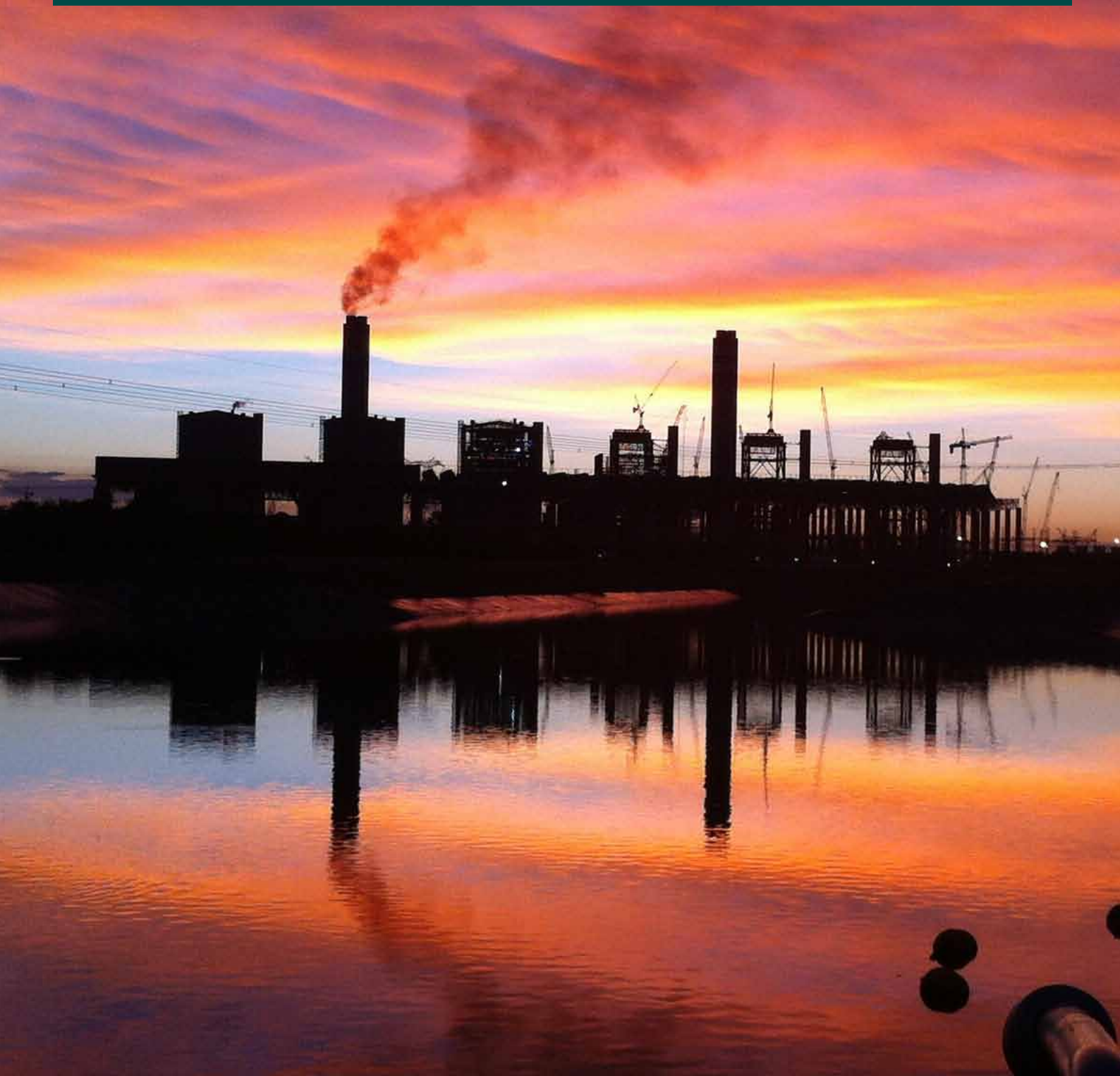
2016/2017

TECHNICAL REPORT
SUBMISSION FOR THE DIVISION OF REVENUE

FINANCIAL AND FISCAL COMMISSION

For an Equitable Sharing of National Revenue



For an Equitable Sharing of National Revenue

Technical Report: Submission for the Division of Revenue 2016/2017

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ACRONYMS

2SLS	Two-Stage Least Squares
AsgiSA	Accelerated and Shared Growth Initiative
BAU	Business As Usual
BLAs	Black Local Authorities
BNG	Breaking New Ground
CECD	Centre for Early Childhood Development
CFO	Chief Financial Officer
CGE	Computable General Equilibrium
CIO	Chief Information Officer
CoGTA	Department of Cooperative Governance and Traditional Affairs
CPW	Community Works Programme
CSIR	Council for Scientific and Industrial Research
DBE	Department of Basic Education
DEA	Data Envelope Analysis
DHIS	District Health Information System
DoC	Department of Communications
DoE	Department of Energy
DoH	Department of Health
DPSA	Department of Public Service and Administration
DPW	Department of Public Works
DSD	Department of Social Development
DST	Department of Science and Technology
DTI	Department of Trade and Industry
DTPS	Department of Telecommunications and Postal Services
ECD	Early Childhood Development
EIG	Education Infrastructure Grant
EPWP	Expanded Public Works Programme
FBS	Free Basic Services
FE	Fixed Effects
FFC	Financial and Fiscal Commission

FIZ	Free Internet Zones
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
GFCF	Gross Fixed Capital Formation
GHS	General Household Survey
GVA	Gross Value Added
HFRG	Health Facilities Revitalisation Grant
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communication Technology
IDP	Integrated Development Plan
IGR	Intergovernmental Relations
IGFR	Intergovernmental Fiscal Relations
INEP	Integrated National Electrification Programme
IUDF	Integrated Urban Development Framework
LSM	Learner Support Material
MEC	Member of the Executive Council
MIG	Municipal Infrastructure Grant
MPAC	Municipal Public Accounts Committees
MTEF	Medium Term Expenditure Framework
NDA	National Development Agency
NDP	National Development Plan
NGO	Non-government Organisation
NGP	New Growth Path
NHG	National Health Grant
NHI	National Health Insurance
NPC	National Planning Commission
NPNC	Non-Personnel, Non-Capital
NPO	Non-Profit Organisation
NSNP	National School Nutrition Programme

OCPO	Office of the Chief Procurement Officer
OECD	Organisation for Economic Co-operation and Development
PES	Provincial Equitable Share
PGDP	Provincial Growth and Development Plan
PICC	Presidential Infrastructure Coordinating Commission
PMG	Parliamentary Monitoring Group
PPP	Public-Private Partnership
RDP	Reconstruction and Development Programme
RE	Random Effects
RHIG	Rural Household Infrastructure Grant
SALGA	South African Local Government Association
SARB	South African Reserve Bank
SCM	Supply Chain Management
SFA	Stochastic Frontier Analysis
SIBG	School Infrastructure Backlogs Grant
SIC	Standard Industrial Classification
SIPs	Strategic Integrated Projects
SITA	State Information Technology Agency
SLA	Service Level Agreement
SMEs	Small and Medium Enterprises
SOEs	State-Owned Enterprises
Stats SA	Statistics South Africa
TIMSS	Trends in International Maths and Science Survey
USDG	Urban Settlement Development Grant
WLA	White Local Authorities
WTP	Willingness to Pay

FOREWORD

The Financial and Fiscal Commission (the Commission) provides independent, impartial advice and recommendations on intergovernmental fiscal relations (IGFR), including the technical design and evaluation of provincial and local fiscal and economic policy. Established in 1994 by the interim Constitution of South Africa, the Commission provides all organs of state with information to help them make informed decisions on matters that affect, or are related to, the management of finances. In this respect, one of the Commission's main objectives is to help inform the following year's budget by making recommendations on the division of revenue among the three spheres of government and to support government's policy-making on IGFR. This is done by annually submitting to Parliament an advisory document summarising the recommendations that the Executive should take into account when crafting the following year's budget. The Submission for the Division of Revenue is made in terms of Sections 214(2) and 229(5) of the Constitution (1996), Section 9 of the Intergovernmental Fiscal Relations Act (No. 97 of 1999) and the Financial and Fiscal Commission Act (No. 99 of 1997), which is the national legislation in terms of which the Commission must function. On 29 May 2015, the Commission tabled at Parliament its Annual Submission for the 2016/17 Division of Revenue. This volume of technical chapters is published as a companion document to the Annual Submission.

The theme of this year's Submission is the IGFR challenges associated with public infrastructure. Long-term planning and financing challenges, and the lack of a long-term strategic vision have resulted in inadequate investment in skills, infrastructure and innovation. This has led to longstanding structural weaknesses in the economy which are affecting growth. In line with the National Development Plan (NDP), government seeks to kick-start economic growth through investing in public infrastructure, which is an important strategic responsibility shared across different spheres and sectors of government. This shared responsibility makes managing public infrastructure financing and implementation complex and requires substantial and competent coordination. Subnational governments also need to be able to work collaboratively in designing and implementing investment projects. There is a pressing need to get the administration and delivery of public infrastructure right because of its importance for national development and regional performance.

The idea that governments should invest in public infrastructure, to support production and trade (and thus growth and development), is well established. The argument for public investment rests on the belief that resources allocated to investment translate into an equivalent value of public capital stock, which benefits the private sector and affects overall growth by lowering the cost of production or distribution. During the post-war years (1950s and 1960s), the economic models underlying the five-year plans and industrialisation strategies relied heavily on high levels of public investment. However, South Africa has certain challenges that hinder the effective use of resources for development. South Africa faces shortages in economic and social infrastructure, and the government is expected to be the main player in closing these deficits, through enabling public policy, complemented by private investment and innovation. Investment – in (capital) equipment and in new (technological and managerial) ideas – is a crucial engine of growth. Investing in capital allows firms to incorporate new technologies and to reorganise production processes according to global best practices. Therefore, fostering a supportive environment for investment and innovation is central to having a dynamic and productive economy.

Public infrastructure has the power to boost national development and regional performance but must be better managed. In a time of uncertain future economic prospects and tight fiscal conditions, the aim should be to achieve the highest value for money and the greatest growth impact from spending public money. Given the fiscal constraints that limit the overall level of public investment, efficiency needs to be maximised through better economic growth and management of investment spending. Improving the quality of governance can help, especially through coordinating investments and building capacity within subnational governments. The focus needs to be not only on the macro-level but also on the meso-, sectoral and municipal levels.

The Submission explores ways of addressing the challenges that may prevent South Africa from reaping the rewards of public investment. Structural reform requires public investment and private sector involvement in education to provide a skilled labour force, to match supply and demand in the labour markets, and to raise productivity. This reform also calls for immense infrastructure upgrading to provide reliable and affordable power, roads, telecommunication, transport and logistics – all very relevant for enhancing competitiveness and revitalising the economy. In addition to addressing these gaps and challenges, lessons from successful high-impact policies in the Submission provide examples of how inclusive infrastructure-led growth can be achieved. Examples of high-impact policies include promoting early childhood develop-

ment (ECD) infrastructure and intervening to raise public sector productivity; enhancing governance and accountability at all levels, but in particular for municipalities; capitalising on the emerging knowledge economy and information communication technologies (ICT) sector to overcome productivity challenges in the public sector; and introducing programmes to enhance the performance of indirect conditional grants.

The Technical Report contains seven chapters:

Chapter 1 outlines and addresses IGFR problems associated with public infrastructure management. It examines five aspects relating to public infrastructure: the type of infrastructure (economic and/or social infrastructure); ways of funding the infrastructure and the impact on growth and jobs; the spheres responsible for the various types of infrastructure, especially the role of subnational governments; reasons for infrastructure investment not delivering economic growth and jobs, given the present configuration; and the conditions required for success. It highlights the specific (economic, institutional and financing) problems that continue to beset public infrastructure and which are discussed in the rest of the Submission. The final section of the chapter provides recommendations that set the context underlying the more detailed recommendations outlined in the rest of this Submission.

Chapter 2 discusses the impact of public capital spending on economic growth, taking into account the strong interdependence of national, provincial and local government, and differences across municipalities. It first examines the impact on labour productivity of private and public capital spending on socio-economic infrastructure (such as roads, electricity, and water and sanitation). The results provide fairly strong evidence that public capital has a significant negative effect, whereas private sector activities have a strongly positive effect on labour productivity. This suggests that infrastructure investments by local government are subject to diminishing marginal returns, indicating inefficiencies in the use and allocation of resources. Under South Africa's current economic policy of increasing public capital expenditure, municipal responsibilities for infrastructure investment are set to rise. Therefore, more attention needs to be paid to innovative ways of enhancing local capacity to properly plan for, allocate finance to and implement key capital projects. The chapter also examines the effects of capital spending on municipal economic growth. The results indicate that where the municipal capital is spent is important for growth. Spending on electricity, water and sanitation, as well as repairs and maintenance, enhances growth, while spending on housing and roads infrastructure has a negative effect on regional output. With municipal responsibilities for infrastructure investment set to rise under South Africa's current economic policy of increasing public capital expenditure, the results suggest that municipal capital spending on water and sanitation, as well as electricity, can spur local economic development. Improving the management of asset registers and maintaining existing infrastructure (to extend the useful life of infrastructure assets) could also benefit long-term economic growth across the country's municipalities.

Chapter 3 reviews direct and indirect conditional grants as well as ways of improving the financing of capital investments. Indirect grants are increasingly being used to fund key infrastructures, but no guiding principles or criteria are in place for establishing or rescheduling direct and indirect conditional grants. This chapter considers the funding and performance of selected direct and indirect infrastructure grants related to education, health, electrification and sanitation. The study analyses the grant budgets and expenditure, and compares the infrastructure delivery targets with actual delivery. The results found that direct grants outperform indirect grants, and that the sanitation indirect grants' performance is low. The chapter makes recommendations on the appropriate mix of conditional grants and on some guiding principles for the scheduling of conditional grants.

Chapter 4 looks at accountability in infrastructure delivery at the local government level. The government has embarked on a massive infrastructure delivery programme, which must be founded on sound accountability arrangements. When accountability fails, many things can go wrong, e.g. public funds are misappropriated or stolen, public officials routinely demand bribes, public contracts are unfairly awarded, and public services are poorly delivered or not delivered at all. This chapter evaluates accountability arrangements against the backdrop of the proliferation of indirect infrastructure grants and the under-spending of these grants, diagnoses accountability problems related to infrastructure delivery and funding, and makes recommendations for strengthening accountability mechanisms within the local government sphere. The study is based on secondary data and the case studies of nine municipalities, (Mangaung, Waterberg, Westonaria, Sol Plaatje, Ramotshere, Mbizana, Newcastle, Stellenbosch and Bush-

buckridge) identified by means of stratified random sampling. The results suggest that the proliferation of indirect grants distorts accountability arrangements. Furthermore, most municipalities may have well-established accountability structures but lack capacity and skilled personnel to execute their accountability role proficiently. The support structures also have insufficient human, financial and research resources. The chapter provides recommendations on these issues.

Chapter 5 considers fiscal arrangements for financing early childhood development (ECD) infrastructure. South Africa has been at the forefront of developing programmes and policies to meet its constitutional obligations towards children's rights. Despite the robust legislation and policies, ECD remains highly inaccessible, inequitable, and insufficiently resourced. The lack of adequate infrastructure, in particular, exacerbates accessibility problems among poor children. Public funding for constructing and maintaining ECD infrastructure is limited, unstructured and highly fragmented. The three spheres of government are concurrently responsible for ECD, but none of them has an identifiable, standing budget line item or programme for ECD infrastructure. The fragmentation and lack of funding is attributable, in part, to policy ambiguities and poor coordination among the departments of social development and cooperative governance and traditional affairs, and municipalities. Without a well-coordinated and integrated national ECD infrastructure programme, piecemeal interventions will continue to distort the distribution of funding and reinforce inequities.

Chapter 6 looks at public sector productivity and how to improve it. Secondary education is used as a case study to examine public sector productivity. With the economy growing slowly and tax revenues under pressure, public service productivity is in the spotlight, especially sectors such as education that consume a large share of government funds. The chapter evaluates the extent to which productivity in secondary education can be improved. The weak association between public funds spent and secondary education outputs suggests that non-monetary determinants of productivity or education expenditures are being used inefficiently. Environmental factors, such as the income of households, teacher commitment, socio-economic status of households and school size, all affect efficiency scores. More specifically, simply increasing resources to public schools will not necessarily improve school outcomes. What is needed is to focus more broadly on understanding productivity in the public sector, the measurement of productivity, and internal and external factors that influence productivity.

Chapter 7 is on improving government operations through information and communication technologies. Shifting to an eGovernment approach has the potential to improve and expand service delivery, as well as to help overcome the spatial divisions that persist in South Africa. The chapter explores the key barriers that prevent departments/municipalities from treating investment in information and communication technologies (ICT) as a strategic enabler for improved service delivery and efficiency. The methodology entailed a review of key policies and literature, as well as interviews with selected stakeholders. The study found that, despite the progress made by government, the ICT goals in the National Development Plan (NDP) are unlikely to be met within the given timeframes, as certain areas first need some attention. These relate to simplifying the policy environment and ensuring that implementation is closely aligned to policy goals and objectives. Such issues need to be addressed before focusing on whether ICT is underfunded or not given sufficient prioritisation, as funding should follow function in an effective intergovernmental system.

Ramos Mabugu, Research and Recommendations Programme Director

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Ramos Mabugu is Director of the Research and Recommendations Programme at the Commission and a Fellow at the University of Stellenbosch, South Africa. He has published on topics related to applied economics, public finance, tax policy, and intergovernmental fiscal relations. Most of his economic modelling work is on the application of computable general equilibrium (CGE) models, social accounting matrix (SAM) methods, input-output methods, and macroeconomic models. In collaboration with colleagues, Ramos has pioneered the first applications of CGE microsimulation (static and dynamic) in two Southern African countries. He has taught and supervised at postgraduate level at the University of Zimbabwe and the University of Pretoria, South Africa. While at the University of Pretoria, Ramos was instrumental in setting up a collaborative environmental economics MSc and PhD training programme. He has served as a consultant for many organisations and was an external examiner for several universities. Ramos has also taught economic modelling courses at the Ecological and Environmental Economics Programme at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Italy. In 2003/04, Ramos gave technical advice at the Centre for International Forestry Research (CIFOR), Indonesia, and Sida, Sweden. In 2006 he was awarded the visiting fellowship award from Curtin University in Australia, in recognition of his contributions to intergovernmental fiscal relations modelling. He earned his PhD in economics from the University of Gothenburg, Sweden.

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CHAPTER 1

Responding to South Africa's Infrastructural Challenges

CHAPTER 1

Responding to South Africa's Infrastructure Challenge

Ramos E. Mabugu[1]

1.1 Introduction

In 1994, the government inherited infrastructure that was generally in poor shape. "South African cities were characterised by dire housing and service backlogs, inequalities in municipal expenditure, the spatial anomalies associated with the 'apartheid city', profound struggles against local government structures, high unemployment and many poverty-stricken households" (Pillay et al., 2006: 2). Post-1994, concerted efforts were made to correct the infrastructure imbalances and to increase access to social and household infrastructure, through providing housing, schooling and health care, and electricity and water connections. Government's strategies and plans have included the Reconstruction and Development Programme (RDP) in 1994, the Growth, Employment and Redistribution (GEAR) programme in 1996, the Accelerated and Shared Growth Initiative (AsgiSA) framework in 2006 (introduced as an extension of the GEAR programme), and the National Development Plan (NDP) in 2012. Key policies are contained within the Urban Development Strategy (subsequently published as the Urban Development Framework in 1997), the Rural Development Framework, the Green Paper on Development and Planning (1999), the Development Facilitation Act (No. 67 of 1995), municipal integrated development plans (IDPs) and the Breaking New Ground (BNG) housing policy (2004). These policies affect land availability and use, public infrastructure, housing markets and transport systems. In the 2015 State of the Nation address, the President did not deviate substantially from these policy directions and placed much focus on improving electricity and energy security. Issues relating to land redistribution and minimum wage legislation were reiterated along government lines, but little detail was provided on the longer-term funding of such projects.

Today, the main pillars of government economic policy, the New Growth Path (NGP), the Industrial Policy Action Plan and the NDP, are anchored in a significant ramping up of current and capital expenditure by the state. The government and state-owned enterprises (SOEs) allocated to infrastructure spending an estimated R642-billion over the last three years and about R827-billion over the Medium Term Expenditure Framework (MTEF) period (National Treasury, 2014). This is expected to contribute significantly to meeting the government job-creation targets of five million jobs in 2020 (NGP) and 11 million jobs by 2030 (NDP). Much is riding on state infrastructure spending being the solution to reducing poverty, inequality and unemployment and generating economic growth.

Infrastructure development is central to the NDP's 2030 vision, and so high levels of investment in infrastructure will continue into the foreseeable future. The extensive infrastructure programme is aimed at rectifying inadequate and inefficient infrastructure, and improving and increasing the country's infrastructure network. This infrastructure drive is propelled by economic growth imperatives and broader social concerns. In other words, the country faces a triple infrastructure challenge:

- To provide infrastructure that stimulates economic growth and job creation.
- To maintain existing infrastructure.
- To provide infrastructure and services to the poor in order to eradicate poverty.

There is also a sense that these challenges are moving targets. People migrate, and economic activity moves, yet infrastructure is locational and permanent, and so policy-makers have to guess the future. The South African Constitution requires the state to provide access to basic services for all citizens, which is reiterated in the NDP. However, the problem is the large "expenditure deficiency" to fill the desired levels of infrastructure necessary to meet these aspirations. This deficiency cannot be removed overnight, as the resources available are limited by the level and rate of growth of gross domestic product (GDP), as well as the national government's ability to raise revenue through its tax instruments. Rather, what is required

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[1] Address correspondence to Ramosm@ffc.co.za or RMabugu@gmail.com. I am grateful to the Financial and Fiscal Commission Research Committee members and Commissioners for comments and suggestions in shaping this work. I am especially grateful to Krish Kumar, Greg Gardner, Sibongile Muthwa, Bongani Khumalo, Thando Ngozo, Tania Ajam, Nico Steytler and Margaret Chitiga for extensive comments on many versions of this paper and excellent insights shared! All errors are mine.

is the progressive realisation over a period of time (2030 in the case of the NDP) commensurate with the economy's ability to make the necessary resources available, and taking into account all other macroeconomic considerations. Moreover, the feedback effects of such a policy need to be considered, i.e. higher spending on infrastructure creates more human capital that may feed through into higher economic growth and per capita incomes, thus enhancing the economy's ability to realise the minimum standards.

This chapter stems from a hypothesis that the current infrastructure is both inadequate and inefficient to meet societal goals relating to economic growth, poverty, unemployment and inequality. One of the drivers of inadequate and inefficient infrastructure has been short-term capital constraints, but the question is at what long-term cost? As stated in the NDP, the government seeks to kick-start economic growth through infrastructure investment. In this regard, the chapter addresses five related aspects:

- The type of infrastructure, through providing a working definition and description of the current public infrastructure landscape patterns and highlighting their weaknesses/strengths.
- The spheres responsible for the different types of infrastructure, especially the role of subnational governments.
- Ways of funding the infrastructure.
- Reasons for infrastructure (by type) not delivering economic growth and jobs, given the present configuration.
- The conditions required for success.

Section 2 discusses definitions, classification and evolution of infrastructure, while Section 3 explores the institutional architecture underpinning public infrastructure. Section 4 highlights the broader economic and fiscal imperatives underpinning public infrastructure and its financing. Following from the analysis, Section 5 draws together conclusions and recommendations.

1.2 Understanding Infrastructure, Classification and Evolution

The idea of governments investing in public infrastructure to support production and trade (and thus growth and development) is well-established. The argument for public investment rests on the belief that resources allocated to investment translate into an equivalent value of public capital stock that, by lowering the cost of production or distribution, benefits the private sector and affects overall growth. Despite being typically only one-fifth to one-tenth of total spending, investments have a large multiplier effect[2] and so have a key role to play in the economy. Long-term growth is related to the size of the capital stock, which is simply cumulated investment. Investment spending is the conduit through which interest rates, and therefore monetary policy, affect the economy. A measure of investment is the amount of gross fixed capital formation (GFCF).[3] Investment – in (capital) equipment and in new (technological and managerial) ideas – allows firms to incorporate new technologies and to reorganise production processes according to global best practice. Therefore, fostering a supportive environment for investment and innovation is central to having a dynamic and productive economy.

During the post-war years (1950s and 1960s), the economic models underlying the five-year plans and industrialisation strategies relied heavily on high levels of public investment. However, South Africa has certain weaknesses that hinder the effective use of resources for development. The country faces shortages in economic and social infrastructure, and government is expected to be the main player in closing these deficits, through enabling public policy, complemented by private investment and innovation.

While the term 'infrastructure' is widely used, especially in policy circles, surprisingly no standard, universally accepted definition of infrastructure exists, although numerous indicators for infrastructure do. Without a clear-cut definition of infrastructure, the process of making meaningful comparisons is complicated and does not assist effective policy formulation. The diversity within the three spheres of governments and public entities adds further complications.

Definitions and/or classifications are made with particular purposes in mind. The infrastructure classifica-

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[2] The multiplier effect describes how an injection into an economy, such as an increase in investment, creates a ripple effect that increases output etc. in an economy.

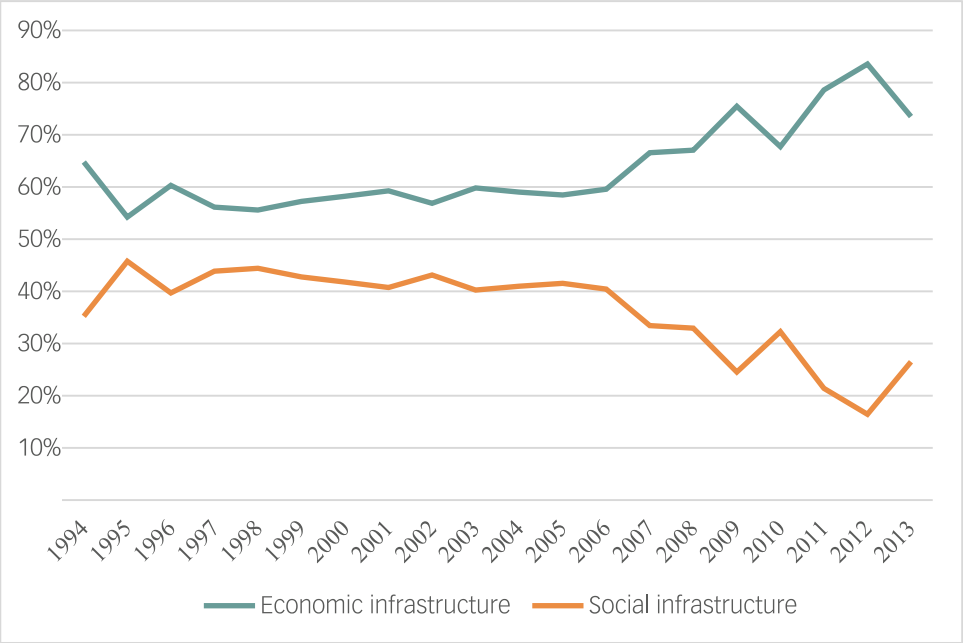
[3] GFCF includes infrastructure investments, e.g. the construction of roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.

tion implied by the literature shows a useful distinction between economic and social infrastructure. For the purpose of this Submission, infrastructure is used as a heterogeneous term, which includes physical structures of various types used by many industries as inputs to the production of goods and services. This description encompasses social infrastructure (such as schools and hospitals) and economic infrastructure (such as network utilities). Network utilities include energy, water, transport and digital communications, which are essential ingredients for the success of the NDP and, indeed, a modern economy.

The South African Reserve Bank (SARB) publishes official infrastructure figures, specifically the economic infrastructure component of general government and public corporations.[4] Statistics South Africa (Stats SA) publishes the national accounts data and, until the late 1980s and 1990s, published data relating to infrastructure (e.g. rail, roads, ports, air travel and telephones). In the South African national accounts, public economic infrastructure includes transport, communication, power, water and sanitation systems, while social infrastructure includes schools and hospitals.

As Figure 1 shows, between 2010 and 2013, economic infrastructure as a percentage of GFCF increased from 68% to 73%, while social infrastructure declined from 32% to 27%. The increased economic infrastructure took place in tandem with targeted growth in public infrastructure investment. However, the decline in social infrastructure's share of GFCF highlights the need for more social infrastructure investment, to address the above-mentioned developmental challenges.

Figure 1: GFCF by type of infrastructure



Source: Author's calculations based on SARB (2014).

Between 1994 and 2014, annual GFCF more than doubled in real terms (Figure 1). Prior to 1994, investment in infrastructure was generally very low (having peaked in 1976). During the GEAR era (1996–2002), public infrastructure investment fell from 8.1% to 2.6% of GDP, as the emphasis was more on fiscal discipline than increasing expenditure. With the AsgiSA plan in 2002, the infrastructure drive was couched explicitly in policy. Since then, GFCF has increased, even when GDP growth stagnated. Although private enterprise GFCF is highest in value, government GFCF has had the highest growth rates, especially public utility corporations (Figure 2). This surge in GFCF was driven by investments made by SOEs such as Eskom (for new power generation capacity) and Transnet (for upgrading and expanding rail and port facilities, and pipeline infrastructure).

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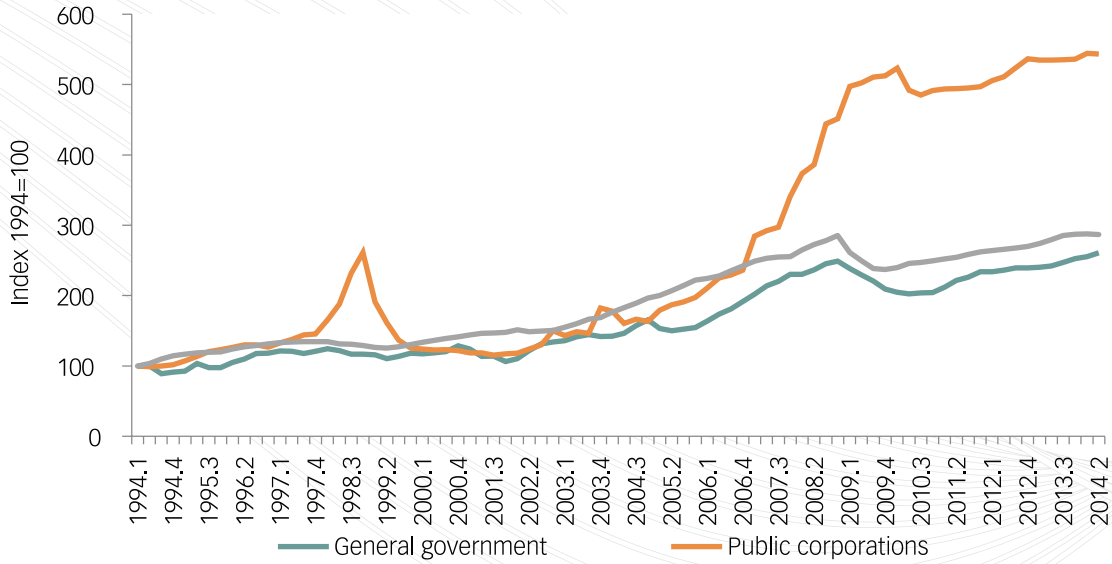
[4] Examples of public corporations are Transnet (transport services such as rail and air), Eskom (electricity), and (until its listing in March 2003) Telkom (telephone services). These have been reclassified, from general government to public corporations.

Figure 2: GFCF by type of organisation (constant 2005 prices)



Note: the rates are seasonally adjusted, indexed 1994=100

Source: Author's computations based on SARB (various years)

Table 1 (page 20) illustrates the real growth rates in infrastructure allocations by sector. A total of R813.1-billion is allocated to public infrastructure over the next three years (2015/16–2017/18). Of this, 77% is for the transport (R339-billion), energy (R166-billion) and water and sanitation (R117-billion) sectors. The upgrading of courts, police stations and correctional facilities is driving growth in the justice and protection services sector, while plans to modernise the electronic document management system used by the Department of Home Affairs explains much of the growth in the central government, administration services and financial services sector.

A concern is that Stats SA has stopped publishing certain data on infrastructure, while a number of implications have relevance for policy.

- Based on continued delays in key projects such as the Medupi and Kusile power stations, the Commission would advise caution over optimistic forecasts. To be reliable and realistic, budgets need to adequately factor in past performance when determining future projections.

- Given budget constraints and the need for infrastructure investments to provide value for money and efficiency, maintaining statistics on infrastructure utilisation is important. This can be done by creating an index of physical infrastructure capital stock, for example:

    - Classroom or school building per capita, to gauge the need for additional buildings.

    - Capacity use of railroad and road infrastructure, computed as different measures of rail infra structure per ton of freight and road infrastructure[5] (both paved and unpaved) per vehicle.

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[5] Rail infrastructure measures include railway lines, locomotives and coaching stock.

Table 1: Real growth in allocations to public infrastructure investment by sector

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
R billion	**Outcome**			**Estimates**		
Energy	75.1	69.5	69.2	71.1	56	39.2
Water and sanitation	22.6	26.2	34.8	37.3	39.8	40.3
Transport and logistics	69.5	76.4	93.7	104.3	113.5	121.4
Other economic services	8.9	11.8	17.5	15.4	15.5	14.7
Health	9.7	10.6	9.7	9.3	9.9	10.3
Education	9.8	12.3	13.5	14.5	14.5	14.8
Other social services	10.7	10.3	11.5	10.6	11.3	11.6
Justice and protection services	4.4	4	3.9	4.5	5.2	5.5
Central government, administration services and financial services	6.9	5.8	8.6	6.9	7.7	8.2
Total	**217.7**	**226.9**	**262.4**	**274**	**273.3**	**265.8**
Real year-on-year growth						
Energy		-10.40%	-3.80%	-0.50%	-23.50%	-31.90%
Water and sanitation		12.30%	28.10%	3.80%	3.70%	-1.60%
Transport and logistics		6.40%	18.50%	7.90%	5.70%	4.00%
Other economic services		27.60%	43.80%	-14.80%	-2.50%	-7.40%
Health		5.80%	-11.70%	-6.90%	2.80%	1.20%
Education		21.00%	6.00%	4.20%	-2.90%	-0.80%
Other social services		-6.90%	7.60%	-10.80%	3.30%	0.60%
Justice and protection services		40.80%	-6.50%	13.20%	11.00%	2.20%
Central government, administration services and financial services		-14.70%	43.10%	-22.00%	8.50%	3.60%
Total		**0.90%**	**11.70%**	**1.20%**	**-3.10%**	**-5.30%**

Source: Author's calculations based on National Treasury (2014)

1.3 Institutional Architecture Underpinning Infrastructure[6]

Public infrastructure attempts to address the twin aims of (i) increasing access for all citizens to basic services through extending or constructing new assets, and (ii) maintaining and/or replacing existing infrastructure. This section explores the nature of institutions relevant for infrastructure. Fiscal decentralisation and intergovernmental fiscal relations (IGFR) are inherently political processes, i.e. with multiple principal-agent layers, often riddled with internecine conflict and the possibility of local elite capture. In many cases, the paucity of institutional and financial capacities at the local level raises the threat of recentralisation i.e. central government intervention is seen as necessary to ensure that a modicum of results are achieved. It is contestable that the principal-agent model is in all instances the appropriate framework for considering intergovernmental incentive mechanisms. In a federation, the principal-agent model, at least in a constitutional sense, seems less appropriate because local governments are usually fiscally autonomous, rather than agents of the central government. Nevertheless, this model may still be appropriate in South Africa, which prides itself as a unitary decentralised state. The rest of this section proceeds on the basis of this understanding.

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[6] Institutions are here loosely defined to encompass the sets of rules, procedures, organisations, relationships and incentives shaping interactions of all spheres of government, the private sector and households with public infrastructure.

1.3.1 Dimensions of institutional issues in public infrastructure

Before describing the institutions and their challenges, it is useful to discuss the seven key institutional dimensions of infrastructure development where alignment is needed.

(i) Infrastructure development is underpinned by policy development, which stems from government's strategic goals and objectives, sectoral and regional investment priorities, etc.

(ii) Capital investment planning, which determines which projects will be funded and who will build and operate them, as well as the financing and the building period. Some best practices for identifying infrastructure projects include using multi-year and annual investment planning that is periodically reviewed. Infrastructure projects are identified and prioritised according to economic, development and market needs. Projects are pre-screened in a standardised manner supported by due diligence studies. Planning, financing and construction of projects are integrated, and the decisions to build infrastructure are based on objectivity with limited political influence (Asian Development Bank, 2014).

(iii) Regulation, enforcement and approval that must be exercised vigorously in the infrastructure development process.

(iv) The actual investment, which comprises both capital and recurrent cost of building infrastructure, and involves exploring and identifying the appropriate mix of finance for infrastructure projects.

(v) The design and construction of the projects, which in a planned economy is exclusively carried out by government entities and agencies. However, the function can also be exercised by private entities, through competitive bidding processes for public works projects.

(vi) The operation and maintenance of completed infrastructure. In many countries, this function is performed by private management and service contracts, as an alternative to government.

(vii) Monitoring, which tends to increase in importance as more other responsibilities are allocated outside of government. Essentially, monitoring consists of different phases that must be in line with the infrastructure project's life cycle and nature. The first phase of monitoring takes place during the project planning stages (i.e. environmental and economic assessment). The second phase entails expenditure monitoring, and the third phase consists of construction monitoring that considers aspects of quality. The last and most important phase is utilisation, where continuous maintenance and condition assessments need to be carried out. Most infrastructure also has a decommissioning phase, which deals with the disposal of the asset after its useful life.

Delegations, or responsibility for important aspects of public sector infrastructure delivery, are provided for in the Constitution, which assigns roles to each sphere of government through the system of intergovernmental relations. Schedules 4 and 5 of the Constitution bestow functional responsibility for the delivery of public services, including but not limited to infrastructure, to the three spheres of government as stipulated below:

National government. Schedule 4 defines the concurrent functions of the national sphere, which is responsible for promulgating national sector legislation and the government's policy agenda. It shares these functions with provincial government, in concurrent arrangements, for education, health, agriculture, public works, rural development, transport and human settlements. With regard to exclusive powers and functions, national government has "residual" or "plenary" powers, e.g. defence, the criminal justice system, home affairs and the tax system. It also determines overarching policy and sectoral regulatory frameworks, including setting norms and standards and overseeing the implementation of these standards and frameworks.

Provincial government. Schedules 4 and 5 define the functional responsibility of provinces. The majority of their assigned competencies are shared (concurrent) with national authorities, meaning that the performance of the provinces has a direct impact on the pursuit of national policy goals. Provinces also have exclusive provincial legislative competence, with jurisdiction over concurrent functional areas with national government as discussed above, as well as exclusive functional areas: e.g. sporting facilities,

libraries, museums, provincial roads and provincial planning. Although provinces are "distinctive", they exercise their powers and perform their functions within the regulatory framework set by the national government, which is also responsible for monitoring compliance with that framework and, if need be, intervening when constitutional or statutory obligations are not fulfilled.

Local government. In giving effect to the constitutional provisions, currently assignment to local government is regulated primarily through the Municipal Systems Act (No. 32 of 2000), the Municipal Structures Act (No. 117 of 1998), the Division of Revenue Act, as well as various sector legislation supported by a range of norms and standards. Municipalities are primarily responsible for intergovernmental planning, and for the provision of basic services, such as water, electricity, sanitation, roads, refuse removal and municipal infrastructure. These functions are performed within nationally and provincially set regulatory frameworks, but municipalities are also expected to promulgate their own bylaws to regulate the operations of these key services.

