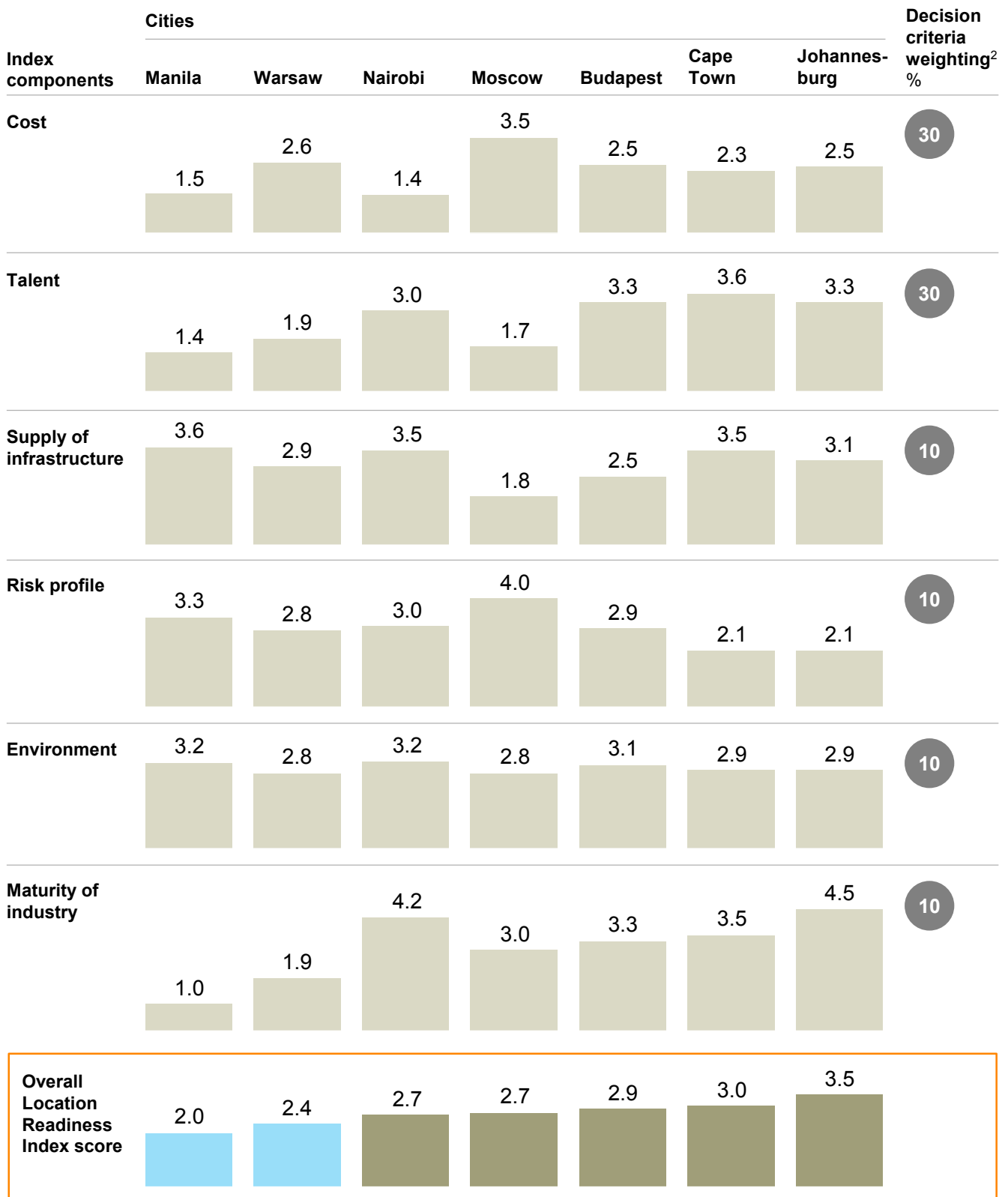
Exhibit 38

South African cities face competition from other existing and emerging business process outsourcing hubs due to higher costs and limited talent

Location Readiness Index scores, FY 2014¹

Index: 1 is most attractive, 5 is least attractive

■ Leading destinations



1 Location Readiness Index score for data, voice, IT, and knowledge process.

2 This is a typical weighting of how important the index components each are, as criteria used for decision making.

SOURCE: McKinsey Corporate and Business Functions Practice; Location Readiness Index database; McKinsey Global Institute analysis

South Africa has already explored several options to reduce cost, including government support through tax incentives (implemented) and special zones (being discussed). Business is targeting higher-end service offerings, including film editing, animation, data analysis, and legal services. However, the country's greatest need is improvement in talent. A shortage of skilled talent has hampered growth, and the lack is particularly acute at the supervisor level, creating increased competition among operators and resulting in increased staff costs and turnover.

South Africa needs a substantial step change in talent development. We estimate that 4,000 to 13,000 students will need to be trained each year to achieve the growth to which the industry aspires. The Department of Trade and Industry's Monyetla Work Readiness Programme seeks to train 18,000 youth and place most of them in BPO. The country must sustain this approach over the course of many years. The final chapter of this report discusses initiatives to address this need, particularly encouraging more students to make vocational training their secondary school option.

A business-government partnership to grow services exports

The export of services to the rest of Africa—and beyond—is an opportunity to showcase South Africa's brand, encourage other countries to buy more of its minerals and manufactured products, and use more of its services. Achieving this will require a partnership between the private sector and government: while business must pursue international opportunities more aggressively, government needs to help establish the regional environment. They will need to work together to win large, long-term contracts in other African countries by marketing the country's offering and brand. Government can undertake more active trade diplomacy and seek trade agreements specifically covering services and the movement of people. A network of commercial attachés in South African embassies can leverage the foreign affairs offices to benefit commercial affairs as well.

Greater cooperation is also needed between different business sectors. The construction and financial sectors are both strong, but they have yet to develop a set of standardised joint packages for taking their offerings to the African market. This would be a breakthrough value proposition, enabling competition with Chinese firms. Similarly, South Africa has strong banking and telecoms companies that are active across the continent. Developing joint mobile banking solutions will allow them to work together in entering markets and scaling opportunities across the continent.

In services, people are often more important than capital. The primary barrier to achieving South Africa's full potential in service exports, therefore, appears to be the supply side of the talent pipeline. A significant increase in the output of skilled South Africans is necessary, from high school and from tertiary institutions. While the education system is primarily in government's purview, business should not wait for universities to produce large volumes of high-quality graduates. Companies should find models to develop the skills they need, especially supervisors and managers, to meet increased demand.

Closer intraregional cooperation is an important enabler of increased services exports, and more effort needs to be made to build strong partnerships. It is especially important that South Africans treat other African countries and their people as equals and cultivate a mindset of making one another stronger together. Government should work more with other African nations to establish trust and pursue a regional strategy that has clear mutual benefits.



The services industry fundamentally deals with managing people. Services companies that succeed in this space are able to master two aspects of the industry: scale and specialisation. South Africa's successful, highly developed domestic sector provides the basis for the specialisation. It now needs to scale this to serve the rest of sub-Saharan Africa's burgeoning market for service imports meaningfully.

This chapter has identified and assessed the potential in a selected group of large, high-potential services export opportunities out of a much larger pool of services. The smaller-scale opportunities also represent considerable potential. All of these opportunities, taken together, will amount to a diversified, dynamic, intraregional economy and offer attractive near-term opportunities.





5. AGRICULTURE: UNLOCKING THE FULL VALUE CHAIN

South Africa has a strong, productive, internationally competitive agriculture sector. The agricultural value chain, including both production and processing, employed approximately 1.1 million people and contributed a combined 150 billion rand (\$13 billion) to GDP in 2014,¹⁹⁷ representing nearly 5 percent of total GDP.¹⁹⁸ In addition, the sector has proven its ability to market and sell its produce in Europe and other major markets, as well as through fast-growing retail chains across Africa. Yet the sector has potential for significant further growth. The rest of Africa, together with Asia, offers strongly growing markets for future agricultural exports, particularly of products in which South Africa already leads, including fruits and beverages.

There is significant room for rural job growth in some parts of the agricultural value chain, chiefly agro-processing and the production of horticultural products.¹⁹⁹ The societal benefits of this are key, given that nearly one in ten South Africans resides on subsistence and smallholder agricultural land.²⁰⁰

Overall, we estimate that South Africa can grow agriculture's contribution to GDP by 163 billion rand (\$14 billion) by 2030 and can create up to 490,000 jobs over the same period.²⁰¹ Of those totals, 124 billion rand (\$11 billion) and 314,000 jobs will come from processing. Capturing this potential, however, will require a bold, integrated national agriculture plan focussed on unlocking major gains in production and expanding processing capacity to move up the value chain.

As a cornerstone of this plan, there will need to be continued focus on improving the productivity and crop yield of South Africa's successful medium- and large-scale commercial farming sector. Smallholder farmers will also have an important role to play. They will need support to aggregate their output through cooperatives to access markets and to transition to higher-value products to strengthen their financial viability. Targeted investments in irrigation, processing facilities, and a cold supply chain will be critical; both government and private investors and operators will be able to find opportunities in these.

In agro-processing, growth will require the expansion of processing plants and robust supply chains into previously neglected rural areas, providing farmers in these areas with market access, high-quality and reliable agricultural inputs, utilities, technical capabilities, logistics, and infrastructure. Regional production centres with excellent infrastructure—in the form of agri-parks or Special Economic Zones, for example—could act as points of service for marketing, skills building, and financing.

¹⁹⁷ All rand values are quoted in 2010 prices. All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

¹⁹⁸ The value chain includes the production and the processing of agricultural products. It does not include the preparation of inputs, such as fertiliser, or the trade of the products through retail or wholesale channels.

¹⁹⁹ *2014 mid-year population estimates*, Statistics South Africa, July 2014. Agriculture has important implications for nearby communities. In South Africa, 1.26 million households reside on subsistence and smallholder agricultural land.

²⁰⁰ Norma Tregurtha, Nick Vink, and Johann Kirsten, *Presidency fifteen year review project: Review of agricultural policies and support instruments in South Africa, 1994–2009*, Trade and Industrial Policy Strategies, March 2008; *Average household size by province*, Census 2011, Statistics South Africa.

²⁰¹ Includes direct, indirect, and induced jobs across the entire economy.

SOUTH AFRICA IS WELL POSITIONED TO CAPTURE BURGEONING DEMAND IN ITS KEY EXPORT MARKETS, PARTICULARLY FOR PROCESSED FOOD

South Africa has a strong set of agricultural exports, and demand for these products is growing strongly in the country's principal markets in Africa, Europe, Asia-Pacific, and the Middle East. We estimate that there is scope to increase South Africa's agricultural exports substantially, especially in processed products; their overall value could nearly quadruple, from 67 billion rand (\$5.8 billion) in 2012 to 212 billion rand (\$18 billion) by 2030 (Exhibit 39).

In some of these markets, South Africa already has significant market share. It is the tenth-largest source of agricultural imports into Europe, South Africa's largest market. Moreover, it is the largest exporter of agricultural produce and processed food to the 14 other member states of the Southern African Development Community, with an estimated 39 percent market share in 2012.²⁰² In particular, South African fruit and nuts account for 82 percent of all Southern African Development Community imports of these products.

39%
South Africa's
market share of
SADC food imports

The African continent as a whole, with its rapidly growing consumer markets, is increasingly important: its share of South Africa's processed food exports grew from 15 percent in 2003 to 49 percent in 2013. The recently announced Tripartite Free Trade Area (TFTA) will open up more opportunities to grow South African agricultural exports by creating a 13.8 trillion rand (\$1.2 trillion) integrated market (in 2013 GDP) across 26 countries. In these countries, we expect the number of households with annual income above 160,000 rand (about \$14,000 at 2015 exchange rates) to double within the next ten years.²⁰³

The Asia-Pacific region, though it accounts for a relatively small part of South Africa's agricultural exports today, is expected to see its agricultural imports grow by 3.8 percent per year to 2030 as its consumer class expands rapidly. It, too, offers major opportunities for South African exporters.²⁰⁴

Given the burgeoning overall demand from these markets, South Africa has the opportunity to grow most categories of raw and processed agricultural exports by a substantial percentage. We conducted analysis to determine whether this growth would be achievable and, if so, for which products; the analysis estimated the expected demand for individual categories of products and tested it against the potential to increase agricultural production in each category. The potential to increase production was informed by benchmarking the current output of representative crop types in South Africa against 28 climatically comparable producing countries.

The benchmarking analysis included a range of crops and products—namely maize, wheat, sugar cane, apples, grapes, oranges, tomatoes, strawberries, cow's milk, beef, and chicken. In this exercise, explained in more detail in the Technical Notes, the range of improvement varied dramatically by crop type. For example, South Africa is already the top producer of oranges in the set of countries it was benchmarked against; in grapes, it has the potential to increase yield by 74 percent. The benchmarked yield improvement potential for maize is even greater, at 92 to 126 percent.²⁰⁵

For each product category, we developed both a low case, under which total growth in exports was most certain, and a high case, which would require significant changes in agricultural technology or would require South Africa to process farm products from

²⁰² The 15 countries are Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

²⁰³ The parties involved in the trade deal hope to finalise the details by 2017.

²⁰⁴ Analysis excludes Latin America and North America, whose current and potential shares of South Africa's agricultural exports are minor.

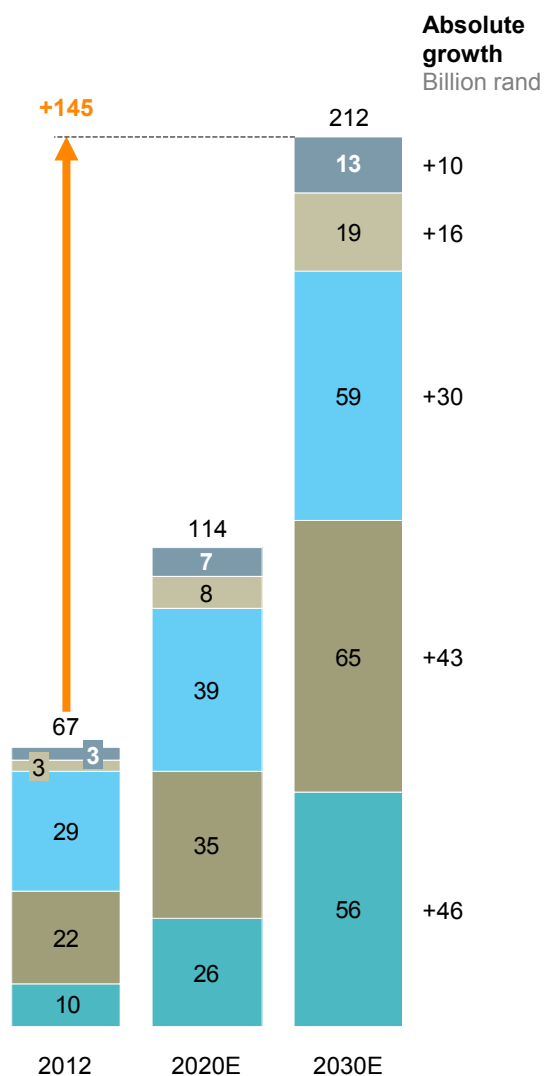
²⁰⁵ Applying the benchmarks to dryland (non-irrigated crop cultivation) crops, in particular maize, may be inaccurate given the use of irrigation in the best-performing countries. We attempted to correct for this.

neighbouring countries. This exercise made it clear that, in either case, South Africa's biggest export opportunities lie in fruit, beverages, and animal products (Exhibit 40).

Exhibit 39

South African agricultural exports could reach 210 billion rand by 2030

Estimated export potential of agro-processing and agricultural products¹
Billion rand, 2010 prices



South African share of imports %	Region	2012	2020E	2030E
0.5	North Africa and Middle East	0.5	0.8	1.2
1.4	Sub-Saharan Africa (excluding SADC) ²	1.4	3.4	5.5
0.5	Europe	0.5	0.6	0.7
38.8	SADC (excluding South Africa)	38.8	47.1	60.6
0.4	Asia-Pacific	0.4	0.6	0.9

1 Based on products South Africa already exports; excludes Latin America and North America, which have lower export prospects.

2 Southern African Development Community.

NOTE: Numbers may not sum due to rounding.

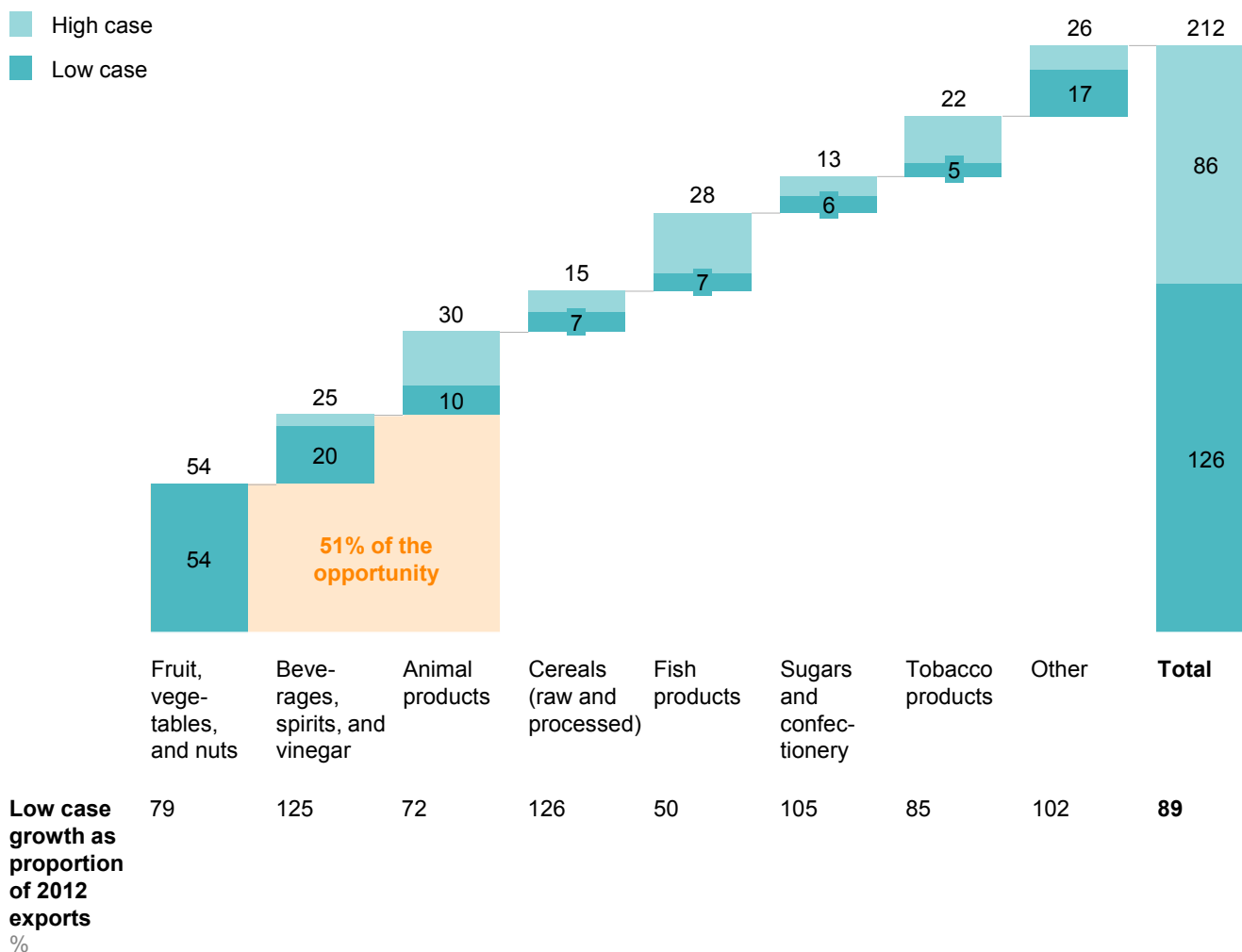
SOURCE: IHS Economics; World Bank WITS; McKinsey Global Institute analysis

Exhibit 40

South Africa's greatest agricultural opportunities lie in fruit, beverages, and animal products

Breakdown of total export demand potential by 2030

Billion rand, 2010 prices



NOTE: Numbers may not sum due to rounding.