The current state of play is that the revenue-, budgeting- and expenditure monitoring functions are located within national and provincial treasuries (although this is not always the case where public entities have been established). Strategic planning functions are typically located in the Presidency, the Office of the Premier or the Office of the Municipal Manager. Project planning and conceptualisation is located within the relevant sector departments, while project management functions are located either with sector departments or with special purposes departments, most notably the provincial departments of public works (DPWs). Inter or intra-governmental functional assignment requires extreme levels of coordination and cooperation between sector departments at all levels of the infrastructure development process. Historically, about 65% of national departments perform infrastructure-related functions, such as government buildings, bulk water resources, police stations, courts and prisons, electrification, and make infrastructure transfers to agencies and public entities. Implicitly, national departments are supposed to provide overarching sectoral infrastructure frameworks informed by the broader national policy. National policies provide the basis from which capital investment plans can be developed. However, with the exception of the Department of Transport, other national departments have not had national capital investment plans for many years.

Provincial departments mainly provide infrastructure related to schools, health, agriculture, provincial roads and public works. Ideally, provincial infrastructure development needs to be supported by the Provincial Growth and Development Plans (PGDPs), which in turn should inform the region-specific and sectoral capital investment plans. PGDPs tend to be high-level plans that are not always assimilated to sectoral or even local government plans. Local government is entrusted with the responsibility for municipal roads and storm-water, water distribution and wastewater collection and treatment, electricity distribution, street lighting, bus and taxi ranks, community halls, refuse sites etc. Similarly, local government has the responsibility to draw up capital investment plans in the form of IDPs. Since 1994, national and provincial spheres and entities have made concerted efforts to strengthen local-level governance through reforms to municipal boundaries, systems, structures and financial arrangements. Efforts underway, which have huge implications for infrastructure delivery, include demarcations, assignment of certain core urban build environment functions to municipalities (e.g. management of spatial planning and land use, human settlements and infrastructure services, and public transport), accompanied by the assignment of a range of local revenue sources to finance such activities.

Infrastructure planning is further hampered by the existence of a large number of agencies and public entities that operate on business principles to support public infrastructure delivery. Examples of these entities include 17 water boards, the South African Roads Agency, the Trans Caledon Tunnel Authority, South African Rail Commuter Corporation, Transnet, Eskom, Telkom, Sentech, Airports Company of South Africa, Alexcor, DENEL, South Africa Post Office Limited and the Development Bank of Southern Africa. In most cases, these entities have their own long-term independent capital investment plans that are not necessarily aligned to the broader national, provincial and local policy frameworks[7]. This is especially true for their capital expansion plans, which tend to be geared towards projects with high economic rather than social returns. Conversely, many of these entities continue to rely heavily on transfers for bailouts, despite the availability of a wide array of revenue sources at their disposal, e.g. user charges, retained earnings, borrowing, transfers from oversight government departments, private-public partnerships (PPPs), concessions and sale of assets.

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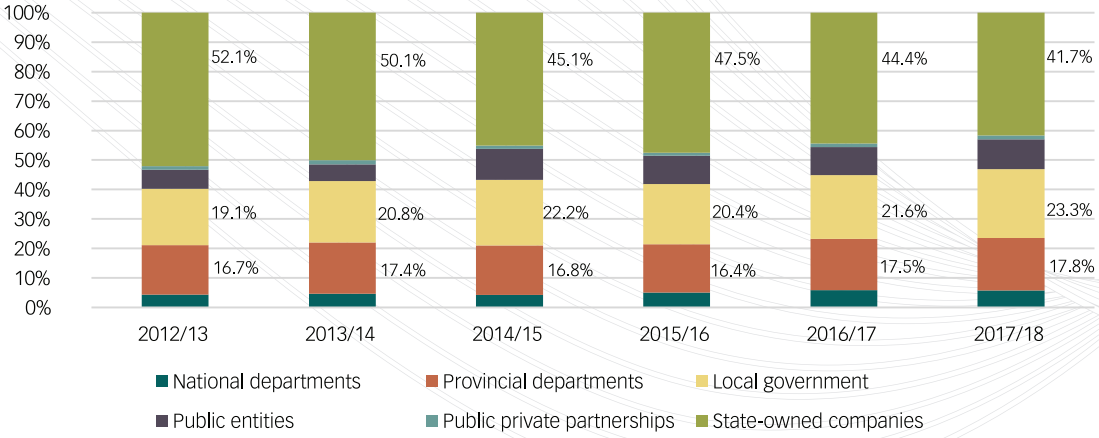
[7] In fact, one of the greatest weaknesses of the IGR system is that it does not force coordination with these public entities.

The quality of governance and the institutional architecture have a major influence on public infrastructure outcomes. Government spheres and entities face a range of common challenges when managing public investment. The responsibility for investing in new and existing infrastructure is a concurrent function and lies with all three spheres of government, including state entities. Over the 2015 MTEF period, SOEs and local government account for just under 70% of all public investment in infrastructure (Figure 3).

Figure 3: Responsibility for public infrastructure spending



Source: Author's calculations based on National Treasury (2014)

The issue of concurrency lies at the heart of sharing responsibilities for public infrastructure across levels of government and entities. A major obstacle is the insufficient financial resources at subnational levels to finance and implement municipal investment plans. Furthermore, poor financial management performance and unmet service delivery targets associated with municipalities (and SOEs) bring into question their ability to effectively drive South Africa's infrastructure-led growth. The principle of self-determination at subnational level will always clash with the need for economies of scale and efficiency, and is something that fiscal decentralisation will have to take into consideration in the future. More asymmetric and differentiated approaches will be called for, and powers will need to be devolved according to the eventual economic benefit.

South Africa's other challenges, which impede the effective use of resources for development, include:

- Large infrastructure projects often require productivity improvements, life-cycle asset management and complex procurement processes, which can result in significant delays and cost escalation.
- Weak intergovernmental coordination processes, which can lead to delays in both project evaluation and project oversight and implementation.
- Allocating resources to a project is typically a multiyear commitment, which may pose particular challenges in a budget system that has insufficient capacity to spend effectively and given a lack of institutional mechanisms to ensure accountability in infrastructure delivery.
- Projects may also be driven by productivity improvements and use of ICT technologies that, if widely applied, may improve public infrastructure management but is not the case at this stage.

Project complexity, and weak management and accountability systems create conditions for corruption to flourish, often to the point where large volumes of public money are diverted to private accounts, without creating any public asset or reaping the expected benefits from the original project. This occurs when the procurement function (including planning and contract award/management) is a standalone process rather than a critical part of public infrastructure management.

Conceptually, integrating procurement with public investment should be about capturing the potential efficiency gains through coordinated management within a framework. A welcome step has been the

introduction of built environment performance plans in order to incentivise integrated planning and implementation within municipalities, as well as the implementation of government's infrastructure plan (a key priority over the medium term). More efficient procurement processes should be implemented, while ensuring adequate checks and balances are not compromised in the process. In this regard the Commission welcomes the release of the Supply Chain Management (SCM) Review by the Office of the Chief Procurement Officer (OCPO) and supports reforms proposed by the OCPO aimed at modernising SCM in the public sector, reducing corruption in both public and private sector, accelerating service delivery and reducing costs. Project management and infrastructure planning are two crucial areas for infrastructure development. In addition, procurement processes need to be integrated with upstream project planning and budgeting and downstream contract and project management coordination. Indeed, this integrated approach, which infuses performance within procurement, is better aligned to the evolving government-wide performance and outcomes-oriented approach. However, such an approach also requires high levels of coordination and skills.

Much will depend on the capacities available (or that can be developed) at the subnational level, through either learning by doing or sister/brother link-ups with more successful entities elsewhere in the country. South Africa's rapid urbanisation will be a key test of those capacities, especially with regard to urban infrastructure development, including transport, sewage, water and sanitation. IGFR are likely to work best when the central government takes an active interest in strengthening institutional frameworks at the subnational level, i.e. supervising programme implementation and holding subnational bureaucracies accountable. Good coordination will be needed among all spheres of government, and the establishment of the Presidential Infrastructure Coordinating Commission (PICC)[8] in 2012 is a critical success factor in the roll-out of infrastructure in a coordinated and prioritised manner.

1.3.2 Recent changes to institutional architecture

Much of the ongoing work is aimed at addressing the problems confronting institutions responsible for infrastructure delivery. Current policy and strategy frameworks include the NGP, the NDP, the National Health Insurance (NHI), and the emerging Integrated Urban Development Framework (IUDF). All of these policies have implications for functions to be assigned to other spheres. The NDP is clear that each sphere of government must improve governance and the execution of their respective powers and functions, while the issue of how powers and functions ought to be managed is an ongoing requirement of the Medium Term Strategic Framework. In the same vein, policy work by the Department of Cooperative Governance has highlighted the importance of taking a more assertive approach to the intergovernmental management of powers and functions. For example, the 2008/9 Policy Review on Provincial and Local Government, the 2012 draft Green Paper on Cooperative Governance, the 2013 Draft Framework for the Assignment of Powers and Functions: a framework for differentiation, and Strengthened District Governance (2014).

From 2012, government began introducing measures aimed at incentivising proper planning and financing of provincial infrastructure. In the 2012 Medium Term Budget Policy Statement, the Minister of Finance made the following statement (National Treasury, 2012: 39):

> Over the next three years government aims to achieve better value for money from investment in provincial infrastructure. A new approach to infrastructure conditional grants is intended to institutionalise proper planning. Provinces will be required to bid for these allocations two years in advance and financial incentives will be built into the grant for provinces that implement best practices in delivering infrastructure.

The approach is based on a diagnostic showing that poor planning is why infrastructure projects fail to finish on time and within budget. A performance-based funding mechanism is suggested for infrastructure conditional grants in the education and health sectors. This represents a move from paying out upfront formula-based allocations in accordance with a payment schedule that forms part of the grant conditions, to awarding allocations to appropriately planned infrastructure projects that are prepared by following best practices for infrastructure planning and procurement. The programme was implemented for the first time in 2013/14, when indicative baselines were determined for the 2014 MTEF based on the level of compliance with the requirements of the 2013 Division of Revenue Act (first approval process). Funds not allocated as part of the first approval process were considered for allocation as part of the second approval process in year two (2014/15). In 2014/15, provinces were required to bid for their 2016/17 infrastructure

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[8] The PICC was created with the aim of improving the planning, coordination and monitoring of core infrastructure development in South Africa.

grant allocations (in education and health) two years in advance (i.e. in the approval process commenced in 2014/15). The performance-based system guidelines have been developed and cover the preparation, assessment and evaluation of the provincial infrastructure planning documents in line with performance-based conditional grant requirements as outlined in the 2014 Division of Revenue Act. Unsuccessful bids will not be partially or entirely funded, and unallocated funds will be pooled. Given that this intervention is new and a work in progress, judging its performance would be premature at this early stage.

As alluded to above, the establishment of the PICC represents an important recent step towards an integrated approach to policy, planning and delivery of infrastructure across spheres of government and sectors. In 2012, the PICC developed South Africa's first National Infrastructure Plan, which identifies 18 strategic integrated projects (SIPs). The SIPs are clusters of infrastructure projects considered as essential for promoting economic growth and supporting service delivery to the poor. They cover seven broad types of infrastructure: geographic, spatial, energy, social infrastructure, knowledge, regional integration, and water and sanitation (Table 2).

Table 2: Strategic integrated projects driving the National Infrastructure Plan

Type of Infrastructure	Focus Areas of SIPs
Geographic	Unlocking the northern mineral belt, with Waterberg as the catalyst
	Durban–Free State–Gauteng logistics and industrial corridor
	South-eastern node and corridor development
	Unlocking economic opportunities in the North West province
	Saldanha–Northern Cape development corridor
Spatial	Integrated municipal infrastructure project
	Integrated urban space and public transport programme
	Agri-logistics and rural infrastructure
Energy	Green energy in support of SA economy
	Electricity generation to support socio-economic development
	Electricity transmission and distribution for all
Social infrastructure	Revitalisation of public hospitals and other public health facilities
	National school-build programme
	Higher education infrastructure
Knowledge	Expanding access to communication technology
	Square Kilometer Array and Meerkat projects
Regional integration	Regional integration for African cooperation and development
Water and sanitation	Water and sanitation infrastructure

Source: PICC (2014)

Much is riding on state infrastructure spending being the solution to reducing poverty, inequality and unemployment, and generating economic growth.[9] The SIPs are expected to contribute significantly to meeting the job-creation targets of five million jobs by 2020 (NGP) and 11 million jobs by 2030 (NDP).

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[9] In its drive to raise employment levels, the South African government has put in place a number of other policies and programmes, such as the Expanded Public Works Programme and the Community Works Programme, that also affect location and investment.

The Infrastructure Act (No. 23 of 2014) establishes the PICC in law and is intended to fast-track the implementation of government's Infrastructure Development Plan. The Act implies the centralisation of infrastructure delivery, which will create opportunities and challenges for the intergovernmental fiscal system. Without a doubt, coordination among the different spheres, departments and agencies responsible for infrastructure development must improve, as proposed by PICC. The establishment of the PICC signals the need to tackle the challenge of building and renewing infrastructure with innovative policy solutions, so as to prioritise projects and overcome coordination problems. For example, PICC could be extremely useful in making amendments to legal frameworks relating to urban infrastructure development and the land and housing market, in order to facilitate public-private arrangements and to improve the functioning and efficiency of government spheres. The PICC could help unblock bottlenecks so land can be released for infrastructure development. The PICC could be especially useful in dealing with the multiplicity of urban local agencies, which have inadequate revenue-raising and financial management capacities (poor credit worthiness, weak management systems, limited revenue raising powers), and coercing the New Development Bank (formerly referred to as the BRICS Development Bank) to play a prominent role.

The risk is that this national pre-eminence of PICC could lead to too much centralised decision-making around infrastructure. For example, it could affect subnational government's control over their specific SIPs budget and planning for revitalising public hospitals and other health facilities, the national school-build programme, integrated municipal infrastructure projects, and integrated urban space and public transport programme. Municipalities are the government sphere that has direct contact with people's needs, and so the PICC actions would have to be strongly aligned with municipal IDPs in order to be mutually reinforcing.

1.3.3 Summing up: challenges and opportunities

Several institutional issues hinder effective infrastructure service delivery, ranging from insufficient skills and capacity, to incomplete and fragmented delegations and accountability channels. These issues must be addressed. Otherwise, misaligned, unbridled and uncoordinated investment in infrastructure will persist, which will result in weakened benefits relative to costs, diminished multiplier effects on growth, and reduced returns on investment. Much will depend on the capacities available (or that can be developed) at the subnational level, either through learning by doing or sister/brother link-ups with more successful entities elsewhere in the country. South Africa's rapid urbanisation will be a key test of those capacities, especially with regard to urban infrastructure development, including transport, sewage, water and sanitation.

IGFR are likely to work best (i.e. in terms of impact on infrastructure provision) when the central government takes an active interest in strengthening institutional frameworks at the subnational level, i.e. supervising programme implementation and holding subnational bureaucracies accountable. Luckily for South Africa, a window of opportunity exists to build on initiatives like the PICC and to overcome the challenges of cooperation between approval authorities in different spheres, resulting in red tape and so forth. It is hoped that the PICC, together with the adoption of the National Infrastructure Plan, will not only improve decision-making in economic infrastructure sectors, but will also result in an integrated and sequenced programme delivered across sectors and spheres, in line with the NDP.

Efforts should not be aimed at recentralisation and increasing the general influence of the centre but at ensuring that subnational units are viable and able to provide services to the people. This approach will be in line with Section 156(4) of the Constitution and, in turn, assumes that the central government – the "principal" – is not only well-intentioned (i.e. follows legal/constitutional provisions) but also has the capacity to impose its (altruistic) will on subnational governments, which is an unlikely feat in many cases. This could be done by tangibly empowering provinces and municipalities to be central players rather than observers in the PICC, in particular with respect to spatial planning and land use management functions. Detailed delegations for concurrent functions need to be developed that specify aspects such as performance targets, delegation norms and standards, and requisite financial arrangements pertaining to each aspect of infrastructure service provision. The institutional challenges are to (a) ensure the PICC improves its capacity and capability to link the municipal, provincial and national infrastructure delivery budgetary processes, so subnational governments are appropriately represented in the national budget process; and (b) improve government's capacities, so that the forward-looking budgeting system and infrastructure allocations can be fully exploited.

1.4 Public-Private Partnerships and Infrastructure

In many cases, PPPs involve cooperation arrangements with government for delivering specified services that government pays for from its revenues. For example, a PPP in which a private sector firm provides the full administration of a prison but not the capital investment for constructing the prison. However, in the context of government debt financing, the relevant forms of PPP are those in which the private sector makes a significant capital investment that government would otherwise have had to make. For example, certain toll road projects, in which the investment in the road or major upgrade is funded from the balance sheet of the private sector participant. South Africa has had some long running experience with PPPs, starting with major successes in the 1990s with arrangements for national roads. Approaching the end of the 1990s, government started to expand this approach to other infrastructure sectors, with the aim of mobilising private-sector finance and capacity. In 2000, a PPP Unit was established in National Treasury to provide the necessary support to such agreements. Some of the notable infrastructure projects concluded through PPPs have been the Inkosi Albert Luthuli Hospital, Mangaung Prison, Universitas Academic Hospital and Pelonomi Private Hospital, Chapman's Peak toll road, the dti head office and the Gautrain.

1.4.1 The infrastructure context

In the context of infrastructure development, only a limited category of PPPs is applicable. An example that might have occurred in the early 2000s was the introduction of private sector firms to construct and operate electrical power stations. The firms would have funded and managed the power stations, while Eskom or an independent power purchaser would have drawn on the power generated at an agreed price. An applicable case would have been the possibility of a private sector investor taking up a 30% stake in the Kusile power station presently under construction. Such arrangements tend to apply more to state-owned public corporations rather than directly to central government itself. Nevertheless, certain cases may be applicable to central government, such as a PPP arrangement whereby a private sector firm funds and contracts a new office block to meet a government requirement, and government enters into a long-term rental lease for use of the offices.

An allied aspect is the degree to which government is willing to allow private sector firms to undertake activities that could be placed in either the state- or private realm. Government pursued various initiatives in the 1990s, whereby state-owned business-oriented activities were transferred to private sector parties. For example, the issue of shares in national telecommunications operator Telkom to private shareholders, and the sale of Iscor assets to the private firm which is now ArcelorMittal. However, from the early 2000s, national government made a deliberate shift in its stance, to refrain (by and large) from transferring such activities to private sector parties, and to concentrate on building up state-owned public corporations to undertake these activities. The government's stance limits the degree of possible funding alleviation that might result from placing more state-run activities in the private sector.

1.4.2 Possibilities and limitations

The possibilities for drawing private sector financing into state initiatives are therefore limited by the government's policy commitment to undertake such activities under state ownership. This appears likely to be the policy of the government under the ANC leadership for a number of years.[10] Nevertheless, government might consider bringing in private sector firms in certain areas that would not represent too great a deviation from its policy stance.[11] One such example is road infrastructure, where forms of private sector investment may be achievable, despite recent resistance to the e-toll arrangements for the Gauteng freeways. Another example, which is clearly within government policy parameters, is the Independent Power Producer initiative being pursued by Eskom, in which private sector proposals are invited for certain forms of power generation. Private households could also be encouraged to do "meter reversing" by investing in solar, similar to what has been done with considerable success in Germany. Under these, the private sector parties provide the entire financing and enter into a supply contract, whereby Eskom or a sister central network operator purchases the power at a contracted rate. In a similar vein, private sector parties can undertake fuel pipeline projects; a few years ago, the state considered such a project before reverting to having Transnet undertake the project. Rail concessions, in which a certain rail line is operated by a private sector firm under contract to a state entity such as Transnet, have previously been contemplated and could again become a possibility. In this case, financing of rolling stock for the concession rail route would shift to the private sector firm. At present, Transnet is undertaking a massive acquisition of rolling stock on its own balance sheet, which is material enough to affect the country's public debt.

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[10] The ideological driven "development state" agenda.

[11] The problem with involving private sector firms is that you then need a strong, independent regulator, and regulatory capacity in South Africa is abysmally poor and prone to capture.

Transnet is investing R135-billion in rolling stock, while Eskom's investment in the Medupi and Kusile power stations is around R280-billion. A nuclear programme would add massively to this. If private sector parties met a portion of these investments, e.g. 30%, the debt financing required by government and its public corporations would be reduced by at least R100-billion.

1.5 Infrastructure Funding Approaches and Analysis

Infrastructure differs from other types of capital investments in various ways that are important for its funding:

- Infrastructure investments are typically big and capital-intensive.
- Infrastructure requires significant upfront funding, whereas the returns on the investment accrue over very long periods of time.
- Infrastructure investments typically generate positive externalities, i.e. more often than not, the social returns exceed the private returns of an infrastructure project.

Thus, the very nature of infrastructure provision means that capital expenditure generally occurs long before services are provided and charges can be collected. This time difference, between the infrastructure expenditure and the receipts, results in a funding gap that needs to be financed.

As a result, private financing and provision of infrastructure is difficult, which is why, historically, infrastructure investments have been provided by the public sector, public-private partnerships (PPP) or regulated private entities. Infrastructure investments are further complicated by the need to evaluate the broader social returns against funding costs and fiscal consequences. Infrastructure investments are not fundamentally aimed at boosting revenues and often have a high social return, which presents government with a dilemma (especially when the fiscal environment is deteriorating and the economy slowing down): the trade-off between positive social benefits and negative fiscal consequences. Equity and efficiency also need to be balanced, given the pressing need for economic and social infrastructure to support economic development in line with the NDP.

An enhanced institutional architecture is needed to govern infrastructure strategy, delivery and finance. Broadly speaking, investment in public infrastructure can be financed by:

- Public sector through revenues or savings, or
- Capital markets through borrowings or equity contributions from the private sector.

As shown in Table 3, there are three broad approaches to funding infrastructure: general budget appropriations, PPPs and development contributions.[12] Table 3 does not rank the different funding approaches but describes the most appropriate situation for each approach. The choice of a funding approach will depend on various factors, including the type and timeline of the infrastructure being funded, and the level of government or sector involved.

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[12] Development contributions as well as a number of alternative funding approaches to those outlined include (a) Specific-purpose securitised borrowing, (b) Certificates of Participation or lease revenue bond, (c) value capture levy, (d) specific purpose levies, (e) Growth area bonds and (f) Business improvement districts.

Table 3: Strengths and weaknesses of different funding instruments

Funding methods	Strengths	Weaknesses	Most appropriate situations
General budget appropriations	• Increased scrutiny, which promotes accountability and transparency for using public funds. • Low transaction costs compared to most other financing methods.	• Cash available to build the asset is uncertain, as non-discretionary spending could take priority. • Inefficient, as may reduce incentives to explore other, more efficient funding options (e.g. user charges). • Full public funding could reduce scope to allocate project risks to those best able to manage them.	• Depends on whether the project is funded through taxes, borrowings or user charges, and on willingness to pay for higher level of service.
Taxation revenue	• No impact on credit rating. • Fairest means of financing infrastructure, as national and provincial tax distributes the cost of infrastructure broadly. • Local government taxes can harness increased property value from infrastructure provision and spread costs across generations that benefit from the infrastructure (e.g. assuming rate hikes are permanent) and across all property owners within a specific area.	• Taxes can distort economic outcomes and do not merely redistribute money and resources. • Tax has little impact on encouraging efficient use of infrastructure services. • Taxation revenue may vary according to government policies and macroeconomic conditions (e.g. business cycles).	• Most suited for infrastructure projects with broad-based benefits that are realised over the short to medium term.
Borrowings	• Can be used to accelerate or bring forward delivery of key infrastructure projects. • Lower cost of capital compared to private sector financing. • Cost of infrastructure aligned more closely to the benefits that accrue over time, improving dynamic efficiency.	• Can be used to accelerate or bring forward delivery of key infrastructure projects. • Lower cost of capital compared to private sector financing. • Cost of infrastructure aligned more closely to the benefits that accrue over time, improving dynamic efficiency.	• Projects where benefits outweigh the costs (leads to improved macroeconomic efficiency). • Projects with long-term benefits, as debt can be viewed as a tax on the future generations (i.e. allows for benefits and costs to be matched over time). • Projects that cannot be done on a commercial basis and where debt can be funded from the operating budget.
User charges	• Equitable, as based on the user-pay principle to fund infrastructure. • Efficient, as encourages best allocation of resources through efficient pricing.	• Demand for goods and services may vary from that anticipated, thus affecting financial returns. • Difficult to achieve efficient pricing: users charges are usually set too high (e.g. monopolies) to encourage optimal use, or too low to cover the cost of capital. • Possible high administration and political costs.	• For projects where there is a link between the service provided and the fee charged for the service. • Some examples are road projects and maintenance funded through vehicle registration fees.

Source: Adapted by Financial and Fiscal Commission from Chan et al. (2009) and ACG (2011)

1.5.1 Modelling the impact of infrastructure investment

An important topic is the links between public infrastructure financing, growth and employment across the country and regions. Modelling the impact of scenarios on investment rates, growth and employment addresses the issue of how to finance the required infrastructure scale-up.

The simulated investment programme is split into three components (i) investment in government sectors (e.g. education, justice etc.) that increase the capital stock of public sectors, (ii) investment in infrastructure (e.g. roads, harbours, airports) that does not increase the capital stock of any sectors in particular and can be considered a public good, and (iii) investment in productive sectors (e.g. the energy sector) that increase the capital stock of a given sector.

The policy simulations thus take into account the effect of infrastructure investment on the *productivity* of other sectors. For example, the construction of a bridge is investment in infrastructure that will have an impact on other sectors, if the use of this bridge reduces travel time. Similarly, government investment in building a road or renovating a harbour will have an impact on other sectors, as their transport margins will decrease and they will be able to trade more using the same quantities of labour and capital. Government investment can also increase private capital stock. For instance, government investment in a nuclear plant increases the capital stock of the electricity/energy sector. The model allows the government to intervene in the public and private sectors of the economy.

A variant of the model is used to analyse how an increase in public investment affects *economic growth.* At its core is the Ramsey optimal-growth framework, oriented towards the constraints that government faces in financing infrastructure expenditures.[13] Table 4 shows the impact of increasing public spending for three years (2015, 2019 and 2025) for three financing methods: direct tax, indirect tax and debt financing.

Table 4: Impact of increased public investment on macroeconomic variables (% deviation from BAU[14])

	Direct tax financing			Indirect tax financing			Debt financing		
	2015	2019	2025	2015	2019	2025	2015	2019	2025
GDP	0.02%	0.15%	0.17%	-0.22%	0.16%	0.26%	0.02%	0.15%	0.17%
GDP deflator	0.02%	-0.34%	-0.27%	-0.22%	-0.33%	-0.25%	0.02%	-0.34%	-0.27%
Real GDP	0.00%	0.49%	0.44%	0.00%	0.49%	0.51%	0.00%	0.49%	0.44%
Real consumption	0.07%	0.30%	0.37%	-0.09%	0.23%	0.37%	0.07%	0.30%	0.38%
Real investment	-0.21%	0.89%	0.51%	0.46%	1.12%	0.79%	-0.25%	0.88%	0.51%
Debt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	-0.15%
Gov. expenditures	0.73%	0.07%	-0.07%	0.76%	0.06%	-0.10%	0.73%	0.08%	-0.08%
Increase in tax rate	0.34%	-0.03%	-0.11%	0.13%	-0.01%	-0.04%	n.a.	n.a.	n.a.

Source: Author's calculations based on South African dynamic CGE model

In the short term (2015), to finance the additional spending, government will need to raise income tax by 34%. If government chooses to finance new spending through indirect taxation, an additional tax of 13% on all commodities will be necessary to keep the deficit constant. Impacts on real GDP in the short term are negligible (0% in 2015) but are positive in the medium to long term (increased 49% by 2019). This is because spending on investment leads to increased infrastructure and economic output. In fact, under a rigid deficit, taxes would eventually go down, as a result of greater production in the economy.

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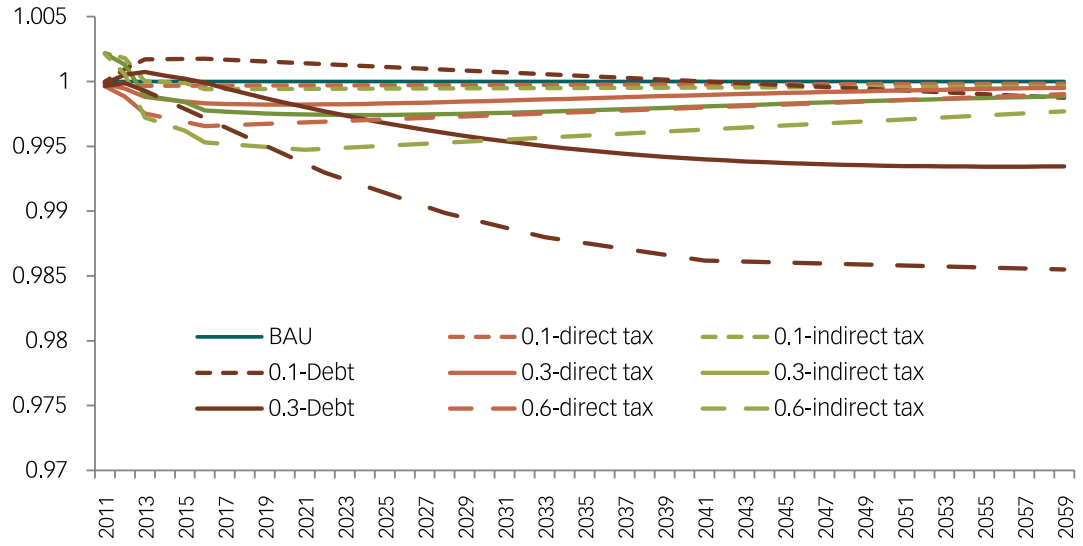
[13] For more details, refer Mabugu et al. (2013).

[14] BAU = Business As Usual in macroeconomic terms is here taken to mean the natural trend of the economy and economic policy.

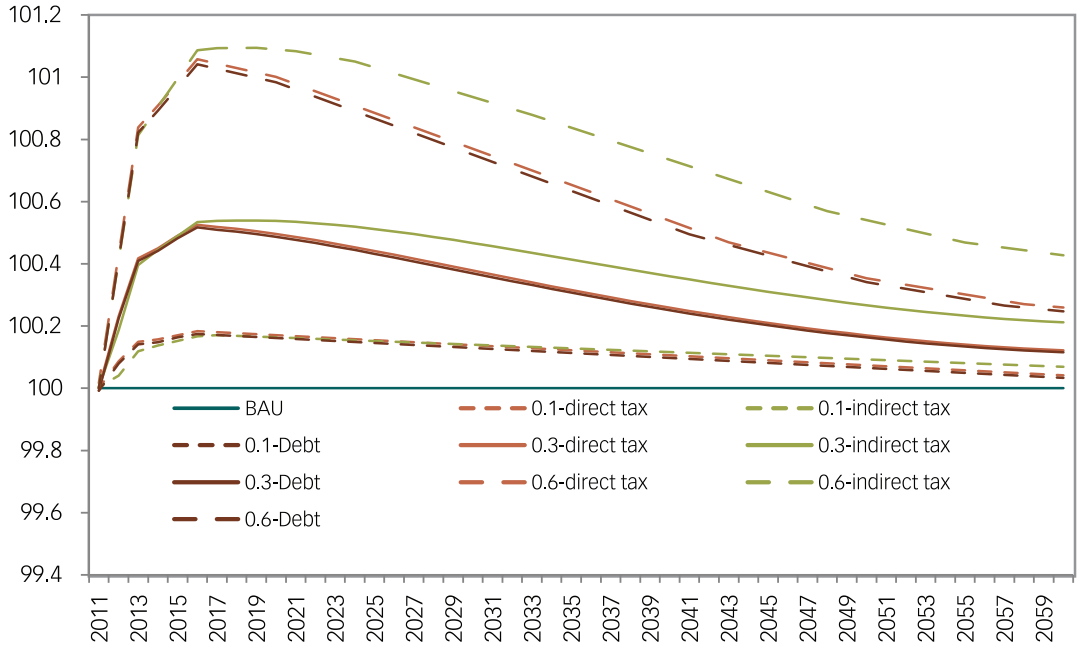
To examine the sustainability of increasing public spending, the debt-to-GDP ratio was calculated over the next 60 years (Figure 4). As the GDP grows over time, a constant deficit translates into an improvement of the ratio. More surprisingly, the greatest improvement happens in the debt-financed scenario. If tax rates are kept the same throughout the period (2011–2059), government revenues increase in the longer term, allowing for a smaller deficit in the future. To test the robustness of these findings, the simulation was run again to see how increased public investment affects GDP under the three financing methods, using values of 0.1, 0.3 and 0.6 for the impact such expenditures have on total factor productivity in South Africa (Figure 5). Whatever the financing method used, the results are similar for all three values (within a range of less than 1%).

Figure 4: Impact of increased public investment on debt-to-GDP ratio (BAU = 100)



Source: Author's calculations based on South African dynamic CGE model.

Figure 5: Impact of increased public investment on GDP (BAU = 100)



Source: Author's calculations based on South African dynamic CGE model.

In the current constrained fiscal climate, it is very tempting to treat public investment as an "adjustment variable". As finances are tightened, cutting public investments may be seen as a viable fiscal consolidation effort. However, as shown here, public investment represents a growth-enhancing form of public expenditure, and so by reducing public investment at a time of sluggish growth is potentially costly.

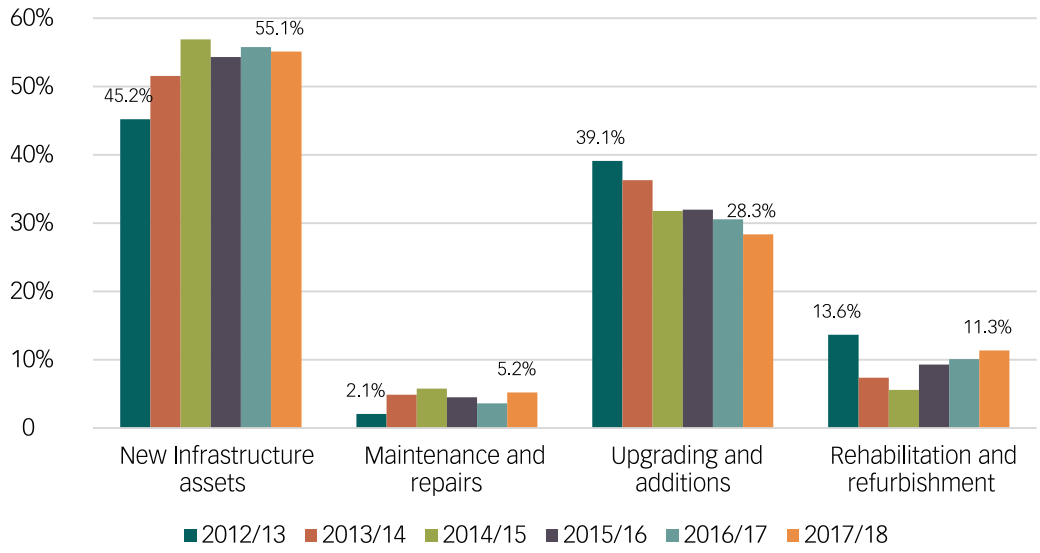
The focus now moves to government infrastructure spending and the effect of alternative financing arrangements on employment, both in the short and longer term. The investment plan discussed above is not able to generate sufficient activity in the economy to reduce unemployment substantially. When the increased infrastructure investment is financed through an increased deficit, GDP improves and unemployment reduces. When financed by tax increases, the implications for unemployment diverge. Financing the investment through increased VAT is pretty harsh on the economy, as everyone is affected, and is not "pro-poor" because all households (including the poor) are hit by an increase in VAT. An intermediate solution could incorporate a combined burden sharing between households and firms. Alternatively proceeds from a VAT increase could be recycled back directly to poor households as discussed in Mabugu et al. (2015). These findings have immediate policy implications.

The modelling results show a strong relationship between economic growth and public infrastructure investment financed through debt. Ultimately, bridging the capital finance gap will require accelerated economic growth. Once growth gets going, financing a higher level of service provision will become self-financing, as infrastructure that supports accelerated growth will lead to government receiving higher taxation revenue. This suggests a sequencing that runs from debt to infrastructure, to growth to tax revenues, and eventually higher service provision. In the short term, the scope appears limited for expanding national grants through aggressive tax reforms that raise available revenue, but will become feasible again after accelerated economic growth.

There are few simple answers to South Africa's weak economic growth rate and associated unemployment and poverty rates. The core requirements for more rapid and sustained growth are greater saving, investment, more productive use of capital by better skilled workers, and moderate unit labour costs. The issue of productivity is crucial. Higher labour productivity will increase the labour intensity of the economy as a whole. However, to get stronger growth in productivity requires wide-ranging changes to policies and incentives, including better management, skills development, research, etc.

Finally, maintenance and efficient use of existing infrastructure might be more important than building new infrastructure but is often assigned less priority. Figure 6 shows that by the end of the 2015 MTEF period, 55% of resources allocated to infrastructure investment will be for new infrastructure. The balance is allocated to repairing, rehabilitating and upgrading existing infrastructure.

Figure 6: Share of infrastructure spending by type



Source: Author's calculations based on National Treasury (2014)

Whereas spending on repairs and maintenance only reaches 5.2% by the end of the medium term, this does reflect an increase relative to the 2.1% allocated in 2012/13. Existing public capital stock is degrading rapidly, while the three spheres of government rush to identify new infrastructure investment projects. Unlike politically visible expenditure items, such as public sector wages, maintenance can be deferred (initially) without obvious signs of deterioration. However, if maintenance continues to be postponed indefinitely, the structural integrity of the asset declines quickly. Therefore, closing the "infrastructure gap" entails more than simply increasing new public investment. The failure to address this "recurrent cost", or deficient operations and maintenance expenditure problem will have powerful macroeconomic consequences, especially for the sustainability of growth and jobs.

1.6 Emerging Messages and Recommendations

In concluding the arguments above, three issues associated with public infrastructure and South Africa's unitary decentralised fiscal system emerge. First, how to ensure an institutional architecture that enables a certain level of services to be provided to the population and ensures resources do not leak. This requires stronger institutions at the subnational levels, as well as capacity for communities to exercise collective action in demanding services and in holding governments at all levels accountable. The analysis pointed to strengthening accountability frameworks and building requisite capacity/skills. In addition, maintenance programmes are lagging behind. The recommendations proposed here are crucial to respond to a rapidly changing world where skills, flexibility, openness and receptiveness to technological change are becoming ever more important for prosperity.

The second issue relates to how to finance the required infrastructure scale-up. Like in other developing areas, there is shortage of capital finance available to fund public infrastructure at all levels.[15] Resource constraints will, therefore, require trade-offs between competing national goals. Some scope does exist for spheres of government and their entities to expand their own financing of capital expenditures through improved operating performance. Options previously discussed by the Commission include improvements in expenditure efficiencies informed by ongoing expenditure reviews, debt collections efficiencies and so forth. Private funding will need to be sourced for some of the required infrastructure investments, although this needs to be better managed to avoid the negative experiences of Gauteng e-toll roads and electricity generation. The relationship between economic growth and debt-financed public infrastructure investment is strong at the national level and should be explored as an option. Ultimately, bridging the capital finance gap will require accelerated economic growth. Once growth gets going, financing a higher level of service provision will become self-financing, as infrastructure that supports accelerated growth initiatives leads to government spheres receiving higher taxation revenue returns. This suggests a sequencing running from debt to infrastructure to growth to tax revenues and eventually higher service provision. The issue of contribution to factor productivity is crucial. Infrastructure delivery has been driven mainly by a basic services equity approach rather than an economic growth stimulation approach. There needs to be a stronger emphasis on the economic role of infrastructure and a recognition that not all provinces have the same growth potential. At this stage, the scope appears limited for expanding national grants through aggressive tax reforms to raise available revenue but will become feasible again after accelerated economic growth.