SOURCE: IHS Economics; World Bank WITS; McKinsey Global Institute analysis

The analysis also pointed to a significant shift towards processed foods in South Africa's agricultural exports, from 60 percent of the sector's total exports in 2012 to an expected 70 percent in 2030; this evolution is in line with the development cycle observed in other countries as agriculture becomes a smaller share of GDP (Exhibit 41). Exports of processed foods will benefit from the strong presence of South African retailers across Africa, as the continent's shift from informal to formal retailers continues.²⁰⁶ These retailers include Shoprite, with 280 corporate outlets throughout the rest of Africa; Woolworths, present in 11 African countries in addition to South Africa; and Spar, active in several countries in the Southern African Development Community region.²⁰⁷ These retailers will likely sell South African processed foods in the markets they expand into. At the same time, neighbouring

²⁰⁶ *The 2014 African retail development index: Seizing Africa's retail opportunities*, A. T. Kearney, March 2014; Renier Swanepoel, *Investing in sub-Saharan Africa: Who will be the winners in FMCG in Africa?* UBS Investment Research, June 22, 2012; "Retail sector in Angola set to grow by 8 percent as middle class expands rapidly", Eaglestone Securities press release, September 24, 2014. In 2014, an estimated 70 to 90 percent of overall sub-Saharan African retail was informal, compared with 33 to 55 percent in South Africa (33 percent is based on employment figures for trade sector).

²⁰⁷ Company websites.

countries could benefit substantially from selling their products into South Africa's processing chain, gaining access to the country's processing infrastructure and distribution network. This in turn will increase South Africa's exports of processed foods.

Exhibit 41

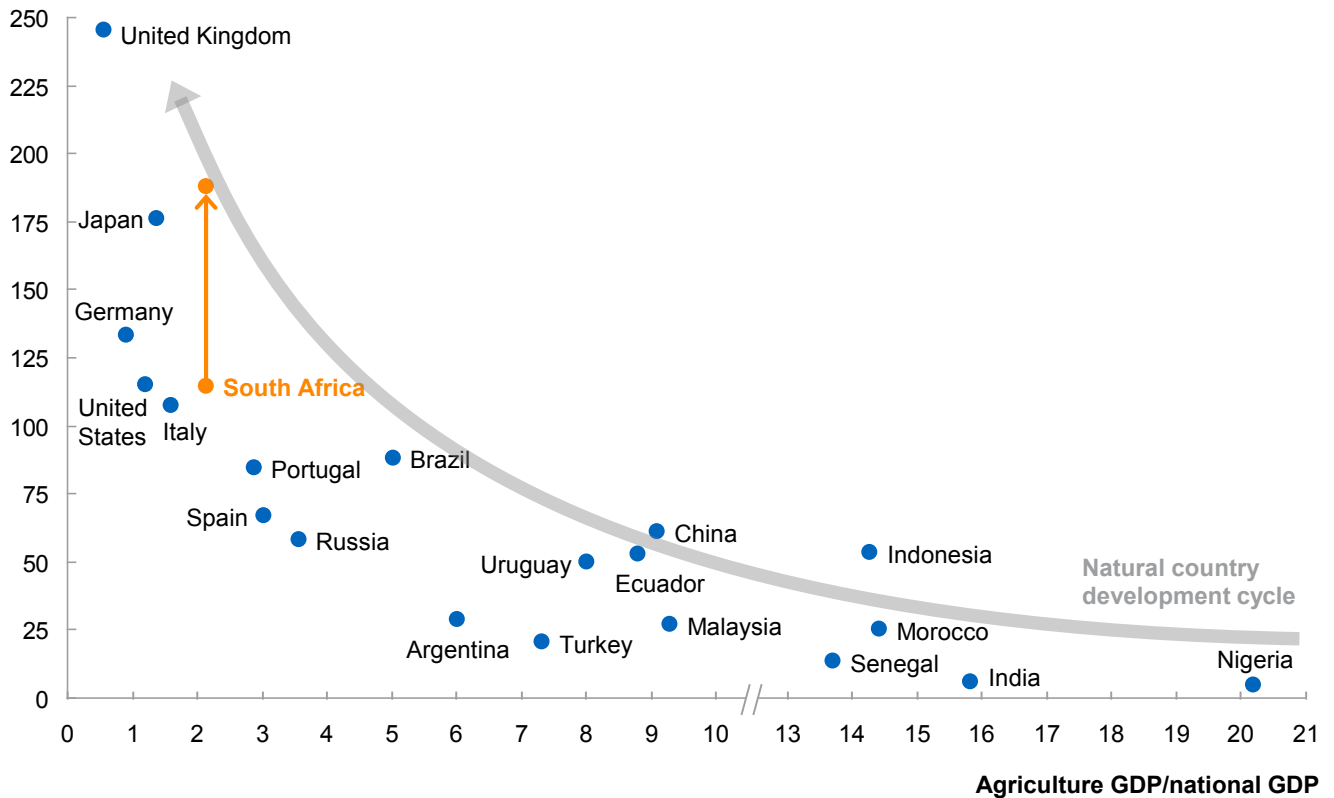
South Africa could experience a strong shift towards more processed products by 2030

NOT EXHAUSTIVE

Weight of the agro-processing sector vs. agriculture sector

Countries with GDP per capita >\$1,000, 2014 (%)

Agro-processing GDP/agriculture GDP



SOURCE: International benchmarks; IHS Economics; World Bank WITS; McKinsey Global Institute analysis

Having clarified the market potential of South African agricultural exports, we considered their cost competitiveness.²⁰⁸ The results of previous analysis suggest that South African exports, particularly fruits and beverages, are cost-competitive in most products.²⁰⁹ However, poultry and, in some markets, maize and fish are less competitive on an imported cost basis (Exhibit 42). Overall, it appears that South Africa has considerable export performance strength on which it can continue to improve.

²⁰⁸ International Trade Centre trade map database, July 2015. With limited room to assess individual products in each market, a number of representative products and importing countries were chosen from the major opportunities identified in Exhibit 40. The import cost was assessed against all other importers into that country for that product, on a dollar-per-ton basis.

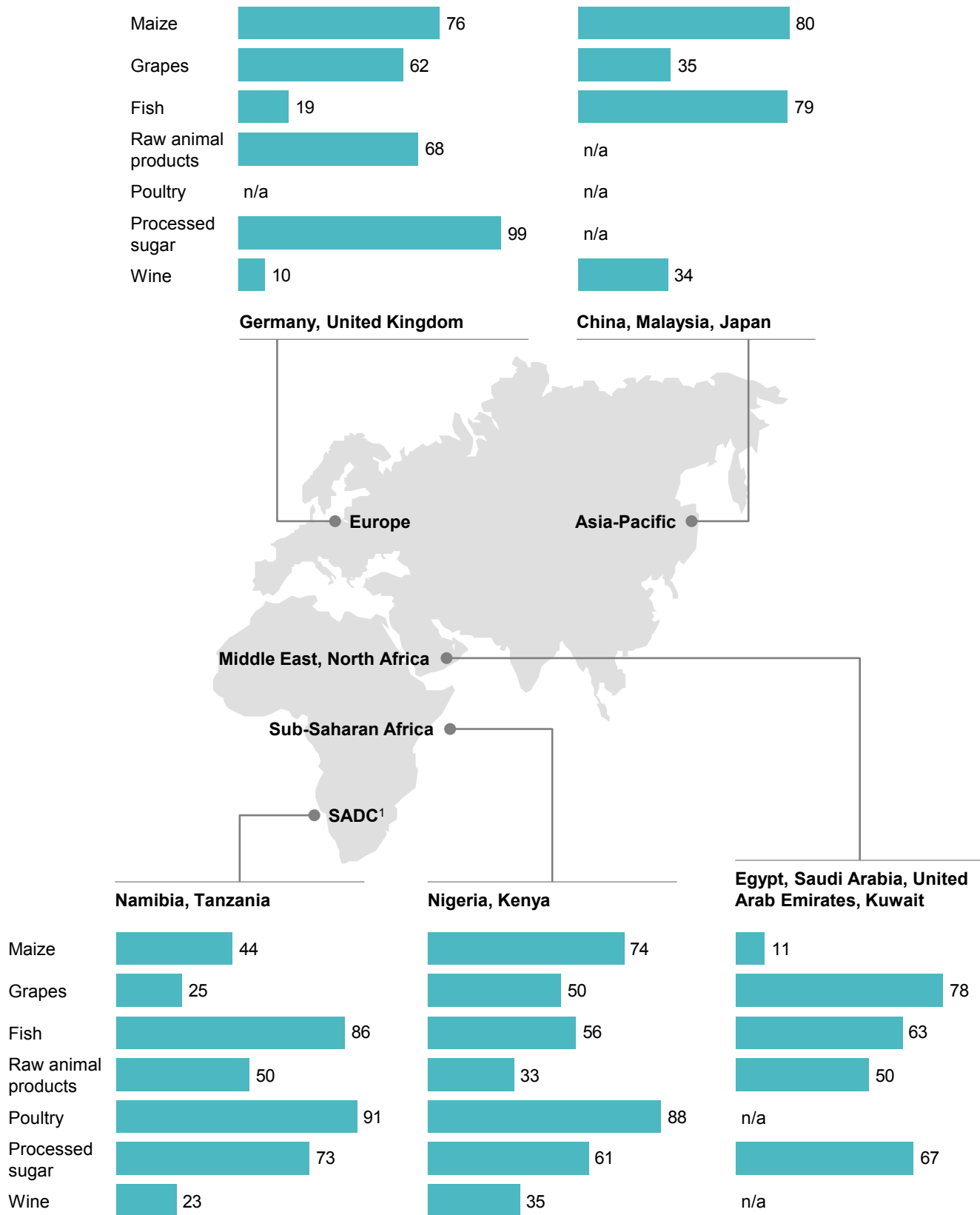
²⁰⁹ We have considered that if the exports are within the top three quartiles in cost, they are comparatively cost-competitive in that market.

Exhibit 42

South African food and beverage exports can be cost-competitive globally, with notable exceptions

Cost competitiveness benchmark, based on average import cost into the countries listed

Position out of 100, where 1 is lowest cost and 100 is highest cost (benchmarked on cost in \$ per ton, 2014)



1 Southern African Development Community.

SOURCE: International Trade Centre; McKinsey Global Institute analysis

BY BOOSTING AGRICULTURAL EXPORTS, SOUTH AFRICA COULD ADD 163 BILLION RAND TO GDP BY 2030

The opportunity is clear: demand is growing fast in South Africa's main export markets, and the country is well positioned to increase production to meet that demand. The rewards will be immense if South Africa succeeds in taking bold steps to increase agricultural yields (from both commercial farms and smallholders) and to boost the output of its agro-processing industry. In the remainder of this chapter, we consider the action required in each of these areas.

We estimate that such steps could add 160 billion rand (\$14 billion) to South Africa's GDP by 2030, doubling the GDP contribution of the entire value chain. Moreover, we estimate that 490,000 new jobs could be created, including 314,000 from agro-processing alone (Exhibit 43).²¹⁰

Exhibit 43

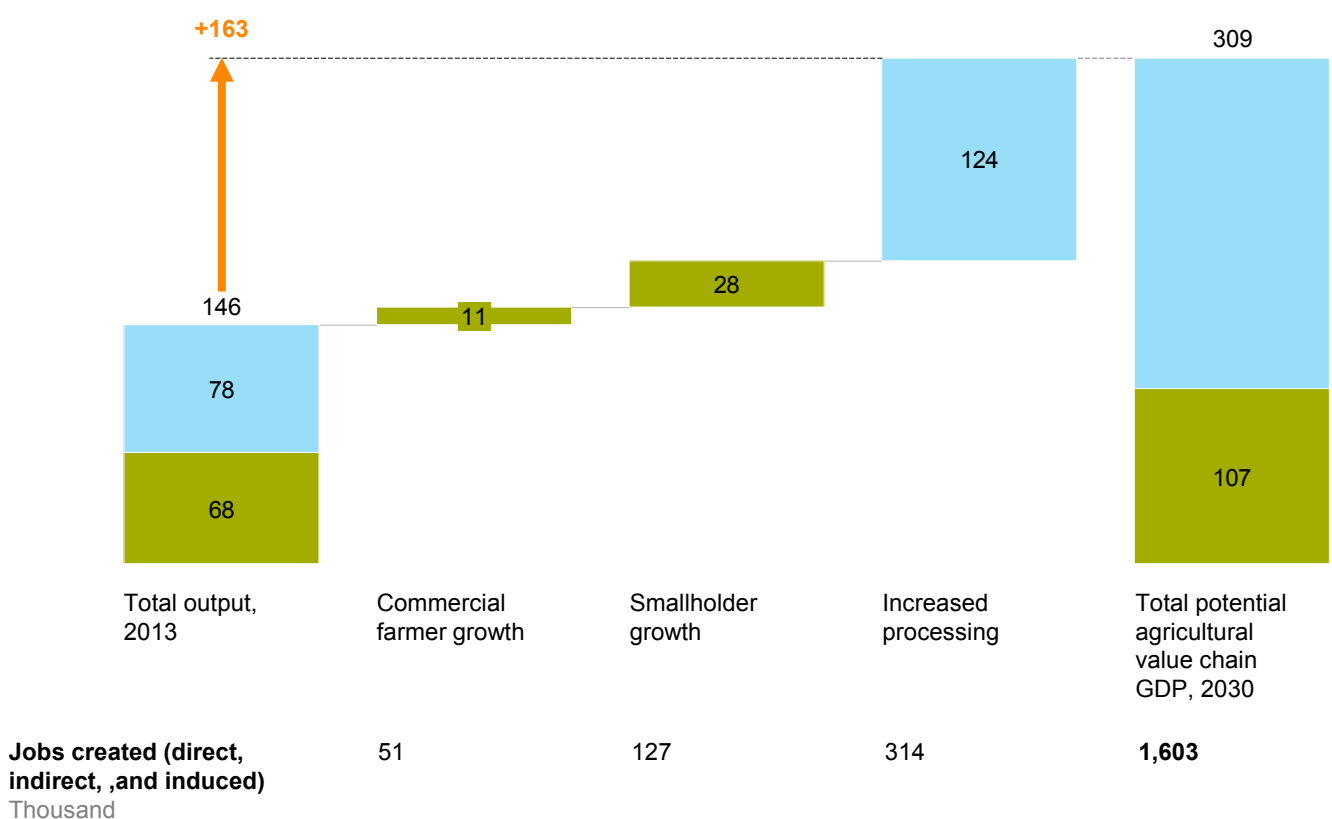
The agriculture value chain could increase value added to GDP by 160 billion rand, doubling GDP contribution and creating 490,000 jobs by 2030

Annual incremental value added to GDP by 2030

Billion rand, 2010 prices

GDP impact

- Processing
- Agriculture



NOTE: Numbers may not sum due to rounding.

SOURCE: IHS Economics; World Bank WITS; McKinsey Global Institute analysis

²¹⁰ We based this estimate purely on growth in exports; it does not consider the growth of the domestic market, which we assumed would constitute business as usual.

Beyond measures of GDP growth, increased agro-processing and farming activities will have important implications for nearby communities. As smallholders transition to professional farming, they will hire people in their communities, particularly for labour-intensive horticulture. Investment in infrastructure and processing plants will also strengthen rural economies.

Investment and job creation in agriculture and agro-processing will be important to uplift rural communities. The initiatives mentioned in this report will directly impact approximately 52,000 households and will indirectly impact far more. The minimum wage for farmworkers is 2,606 rand (\$226) per month—significantly higher than current incomes from subsistence farming and welfare grants—so gains in employment will substantially raise the standard of living in rural areas.²¹¹

SOUTH AFRICA'S COMMERCIAL FARMING SECTOR IS AT A STRONG STARTING POINT—BUT NEEDS A GROWTH STRATEGY

South Africa has a high prevalence of commercial farms (20 hectares or greater), accounting for an estimated 87 to 90 percent of the country's currently employed farmland. These farms, which have been undergoing a wave of consolidations and mechanisation, currently produce a wide range of products for domestic use and export. Nonetheless, opportunities exist to achieve significant increases in production from commercial farms, primarily by improving crop productivity and making additional land available for farming.

To realise these opportunities, South Africa needs a growth-oriented agricultural strategy that focuses on increasing the productivity of existing farmland, improving access to value added processing, proactively managing impending supply disruptors such as drought and water availability, and providing help to control the impact of market volatility in commodity prices on farmers.²¹² In addition, there should be a coordinated, concerted drive to play to the country's strengths, focussing on the specific products that South Africa can produce competitively, due to its agronomy and cost-advantaged proximity to demand locations.

Improving cost and crop yields

As discussed above, productivity is already high for many of South Africa's agricultural products. Among the 28 countries in the benchmark set, South Africa's commercial farms are in the top quartile of productivity in oranges, apples, grapes, and wheat (Exhibit 44). However, South Africa's productivity in maize and sugar cane is in the third quartile, and in strawberries is in the bottom quartile. To maintain South Africa's leadership in some crops and increase productivity in others, a number of techniques will be important.

52k

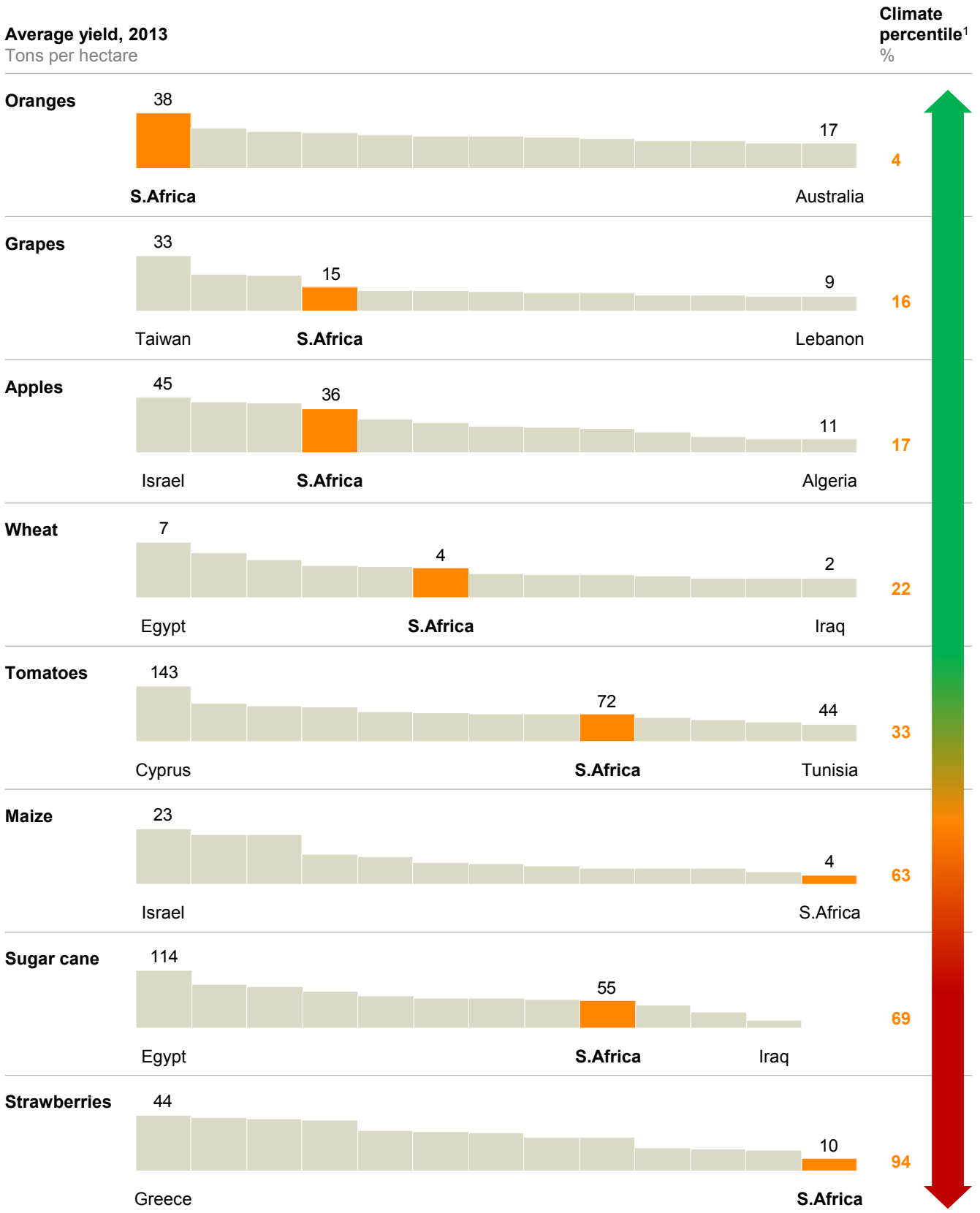
Number of rural households affected by this opportunity

²¹¹ The average welfare grant was 581 rand (\$50) per month in 2013. For the elderly, it was 1,350 rand (\$117) per month. *Annual report 2013/14*, South African Social Security Agency, July 2014; *2014 mid-year population estimates*, Statistics South Africa, July 2014; RSA National Treasury Budget Review 2014 and 2015, February 26, 2014 and February 25, 2015. *World development indicators 2015*, World Bank, April 2015; *2015 farm worker wages, sectoral determination: Basic conditions of employment legislation*, Department of Labour, March 2015.

²¹² Drought management is approached differently across the globe. Both water and heat shocks can devastate production, as observed in South Africa in 2015. Israel is developing irrigation technology, but irrigation is not universally viable. Genetically modified organisms can offer a solution but are controversial. Crop insurance is important and can help farmers mitigate shocks.

Exhibit 44

South Africa's best yields are in fruit; other products have room to improve



1 South Africa's relative position (in yield) out of 100, among 28 countries with climates similar to South Africa's: Algeria, Argentina, Australia, Bahrain, Bhutan, China Taiwan Province, Cyprus, Egypt, Greece, Guadeloupe, Iraq, Israel, Italy, Jordan, Kuwait, Lebanon, Libya, Malta, Montenegro, Morocco, Nepal, Pakistan, Portugal, Qatar, Saudi Arabia, South Africa, Tunisia, and Uruguay.
NOTE: Not to scale.

SOURCE: UN Food and Agriculture Organization Statistics Division; McKinsey Global Institute analysis

For crops where South Africa is competitive and needs to stay that way, it will be important to invest more in R&D and introduce the use of digital platforms to share knowledge among farmers.²¹³ At the same time, South Africa could use several levers to boost productivity for products that are less internationally competitive. These include further consolidation of farms; the use of advanced automation, such as remote-controlled tractors; advanced sensing and analytics, including yield monitors and other control systems; microsegmentation (tailored approaches to maximise yield on each parcel of land); and advanced irrigation and water-saving techniques.²¹⁴ Another proven tool to improve productivity is the use of contract farming, which outsources farming to investors with high skill levels. This could be an option for commercial farms that have changed ownership under South Africa's land reform programme, which has returned land to black owners (or their descendants) who were dispossessed under racial policies. Many of these new owners may not have commercial farming expertise.²¹⁵

It is important that South Africa maintain a cost-competitive position. Many products are commodities, and if the country is to increase exports to markets in Asia in particular, its costs will need to become more competitive. South Africa can start by strengthening the cost base of its already-competitive products. Levers to reduce cost include aggregation and developing new crop varieties (through research), as well as the yield levers already mentioned. Improved access to rail networks will help make logistics more cost-competitive. Increased production implies higher water use. Forecasts to 2035 indicate agriculture could use 9.7 billion cubic metres (49 percent of water demand that year).²¹⁶ Increased access to and better techniques of irrigation will be important for horticulture, but South Africa will also have practical limitations with the application to dryland crop farming, for instance. Increased irrigation will also come at a cost. Finally, government needs to give increased attention to trade agreements and the regulations dealing with agricultural products in foreign markets.

Overall, increasing the productivity and strengthening the cost position of commercial farms is important for supporting a strong overall agricultural sector that is able to expand exports, supply food to South Africa's residents, and provide sufficient raw materials to grow the agro-processing industry.

Making additional land available for farming

In addition to increasing farm productivity, South Africa has the potential to explore additional, unused land that is suitable for agricultural production. An additional 1.6 million to 1.8 million hectares could be used for farming above the 13 million to 14 million hectares in use today, with the potential to increase output by some 14 percent, based on information from the Bureau for Food and Agricultural Policy.²¹⁷

²¹³ India has a successful digital knowledge-sharing model.

²¹⁴ Previous MGI research found that global agricultural productivity could more than double by 2025, with the largest opportunities in emerging regions arising from a combination of increasing yields, reducing waste, mechanisation, and scale. For a detailed discussion of these opportunities, see *Global growth: Can productivity save the day in an aging world?* McKinsey Global Institute, January 2015.

²¹⁵ We consider a shift to higher-value crops in the discussion of smallholders. Our analysis suggests that smallholders can capture most of this opportunity. Commercial farms, which already produce high-value crops, can play a key role by transferring their knowledge and skills to small-scale farmers nearby.

²¹⁶ Steve Hedden and Jakkie Cilliers, *Parched prospects: The emerging water crisis in South Africa*, Institute for Security Studies, African Futures paper number 11, September 2014.

²¹⁷ *The contribution of the agro-industrial complex to employment in South Africa*, Bureau for Food and Agricultural Policy, June 2011. South Africa cultivates 13.1 million hectares of land, but the combination of land classes I, II and III, which traditionally represent arable land, makes up 12.6 percent of total land in South Africa, or 15.4 million hectares, meaning an additional 2.3 million hectares are available. Of this, only the 78 percent of the land that is sloped at 12 degrees or less can be cultivated without unusual interventions, which equals approximately 1.8 million hectares of land.

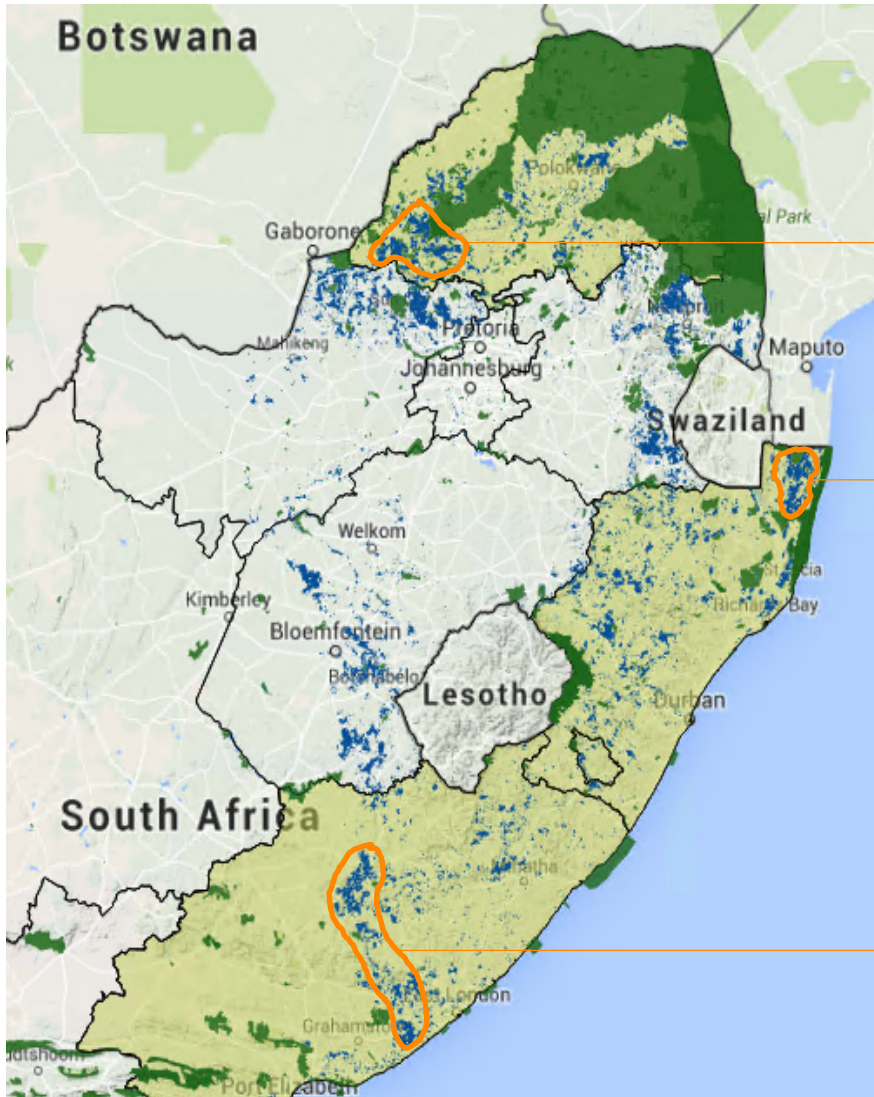
Using McKinsey's Agricultural Commodity Research Engine (ACRE) tool, we conducted an analysis of the Eastern Cape, KwaZulu-Natal, and Limpopo Provinces, home to 69 percent of South African agricultural households.²¹⁸ Across the three provinces, several areas of concentrated opportunity may warrant a deeper exploration for focussed development (Exhibit 45). The revolution in technology and data use in agriculture could help South Africa understand and prioritise the opportunities to bring additional land under cultivation.

Exhibit 45

All three focus provinces have unused land suitable for agriculture

Suitable, unused land: Limpopo, KwaZulu-Natal, and Eastern Cape Provinces

- Protected area
- Suitable, unused land



- Limpopo**
Over 300,000 hectares of high-potential land concentrated near the southwest corner of the province
- KwaZulu-Natal**
The highest concentration is in the northeast, surrounded by several protected areas (including the Tembe National Elephant Park), with nearby water access from lakes Sibhayi and Jozini
- Eastern Cape**
The bulk of the opportunity resides in a single ~250-kilometre band, which stretches from East London on the coast past Queenstown to the north. Steep areas increase the difficulty of establishing large, continuous development zones

SOURCE: McKinsey ACRE tool; ConScience; McKinsey & Company Geospatial Analytics; The World Database on Protected Areas; McKinsey Global Institute analysis

²¹⁸ Using geospatial mapping and crop suitability modeling to understand the site-specific crop yield potential around the globe, the ACRE tool aggregates data from global soil maps and local climate conditions to identify agronomic suitability at the one-square kilometre level. AgriSETA, Sector analysis agriculture prepared for submission to the Department of Higher Education, June 2010.

Investment will be needed to bring new agricultural land to its full arable potential, particularly in soil preparation, because unused land tends to degrade; techniques such as deep tillage and incorporation of soil amendments can help. It will also be necessary to ensure sufficient access to water in new agricultural land, although two of the areas identified potentially have access to irrigation water.²¹⁹

To unlock additional land for farming, however, the government will need to overhaul its land registry system and back up the reform with increased data collection on land use in rural areas. It will also need to develop a land use and classification plan to manage competing demand for land (for example, between agriculture, mining, and game reserves), which will reduce uncertainty by clarifying the long-term suitability of land for farming. Specifically, the government needs to assess future land use requirements (particularly near urban areas) and make clear zoning decisions. A lack of a clearly communicated policy on land use by all departments will discourage investment in improving the quality of land for agriculture and in the supporting infrastructure.

SOUTH AFRICA CAN TRANSFORM THE PRODUCTIVITY OF ITS SMALLHOLDERS BY SWITCHING TO HIGH-VALUE CROPS AND INCREASING INPUT USE

Smallholders and subsistence farmers currently farm some 10 to 13 percent of available agricultural land in South Africa.²²⁰ About 40 percent of this land is under cultivation by smallholders whose farm sizes range from five to 20 hectares, of which nearly four-fifths is used as an additional source of food for the household.²²¹ By raising the productivity of these smallholdings and helping farmers gain access to markets, South Africa can support many rural households in making farming a commercially viable concern that sells crops and employs workers. We estimate that South Africa has the potential to boost the productivity of its smallholdings by switching to high-value crops and using improved inputs.

Levers for improving smallholder productivity

We estimate that switching to high-value crops could increase GDP by 27 billion rand (\$2.3 billion) and create 121,000 jobs. In addition, improving inputs for smallholders could increase GDP by 1.4 billion rand (\$122 million) and create 6,000 jobs. Smallholders are not always less productive than commercial farmers, but there is scope to improve their value added, quality of life, and income. The particular opportunities are as follows:

- **Higher-value crops.** Switching to higher-value crops, many of which are labour-intensive, would not only improve the sustainability of smallholdings but also create jobs. In the provinces of Eastern Cape, KwaZulu-Natal, and Limpopo, we found that the most promising products for farms at this scale are in horticulture, in particular berries, strawberries, and tomatoes.²²² Other opportunities include eggs, ultrahigh temperature milk, and beef,²²³ while some consolidation of smallholdings into larger farms of about 30 hectares would make avocado, litchi (lychee), and mango attractive. Shifting to different crop types requires a gradual transition over up to four years for horticulture, as well

²¹⁹ *The South African agricultural baseline: 2011*, Bureau for Food and Agricultural Policy, 2011; Map of water management areas, https://www.dwa.gov.za/iwqs/wms/data/WMS_WMA_map.asp.

²²⁰ Glwadys Aymone Gbetibouo and Claudia Ringler, *Mapping South African farming sector vulnerability to climate change and variability*, International Food Policy Research Institute discussion paper number 00885, August 2009. This paper mentions that commercial farmers cover 87 percent of farmland and account for 90 percent of agriculture value added. For the purposes of this report, we estimated that commercial farmers cover 90 percent of farmland; see detailed online Technical Notes on agriculture.

²²¹ Norma Tregurtha, Nick Vink, and Johann Kirsten, *Presidency fifteen year review project: Review of agricultural policies and support instruments in South Africa, 1994–2009*, Trade and Industrial Policy Strategies, March 2008.

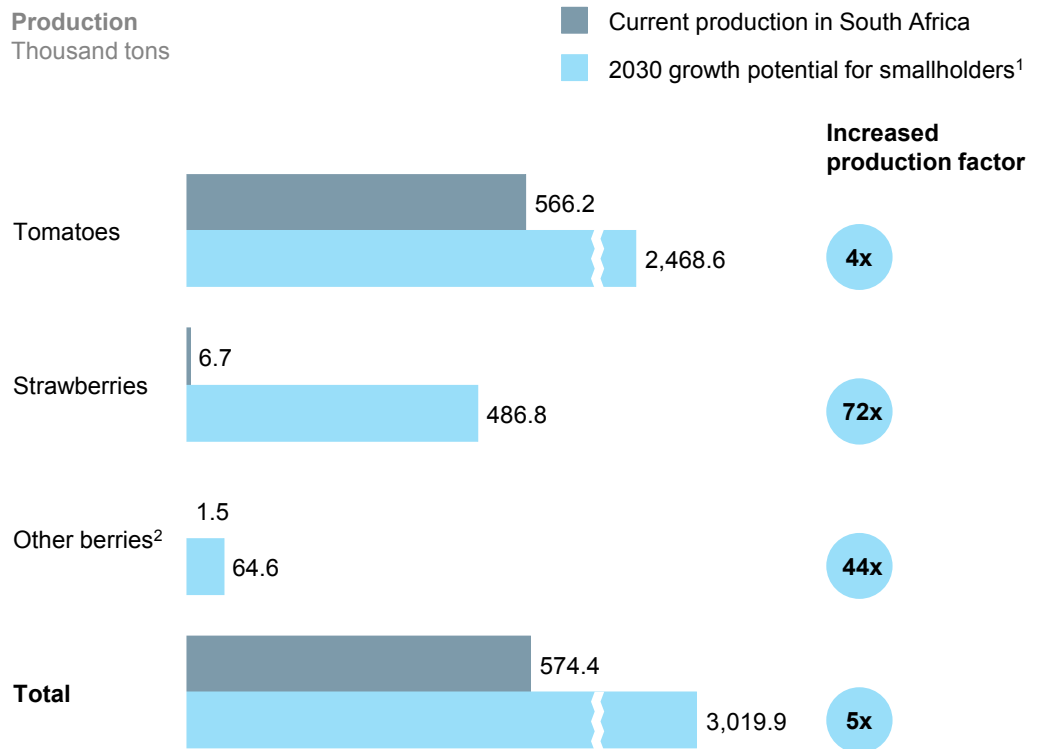
²²² Of these products, South Africa is currently not strong in the production of strawberries.