The third issue related to intergovernmental transfers and revenue assignments is to reiterate that self-determination at the local level as a principle will always clash with the need for economies of scale and efficiency. In the future, fiscal decentralisation will have to take this fundamental challenge into consideration and allow for "alliances for success", for example with respect to tourism development. More asymmetric and differentiated approaches will be called for. Powers will need to be devolved according to the eventual economic benefit the question will be whether political devolution without the economic counterpart is worth pursuing at all. There might be no desire or need for blanket devolution, and decentralisation (with appropriate levels of assignments and access to resources) must be designed accordingly.

There is a pressing need to harness the power of public infrastructure, given its importance for national development and regional performance. With uncertain future economic prospects and tight fiscal conditions, public infrastructure must be better managed, to achieve the highest value for money and the greatest growth impact from spending public money. Improving the quality of investment governance can help, especially through coordinating investments and building capacity within subnational governments. Levels of public investment are limited by fiscal constraints, and so efficiency needs to be maximised

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[15] This is obviously at the aggregated level and at the individual level may not be so, for example existence of rollovers at subnational level. There is also shortage of infrastructure delivery capability such that if we increased the finances it would still not be absorbed.

through better economic growth and investment spending. Added to these challenges is that of corruption in public procurement and investment. Nevertheless, despite the challenges, South Africa has many assets that can be mobilised to its advantage. These include a resilient people, a world-class constitution, a NDP that sets the broad direction for the way forward for infrastructure development and its alignment within the country's 2030 vision. This chapter argues that South Africa should build on these strengths and, at the same time, address the inadequate institutional structures that have deterred long-term investment to support future prosperity. It has provided some direction on the areas of reform that could generate the strong growth, employment and poverty reduction outcomes.

With respect to creating conditions for the future prosperity of all South Africans from infrastructure-led growth, the study recommends that Government:

1. Develops the National Infrastructure Plan's funding strategy, so that the plan is fully funded to ensure projects are delivered on time and in accordance with the plan. Additional funds need to be raised to cover additional costs of all existing and future infrastructure plans. This has to be done in a sustainable and affordable way, and ensure that such expenditures required for the future operations and maintenance of these assets are catered for.

2. Redesigns capital conditional grants by (a) allowing for payment of infrastructure upstream costs of provinces and municipalities (e.g. a special fund for feasibility and pre-procurement studies), (b) making capital grants pledgeable, where an authority has adopted a well-founded and approved long-term capital strategy, and (c) extending the existing incentive/support for long-term capital planning by provinces and municipalities

3. Raises public debt, aggressively using available borrowing space, to help finance deserving and rigorously appraised infrastructure plans (e.g. based on performance and governance profiles). Municipalities should seek to expand debt financing of capital expenditures, with due regard for prudential benchmarks and ratios to ensure sustainability. The increase in debt levels should not trigger a review of the country's credit rating: well-planned and executed infrastructure ultimately pays its way through higher economic growth, and hence the country need not suffer a credit rating downgrade related to such funding mechanisms.

4. Improves acceptability of the user charge principle for higher levels of infrastructure services by (a) using equitable sharing (conditional and unconditional grants) to demonstrate better efforts being made to balance consumer's affordability to pay increased service charges (i.e. water, electricity, transport etc.), (b) undertaking transparent and robust willingness to pay (WTP), (c) making available better data on WTP and affordability, and (d) developing costing models for various services and impacts to demonstrate how such charges could/should be calculated (also determines appropriate level of service)

5. Ensures infrastructure procurement planning, contract award and management work in tandem at the highest strategic level with other elements of infrastructure management to raise efficiency. This can be done through ensuring that all conditional capital grants should not just give money, but make sure from a human resources perspective that the requisite procurement and engineering skills are there.

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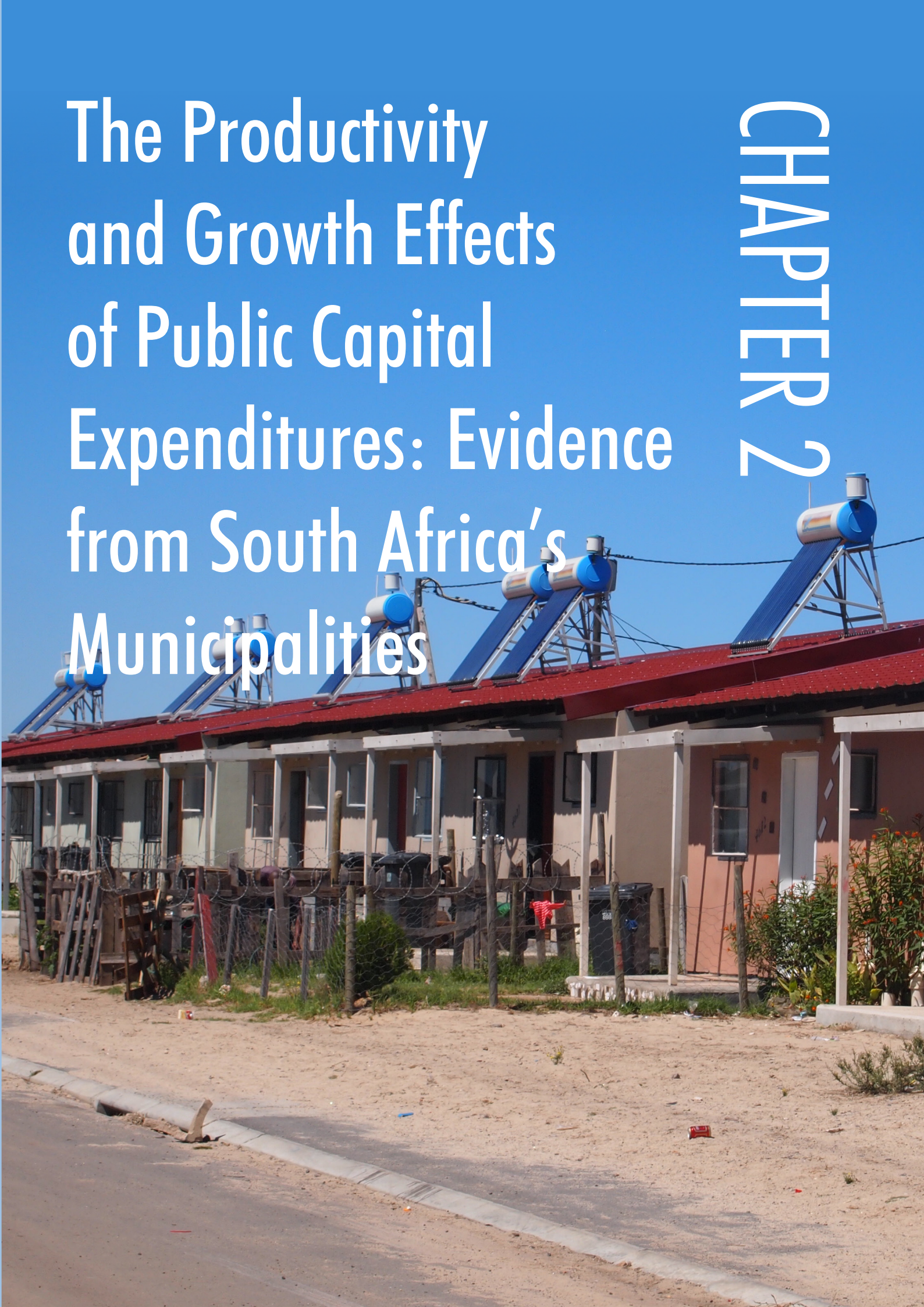
CHAPTER 2

The Productivity and Growth Effects of Public Capital Expenditures: Evidence from South Africa's Municipalities



CHAPTER 2

Economic Growth Effects of Municipal Capital Spending

Hammed Amusa[16]

2.1 Introduction

The seminal work of Aschauer (1989) found a positive correlation between reduced levels of investments in public infrastructure and declining productivity in the United States during the 1970s. Since then, numerous studies have emphasised the important, and often decisive, role of infrastructure investments in improving the quality of life of citizens, facilitating long-run growth and enhancing a country's productivity.[17] These findings have informed a number of policy recommendations for increased public sector investments, in order to deal with infrastructure challenges faced by nations around the world. In advanced economies, increased infrastructure spending, upgrading and modernising are viewed as essential to maintaining extensive transport, power, water and telecommunications networks, and sustaining long-term productivity growth. The Millennium Development Goals, and other efforts aimed at reducing poverty and improving economic growth in the developing world, require countries to invest a large proportion of their national income in critical infrastructure – water and sanitation, electricity and adequate road networks – to meet human development needs and support economic and social development (McKinsey Global Institute, 2013).

The positive relationship between infrastructure investment and an economy's growth and productivity is by no means the consensus view in the literature. For instance, in their analysis of 43 developing countries, Deverajan et al. (1996) found that government consumption expenditure has a positive impact on economic growth, but increased public investment expenditure (including transportation and communication) has a significant negative effect. Similarly, in an analysis of private and public investment in the United States and Canada over four decades, Voss (2002) found that increases to public infrastructure had an adverse effect on economic activity. The two main explanations for these contrary findings are:

(i) The negative effect of infrastructure investments in developing countries can be attributed to public resources being used for "white elephants", i.e. investments in unproductive projects that yield no future economic benefits (Pritchett, 1996).

(ii) Instead of playing a complementary role, increases in public infrastructure outlays may adversely affect economic activity by displacing or "crowding out" private investments.

The effect of crowding out private capital formation may be more detrimental when government borrows from domestic capital markets in order to finance increased public infrastructure spending (Agénor and Moreno-Dodson, 2006). Increased public sector borrowing could reduce the amount of capital available for private sector investments, thereby raising the cost of borrowing, if markets deal with the shortfalls by resorting to credit-rationing measures. This reduced private sector investment may be further compounded if expansion plans are revised downwards because of expectations that tax hikes will be used to cover any deficits incurred by financing public infrastructure through debt. In such cases, an increase in public infrastructure investment may well hamper, rather than foster, economic growth (Gómez-Antonio and Fingleton, 2012).

In a country like South Africa, where infrastructure investment is a key part of economic growth, an important question to consider is whether increasing public infrastructure investment will bring advantages or disadvantages. Since 2006, economic policy has shifted towards a development framework that emphasises accelerated capital expenditure aimed at improving education, health care, social security and public housing, and gives high priority to infrastructure investments that promote rural development and emerging strategic industries.[18] The policy shift is intended to deal with the gross neglect of infrastructure investment during the first post-apartheid decade. Since 2006, economic and social infrastructure investments have accounted for over 20% of total government spending (Figure 7). Public investment infra-

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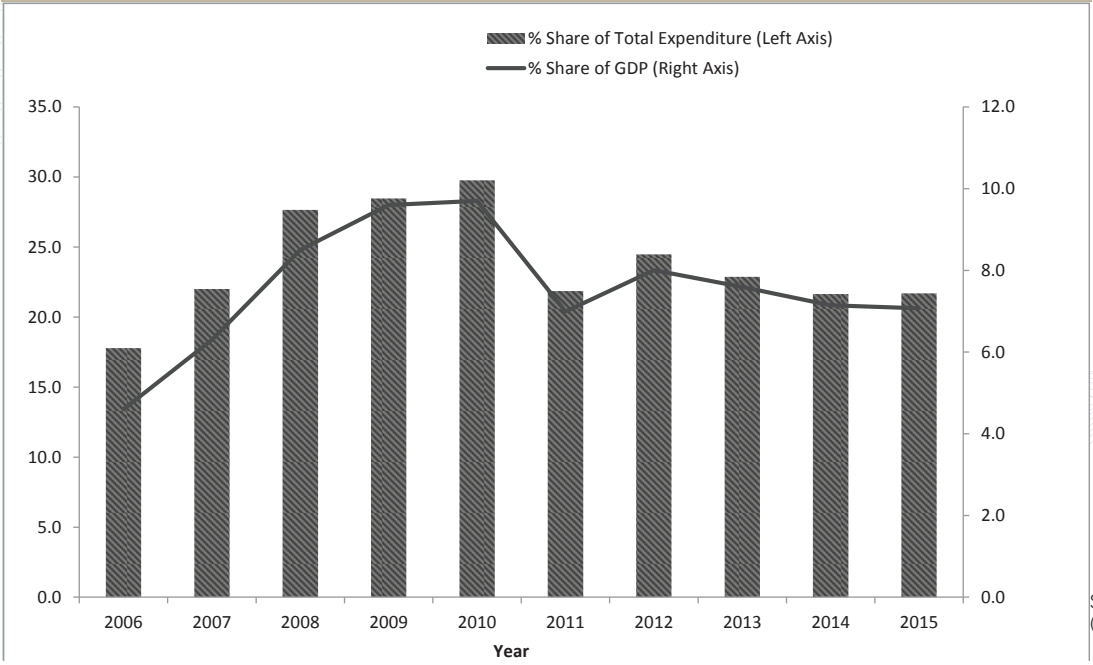
[17] See for example Everaert and Heylen (2001), Kemmerling and Stephan (2002), Fedderke et al. (2006)

[18] In 2006, the national government launched the Accelerated and Shared Growth Initiative for South Africa (AsgiSA), which was the result of extensive, comparative research undertaken by an international panel of economists at Harvard University's Center for International Development, AsgiSA identified six "binding constraints": currency volatility, an inefficient national logistics system, shortages of suitably skilled labour, market and regulatory practices that stifled new investment opportunities and the growth of small and medium enterprises (SMEs), and deficiencies in the state's capacity for service delivery. These six factors mitigated against the economy's prospects of halving poverty and unemployment through a sustained annual growth rate of 6%. To overcome these constraints, the AsgiSA framework focused on developing infrastructure, enhancing skills, promoting SMEs, and reinforcing the capacity of state institutions to augment social development (Looney, 2014). Although a framework for creating a "developmental state" replaced AsgiSA in 2010, the main pillars of current economic policy – the New Growth Path (NGP), the Industrial Policy Action Plan (IPAP) and the National Development Plan (NDP) – are anchored in substantially increased public capital expenditure.

structure as a share of GDP has also increased and is expected to average 7.6% for the period 2006–2015. This is in line with the 7–9% recommended by the United Nations Conference on Trade and Development (UNCTAD) as necessary for achieving broader economic growth and poverty reduction objectives.

Figure 7: Public infrastructure investment (2006–2015)



Source: National Treasury (2014)

2.2 Problem Statement

South Africa's decentralised cooperative governance system means that responsibility for increased public infrastructure investments is shared across all spheres of government. This responsibility is arguably more important for municipalities because local government is seen as crucial to addressing the apartheid legacy of unequal access to socio-economic infrastructure and economic opportunities. The country's Constitution of 1996 reflects this view, mandating municipalities to play a "developmental role" by fulfilling the "basic needs" of their communities.[19]

Give the importance of infrastructure investments for economic policy, municipal spending on its mandated functions have become an important component of public capital expenditures. Between 2006 and 2013, municipalities accounted for over 40% of total public infrastructure spending (Figure 8). This trend is expected to continue, as government plans to allocate over R800-billion (about $80-billion) to a three-year development plan (2013/14–2016/17) aimed at overcoming the spatial fragmentation of South Africa's built environment, improving public transport and accelerating investment in human settlements. Municipal improvements to reticulation, sanitation and sewerage processing plants will account for the bulk of the spending by all three spheres of government. Municipalities are also expected to align the increased infrastructure investment with their integrated development plans (IDPs)[20], to ensure more effective service delivery and promote local economic development.

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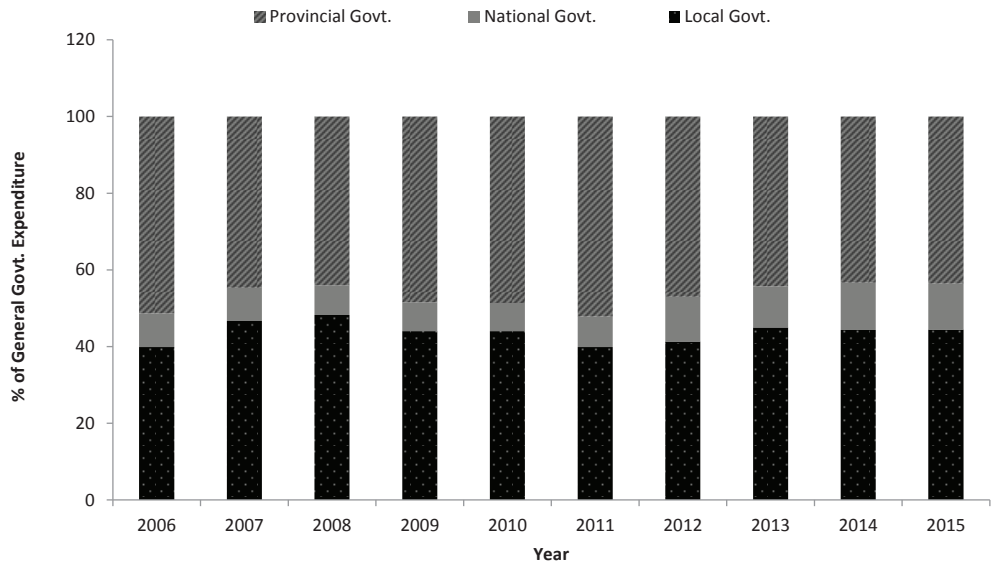
[19] In line with standard public finance theory – for example, Musgrave and Musgrave (1973) and Oates (1972) – this mandate is informed by the belief that within decentralised governance structures, local (or regional) administrations can use their knowledge of local conditions and needs of citizens to efficiently provide public goods and a better distribution of public services.

[20] In South Africa, every municipality is required to produce an IDP, based on the outcomes of an extensive consultative process between municipal authorities and local citizens. An IDP maps a municipality's future over the short, medium and long term. In particular, it takes into account the existing conditions, problems and resources available for development, and sets out a framework on how to address issues related to spatial planning, disaster management, financial management, and the infrastructure services needed for social and economic development.

Figure 8: Public infrastructure investment by government sphere (2006–2015)



Source: National Treasury (2014)

Following decades of under-investment and neglect, a generally held view is that South Africa's planned and significant infrastructure expansions will play an important role in boosting regional development and productivity (Kumo, 2012; National Treasury, 2014). However, the relatively poor service delivery across many municipalities has cast doubt on whether municipal infrastructure spending can create a sufficient foundation for regional economic growth. Potholed roads, crumbling water infrastructures and health concerns over poor sewerage systems have become frequently discussed issues in South Africa. In recent years, citizen protests have been about service delivery failures, not the lack of access to services, as was the case during the early years of democracy. Municipalities are significantly under-spending, on both asset renewals and maintenance, and have limited capacity to implement effective mechanisms for planning and delivering vital infrastructure (Kuye and Ajam, 2012). Given this under-spending of infrastructure budgets, providing additional funding is unlikely to have any meaningful impact. Indeed, in its 2014/15 Submission on the Division of Revenue, the Financial and Fiscal Commission (the Commission) argued that increased funding for infrastructure would have limited value unless the quality of the existing regulatory regime and poor municipal asset management and provision were first addressed (FFC, 2013).

This chapter assesses the effects of public capital expenditure on productivity and growth, using South African municipal data. South Africa's three spheres of government (national, provincial and local) operate within a quasi-federal structure, which is intended to foster a spirit of mutual cooperation and to facilitate the alignment of policy, legislation and overall service delivery programmes.[21] The strong interdependence of the three government spheres implies that policy decisions often involve trade-offs, between ensuring sufficient resources for each sphere to fulfil its constitutional mandate(s) and allocating scarce resources to the sphere best placed to implement expenditure (and public investment) programmes that will have the strongest impact on growth and development. This, coupled with very different socio-economic and institutional variables among municipalities, gives rise to interesting differences in the effects of growth-enhancing expenditures across time and local jurisdictions.

Given South Africa's strategy to enhance growth through significant public infrastructure investments, the value of this empirical study on the effects of public capital is two-fold. Firstly, it provides policy-makers with guidance on how scarce resources can be better mobilised and allocated to boost economic activity and foster social development. Secondly, it sheds light on the impact of specific fiscal policy components within the context of a decentralised, developing country. A number of studies have examined the link between public capital expenditure and economic growth/output productivity in South Africa.[22] However, none has separated the productivity and growth effects of the infrastructure spending by each distinct sphere of government.[23] This study examines the relationship between infrastructure investments and both economic growth and productivity, with a focus on local government (consisting of 234 municipal administrative structures), and is to the best of our knowledge the first of its kind in South Africa or Africa.[24]

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[21] The 1996 Constitution of South Africa stipulates a unitary system of governance in which the national and subnational units (i.e. provinces and local governments) operate not along hierarchical lines, but function as distinct, interdependent and interrelated "spheres".

[22] For a review of South African case studies, see Maisonnave et al. (2013) and Calitz and Fourie (2010).

[23] The paper by Marinkov (2012) is the closest to this study. However, in contrast to this study which focuses on a specific component of government spending (i.e. expenditures on infrastructure investment), Marinkov used aggregate expenditure and revenue to evaluate the impact of fiscal assignment on economic growth of municipalities and provinces.

[24] Outside of this study, we are only aware of the studies by Rauch (1994) and Yeoh and Stansel (2013) on cities in the United States that examine the relationship between public expenditures and productivity/economic output with a focus on subnational governments, rather than on states or nations.

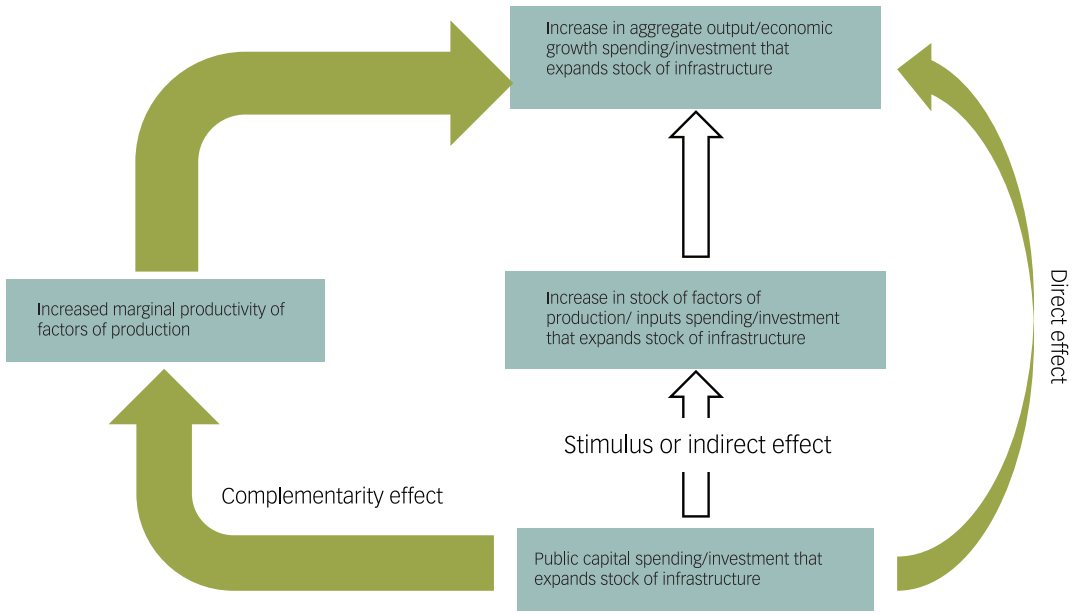
After a brief literature review, the institutional background on local governments is provided together with details of infrastructure spending at the municipal level. The theoretical framework is then presented, incorporating public capital expenditure into a Cobb–Douglas production function. The empirical counterpart to the theoretical model is introduced, and the dataset used to test the model is outlined. Following an empirical analysis and a discussion of the results, some concluding remarks and recommendations are made.

2.3 Literature Review

In studying the relationship between fiscal policy and economic growth, the literature on endogenous growth models (e.g. Landau, 1983 and Barro, 1991) has categorised the various components of government expenditures into two broad types: productive and unproductive spending. Productive government expenditures relate to socio-economic infrastructure that provides an enabling environment for growth by complementing the production process and raising the marginal productivity of factor inputs (land, labour and capital). Conversely, unproductive spending relates to government spending that does not directly affect production processes but benefits households (for example employee compensation and wages). Such spending is usually financed through taxes and so represents a shift of resources away from potential return-generating investment opportunities that could stimulate higher economic growth (Christie and Rioja, 2011; Devarajan et al., 1996).

Macroeconomic theory identifies two broad transmission mechanisms – traditional (or conventional) and alternative (or neo-conventional) – through which public spending on productive infrastructure can positively affect economic growth. Within the conventional transmission framework (illustrated in Figure 9), the first and often advanced channel reflects a direct productivity effect. It assumes that infrastructure is a form of physical capital and thus a direct input into the production process. Therefore, higher levels of public investments in infrastructure would result in increased marginal productivity of private inputs, thereby raising the rate of return on private investment. In such cases, the increased rate of return would encourage higher levels of output to meet any increased private demand for physical capital, an outcome that induces economic growth (Dissou and Didic, 2013).

Figure 9: Channels through which infrastructure spending affects growth



Source: Adapted from Fedderke and Garlick (2008)

The second conventional channel posits that increased spending on public capital generates a complementarity effect by either lowering the costs of production or raising the marginal productivity of factor inputs (land, capital and labour) employed in the production process. For example, public investment aimed at ensuring constant electricity supply lowers the cost burden for firms, which would otherwise have had to source expensive, alternative sources of power supply. Providing reliable power supply also assists in the efficient use of heavy machinery and equipment across industries, raising the marginal productivity of factor inputs. Thus, public investments in productive infrastructure, which lowers operating costs of firms and raises marginal productivity of factor inputs, may create profitable avenues for both foreign and domestic investment opportunities, directly boosting overall economic activity (Fedderke and Garlick, 2008).

Independent of the conventional transmission routes outlined above,[25] recent studies have identified a number of alternative channels through which infrastructure may influence economic growth. Ferreira (1999) suggests that public investments that expand the existing stock of productive infrastructure can have a stimulus or indirect effect, by generating positive externalities that boost the accumulation of factors of production (labour and capital) or raise the productivity of factors of production. For example, public investments targeting improved access to, and use of, quality health and education infrastructure can create a better educated and healthier labour force. Similarly, where public investments improve public transportation networks, workers are able to commute to their jobs more easily and rapidly (Dissou and Didic, 2013). Increased human capital and movement of human capital stimulate increased labour productivity, ensuring that public investments indirectly contribute to economic growth.

In addition to the stimulus effect, Agénor and Moreno-Dodson (2006) argue that public spending on infrastructure maintenance may positively affect growth by improving the durability of private capital. Public sector spending on repairs and maintenance not only enhances the quality and longevity of public infrastructure, but also lowers the rate of depreciation and maintenance spending by the private sector. For example, by investing in maintaining the quality of public road networks, government can assist the private sector to extend the lifespan of capital equipment used to transport its output and workforce across (and within) different economic regions (Agénor, 2005). With less expenditure on capital resources, the public sector is able to allocate resources to other profitable or growth-enhancing investment opportunities.

The literature provides plenty of evidence to support the hypothesised transmission channels detailed above. Reinikka and Svenson (2002) surveyed the investment responses by firms in Uganda to structural reforms. They found that poor public infrastructure lowers productive investment by firms because the private sector is compelled to make investments in their own capital rather than in investments with potentially higher rates of return. In the Philippines, Tereul and Kuroda (2005) found that providing more public infrastructure reduces production cost and contributes to increased productivity growth within the country's agricultural sector. Finally, studies on the provision of health care and education facilities, especially within developing countries, (e.g. World Bank, 2005; Saghir, 2005) have shown that close interlinkages between health and education can magnify the effects of an increase in public infrastructure on economic growth. For instance, public sector investments in road infrastructure creates a spill-over effect, making it easier for citizens to attend school and access health care. Such access creates a virtuous cycle, as healthier citizens are more likely to further their education and training, making them more productive within the labour market. Investing in education and health facilities also enhances life expectancy of a country's population, lowering uncertainty about longevity and the risk of death, thereby contributing to an increased propensity to save. The sum total of these effects are improvements in labour productivity and competitiveness, which attracts investment and compounds economic growth (Agénor and Moreno-Dodson, 2006).

2.4 Institutional Background and Infrastructure Investment in Municipalities

Transforming and establishing local government structures was a considerably more drawn-out process than for the other spheres in South Africa's intergovernmental system, reflecting efforts to overcome the legacy of apartheid. Pre-1994, the formal practice of racial segregation found expression in race-based municipal authorities, whose primary function was to create and perpetuate local separation and inequality. Under the Group Areas Act (No. 41 of 1950), South Africa's towns and cities were divided into areas exclusively owned and occupied by a designated race group. The apartheid system of local government segmented the country's regions according to how and where the public sector delivered goods and

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[25] While the direct and complimentary effects have a positive impact on economic growth and collectively reflect a crowding-in effect on private sector investment, the literature also recognises a third conventional channel – the crowding-out effect, which can have a negative impact on growth. Increases in public infrastructure spending funded through borrowing from domestic capital markets may reduce the amount of capital available for private sector investments. If the private sector's demand for capital is sufficiently high, constraints on available domestic capital could "crowd out" the private sector by raising borrowing costs and prompting credit-rationing, adversely affecting private sector capital formation. Anticipation that tax increases will be used to finance public debts incurred in financing infrastructure programmes may cause downward revisions to intended investment plans by the private sector, a move that will further exacerbate any slowdown in the rate of private sector capital formation. By crowding out the private sector, deficit-financed public capital spending may constrain, rather than enhance, economic growth.

services, creating great inequalities in access between well-resourced white areas (or suburbs) and poor black communities (Smith and Vawda, 2003).

Most of the country's white population lived in urbanised neighbourhoods located around areas of relatively lucrative commercial activities. These areas were under the jurisdiction of White Local Authorities (WLAs), which had powers to levy property rates and charge trading services (on the provision of electricity, water and sanitation). WLAs generated over 90% of revenue from own sources and allocated most of their revenues to funding parks, libraries, schools and public facilities, creating model environments not even found in more developed countries (Zegeye and Maxted, 2003).

In South Africa's non-white areas, especially those designated as African communities, administrative powers were vested in Black Local Authorities (BLAs).[26] However, BLAs were perceived as apartheid institutions designed to entrench segregation and lacked legitimacy among the (black) communities they were intended to serve. The ability of BLAs to develop revenue sources was severely limited by apartheid restrictions on economic development in black areas, the lack of socio-economic infrastructure able to generate service fees and the payment boycott (of rents and service charges). As a result, BLAs generated very little own revenues and gained a reputation of beleaguered institutions lacking the capacity to provide critical socio-economic infrastructure and implement efficient financial systems (Shubane, 1991).

Thus the democratically elected government inherited a local governance framework designed to provide quality services for a privileged minority and to systematically exclude the majority of citizens from owning land in urban areas and accessing basic socio-economic services (such as education and health care). After the 1994 elections, the government embarked on a transition process towards developmental local government that aimed to: (a) establish a more participatory and inclusive system of municipalities and (b) reform and strengthen the administrative capacity of municipalities, in order to address the apartheid legacies of spatial segregation, inequality and poverty.

To achieve the broad goal of developmental local government, the Constitution assigns substantial powers and functions to municipalities. Like the WLAs in the past, the most important municipal functions relate to the provision of infrastructure to support the delivery of socio-economic services, including water, sanitation, roads, storm water drainage and electricity. To ensure that municipalities have the fiscal capacity to carry out mandated functions, local governments are granted relatively broad revenue sources compared to provinces. The main revenue bases are property rates and user fees on water, electricity and sanitation services provided by a municipality. The Constitution also entitles municipalities to an equitable share of nationally collected revenues (Bahl and Smoke, 2003).

Two factors have largely shaped municipal investments in social and economic infrastructures: (i) the constitutional mandate that municipalities have a developmental role to play, and (ii) the overarching macroeconomic policies developed by the national government.[27] Following the 1994 transition, the first major economic policy implemented was the Reconstruction and Development Programme (RDP). The RDP proposed a leading and enabling role for the state, and advocated for prioritising spending on social development, to meet government's objectives of a more equitable distribution of wealth and the provision of essential basic services (Adelzadeh, 1996).[28] In 1996, the RDP initiative was supplemented with a new policy – the Growth, Employment and Redistribution (GEAR)[29].

The GEAR reforms were aimed at stimulating economic growth and improving government finances in order to provide the budget resources necessary for targeting poverty alleviation and social development. These policies resulted in increased municipal capital spending.[30] Between 2001 and 2006, capital expenditure increased from R6-billion to R20.9-billion, or an average annual growth of 18.5% in real terms. As Figure 10 shows, infrastructure-related spending was a significant share of total municipal capital expenditure, averaging 60%. Since 2006, government has continued to ramp up public infrastructure investments, as a platform for faster, more inclusive economic growth. With the exception of the immediate periods before and after South Africa's hosting of the soccer World Cup in 2010, growth in municipal capital expenditure has remained positive, and almost all capital expenditures have been (and are) investments in core socio-economic infrastructure.

[26] During apartheid, the term "Black" referred collectively to non-white persons that apartheid legislation radically discriminated against. In the post-apartheid dispensation, apartheid racial classifications were removed when the Population Registration Act (No. 30 of 1950) was repealed in 1991; it was replaced by the Identification Act (No. 68 of 1997). However, the Employment Equity Act (No. 55 of 1998), which outlines the transformation of South Africa's social, economic and political institutions, speaks of "designated groups" to include "black people, women and people with disabilities". The Act defines "black" as referring to "Africans, Coloureds and Indians". Hence, this study cannot describe the apartheid-era decentralisation and consequent economic effects without recourse to such racial classifications. Their use in this study, however, does not imply their legitimacy.

[27] In South Africa's model of an integrated and cooperative federalism, the national government is established as the dominant sphere responsible for formulating many social and economic policies delivered by provincial and local governments Smoke (2001).

[28] Concomitantly, the RDP also advocated a prudent fiscal policy and included strategies, such as tax reform, debt consolidation and the reduction of debt service costs, which were undermining the new government's socio–economic objectives (Faulkner and Loewald, 2008).

[29] The main aim of the GEAR strategy was to transform South Africa into a globally competitive, export-oriented economy. To achieve this, GEAR focused on expenditure restraints (to reduce the deficit-to-GDP ratio and contain the costs of servicing public debt), tight monetary policy (to lower inflation) and tax and trade reforms.

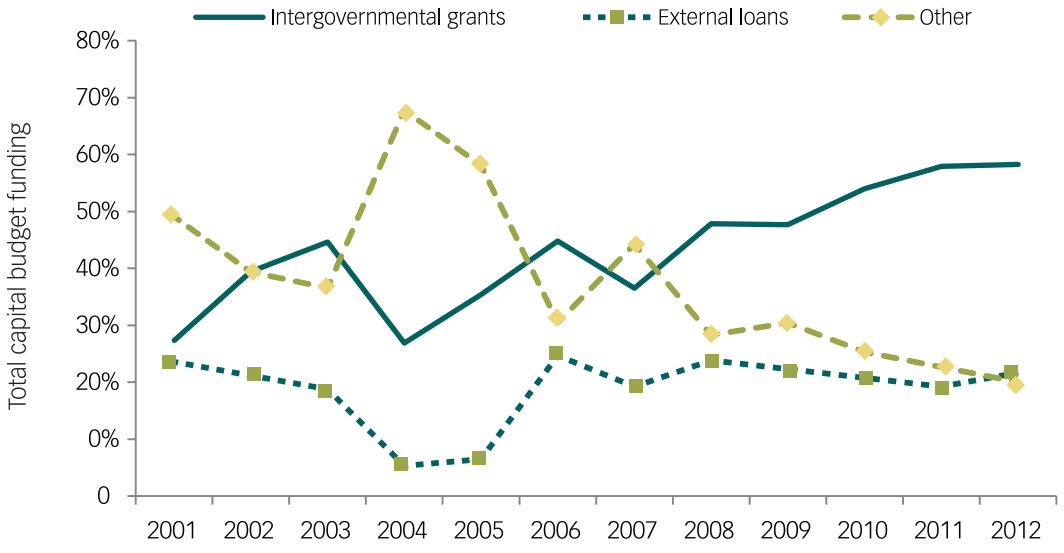
[30] Municipal capital expenditure refers to spending on infrastructure and non-infrastructure assets. Infrastructure capital expenditure refers to acquiring new assets for delivering services related to water and sanitation, electricity, housing and roads and storm water. Non-infrastructure capital expenditure consists of assets such as land and buildings, fleet vehicles, specialised vehicles such as ambulances, and information technology networks that support administrative functions of municipalities.

Figure 10: Trends in municipal capital expenditures (2002–2012)

Source: National Treasury (various years)

In aggregate, municipalities generate 90% of their total operating revenues from own sources,[31] but most capital spending is financed through intergovernmental grants and external loans sourced from institutions such as the Development Bank of Southern Africa. Prior to 2006, municipalities funded, on average, over 40% of their capital budgets through internally generated revenues. In 2007, internally generated funds accounted for R17-billion of the total municipal capital budget, declining to R7.8-billion in 2012. During the same period, intergovernmental grants and external loans became the key sources of capital funds for municipalities (Figure 11).

Figure 11: Contribution to municipal capital funding (2002–2012)



Source: National Treasury (2011)

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[31] It is important to note that there exists a wide variation in the generation of own-revenues, from the large metropolitan municipalities that raise nearly all of their revenues from own-sources to small, mainly rural municipalities that have very limited fiscal capacity and are solely reliant on intergovernmental transfers.

Two factors account for the decline in municipalities' own contributions to capital expenditure. (1) Municipalities are finding it more difficult to generate surpluses on their operating budgets due to cost pressures that are, to a large extent, the result of having to meet national government's goal of universal access to basic services for all households. Municipalities have to provide free basic services (FBS) in water, electricity, sanitation and refuse services to all citizens, especially those residing in poor households. (2) Municipalities are using the Municipal Infrastructure Grant (MIG)[32] instead of internally generated ("own") revenues, which they are spending elsewhere on the municipal operating budgets (National Treasury, 2014). In 2004, a total of R4.4-billion was allocated to municipalities via the MIG programme. By 2013, this figure had more than tripled to R15.5-billion (about US$1.5-billion).[33]

Despite the heavy reliance on national transfers, municipalities retain significant autonomy in planning for and implementing infrastructure programmes. This autonomy reflects the prevailing view that infrastructure grants channelled via the MIG must promote and reinforce the municipality's IDP, which identifies strategies for addressing service delivery backlogs and socio-economic disparities.

2.5 Productivity Effects of Public Capital

2.5.1 Analytical framework

Following the lead of previous studies (e.g. Morrison and Schwartz, 1992; Holtz–Eakin, 1994; Barro and Sala-i-Martin, 1991; De Mello, 2002; Yeoh and Stansel, 2013), an aggregate Cobb–Douglas production function is specified for the regional[34] output in municipality i at time t of the following form:

$$Y_{i.t} = A\phi[L, K_p] = A_{i,t} Kp_{i,t}^{\alpha} L_{i,t}^{\beta} \qquad (1)$$

where Y is real output, Kp is the private capital stock, L is labour, and A captures the efficiency of production (or total factor productivity). α and β are the shares of regional labour and private capital, and are assumed to add up to $1\ (\alpha + \beta = 1)$, implying constant returns to scale.