²²³ While Nguni cattle are preferred by smallholders, they are not a popular source of beef. For this reason the vast majority of traditional farmers cannot access formal meat processing markets. Encouraging a move to hybrid cattle types could increase the value of these cattle herds and increase the general supply of beef.

as ongoing support for farmers during the transition period. A mindset shift from self-sufficiency to selling goods into a market will also take time. In some cases, support in the form of supplementary income may be necessary until the new crops are established and sustainable. Assuming that this shift occurred on 80 percent of smallholdings currently producing grain, South Africa could potentially capture 12 percent of predicted global demand growth for berries, strawberries, and tomatoes (excluding North America) based on domestic yields of those crops in 2013 (Exhibit 46).²²⁴

Exhibit 46

Smallholders could produce enough strawberries, berries, and tomatoes to capture three million tons of demand by 2030 (with approximately 3 percent of arable land)



1 Based on production from 80% of smallholder grain farms (50–20 ha) in three provinces (Eastern Cape, KwaZulu-Natal, and Limpopo). Allocations of land: 53% strawberries, 38% tomatoes, 9% other berries. This estimate is based on recorded South African yields for these crops in 2013 and is assessed against a total global production of 28 million tons (excludes North America because it is impractical to include due to possible product damage and high local production).
 2 Excludes blueberry production due to insufficient data.

SOURCE: McKinsey Global Institute analysis

- Improved inputs.** Smallholders in general do not have access to high-quality inputs, and yields and crop variety suffer as a result. Providing greater access to such inputs can generate major improvements in yields of up to 110 percent. Fertiliser can typically increase yields by about 50 percent, seed varieties by about 15 percent, and access to improved training and information by about 40 percent.²²⁵ The government of Malawi, for example, subsidises improved fertilisers and seeds by offering vouchers to farmers of maize and tobacco, and as a result, smallholder yields of these crops have doubled.²²⁶

²²⁴ The displaced grain crops would account for only 3 percent of the total land area currently used for maize and wheat and therefore could not have a significant impact on current grain production.

²²⁵ See detailed online Technical Notes on agriculture for full explanation and sources.

²²⁶ Coupons are distributed to districts and within districts to Extension Planning Areas in two rounds, with the first-round allocation in earlier years broadly in proportion to cropped maize and tobacco areas and (in later years) farming population. Partners include donors and fertiliser and seed industry leaders, as well as the public sector.

- **Access to markets.** Smallholders face significant challenges when competing on the global scale in terms of quality and standardisation of produce, traceability of products to point of origin (a European requirement), and access to large supermarkets and retail outlets. Close links to market knowledge are required to keep abreast of regulatory changes and industry and consumer trends.
- **Subsistence farming support.** Some 6 percent of agricultural land in South Africa is used for subsistence farming by an estimated 1.2 million farms and a total of 4.3 million individuals, close to one-tenth of South Africa's total population. Such landholdings—for instance, small personal vegetable gardens—could be aggregated to allow access to market, but a programme similar to the one we envision for smallholders is impractical given the number of owners. Other ways to support subsistence farmers include, for instance, educational services and access to irrigation.

Making it happen: Significant investment and stakeholder involvement required

Rather than relying principally on subsidies, South Africa's smallholders need a multifaceted approach to help improve their inputs and shift to higher-value crops. Financial support, training, and the right incentives and infrastructure all need to be in place. From interviews conducted for this study, it was clear that these programmes may seem fairly easy on paper, but in reality they face many challenges. To make such programmes work, considerable management and business support is needed over a period of years. The key aspects that South Africa should consider include the following:

- **Extension services and support programmes.** Support programmes—including extension services, financial services, human resources and technological development, delivery systems, and marketing services—are necessary to help farmers use their land to its full potential. South Africa already invests 2.9 percent of agricultural GDP in extension services, more than double the proportion in other African countries.²²⁷ Despite this relatively large investment, though, delivery could be significantly more efficient. For one thing, South Africa's agricultural extension service providers are oriented towards commercial farmers, with fewer providers supporting smallholder farmers: the ratio of extension staff is 1.21 to 1 for commercial farmers and 1.86 to 1 for smallholder and subsistence farmers.²²⁸ If a programme is undertaken to transition smallholders to horticulture, for instance, intensive support would be necessary over the course of the years of transition, resulting in an increased need for extension service providers. Moreover, the quality of extension support to farmers varies; many services are outdated, staff members are often underqualified, and too often solutions are geared towards larger commercial farmers. Kenya provides an example of how a country can continuously improve extension services to address a wider range of demands. Its National Agriculture and Livestock Extension Programme has promoted demand-driven extension services through the dissemination of information and the use of 12 different support formats, including field days, demonstrations, courses, on-farm trials, and common-interest groups.
- **Access to funding.** South Africa's Land Bank is a strong source of funding, but it could revise its mix of funding so that finance is better tailored to smallholders and subsistence farmers and is linked with education and support. One example of such an approach is the Agricultural Development Fund in Morocco, which allocates money for equipment, promotion of products, and technical assistance services to smallholders. South Africa must find innovative ways to access private-sector finance, particularly for farmers

²²⁷ Norma Tregurtha, Nick Vink, and Johann Kirsten, *Presidency fifteen year review project: Review of agricultural policies and support instruments in South Africa, 1994–2009*, Trade and Industrial Policy Strategies, March 2008.

²²⁸ Isaac Azikiwe Agholor et al., "Quality of extension services: A case study of farmers in Amathole", *Journal of Agricultural Science*, volume 5, number 2, February 2013.

on communally owned land, which cannot be used as surety with current funding models. In Nigeria, for instance, more than 20 banks worked with the government to design a \$500 million risk-sharing facility to support lending to small and medium-sized agricultural businesses and producers. Supply-chain partners need to utilise a practical and reliable payments system, with short payment cycles and an affordable cash-based payments process, given these farmers' dependence on cash.

Input subsidies are another tool to support small-scale farmers, but they must be explicitly temporary, with an understanding that farmers will progress to self-funding through a structured programme. Smallholder farmers will continue to be vulnerable to price swings and crop losses. Programmes that succeed in supporting them through these swings focus on helping with better market access. For example, Massmart's Supplier Development Fund (through its Ezemvelo Direct Farm Programme) gives farmers access to grant funding for inputs. The fund ensures that farmers can buy the inputs needed to grow crops for sale and provides continued access to grants in subsequent years. The programme also provides protection for farmers, subsidising the grant if crops fail.²²⁹

- **Support to form cooperatives.** Cooperatives can give smallholder farmers greater access to financing, inputs, markets, and the agricultural supply chain. Further, large-scale processing and retail companies are best positioned to track agricultural demand cycles and supply chains to provide guidance to farmers. These companies do not have the resources to work directly with individual smallholder farmers, so a cooperative approach is essential to ensure market access for these farmers. One successful example is Is'Baye's High Value Crop programme in the Eastern Cape Province, supported by the Agricultural Research Centre, the provincial Department of Agriculture, and local retailers including Spar. The cooperative reaches more than 5,000 households and has increased their collective annual revenue by 19 billion rand (\$1.7 billion) over 15 years.²³⁰ Advisory services can be instituted to help small farmers set up their own cooperatives, provide support at the pre-registration and registration stages, and link farmers with other stakeholders and knowledge platforms.

INVESTMENT IN AGRO-PROCESSING CAN INCREASE VALUE ADDED BY OVER 100 BILLION RAND AND CREATE 300,000 NEW JOBS

In 2014, South Africa's agro-processing industry contributed 78 billion rand (\$6.8 billion) to GDP and employed 362,000 people.²³¹ Exports of processed products amounted to 55 billion rand (\$4.8 billion), or 6 percent of total exports in 2013. From 2004 to 2014, processing grew at 1.9 percent per year, and from 2008 to 2014, employment grew by 57,000 despite a contraction in employment in the manufacturing sector as a whole. South Africa already has a very strong processing industry, with products including grain milling, consumer food products, frozen and tinned food, sugar, starch, chicken products, and animal feeds. Some players in this sector are even branching out into providing financial services or owning operations in other African countries.

As discussed above, the biggest opportunities for growth in agro-processing exports are in fruit, beverages, and animal products. As noted, to pursue additional growth in animal products, fish, sugars, and tobacco products, it may be necessary to expand supply chains to neighbouring countries.

²²⁹ *Supplier Development Fund annual report*, Massmart and Walmart, 2014.

²³⁰ The minimum wage for farmworkers is 2,606 rand (\$226) per month.

²³¹ Employment in processing is split between six main activities: 32 percent in the manufacture of food products (bakery, sugar, cocoa, chocolate, confectionery, macaroni, noodles, and other products); 29 percent in the preparation of meat, fish, fruit, vegetables, oils, and fats; 21 percent in the manufacture of beverages; 10 percent in grain milling products, starches, and animal feed; 7 percent in dairy products; and 2 percent in tobacco products.

314k
Number of jobs
agro-processing
could create

We estimate that growth in agro-processing industries could add an additional 124 billion rand (\$11 billion) to GDP through exports and could create 314,000 jobs by 2030.²³² The processing would be complementary to the production growth from commercial and small-scale farmers. South Africa needs to consider six dimensions in order to grow the agro-processing industry:

- **Market access and strength.** Because productivity is relatively high and the sector offers such a broad range of products, there is significant potential to expand markets for processed agricultural goods. South Africa's largest markets today are the Netherlands, which imported goods worth about 9.8 billion rand (\$854,000) in 2012, Namibia (9.3 billion rand [\$810,000]), and the United Kingdom (8.6 billion rand [\$744,000]). The government can encourage increased exports by strengthening South Africa's brand, identifying new markets, and negotiating new trade deals. As mentioned in Chapter 4, a commercial attaché in South African embassies could assist.
- **Market diversification.** Europe is South Africa's biggest market for edible fruits and nut products, but its growth is forecast at only 3.1 percent a year between 2015 and 2020. As discussed above, this compares with projected growth of 4.2 percent in the Asia-Pacific region and 4.3 percent in North Africa and the Middle East. South Africa needs to build on established markets in the Southern African Development Community area at the same time that it diversifies. In its home region, South Africa has strong retailers that are broadening their focus to include the rest of Africa, giving the agro-processing industry an opportunity to establish new links to distribution chains.
- **Supply-chain sustainability.** Agricultural producers, processors, and marketers all have a stake in an effectively run supply chain. However, expanding production, shifting to more horticultural products, and bringing smallholder cooperatives and neighbouring countries' farmers into the supply chain will strain it. Expanded investment will therefore be required, particularly in power, water, and logistics. Moreover, South Africa must pay attention to the location of new processing plants, to ensure that infrastructure plans are aligned and that plants are close to the targeted farmers. The country must endeavour to ensure that new processing entrants maintain the same quality of operations as the incumbents to prevent risk to the reputation of the country's produce. The emergence of traceability to source in the European Union will similarly impose stringent demands on farmers and processors. Programmes to support the growth of emerging businesses currently operate in countries such as in Kenya, Mozambique, and Rwanda.²³³
- **Access to financing.** It is riskier for businesses to provide services to cooperatives of smallholders than to commercial farmers. Low financing rates can help encourage investment in agro-processing and supply chains, as can public-private partnerships that can help to manage risk. Some governments have provided a guarantee on the loans granted by commercial banks for agricultural production and processing, to help manage risk. Alternatively, the Fund for Agricultural Finance in Nigeria (FAFIN) provides funding together with technical and business support services to its investments, to

²³² The calculation of value added is based on the assumption that all produce would be sourced domestically. If some raw materials originate in neighbouring countries, the full GDP impact will be split with them.

²³³ Three examples are the Pan African Agribusiness and Agroindustry Consortium, which offers support to small and medium-sized enterprises (SMEs) support in Kenya and other African nations by facilitating a network of organisations and partnerships; the United Nations Industrial Development Organization, which has established food processing pilot centres in countries such as Mozambique, Rwanda, and Tanzania; and AGRO-START, whose aim is to increase the competitiveness of SMEs in animal breeding and horticulture in southeastern Europe. The programme offers a South East Europe Kit for Entrepreneurs, an easy-to-use online resource that gathers information about national, regional, and EU-level legislation; financial support for entrepreneurs; and other services. See Pan African Agribusiness and Agroindustry Consortium website, www.panaac.org/our-programmes/panaac-s-sme-s-support; United Nations Industrial Development Organisation, *Food Processing Pilot Centres*, 2007; AGRO-START website, www.agro-start-see.eu/.

ensure new enterprises are successful (the technical facility provided is worth up to 10 percent of the total investment size).

- **Capital-intensive assets.** South Africa must ensure that the capital-intensive infrastructure needed to support agro-processing is in place, from distribution chains to road, rail, water, and power to ports. Sea transport accounted for 84 percent of export routes for agro-processing products in 2013.²³⁴ South Africa has access to domestic ports and to the Maputo port in Mozambique, which has a conventional fruit terminal. Many projects to expand rail and road access within South Africa are progressing, but access to Southern African Development Community economies and the rest of Africa needs to improve: 49 percent of all exports go to neighbouring African countries.²³⁵ In this regard, Special Economic Zones and agri-parks could play the role of hubs, providing utilities and access to air, rail, and port and cold-chain infrastructure. They could also act as meeting points for all operators in the value chain, including traders and retailers. South Africa has four zones targeted at agro-processing and plans to introduce agri-parks in 44 district municipalities (see Chapter 1, on manufacturing, for further discussion on the role of SEZs).²³⁶ Nigerian agro-processing zones, known as Staple Crop Processing Zones, provide an attractive business environment and support businesses with land acquisition and infrastructure, fiscal, and administrative incentives. They also ensure that processors gain access to and develop close links with suppliers. Each of these zones focusses on a specific crop type.
- **Knowledge and skills development.** Although unemployment in South Africa is high, agro-processing currently suffers from a skills shortage at all levels. Agricultural schools and technical agricultural colleges are proven ways to create capable farmers and processing plant operators, but scholars and students need to be encouraged to pursue this field of study. Moreover, targeted interventions are required to accelerate skills development. Training should commence in secondary and vocational schools to present a career in agriculture as an early option to students. More work also needs to go into R&D in areas such as quality testing, labelling, new product development, and disease prevention. The private sector could encourage the development of new venture opportunities through funding and promoting agri-business utilising this technology. In addition, contract farming should include formalised training plans for owners, to enable them to maintain productivity when farms are returned.

SOUTH AFRICA NEEDS A NATIONAL PLAN TO UNLOCK AGRICULTURAL PRODUCTION AND PRODUCTIVITY

At the national level, South African government departments need to agree and work together on a strategic plan to enable increased agricultural production and productivity as well as expansion of agro-processing. Clear regional priorities and pooling of resources would be beneficial, combined with a programme that tracks progress on funded initiatives. This plan would build on the current nine-point Agricultural Policy Action Plan and would draw on examples of success in other countries, such as Morocco (see Box 5, “Morocco’s agricultural revolution”).

International best practice suggests that, in some respects, the current direction of agricultural policy in South Africa may require modification. For example, Morocco has increased crop yields by moving away from smallholder farming through aggregation and

²³⁴ IHS Global Insight trade data, 2013, database accessed May 2015.

²³⁵ Ibid.

²³⁶ Budget vote 2015/16, speech by Deputy Minister Mcebisi Skwatsha, Department of Rural Development and Land Reform. The South African government has allocated two billion rand (\$174 million) to introduce agri-parks in the 44 district municipalities, prioritising the 27 poorest ones. Plans call for 200 million rand (\$17 million) to be used for institutional and capacity development, skills acquisition, or both; 626 million rand (\$54 million) for acquiring 185,000 hectares of land to be used by farmers; and 363 million rand (\$32 million) for recapitalisation and development of farms.

by bringing skills into agriculture through contract farming and private investment. This suggests that South Africa might reconsider the intention, stated in the Agricultural Policy Action Plan, to increase the number of smallholder households from 164,000 in 2012 to 400,500 in 2019. In its land reform process, South Africa will also need to be careful not to leave new farmers isolated and lacking support. Once the land ownership transfer is complete, new farmers still require continued support over several years before becoming fully knowledgeable and productive. Drawing on Morocco's experience, contract farming (discussed above) may be the best route to ensure that redistributed land is productive and that resident communities earn a good living from their land. There may be an opportunity to transfer skills during this process.

Box 5. Morocco's agricultural revolution

Morocco has transformed its agriculture sector in recent years, boosting contribution to GDP by 55 percent and agricultural production by 45 percent between 2005 and 2010.¹ Its experience offers an interesting comparison for South Africa. Morocco has a comparable climate and many similar products, including vegetables, cereals, and fruits such as citrus and strawberries. Morocco has rapidly developed a full export value chain, from fresh strawberries to the United Kingdom to frozen strawberries for French yogurt producers. Both countries face some similar challenges, including the need for land reform (through aggregation of land), increased access to irrigation, and a need to open up international trade to farmers.

Morocco took a segmented approach to its agricultural revolution, taking specific actions to increase the productivity of commercial farmers on the one hand and smallholders and subsistence farmers on the other. In the case of commercial farmers, it focussed on a shift to higher-value crops, including tomatoes, strawberries, sugar, and dairy (and associated processing facilities), and on aggregation of land, making more property available for commercial use and automation and digitisation. Morocco launched between 700 and 900 projects designed to consolidate smaller farms into larger concerns, and it explicitly encouraged international investors to take part in farming and bring their management capabilities to bear on the sector. These initiatives helped increase capital investment in agriculture from \$3.7 billion in 2005 to \$6.3 billion in 2010, a 70 percent increase.²

In the case of smallholders and subsistence farmers, Morocco focussed on expanding productivity through increased output and higher-value crops. It canvassed national and international investors to assist with funding and to bring their expertise into the sector through contract farming. Contract farming was used to help aggregate the operations of smallholder farms. These contractors provided inputs and extension services, co-distributed financial products, and organised access to mechanisation, logistics, and end markets for farmers.