Output per worker can be derived by dividing Eq. (1) by $L_{i,t}$ and is specified as:

$$\frac{Y_{i,t}}{L_{i,t}} = A_{i,t}\left[\frac{Kp_{i,t}}{L_{i,t}}\right]^{\alpha} \qquad (2)$$

where $Y_{i,t}/L_{i,t}$ is productivity per worker, and $Kp_{i,t}/L_{i,t}$ is the capital–labour ratio.

A standard productivity accounting equation can be derived by taking the natural logarithm of Eq. (2):

$$y_{i,t} = a_{i,t} + kp_{i,t} \qquad (3)$$

To examine the effect of infrastructure investments by municipalities, let total factor productivity depend solely on municipal public capital stock as follows:

$$a_{i,t} = T_t + \gamma Kg_{i,t} + \varphi_i \qquad (4)$$

where T_t is the technology available to all municipalities at time period t, $Kg_{i,t}$ captures public capital stock in the i^{th} municipality in year t, and φ_i is municipal-specific effects. Municipal-specific effects are included in Eq. (4) to control for unobservable municipal-specific effects that may affect either the level of technology or the productivity of output in ways that are difficult to quantify. For instance, politicians in charge of local authorities can use their standing within the ruling national party to secure guaranteed loan financing for municipal infrastructure programmes, but establishing a cardinal value for the ability of politicians to exert influence is problematic. Measuring the level of technology is also often difficult, and so most studies capture T as a time effect common to all regions for a given year. As Yeoh and Stansel (2013) suggest, such time effects can be consistently estimated using dummy variables for each year included in the sample.

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[32] Previously fragmented infrastructure grants for municipalities were consolidated into a single conditional grant programme – the Municipal Infrastructure Grant (MIG).

[33] Transfers from national government to local government are through unconditional and conditional grants. In terms of the 1996 Constitution, a municipality is entitled to an equitable share of nationally raised revenues to enable it to carry out its mandated functions and provide basic services. Each municipality's equitable share is allocated as unconditional transfers, using the local government equitable share formula. Conditional grants are allocated to municipalities to enable them to deliver on their mandated functions to eradicate backlogs in crucial infrastructure and essential basic services, and to support municipal capacity-building initiatives. Therefore, conditional grants are of two main types: infrastructure and capacity building. The MIG is the largest conditional grant transfer and is allocated using formula that take into account poverty, backlogs, and municipal powers and functions.

[34] The term regional is used to denote the area of jurisdiction or authority within which a municipality can exercise its fiscal responsibilities and mandated functions relating to economic development and social services.

Substituting Eq. (4) into Eq. (3) yields the following expression[35]:

$$y_{i,t} = T_t + \gamma Kg_{i.,t} + \alpha kp_{i,t} + \varphi_i + \xi_{i,t} \quad (5)$$

where all variables are as described above and $\zeta_{i,t}$ is the corresponding disturbance term that is assumed to be independent and identically distributed with zero mean and constant variance σ^2_{ζ}.

Eq. (5) represents the analytical framework for estimating the extent to which municipal infrastructure investments affect the productivity of regional output. In the log-normal specification of Eq. (5), the slope coefficient for public capital stock yields the elasticity of output per worker with respect to a change in the level of gross fixed capital formation by the public sector within municipalities. Hence, Eq. (5) states that additions to the stock of private and public capital will augment productivity of regional output by and > 0, respectively.

Eq. (5) represents the baseline model. To make the model more robust, it is appropriate to estimate a more general formulation of Eq. (5), given as:

$$y_{i,t} = T_t + \gamma Kg_{i.,t} + \alpha kp_{i,t} + \delta X_{i,t} + \varphi_i + \xi_{i,t} \quad (6)$$

where, in addition to the variables defined above, X is a vector of exogenous variables that are known in the literature to affect productivity of output. These include municipal population size, municipal land size, real income per capita, and municipal unemployment rate. For ease of discussion, the full regression model can be written as:

$$\begin{aligned} y_{i,t} = T_t + Kg_{i,t} + kp_{i,t} + \delta_i pop_{i.t} + \delta_2 land_{i,t} \\ + \delta_3 income_{i,t} + \delta_4 Unemp_{i,t} + \varphi_{i,t} + \xi_{i,t} \end{aligned} \quad (7)$$

where the lower case letters denote natural logarithms.

Eq. (7) includes a control for municipal population size (*pop*) to capture two possible effects: (i) the potential for municipalities to gain cost advantages when providing identical levels of public goods in densely populated communities, and (ii) the possibility that expansions in population sizes may impose additional demands on municipalities to provide more public goods (and services). A control for municipal land area in square kilometres (*land*) is included to account for the effect of boundary changes, such as the disestablishment and incorporation of the Kungwini local municipality and the Metsweding district municipality into the Pretoria/Tshwane metropolitan municipality in 2011. Real (*personal*) income per capita (*income*) captures the potential effects of regional wealth on productivity of output. The quantity and quality of services provided by a municipality is dependent on its fiscal capacity: regions with wealthier tax bases may be able to provide more public goods, and invest in socio-economic infrastructure that attracts mobile factors of production. Finally, the unemployment rate (*Unemp*) is included to capture the effects of the business cycle in a given municipality.

2.5.2 Description of the data

From Eq. (5), both private and public capital stocks are an essential input in the production of regional output and, therefore, necessary variables to include in the regression analysis. However, like most developing countries, South Africa does not have a sufficiently long (and official) time series dataset for capital stock held by the private and public sectors. An alternative is to apply the PIM to a dataset of public and private investment spending to generate stock data for both types of capital. While South Africa's experience with local government structures stretches back to the early 1900s, municipal characteristics (such as coverage areas, boundaries and functions) have changed since the 1970s. This means that accurate data is not available to match historical investment data with current municipal structures. To overcome this challenge, proxies are used for public and private capital stocks.

Following the approach of Rauch (1995) and Yeoh and Stansel (2013), productive public expenditures are the proxy for public capital stock, i.e. municipal spending on core infrastructure for roads, water and sanitation, electricity and sewerage systems. Municipal spending consists of two categories: current ex-

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[35] This equation can be interpreted as a standard two-way fixed effects model that includes dummy variables to capture municipal and time-specific effects.

penditure (such as the municipal wage bill and pensions), and capital or investment spending. Capital spending can be further separated into tangible assets (such as roads, water and sanitation, as well as operations and maintenance) or intangible assets (education, health and human capital). Unlike current spending which a priori is considered unproductive, capital spending is considered productive, as such spending can boost output growth by augmenting private investment (De Mello, 2002). According to Nakahigashi (2009), gross value added (GVA) generated from private capital stock results in the consumption of fixed capital, with such consumption representing capital depreciation and distribution to economic entities that provided capital. According to Nakahigashi (2009), GVA generated from private capital stock, as contribution of private capital, consumes fixed capital through capital depreciation and distribution to economic entities that provided capital. Hence, gross value added by the private sector can be viewed as an approximation of output obtained from optimally using the available private capital stock. Based on this hypothesis, the GVA per worker is used as a proxy for the stock of private capital in municipalities.

Different types of public expenditure affect the health, education and labour productivity of a municipality's residents in various ways. However, inconsistent reporting by municipalities makes it difficult to include separate variables for each individual component of municipal infrastructure spending in the model. For example, municipalities that lack engineering capacity often employ private contractors to install water and sanitation infrastructure, but this expenditure could be listed under bulk purchases, which is part of municipal operating expenditure. As a result of this irregular accounting practice, in some years certain municipalities recorded zero outlays on water and sanitation. To overcome such inconsistences, a simple sum of the four categories of municipal capital expenditure (electricity, housing, roads and storm water, and water and sanitation) is divided by municipal population to obtain a measure of per capita capital expenditure by municipality. Using population size of a municipality as the denominator is appropriate because public goods and services are generally non-excludable and accessible to all local residents.[36] Data on municipal authorities' capital spending was obtained from National Treasury's local government database.

Global Insight's Regional Explorer database reports the aggregate value of GVA, in real terms, by municipality and by 34 detailed Standard Industrial Classification (SIC) sectors. To obtain GVA per worker in the private sector, GVA figures are excluded for industries where government has a dominant presence, i.e. public administration and defence, education, health and social work, as well as the collection, purification and distribution of water. Both municipal output (measured as real gross domestic product per region, i.e. GDP-R) and private sector GVA are divided by the total number of persons employed within a local jurisdiction during the year. These values yield the municipal output–labour (labour productivity) and private GVA–labour ratios. The Regional Explorer database also provides the data on municipal population size, municipal land size, real income per capita, and municipal unemployment rate. Table 5 presents summary statistics of the variables included in Eq. (7).

Table 5: Definition of variables and descriptive statistics

Variable	Description	Mean (Std.Dev)	Source
Y	Dependent variable measured as municipal output (or regional gross value added) per worker (in constant 2005 Rands)	148.6 (63.68)	Global Insight
K_g	Per capita municipal spending on public infrastructure (in 2005 constant Rands)	0.34 (0.54)	National Treasury
k_p	Municipal private capital measured as private sector gross value added per worker (in constant 2005 Rands)	530.16 (1932.72)	Global Insight
pop	Municipal population size	210143 (475333)	Global Insight
land	Municipal land size (in square kilometres)	4750.54 (5378.95)	Global Insight
income	Municipal personal per capita income	24388.04 (24019.94)	Global Insight
Unemp	Municipal unemployment rate	0.274 (0.130)	Global Insight

Note: Data is municipal-year observations for 234 municipalities over the period 2003–2012.

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[36] This is especially true in the case of services offered by municipalities under the FBS programme.

2.5.3 Estimation procedure and empirical results

Including municipal-specific effects, φ_i, in Eq. (7) recognises the existence of time-invariant, municipal-specific characteristics that may result in significant variations in municipal output, but are excluded from the vector of control variables due to unobservability or measurement difficulties. Excluding variables that capture such characteristics creates the problem of omitted variables that may bias the estimates of the regression model. Estimating Eq. (7) using panel data can help overcome this problem, as it allows for municipality variations to be investigated by including municipal-specific effects incorporating unobserved heterogeneity (Baltagi, 2013; Wooldridge, 2002).

Although a useful and more encompassing approach would be to consider the structure of the data, a balanced panel data is considered here. Observations of the dependent and explanatory variables are grouped by municipality. In turn, the location of municipalities implies that local authorities can be grouped by different regions (provinces) or by type (metropolitan, secondary town or rural area). In the social science literature (particularly political science and sociology), this type of data is known as hierarchically structured data. By convention, repeated measurements (of socio-economic and political variables) are at the lowest level in the hierarchical structure and thus defined as level-1 units, while jurisdictions are level-2 units that contain the level-1 units.[37]

One assumption of the single-level multiple regression model is that residuals for each municipality, $\zeta_{i,t}$, are uncorrelated with one another. However, grouped or clustered data induces unobserved heterogeneity. If estimates fail to take such clustering effects into account, the independence assumption will be violated. This problem can be overcome by dummy variable for the different clusters, in which case a fixed effects model is estimated. However, a drawback of the fixed effects approach is that it makes use of only within-individual differences, essentially discarding variations between individuals. Where predictor variables vary greatly across a unit of analysis (for example individuals, municipalities or countries) but vary little over time for each unit, then fixed effects estimates will be very imprecise (Allison, 2009).

According to Baltagi et al. (2001), when data is grouped or clustered, unobserved group and within group effects can be controlled for by estimating Eq. (7) using a multi-level model.[38] Given the intergovernmental framework that exists in South Africa, Eq. (7) can be rewritten as a basic three-level multi-level model in which observations of the variables in time period t are nested in municipality i located in a province j. This is written as:

$$y_{jit} = \tau + T_{jit} + Kg_{jit} + kp_{jit} + \delta_i pop_{jit} + \delta_2 land_{jit} + \delta_3 income_{jit} + \delta_4 Unemp_{jit} + u_{jit} \quad (8)$$

where τ is the constant term, y_{jit} could denote (the productivity of) the output of the i^{th} municipality in the j^{th} province in time period t. The subscripts for the explanatory variables follow the same definition.

The disturbance term in Eq. (8) is given by:

$$u_{jit} = \upsilon_j + \varphi_{ji} + \xi_{jit} \quad (9)$$

where υ_j denotes the j^{th} unobservable province specific effect which is assumed to be $iid\ (0, \sigma^2_{\upsilon})$, φ_{ji} denotes the nested effect of the ith municipality within the jth province which is assumed to be $i.i.d\ (0, \sigma^2_{\varphi})$, and ζ_{jit} denotes the rest of the disturbance which is also assumed to be $iid\ (0, \sigma^2_{\zeta})$. The $\upsilon_j S$, $\varphi_{ji} S$ and $\zeta_{jit} S$ are independent of each other and among themselves. This represents a nested classification, in that each successive component of the error term is imbedded or "nested" within the preceding component (Baltagi et al., 2001). Eq. (8) can viewed as consisting of two components: a fixed part (which specifies the relationship between the mean of y and explanatory variables) and a random part that contains the hierarchical residuals. Taking these components into account, a detailed version of Eq.(8) can be expressed as:

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[37] Other notable examples include the grouping of countries into regional economic and trading blocs, reading achievement scores at the student level and teacher–student ratios at the school level.

[38] Luke (2004) used a multi-level model to study the influence of tobacco industry political action committee on tobacco-related voting behaviour of members of the US Congress. Multi-level models have also been used to analyse internal migration in Estonia (Kulu and Billari, 2004) and to study regional variation in earnings inequality in contemporary urban China (Xie and Hannum, 1996).

$$Eq.(8) = \begin{cases} \tau + T_t + \gamma Kg_{jit} + \alpha kp_{jit} + \delta_1 pop_{jit} \\ + \delta_2 land_{jit} + \delta_3 income_{jit} + \delta_4 Unemp_{jit} : \text{Fixed Part} \\ \\ \upsilon_j + \varphi_{ji} + \xi_{jit} : \text{Random Part} \end{cases}$$

where the fixed part parameters are γ, α and δ_1 - δ_4, and the random part parameters are σ^2_{φ} and σ^2_{ζ}, respectively.

Table 6 presents the results of the multi-level model. The first column gives results with the explanatory variables excluded, while the second column is the full model that includes all variables specified in Eq. (8).

Table 6: Multi-level model estimates of Eq. (8)

Variable	Description	Mean (Std.Dev)
kg	-0.003 (0.01)	-0.004 (0.004)
kp	0.01 (0.016)	0.10** (0.02)
2004 Dummy	0.04*** (0.003)	0.03*** (0.004)
2008 Dummy	0.11*** (0.02)	0.01 (0.02)
2012 Dummy	0.20*** (0.02)	0.20** (0.02)
pop		0.04 (0.03)
land		-0.001 (0.03)
income		0.69*** (0.03)
unemp		0.79*** (0.13)
τ	4.75 (0.08)	-2.52 (0.60)
Random effects		
σ_{υ}	0.122	0.258
σ_{ψ}	0.351	0.385
σ_{φ}	0.06	0.03
x^2	2876	15490.7
Number of observations	2340	2340
Number of clusters	9; 234	9;234

Note: The numbers in parentheses are robust standard errors. (*), (**) and (***) denote statistical significance at the 10%, 5% and 1% levels, respectively. Both models include a dummy variable for each year (2004–2012) to capture the time–specific effects. The data is grouped by 234 municipalities that are distributed across the country's nine provinces.

The results in Table 6 support the hypothesis that a growth in private capital and regional wealth indirectly enhances the productivity of capital and labour used to generate products and services. Private capital stock (represented by kp in Column 2) has a positive and statistically significant effect on the (municipal) output–labour ratio: a 1% increase in private capital stock will increase labour productivity by 0.1%. The relationship between municipal per capita income (income) and labour productivity is also positive and statistically significant. The effect on the unemployment rate is also statistically significant: a 1% increase in unemployment will boost labour productivity by 1.2% (*exp*(0.79)-1).

These results can be explained by the dynamics of the post-1994 economy in South Africa. Following decades of race-based employment discrimination, the demise of apartheid resulted in an increased supply of relatively unskilled labour, in particular an unprecedented influx of African women into the labour market. However, the demand for this labour did not match the supply. Two factors made the situation worse: (i) the shrinking mining and agricultural sectors, which had previously absorbed much of the country's relatively unskilled labour; (ii) the end of international isolation and South Africa's policy shift towards a competitive, export-oriented economy, which required more skills. As a result, unemployment among the less-skilled and/or less-experienced workers ballooned, while highly-skilled workers saw their real wages and productivity increase, as industries and the economy as a whole shifted towards capital- and skill-intensive production methods (Banerjee et al., 2007).

With the exception of the coefficient for 2008, the parameters for the year dummies that capture the effects of technology (*T*), are all positive in relation to the excluded 2003 dummy and statistically significant at the 5% level.[39] This suggests that available technology after 2003 played a positive role in increasing labour productivity. Finally, the results from the multi-level model estimation of Eq. (8) provide no evidence of a statistically significant relationship between municipal expenditures on infrastructure and labour productivity during 2003–2012. However, these results are benchmark findings and a first step in the empirical analysis.

A potential drawback of the multi-level estimates is the endogeneity of the predictor variable , as unobservable factors that influence the dependent variable (*y*) may also affect the variable capturing municipal infrastructure spending. Kg may also be correlated with the error term ζ_{jit} which may bias the parameter estimates. Different channels through which endogeneity may result are important here. For example, municipal preferences for particular public goods may be heavily influenced by strong interest or client groups (such as pensioners or youth groups). These groups seek to affect the level (and type) of public infrastructure investments by lobbying for targeted services, such as city parks or old age homes, that benefit their specific group(s) and reduce available resources for other viable alternatives. Another reason for endogeneity is the mechanical association between the labour productivity of output and public infrastructure spending. In decentralised fiscal systems, subnational jurisdictions have the autonomy to enact fiscal policies to benefit their citizens. For municipalities with higher levels of average income, funds generated from higher taxes may be used to finance increased and improved levels of public services. In this case, reverse causality may exist between dependent variable (y) and public expenditures, as current expenditure will be dependent on per capita income.

To address the possible endogeniety of , an instrumental variable (IV) is used in a two-stage least squares (2SLS) estimation of Eq. (8). What makes applying the 2SLS approach difficult is that the chosen instrument has to satisfy dual conditions, of being an exogenous determinant of municipal infrastructure spending, which is uncorrelated with the output–labour ratio. In this study, the degree of ethnic fragmentation (Ethnic) is used as an instrument for , following existing literature. Lessman and Markwardt (2010) and Arikan (2004) suggest that ethnic fragmentation contributes to heterogeneous preferences of different ethnic groups, thus making it difficult to achieve consensus on the types (and levels) of public services to produce with jurisdictional revenues.[40] In the Alesina et al. (1999) index of ethnic fragmentation, for each municipality i, Ethnic is denoted as:

$$1 - \sum_{i} (Race_i)^2 \qquad (10)$$

where $Race_i$ denotes the proportion of persons in the population listed by Census data as race i, where i = Africans, Coloureds, Indians and Whites. Since Ethnic is defined as the probability that two people randomly drawn from an area belong to the same ethnic group, its value ranges from 0 (indicating that municipality i is dominated by a single ethnic group) to 0.75 (implying perfect fragmentation and the equal distribution of all ethnic groups).

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[39] For brevity, we report estimates of the year dummies at 4–year intervals.

[40] To a large extent, this argument is reflected in efforts to deal with South Africa's historical legacies. For example, ANC-affiliated trade unions and civic organisations in the mainly poor black townships of Cape Town have accused the Democratic Alliance-led administration of devoting disproportionate funding to socio-economic amenities in mainly white suburbs.

The equation of interest – Eq. (8) – contains an endogenous explanatory variables as well as unobserved heterogeneity in the form of municipality-specific effects. Therefore, the IV estimates are obtained using both fixed effects (FE) and generalised random effects (RE) 2SLS methods, and the results are presented in Table 7. Based on the statistical significance of the chi-square distribution of the difference between the FE and RE estimators, the Hausman specification rejects the null hypothesis that the FE method yields a consistent estimator of Eq. (8) and instead selects the RE as a viable estimator whose consistency cannot be rejected.

Table 7: Multi-level model estimates of Eq. (8)

	Fixed Effects **Model I**	Random Effects **Model II**
kg	0.59 (0.93)	-0.83*** (0.03)
kp	0.063 (0.05)	0.028* (0.02)
2004 Dummy	0.004 (0.047)	0.07*** (0.034)
2008 Dummy	-0.19 (0.30)	0.32*** (0.07)
2012 Dummy	0.18* (0.35)	0.42** (0.07)
pop	-0.014 (0.15)	0.07*** (0.03)
land	0.043 (0.13)	-0.11*** (0.03)
income	0.71*** (0.09)	0.41*** (0.05)
unemp	0.54 (0.45)	0.77*** (0.19)
τ	-2.73 (1.78)	0.411*** (0.05)
First-stage diagnostics		
Partial R_2	0.09	0.10
AP-F†	0.62	8.48
Prob>F	0.43	0.003

Note: The numbers in parentheses are robust standard errors. (*), (**) and (***) denote statistical significance at the 10%, 5% and 1% levels, respectively. Both models include a dummy variable for each year in the sample to capture the time–specific effects.

The results of the preferred random effects estimate of Eq. (8) are very similar to those obtained from multi-level model results in Table 6.[41] The one important difference is that the effect of Kg on labour productivity may be negative but is statistically significant and greater in magnitude. The result suggests that a 1% increase in infrastructure spending by municipalities will, *ceteris paribus*, cause a 0.8% decrease in labour productivity. This negative effect of is of economic significance, suggesting that infrastructure investments by local government in South Africa are subject to diminishing marginal returns. However, a closer examination of capital spending by municipalities suggests an alternative explanation: "fiscal dumping". Across municipalities, budgets, especially capital budgets, are plagued by serious problems of under-spending and fiscal dumping. In 2011/12, municipalities under-spent their capital budgets by R14.8-billion (or 32.3% of total capital budgets), compared to R18.9-billion (29.4%) in 2010/11 and

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[41] Note that lower part of Table 7 yields first-stage results of the 2SLS estimations, and allow for an assessment of the validity of the chosen instrument. Importantly, the result for the Angrist–Pischke multivariate F-test of excluded instruments, which is a test of weak identification, indicates that for the random effects estimation of Eq. (8), Ethnic is a viable instrument that does not suffer from weak bias ($F > 10$).

R8.5-billion (8.9%) in 2009/10. The 21 secondary cities failed to spend R2.9-billion (44%) of their total capital budgets between 2009 and 2012. The worst performers were the 111 local municipalities and all district municipalities that consistently underspent their respective capital budgets by more than 30% (National Treasury, 2012). Such under-spending reflects either a failure to align municipal IDPs with budgets or a lack of capacity to properly plan for and implement service critical service delivery programmes.

The problem of under-spending is compounded by the growing phenomenon of fiscal dumping. Fiscal dumping occurs when municipalities (or national/provincial government departments) record slow spending in the first months of the financial year and then spend 50% or more in the last quarter (or periods) of the financial year. This is done as an attempt to improve overall expenditure performance for the year, and the spending is usually allocated to unplanned items. According to Commission (FFC, 2013), underspending and fiscal dumping have both contributed significantly to procurement and project management inefficiencies, resulting in slow implementation of capital projects and a compromised quality of services (and capital projects). Not surprisingly, the unprecedented rates of violent protests have been linked to strong public discontent with the poor quality of infrastructure and slow pace of municipal service delivery. [42]

2.6 Growth Effects of Public Capital Spending

This section considers the impact of local government spending on output growth using South African municipal data. The equations employed in the empirical analysis are adapted from the equations in the theoretical endogenous growth model developed by de Mello (2002).[43] The estimating equations are set out as follows:

$$Y_j(t) - Y_j(t-1) = \vartheta_0 + \vartheta_1 Y_j(t-1) + \vartheta_2 L_j(t) + \vartheta_3 G_j(t) + \vartheta_4 C_j + \varepsilon_j(t) \quad (11)$$

where Y is the measure of regional (municipal) output, L denotes size of resident population, G is government capital spending and C reflects a vector of control variables. Finally, j is an index for a municipality, t represents years (or time), while ε is the corresponding disturbance term that is assumed to be independent and identically distributed with zero mean and constant variance.

Before discussing the estimation strategy, the variables for analysing the growth–public capital spending nexus are described. The estimation of Eq. (10) requires the measures of government spending to be included. The literature examining the link between government spending and economic growth has noted the usefulness of separating "primary", or "core", public capital (such as roads, sewers and water supply) from "other" types of public capital. Such a distinction is particularly important because any potential link between public capital and economic growth involves core public capital (Aschauer, 1989). In examining the link between public capital spending and growth, this study takes into account the capital expenditure functions assigned to municipalities.

Following the classification used by National Treasury, the G variable is disaggregated into data on operating expenditures and capital outlay for the following four functions: roads, housing, water supply and sanitation treatment, and electricity, which cover the core sectors of public infrastructure routinely used in the literature. Municipal operating expenditures include spending on employees, remuneration of public officials, finance charges and payments for supplies. The functional classification of operating expenditure includes outlays on repairs and maintenance of existing infrastructure. Yet capital spending should not only focus on the roll-out of crucial infrastructure but also include the allocation of necessary funds for operating and maintaining the capital asset for the whole of its design life (Wall, 2008). For this reason, the variable *G* in Eq. (10) will include expenditures dedicated to repairs and maintenance, as well as outlays on core public infrastructure.

Taking into account the developmental role envisaged for municipalities within South Africa's IGFR system, the estimation of Eq. (10) includes a vector of control variables related to municipalities' socio-economic characteristics and highlighted in the empirical literature as potential exogenous variables that affect growth across municipalities. In recent years, models of the "new economic geography" have highlighted the important role of agglomeration economies in the economic development of different regions.

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[42] Formal/organised protests, in the form of payment boycotts have been directed at local government. In towns across the country, ratepayers' associations have declared disputes with municipalities over poor service delivery, corruption and mismanagement; withheld the payment of rates and taxes to their municipalities; and, in some cases, assumed the responsibility of providing municipal services. Ratepayers' associations in 70 towns have declared disputes, with R10-million withheld by ratepayers in 35 towns (Powell et al., 2010).

[43] The study by Baltagi and Pinnoi (1995) used a similar set of equations.

Agglomeration effects are controlled for by including two variables: (i) the size of a municipality's population, and (ii) income per capita, as a measure of the economic development. In addition, regions with higher levels of per capita income potentially have access to wealthier tax bases that could be used to provide higher levels of (quality) public goods and invest in socio-economic infrastructure. Such outcomes may attract mobile factors of production that enhance regional economic development and growth. Thus, including a control for municipal income per capita can help capture the potential effects of a jurisdiction's wealth on its economic growth. Finally, a system of intergovernmental transfers provides recipient municipalities with increased revenue streams and possibly higher levels of public service than would have been obtained only using own revenues. The estimation model outlined in Eq. (10) thus includes intergovernmental transfers as part of the e vector of control variables.

2.6.1 Estimation procedure and empirical results

By following a panel data approach, this study endeavours to fully use both the time and cross-country dimensions of the chosen balanced panel dataset spanning a 10-year period (2003–2012). Preliminary descriptive analysis of the data (Table 8) indicates significantly different spending patterns for service delivery functions of municipalities, resident population and economic characteristics.

Table 8: Descriptive statistics

Variable	Mean	Std.Dev	Minimum	Maximum
Regional GDP (Y)	7323567	2.78e+07	119779	3.20e+08
Capital expenditure on:				
Electricity (E)	18341.14	110870	0	2450808
Water and sanitation(W)	23833.9	104152.7	0	2157197
Housing (H)	47239.81	1162280	0	4.16e+07
Roads (R)	23439.08	114237	0	2258531
Repair and maintenance (RM)	38347.39	241731	0	4291519
Other capital (OC)	678694.5	1.61e+07	0	6.87e+07
Operating expenditure (OE)	438459.8	2004564	0	2.70e+07
Equitable share transfers (T)	61528.51	146073.6	1963	2125543
Regional GDP per capita (INC)	24388.04	24019.94	1561	267836
Resident population (L)	210143	475333	6575	4488843

Note: Figures for items listed under capital expenditure as well as regional GDP (Y) are in '000 of South African Rands.
Per capita regional GDP is stated as Rand amounts.

When estimating Eq. (10), an important consideration to note is the possibility that municipality-specific effects could influence output growth across municipalities, but, owing to unobservability, are excluded from the set of explanatory variables. Failure to consider such effects may bias estimates and render the results invalid. Estimating Eq. (10) as a panel data model helps overcome this problem, as it includes a parameter of municipal-specific effects, thus incorporating unobserved heterogeneity across municipalities. The version of Eq. (10) that includes municipal-specific characteristics can be rewritten as follows:

$$Y_j(t) = \vartheta_0 + \vartheta Y_j(t-1) + \vartheta_2 L_j(t) + \vartheta_3 G_j(t) + \vartheta_4 C_j + \psi_j + \varepsilon_j(t) \quad (12)$$

where $\vartheta=1+\vartheta_1$, and Ψ is a dummy that accounts for the municipal-specific characteristics of the j^{th} municipality.

Depending on the different assumptions made about the municipality-specific effects, Eq. (11) can be estimated as a random or fixed effects model. To decide between both effects, Baltagi (2013) suggests a Hausman test based on the difference between the fixed effects and random effects estimators. On the basis of the statistical significance of the chi-square distribution, the Hausman test[44] rejects the null hypothesis that the random effects model yields a consistent estimator of Eq. (11).

Table 9: Baseline estimates of Eq. (11)

	Dependent Variable: Regional GDP Growth	
	Fixed Effects **Model I**	Random Effects **Model II**
Lagged dependent variable	-0.25** (-2.60)	-0.677 (-0.83)
Electricity **(E)**	1.39 (0.64)	-0.309 (0.758)
Water **(W)**	4.79** (2.11)	0.203 (0.861)
Housing **(H)**	-0.925 (-1.08)	0.29 (0.469)
Roads **(R)**	-0.834 (-0.63)	0.519 (0.65)
Other capital **(OC)**	-0.831 (-0.38)	-1.13 (-0.97)
Repair and maintenance **(RM)**	3.14* (1.97)	0.264 (0.21)
Operating expenditure **(OE)**	-4.82** (-2.19)	-0.167 (-0.12)
GDP per capita **(INC)**	27.97 (0.66)	-2.58 (-1.02)
Population **(L)**	51.997 (0.72)	5.68** (2.16)
Constant term **(C)**	-668	0.496

Note: Both fixed and random effects models included municipal dummies. The numbers in parentheses are heteroscedasticity-consistent t-statistics. (*) and (**) indicate coefficient significance at the 10% and 5% levels respectively. With the exception of the lagged dependent variable, all explanatory variables are expressed in logarithms.

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[44] The Hausman test yields the following result: X^2 (11) = 23.95 with a p value of 0.01.

The results can be summarised into two distinct findings: (i) estimates with statistical significance and (ii) estimates with economic significance. Table 9 shows that water and sanitation expenditures, and outlays on repairs and maintenance are positively correlated with growth: a 10% increase in capital spending on water infrastructure will result in a 0.4% increase in municipal output.[45] Similarly, a 10% increase in repair and maintenance outlays will increase municipal output by 0.3%. In terms of economic significance,[46] spending on electricity infrastructure positively affects, but spending on housing and roads infrastructure negatively affects, regional economic growth.

The surprising finding, that municipal capital spending on roads and housing infrastructure negatively affects regional growth, attests to the real infrastructure spending problems confronting municipalities. Since 2009, the delivery of integrated housing settlements has been devolved to municipalities. However, this devolution has occurred against the backdrop of municipal constraints, including a shortage of planning and project management skills, as well as weak administrative capacity to take expenditure decisions around housing and roads infrastructure. This limits not only the developmental role envisaged for municipalities but also the positive externalities that may result from the effective roll-out of integrated housing and road infrastructure.

2.7 Conclusion and Policy Recommendations

2.7.1 Summary of findings

This chapter investigated the relationship between public spending and labour productivity using panel data for South Africa's 234 municipalities over the period 2003–2012. The chapter estimates a simple Cobb–Douglas production function that explicitly includes the impact of private capital and productive public expenditure in socio-economic infrastructure (such as roads, electricity, and water and sanitation) on municipal labour productivity. The results provide fairly strong evidence that government capital has a statistically significant negative effect on regional labour productivity, whereas private sector activities have a statistically significant, strongly positive effect on labour productivity. These findings are robust across the different econometric specifications considered and suggest that municipal allocations to infrastructure investments are inefficient. However, while infrastructure spending by many municipalities may be poorly planned, the importance of municipal infrastructure investment should not be ignored based exclusively on this evidence. Capital spending by municipalities can enhance municipal economic growth, depending on the specific function. Spending on electricity, water and sanitation, as well as repairs and maintenance has a positive effect on growth, while spending on housing and roads infrastructure has a negative effect. These results suggest that, with municipal responsibilities for infrastructure investment set to rise, capital spending on water and sanitation, and electricity can spur local economic development. Improving the management of asset registers and maintaining existing infrastructure assets to extend their useful life could also benefit long-term economic growth across the country's municipalities.

2.7.2 Recommendations

With respect to improving the economic growth effects of municipal capital expenditures, the Commission recommends that:

1. Grant allocations for infrastructure investment reflect the prioritisation (or weighting) of growth-enhancing infrastructure programmes, to enable municipalities to play their (envisaged critical) role in promoting economic development and growth.

2. Government establishes either an incentive grant or a reserve fund, which can be used to assist or reward municipalities. Funds would be for maintaining and renewing infrastructure, to ensure the long-term sustainability of critical socio-economic infrastructure and enhance local economic growth.

3. Government establishes a transitional capacity-building grant to fund technical assistance for building necessary capacity that will enable municipalities to prepare and implement credible infrastructure asset management plans.

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[45] Recall that Eq.(11) is estimated in log-linear form. To interpret the coefficient of 4.79 on the natural log of the water variable (W), the following statements can be made: (a) 1% increase in W will increase growth in municipal output by 4.79/100 = 0.047 (or 0.05), or (b) 10% increase in W will increase output growth by 4.79*log(1.10).

[46] In recent years, a number of studies in the social sciences (see for example Ziliak and McCloskey, 2003; McCloskey and Ziliak, 1996; Wooldridge, 2000 and Goldberger, 1998) have suggested the importance of viewing a particular statistical or empirical result not only in terms of statistical significance but also in terms of economic significance. According to Steward and O'Donnell (2014), while no universal definition of the term exists, economic significance remains a well-established concept, which suggests that, when explaining a set of empirical findings, a researcher needs to take into account issues such as magnitude and the overall implications of the reported correlation or effects.

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CHAPTER 3

A Review of Direct and Indirect Conditional Grants in South Africa – Case Study of Selected Conditional Grants

CHAPTER 3

A Review of Direct and Indirect Conditional Grants in South Africa – Case Study of Selected Conditional Grants

Sabelo Mtantato[47] and Sasha Peters[48]

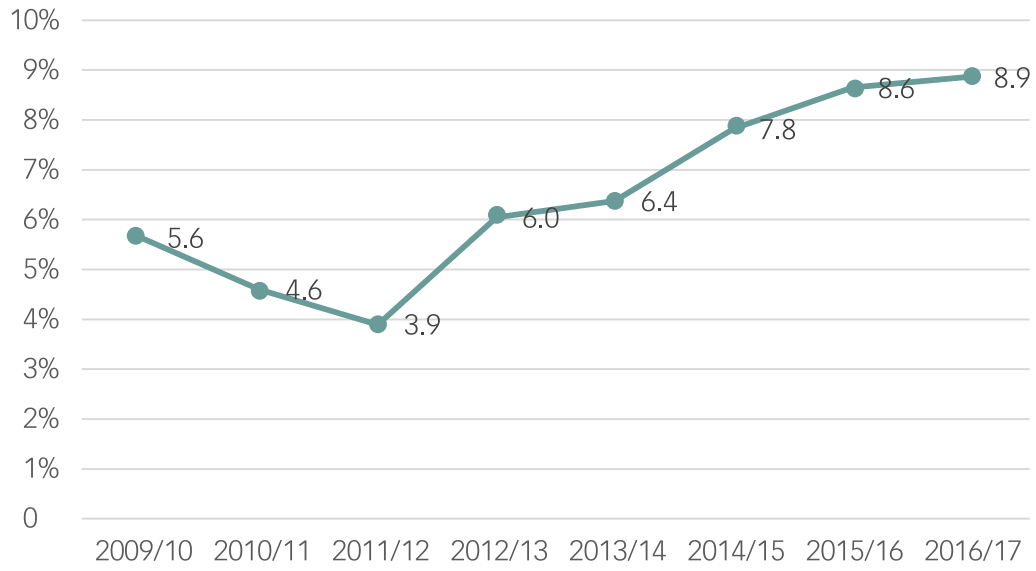
3.1 Introduction

Intergovernmental fiscal transfers are a dominant feature of public finance in many countries, including South Africa. This is mainly because in countries with more than one level (or sphere) of government, national government is able to raise more revenue compared to subnational governments. Sections 227(1) (a) and (b) of South Africa's Constitution of 1996 state that local government (and each province) is entitled to an equitable share and may receive other allocations from national government revenue, either conditionally or unconditionally. Conditional grants are either direct or indirect. Direct conditional grants are transferred directly into the bank account of the recipient (for example, to a municipality) and must be used for the stated purpose and comply with stipulated conditions and reporting. In the case of indirect grants, a national sector department or public entity performs a function on behalf of a municipality or province. Thus no funds are transferred to the province or municipality concerned, but any infrastructure developed becomes the responsibility of the relevant subnational government.

3.2 Problem Statement

In 1998/99, transfers in the form of direct and indirect conditional grants were introduced mainly to ensure adequate funding of national policy priorities. Provincial and local government conditional grants have been key for funding infrastructure provision and reducing infrastructure backlogs. The share of indirect grants to direct grants is increasing at a phenomenal rate, from 3.9% in 2011/12 to 6.4% in 2013/14, and is projected to reach 8.9% in 2016/17 (Figure 12).

Figure 12: Share of indirect grants to direct grants



Source: National Treasury (2013a, 2014)

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Indirect grants are mostly used to fund infrastructure because, historically, municipalities have not performed well in developing infrastructure. The practice – of national government implementing infrastructure projects on behalf of municipalities that lack capacity – may result in service delivery but carries some risks. These include weakened accountability, and poor maintenance budgeting and planning. To establish whether changing the form of conditional grants improves performance, the Financial and Fiscal Commission (the Commission) undertook a study to assess the funding and performance of specific education-, health-, sanitation- and electricity-related conditional grants.

3.3 Aim and Objectives

This chapter examines whether changing the form of conditional grants (from direct to indirect) improves spending on and delivery of infrastructure, by assessing the funding and performance of specific education-, health-, sanitation- and electricity-related conditional grants. The chapter's two specific objectives are:

- to evaluate and analyse changes in the schedules of conditional grants (direct and indirect) using the funding for infrastructure for schools, health, sanitation and electrification as a case study; and
- to quantify the growth and analyse the performance to date of these grants.

3.4 Research Methodology

3.4.1 Study approach

The quantitative analysis of selected grants in the sanitation, energy, education and health sectors used both a direct measure of service delivery approach and an expenditure approach. For the direct measure of service delivery approach, an indicator used is the share of households provided with a service (in this case, infrastructure delivered) and having access to a service; a discrepancy between annual service delivery targets and the actual delivery over a period of time is used as an indicator for performance. An expenditure approach entails analysing the spending of funds allocated for a function or programme. An indicator used in this approach is under-spending, with performance assessed by comparing budget allocations and expenditure.