To support the overall programme, Morocco set up an integrated water-management plan; opened up new markets through free trade agreements; broadened access to inputs, services, and distribution networks; improved the business environment and access to financing; and reformed the public institutions providing services (extension services and R&D). These broader efforts were integral to Morocco's rural development programme.

¹ All growth based on real 2005 prices from 2005 to 2010. IHS World Industry Service data for value added and total sales (gross output), database was accessed July 2015.

² IHS World Industry Service data for capital expenditures (investments or CapEx), nominal, database was accessed July 2015.

A strategic plan to accelerate South African agriculture could include the following key elements:

- **Clarification of land rights.** Title deeds and ownership need to be confirmed and communicated clearly to farmers so that they are motivated to invest in their land. Today, smallholders are often unsure of their ownership status and therefore hesitant to invest. Unless land ownership is settled, other levers could all too easily fail to be effective.
- **Consolidation.** Consolidation of small-scale farms into larger, market-oriented farms can be an effective way to attract investment. One challenge that Morocco experienced in this regard was managing the relationship between farmers and investors; farmers were reluctant to sell their entire crop exclusively to investors. However, South Africa may be able to discover a middle ground in which investors support cooperatives or broad farm areas while farmers retain exclusive ownership of their land.
- **Infrastructure.** Farmers need the development of cold-chain infrastructure to allow them to get their products to market over long distances and to keep produce such as berries and tomatoes fresh. Developing such infrastructure—including through the recently launched agri-parks initiative—will require both public and private investment. Other developing economies provide useful lessons in the development of cold-supply chains. In India, for example, the government provided fiscal incentives and grants, and set up a centre of excellence for cold-chain-related activities to encourage private-sector investment.
- **Irrigation and water management.** South African farming needs more effective and extensive irrigation, which will require a government water strategy. Only 3.7 percent of all irrigated land is currently on smallholdings; this share will need to rise if small-scale producers are to move towards higher-value crops.²³⁷ There is considerable scope to extend existing irrigation systems, but this will require investment and effective project delivery.
- **Attraction of investment.** South Africa is directing large amounts of public investment into agriculture, although most of the funds go into land redistribution. Private funding could help bridge specific gaps in the supply chain and infrastructure, as well as in providing bridging financing to farmers making the transition to higher-value crops. Private-sector players in agro-processing are potentially the most promising sources of such funding, and they are motivated to help link funding to a co-production operating model without necessarily requiring ownership of farms.

•••

By implementing an ambitious plan to increase agricultural production and exports, South Africa can deliver substantial additional economic value and employment across the country, including the most deprived rural areas. The country's agricultural sector has many successes to build on as well as powerful advantages in serving fast-growing markets in Africa and Asia. Yet much work lies ahead. If South Africa is to unlock the full potential of its agricultural value chain, the private sector and government alike will need to take concerted action to improve productivity, expand access to new markets, build skills, and grow the agro-processing industry. With a clear vision and robust long-term strategy in place, the rewards will be tremendous.

²³⁷ Recommended types of irrigation include drip and sprinkler irrigation. The latter is cheaper to implement and maintain, with low energy usage. It may be best suited in general to small-scale farmers, although a balance of several types will most likely be needed, depending on climate, crops, and soil. Furthermore, a shift to drip irrigation and other micro-irrigation systems will be increasingly important for water conservation.



6. EQUIPPING SOUTH AFRICANS FOR THE JOBS OF THE FUTURE

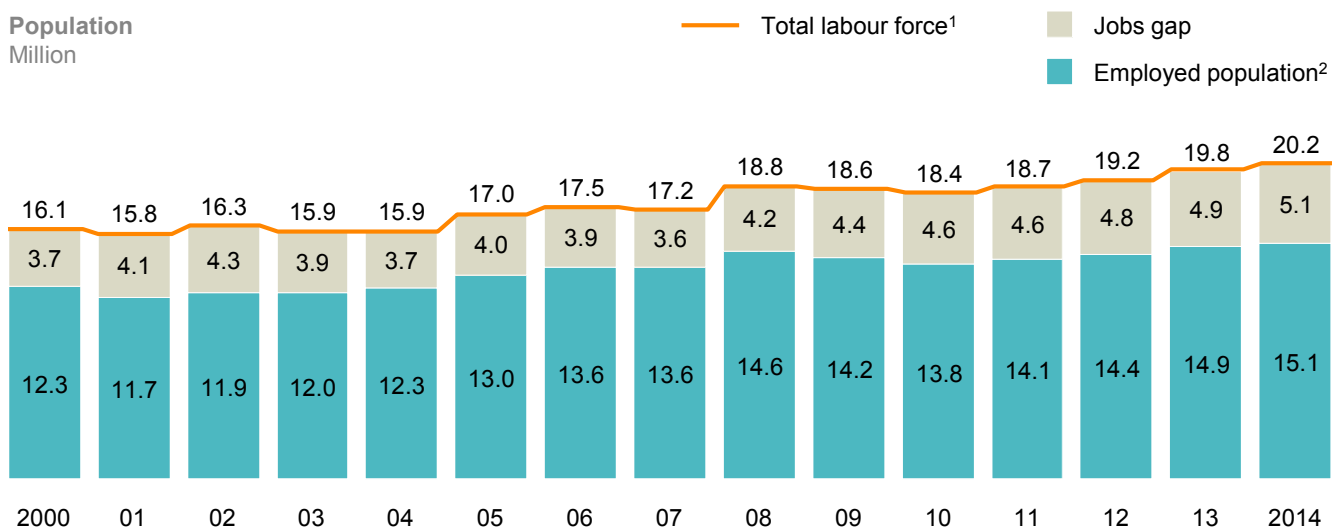
South Africa not only needs to deliver on its growth opportunities; it needs to do so in a way that creates jobs for its citizens and makes meaningful progress in reducing its high levels of unemployment. The priorities identified in this report could create 3.4 million jobs by 2030, but the reality is that much of today's workforce will not be able to fill those jobs. Getting South Africa's population employment-ready is an urgent imperative. This chapter considers two important contributors to this outcome: educating for employment, and connecting people and jobs.

SOUTH AFRICA DOES NOT CREATE ENOUGH JOBS AND STRUGGLES TO FILL EXISTING VACANCIES

South Africa has faced persistently high unemployment levels. As of March 2015, the unemployment rate stood at 26.4 percent, with 5.5 million South Africans unemployed.²³⁸ The expanded unemployment rate, which includes people who have stopped looking for work, stood at 36.1 percent. Although South Africa has steadily created jobs over the past 15 years, it has done so at a slower rate than the increase in the labour force; as a result, the gap between job seekers and jobs rose from 3.7 million in 2000 to 5.1 million in 2014 (Exhibit 47).

Exhibit 47

The jobs gap is currently at the highest level in 14 years



1 Does not include discouraged job seekers.

2 Adults and youth.

NOTE: Numbers may not sum due to rounding.

SOURCE: Stats SA; McKinsey Global Institute analysis

At the same time, South Africa has many reported vacancies. In the 2013–14 financial year, the Department of Labour estimated that there were close to 50,000 vacant posts advertised nationally. Professional and managerial positions accounted for 57 percent of these vacancies, while technicians, clerical workers, and services and sales workers

²³⁸ Quarterly Labour Force Survey: Quarter 1, 2015, Statistics South Africa, May 2015.

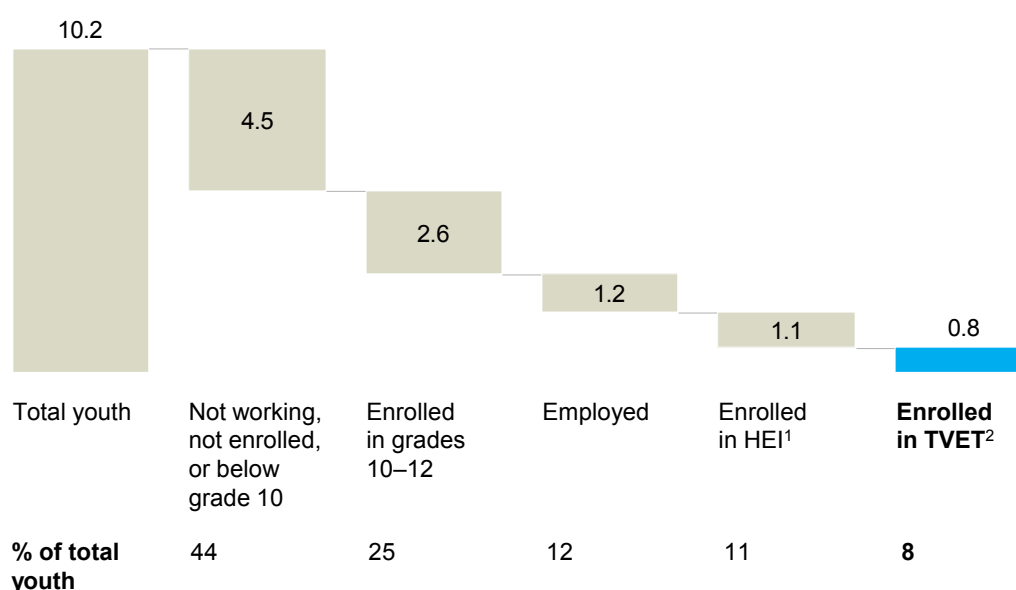
accounted for 30 percent.²³⁹ As an indication of this challenge, the government has identified no fewer than 100 skills on its *List of occupations in high demand*.²⁴⁰ Yet less than 10 percent of youth between the ages of 15 and 24 are enrolled in technical or vocational education institutions (Exhibit 48). South Africa faces simultaneous challenges of high unemployment and unmet demand for people with particular skills. When considering how to realise the country's job creation potential over the next 15 years, it is necessary to understand what types of jobs will be created and how to prepare the appropriately skilled future workforce.

Exhibit 48

Less than 10 percent of youth between the ages of 15 and 24 are enrolled in vocational education institutions

Youth education enrolment and employment, 2013

Million



1 Higher education institutions.

2 Technical and vocational education and training colleges.

NOTE: Numbers may not sum due to rounding.

SOURCE: Department of Higher Education and Training; Department of Basic Education; McKinsey Global Institute analysis

THE BIG FIVE GROWTH PRIORITIES COULD CREATE UP TO 3.4 MILLION JOBS; WILL SOUTH AFRICANS BE ABLE TO FILL THEM?

Altogether, we estimate that the opportunities discussed in this report could create up to 3.4 million jobs in manufacturing, infrastructure, energy and natural gas, services, and agriculture.²⁴¹ Each of the sectors has a particular distribution of skills within its labour force (Exhibit 49). To understand this distribution in more depth, we define five broad levels of skills. First, elementary occupations, which account for 22 percent of the new jobs created, require no specific skill set and can be filled by an individual with or without a school leaving (“matric”, or secondary) qualification. Second, skilled trade workers (48 percent of new jobs) include roles such as clerks, sales operatives, skilled labourers and craftsmen, and plant and machine operators and assemblers; each requires specialised vocational training.

²³⁹ *Job opportunities and unemployment in the South African labour market, 2013–2014*, Department of Labour, October 21, 2014.

²⁴⁰ *List of occupations in high demand: 2014*, Department of Higher Education and Training, November 2014.

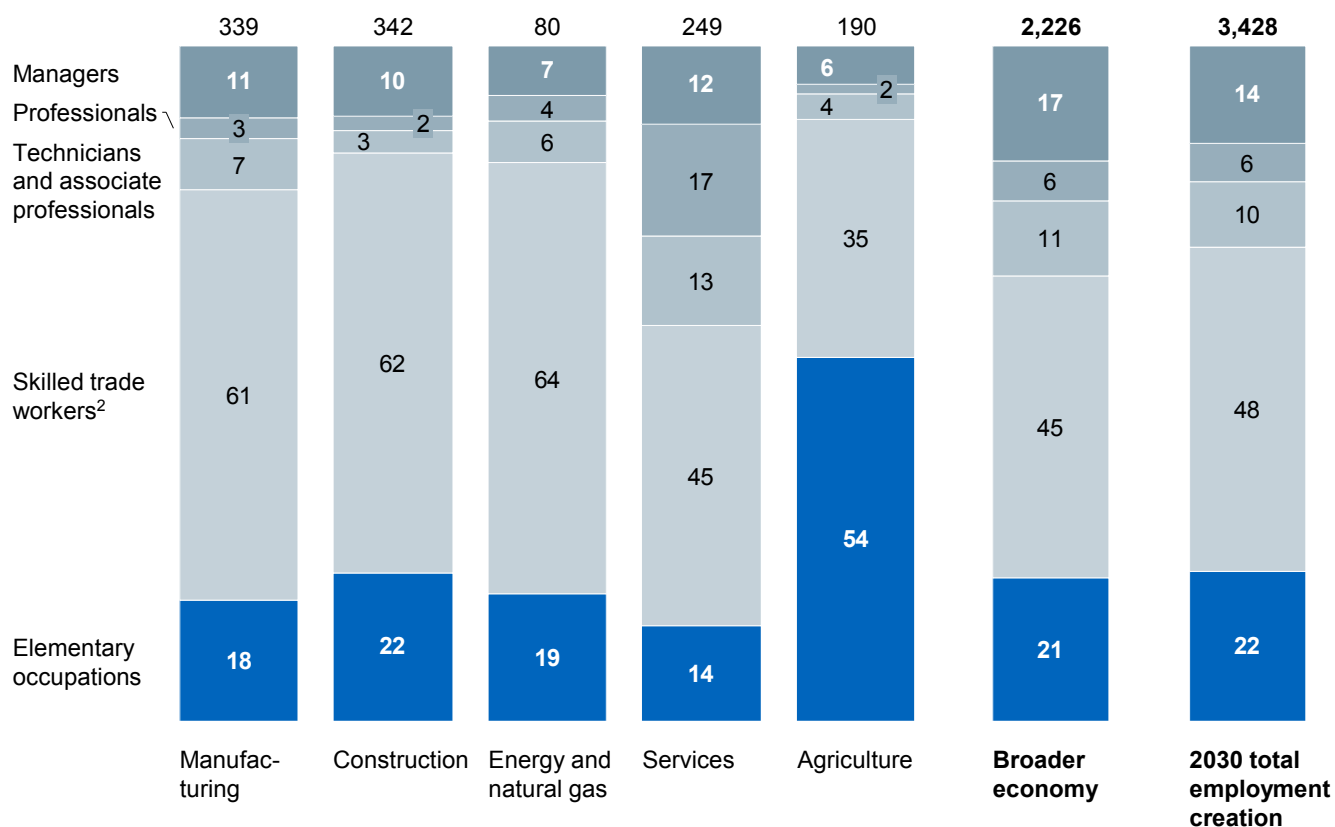
²⁴¹ This includes direct jobs created in the specific sectors as well as the indirect and induced jobs in the broader economy.

Third, technicians and associate professionals (10 percent of new jobs) require a technical tertiary qualification and an apprenticeship period. Fourth, managers (14 percent of new jobs) include both senior officials in government and management positions in the private sector. Finally professionals (6 percent of new jobs) encompass all jobs in professional roles, which typically require a university degree.

Exhibit 49

Only 22 percent of jobs created could employ entry-level matriculants; other roles require vocational skills or qualifications

Breakdown of estimated jobs created, by skill level and sector, forecast for 2030¹
%; thousand



¹ Skill level defined using Stats SA Quarterly Labour Force Survey categories.

² Skilled trade workers include roles such as clerks, sales operatives, skilled labourers and craftsmen, and plant and machine operators and assemblers.
NOTE: Numbers may not sum due to rounding.

SOURCE: Stats SA, Quarterly Labour Force Survey; McKinsey Global Institute analysis

Only agriculture will create substantial levels of jobs for the elementary occupations (those that can employ significant numbers of people with a secondary education or less). Construction, manufacturing, energy and natural gas, and services will require significant numbers of skilled artisans and employees competent in a vocation.²⁴² Overall, just 22 percent of new jobs could be taken by people with only a “matric” (school leaving), or secondary, certificate, while an additional 48 percent will require additional on-the-job vocational training coupled with some classroom learning to gain skills, whether trade or clerical.

²⁴² Because few natural gas industries exist, its skills profile has been built up as a mixture of mining and manufacturing, since most jobs could be created in the shale gas and manufacturing sectors.

Another challenge is the work readiness of matriculants entering the labour market. Major employers have raised concerns that school leavers are ill equipped for employment.²⁴³ In particular, they have noted shortcomings in mathematics, science, general problem solving, and verbal and written language skills in English; they have also observed that so-called soft skills, such as self-discipline and teamwork, are often lacking.²⁴⁴ Given this outlook, many employers are reluctant to hire young people. This makes the task of getting young South Africans ready for employment absolutely critical. It will call not only for improvements in the schooling system, but also much greater focus on job readiness and vocational training.

Unless South Africa can create the workforce to fill the jobs it creates, companies will struggle to grow their businesses to take advantage of new opportunities. And without growth, business will be unwilling to hire new people. Economic growth and employment growth must go hand in hand.

TRANSFORMING THE EDUCATION-TO-EMPLOYMENT JOURNEY

Building an employment-ready workforce will be a huge undertaking for South Africa, and one in which both government and the private sector will need to invest. Nonetheless, as previous McKinsey studies have shown, several countries around the world have succeeded in strengthening the “education to employment” journey. This was achieved both through step-change improvements in, and by increasing the number of young people undertaking, the technical training that is closely linked to industry needs.²⁴⁵ While a broader review of the education system is not the focus of this report, several interventions could achieve impact at speed and scale.

To begin, South Africa will need to focus attention on the quality of the National Senior Certificate, particularly in the context of preparing young people for university entry and professional and managerial roles. South Africa is among the lowest-ranked countries in the results of the international standardised tests, including the Trends in International Mathematics and Science Study and the Progress in International Reading Literacy Study. Although South African learners’ performance on the mathematics and science study improved slightly between 2006 and 2011, South Africa remained one of the poorest-performing countries, surpassing only Honduras and Ghana in mathematics and only Ghana in science.²⁴⁶ According to the reading-test report, 43 percent of grade five pupils in South African schools have not developed the basic skills required for reading at the equivalent international grade.²⁴⁷

Although the broader question of improving the schooling system is beyond the scope of this report, it is worth highlighting a few actions that could have significant impact. One is to step up South Africa’s investment in training adequately qualified teachers through universities, as well as improving the skills of current educators. Moreover, rewarding and recognising teaching excellence needs to become more widespread and routine, and effort should be made to encourage teaching as a long-term career (currently, many of the best teachers move to better-paid administrative roles). Continued efforts also are required to increase access to learning resources, including IT and mobile libraries.