The growth in direct and indirect grants was analysed over seven years from 2004/05 to 2016/17. For the education-, health- and sanitation-related infrastructure conditional grants, the analysis covers a period of three or four years, depending on when grant was introduced. The oldest of the selected grants is the Integrated National Electrification Programme (INEP), which is analysed back to 2006/07.

Table 10: Description of selected infrastructure grants

Sector department	Name of grant	Rationale and brief description
Municipal conditional grants		
Department of Water and Sanitation	Rural Household Infrastructure Grant (RHIG)	Previously administered by the Department of Human Settlements, the RHIG was introduced in 2010/11 to support municipalities in addressing rural basic sanitation backlog. The RHIG has both direct and indirect components.
Department of Energy	Integrated National Electrification Programme (INEP)	The INEP provides capital subsidies to Eskom and municipalities for addressing the electrification backlog of occupied residential dwellings, installing bulk infrastructure, and rehabilitating and refurbishing electricity infrastructure. The INEP has direct and indirect components: direct grants are to municipalities deemed to have adequate capacity; indirect grants to municipalities deemed to lack capacity to implement the electrification programme.
Provincial conditional grants		
National and Provincial Department of Education	School Infrastructure Backlogs Grant (SIBG) and Education Infrastructure Grant (EIG)	The SIBG is an indirect grant implemented by the national Department of Basic Education (DBE) on behalf of provincial education departments. The grant provides funding for the Accelerated Schools Infrastructure Delivery Initiative, which is an ongoing programme aimed at implementing basic safety norms and standards in schools. The EIG is a direct grant to provincial education departments that is used to supplement the school infrastructure programme in provinces.
National and Provincial Department of Health	National Health Grant (NHG)	The NHG is an indirect grant with three components to support: (i) infrastructure projects, (ii) the national health insurance scheme pilot sites and (iii) the roll-out of the human papillomavirus vaccine.
	Health Facilities Revitalisation Grant (HFRG)	The HFRG component is used to accelerate the construction, maintenance, upgrading and rehabilitation of new and existing health infrastructure, and to supplement expenditure on infrastructure delivered through public-private partnerships.

Brief description of selected infrastructure grants

The four conditional infrastructure grants chosen (two provincial and two local government grants) are briefly described in Table 10.

3.4.2 Justification for selected grants

The provision of sanitation services in South Africa, especially in rural areas, remains a challenge. It is funded through the RHIG, which has been affected by changes to its scheduling over recent years. Furthermore, a direct component was recently introduced, and so the grant now has indirect and direct components. INEP also has both indirect and direct components: the indirect is for Eskom (agent) and the direct for municipalities that have adequate capacity. Comparing performance under these two different arrangements will therefore be insightful.

Education (SIBG and EIG) and health (NHG and HFRG) infrastructure grants were chosen because education and health account for the largest share of provincial budgets (more than 40% goes on education and more than 30% on health). Addressing infrastructure backlogs in these two sectors is a national priority, and a large part of infrastructure is funded through conditional grants. Furthermore, these grants consist of both direct and indirect components. The HFRG is important not only for addressing backlogs but also for implementing National Health Insurance, one of the biggest reforms within the health sector.

3.5 Overview of Key Infrastructure Backlogs in South Africa

3.5.1 School infrastructure

Despite the government's efforts to invest heavily in education over the past two decades, the sector continues to face challenges, as reflected by its performance and dilapidated public school infrastructure. The current policy focuses on "improving the functioning of the education system, mainly through procedural reforms and easing of resource constraints in specific areas – including school-related infrastructure" (Centre for Child Law, 2014: 1). Data from the Department of Basic Education (DBE) indicates large backlogs in basic services, particularly with respect to water, electricity and sanitation in the Eastern Cape, KwaZulu-Natal and Free State, with very slow progress between 2009 and 2011 (Table 11).

Table 11: Basic infrastructure backlog at schools (2009–2011)

Province	Percentage of public schools without					
	Water		Electricity		Library	
	2009	2011	2009	2011	2009	2011
Eastern Cape	19.5	19.3	20.6	20.6	90.0	90.0
Free State	15.2	14.7	15.1	14.9	74.0	74.0
Gauteng	0.0	0.1	0.6	0.6	41.0	41.0
KZN	10.4	10.6	26.7	26.6	79.0	80.0
Limpopo	8.1	6.6	7.4	5.8	93.0	93.0
Mpumalanga	6.4	6.9	13.2	11.8	81.0	83.0
Northern Cape	2.6	2.6	5.3	5.3	81.0	81.0
North West	1.0	1.0	3.6	3.6	70.0	71.0
Western Cape	0.0	0.0	0.1	0.1	47.0	47.0

Source: DBE (2009, 2011)

Due to the high backlogs, the DBE committed to spend R8.2-billion between April 2011 and March 2014 to improve school infrastructure throughout the country. In 2011/12, these funds were located through the newly established SIBG, an indirect grant, and the EIG[49], a direct grant.

3.5.2 Health infrastructure

In 1995, the Council for Scientific and Industrial Research (CSIR) undertook a national audit on health facilities on behalf of the Department of Health (DoH) (CSIR, 1996). The audit found that about 17% and 12% of public health facilities required substantial repair and replacement respectively. In some provinces, the situation was much worse; for example, in Limpopo about 24% of public health facilities needed to be replaced or condemned. In 1998, the Hospital Rehabilitation and Reconstruction programme was introduced, with the aim of replacing equipment and facilities in hospital and constructing new hospitals. A Hospital Revitalisation programme, outlined in the Ten Point Plan Strategic Framework (1999–2004), was

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[49] The EIG was created from the restructuring of the infrastructure grant to provinces.

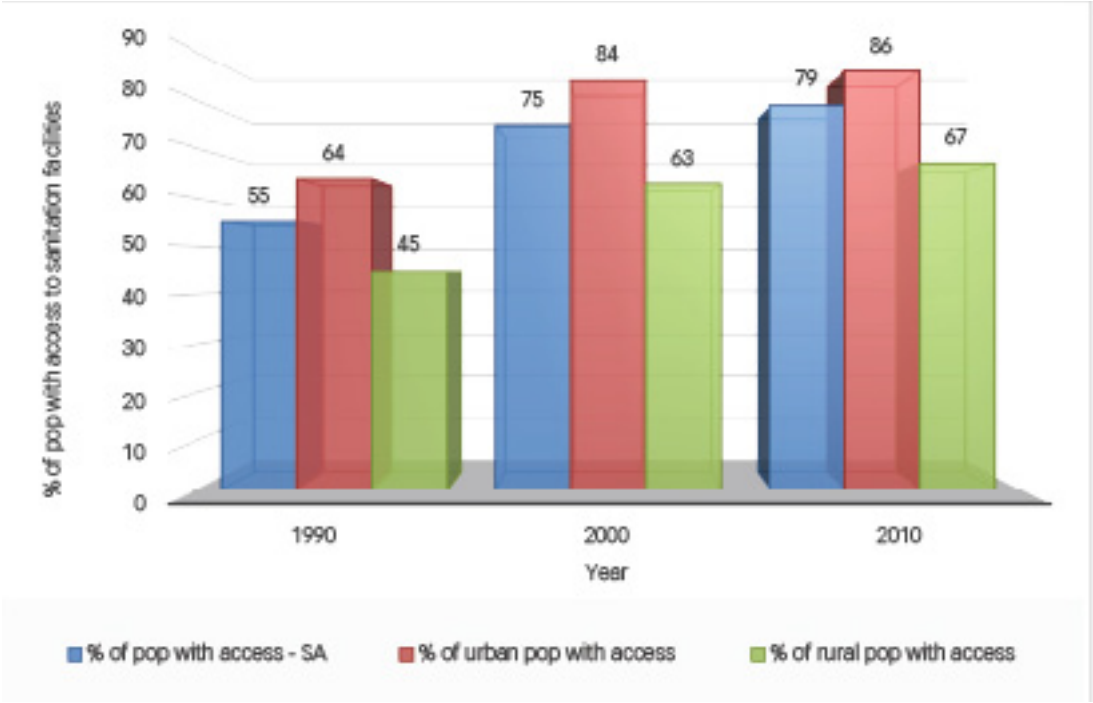
intended to improve infrastructure, health technology, organisational management and service quality (DoH, 2000). The number of hospitals that participated in this programme was 40 in 2008 and 27 in 2009.

3.5.3 Provision of sanitation

Sanitation backlogs and progress

Since 1990, sanitation services and facilities have improved nationally and in urban areas, but backlogs remain high in rural areas (Figure 13 and Table 12).

Figure 13: Percentage improvement in sanitation facilities (1990–2010)



Data source: Trading Economics[51]

Table 12: Sanitation backlog by province in 2011

Province	Percentage of backlog
Eastern Cape	40%
Free State	23%
Gauteng	11.1%
KwaZulu-Natal	32.3%
Limpopo	62.2%
Mpumalanga	42.8%
North West	42.4%
Northern Cape	24.3%
Western Cape	9.0%

Source: Stats SA (2012)

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[50] http://www.tradingeconomics.com/south-africa/improved-sanitation-facilities-rural-percent-of-rural-population-with-access-wb-data.html

As Figure 13 shows, between 1990 and 2010, access to sanitation facilities improved from 55% to 79% nationally and from 64% to 86% in urban areas. However, access in rural areas remained much lower, at 67% in 2010. Challenges to improving sanitation delivery in rural areas include the topography and widely dispersed settlement patterns, which make building the necessary infrastructure and connecting households very expensive, and sometimes unaffordable. The four provinces with the highest sanitation backlogs are predominantly rural: Limpopo, Mpumalanga, North West and the Eastern Cape (Table 12). In response, the RHIG was introduced over the 2010 Medium Term Expenditure Framework.

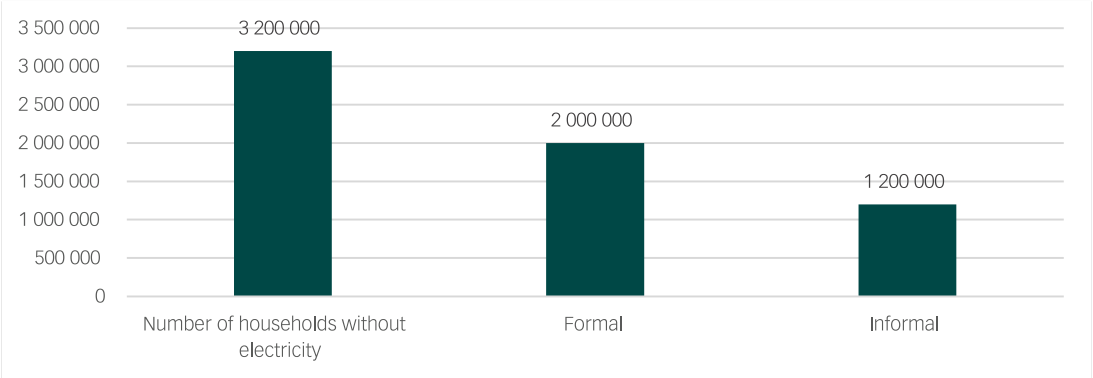
3.5.4 Provision of electricity

Electrification backlogs and progress

In 1994, when the democratic government took over, only 36% of South African households had access to electricity. The majority of South Africans were using inferior and unhealthy sources of energy such as coal and (in rural areas) wood. From 1994, through the Reconstruction and Development Programme, the government undertook to rectify the historical inequities in the provision of basic services to households. The target was to provide access to electricity to an additional 2.5 million households by 2000. The emphasis was on the electrification of previously disadvantaged and rural areas, as well as schools and clinics.

Between 2002 and 2011, South African households connected to the main electricity supply increased by 6%, from 77% to 83% (Stats SA, 2011). The INEP was introduced in 2006/07 with the intention of achieving universal access to electrification of households by 2014, but a review by the Department of Energy (DoE) in 2012 found that over three million households remained without access to electricity (Figure 14). The aim of achieving universal access has now shifted from 2014 to 2025.

Figure 14: Electrification backlog in South Africa (2013)



Source: DoE (2013)

According to the DoE, of the households without access to electricity, 75% are within the area supplied by Eskom and 25% within the area supplied by municipalities. In other words, municipalities still have to provide electricity to about 850 000 households, while Eskom is responsible for over 2.5 million households.

3.6 Overview of Trends Direct and Indirect Grants

Table 13 details the total value of direct and indirect conditional grants allocated between 2004/05 and 2016/17.

Table 13: Allocations in respect of direct and indirect grants

	Direct Grants (R million)	Indirect Grants (R million)
2004/05	68 291	1 707
2005/06	25 539	1 753
2006/07	35 065	1 436
2007/08	47 316	2 034
2008/09	60 396	2 418
2009/10	70 800	3 088
2010/11	119 093	2 940
2011/12	95 737	2 770
2012/13	103 529	7 271
2013/14	110 263	8 390
2014/15	118 090	13 139
2015/16	128 853	14 510
2016/17	137 309	14 349
Real annual average growth over the period	0.3%	13.0%

Source: National Treasury (2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013a, 2014)

The monetary value of direct grants may be much greater than that of total indirect grants, but indirect grants are growing at a faster pace. Between 2004/05 and *2016/17, indirect grants grew by 13% in real terms and 19% in nominal terms, significantly outpacing the marginal growth of 0.3% in direct grants. From a low base of R1.7-million in 2004/05, indirect grants are projected to reach just over R14-billion by 2016/17. This is a sign of greater centralisation and control over spending by national government.

3.7 Performance Analysis of Selected Infrastructure Grants

The analysis of selected conditional grants covers the direct and indirect components and looks at both the financial and non-financial performance.

3.7.1 Financial performance of selected infrastructure grants

Education

SIBG and EIG were both implemented in 2011/12. As Table 14 shows, the direct grant (EIG) has performed better than the indirect grant (SIBG). Nevertheless, the spending of SIBG has improved since 2011/12, reaching just over 70% in 2013/14, but more needs to be done to ensure better spending.

Table 14: SIBG and EIG financial performance

	SIBG – Indirect grant			EIG – Direct grant		
Year	Allocation (R'mil)	Expenditure (R'mil)	Percentage of allocation spent	Allocation (R'mil)	Expenditure (R'mil)	Percentage of allocation spent
2011/12	700	76	10.87%	5 311	5 539	104.29%
2012/13	2 065	859	41.63%	5 802	5 454	94.00%
2013/14	1 931	1 370	70.95%	6 643	6 928	104.29%
Total	4 696	2 305	49.08%	17 756	17 921	100.93%

Health

Indirect Grant: National Health Grant (NHG)

As from 2013/14, the NHG has two components, one for national health insurance and one for health facility revitalisation (National Treasury, 2013b). The aim of the health facility revitalisation component is to accelerate the construction, maintenance, upgrading and rehabilitation of new and existing health infrastructure, and to supplement expenditure on infrastructure delivered through public-private partnerships. Of the R440-million adjusted appropriated, only R182.7-million was spent (the adjustment includes R167-million which was converted to the direct grant to KwaZulu-Natal and Northern Cape provincial health departments and a declared "saving" of R200-million arising from slow spending). At end December 2014 (in terms of the December in-year monitoring), spending was R352.4-million out of the R717-million adjusted budget. The national DoH has again adjusted the allocation, shifting R262-million to the direct grant. The rationale for creating the NHG was to fast-track priority projects and improve spending on and performance of health infrastructure. However, the national DoH has also taken over a number of smaller and diverse projects, which provinces could manage on their own, but does not have the necessary capacity to manage these projects.

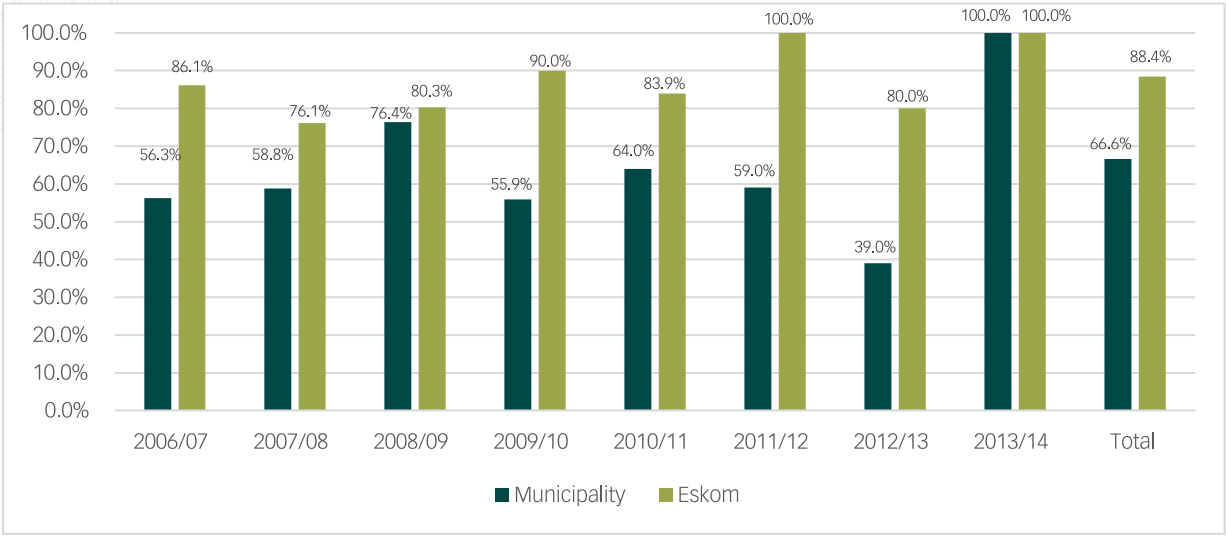
Direct: Health Facilities Revitalisation Grant (HFRG)

This grant funds the construction and maintenance of health infrastructure and was created in 2013/14 through the merger of three health infrastructure grants: the hospital revitalisation grant, the health infrastructure grant and the nursing colleges and schools grant. In 2013/14, the grant ring-fenced components corresponding to the previous grants that it replaced. The spending performance for the three components was: 88% (health infrastructure), 83% (hospital revitalisation) and 69% (nursing colleges and schools). From 2014/15, these separate components fall away in order to provide greater flexibility for provinces. Provinces will be able to shift funds between projects during the year, so that delays in one project do not result in underspending on the grant as a whole (National Treasury, 2013b).

Electricity

The INEP has an indirect component implemented by Eskom and a direct component implemented by municipalities. As Figure 15 shows, between 2006/07 and 2013/14, the indirect component outperformed the direct component of this grant. This could be because, unlike many other indirect conditional grants, this particular one is spent by an agency (i.e. Eskom) not a national department.

Figure 15: Spending performance of the direct and indirect components of the INEP



Sanitation

The RHIG was introduced as an indirect grant in 2010/11 and did not perform well until 2013/14 (Table 15). In each financial year, spending increased between February and March (Figure 16), which could indicate fiscal dumping[51] by the national department.

Table 15: Budget and expenditure of the RHIG (2010/11–2013/14)

Year	Allocation (R'mil)	Expenditure (R'mil)	% of Allocation Spent
2013/14	240.4	215.3	89.56%
2012/13	340.6	205.6	60.36%
2011/12	258	187.3	72.60%
2010/11	100	62	62.00%
Total	**939**	**670.2**	**71.37%**

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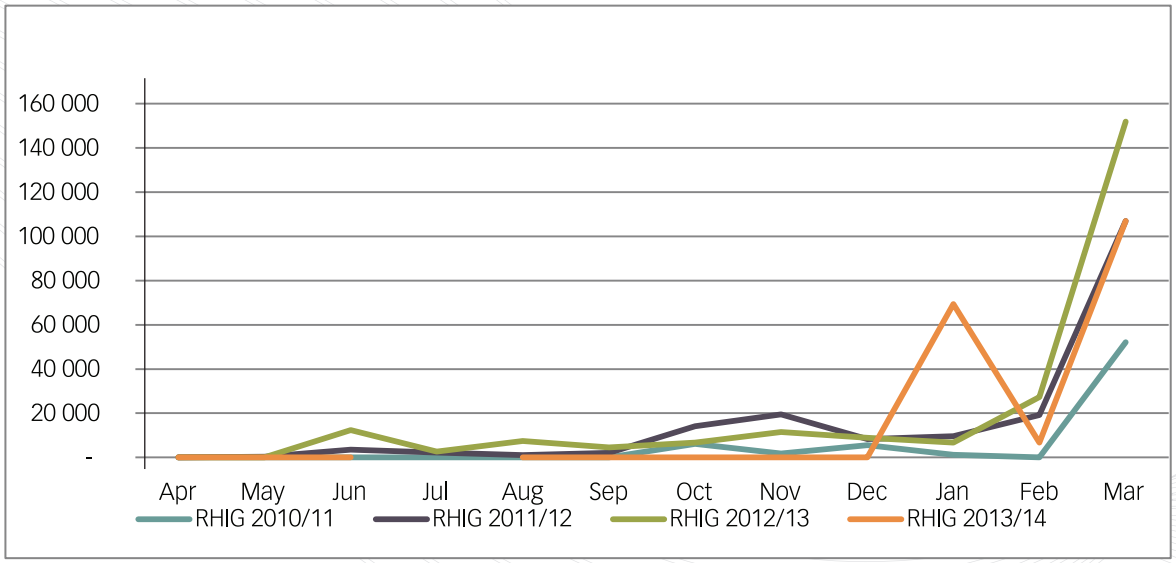
[51] Fiscal dumping is when departments rush to spend their remaining allocated funds before the end of the financial year and is not considered an acceptable practice.

Figure 16: RHIG spending (2010/11–2013/14)



3.7.2 Non-financial performance of selected infrastructure grants

In analysing the non-financial performance of selected infrastructure grants, the key challenges included the non-availability/incompleteness of data on targets or delivery, which made determining the actual performance difficult. In some cases, data on targets and delivery was available but inconsistent (for example data contained in annual reports, departments' Annual Performance Plans and presentations made to Parliament).

Education grants (SIBG)

Unlike the SIBG, assigning specific measurable outcomes directly to the EIG direct grant is not possible because its goal is to provide supplementary funding to provinces for education infrastructure. Table 16 shows the targets and delivery for eradicating inappropriate schools and for providing water, sanitation and electricity to schools.

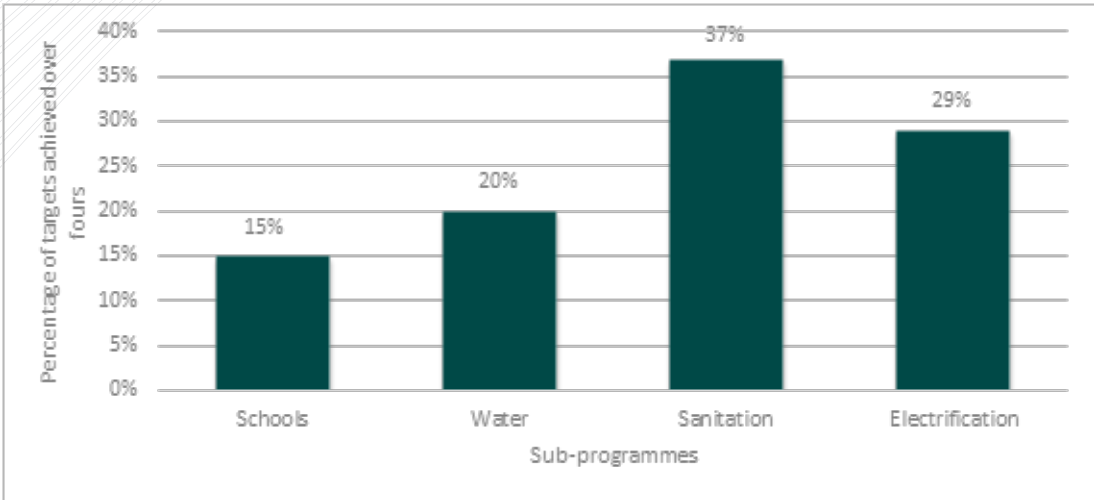
Table 16: Schools infrastructure backlogs grant: targets and delivery since 2011/12

Targets and completed since 2011/12	2011/12	2012/13	2013/14	2014/15 (September 2014)	2015/16
Sub-programme – Inappropriate Schools					
Total Target: 510 (496)	Not available	49	140	150	171
Number completed: 75 (15%)	In progress: 49	17 (35%)	36 (26%)	22 (15%)	
Sub-programme – Water					
Total Target: 1120	188	932	Not available	Not available	
Number completed: 225 (20%)	In progress 161	156 (17%)	49	20	
Sub-programme – Sanitation					
Total Target: 741	354	387	Not available	Not available	
Number completed: 275 (37%)	In progress 214	188 (53%)	64	23	
Sub-programme – Electrification					
Total Target: 914 (916)	231	683	Not available	Not available	
Number completed: 265 (29%)	In progress 168	144 (21%)	77	44	

Source: DBE (2014)

By September 2014, as Figure 17 clearly illustrates, none of the SIBG sub-programmes had come close to meeting their targets.

Figure 17: Summary of the SIBG performance



Health infrastructure conditional grants

The targets set and the actual 2013/14 delivery for the health infrastructure conditional grants are shown in Tables 17 and 18. The extent to which the targets were met cannot be assessed because the reporting on delivery of the infrastructure grants (Table 18) does not correspond to the targets set (Table 17).

Table 17: Health infrastructure grants target (2013/14)

Grant name	2013/14 Targets
Hospital Revitalisation Grant	• Number of new replacement facilities constructed: 68 • Number of facilities procured health technology equipment: 15 • Number of facilities funded for organisational development and quality assurance: 27
Health Infrastructure Grant	• Number of health facilities planned, designed and constructed: 200

Table 18: Health infrastructure grants delivery (2013/14)

Grant name	Delivery 2013/14
Health Facility Revitalisation Grant	• 587 health facilities planned including designed
	• 845 facilities on different stages of construction
	• 406 on retention
	• 352 maintained facilities
National Health Grant: Health Facility Revitalisation component	• 102 clinics selected to get additional space 79 completed
	• 340 FET colleges students appointed through Development Bank of Southern Africa and resumed work in Gauteng, KwaZulu-Natal and Mpumalanga provinces
	• Feasibility studies for Limpopo Academic Hospital and Chris Hani Baragwanath hospitals finalised

Electrification grant (INEP)

The indirect component of the INEP relates to Eskom, while the direct component relates to municipality-provided connections. As Table 19 shows, the targets for 2008/9, 2009/10 and 2010/11 were not available for Eskom.

Table 19: Number of household connection targets and actual connections (2006/07–2013/14)

Targets and delivery	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
ESKOM								
Target	70 962	92 521				99 403	114 224	157 839
Delivery	75 560	102 432	68 208	100 379	136 597	106 061	118 926	174 521
Percentage	106%	111%				107%	104%	111%
MUNICIPALITIES								
Target	76 305	66 875	48 447	76 263	84 235	99 505	73 847	87 231
Delivery	74 253	66 131	46 381	67 002	54 872	48 491	47 204	89 771
Percentage	97%	99%	96%	88%	65%	49%	64%	103%

Eskom has exceeded its annual target every year for which data is available, while the performance of municipalities has fluctuated. Nevertheless, the 83% average over the eight years is not a bad performance for municipalities.

Sanitation grant (RHIG)

As Figure 18 illustrates, the RHIG has not performed well, as only half (46% and 47% respectively) of the planned toilets were delivered in 2010/11 and 2012/13 and about two-thirds (69%) in 2011/12. In 2013/14, the units delivered exceeded units planned because of a large number of units that were started in the previous financial year.

Figure 18: Number of RHIG units targeted and delivered since 2010/11

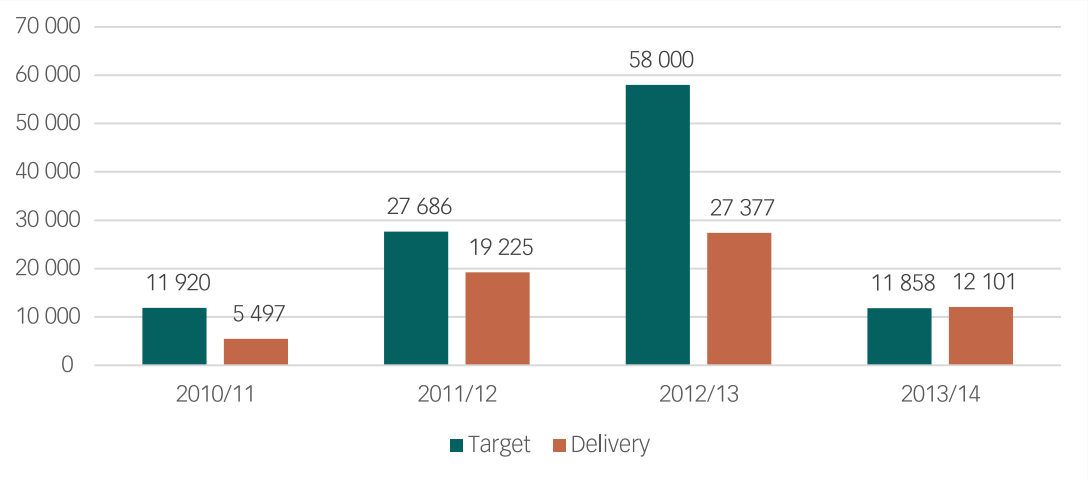


Table 20 provides a summary of both financial (expenditure) and non-financial (infrastructure delivery) performance for the selected education, health, electrification and sanitation grants.

Table 20: Summary of financial and non-financial performance of selected infrastructure grants

Sector	Grant category	Financial performance	Non-financial performance	Recent developments
Education	Direct (EIG)	Good	Cannot be directly determined	Average spending was above 100% over three years (2011–2013).
	Indirect (SIBG)	Poor	Poor	Due to poor spending since its introduction, allocation has been reduced in 2015 Medium Term Expenditure Framework. Over three years (2011–2013), spending was at 49%.
Health	Direct (NHG)	Good	Cannot be directly determined – non-alignment of targets and delivery	In 2013/14, the direct component was divided into three grants, for health infrastructure, hospital revitalisation, and nursing colleges and schools grants. Spending was 88% for health infrastructure and 83% for hospital revitalisation.
	Indirect (HFRG)	Poor	Cannot be directly determined – non-alignment of targets and delivery	In 2013/14 spending was at 41.5%. R167-million was converted into direct grants to KwaZulu-Natal and Northern Cape provincial health departments. In 2014/15, an allocation of R262-million was shifted to the direct grant.
Electrification	Direct (INEP)	Good	Good	Over the period 2006/7–2013/14), spending of the indirect component outperformed the direct component. This could be because, unlike many other indirect conditional grants, the grant is spent by an agency (i.e. Eskom) rather than a national department. Similarly, non-financial performance was better for Eskom (indirect grant) than municipalities (direct grant). Most years Eskom exceeded its target for households connected, whereas municipalities averaged just over 83%.
	Indirect (INEP)	Good	Good	
Sanitation	Direct (RHIG)	Cannot be determined (2013/14)	Cannot be determined (2013/14)	The RHIG was an indirect grant since its inception in 2010/11 and did not perform well until 2013/14 when the direct component was introduced.
	Indirect (RHIG)	Poor (but improving)	Poor (but improving)	

Provinces and municipalities appear to be better than national government at ensuring grant funding is spent. In some instances, determining the actual performance is difficult because the data relating to targets and actual delivery is either not available or incomplete. However, from the available data the following can be highlighted:

- The indirect education grant partially achieved its targets.
- Reporting on health grant outcomes was not aligned to targets.
- The electrification indirect grant performed better than the direct grant. This could be because the grant is implemented by a specialised agency (Eskom), not a national department. The direct grant was used to achieve 83% of household connection targets in seven years. This good performance could be because municipalities have been implementing these projects for a number of years.
- The sanitation indirect grant performance improved. It is too early to determine the performance of the direct component.

Some of the reasons for the poor performance of indirect conditional grants include:

(i) A lack of capacity even at national level. The lack of capacity in provinces and municipalities is one of the main reasons for national departments implementing indirect grants. Yet, in some instances, national departments do not have the capacity and rely on implementing agents.
(ii) Implementing agents do not always have sufficient technical capacity (DBE, 2014).
(iii) Poor planning processes, which should include identifying grant beneficiaries (i.e. communities and households).

3.8 Conclusions and Recommendations

Provincial and local government conditional grants are key for funding infrastructure provision and reducing infrastructure backlogs in various sectors, including education, health, sanitation and electrification. Indirect grants to provincial and local government are increasing and growing at a faster rate than direct grants. No principles or policies exist to guide the reclassification of grants from direct to indirect (and vice versa), despite numerous recent reclassifications. Nevertheless, key aspects, which should guide government in assigning grants direct/indirect status, emerged from an assessment of the performance of grants in the education, health, electricity and sanitation sectors. With respect to financial performance, the analysis shows that direct grants outperform indirect grants. The one exception is the electrification indirect grant, which is implemented by an agency and not a national sector department.

With respect to managing direct and indirect conditional grants, the Commission recommends that:

1. National Treasury and line departments consider the use of indirect grants as a measure of last resort while continuing to build capacity in provinces and municipalities.
2. Clear criteria are developed to guide the scheduling and rescheduling of conditional grants, taking into account:
    a. Historical financial performance
    b. Non-financial performance
    c. Time period before converting a direct grant to an indirect grant. The responsible government sphere should be given sufficient time (at least three years) to administer and implement a direct grant before considering conversion to an indirect grant. Such conversion must be implemented on a differentiated approach
3. Comprehensive capacity-building plans are developed, with clearly determined targets and time-frames, in cases where indirect grants are considered as a result of poor capacity within a province or municipality.

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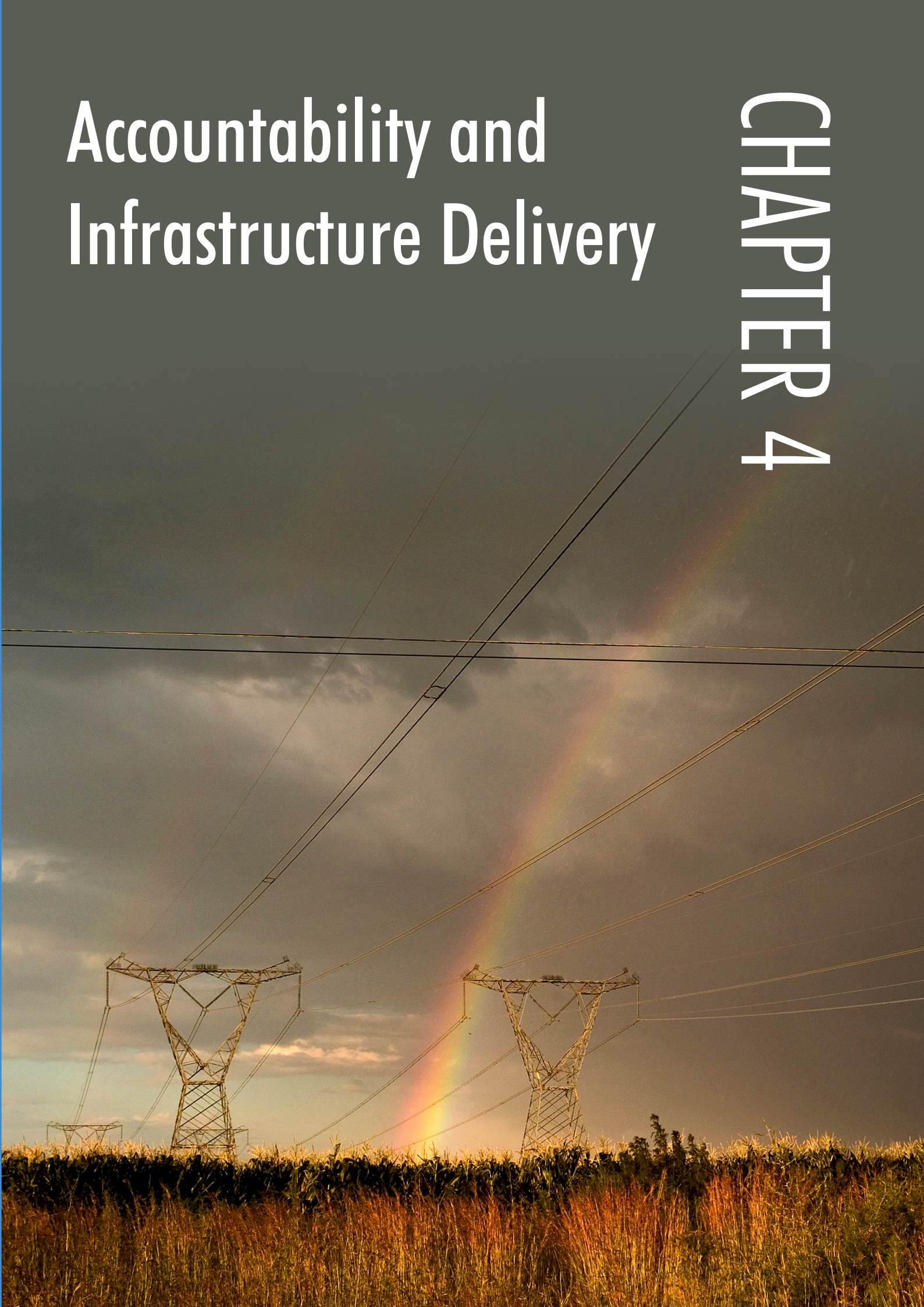
Accountability and Infrastructure Delivery

CHAPTER 4



CHAPTER 4

Accountability and Infrastructure Delivery

Mkhululi Ncube[52] and Zanele Tullock[53]

4.1 Introduction

The decentralised delivery of infrastructure in South Africa recognises the key role of subnational governments, especially local government as the sphere closest to the people. In years to come, the National Development Plan (NDP) envisages an even bigger role for local government. To deliver infrastructure, municipalities rely heavily on indirect[54] and direct conditional grants, which means that municipalities are required to report to the grant provider (national or provincial department) on the spending of such grants. National or provincial departments are responsible for the performance of indirect grants, which are characterised by widespread under-spending.

This chapter looks at local government accountability for the spending of infrastructure conditional indirect grants. These grants drive infrastructure provision and are proliferating, but have high levels of under-spending. The chapter considers:

- How municipal councils can exercise accountability over conditional grants, which is related to where the accountability for the performance should lie: with the grant provider (national or provincial department), the municipality (as recipient of the grant) or both.
- Whether, given the levels of under-spending, councils are failing in their task to hold the executives accountable.
- If accountability lies with the council, how effective are the municipal accountability mechanisms, such as the Municipal Public Accounts Committees (MPAC) and Audit Committees.

The chapter also makes recommendations on strengthening accountability mechanisms for infrastructure delivery and management within the local government sphere.

Accountability here refers broadly to a range of processes by which individuals or groups of individuals are held to account for their actions or conduct (Glynn and Murphy, 1996). Two elements of accountability are considered: at a basic level, accountability is about giving an account of one's actions or accounting for spending; more broadly, accountability requires "a person to explain and justify their decisions or actions" (Corder et al., 1999).

After discussing accountability arrangements in the local government sector, the methodology and findings are presented, followed by the conclusions and recommendations.