While these steps are critical, we must emphasise that South Africa’s education system has historically focussed on certification rather than employment. This will need to change if the country is to prepare the majority of its young people for the jobs of the future. International

48%

Percentage of jobs created that will require vocational training

²⁴³ “SACCI Congratulates 2013 matrics”, South African Chamber of Commerce and Industry press release, January 7, 2014.

²⁴⁴ Carmel Marock, *Grappling with youth employability in South Africa*, Human Sciences Research Council, March 30, 2008.

²⁴⁵ *Education to employment: Designing a system that works*, McKinsey Center for Government, January 2013.

²⁴⁶ *TIMSS 2011, Mathematics, science and reading achievement*, Trends in International Mathematics and Science Study, 2011.

²⁴⁷ *Ibid.*

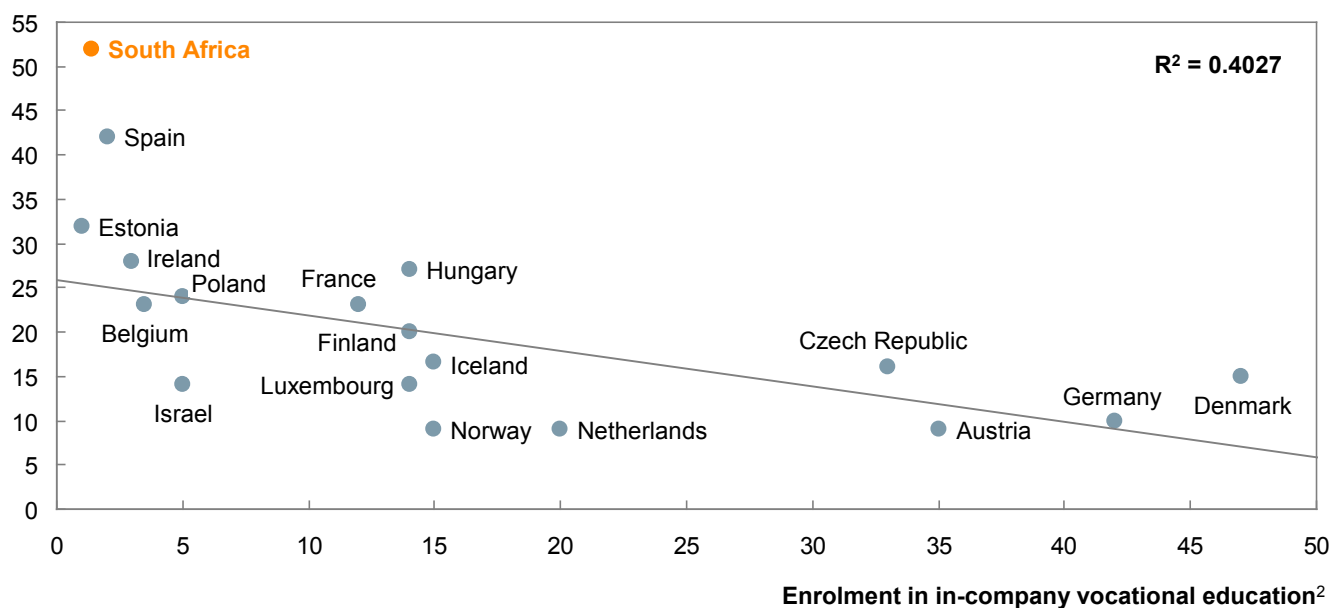
evidence indicates a strong correlation between enrolment in vocational training and levels of youth employment (Exhibit 50). In countries with relatively low youth unemployment, such as Germany, enrolment in vocational education accounts for as much of 50 percent of all youth in the eligible age group. Based on the job requirements discussed above, we suggest that 40 to 60 percent of South African youth should be pursuing vocational training.

Exhibit 50

In both emerging and developed economies, youth employment correlates positively with enrolment in vocational education

Youth unemployment rate (age 15–24)¹

%



1 2013 data for South Africa; 2010 data for other countries.

2 In % of the age cohort; for a sample of 17 OECD countries that offer in-company vocational education systems.

SOURCE: OECD; Stats SA, Quarterly Labour Force Survey; Lolwana, South Africa country report for the 2014 ministerial conference on youth employment, May 2014; World Bank; McKinsey Global Institute analysis

In recent years, South Africa has taken steps to strengthen technical and vocational training. Following reforms to the vocational training sector, enrolment in the country's 50 technical and vocational education and training (TVET) colleges more than doubled in three years, from 358,000 in 2010 to 794,000 in 2013; in 2013, 8 percent of 15- to 24-year-olds were enrolled in TVET.²⁴⁸ The government has set an ambitious target of enrolling four million students—close to 40 percent of this age group—in TVET colleges by 2030.²⁴⁹

Alongside TVET college qualification offerings that cater to school leavers, South Africa offers a vocational stream in the last three years of secondary schooling. The National Certificate (Vocational), known as the NC (V), enables students to gain practical work experience while undergoing training in technical occupations such as carpentry and mechanical drafting.²⁵⁰ The country has not yet been able to encourage large numbers of secondary school students to pursue the NC (V), however. Only 160,000 students in the

²⁴⁸ *Statistics on post-school education and training in South Africa: 2013*, Department of Higher Education and Training, March 2015.

²⁴⁹ "Summary of progress made on NSDS III", Department of Higher Education and Training, presented at National Skills Conference in Boksberg, South Africa, October 10–11, 2013.

²⁵⁰ *Further education and training: A guide to opportunities for further learning*, third edition, Department of Higher Education and Training, 2011.

last three grades of school were enrolled in the NC (V) stream, compared with 2.6 million enrolled in grades ten to 12 across the educational system.²⁵¹

The international experience shows that vocational training must be closely linked to practical work experience through apprenticeship if it is to have true impact on employment and economic growth. While South Africa's government and industry have made concerted efforts in recent years to increase the number and quality of apprenticeships, they will need to redouble their efforts as part of a broader drive to strengthen the education-to-employment journey. The experience in several other countries suggests ways in which to build alignment between employers, government, education providers, and students to deliver seamlessly linked vocational training and apprenticeship (see Box 6, "National vocational training systems"). In South Africa, one existing avenue to build such alignment is the Human Resources Development Council, which brings together business, academia, organised labour, civil society, and government to identify skill set gaps in industry and to advise on approaches to address these gaps. Its focus areas range from maritime skills to ICT skills.

²⁵¹ Ibid. *Education statistics in South Africa 2013*, Department of Basic Education, March 2015.

Box 6. National vocational training systems

Building a robust national education-to-employment system is a complex undertaking, and the experience of several other countries around the world provides helpful lessons for South Africa.

- **Germany.** The German model provides a dual education system in which learners have the option to enter vocational training after completing compulsory education (generally at the age of 15).¹ Close to 60 percent of eligible young people opt for this route, which covers some 350 recognised training occupations.² Both the public and private sectors play an active role in the system. Government sets the regulatory framework and standards, defines some of the core curricula, and funds public vocational schools. Employers develop much of the educational content and undertake the majority of teaching: qualified industry staff members provide on-the-job training even as students attend formal vocational schools. In all, more than 20,000 firms—one-quarter of all German companies—participate in the system and provide vocational training. The German model has been highly successful: its dropout rate is low, and more than half of participating employers offer their apprentices full-time employment after their training. This has helped Germany achieve one of the lowest rates of youth unemployment in Europe, at

10 percent in 2010 (against an average of 19 percent for developed countries).

- **The Philippines.** Some 1.4 million students graduate from vocational programmes in the Philippines each year, and more than 60 percent of them move directly to employment. More than 4,000 registered and accredited training providers operate across both the private and public education sectors, many of them adapted to local communities and their needs. Many provide on-the-job training as part of their programmes. Although efforts are still under way to strengthen employer involvement in the country's vocational education system, major industry players are involved in formulating a comprehensive plan for the development of a skilled workforce in the country.
- **The United Kingdom.** Following major efforts to reform the UK vocational education system over the past decade, the country has achieved some notable successes. Nearly half of post-secondary students pursue vocational education, and 7 percent participate in workplace-based learning outside the classroom. More than 200,000 young people are engaged in apprenticeships in a typical year. Employers are regularly involved in development and specification of qualifications as well as awarding processes, while rigorous quality assurance ensures that teachers are well qualified for vocational instruction and have industry experience. A particular emphasis of the system is on providing students with access to good and reliable information, allowing them to compare and select among training providers.

¹ *Berufsbildungsbericht 2006*, Bundesministerium für Bildung und Forschung, 2006.

² Alexander Schnarr, Sun Yang, and Kai Gleißner, *Vocational education and training and the labour market: A comparison of China and Germany*, International Centre for Technical and Vocational Education and Training, November 2008.

South Africa can take several steps to achieve a step change in vocational education enrolment and impact. These include:

- **Strengthen career guidance and TVET advocacy.** South Africa can do more to highlight the benefits of alternative education and career paths, providing students with high-quality information and counselling to understand their career options. In its drive to promote vocational education, the government could publicise the employability of TVET graduates and the value of a technical qualification. To reach the required scale of vocational enrolments suggested in this report, school principals and career counsellors will need to be well versed in the technical career options available for students, including the NC (V), TVET colleges, and apprenticeships. They must be able to guide students to the appropriate route, including through the use of aptitude tests. Coordination with industry will be needed to create transparency around available career options and training opportunities. Finally, increased emphasis is needed in communicating entrepreneurship as a career option (see Box 7, “Promoting entrepreneurship and small-business growth to create jobs”).
- **Deepen involvement by industry.** As discussed above, successful dual education systems place heavy emphasis on the role of industry, in partnership with government and academia, to identify critical training and occupation needs. Industry must play an active role in identifying the critical occupations that training will be provided for, draft and teach the curriculum, participate in assessment and quality assurance, and provide work opportunities and apprenticeships for students and graduates. Industry will also need to spearhead developing skills standards, national demand and supply estimates, and industry-specific curricula. The Human Resource Development Council should be a key enabler of this enhanced industry role. Smaller businesses need to be involved, too, and must develop their own appropriate training programmes.
- **Strengthen young people’s readiness for work.** South Africa’s high unemployment rates mean that many young people lack role models who have been successful in the labour market. This is both a cause of and a contributor to the extremely high levels of inequality of opportunity among young South Africans.²⁵² As discussed above, industry views hiring young people as risky because of a lack of confidence in their skills. This makes it imperative that South Africa increase its focus on developing “soft skills” such as workplace behaviour, interview preparation, customer relations, and communication skills. South Africa can also encourage job shadowing at the school level to increase exposure to the labour market, and can encourage employers to increase training in soft skills for new employees. This is critical to increase industry’s confidence in candidates for apprenticeships. In this regard, some highly effective existing models are already in place (see Box 8, “Pioneering efforts to prepare youth for entry-level jobs”).
- **Develop human capital and quality assurance.** South Africa must work to improve the competencies of its educators in technical colleges. Industry and business will need to work together to identify educators with sufficient subject and practical knowledge to make vocational training a success. In fact, industry should take the lead role in providing trainers who can develop detailed content knowledge. Improving the skill set of educators could include developing mandatory teacher training programmes that involve competency-based retraining and industry work experience.²⁵³ In addition, standards

²⁵² Measured by intergenerational earnings elasticity, which is the proportion of the parental income position transmitted to the next generation. A value of 0 represents a case of complete mobility, where the incomes of parents and children are completely unrelated. South Africa’s value is 0.6, second to Peru. See Patrizio Piraino, *Intergenerational earnings mobility and equality of opportunity in South Africa*, Economic Research South Africa, working paper number 448, August 2014.

²⁵³ This model combines a few days of classroom training with weeks of practical teaching in the field and regular follow-up training sessions to reinforce the skill set.

for students, teachers, institutions, and apprenticeship programmes must be monitored and published.

- **Increase funding.** Funding for TVET colleges increased from 3.9 billion rand (\$339 million) in 2010 to 5.7 billion rand (\$495 million) in 2013, and more funding will be needed as the number of students increases.²⁵⁴ Ultimately, government must work with organisations such as the Sector Education and Training Authorities, industry associations, and large employers to provide funding for the expansion of vocational training. A model the United Kingdom has used, for example, is to link funding of vocational colleges to outcomes (such as the number of qualifications and students' success rate per qualification) rather than enrolments, thus providing incentives for performance. In addition, funding for existing Sector Education and Training Authorities can be better aligned with the skills required.

ONCE JOBS ARE CREATED, SOUTH AFRICA NEEDS TO CONNECT JOB SEEKERS TO EMPLOYMENT

Once South Africa has the jobs and the labour force it needs, it will still face the challenge of connecting people to those jobs. Some companies do not hire their own trainees, and this is not a unique situation. Labour markets around the world are inefficient and are struggling to link unemployed people with vacancies.

Previous work by MGI has found that online talent platforms can help resolve these challenges by improving the effectiveness of connecting individuals with work opportunities.²⁵⁵ This analysis found that South Africa in particular could be among the countries that benefit most from digital labour platforms, which have been shown to increase productivity and labour-force participation (Exhibit 51). They can support unemployment reduction in South Africa by facilitating new job matches that otherwise might not have taken place, reducing the time workers spend looking for new jobs, increasing demand for labour as more flexible work programmes become available, and allowing for improved forecasting, planning, and investment through better availability of data. In the long run, government could use digital labour platforms to capture data, apply analytics, and better understand the evolving demand for specific skills and occupations.

The impact for South Africa could be immense. We estimate that increased participation and faster job matches will drive the most impact, together accounting for a 3.9 percent increase in GDP and a 5 percent increase in employment, which represents jobs for an additional 860,000 people. Benefits of this magnitude are realistic to aim for, given that digital platforms already have high penetration in South Africa. Currently, 3.8 million South Africans use LinkedIn, while the number of South Africans using the website Careers24 nearly doubled between 2013 and 2014.²⁵⁶ Some businesses have begun using text-message-based job application tools, and young people are increasingly using mobile applications such as Giraffe that link job seekers with potential employers.

860k
Potential
employment
increase from
online talent
platforms

²⁵⁴ All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

²⁵⁵ *A labor market that works: Connecting talent with opportunity in the digital age*, McKinsey Global Institute, June 2015.

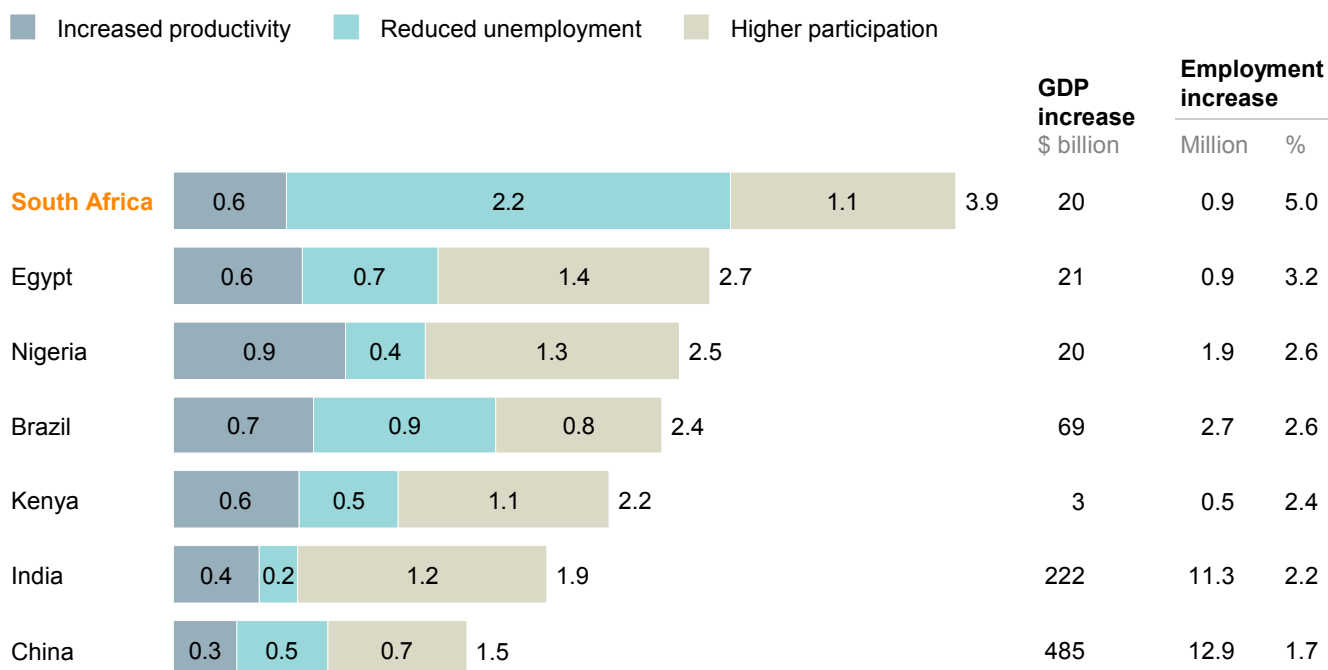
²⁵⁶ Mzekandaba, Simnikiwe, "LinkedIn usage grows 40% in South Africa", ITWebAfrica.com, September 16, 2014; Careers24, "It's time for recruiters to have their say", BizCommunity.com, May 26, 2015; *A labor market that works: Connecting talent with opportunity in the digital age*, McKinsey Global Institute, June 2015.

To achieve these results, however, South Africa must address a number of technical challenges. Average broadband speed is just 3.6 Mbps, lower than the global average of 4.5 Mbps,²⁵⁷ and only 40.9 percent of households have at least one member who has Internet access; most Internet usage in both urban and rural areas is on mobile devices.²⁵⁸ The country needs tools developed specifically for mobile devices, in several languages. In addition, government and telecommunications companies need to accelerate infrastructure upgrades to increase data coverage and Internet access, and to reduce connection costs.

Exhibit 51

Digital labour platforms have greater scope for impact in South Africa than in other emerging markets and could increase employment by 5 percent

GDP impact of digital labour platforms by country, 2025 % of GDP



NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute Digital Labour Market Model

²⁵⁷ S. Thomas, *10 slides that tell you everything you need to know about the South African digital landscape*, Memeburn, January 27, 2015; Simon Kemp, *Digital, Social and Mobile in 2015*, We are Social, January 2015.

²⁵⁸ *General household survey, 2013*, Statistics South Africa, June 18, 2014. Mobile devices include mobile telephones and devices such as 3G cards.