4.2 Literature Review

4.2.1 Conceptualising accountability

Accountability is an ever-expanding and chameleon-like term, often meaning many things to different people (Mulgan, 2000). For auditors, accountability is a financial matter; for political scientists, it is a political imperative; for legal scholars, it is a constitutional arrangement; and for philosophers, it is an issue of ethics (Bovens, 2007). Literature divides accountability into narrow and broad definitions. Defined broadly, accountability contains the following evaluative dimensions: transparency, equity, democracy, efficiency, controllability, responsiveness, responsibility and integrity. Many concepts speak to accountability, making it difficult to determine empirically whether an organisation/institution is accountable, as each dimension is not easy to operationalise and measure. In the narrow sense, accountability is defined as a social relationship, where one actor is obliged to explain and justify conduct (Bovens, 2007; Mulgan, 2000). Accountability is a relationship between an actor (accountor) and a forum (the accountee), in which the

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[54] An indirect grant is a conditional grant, which is an allocation in kind for spending by a national department on behalf of a municipality.

actor has an obligation to explain and to justify his or her conduct and to face the consequences, while the forum can pose questions and pass judgement (Bovens, 2007). Expanding on the concept, Horng and Craig (2008: 14) stated that accountability needs five interconnected elements to be present:

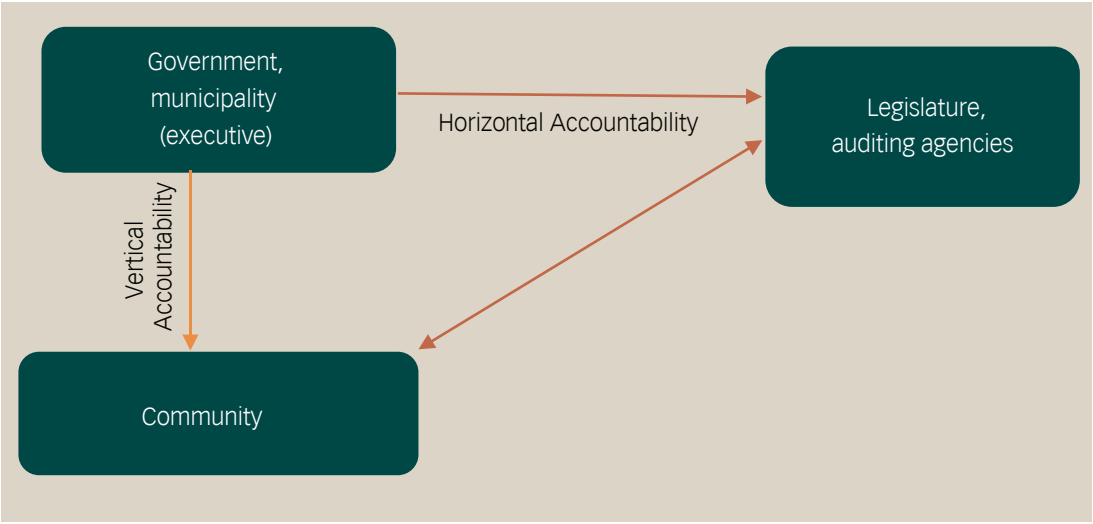
- delegation (clear assignments of duties to each person and agency);
- finance (adequate funding at all levels to do the job);
- performance (public servants, ministries and other service providers actually doing their job);
- information about performance (monitoring or measuring the effectiveness of this performance);
- enforceability (meaning that what is supposed to be done is done, and that there are consequences if it is not).

Accountability is broadly categorised under either (i) accountability relations or (ii) nature of obligation (Akpanuko and Asogwa, 2013).

In the first category, accountability is prefaced with many adjectives, e.g. administrative accountability, (i.e. where municipal officials are accountable for the output they deliver); economic and fiscal accountability (i.e. accountability of local officials for economic activities entrusted to them, including revenue generation and expenditures); intergovernmental accountability (i.e. accountability between higher and lower levels of government); and political accountability (i.e. accountability for fair/equitable distribution of resources), electoral accountability (i.e. accountability of electoral officials to their voters); and social accountability (i.e. accountability to groups, networks, families, communities).

In the second category, accountability is divided into vertical, horizontal and diagonal/hybrid accountabilities (Figure 19). Vertical accountability is when subnational institutions account to provincial or national government. Horizontal accountability is when municipalities account to accountees who are not hierarchically superior. Diagonal/hybrid accountability is when citizens get involved directly in horizontal (state-to-state) accountability processes – when civil society takes on the state's attributes in supervising the performance of state agencies. A good example is when ordinary people participate in oversight activities that supplement the activities of official oversight bodies.

Figure 19: Vertical and horizontal accountability

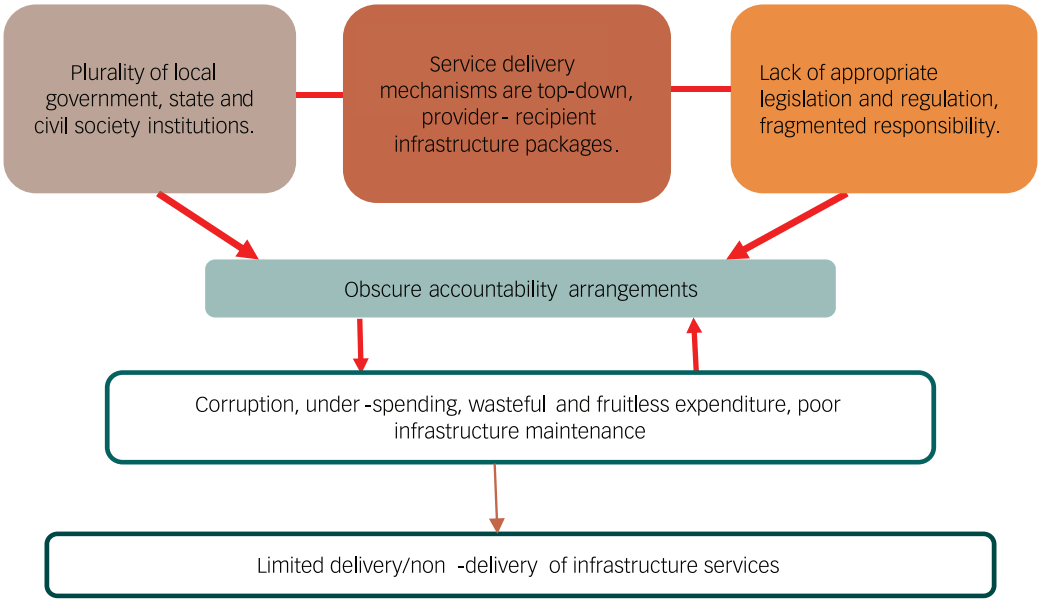


Literature also distinguishes between formal (direct control) and informal (indirect influences), and between internal (to the bureaucracy) and external (to the local government bureaucracy) accountability mechanisms.

4.2.2 Causes of weak accountability arrangements

Literature has singled out three categories of factors responsible for weak accountability mechanisms. These factors are summarised in the framework illustrated in Figure 20 and include: a plurality of institutions, lack of appropriate legislation and regulations, and a top-down, provider-recipient approach to infrastructure delivery.

Figure 20: Factors behind weakened accountability arrangements



As Figure 20 highlights, obscure accountability arrangements give rise to corruption, wasteful and fruitless expenditure and under-spending, which in turn lead to poor and inadequate infrastructure delivery.

4.2.3 Consequences of weak infrastructure delivery accountability

The literature highlights a number of problems associated with weak accountability for infrastructure delivery. These include corruption (use of public office for private gain), clientelism (channelling public resources to specific client groups) and capture (exerting influence on and colluding with public officials to gain some advantage). The overall effect is poor service delivery. Table 21 summarises some of the consequences of weak accountability in different countries.

Table 21: Weak local government fiscal accountability consequences

Country	Issues Arising from Weak Fiscal Accountability Systems
Argentina	High levels of local government indebtedness and failure to provide urban services.
Bosnia	Impaired safeguarding measures, abuse, misuse, fraud and irregularities; widespread corruption; misconduct and misuse of funds; government dissatisfaction with public institutions.
China	Common problems in compliance with laws and regulations; unlawful tax practices.
Columbia	Negligence, corruption and misuse of public funds.
India (Karnataka State)	Frequent cases of abuse, misuse and fraud; irregularities and malpractices in procurement; lack of coherence to the stated rules and procedures.
Indonesia	Unethical and uneconomic operations because of perverse corruption, inefficient cash management and collusive practices in procurement.
Philippines	Lack of compliance with laws, rules and regulations; fraud and irregularities; overpaid public purchase and procurement.

Source: Adapted from Baltaci and Yilmaz (2006)

4.2.4 Accountability arrangements in the local government sector

Understanding accountabilities in the local government sphere means first understanding who is accountable for infrastructure delivery. Pinpointing the accountability is not easy because the sphere contains many players with various governance and management responsibilities. It is also complicated by the conflation of accountability processes with various socio-political factors (Khalo, 2007) and the fluid concept of accountability. Nevertheless, some local government accountability, both internal and external, can be identified.

South Africa's local government fiscal framework is complex, characterised by multiple fiscal accountability connections. Those who are accountable for infrastructure delivery range from the service recipients to the central government, and in between these two extremes are local and provincial governments, service providers, middlemen, politicians, civil society, independent institutions, etc. Accountability arrangements are both internal and external, and formal and informal, as detailed in Table 22.

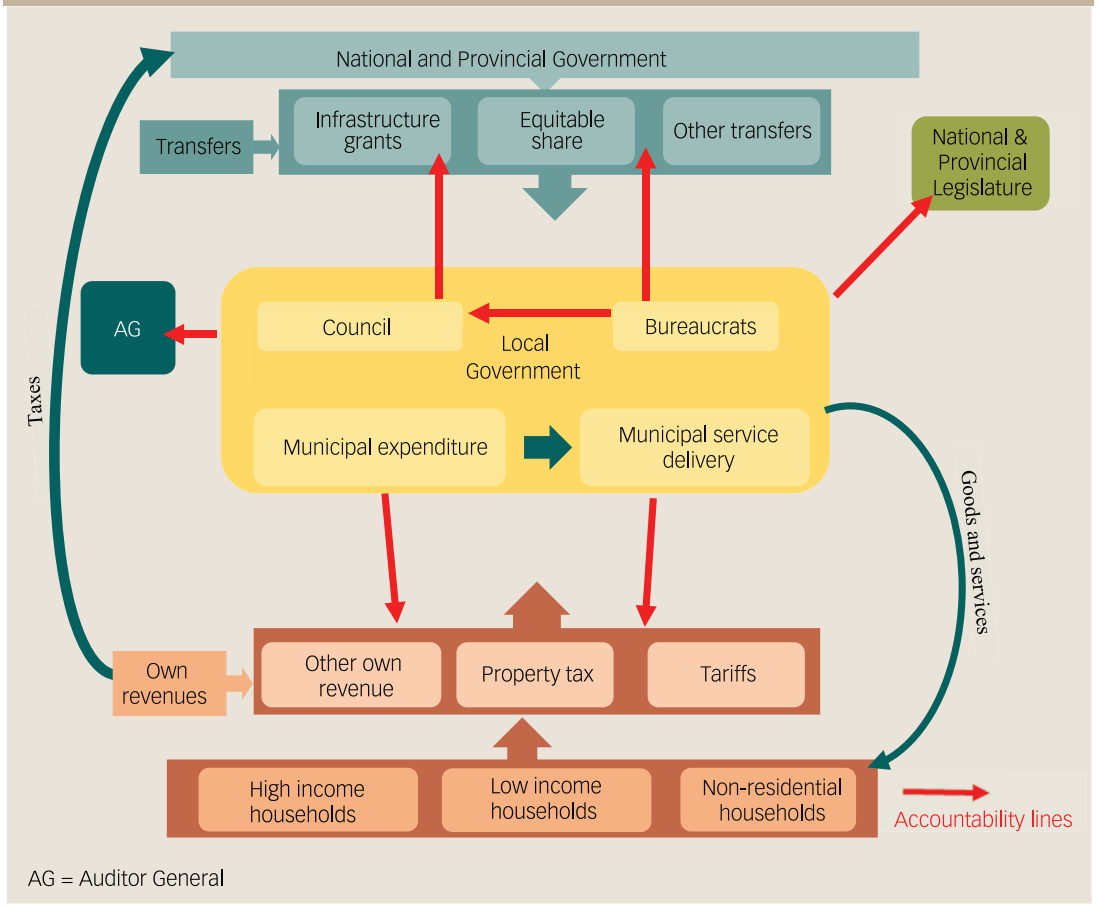
Table 22: Accountability mechanisms in infrastructure delivery

	Internal	External
Formal	Rules and regulations Budgets Performance evaluations Internal auditing Monitoring Incentives	Enabling legislation and laws Budget/auditing committees Political and legal oversight Auditor-General Citizen participation
Informal	Professionalism	Public scrutiny Interest group pressure Peer review Media scrutiny

National and provincial governments are responsible for providing policy direction and funding, while local government is responsible for governance and for raising own revenues to provide services at the local level. Government policies need to be reflected at subnational levels and are largely funded through transfers of public resources from national to subnational government. These transfer payments mean that local government is accountable to national government (i.e. vertical accountability). Local government also has a direct accountability relationship with the public and its constituent communities. In addition to transfers, municipalities provide public goods and services using own revenues raised through various instruments (e.g. rates and local taxes). These revenue sources make the sphere accountable to households and business.

A number of accountability relationships exist within local government: between elected officials and managers, between elected officials and citizens, and between citizens and managers. Figure 21 provides a bird's-eye view of key accountability flows for infrastructure delivery. Local government is shown at the centre because of its importance for infrastructure spending and delivery.

Figure 21: Key accountability flows for infrastructure delivery



AG = Auditor General

Local government accountability in South Africa is embedded in various pieces of legislation. The general framework for prudent financial management and local government accountability is set by the Constitution (1996). Additional guidelines for accountability are provided in the Municipal Structures Act (No. 117 of 1998), the Municipal Finance Management Act (No. 56 of 2003), and regulations such as the Local Government Municipal Regulations of Financial Misconduct Procedures and Criminal Proceedings and the Municipal Regulations on Standard Chart of Accounts, as well as various National Treasury circulars.

4.3 Methodology

The methodology included both desktop research and fieldwork. The desktop research evaluated accountability arrangements for (and under-spending of) conditional infrastructure grants, while qualitative case studies evaluated the efficacy of accountability mechanisms for infrastructure delivery within the local sphere. For the case studies, the following nine municipalities were identified through a stratified random sampling technique: one metropolitan municipality: Mangaung (Free State); one district municipality: Waterberg (Limpopo); and seven local municipalities: Westonaria (Gauteng), Sol Plaatje (Northern Cape), Ramotshere Moiloa (North West), Mbizana (Eastern Cape), Newcastle (KwaZulu-Natal), Stellenbosch (Western Cape) and Bushbuckridge (Mpumalanga).

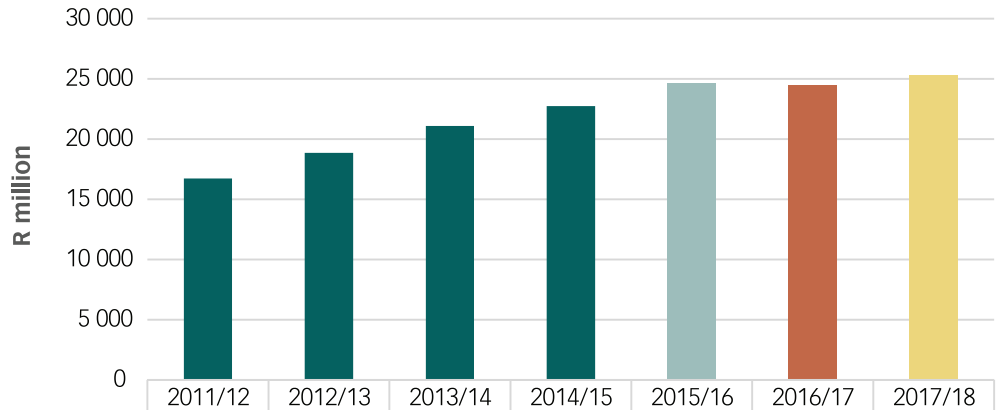
Information was collected from primary and secondary sources within the municipalities. Secondary data was collected from municipal annual reports, research reports and other relevant government and parliamentary reports. Primary information was collected through interviews and discussions with municipality officials, mostly municipal managers, chief financial officers (CFOs) and planning and infrastructure managers. A total of 49 officials were interviewed in the nine municipalities using a semi-structured questionnaire. Interviews with these stakeholders enabled some triangulation of the results to get a comprehensive picture of both internal and external accountability arrangements. The qualitative analysis focused on emerging themes, patterns and trends.

4.4 Research Findings

4.4.1 Infrastructure grants and accountability

The local government sphere implements part of the national infrastructure programme, and most municipalities rely on national and provincial transfers for capital investments. As Figure 22 shows, in 2015/16 local government received almost R24.6-billion in direct and indirect infrastructure grants (up from about R17-billion in 2011/12) and is projected to receive R25.3-billion in 2017/18.

Figure 22: Local government infrastructure grants



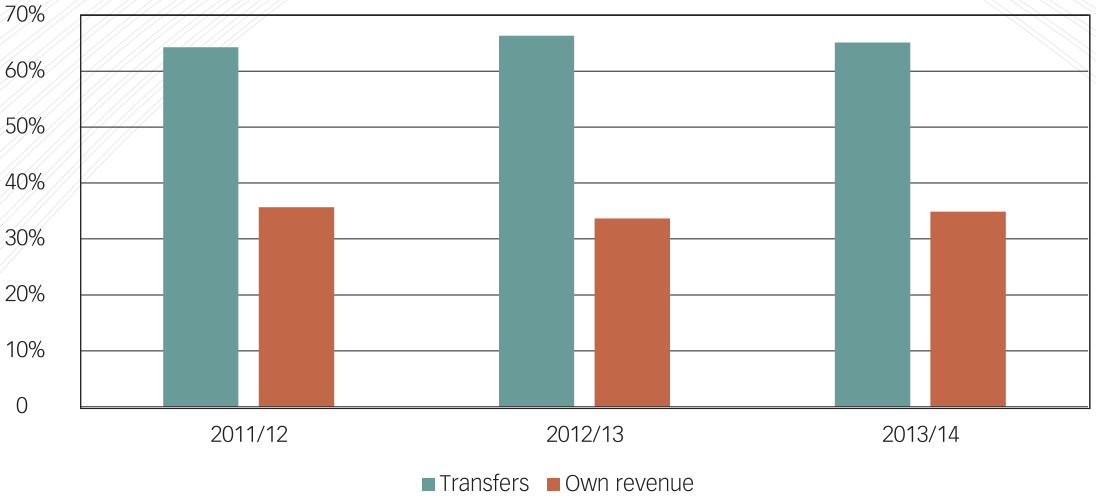
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Infrastructure Grants	16 749	18 868	21 087	22 737	24 637	24 470	25 274

Source: Author's calculations from National Treasury database

4.4.2 Conditional grants and accountability

Conditional grants are the main source of infrastructure funding, and so the accountability relationship is primarily between local and national/provincial departments. There is very little accountability between municipalities and their communities, which could be explained in part by local government's heavy reliance on conditional grants, resulting in municipalities using little (if any) own revenues for infrastructure funding (Figure 23).

Figure 23: Shares of revenue sources for local government infrastructure



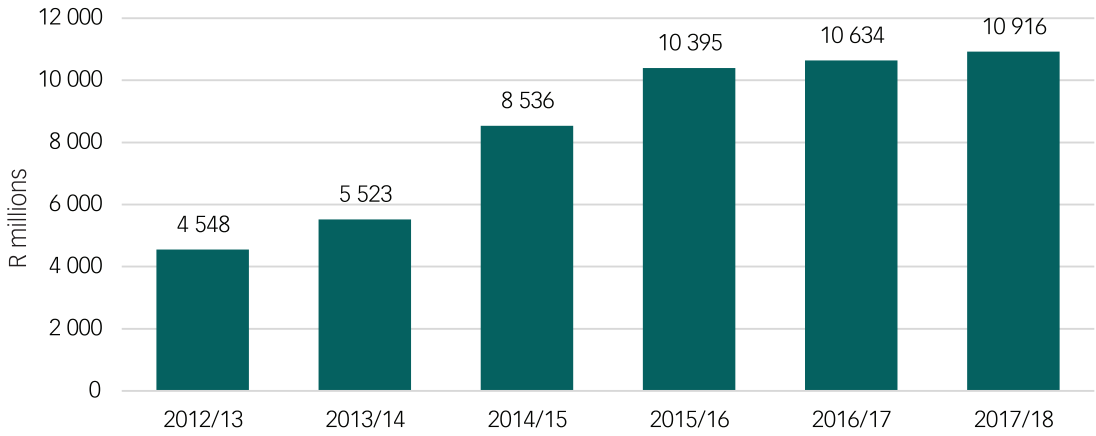
Source: Author's calculations

National and provincial government impose the rules and methods of service provision, and provide the bulk of resources. They are more concerned with ensuring legal and financial compliance than prioritising efficiency, effectiveness, quality and value for money. When the focus is not on satisfying clients by using resources as efficiently as possible, and success is measured by following rules, the result is often a lack of sensitivity to citizens' choices and demands.

4.4.3 Indirect infrastructure grant proliferation and accountability

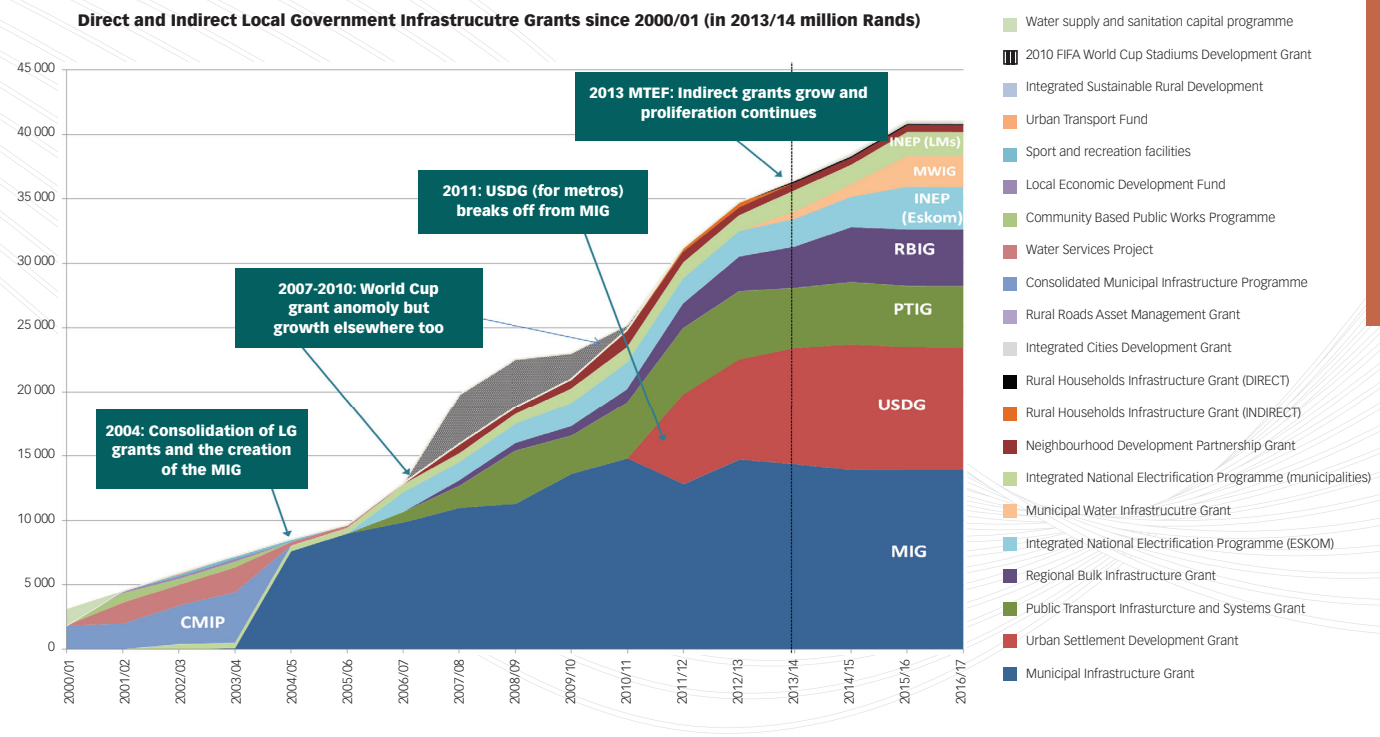
The intergovernmental fiscal system has recently seen a proliferation of indirect infrastructure grants. Line departments have motivated for the creation of new grants in order to meet the demands for new infrastructure. As a result, there has been a move away from the grant consolidation approach, which was gradually implemented between 2004 and 2010. Figure 24 plots the trends in indirect transfers to the local government sector, while Figure 25 shows the evolution of infrastructure grants. Indirect grants to local government amounted to R4.5-billion in 2012/13 and are expected to rise to over R10-billion in 2017/18 (Figure 24).

Figure 24: Indirect transfers to local government



Source: Author's calculations from National Treasury database

Figure 25: Direct and indirect infrastructure grants



Source: Author's calculations from *National Treasury (2015)*

Table 23: Real growth of local government direct and indirect grants

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	Average growth rate
Direct	10%	88%	17%	-3%	5%	20%	8%	10%	0%	6%	16%
Indirect	12%	46%	31%	29%	-8%	-6%	61%	17%	49%	18%	25%

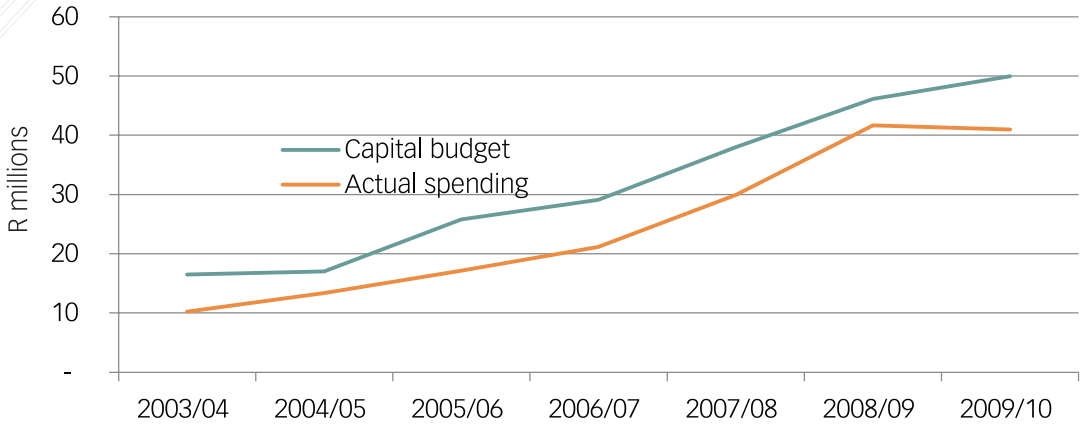
Table 23 traces the growth rate of indirect and direct infrastructure grants and shows clearly the shift to indirect grants: the average real growth rate of indirect grants was 25% compared to 18% for direct grants.

The proliferation of indirect grants does not bode well for accountability relationships in the local sphere. Municipalities surveyed appear clear on accountability lines for direct grants but less so for indirect grants, especially who is answerable for the under-spending of indirect infrastructure grants. Some municipalities (Sol Plaatje, Ramotshere Moiloa, Newcastle, Stellenbosch and Mbizana) suggested that they are sometimes held to account for poor quality work that is funded through indirect grants and supervised by national or provincial departments.

4.4.4 Under-spending and accountability

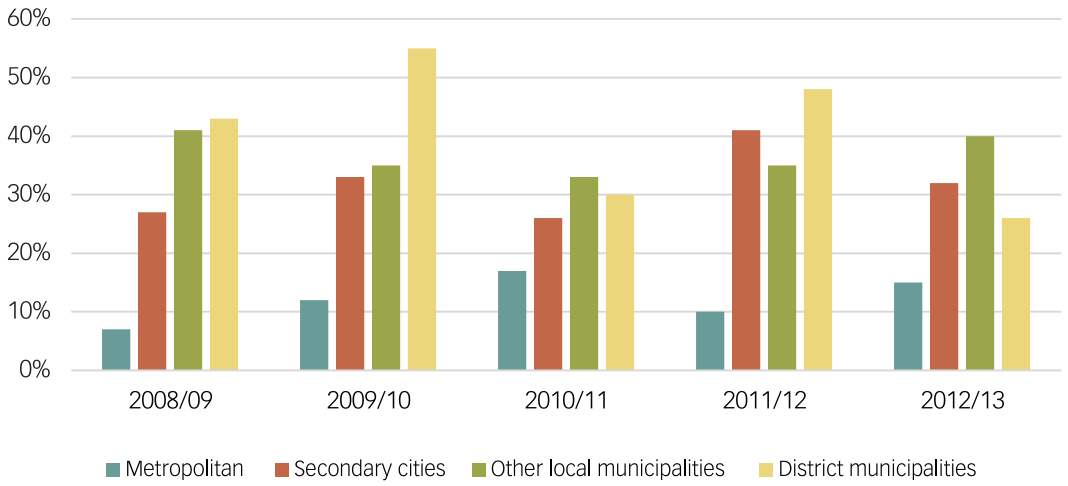
As Figures 26 and 27 show, the under-spending of infrastructure grants by local government is a challenge. Capital budgets are funded from own revenues and infrastructure grants. Under-spending on capital budgets is higher among district and local municipalities than metros and secondary cities.

Figure 26: Capital expenditure under-spending



Source: Author's calculations from National Treasury database

Figure 27: Under-spending on capital budgets by type of municipality



Source: Author's calculations from National Treasury database

Table 24 shows the expenditure performance of direct and indirect grants. The under-spending of indirect grants is greater than that of direct grants. For example, in 2013/14, an average of 92% of direct grants were spent, compared to 83% for indirect grants.

Table 24: Expenditure performance of direct and indirect grants

	2011/12	2012/13	2013/14
Direct transfers			
Local Government Financial Management Grant		96%	98%
Municipal Infrastructure Grant	84%	79%	95%
National Electrification Programme	93%	81%	81%
Public Transport Infrastructure Grant	49%	104%	
Neighbourhood Development Partnership Grant	95%	103%	
Rural Transport Services and Infrastructure Grant	32%		
Electricity Demand-side Management	91%	49%	
Disaster Relief Funds	62%	68%	
Municipal Drought Relief	81%		
Expanded Public Works Programme Integrated Grant (Municipality)		103%	115%
2010 FIFA World Cup Stadiums Development Grant			98%
Municipal Water Infrastructure Grant (Schedule 5B)			68%
Rural Road Assets Management Systems Grant			95%
Urban Settlements Development Grant		93%	
Average Direct	73%	86%	93%
Indirect transfers			
National Electrification Programme	84%	80%	100%
Neighbourhood Development Partnership Grant	96%	47.50%	87%
Water Service Operating Subsidy Grant	100%		
Regional Bulk Infrastructure Grant	97%	96%	100%
Rural Household Infrastructure Grant	31%	60%	38%
Average Indirect	82%	71%	81%

Source: National Treasury (2014)

Reasons for under-spending on indirect grants are many and include a lack of capacity, weak oversight institutions, and poor planning and budgeting. In response, the government has implemented a host of capacity-building initiatives and established various monitoring and benchmarking arrangements.

Yet the question remains: who is accountable for under-spending on indirect grants. And who is accountable for (and must bear the consequences of) the non-delivery or postponed delivery of infrastructure, which is implied by the under-spending. When the responsibility for spending indirect grants lies with national departments, municipalities cannot be held responsible for any under-spending. National (or line) departments responsible for these grants have to account to Parliament, and Parliament in turn accounts to the electorate. However, this long accountability loop is often ineffective and results in the wrong parties being held responsible for spending inefficiencies. For example, local government may be held responsible for the non-spending of indirect grants (and thus non-delivery of infrastructure) because previously these grants were administered by municipalities – and communities think that this is still the case. In contrast, national government departments responsible for under-spending cannot be held to account by municipal councils and are not directly answerable to communities where such infrastructure is destined.

Furthermore, as indirect grants are not municipal own revenue, municipalities may not always pay attention to performance, which may explain why the spending of municipal own revenue is better than that of conditional grants (Figure 28). The implication is that own revenues are spent more efficiently and transparently because taxpayers demand more accountability from the municipality. Therefore, local-level accountabilities could be improved by expanding municipal own-revenue sources through (e.g.) borrowing.

Figure 28: Average spending as a percentage of adjusted budget

Source: Author's calculations from National Treasury database

4.4.5 Legislation and accountability capacities in local government

Legislation is clear: all spheres of government are required to be accountable, transparent and responsive to the needs of the people. Section 152(1a) of the Constitution and Section 51(b) and (i) of the Municipal Systems Act (No. 32 of 2000) are explicit about the need for local government accountability and for establishing accountability structures. South Africa has a number of accountability mechanisms, such as budgets, performance evaluations, internal auditing, monitoring and incentives, while legislation provides for accountability bodies, such as national and provincial committees of Parliament, political and legal oversight bodies, the Office of the Auditor-General and citizen participation. At national and provincial levels, public accounts committees ensure that, among other things, the executives are accountable for the effective and efficient use of resources.

Municipal accountability structures

The Constitution (1996) vests the legislative and executive powers of a municipality in the municipal council. The Municipal Structure Act (No. 117 of 1998) provides for various committees that exercise accountability and oversight of municipal officials and the executive. There are three types of committees:

The executive committee: This is the municipal council's principal committee from which a mayor is elected. The executive mayor is responsible for the day-to-day running of the municipality, with the assistance of a mayoral committee. A mayoral committee makes decisions, proposals and plans that have to be approved by council. Therefore, the mayor and/or mayoral committee accounts on behalf of the administration to the council. If the mayor or the mayoral committee does not account satisfactorily to council, the mayor may be removed.

Section 79 committees: These committees assist council in exercising oversight of the executive and can include both councillors and outside experts. They are usually temporary and appointed by the executive committee when needed. Section 79 committees include the Municipal Public Accounts Committee (MPAC), the Finance Oversight Committee and the Audit Committee. The MPAC, established through the Municipality Finance Management Act (No. 56 of 2003), is a local version of provincial and national public accounts committees. Its mandate is to hold the executive to account and to ensure that municipal resources are used effectively and efficiently. The MPAC examines Auditor-General reports and determines whether municipal funds are appropriately spent. In the case of wasteful, irregular, unauthorised and fruitless expenditures, the MPAC can, if necessary, call the executives to account. This implies that MPACs play a more significant role in financial accountability than other municipal committees. The Finance Oversight Committee exercises oversight on policy matters, such as pointing out deviations from stated policies, while the Audit Committee is equally important for budgetary accountability.

Section 80 committees: These committees report to the executive committee or executive mayor and are usually permanent committees that specialise in one area of work (e.g. energy, finance, housing, social welfare). They are sometimes given the right to make decisions over small issues.

In assessing the effectiveness of accountability mechanisms for infrastructure delivery within local government, particular attention was paid to the committees that deal with infrastructure delivery or spending in one form or another: the MPACs, Audit Committees and Finance Oversight Committees. The assessment was based on five elements of accountability as identified by the World Bank (World Bank, 2004: 47, quoted in Horng and Craig, 2008): clear lines of delegation and assignments; adequate funding for accountability structures; performance and skills to do the job; information about performance; enforceability and consequences for not performing. Effective accountability also requires enablers, such as a clear mandate, adequate powers, adequate resources (human, financial, equipment), strong leadership, access to information, skills to interpret and analyse budgets, and financial information (Moeti, 2007).

All municipalities studied have committees responsible for holding executives to account, with a clear mandate that is spelt out in various pieces of legislation and circulars. However, most of these committees appear to lack capacity and skilled personnel able to scrutinise, interpret and analyse information on fiscal and financial matters. Without capacity, these committees will have difficulty gathering and analysing information that can be used to hold executives to account. Financial resources for these committees are also lacking, meaning that (i) the committees cannot procure support for distilling essential information necessary to hold the executive to account; (ii) the committees are unable to hold widespread, effective public hearings (i.e. platforms that enable council to account to communities), which results in limited societal accountability[55] for the local sphere closest to the people; (iii) committee reports and resolutions are not widely disseminated, further limiting the municipality's societal accountability. These findings corroborate those of Khalo (2007) who identified challenges facing MPACs as including lack of continuity and loss of institutional memory, inadequate powers, limited resources and poor attendance of their public hearings.

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[55] Societal accountability refers to actions and mechanisms that citizens, communities and civil society can use to hold public officials and public servants to account.

Accountability risks

For the municipalities surveyed, the most significant risks to accountability are the turnover of senior staff and the lack of permanently appointed municipal managers and CFOs (Figures 29 and 30). The situation has improved with (for example) the proportion of "acting" municipal managers in the North West Province declining from 57% in 2011 to 22% in 2013. However, certain provinces still lack permanently appointed senior management; for example, in 2013, nearly a third (30%) of Limpopo municipal managers were "acting".

Figure 29: Acting municipal managers

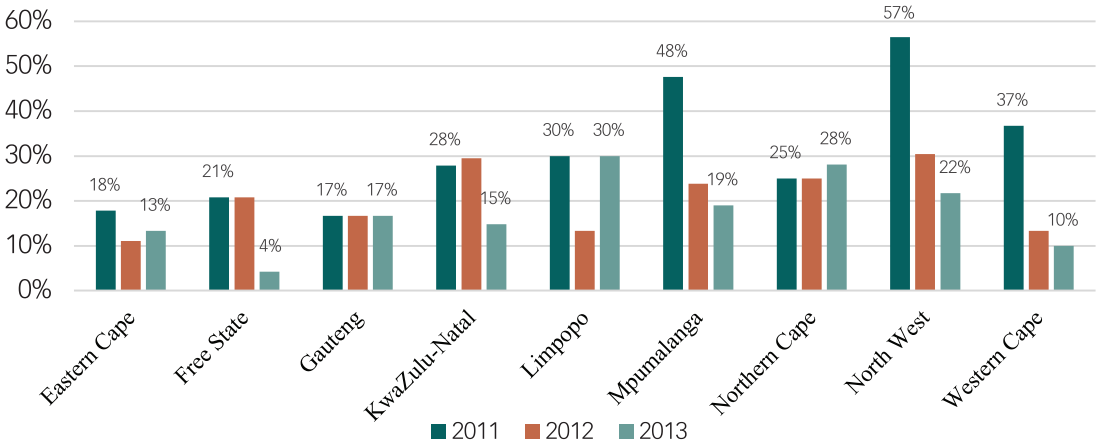
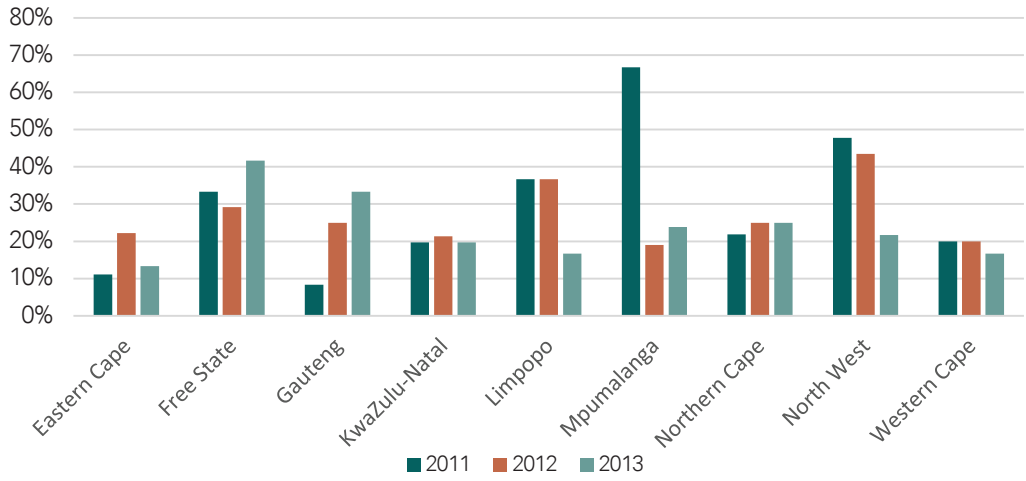


Figure 30: Acting chief financial officers



Senior managers are responsible for executing council resolutions, including resolutions related to budgets. Despite the downward trend, the percentage of acting senior managers is cause for concern, as these officials account to political executives and line departments on the use of resources. Instability at senior management level contributes to poor quality statutory documents, such as the integrated development plan (IDP), the budget, annual reports and financial statements, thereby diminishing the municipality's ability to account. Another concern is that the acting municipal manager or CFO may shift the blame for under-performance to previous incumbents. Acting managers are also more likely to avoid taking responsibility and to delay making decisions.

4.4.6 Societal accountability and infrastructure delivery

Infrastructure is delivered for citizens and, therefore, their needs should ideally be factored in. Municipalities need to account to citizens regarding infrastructure spending, selection, prioritisation and location. Societal accountability is when citizens hold public officials to account through monitoring their spending patterns, exposing wrong doing and activating investigations into abuse and misuse of resources. In all nine municipalities studied, citizens are consulted about infrastructure through their involvement in the development of the IDP. However, accountability is minimal, as community consultation happens only before the IDP

is developed, not when it is in place. In other countries, public officials have to account to communities on budgetary issues in between elections. India and Uganda can provide useful lessons for South Africa about effective and institutionalised societal accountability on fiscal issues (Bjorkman and Svensson, 2009). In both countries, societal accountability is achieved through community monitoring groups, which track expenditures, report on municipal under-spending and check that public funds are disbursed for intended purposes. These community monitoring groups are made up of individuals elected by communities and chosen based on their expertise in different areas of service delivery (ibid).

4.5 Conclusion and Recommendations

Accountability is the cornerstone of development and good governance (NPC, 2011). Local government accountability for infrastructure delivery and spending is complicated by the fact that most infrastructure is funded through direct and indirect conditional grants, rather than own revenues. Accountability for the performance of conditional grants flows from municipal officials to national or provincial departments, with very limited accountability to municipal councils and communities. The proliferation of indirect grants distorts effective accountability within the transfer system. National (or line) departments administer indirect grants but are rarely held to account for under-spending these grants, while municipal councils are unable to hold national departments to account. Under-spending on infrastructure grants implies forgone or postponed investment, increased backlogs and, ultimately, diminished growth.

Under-spending is more pronounced for indirect conditional grants than for own revenues, which suggests that own-revenue spending is more efficient. This is probably because municipal councils are able to hold the executive to account for own-revenue spending, whereas councils and communities cannot hold national department officials to account for the under-spending of indirect conditional grants.

Addressing under-spending requires clear accountability lines and those responsible for inefficient spending to be answerable, and sanctions that can be imposed. The current framework fails to guarantee accountability, which suggests that, where possible, a shift towards direct infrastructure grants is necessary. An accountability framework should be developed for indirect grants. Such a framework should involve municipal councils (as is the case for own revenues) and should contain indicators for monitoring the grants. Serious consideration needs to be given to a new infrastructure funding framework that will enhance the accountability and management of public finances. Accountability could also be improved by municipalities expanding their own-revenue sources, including through borrowing. Therefore, strategies are needed to improve the uptake of loan finance and broaden the scope of debt instruments to cater for different municipalities.

Accountability structures are in place in all South Africa's municipalities, but accountability is often seen as simply meeting legal obligations and financial compliance, rather than providing quality and value for money. The structures are insufficiently resourced to ensure that public officials answer for their behaviour, justify and report their decisions, and are eventually sanctioned or rewarded for those decisions. Municipalities lack the capacity and skills to monitor and track expenditures, and hold executives accountable for under-spending. The accountability structures need strengthening, through research support and technical expertise, so that they can address problems, such as the diversion of public funds for unintended purposes, and general inefficient spending. Although the institutional component of the local government equitable share does provide for some councillor support (and by extension council committees), incentives should be embedded, to encourage municipalities to support properly these committees.

The needs of communities also need to be factored in, as infrastructure is delivered for citizens. The value of community/societal accountability in infrastructure delivery is well documented, as is the fact that the opportunities for fraud, bribery, embezzlement, corruption and patronage are higher in the provision of infrastructure than for other public goods (Bardhan and Mookherjee, 2005). Community accountability makes it more difficult for public officials to divert public resources for undesignated purposes (Ling and Roberts, 2014). Despite the high value placed on societal accountability for infrastructure delivery, this study has shown that societal accountability is limited in many municipalities mainly due to inadequate financial and human resources.

With respect to improving accountability on local government infrastructure delivery, the Commission recommends that:

- National Treasury and the Department of Cooperative Governance develop an accountability framework for indirect infrastructure grants. The framework should identify accountability lines, mechanisms, and enforcement, and spell out the consequences for undermining the accountability arrangements.

- Accountability structures and infrastructure within the local government are strengthened, and incentives are provided within the existing transfer streams for research and technical support. Committees should be provided with adequate technical and research support, and sufficient resources to engage with and account to the communities. Smaller and adjacent municipalities should endeavour to pull together such support to aid the work of accountability committees.

- Social accountability is institutionalised (established as a convention or norm in the local government sector) and an accountability framework is developed by the South African Local Government Association (SALGA), to guide communities on how to hold local governments accountable. This framework should also contain indicators for rating municipality performance on social accountability in general and infrastructure development in particular.

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CHAPTER 5

Fiscal Arrangements for Financing and Delivery of ECD Infrastructure

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Eddie Rakabe [56]

5.1 Introduction

One of the classical statutory and public investment functions is ensuring adequate provision of quality early childhood development (ECD) infrastructure to house government-subsidised programmes (Sussman and Gillman, 2007). South Africa's obligations to provide child welfare services are derived directly from Chapter 2 of the Constitution (1996), in particular Section 28, which prescribes the ethical and legal obligations of the government and caregivers to honour children's rights. The Constitution builds on three fundamental principles of children's rights: protection, survival and development. Government has developed legislation, policies and programmes that give effect to the Constitution, most notably the Children's Act (No. 38 of 2005) and the National Development Plan (NDP).

Among other things, the Children's Act regulates the provision of different child-care services and in particular ECD. The Act views ECD services from a narrow education perspective, as programmes that promote a child's emotional, cognitive, physical, social and communication abilities from birth to school-going age (0–6 years) and that are provided on a regular basis by a person other than a child's parent or caregiver. The NDP considers a child's prior exposure to ECD as the fundamental prerequisite for entry into the basic schooling system. It envisages that, by 2030, every child will be enrolled in ECD for at least two years before entering Grade 1. To meet these policy objectives will require investing in ECD infrastructure and expanding access to ECD services, especially for the poor.

The challenge is that, despite the robust legislation and policy underlying the provision of ECD services, the sector remains fragmented and insufficiently resourced – parents' fees alone cannot cover the cost of delivering high quality early education infrastructure. The Children's Act puts no obligation on government to fund early education infrastructure, but such a requirement is implied in Section 227 of the Constitution. Section 227 states that the provision of child-care facilities is a concurrent local government function, whereas national government and provinces are responsible for the education and welfare components. These arrangements cause intergovernmental fiscal tensions and complexities over the financing of ECD infrastructure between local government and the social development sector. For local government, ECD services are an unfunded mandate because of the perceived lack of support from the provincial social development departments, whereas the social development sector is of the view that local government does not prioritise early education facilities in its infrastructure allocations. The only notable government financial contribution to ECD facilities is the monthly operational subsidy made available to registered and qualifying centres (PMG, 2014). This subsidy is channelled through the provincial social development and education departments and is used mainly for the nutritional needs of children and for paying the caregivers' salaries. Local government financial support to ECD is almost non-existent, other than some limited funding from better resourced municipalities, particularly the metros (Ilifa-Labantwana, 2011).

Evidence indicates that ECD programmes with the highest infrastructure standards deliver significant and lasting positive behavioural and development outcomes for learners and the economy at large (Azzi-Lessing, 2009; Krichevsky et al., 1997; Olds, 2001). However, the reality is that many ECD facilities in South Africa are unable to meet the infrastructure standards. A national audit found that 70% of ECD centres are unsuited to providing ECD services, and 40% require urgent maintenance (DSD, 2014a). Children are often housed in unsafe facilities that do not have heating, ventilation, sanitation, separate kitchen and administrative facilities, water or electricity. (Viviers et al., 2013). The majority of these centres lack the necessary resources to build "fit for purpose" facilities because they are donor- or self-funded private and community-based or non-profit organisations (NPOs)[57] (Ilifa-Labantwana, 2011). The lack of funding and high start-up costs deter the establishment of new facilities in poor communities (Viviers et al., 2013), which in turn prevents many ECD facilities from registering and accessing the operational subsidy available from the Department of Social Development (DSD).

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[57] NPOs are largely dependent on donor funding with only 10–20% of required funds coming from government (Ilifa-Labantwana, 2011).

The ECD infrastructure supply bottlenecks are the result of many factors, including obscure intergovernmental fiscal arrangements, high construction costs and low income levels. Against this background, the benefits of public ECD investment are evaluated, as well as the existing intergovernmental arrangements for delivering and financing infrastructure, and alternative funding models for scaling up investments in ECD facilities.

5.1.1 Problem statement

Despite the existence of between 18 000 and 21 000 ECD centres (registered and unregistered), access to adequate ECD facilities for children under five years old is limited (DSD, 2012). There are as many formal ECD centres as there are public ordinary schools, and yet the former accommodates about two million children while the latter caters for more than 12 million children. Based on the current number of ECD facilities, the average enrolment rate is 95 children per facility. Access to ECD facilities is highly unequal: the poorest children who live in rural and urban informal settlements have the least access, inappropriate facilities and low quality programmes. Overall, only 20% of children aged 0–5 years in the poorest 40% of households have access to centre-based or out-of-home early learning services.

How the roles and responsibilities for ECD facilities are divided across the three spheres of government creates considerable intergovernmental contestations. National and provincial governments are responsible for delivering ECD services (i.e. operating subsidies) but not infrastructure, which is expected to be a local government mandate. However, local government is primarily occupied with delivering priority basic services, and budget allocations to ECD are almost non-existent – although metropolitan municipalities such as Tshwane and Johannesburg are running fully funded ECD facilities. The current subsidy model for ECD does not provide for infrastructure development and maintenance, which leads to inequitable provision of services, especially in poor areas where facilities are unavailable (Richter et al., 2012).

In response to the persistent problem of under-servicing in poor communities, private individuals and NPOs arbitrarily establish ECD facilities. Facilities are often set up in churches, community halls and multi-use buildings (Watermayer, 2013). As a result, poorly structured and equipped facilities have proliferated, exposing the children to risks. Proliferation also inadvertently increases the infrastructure backlog because the establishment of many small and unviable facilities in close proximity leads to unnecessary competition for resources. In some instances, the mushrooming of ECD facilities has resulted in officials being resistant to register centres because of their perception that these establishments are driven only by profit motivations (Watermayer, 2013).

ECD facilities must comply with relevant legislative requirements in order to operate and qualify for a government operational subsidy. These include having adequate sanitation (one toilet for every 20 children), complying with uniform building designs (i.e. separate activity, storage, kitchen and playroom area) and building regulations (i.e. ceilings, ventilation and adequate space) and being accessible to children with special needs. Meeting these requirements is evidently problematic for both the affluent and (most particularly) the poor communities (Ilifa-Labantwana, 2011; Viviers et al., 2013; Watermayer, 2013). Private and NPO facilities are unable to fund infrastructure (80% of the funding requirements) from fees and donations.

Despite its proven importance (Anderson et al., 2003; Engle et al., 2007; Walker et al., 2005), ECD remains the only public service responsibility where government takes a less active role in building the necessary enabling infrastructure. There are no identifiable government programmes for financing the construction of new facilities, upgrading and maintaining existing facilities, and improving access to adequately structured and equipped facilities. Yet such programmes exist for Grade R and the rest of the basic education schooling system. The reasons for this anomaly include a lack of clarity on budgeting for infrastructure and weak coordination within the different spheres of government (Giese and Budlender, 2011).

Various factors influence the inability/reluctance of government to finance ECD infrastructure:

- The ambiguous division of roles and responsibilities across spheres and sectors;
- The legislative framework, which prohibits government from allocating capital funding to privately run facilities because of accountability and ownership issues;
- Government's direct involvement in building and owning ECD centres, which is likely to increase operational expenditure because of the required standardisation in conditions of services.

The net effect is that many ECD centres are unable to meet infrastructure standards but continue to operate illegally, while many children are excluded from accessing quality ECD services that they need to develop their full potential.

5.1.2 Methodology

The study employs multiple research methods, including a meta-analysis to establish the benefits of public investment in ECD infrastructure, unstructured interviews, case studies and an analysis of ECD budget allocations. The aim of the interviews is to assess the different modalities of ECD infrastructure delivery and the applicable intergovernmental fiscal and accountability arrangements. Interviews were conducted with two NPOs (Centre for Early Childhood Development and Ilifa-Labantwana) that are active in the ECD space in order to ascertain the extent and effects of poor ECD infrastructure, particularly on poor learners. The interviews also helped to establish any differences in the quality of services offered by centre-based and other ECD services. The interviews took place in two metropolitan municipalities (City of Cape Town and City of Tshwane) and two provinces (Western Cape and KwaZulu-Natal). The provinces and municipalities were selected so that different funding and delivery models could be assessed. The funding instruments – provincial equitable share (PES) and municipal infrastructure grant (MIG) – and the budgets of the different spheres and/departments responsible for ECD were analysed to determine the composition of ECD-specific expenditure (capital vs operational), budget prioritisation, and allocation criteria. The case studies evaluated the institutional and fiscal arrangements of government-funded programmes for upgrading ECD facilities in impoverished communities.

5.2 Investing in the Children

5.2.1 ECD policy

Providing adequate investment, which enables children to thrive, is a moral and an economic imperative. Many studies have found that relatively low levels of investment during childhood can yield intergenerational economic returns for both individuals and the society (Rees et al., 2012). However, many factors influence the impact of this investment during childhood, including the type, size and target recipient of investment and the sector in which investments are made. The returns on investing in children further depend on the availability of institutions and policies to ensure successful service delivery and complementary investments (e.g. in job creation).

Investments through ECD programmes can be directed towards a range of interventions in health, social care and protection, access to basic services (water and sanitation), nutrition, education and infrastructure. The combination of these investments or services depends on the socio-economic circumstances and priorities of the individual country. Governments across the world are increasingly moving towards more universal and integrated service delivery models to meet the multiple needs of children, i.e. health, nutrition, cognitive and psychological development. Some focus on educating parents, while others emphasise integrating health and child development, home visits, pre-school education and communication packages (Unicef, 2006).

The problem is that integration is not always possible because planning, funding and delivery programmes are managed by different levels of government, departments and agencies that operate independently. This makes it difficult to determine what contribution the relevant departments can make to the children's needs at different stages of their lives and entrenches an output-oriented, not outcome-oriented, delivery approach (Moore and Skinner, 2010). A comparative study of developing countries found no blueprint for a holistic approach to ECD. Each country designs its programmes in accordance with the prevailing socio-economic circumstances, with special emphasis on areas "where impact can be multiplied through collaboration, coordination, convergence or integration" (Unicef, 2006: 9).

The policy framework underpinning ECD services in South Africa emphasises a multi-dimensional approach to investing in children, encompassing not only education but also nutrition, health, access to basic services and social services and protection. The Constitution guarantees every child an unqualified right to essential elements of ECD, and the Children's Act sets out the framework for providing children services (i.e. parenting, adoption, access to courts, child-care, development and protection). The Children's Act in particular obliges the Minister of Social Development to put in place a comprehensive national strategy to achieve properly resourced, coordinated and managed ECD. In 2005, government adopted the National Integrated Plan for ECD (2005–2010) that sought to integrate and coordinate programmes undertaken by various departments and located in different sites. The 2014 national ECD policy identifies 11 services[58] that are required to

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[58] These include parenting support and education; child-centred social security; free birth registration; basic health care; food and nutritional support; safe and affordable day-care; early learning support; protection from abuse, neglect and exploitation; play and recreational facilities; specialised services for children with disabilities; and ECD information.

ensure maximum development of children during their early years. Most of the responsibility for providing these services sits with the DSD, while the education and health departments are responsible for children's education and health needs. Municipalities are empowered to regulate child-care facilities and, in certain instances, to directly provide child-care services (Giese and Budlender, 2011).

Notwithstanding the availability of a comprehensive package of children services, South Africa focuses disproportionately on the education element of children's needs. More than 40% of the DSD's budget is spent on education-related services. The Department of Basic Education (DBE) spends a significant amount of funding on Grade R, while the Department of Cooperative Governance and Traditional Affairs (CoGTA) focuses on training ECD practitioners through the Expanded Public Works Programme (EPWP). Investment in other, equally important child-care and welfare services is mixed. For instance, although the coverage and quality of comprehensive preventative and curative child health-care services have improved in recent years, the incidence of diarrhoeal disease and pneumonia in children under five years' old remains high. Malnutrition and stunting are still a key cause of mortality for children under five years' old. And, while the registering of births may be nearly universal, access to early learning programmes is neither universal nor equitable, although it is increasing (Martin et al., 2014).

5.2.2 Division of ECD functions and responsibilities

Internationally, no blueprint policy framework assigns ECD-related functions to the different spheres of government. This is partly because of the multi-dimensional nature of ECD services. However, the division of tasks and responsibilities has also changed considerably, as a result of decentralising and deregulating welfare and education policies (OECD, 2000). Provinces and municipalities have become more active in the area of child-care, responsible for policy-making, planning and supporting ECD facilities. Policies across the OECD countries emphasise the need for non-profit public ownership of facilities and mixed provision, so families have more choice and can play an active role in decision-making.

In South Africa, the broader policy framework underpinning ECD provision emphasises integrated and intersectoral delivery. The responsibility for delivering ECD is divided across the departments of social development, education, health, as well as local government, with the DSD providing overall policy guide and coordination. According to Schedule 4, Part A of the Constitution, education and welfare services are concurrent responsibilities of national and provincial government. Part B singles out child-care facilities as being a local government responsibility shared with other two spheres of government. Section 87 of the Children's Act gives effect to the Constitution, stating that municipalities must identify and provide suitable premises for partial care facilities.

However, the policy framework is not clear on whether the role of government is to regulate or implement ECD facilities. Local authorities may have the legislative competence to pass legislation and policy relating to child-care facilities (DSD, 2014b), but funding is not included. The ECD infrastructure policy states that national government funding of ECD infrastructure is voluntary because government has no expressed or implied legislative duty to provide ECD facilities.

5.2.3 Benefits of investment in early education infrastructure

While the benefits of investing in infrastructure are well documented, until recently little attention has been given to the benefits of early education infrastructure on human development and the broader economy. Yet infrastructure serves as the foundation of the entire education value chain (Azzi-Lessing, 2009), and the child benefits both directly and indirectly from such investments.

Child development pioneers, such as Montessori (1965), have always emphasised the importance of children interacting with their environment as the basis for development, and the need for children to play in an environment rich in resources. Certain extreme physical environment elements (e.g. poor ventilation) and internal classroom environment (e.g. higher noise levels and poor lighting) can have a negative effect on learners (Higgins et al., 2005). Cuyvers (2011) found that students who attend schools with quality infrastructure had significantly higher levels of satisfaction and wellbeing than students who attend schools with poor quality infrastructure.

Recent research (mainly from the environmental psychology and architecture fields) into how the physical environment affects child development has looked at the impact of:

(i) centre-based ECD versus home-based ECDs;
(ii) ECD centre and group sizes, learner–teacher ratio and density;
(iii) technical design features i.e. lighting, ventilation, and classrooms.

An influential body of work by Shonkof and Phillips (2000) and Kritchevsky et al. (1977) found correlations between positive outcomes for children and specific programme quality attributes, such as learner–teacher ratio and group size. Although group size and learner–teacher ratio may not seem related to the physical environment, these variables have serious implications for the structural organisation of ECD facilities and the quality of programmes. For instance, programmes that cater for more than 75 children are associated with poor quality outcomes because of the limited interaction between learners and teachers (among other things).

Research conducted at St. Joseph College in West Hartford, Connecticut, found teachers interacting with children—a known indicator of process quality—on average only 3 percent of the time. However, after the program relocated to a new facility where each classroom had a utility sink, storage, telephone, and most importantly, a bathroom for children, adult-child interactions increased to 22 percent. Structural features such as these enabled teachers to spend more time in the classroom and increase their interaction with children. In addition, larger classrooms made it easier to configure the space into well-defined activity areas that supported cooperative and engaging play. Teachers also reported easier transitions and fewer tantrums (Sussman and Gillman, 2007: 10).

Many studies have looked at how the physical environment affects children, including the impact of technical design features, such as acoustics, climate control, lighting and classroom features etc. on the children's achievements, engagement, attendance and wellbeing. Table 25 shows the result of a meta-analysis on the effects of ECD infrastructure.

Table 25: Meta-analysis: economic effects of ECD infrastructure

	Temperature/ air quality	Noise	Light	Other features	Equipment	ICT
Attainment – improvements in curriculum attainment	Poor internal air quality → poor attainment (Earthman, 2004)	Noise → poor reading scores (Schneider, 2002)	Mixed results	Outdoor spaces → reduced feelings of crowding (Tanner, 2000)	Comfort and better attitude → better attainment	Mixed results
Engagement – decrease in disruptive behaviour	Uncomfortable temperature and poor air quality → distraction	Noise →lack of attention and distraction				
Affect – improvements in self-esteem		Noise → annoyance		Conflicting evidence on ceiling height (Read et al., 1999; Earthman, 2004)		
Attendance – fewer instances of lateness and absenteeism	Poor air quality → poor attendance (Rosen and Richardson, 1999)		Light → improved attendance (Hathaway, 1990)			
Wellbeing - reduction in minor and major ailments	Poor air quality → ill health (Lee and Chang, 2000)	Inconclusive	Light → visual stimulation and improved mental attitude (Earthmore, 2004)		Better ergonomic design → improved wellbeing, (Troussier, 1999)	

From a broader economy perspective, prominent economists such as Rob Grunewald and James Heckman have concluded that the return on investment of ECD programmes far exceeds that of economic development projects, such as building of stadiums. Rolnick and Grunewald (2003) found that the public gained 80% of return on investment from ECD programmes. Lynch (2007) quantified the economic benefits to taxpayers of universal high quality education to children aged 3–4 years who live in poverty, and found a net effect on the budget of up to $61-billion. Using a cost-benefit model, Barnett and Hustedt (2011) estimated that a programme for children aged 3–4 years costing $50-billion would create over $230-billion in value over 40 years.

5.3 Infrastructure to Facilitate Access and Quality Early Education

The need for sufficient and quality physical ECD infrastructure is obvious. Proper physical infrastructure means that early education can be accessed in a quality and safe learning environment. The condition of the physical space and the environment can affect the safety, wellbeing and behaviour of children, the conduct of teachers and, most importantly, the perception and participation of parents. Indeed, the condition of the infrastructure can be considered a proxy for the quality of service rendered (DBE et al., 2011).

5.3.1 Infrastructure typologies and access issues

The ECD sector comprises a variety of providers, including a large number of small home- and community-based care centres, multipurpose centres, privately owned pre-schools and small non-profit care centres predominantly found in less affluent areas (Watermayer, 2013). Many of these programmes are inadequately resourced to respond to the growing demand. Moreover, obtaining sites, securing permits, arranging finance and constructing facilities take a long time. As a result, many children are unserved or served in unsafe structures, while policy-makers resort to stopgap interventions, such as shorter day programmes or lower programme standards. These measures often dilute programme quality and undermine policy objectives (Sussman and Gillman, 2007).

The DSD recognises at least eight infrastructure typologies or ECD models for delivering early education in centre-based and non-centre-based ECD facilities (Table 26). Centre-based programmes predominantly provide formal and structured early learning programmes to a large group of children. Non-centre-based programmes mostly provide care services to children who do not have access to formal centres, live far from the nearest centre-based programme or whose parents are unable to afford the fees. The national ECD draft policy requires all facilities to have adequate physical infrastructure and to be accessible, i.e. "within safe and reasonable reach" (DSD, 2014b: 111). Furthermore, all programmes must be delivered in safe buildings or structures, which have hygienic sanitation facilities, hygienic and safe food storage and preparation areas, as well as suitable indoor and outdoor spaces for providing the relevant programmes. There must also be clean potable water, access to safe energy and the necessary equipment and materials for delivering programme activities (Giese and Budlender, 2011; Martin et al., 2014).

Table 26: ECD infrastructure typologies

Type	Description	Infrastructure requirements
Centre-based ECD programmes	Structured programmes that operate five days a week and provide care, nutrition and early learning	Building or prefabricated structure
Non-centre-based programmes		
Home-based ECD programmes	Services that involve home visits and parent/caregiver education	Transportation and family homes
Community-based ECD programmes	Programmes that operate two to three days a week and provide early leaning programmes, nutrition and parent education	Community buildings
Outreach ECD programmes	Programmes that take place at least once a week and involve training parents on stimulating their child's learning	Building structure
Play groups	Meetings of caregivers and children groups for 2–3 hours, once a week, to encourage interaction between the children	Equipment and material
Toy libraries	Community services that provide access to a collection of play materials	Building structure
Mobile ECD programmes	Programmes offered to children in rural and farming areas that operate 2–4 hours for three days a week	Vehicle
Child-minding services	Programmes offered to a small group of children (whose parents are working or seeking work) in a child-minder's family home	Family home

Source: DSD (2013)

Available evidence suggests that enrolment into formal and centre-based ECD programmes for children aged 0–5 years in South Africa is low, particularly in rural communities and informal settlements (Richter et al., 2012; Viviers et al., 2013). The General Household Survey (GHS) shows that only two million (34%) of the 5.7 million young children aged 0–5 years are cared for in formal ECD centres (Stats SA, 2014). The remainder typically receive ECD services through informal arrangements, such as home-based care or shorter day programmes, home visits, outreach or mobile programmes (Table 27).[59]

Table 27: Proportion of children aged 0-4 years in different ECD services (2013)

ECD arrangements	Provinces									
	EC	FS	GP	KZN	LP	MP	NC	NW	WC	South Africa
Grade R, Pre-school, crèche	30.7	49.5	47.4	23.2	36.1	30.7	23.8	29.5	37.3	34.4
Day mother	8.1	12.2	14.7	18.0	11.1	4.2	13.1	4.2	10.4	11.9
Home with parent or guardian	52.5	32.2	33.4	48.2	43.1	56.2	52.9	56.2	42.7	45.4
Home with another adult	6.7	5.2	3.5	10.0	8.4	6.9	8.3	6.9	7.4	7.0
Home with someone younger than 18 yrs.	0.0	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.2	0.1
Somebody's dwelling	1.3	0.8	0.9	0.4	1.1	1.9	1.5	1.9	2.0	1.0
Other	0.7	0.0	0.2	0.2	0.0	0.2	0.4	0.2	0.0	0.2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Note: EC: Eastern Cape; FS: Free State; GP: Gauteng Province; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NC: Northern Cape; NW: North West Province; WC: Western Cape.
Source: Stats SA (2014)

As Table 27 shows, in most provinces (with the exception of the Free State and Gauteng Province) over half of the children aged 0–4 years are being cared for at home. The high incidence of home-based care is possibly because of (i) the parents' decision to delay child enrolment in a centre-based ECD programme, (ii) affordability factors, and (iii) the outright shortage of facilities. Harrison (2012) concedes that not every child aged 0–5 years should be in a child-care facility because parents and caregivers should be at the centre of a child's development during this period. However, affordability and shortage of proper facilities should not be a deterrent for enrolment at a child-care facility.

South Africa has between 18 000 and 21 000 ECD facilities (registered and unregistered) that accommodate between 1.2-million and 2-million children (DSD, 2014a; Harrison, 2012). This equates to an average enrolment of between 95 and 111 children per facility. However, if only registered ECD centres are included, the average enrolment drops to 47 children per facility. The enrolment capacity of ECD centres has implications for infrastructure requirements, but the average enrolment figures vary according to the surveys. In 2011, a Public Expenditure Tracing Survey of 381 ECD facilities found the average learner–facility ratio to be 25 and 26 in public and community facilities respectively, with a slightly higher ratio (of 30) in unregistered facilities (DBE et al., 2011). The 2014 national audit of ECD centres found the average enrolment to be 51, with the smallest centres accommodating a minimum of 20 children and the largest centres taking 150 children or more; the smallest median capacity was found in the Eastern Cape (44 children) and the largest (56 children) in Gauteng (DSD, 2014a).

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[59] Non-centre-based facilities generally provide little or no early education activities. Ilifa-Labantwana found that the majority of ECD facilities in ten townships focused predominantly on providing a safe place for young children while parents are working.

The prescribed norms and standards have implications for infrastructure, requiring the separation of age-groups per class and smaller staff–learner ratios (Table 28). These norms and standards imply that each ECD facility must have a minimum of five classrooms and that the number (and/or capacity) of ECD facilities will have to increase to accommodate additional children, based on the reported enrolment rate per facility. In some cases, the staff–learner ratio for younger age groups is above the recommended norm, ranging between 20 and 29 (Ilifa-Labantwana, 2012).

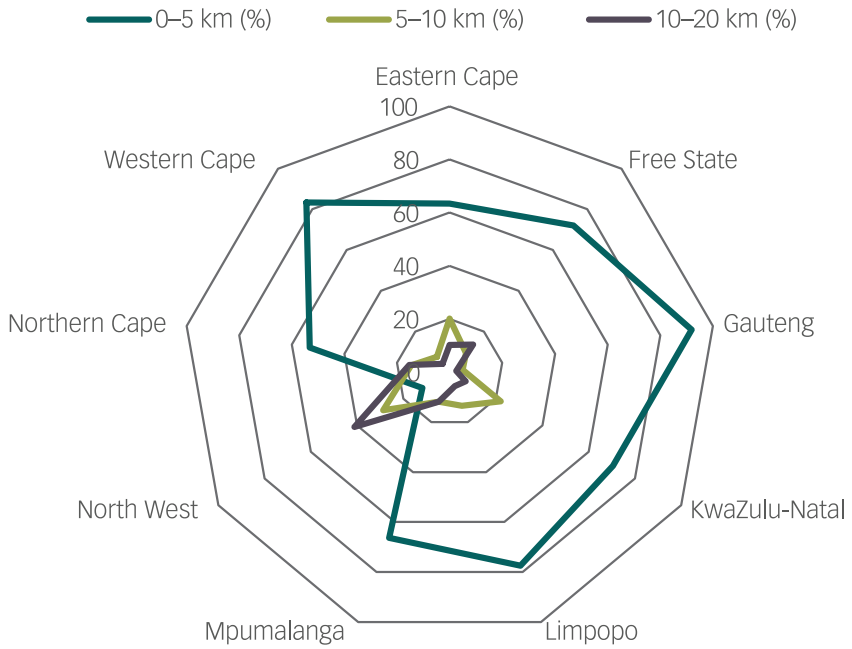
Table 28: ECD staff–learner ratios

Type	Description
1 to 18 months	1:6 plus assistant
18 to 3 years	1:12 plus assistant
Three to four years	1:20 plus assistant
Five to six years	1:30 plus assistant

Source: Adapted from Giese and Budlender (2011)

ECD facilities are fairly equitably distributed and close to most children. Approximately 4.8 million (73%) of South African children aged 0–5 years live within a five-kilometre radius of an ECD centre. Gauteng and the Western Cape provinces have the highest proportion, while the North West Province has the lowest proportion (12%) of children living within five kilometres of an ECD centre. This reflects the density and urbanisation differences among provinces. The distribution shown in Figure 31 reinforces the argument for expanding the capacity of existing ECD facilities rather than establishing new sites in order to accommodate more children. Nevertheless, the availability of an ECD centre within close proximity is not sufficient to ensure enrolment – the centres still need to be well resourced, affordable and provide comprehensive, quality child-care and early education.

Figure 31: Child–ECD facility distance radius



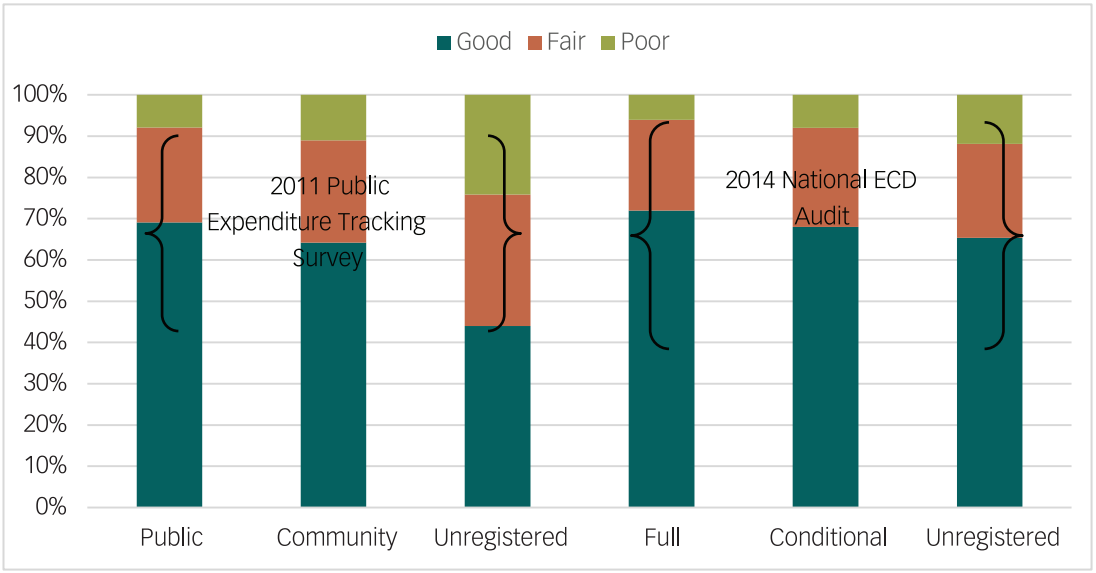
5.3.2 Conditions of existing ECD facilities

ECD facilities in South Africa are generally perceived to be inadequately equipped and in poor physical condition (DSD, 2012; Ilifa-Labantwana, 2011) and are commonly housed in community buildings, such as churches and community halls, not purpose-built facilities (Watermayer, 2013). The Sustainable Livelihoods Foundation (2013) surveyed 182 ECD facilities in ten townships and found that 50% of the centres do not have playgrounds. The main infrastructure challenges include insufficient classrooms, no separate areas for cooking, storage or staff offices, and poor basic service amenities. There is also a lack of learning materials and resources, and inadequate security and safety for children at ECD facilities (DBE et al., 2011).

Contrary to the prevailing perceptions of poor ECD physical conditions, the 2014 national ECD audit found that facilities improved enormously between 2001 and 2014 (DSD, 2014a). In 2001, more than half of facilities in five provinces (Eastern Cape, KwaZulu-Natal, Mpumalanga, Limpopo and North West) scored below the national average (of 53%) for access to piped water, flushing toilets and mains electricity (Williams and Samuels, 2001). By 2014, access to basic services had increased to more than 80%, over 90% of facilities had separate kitchen areas, 80% had separate toilets for adults, while 55% had dedicated staff offices. Two independent surveys also found that ECD facilities have improved (Figure 32), with unregistered ECD facilities in good condition increasing from just under 50% in 2011 to 65% in 2014.

Over half of the registered centres (55% of fully and 53% of conditionally registered centres) are housed in structures built specifically for the purpose of providing ECD. The rest use community halls, primary schools, houses and garages and places of worship. A small proportion of centres (10% of fully registered and 16% of unregistered centres) are housed in informal structures (i.e. buildings made of corrugated iron and wood, or mud and poles). Figure 32 shows the results of two separate studies that affirm the generally good physical conditions of ECD facilities (DBE, 2011; DSD, 2014a).

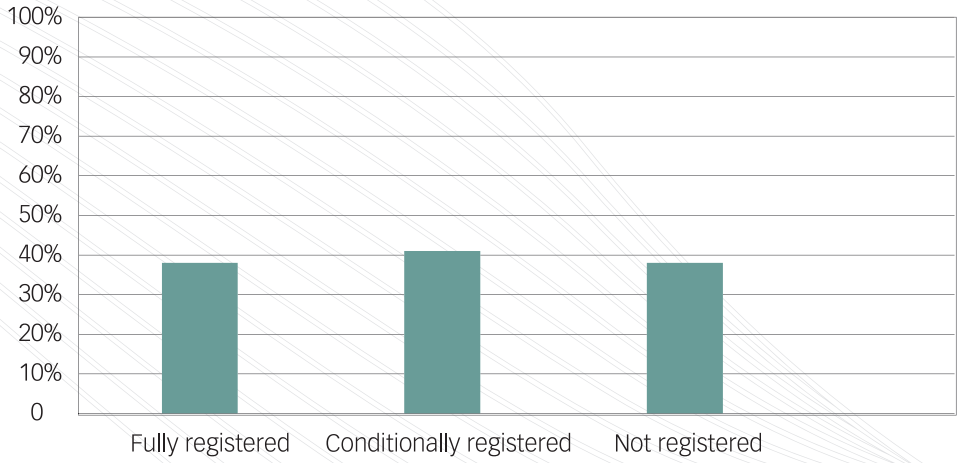
Figure 32: Condition of ECD buildings



Adapted from DBE et al. (2011) and DSD (2014a)

Notwithstanding their fairly good physical condition, a significant number of facilities require urgent maintenance (Figure 33). These results contradict the national audit findings that more than 90% of facilities reported no defects on their roofs, plumbing and walls. The discrepancy may be attributable to interviewee bias.

Figure 33: Facilities needing urgent maintenance in 2014



Source: DSD (2014a)

5.4 Sources of ECD Infrastructure Funding

Municipalities interpret the legal framework differently: some make provision for infrastructure funding, while many others limit their duties to land-use planning and zoning requirements for ECD facilities (City of Tshwane, 2012; Drakenstein Municipality, 2014).

South Africa does not have a systematic programme to finance ECD infrastructure. Nevertheless, ECD facilities receive funding from a number of sources, including operational subsidies, user fees, donations and fundraising. The bulk of income comes from subsidies (55%) and fees (36%), with the balance being made up of donations and fundraising (predominantly for unregistered facilities). The current subsidy model for ECD does not provide for infrastructure development and maintenance, even though facilities must meet prescribed infrastructure requirements to qualify for registration and the subsidy (Richter et al., 2012). The average monthly subsidy income per child ranges from just R100 to R350, depending on the number of qualifying children and the province. The fees charged are generally too little to finance facilities' capital needs – the average monthly fee per child ranges from R20 in low income areas to just over R350 in well-off areas (DSD, 2014a). Table 29 shows the subsidy allocation and distribution by province.

Table 29: Subsidy rate, allocation and beneficiaries by province (2014/15)

Province	Rate per child per day	Allocation per annum	Number of children receiving the subsidy	Total number of children enrolled for ECD
Eastern Cape	15	R227 165 400	57 365	83 613
Free State	15	R181 173 960	45 751	110 275
Gauteng	15	R279 548 280	70 993	168 822
KwaZulu-Natal	16	R364 569 216	86 309	145 169
Limpopo	15	R274 075 560	69 211	147 818
Mpumalanga	15	R193 066 440	48 739	127 685
North West	15	R91 448 280	23 093	73 587
Northern Cape	15	R19 994 080	4 948	31 924
Western Cape	15	R233 640 000	59 000	103 200
Total		**R1 864 221 216**	**465 009**	**992 093**

Source: Adapted from DSD (2014a)

Some ECD facilities benefit from infrastructure improvement initiatives by provinces, national departments, agencies, local government and the private sector, but these programmes are largely unsystematic and not reflected in the budget line items. For example, the departments of public works, rural development and land reform, and cooperative governance and traditional affairs occasionally fund infrastructure though programmes such as the Expanded Public Works Programme (EPWP), the Community Works Programme (CPW) and the Community Rural Development Programme[60]. In 2013/14, the social sector EPWP was allocated just under R273-million, while the CPW budget was about R1-billion.