Box 7. Promoting entrepreneurship and small-business growth to create jobs

A thriving small and medium-sized enterprises (SME) sector is an important driver of innovation, value added, and employment, contributing 63 to 67 percent of GDP across economies globally.¹ However, SMEs in South Africa contributed only 52 percent to GDP in 2010.² To improve on this, South Africa must strengthen both new business creation and the rate at which SMEs can grow into large-scale enterprises.³

Promoting entrepreneurship. South Africa currently has one of the lowest business creation rates in the world (Exhibit 51), and surveys indicate that only 10 percent of the labour force would consider starting a business.⁴ The country must raise the profile of entrepreneurship and promote it through the education system. Steps it should take include:

- **Teaching of entrepreneurial skills in educational institutions.** Both secondary schools and TVET colleges could offer at least one practical entrepreneurial experience as part of the formal learning programme. This could include running a minicompany or being responsible for an entrepreneurial project for a company or a social project. Established businesses and non-profits could partner with schools and colleges to run these programmes. International examples include the African Leadership Academy, which offers a two-year pre-university programme providing entrepreneurial education to students aged 16 to 19. Backed by mentorship from established entrepreneurs, students are given practical opportunities to start and run business and social ventures within the academy's campus economy and in their own communities. Since the programme began in 2008, students and alumni have launched over 40 successful for-profit and social ventures.
- **Enhancing awareness of entrepreneurship as a career.** Less than 70 percent of South Africans see entrepreneurship as a viable career option. Options to change this outlook could include sponsored television and radio shows featuring entrepreneurs as important contributors to society as well as high-profile business competitions sponsored by educational institutions, business, and government.

Strengthening the business environment. Beyond promoting and teaching entrepreneurship, small businesses need greater access to funding, business support, and markets. Specific steps that South Africa can take include:

- **Improving access to funding.** South Africa has no lack of financing options, but early-stage SMEs need better access (approximately 75 percent of SMEs are currently unaware of available funding options). A model to encourage funders could be the formation of public and private partnerships for risk sharing. Simultaneously, government could relax registration requirements and regulatory obstacles to encourage businesses to formalise and improve compliance. It could also simplify tax laws that apply to SMEs; options include tax exemptions for companies less than three years old and subsidised investments for startup equipment financing to those that formalise.

¹ World Bank, 2011.

² GDP data from 2010, International Finance Corporation MSME Model; OECD; Joshua Abor and Peter Quartey, "Issues in SME development in Ghana and South Africa", *International Research Journal of Finance & Economics*, issue 39, 2010.

³ A small or medium-sized enterprise has one to 200 employees (including the business owner) and includes microenterprises. An entrepreneur is an individual who makes a choice based upon preference to start a business instead of working for somebody else. This does not include "necessity entrepreneurs", individuals who start businesses solely due to the inability to get other employment. Businesses with the potential to scale into larger enterprises (startups) are typically innovation-based; those based on more traditional models (services, hospitality, and retail) are more likely stay small in scale.

⁴ Global Entrepreneurship Monitor Online database, 2014.

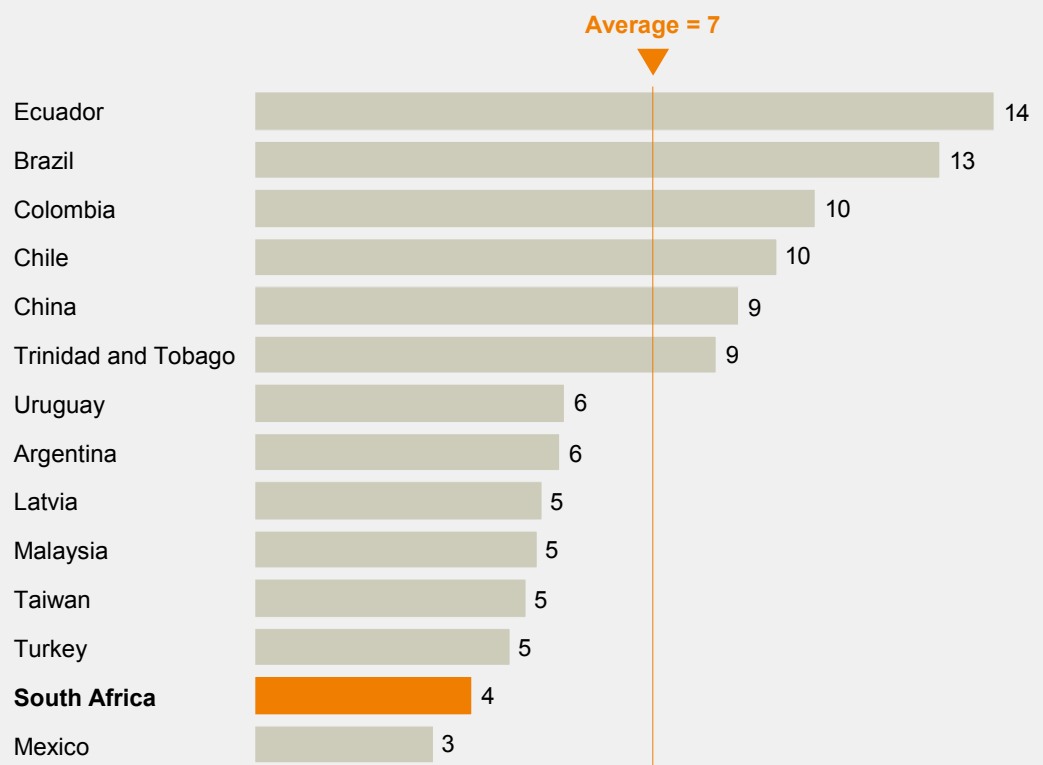
Box 7. Promoting entrepreneurship and small-business growth to create jobs (continued)

- **Boosting business support.** Access to high-quality, innovative business support is essential to improve the success rate of new ventures. Ideally, support and funding would be offered together through a “one-stop shop” physical location that assists with registration, obtaining permits, loan and grant support, and other requirements. In cases where the business is developing a new product, support needs to extend to product and prototype support through government labs. One example is the Jamaica Business Development Corporation, which runs a mobile clinic that travels to urban and rural areas and offers free business support and financial consultation to SMEs.¹
- **Expanding market access.** SMEs need facilitated access to both domestic and international markets. Obtaining an export license is currently arduous, and South Africa could streamline document requirements, for instance by facilitating electronic submissions. Private banks that offer SME funding to facilitate supply chains could look to package these services with access to international markets.

Exhibit 52

South Africa’s business creation rate is extremely low, at 4 percent of the labour force, compared to the 7 percent average in peer countries

Business creation rate for efficiency-driven economies in 2013¹
% of population that starts businesses



¹ Countries that focus on efficiency (as opposed to less developed, factor-based countries and more developed, innovation-based countries).

SOURCE: Global Entrepreneurship Monitor, 2013; McKinsey Global Institute analysis

¹ Jamaica Business Development Corporation.

Box 8. Pioneering efforts to prepare youth for entry-level jobs

In the context of widespread youth unemployment alongside a shortage of appropriately skilled entry-level workers in many industries, there have been several pioneering efforts around the world to equip young people with job-ready skills. These efforts created a springboard for the launch, in 2014, of the Generation education-to-employment programme by the McKinsey Social Initiative and several global partners. To date Generation has offered programmes in five countries—India, Kenya, Mexico, Spain and the United States. These are based on a training methodology that, in as little as eight weeks, gives youth the technical and personal skills to start and succeed in entry-level jobs; as many as 98 percent of programme participants have found employment.¹

In South Africa, the Harambee accelerator is an employer-founded initiative that facilitates the employment and retention of young, previously unemployed work seekers to grow the entry-level labour pool. Harambee has developed a robust process of matching candidates to employers and quickly preparing candidates for work. It has also tailored a number of innovative training programmes to meet the identified needs of industry and employers in sectors ranging from retail and hospitality to financial services to mining. Since 2011, more than 265,000 candidates have been identified, and close to 30,000 young people have been placed in work. In all, 97 percent of the youth the Harambee accelerator places keep their jobs for at least three months, and 85 percent stay for at least one year.

¹ See www.generationinitiative.org.



The big five priorities identified in this report offer tremendous growth potential across the economy. They could also create an additional 3.4 million jobs, a huge contribution to solving South Africa's unemployment challenge. Yet concerted effort is necessary to ensure that young South Africans are equipped to take the newly created jobs; employers today indicate overwhelmingly that the average school leaver is not ready to enter the workforce.

Growth and skills development will need to move in tandem: the country needs a coordinated drive to strengthen the education-to-employment journey, particularly through greater emphasis on vocational training that is closely linked to industry needs and builds practical workplace skills. Employers themselves, both large and small, will need to play a central role in this system, developing curricula, providing on-the-job training, and offering employment to graduates.

The task is large and complex, but the experience of many other countries—and the examples of cutting-edge initiatives in South Africa—shows that there are proven ways to bridge the divide between students, employers, and education providers. The resulting systems work for young people, industry, and the economy as a whole. Moreover, advances in technology are making progress ever more possible. The goal of moving millions of young South Africans from joblessness to work and hope is eminently attainable.





TECHNICAL NOTES

A complete technical appendix, setting out the methodology used in this report, is available at www.mckinsey.com/mgi. These notes summarise that methodology and highlight the major data sources and assumptions adopted in the report.

1. OVERVIEW OF APPROACH TO ESTIMATING THE VALUE ADDED AND JOB CREATION POTENTIAL OF THE BIG FIVE PRIORITIES

To estimate the impact of each opportunity, we started by estimating the impact on revenue in the case of exports (manufacturing, services, and agriculture) and new industries (natural gas), and expenditure in the case of infrastructure. We then converted this to the impact on GDP by applying value added multipliers calculated using an input-output table for the South African economy (from the mid-2000s). The estimation includes the impact on value added from the initial change, from the effect on suppliers, and from consumer spending induced by the increased production (and hence wages). The impact is typically more than the initial change to sales or output, except in cases where the industry evaluated relies heavily on imports. An assumption inherent in this analysis is that the pattern of imports and exports in a supply chain will remain unchanged.

We employed a similar analysis to measure job impacts economy-wide, where the increased revenue was used to estimate the jobs created in a particular sector and among its suppliers, as well as those created from induced spending. We also accounted for improvements in sector productivity, and the impact on jobs, using three analytical steps:

- We modelled increased productivity levels for each sector to 2020 and 2030 using a sector productivity growth rate.²⁵⁹ This productivity growth rate per sector was derived from a set of countries that achieved a GDP growth trajectory similar to the one that forecasts indicate South Africa will achieve.²⁶⁰ The five countries in the data set (and the period over which they experienced this growth) are Morocco (2000 to 2013), South Korea (1990 to 2005), Malaysia (1993 to 2015), Estonia (1996 to 2007), and Poland (2000 to 2013).
- We calculated the value added for the estimated increase in revenue or expenditure levels for each opportunity in 2020 and 2030, based on initial impact figures in the input-output tables.
- We calculated the jobs created in each sector using this expected value added and the forecast productivity levels in 2020 and 2030. Jobs created in the broader economy were calculated based on the difference between output and value added for the relevant sector's inputs, multiplied by the overall economy's productivity level, also for 2020 and 2030.

²⁵⁹ Sectors include agriculture, manufacturing, construction, transport, storage and communication, mining and quarrying, personal services, utilities, retail, government, and finance and business services.

²⁶⁰ This is accelerated growth of 4 to 5 percent per year. This exceeds the consensus forecast but would be realised if South Africa does unlock some of the opportunities this report discusses.

2. ADVANCED MANUFACTURING: CREATING A GLOBAL HUB

Calculation of impact on GDP

To calculate the potential impact on GDP of growing the advanced manufacturing industries, we estimated market demand growth by region and estimated how much South Africa could capture of this growth, based on its historical performance in those markets.

We started by calculating a forecast of the demand for all manufactured products classified as “global innovation for local markets” (key advanced industries, as discussed in previous MGI research),²⁶¹ We then calculated South Africa’s 2013 market share of imports into all countries globally. We estimated the potential organic growth into each region based purely on South Africa’s existing market share into those regions.

We also estimated South Africa’s potential market share growth in each region by setting a benchmark market share for each region. We calculated the benchmark as the top decile of South Africa’s market share across all countries in that region. Based on this, we were able to estimate what South Africa could be exporting in total to each region. This was then the basis for the estimated increase in exports by product and in total, along with the relevant growth rates.

We calculated the overall potential for South Africa by adding the organic growth and the new regional market shares in 2020 and 2030. All analyses were undertaken using level two categories: for example, chemicals were divided into organic chemicals, inorganic chemicals, fertilisers, and so on.

Calculation of revealed comparative advantage

Revealed comparative advantage is an index used in macroeconomics that estimates a country’s comparative advantage in producing a product based on its proportional export of that product relative to the proportional export of that product in for all other countries in the world. We calculated it as:

$$\frac{\left(\frac{\text{Exports of product X from South Africa}}{\text{Total exports from South Africa}} \right)}{\left(\frac{\text{Exports of product X from the rest of the world}}{\text{Total exports from the rest of the world}} \right)}$$

A value greater than 1 indicates the South Africa has a comparative advantage: it exports more of the product on average than would be expected given global export trends.

²⁶¹ *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute, November 2012. Databases used included: IHS Economics, IHS World Industry Service, World Bank World Integrated Trade Solution, accessed in February 2015.

3. INFRASTRUCTURE: PARTNERING FOR PRODUCTIVITY

Calculation of historical spend levels, required spend levels, and infrastructure stock

MGI typically analyses national infrastructure spend levels as a percentage of a country's GDP as a way to benchmark spend levels. In this report, this analysis used McKinsey's Infrastructure Stock and Spend (ISS) database for historical data. The ISS database showed that South Africa's infrastructure spend levels as a percentage of GDP came to 4.9 percent from 1992 to 2012. We then updated this finding with the latest South African National Treasury budget (for the cycle until 2017/18, announced in February 2015).²⁶² This document outlines 813 billion rand (nominal), or \$71 billion, in expenditure for the three-year period starting in 2015.²⁶³ The ISS database considers four major asset classes: energy, water and sanitation, transport and logistics, and telecommunications, which together account for 82 percent of South Africa's total budgeted infrastructure spend from 2012 to 2017.

Because the National Treasury's budget runs only until 2017/18, we extrapolated the spend levels from 2018/19 to 2025/26 to estimate spend over the next decade. For the purposes of this analysis, we decided to maintain the historical spend level at 4.9 percent. In order to maintain this spend level, annual expenditure on infrastructure needs to increase by 4 percent per year in real terms. This helps correct for a slight drop-off in spend levels in 2016 and 2017 and for depreciation of 2.5 percent per year. Based on this extrapolation, South Africa is likely to spend 2.2 trillion rand (\$191 billion) over a decade, or 220 billion rand (\$19 billion) per year. South Africa spent 191 billion rand (\$17 billion) in 2014/15 (in real 2010 prices).

Estimating the direct supply-side GDP effect of greater capital stock

Since South Africa already spends slightly more than is notionally required on infrastructure (4.7 percent infrastructure spend as percentage of GDP compared to a requirement of 4.3 percent of GDP to reach and maintain an appropriate infrastructure stock level), this report focussed on achieving greater value from the same spend levels by boosting productivity. Earlier MGI work indicated that approximately 40 percent of spend could be saved or reduced by focussing on the productivity levers discussed in this report.²⁶⁴ We applied this ratio in two ways. First we assessed how much could be saved if these productivity levers were applied to the forecast 2.2 trillion rand (\$191 billion) spend. Improving productivity will yield the same long-run GDP impact as spending 2.2 trillion rand because the delivered impact in the long run will be the same, but for lower expenditure. Therefore, in addition to the baseline impact of the projected 4.8 percent spend per year to 2030, an additional 1.9 percent was added (40 percent of the 4.8 percent).

Second, we applied these productivity levers to the infrastructure spend level suggested by the National Development Plan (NDP), 10 percent of GDP.²⁶⁵ We estimate that this would come to a cumulative 3.7 trillion rand (\$321 billion) invested in infrastructure by 2025, or 1.5 trillion rand (\$130 billion) more than budgeted, on average 370 billion rand (\$32 billion) per year. This 10 percent includes more than the major four classes of infrastructure (accounting for 82 percent of all spend in South Africa). When additional asset classes are taken into account, South Africa's infrastructure spend levels as a percentage of GDP are 5.9 percent, so 4.1 percent more would have to be spent to reach NDP levels. In a similar manner as before, we applied the approximately 40 percent saving to this additional 4.1 percent spend, which means saving 1.5 percent of this expenditure per year (40 percent of the 4.1 percent). We then assumed that this saving would also be invested in more infrastructure.

²⁶² *Budget review 2015*, RSA National Treasury, February 25, 2015.

²⁶³ All rand values are quoted in 2010 prices. All dollar figures (in brackets) are estimated using a 2015 average exchange rate of 11.52 rand per dollar.

²⁶⁴ *Infrastructure productivity: How to save \$1 trillion a year*, McKinsey Global Institute, January 2013.

²⁶⁵ *National Development Plan: Vision for 2030*, RSA National Planning Commission, November 11, 2011.

For the direct supply-side effect, we assessed the impact of expanding infrastructure beyond the baseline spend levels, first by 1.9 percent. We calculated the additional, accumulated new infrastructure stock net of depreciation, based on a projected GDP and the additional annual infrastructure investment of 1.9 percent of GDP. We repeated this calculation where we invested the total potential savings in infrastructure. In this case it was the 1.9 percent savings of the 2.2 trillion rand (\$191 billion) spend levels, plus the 1.5 percent savings of the 3.7 trillion rand (\$321 billion) spend levels, for a total saving of 3.4 percent. We then calculated the cumulative impact on infrastructure stock, based on first the 1.9 percent additional investment, followed by the 3.4 percent additional investment, taking into account an annual depreciation rate of 2.5 percent (from an infrastructure stock level in 2012 of 67.9 percent of GDP). This gives us a range of impact potential, with 1.9 percent additional investment at the lower end and 3.4 percent additional investment at the higher end.

The current infrastructure budget would increase infrastructure stock to 77 percent of GDP by 2030, while the lower investment case (1.9 percent, investment as percent of GDP) would increase stock to 95 percent, and the higher case (3.4 percent, investment as percent of GDP) would increase stock to 109 percent. This is an additional 905 billion rand (\$79 billion) in stock in the lower case and an additional 1.6 trillion rand (\$139 billion) in stock in the higher case of by 2030. These increases in infrastructure stock are well above the 70 percent benchmark level mentioned earlier, and this is a sign of South Africa investing in its future growth. However, not all of this spend necessarily has to go into infrastructure; it may be more than is required. Some of this money might be better invested in other parts of the economy, but we did not model for that.

The impact of these two increments in productivity is not linear, because the higher infrastructure stock level starts to have diminishing returns on long-run GDP, as can be seen from the output elasticity of public capital work equation from Bom and Ligthart (2008), which we used as the basis of our calculations.²⁶⁶ From this, we estimated the marginal productivity of the infrastructure, or the rate of return on the infrastructure investment, for each year. We assume a non-linear relationship and therefore use the following formula. In this equation, θ is the output elasticity and $\Delta Public\ capital$ is the annual additional invested capital:

$$\Delta GDP_t = \theta \times \Delta Public\ capital_t \times \left(\frac{GDP}{Public\ capital} \right)_t$$

We estimated that the annual direct effect from expanding the infrastructure stock by the lower case (1.9 percent of GDP to 2030) will equal 163 billion rand (\$14 billion), and that the effect of expanding the stock by the higher case (3.4 percent of GDP) to 2030 will equal 258 billion rand (\$22 billion). We estimate that the planned 2.2 trillion rand (\$191 billion) spend by South Africa without any productivity improvements will increase GDP by 616 billion rand (\$54 billion) in 2030. So the productivity levers increase the baseline GDP impact by 42 percent; South Africa will essentially get 42 percent more GDP impact for spending the same amount of money.

²⁶⁶ See Pedro R. D. Bom and Jenny E. Ligthart, *How productive is public capital? A meta-analysis*, CentER and Department of Economics, Tilburg University, January 2008.

4. NATURAL GAS: POWERING SOUTH AFRICA'S FUTURE

Potential power demand estimation

As the starting point for this analysis, we compared South Africa's peak available power capacity against peak demand. Peak available capacity reflects installed capacity multiplied by an availability factor, i.e., the proportion of time during which plants could provide power to the grid. We account for existing capacity, decommissioned capacity, and committed new plants. We assume an availability factor of 80 percent for non-renewables (based on Eskom's average availability factor target) and 30 percent for renewables (the average of wind and solar technologies, as estimated by the US Energy Information Administration).²⁶⁷ We then subtract a reserve margin of 15 percent.

We calculate peak demand based on average 2014 peak demand, escalated at the growth rate set out in the *Integrated Resource Plan 2013 Update report* (an average of 2.8 percent to 2030). Given the uncertainty associated with demand forecasts, we also consider low and high peak demand scenarios, by adding or subtracting one percentage point to or from the growth rate.

Capital expenditure estimation

We multiplied the various elements of installed capacity by capital costs per kilowatt to determine total capital expenditure. All capital expenditure is reported in real 2015 terms. We assume capital costs per kilowatt of 31,481 rand (\$2,733) for coal, 70,891 rand (\$6,154) for nuclear, 5,706 rand (\$495) for open cycle gas turbine, 8,659 rand (\$752) for combined cycle gas turbine, 19,477 (\$1,691) rand for wind, and 35,596 rand (\$3,090) for solar photovoltaic.²⁶⁸

Two other capital estimates should also be highlighted. For pipelines, we assume a capital cost of 748,544 rand (\$65,000) per inch kilometre.²⁶⁹ For the LNG regasification terminal, we estimate a total cost based on recent terminals of similar size, with a final value of 4.4 billion rand (\$382 million) for a terminal with 170 billion cubic feet per year capacity.²⁷⁰

GDP and jobs impact estimation

We calculate GDP and jobs in both 2020 and 2030. The role of gas in filling the power gap is a medium-term initiative, so the 2030 numbers are important.

In 2020, GDP is impacted by capital expenditure and new power produced. The two capital expenditure items are pipelines and power plant construction. For pipelines, we use an iron and steel multiplier (1.11) to determine GDP impact. The multiplier measures direct, indirect, and induced GDP impact. For power plant construction, we first estimate the localised component of power plant construction (44 percent for CCGT, 30 percent for solar photovoltaic) and then use a construction multiplier (1.16) to determine GDP impact.²⁷¹ For the new power component, we multiply power produced by an estimated price (0.89 rand, or \$0.08, in real 2015 terms, a 21 percent increase on the current price) and then use a power production multiplier (1.21) to determine GDP impact. The estimated electricity price is calculated by comparing the levelised cost of energy in the "big gas" case to the current levelised cost of energy, and applying this increase factor to the current electricity price. This generates a total GDP impact in 2020 of 16 billion rand (\$1.4 billion).

²⁶⁷ 2014 integrated annual report, Eskom; *Annual energy outlook*, US Energy Information Administration, 2014.

²⁶⁸ *Integrated resource plan for electricity (IRP) 2010–2030: Update report*, Republic of South Africa Department of Energy, 2013.

²⁶⁹ David Santley, Robert Schlotterer, and Anton Eberhard, *Harnessing African natural gas: A new opportunity for Africa's energy agenda?* World Bank, January 1, 2014.

²⁷⁰ Enerdata.

²⁷¹ *Cost of construction: New generation technology*, WorleyParsons, 2012.

In 2030, GDP is impacted by new power produced and by gas-based industrial output. We follow the approach outlined above to determine power GDP impact, estimating a 2030 impact of 138 billion rand (\$12 billion).

For the industry output, a series of assumptions is needed because the current use of gas in South Africa is extremely limited. In most cases, industries that could use gas are using low-cost coal. We allocate the 450 billion cubic feet of industry gas between cement, polyethylene, and methanol. These three industries span the range of potential of value added from gas; cement has the highest value added and methanol has the lowest. We chose the industries to demonstrate this range rather than as a prediction of what the final use of the gas may be.

To determine the division between these three products, we assume that the entire ethane component of the supplied gas is extracted for production of polyethylene (an aggressive but simplifying assumption). We rely on data from wells in Marcellus and Barnett in the United States (which are most similar to the Karoo Basin) to determine an ethane share of 9 percent of total volume.²⁷² Then we divide the remaining share (after fully meeting power sector demand) between methanol and cement based on the split of estimated production in these sectors in 2025.²⁷³ Next, we calculate average value added for each of these sectors and determine the likely revenue based on gas consumed. Finally, we apply a chemicals industry multiplier (1.02) to determine GDP impact. This generates industry GDP impact of 114 billion rand (\$10 billion). However, given the uncertainty in gas prices, we assume that the range could be anywhere from zero to 114 billion rand (\$10 billion).

Adding 2030 power and industrial GDP together, we estimate a total impact of 138 billion to 251 billion rand (\$12 billion to \$22 billion).

In 2020, jobs are created in the construction of pipelines and power plants. For power plants, we again estimate the localised component of construction (44 percent for CCGT, 30 percent for solar photovoltaic), and then apply our jobs productivity multiplier, using construction for plants and manufacturing for pipelines. The total number of temporary jobs created by 2030 from all of these construction projects was estimated in a similar way. The estimate incorporates the full investment for new power plant construction and the full investment into pipelines, including the potential transmission and distribution pipelines from Mozambique to South Africa and, should shale gas be proven, from the Karoo to the rest of the country. This estimate came to 820,000 temporary jobs.

In 2030, we consider only permanent jobs. These are created in shale extraction and industry. We ignore jobs in the power sector, because we assume that all of these will be filled by employees from decommissioned plants. For the shale extraction jobs, we assume that shale production could range from 0.3 trillion to 0.7 trillion cubic feet. We then rely on Department of Trade and Industry analysis to determine jobs figures.²⁷⁴ The department suggests 146,200 jobs for one trillion cubic feet per year extraction, and we scale this to the relevant range. For industry, we first calculate value added in industry by subtracting the input cost of gas from industry revenue. Then we apply a manufacturing productivity multiplier to determine jobs created.

²⁷² Keith A. Bullin and Peter E. Krouskop, "Compositional variety complicates processing plans for US shale gas", *Oil and Gas Journal*, volume 107, issue 10, March 9, 2009.

²⁷³ IHS Economics.

²⁷⁴ *Gas-based industrialisation*, RSA Department of Trade and Industry, 2015.

5. SERVICE EXPORTS: RIDING THE WAVE OF AFRICA'S GROWTH

Analysing and expressing services trade can be complex. We need to first differentiate between the successful export of services (through the movement of skilled people between one country and another) and the foundation of a subsidiary in another country. While the latter may be a services company, it no longer represents an export of South African services; it is a foreign direct investment by a South African company. The subsequent flow of profits and dividends will still benefit South Africa as any investment might. However, the only measurable services provided might be the shared services provided within South Africa. In the service exports chapter we are investigating service trade opportunities rather than pan-African investment opportunities. We also investigate international service opportunities in business process outsourcing.

South Africa's market share of service exports to sub-Saharan Africa

Understanding South Africa's share of exports to sub-Saharan Africa required considerable analysis. We removed government as well as tourism and travel services from the analyses to focus on services that South Africa specifically supplied into the region. This reduced South Africa's total service exports from 98 billion rand (2010 real prices) to 32 billion rand (2010 real prices), or \$8.5 billion to \$2.8 billion. Service trade data for emerging markets is incomplete in many cases, including from South Africa. To estimate South Africa's share of service imports by other African countries, it was necessary to mirror trade data from all the countries that do declare their service imports. These were predominantly the developed economies, and their service imports from South Africa came to 22 billion rand (2010 real prices), or \$1.9 billion. Using this mirrored trade data, we eliminated all trade to these developed economies, and then assumed the remaining trade, 10 billion rand (\$868 million), was to sub-Saharan Africa only. In reality, this number also included other emerging economies, so at best it is an overestimate. South Africa therefore has at most a 2 percent market share of service imports into the rest of sub-Saharan Africa.

GDP impact of construction

Using McKinsey's proprietary ISS database, we estimate the full value of construction projects in South Africa as 293 billion rand (\$25 billion) in 2013 and that contracts worth 318 billion rand (\$28 billion) will be executed in 2015. These projects include mining, oil and gas, process industries, real estate, social infrastructure, transport, and utilities. Since all of these prices are in 2012 real prices, we converted them to 2010 real prices.

Then we estimate the scale of midsize construction projects (from \$200 million to \$1 billion) across sub-Saharan Africa using three sources: the UN Service Trade database, McKinsey's proprietary IPAT 3.0 database, and McKinsey's proprietary ISS database. Estimates from these three sources were averaged to identify 500 billion rand (\$43 billion) in potential construction projects in 2030 in sub-Saharan Africa (excluding South Africa).

The GDP impact was estimated by assuming South Africa could capture 20 percent market share of these projects and that 31 percent of this would be earned by South African firms (the other 69 percent going to their local partner, local labour, and local manufacturers of cement and other materials). This revenue was then converted to a GDP impact using a business services multiplier from the input-output table for the South African economy (1.38).

GDP impact of financial services

We estimated the size of the opportunity in banking revenue and insurance premiums by using two proprietary McKinsey & Company databases, Panorama Global Banking Pools and Panorama Global Insurance Pools.²⁷⁵ These pools contain forecasts of revenue growth in each banking segment until 2020 in nominal US dollar values, as well as forecasts of premium growth for life and non-life insurance products in nominal US dollar values across the whole of sub-Saharan Africa until 2020. For banking we extended these forecasts to 2030, given the established nature of the industry and projections of significant GDP growth rates for the region. For insurance we halved this forecast (in its nominal US dollar basis) from 2020 to 2030 because of the much higher uncertainty about how the industry will develop. We separated South African data from these forecasts and treated South Africa separately. All the analyses were conducted in nominal prices in dollars and then converted to South African rand using the forecast exchange rate for that year. The forecast exchange rate is projected to weaken to 18.89 rand to a dollar in 2030, and this change in value is included to ensure that the estimates are all in nominal prices.²⁷⁶ (We should note that the nominal rand-dollar exchange rate differs from that used for other sectors covered in this report, where all analyses are reported in real 2010 prices. All GDP and job creation impact analyses in this report, including this section, were conducted in real 2010 prices.)

²⁷⁵ The banking pools database captures revenue reported in individual bank financial statements.

²⁷⁶ IHS World Industry Service, February 2015.

6. AGRICULTURE: UNLOCKING THE FULL VALUE CHAIN

Calculation of impact on GDP

To calculate the potential impact on GDP of agriculture and agro-processing, we estimated the market demand growth by region of existing markets that South Africa exported to and estimated how much South Africa could capture of this growth, based on its historical performance in those markets. We undertook this analysis for raw and processing products together.

Initially, we calculated total forecast of demand for food, beverages, and tobacco for local markets products using regionally appropriate growth rates provided by IHS Economics in a forecast model we developed. We then calculated South Africa's 2012 market share of imports into all countries globally. We used figures for total imports and for South African imports reported by individual countries rather than reported export figures from South Africa, which do not always match import figures reported by the partner. The global demand growth was estimated for 24 categories of products until 2030, across seven geographical regions.

We then estimated the potential organic growth into each region based purely on South Africa's existing market share into those regions. We also estimated new regional market growth by setting a benchmark market share for each region, based on the highest decile of South Africa's market share of countries in that region, excluding the top countries in order to eliminate outlier shares. Based on this, we were able to estimate what South Africa could be exporting in total to each region if the country could achieve benchmark market shares of imported products into those countries. This was then the basis for the increase in exports by product and, in total, the requisite growth rates.

We calculated the overall potential for South Africa by adding the organic growth and the new regional market shares in 2020 and 2030. This was the basis for the top-down estimate of the maximum potential should South Africa continue with success in its food exports, and thereby increase its exports from 67 billion rand (\$5.8 billion) in 2012 to 212 billion rand (\$18 billion) in 2030.

We split additional export value into the raw food and processed food components in order to separately estimate the GDP impact of each. The 24 categories of products were classified into raw and processed food categories, and we found that South Africa would shift from exporting 46 percent raw food in 2012 to 29 percent raw food and 71 percent processed food in 2030. Based on this shift, we estimated that processed food would contribute 75 percent of revenue growth and raw food only 25 percent.

Based on this, we split the GDP impact between processing and production and used multipliers from the input-output table (1.11 for agriculture and 1.13 for processing).

The impact on job creation was estimated in several parts. The methodology discussed earlier was applied in all cases. Agro-processing jobs were estimated from the additional export revenue generated and the methodology described. The agriculture jobs were more complex. Because the long-run trend is for mechanization and decreased use of labour in commercial agriculture, purely increasing the output from agricultural production would not create many additional jobs. Therefore we based the job creation estimate on two main levers. First we discussed increasing the quantity of land used for agriculture. That would create jobs because the land is currently unused (commercial farmer growth). Second, we considered making subsistence-focussed smallholder farmers more productive through increased land yields and switching to high-value crops, and we concluded that this would raise these farmers' incomes. But this would also increase the daily work required of them, and so they would evolve into small-scale commercial farmers and hire people to help them work their farms (smallholder growth). We estimated the revenue generation impact of these

two approaches and estimated the job creation from this. We also split the value added of the increased agricultural production to GDP between these two approaches based on their relative revenue generation potential. Switching to higher-value crops (smallholder growth) is the higher income-generating option of the two, given the significantly higher value of the crops produced (from horticulture).

Making the choice of high-value crops

We used a McKinsey team of experts and their proprietary analytical tool, the Agricultural Commodity Research Engine (ACRE), to identify seven high-value crops that would be suitable for our focus provinces, Eastern Cape, Kwazulu-Natal, and Limpopo, instead of grain crops. The team assessed a total of 19 crops among those put forward for consideration in the National Development Plan, and then applied three filters to choose the most suitable examples.

First they considered the agronomic and climatic characteristics that would drive crop suitability, looking at each province individually to understand specific climates. They then looked at efficiency of scale, concentrating on small-scale farmers, to understand which crops would be suitable for the sub-20-hectare land plots that we are focussing on. Different crops have minimum farm scales required for cost-effective production, based on several key factors, including mechanization level, farm overhead, and downstream market volume requirements. Next, they looked at additional barriers to market based on on-the-ground knowledge and local experience. Finally, they identified seven high-value crops that ranged in suitability over the three provinces. Strawberries, other berries, and tomatoes were chosen as the three crops with the highest suitability for each of the climates.

The economic impact of these crops was assessed by estimating the revenue difference if maize production was shifted to these three products. The difference in yield and market price per ton for these three products and maize was sourced and analysed for the relative difference in the revenue value of the produce.²⁷⁷ Only existing smallholder land was used for this purpose, of which we assessed only smallholder land in the three provinces mentioned. We had already estimated that smallholders accounted for about 4 percent of total agricultural land use, and we estimated further (based on number of households) that roughly two-thirds of this land was in the three provinces we focussed on. Based on publicly available data, we estimated that roughly 35 percent of this land, or 112,000 hectares, was dedicated to grain production.²⁷⁸ We assumed that 80 percent of these farmers would be prepared to convert their land use by 2030, basing the scale of the high-value horticultural crop opportunity on the difference in value between the new crops and (the assumed current staple) maize. We estimate that the displaced grain crops would account for only 2 percent of the total land area currently used for maize and wheat, and therefore could not have a significant impact on current grain production.

²⁷⁷ FAO Stat Production Data, South Africa 2013

²⁷⁸ AgriSETA, Sector analysis agriculture prepared for submission to the Department of Higher Education, June 2010.

7. EQUIPPING SOUTH AFRICANS FOR THE JOBS OF THE FUTURE

Estimating the skills breakdown by each type of job created

This section of the report discusses how the jobs created by the big five growth opportunities will translate into required skills. To understand what skills are required by each sector, we used data from the Quarterly Labour Force Survey, Quarter 2, 2014.²⁷⁹ This database breaks down employment in every sector by types of jobs. We then grouped these job types into five broad categories based on the level of skill underlining each, as set out in Chapter 6.

Based on this breakdown, we were able to work out the percentage distribution of these five skills types by sector. We also estimated the skills breakdown for the broader economy. We then applied these skills breakdowns to the jobs estimates for each of the five opportunities. For agriculture, we applied the manufacturing sector's skills profile to agro-processing and agriculture's skills profile to actual agricultural production. For gas, we applied the mining sector's skills breakdown to shale gas jobs and the manufacturing sector's skills breakdown to jobs resulting from gas-based industries, such as chemicals and concrete. For infrastructure, we used the construction sector's breakdown, and for manufacturing and services, we used their respective skills breakdown. Only the direct jobs created were treated in this manner; all the estimated jobs for the broader economy were assessed against the skills breakdown of the entire economy. This allowed us to confirm the skills distribution required by each of the big five opportunities and of all the opportunities together. We have not accounted for how skills may change over the next 15 years.

²⁷⁹ *Quarterly Labour Force Survey, Quarter 2, 2014*, Statistics South Africa, July 29, 2014.



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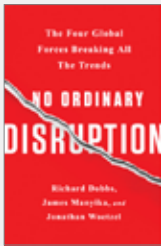
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