The National Development Agency (NDA) also provides limited infrastructure financial assistance, mainly in the form of mobile ECD trucks. In 2014/15 the NDA spent R6.6-million, or 34% of its total ECD programme budget (of R19.2-million) on infrastructure development, of which 28% was allocated to the Eastern Cape (NDA, 2014). Available information on private sector funding suggests that most companies support formal schools and some ECD centres through their corporate social investment programmes.

The wide variation in funding approaches is evident from Boxes 1 and 2. Most provinces do not have an identifiable programme for financing the construction or maintenance of ECD infrastructure; in exceptional cases, individual authorities may allocate a once-off budget to construct, upgrade or maintain facilities.

Box 1: Provincial ECD infrastructure programmes and funding approaches

ECD infrastructure financing programmes varies markedly across the different provinces. In Gauteng, the province does not provide any form of capital funding to ECD facilities, which are predominantly fee-dependent, private facilities able to raise own capital funding. The Eastern Cape provincial DSD occasionally pays the rents on behalf of ECD centres.

The Western Cape does not have a coherent programme or a standing budget line item for ECD infrastructure but, at the end of the financial year, often allocates funding from the ECD directorate for the upgrading of unregistered facilities. The upgrades are carried out by NGOs such as the Centre for Early Childhood Development (CECD) and Illifa-Labantwana. In 2013/14, the unit made R3-million available for upgrading 300 ECD facilities, assisted by five NPOs to manage the upgrade programme. Upgrades cost between R8,000 and R250,000 and covered the installation of water, septic tanks, and even the replacement of buildings. Mainly community-based centres are eligible for the upgrades, but the CECD) found that 91% of facilities they assisted are privately owned. (Atmore, 2014). Over the years, the ECD directorate piloted the construction of four enrichment centres (include crèche, toy library and outreach centre) and transferred the operations of these centres to NPOs. The project has since failed because of the NPOs were unable to sustain the centres, despite paying a small annual rental fee of R100. The ECD directorate also receive an annual donation of R70,000 from the Queen of Monaco, to assist at least one centre a year.

KwaZulu-Natal is the only province that consistently allocates a budget for building, upgrading and maintaining ECD infrastructure, using funds from the provincial equitable share. Between 2009 and 2014, the province spent more than R750-million on ECD infrastructure, with the bulk of the funding going towards constructing new facilities at an approximate cost of R5.3-million per centre. Facilities eligible for upgrades and refurbishment are identified by the provincial DSD and through MECs (Members of the Executive Council) intervention programme.[61] Newly built facilities remain the asset of the department but are operated by NPOs through Service Level Agreements (SLAs). A cause for concern is the lack of integration between the province and municipalities when planning for the construction of child-care facilities.

Table 30: KwaZulu-Natal ECD infrastructure spending

R'000	2009/10	2010/11	2011/12	2012/13	2013/14
New	60 684	54 192	122 616	125 352	141 021
Upgrades and additions	13 125	18 110	10 115	75 026	36 347
Refurbishment and rehabilitation	3 994		7 178		
Maintenance	6 632	7 345	5 056	20 000	34 414
Total	**84 439**	**79 649**	**144 971**	**220 380**	**211 801**

Source: KZN provincial treasury (2014).

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[60] It is not clear whether the department funds construction of new ECD facilities from its own allocations or coordinates funding from relevant departments. However, the department often puts out tenders for construction of these facilities.

[61] MECs = Members of the provincial Executive Council.

Like provinces, municipalities provide limited funding support to ECD, despite being the constitutionally designated sphere of government "responsible for supporting child care facilities to meet minimum infrastructure, health and safety standards, registration of child-minding services, the development of new ECD service provision infrastructure, and the audit and identification of available infrastructure that may be used for expansion of early learning services" (DSD, 2014a: 58).

The national ECD policy and ECD infrastructure policy categorically state that municipalities are responsible for providing ECD facilities and connecting them to utility services. However, research shows that only 10% of facilities have ever received support from their local municipality (Sustainable Livelihoods Foundation, 2013).

Box 2: Selected local government ECD programmes and funding approaches

The City of Cape Town has an ECD policy, an ECD land-use policy and an established ECD programme, with 10 staff members, responsible for the capital and operational requirements of both city- and community-owned ECD facilities. The city's capital programme is guided by a needs analysis conducted by the Council for Scientific and Industrial Research. The programme oversees 24 ECD centres owned by the city and a number of ECD Centres of Excellence that support smaller facilities. Each centre costs approximately R8-million and can accommodate 100–250 children. Once a facility is built, the city invites NPOs and community-based organisations to apply to operate the facility. Successful applicants enter into a facility management contract (operational lease), which stipulates the rental fees and conditions under which the facility must be maintained. Operators pay an annual lease fee of R700 but are responsible for the utility fees and minor maintenance; major maintenance is carried out by the city. The city's total ECD capital spending was R7.3-million in 2013/14, R16-million in 2014/15 and R11-million in 2015/16.

The City of Tshwane has 10 ECD centres that are owned and run by the municipality through the Early Childhood Development Institute. The city covers the capital and operational costs, including personnel costs, of these facilities. Other facilities within the city's jurisdiction benefit from a competitive grant-in-aid programme that has been running since 2006. A R100,000 once-off grant is offered to successful applicants that meet the set requirements, which include being in existence for two or more years, being registered as an NPO and enrolling more than 20 children. Use of the grant is limited to training (40%) and educational equipment, food and mattresses. In 2013/14, the city spent a total of R7-million on 70 ECD facilities.

5.4.1 Policy and funding constraints impacting ECD infrastructure delivery

In 2012, the DSD adopted a policy on the integrated delivery of social infrastructure and management, to ensure that government invests in the growth and maintenance of early learning infrastructure. Such infrastructure should be in close proximity to the children, and the aim is to remedy the infrastructure deficit for early learning services, facilitate the provision of conducive and quality learning environment, and standardise facility designs. The policy distinguishes two categories of priority infrastructure: category 1 covers facilities that the DSD is obliged to provide (e.g. child and youth care centres and shelters for victims of crime and abuse); category 2 covers facilities that the department has no expressed or implied duty to provide and includes ECD centres (DSD, 2012).

The ECD infrastructure policy states that local government should provide ECD facilities using the MIG and the Urban Settlement Development Grant (USDG). It also proposes the introduction of (i) an NPO infrastructure improvement grant, to help NPOs meet minimum norms and standards; and (ii) an infrastructure grant to provinces, to help accelerate construction, maintenance, upgrading and rehabilitation of new and existing infrastructure. However, how NPOs will benefit from the funding is unclear because the national ECD policy explicitly states that only publicly owned facilities will be funded. The infrastructure policy further proposes that newly constructed facilities will be owned by the DSD.

The demand planning instrument is another key innovation of the ECD infrastructure policy. Although the policy contains few details, this instrument would inform decisions on the spatial distribution of new infrastructure and the co-location of social service delivery facilities to optimise accessibility and social infrastructure needs. However, the policy is silent on the norms and standards for ECD facility design, basic services amenities, maintenance, delivery targets and timelines (DSD, 2012).

Legislative ambiguities and constraints

Although the Constitution clearly assigns child-care facilities to local government, policy ambiguities remain over which sphere is ultimately responsible for funding ECD infrastructure. Local authorities have the legislative competence to pass legislation and policy relating to child-care facilities, as per Schedule 4, Part B of the Constitution (DSD, 2014b) but do not receive funding to support such authority, as shown by the near zero allocation to ECD infrastructure and indicated in the national ECD policy. Moreover, the ECD infrastructure policy states that national government has no expressed or implied legislative duty to provide ECD facilities, and so any funding of ECD infrastructure is voluntary.

Government's ability to invest in ECD infrastructure is limited by various legislative impediments:

- The Children's Act (in Section 93) broadly stipulates that the MEC for social development may fund (mainly centre-based) ECD programmes from departmental appropriations. The Act distinguishes between centre based, i.e. ECD programmes, and non-centre based,[62] i.e. ECD services. This has implications for registration and funding. For instance, ECD centres with less than six children fall outside the Act's definition of partial care[63] and so do not qualify for the ECD subsidy.

- The Public Finance Management Act (No. 29 of 1999) prohibits government from investing in assets owned by communities or private individuals.

- Amendments to the NPO Act (No. 71 of 1997) allow members of NPOs to share the assets upon dissolution of the organisation, which is likely to reduce the extent of public investment within the ECD sector because of the potential losses to government.

Lack of cooperation

Another difficulty is the lack of coordination and cooperation between the different government departments and spheres, in particular the departments of cooperative governance and of social development, and municipalities.

- The DSD claims that municipalities should (but are not) funding ECD facilities from their MIG, USDG and the Integrated City Development Grant.

- The South African Local Government Association (SALGA) claims that provincial DSDs do not make the necessary funding allocations to municipalities.

- CoGTA is of the view that municipal funding anomalies result from the absence of social development sector plans and the lack of participation in municipal IDP planning processes by the provincial social development departments.

Insufficient resources and costs

An important supply constraint is the lack of sufficient resources from both government and communities. The average costs of a new ECD facility range from R5.6-million to R8-million, based on the Western Cape and KwaZulu-Natal experiences. Most provinces and smaller municipalities are unlikely to be able to afford such costs within their allocated budgets. However, Watermayer (2013) shows construction and upgrades can be achieved with moderate costs (Table 31). The reasons for costs variation are beyond the scope of this paper but nevertheless need serious consideration.

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[62] Non-centre-based ECD services include home-based care by family members, neighbours and community members.

[63] When a person takes care of more than six children on behalf of their parents or caregivers during specific hours of the day or night, with or without reward.

Table 31: Estimated cost of upgrade and new site developments (2013)

Category 1	Estimated costs
Maintenance or building support to meet DSD requirements	R60 000
Category 2	
Additional major structure (playroom) and building support to meet DSD requirements	R100 000-R200 000
Category 3	
New site development	R200 000

Source: Watermayer (2013)

5.4.2 Alternative funding models, approaches and instruments

Constructing ECD facilities is complicated[64] and expensive, requiring very large upfront investment. Programmes catering to high income families can afford to borrow the capital to finance their facilities, although some may require a loan guarantee, but programmes serving low and middle income families face greater challenges. Parental fees and various government-funded operating subsidies do not generate enough revenue to support the cost of a well-designed facility (Sussman and Gillman, 2007). As a result, many public school and community-based programmes require large capital subsidies.

Capital subsidies are needed when there is market failure and information asymmetry and monopolistic conditions generated by the discrepancy in population densities i.e. when low densities make the facility unviable (Grunn, 2008).

The public sector needs to fill the gulf between the available funds and the large sums of capital needed to create state-of-the-art physical environments that support quality ECD programmes. Several financing options are available to government, depending on whether the supply or the demand side is targeted, and the roles played by the public, private and voluntary sectors. Depending on the policy orientation, five different financing models are available (Grunn, 2008):

(i) Central public supply, where central government directly builds or rents facilities and hires staff. This model is useful where universal access is a national policy target and requires high and equal quality services everywhere to avoid spatial inequities. The success of the model depends on an adequate budget and proper control of the costs.

(ii) Decentralised public supply, where municipalities implement infrastructure projects on behalf of national government through a block grant, with or without earmarked funds.

(iii) Public incentive-based financing, whereby national government reimburses child-care providers in block or per child, based on the quality of the facility. For this model to work, a rating and accreditation system for ECD providers needs to be in place.

(iv) The mixed model and market making, where government stays out of ECD provision and lets parents, NPOs and private providers finance most of it. Government's role is to provide supplementary services, such as matching open places with parents.

(v) Demand-side public subsidy but private provision, whereby government provides generous means-tested subsidies to parents (as a voucher), enabling them to buy ECD education at any private facility of their choice.

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[64] Skills are needed in property finance and rights, land regulation, contracting and project management, and design and construction.

5.4.3 Models of developing ECD facilities

The way in which ECD facilities are developed affects how fast the facilities are completed, the quality of the final product, the government's ability to meet policy objectives, and the cost effectiveness of the capital programme. Sussman and Gillman (2007) identify three approaches for improving and increasing ECD infrastructure capacity:

(i) The "public works" approach, which is common in South Africa and used by KwaZulu-Natal and the City of Cape Town. In this approach, government assembles land, and designs and constructs facilities, which are then either transferred or leased to ECD providers. It is synonymous with the central public supply approach described in section 5.4.2. The main drawback of this model is the inability of ECD providers to maintain the facility to the required standards.

(ii) The "do-it-yourself" or "bootstrapping" approach. Under this arrangement, the state supports intermediaries who supply technical assistance to ECD providers to help them develop facilities. Without technical assistance, Watermayer (2013) found that communities spend substantial amount of funds trying (but failing) to comply with DSD requirements, thus remaining in contravention of the legislation and unable to access the subsidy.

(iii) The "turnkey" developer, whereby the ECD provider contracts with a firm that develops the facility to the operator's specifications while funded by government. The most effective turnkey approach is to use a non-profit developer, especially one familiar with early childhood education. The Western Cape DSD has been experimenting with this approach, using NPOs to upgrade facilities on its behalf. The programme has generally been considered a success, but its haphazard nature is its major pitfall.

(iv) The "social franchising" model, which entails rolling out social programmes by replicating what has been shown to be effective. Social franchises can take the form of structured networks, where franchisees commit to use the same quality materials and programmes, and to share information and resources. Social franchises reduce start-up and developmental costs because franchisees are able to build on an existing way of doing things and use tried-and-tested materials. Standardisation also facilitates effective monitoring (Ilifa-Labantwana, 2011).

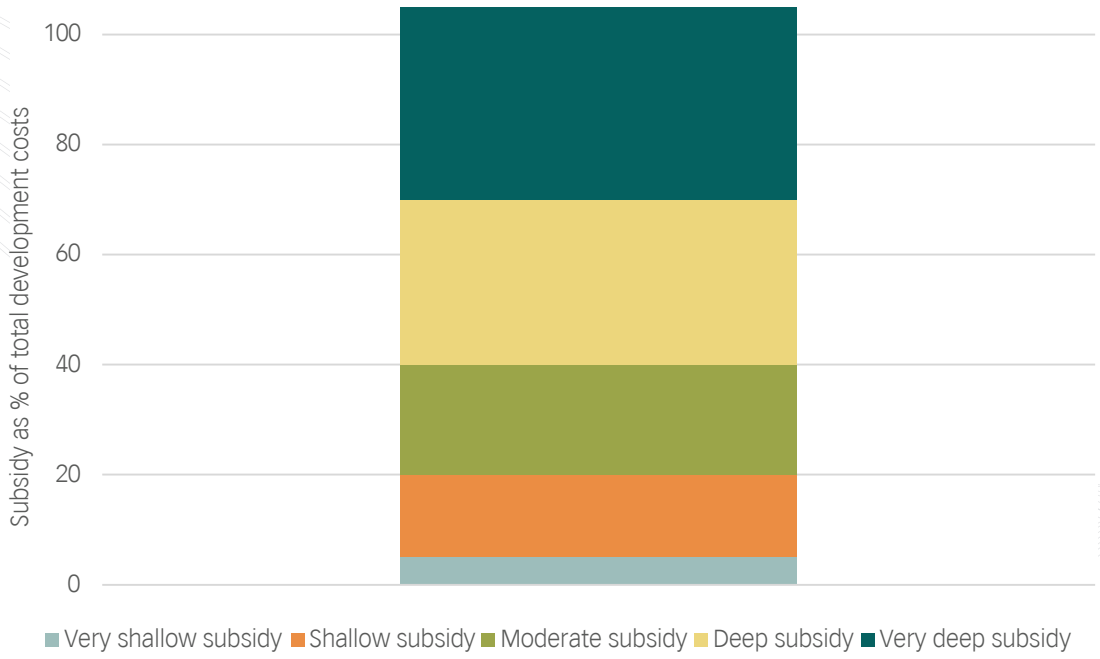
5.4.4 Alternative funding instruments

Another important barrier is the availability of appropriate funding instruments. Without access to grants or funding, which can supplement parental fees and modest public operating subsidies, programmes make painful trade-offs that compromise quality. This is evident in staffing levels, teacher qualifications, and salary levels. To upgrade the physical environment or to construct state-of-the-art facilities requires access to a substantial amount of funding. Policy-makers can choose between capital grants, loans and public-private partnerships (PPPs).

Capital Grants

These are the simplest and most common means of funding infrastructure and reducing the burden of future operational budget requirements. Grant funding is more straightforward but can have a large budgetary impact relative to the number of facilities assisted, which makes it politically and fiscally risky. To manage the risks, a grant can take various forms, from shallow to deep subsidies, or a small annual disbursement that allows the provider to build incrementally. As Figure 34 shows, capital subsidies can range from 5% to 100%, depending on the type, size and economic attributes of the facilities. In the United States, the state made $30-million available in capital grants, with the centres matching 20% of the costs (Children Investment Fund, 2011).

Figure 34: Incremental capital subsidy model



Source: Adapted from Sussman and Gillman (2007)

Loans

Debt finance is another possible instrument that allows cost to be spread over the facility's useful life. However, revenue constraints limit the ability of ECD centres to secure debt (Children Investment Fund, 2011). The public sector could potentially reduce the bank's risk, especially when the investment serves the public sector's purpose. A well-designed loan guarantee programme can help to reduce the state's fiscal burden, overcome unique debt barriers faced by early ECD centres and, most importantly, crowd-in private investment. However, available evidence on the effectiveness of this instrument is mixed.

Public-Private Partnerships (PPPs)

PPPs are another important way of financing the construction of ECD facilities, whereby government agrees to match the funding raised by a voluntary organisation for the purpose of upgrading or constructing new facilities.

Whatever the type of funding, infrastructure financing must include funds to cover the costs of technical assistance and to ensure efficient and effective use of resources, as most ECD centres are small and have no or limited experience in planning and managing capital projects.

5.5 Conclusion

The availability of sufficient and quality physical ECD infrastructure is critical for both the wellbeing and cognitive development of children. More importantly, it increases the access and enrolment of young children in education-oriented child-care facilities. Well-conditioned ECD physical spaces benefit not only the children but also teachers (through greater job satisfaction) and parents (who participate more in their children's early education).

South Africa has between 18 000 and 21 000 formal ECD facilities, which accommodate about two million children aged between 0–5 years, with only half benefitting from the DSD operational subsidy. The high number creates an artificial perception that facilities are in over-supply (relative to the number of children enrolled). However, many of these facilities are very small, accommodating an average of 20–30 children, when a typical learning centre should optimally cater for 65 children. Thus the current number of facilities is far less than that required and, when the norms and standards for staff–learner ratio are taken into account, the infrastructure deficits appear even larger.

With regards to the accessibility of ECD centres, approximately 4.8 million (73%) children aged 0–5 years live within five kilometres of an ECD centre. Half (50%) of the centres are housed in formal structures built specifically for the purpose of providing early childhood care and development, with access to basic amenities and with no structural deficiencies. However, adequate and quality infrastructure still needs to be provided, particularly within impoverished communities and provinces, such as the North West Province where less than 10% of the children aged 0–5 years live within five kilometres of an ECD facility.

Despite policies that highlight the importance of ECD, public sector funding for ECD infrastructure is sporadic, and government's response is largely absent and unsystematic. No coherent framework for financing ECD infrastructure exists, partly because of policy ambiguity over which sphere of government – national, provincial or local – is responsible for funding the infrastructure. In general, provinces and municipalities do not have a structured programme or standing budget item for infrastructure. A few provinces and municipalities occasionally fund the construction or upgrading of ECD facilities, and use different approaches. These piecemeal interventions distort the distribution of funding and serve to reinforce inequities.

The absence of a public funding programme for ECD infrastructure is also in part because legislation prohibits government from directly funding community and privately owned ECD facilities. KwaZulu-Natal and the City of Cape Town have been experimenting with alternative funding and delivery models to overcome the legislative hurdles. Possible models include government owning the facilities and contracting the operations to community organisations, co-funding facilities (with incentives to meet minimum infrastructure requirements) and a turnkey approach in which NPOs are contracted as technical assistance intermediaries to ECD centres. The lack of funding is attributable to poor cooperation and coordination between the different spheres of government. In other sectors, similar cases of poor coordination have been resolved by developing sector-specific infrastructure plans to guide allocations and investment interventions by the different spheres.

5.6 Recommendations

With respect to fiscal arrangements for financing ECD the Commission recommends that:

1. Government provides a full or partial capital subsidy for constructing and/or upgrading community- and NPO-based ECD facilities, through the municipal infrastructure conditional grant. The funding will facilitate compliance with the required infrastructure norms and standards, ensure that capital expenditure for ECD is carried out through municipalities and minimise inequities in quality standards and service levels.

2. The Department of Social Development introduces a temporary funding programme from within its allocated budget, through which self-identified private ECD facilities in poor areas can apply for capital subsidy assistance, on condition that they agree to meet pre-specified deliverables such as enrolment targets, operational sustainability, educational activities and financial accountability.

3. The national and provincial departments of social development develop an ECD infrastructure sector plan, indicating areas that require urgent intervention, to inform the allocations and investment in ECD infrastructure by the different government spheres and departments.

4. The provincial departments of social development lobby for the ECD infrastructure plan to be incorporated into municipal IDPs.

5. Government makes available technical intermediary services to ECD facilities that are able to build or upgrade facilities on their own.

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CHAPTER 6

Can Public Sector Productivity Be Improved? The Case of Secondary Education

CHAPTER 6

Can Public Sector Productivity Be Improved? The Case of Secondary Education

Ghalieb Dawood [65]

6.1 Introduction

With the economy growing slowly and tax revenues under pressure, public service productivity is in the spotlight. Productivity improves when services are provided more efficiently and effectively, through either producing the same outputs at lower cost or producing more outputs with fewer resources. This reduces the strain on the fiscus and potentially means avoiding difficult policy trade-offs, such as having to prioritise either social grants or investment-related activities. Section 195 of the Constitution (1996) also stipulates that services should be provided using resources efficiently, economically and effectively. Government therefore has a constitutional responsibility to provide citizens with the maximum benefit out of available resources, so that socio-economic obligations can be met faster. In the White Paper on the Transformation of the Public Service (DPSA, 1995), the effective delivery of public services is highlighted as an important priority.

Despite a legislative framework that emphasises efficient and effective service delivery, there is increasing concern that government is not achieving maximum value in key areas of its budget; for example, social services such as education and health. To date, little work has been done on measuring public sector productivity, largely because no single measure of productivity exists for the public sector. Moreover, outcomes are achieved through several government agencies working together, which makes the measurement of productivity partial at best.

This chapter looks at productivity in education, specifically secondary schools, as education is a concurrent function that raises many intergovernmental fiscal relations issues pertinent to the Financial and Fiscal Commission (the Commission).

6.2 Background

Economic theory suggests that education is a vital function of government because of its important role in forming human capital and contributing to economic growth (Afonso and St. Aubyn, 2006). Education also has the potential to address inequality, as well as lead to higher living standards in the long term (Ruggiero and Vitaliano, 1999). A prerequisite for achieving these objectives is education spending that is efficient and effective; otherwise, the impact on the economy is likely to be considerably weaker.

With the fiscus under pressure, calls are growing for greater accountability in how public funds are spent, especially on programmes that consume a large share of government funds. In 2013/14, the education sector was the largest component in the government budget,[66] accounting for 23% of government expenditure. Yet dissatisfaction with education outcomes is widespread, considering the resources consumed and the rising per-learner expenditure. Lower-than-optimal performance, combined with increases in real per-learner expenditure, imply that resources are not being utilised optimally. Many see inadequate and misallocated financial resources as a key contributor to the problems facing public education in South Africa. Some argue the problems go beyond finances to include structural and organisational challenges. Public-choice literature also suggests that managers in the public sector are more inclined to increase budgets and manage budgetary slack creatively than to pursue objectives of cost minimisation or output maximisation (Chalos, 1997).

Approximately 75% of the total education budget is spent at provincial level and the rest at national level. In terms of Schedule 4 of the Constitution, higher education is the responsibility of national government, while public primary and secondary schools are a concurrent function: national government sets the policy framework, while the provinces take charge of implementation. Education absorbs a large share of government's wage bill, and so increasing productivity in return for higher salaries is critical for the long-term health of the economy (Boyle, 2006).

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[66] Total government expenditure is defined as expenditure prior to interest commitments being added to total government expenditure.

Despite concerns raised over the quantum and impact of educational spending, few studies have looked at how using budgets efficiently affects performance. This is critical from a policy perspective, as simply increasing educational spending – for example, on no-fee schools – may not necessarily improve performance unless funds are used optimally. Achieving value for money means increasing results without increasing spending, and reducing costs without affecting the results or outputs.

6.2.1 Objectives

The specific objectives of this study are to:

- Evaluate the extent to which productivity in secondary education can be improved.
- Identify socio-economic and fiscal factors that may hamper productivity in education, specifically focusing on secondary education.
- Provide fiscal and other proposals to enhance productivity in the sector and in government as a whole, in order to foster an improved service delivery environment.

This chapter builds on previous research by the Commission that examined the wage bill (FFC, 2014) and managing fiscal sustainability. It explores whether government is maximising the use of the resources at its disposal in the education sector.

6.2.2 Functional and institutional arrangements of public sector productivity

In spite of South Africa's complex and sophisticated financial management and accountability framework, public sector productivity is not the responsibility of a single department, but is fragmented across government (Table 32). This policy vacuum has created a space for various departments, including the Department of Public Service and Administration (DPSA) and National Treasury, to look into assessing public productivity. For example, the DPSA (2014) has developed a draft productivity measurement framework for the public sector, while National Treasury has conducted several public expenditure reviews aimed at uncovering inefficiencies in the system.

Table 32: Roles and responsibilities with respect to public sector productivity

Legislation	Roles and Responsibilities
Constitution (1996) Section 196(4)(b)	The Public Service Commission (PSC) should propose measures to improve efficient and effective implementation of public services.
White Paper on Transformation of Public Service (1997)	All national and provincial departments are expected to set up a transformation unit, with the aim of identifying stumbling blocks to effective service delivery, and making suggestions on how to improve services. The PSC and DPSA are tasked with monitoring overall performance, achieving value for money, and reporting to Parliament on the implementation of the White Paper and batho pele principles.
Public Finance Management Act (1999) Section 38 (b), 45(b)	Accounting officers of national and provincial departments and agencies are accountable for the efficient and effective use of financial and other resources. Government officials are accountable for efficient and effective resource use within their areas of responsibility. National Treasury must enforce effective and efficient financial management, while provincial treasuries perform a similar function at provincial level. Treasuries may also play a facilitating role, in capacitating officials so that they fulfil the requirements, which are meant to ensure that resources are used optimally.
Municipal Finance Management Act (2004) Sections 62(1) (b) and 98(1) (b).	Accounting officers of municipal departments are accountable for efficient and effective use of financial and other resources. Local government officials are responsible for efficient and effective resource use in their domain of responsibility.
Public Audit Act (2004) Section 20 (3)	Where required, the Auditor-General may report on whether the auditee's resources were procured economically and used efficiently and effectively.

With the implementation of the White Paper on Transforming Public Service Delivery (DPSA, 1997), government agencies established transformation units to identify internal blockages to efficient and effective service delivery. Transformation units may be present in many government departments, but most of them have become ineffective.[68] Many have little capacity, lack buy-in from senior management and no longer concentrate exclusively on effective and efficient service delivery. Their focus has been diluted by the addition of functions such as change and diversity management to their portfolios. There is also a lack of clear standards, targets and procedures necessary to implement improvement plans in departments (PSC, 2008).

6.3 Literature Review

6.3.1 Clarifying concepts of public sector productivity

Productivity is commonly defined as the relationship between resources and results, or how inputs are transformed into outputs (Bauckaert, 1990; Gilder, 1975; Simpson, 2009). For a government, increasing productivity means expanding services while keeping inputs constant, or delivering the same services with fewer resources – the result is the same: a decline in unit costs. Unlike the private sector, no single measure captures productivity in the public sector. An emerging understanding recognises that public productivity includes dimensions of efficiency and effectiveness that encompass the concept of quality (Hatry, 1978). This understanding also links to the Constitution (1996), which prescribes the efficient and effective use of public resources.

In government thinking on productivity, two common misconceptions often prevail:

i) The belief that productivity should be improved largely by cutting costs (e.g. reducing personnel and other inputs) to deliver the same level of services. Not much consideration is given to expanding services – and improving the quality of services – using the available resources.

ii) A mistaken view that productivity can be achieved by driving down costs through substituting higher quality inputs for lower quality inputs. Such a strategy may reduce costs but often results in poor service delivery. For example, building schools with inferior quality materials may cost less but can place schoolchildren at risk, especially where adverse weather conditions may cause structural damage to school buildings.

Despite the acknowledgement that public productivity includes both efficiency and effectiveness, data and standards for measuring effectiveness are not always available. In practice, efficiency measures are used as a proxy for productivity, although focusing on efficiency alone presents only a partial picture of productivity. This chapter follows the efficiency approach to measuring productivity, using "productivity" and "efficiency" interchangeably.

6.3.2 Causes of poor productivity in the public sector

Various factors contribute to poor productivity in the public sector. Public sector managers are often more interested in maximising their budgets than in efficiently allocating resources. They are more inclined to increase budgets and creatively manage budgetary slack than to seek to minimise costs and maximise outputs (Chalos, 1997). Budgetary slack refers to non-productive activities such as low effort, over-employment and higher wages paid to staff (Borge et al., 2008).

A study in Ghana by Asamoah and Yeboah-Assiamah (2013) found that public administration weaknesses can be ascribed to poor leadership, a shortage of expertise in critical areas, overstaffing, abuse and waste, inadequate internal and external systems, and a proliferation of duplication and fragmentation. Political interference in decision-making also has a negative impact on performance, especially when related to appointments and promotions. A lack of autonomy further exacerbates low productivity in public administration, preventing employees from making decisions on procedural aspects of their jobs and resulting in increased cautiousness and rigidity in employee actions (Asamoah and Yeboah-Assiamah, 2013). Etekpe (2012) found similar findings when assessing poor productivity in Nigeria.

A study of public sector employees in the United States found that human resource and budget issues are

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[67] Transformation units have changed to batho pele units to facilitate implementing batho pele principles in the public service.

significant factors that affect productivity (Haenisch, 2012). Typical human resource issues relate to poor supervision and management, insufficient staff, lack of training, and too much work. Employees also felt that poor pay, no recognition, and low budgets influenced their productivity. A study by Curristine et al. (2007) concluded that, while salaries are important for staff, performance-related pay does not affect staff motivation.

From an organisational perspective, having multiple goals but limited capacity can also influence the productivity of an agency. In an attempt to achieve all the goals, resources are spread too thinly, thereby compromising the ability of staff to provide dedicated attention to any given goal (Etekpe, 2012). In Australia, some agencies centralise work, which results in higher-level staff carrying out functions that are more appropriate to a lower level, leading to slower decision-making processes and increased costs (Haenish, 2012).

External factors can also hinder public sector productivity, mainly the institutional and legislative set-up that regulates a large chunk of public sector operations. For example, inefficient internal processes may be the result of adhering to compliance requirements, which are not factors that a public agency can control. Onerous provisions may be enforced in high-risk areas such as procurement and financial management, where rent-seeking behaviour by public officials is more likely. Further, public sector practices (such as policy-making and intergovernmental service delivery) are guided by prescribed consultation norms that are sometimes time consuming and costly. These unique challenges are compounded by institutional inertia and regimented practices in the public sector that prevent many public agencies from finding creative ways through the bureaucratic red tape.

Both internal and external factors affect productivity in the educational sector. An OECD study found that, despite some countries spending the same share of GDP on education, their respective performances in PISA[68] assessments were very different (Curristine et al., 2007). This was attributed to either non-monetary determinants of education performance, or the inefficient use of education expenditure. Determinants within the education system relate to school size, teacher/learner ratio and residency-based selection. Environmental factors such as education of parents, location, and GDP per capita also seem to influence productivity in the education sector (Curristine el al., 2007).

6.3.3 Improving public sector productivity

Endogenous growth theory suggests that knowledge transfer, research development, and skills training contribute significantly to labour productivity (McCarthy, 2005). According to Gilder (1975), other traditional sources of productivity gains include the concentration of capital, improved allocation of labour, and economies of scale.

It should be noted that interventions targeting individual employees, while critical, are not the only source of productivity improvements. Equally important are institutional and government-wide factors; this raises the question of whether a coherent productivity plan for government can be an effective mechanism for synergising interventions at different levels.

From an intergovernmental perspective, in principle, devolution – if accompanied by fiscal and political decentralisation – can create incentives for subnational government to provide services more effectively (Curristine et al., 2007). This assumes that subnational government has the capacity to implement the devolved functions, which may not always be the case. A further consideration is how strongly employees interact with the systems, processes, culture and leadership within the organisation, as this can either hinder or assist individual performance outcomes. A skilled employee, for example, may be operating sub-optimally merely because of organisational constraints, such as a lack of computer facilities or the presence of unnecessary red tape.

In the private sector, competition exerts a disciplining effect, as firms are punished if internal inefficiencies increase above a critical level. It is often argued that inefficiencies in the public sector are allowed to proliferate because of the lack of a disciplining function similar to that of competition in the private sector. Some scholars believe that the closest approximation is public scrutiny, where public pressure is placed on government agencies that do not deliver or that provide inferior services. Table 33 provides a summary of the mechanisms that can lead to improved productivity in the public sector.

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[68] The Programme for International Student Assessment (PISA) is a triennial international survey that evaluates education systems worldwide by testing the skills and knowledge of 15-year-old students.

Table 33: Mechanisms for enhancing public sector productivity

SOURCE	MECHANISM	BENEFITS	PROBLEMS/CHALLENGES
Infrastructure	Increased public investment in social and economic infrastructure	New investment opportunities and more economic development	Identifying strategically selected sectors of the economy that will yield largest marginal return on public investment. (Familoni, 2004)
	Improved operational efficiencies of state-owned companies that maintain and invest in large-scale public infrastructure projects	Enhanced quantity and quality of such infrastructure, which expands the economy's productive capacity	Maladministration and mismanagement of state-owned companies have a negative impact on economy and the poor. (Familoni, 2004)
Labour	Policies on reducing new hires, strict controls on temporary employees, and central redeployment of employees	Stabilised workforce cost base in the short term. Sends message to organisation to prioritise activities with available resources	Capacity gaps across the organisation. Over time, may create inadequate oversight of key functions or top-heavy management (PwC, 2013)
	Human resource management reforms (e.g. performance management, skills training, workforce planning, control and compensation reform)	Improved staff motivation, skills development, and reduces budgetary slack	If implemented haphazardly, can increase costs without any substantial gain
	Public finance school	Enhanced finance skills in departments	Portability of skills learnt is critical for the training to be effective
Institutional	Application of 'efficiency dividends' across departments	Less expectations of increased funding for the same activity year-on-year, and a continuous-improvement mind-set	Budget flexibility of senior managers removed, as expense control is transferred to the treasury (PwC, 2013)
	Setting up shared back-office service centres	Investment can establish a step change in costs for non-core services in departments	Often established without consideration for the scale required to achieve acceptable rate of return (PwC, 2013)
	Business process re-engineering of administration	Less duplication, overlaps and uncoordinated internal processes	Failure if resistance to change, lack of organisational readiness, no proper champions or integration mechanisms (Mmereki and Moruisi, 2013)
	Cutting red tape	Lower transaction costs and shorter turnaround time to deliver services	Challenging decision-making process that requires buy-in at both technical and political level
Government-wide	General review of public policies (audit)	Less bureaucratic complexity by streamlining processes and procedures	Cooperation required from all ministries
	Comprehensive spending reviews	Identification of inefficiencies in service delivery	Coordination required between different levels of government, definition of performance targets and demand for good-quality outcome-focused data
	Introduction of eGovernment portal	Reduced administrative burden	Potential technical constraints, and co-operation required from all ministries and levels of government (Mandl et al, 2008)
	Hard budget constraints and incentive schemes	Reduced budgetary slack and public-sector wages	Potentially politically unpopular, incentive schemes resisted by unions (Borge et al, 2008)

6.3.4 Measuring public sector productivity

Studies of public sector productivity have focused largely on sectoral or individual agency analysis. Attempts to measure public sector productivity on a national level have met with methodological difficulties. In the national accounts, public sector output is equal to input, and therefore public sector productivity is assumed to be zero (Akazili et al., 2008; Boyle, 2006). The main sectors assessed include health (Marschall and Flessa, 2011); education (Alexander et al., 2010; Garrett and Kwak, 2010; Hu et al., 2009); local government (FFC, 2011; Monkam, 2011); and agriculture (Conradie and Piesse, 2014).

Economists use one of three techniques to measure public productivity: the index number approach, parametric methods and non-parametric methods. While the index number approach is commonly employed in sector-based analysis where data is available, parametric methods (e.g. Stochastic Frontier Analysis (SFA)) and non-parametric (e.g. Data Envelope Analysis (DEA)) are more frequently applied when measuring efficiencies in agencies such as hospitals or schools.

Efficiency in education is primarily analysed using DEA models, with variants of the one-stage model typically being employed to analyse school efficiency. For example, Garret and Kwak (2010) used the DEA technique to investigate the effectiveness of 447 public school districts in Missouri, US, with a baseline model and two alternative models that included a wealth variable. The baseline model produced a less robust outcome than the two alternative models. The study found that only 27 district schools were efficient, and that the main sources of inefficiency were inadequate student-year progress and graduation, and significant excess funding. Hu et al. (2009) employed a one-stage DEA model to evaluate the efficiency of 58 primary schools in Beijing, China. The main input variables selected were student–teacher ratio, teachers' average teaching experience, teacher qualifications, total expenditure per student, number of library books per student, average teacher salary, and students' average attendance in hours. The main output variables were pass rates in mathematics, Chinese and English, student academic awards from the district, and teacher-excellence awards. The study found that 50% of the schools were efficient, with an average all-sample efficiency score of 0.90 out of the highest possible score of 1.00.

While traditional one-stage DEA models can estimate an efficiency score, the models cannot explain the non-discretionary drivers of efficiency. Therefore, two-stage models are employed to account for the impact of environmental and non-discretionary factors. Alexander et al. (2010) used a two-stage DEA model to analyse efficiency differences between secondary schools in New Zealand. In the first stage, the relative efficiencies of the schools were computed using a one-stage DEA model; in the second stage, a censured Tobit regression model was estimated to identify possible causes of inefficiency. Some of the first-stage DEA inputs included school expenditure, teacher salaries, and number of learners in each school year. The main output variables were school performance at the Year 11 National Certificate Examinations, Year 12 Sixth Form Certificate and the University Bursary Examinations level. At the second stage, environmental regression variables, such as school ownership, geographical location, gender orientation, and school size, were included. The paper found that the average efficiency score was highest for integrated girls' schools (0.82) and lowest in state-owned co-educational schools (0.70). In addition, the paper showed that the socio-economic environment has a positive impact on school performance and efficiency.

Productivity analysis is still in its infancy in South Africa. However, recent studies have applied SFA and DEA techniques to measure productive efficiency in municipalities (FFC, 2011; Monkam, 2011). In the education sector, Taylor and Harris (2004) evaluated the relative efficiency of ten South African universities. The study used total expenditure, capital employed, and student and staff numbers as the main inputs, while graduation rates and research output were selected as the output variables. The study found that between 1994 and 1997 overall university efficiency increased marginally, from 86% to 88%, with Potchefstroom University and Rand Afrikaans University being the most efficient.

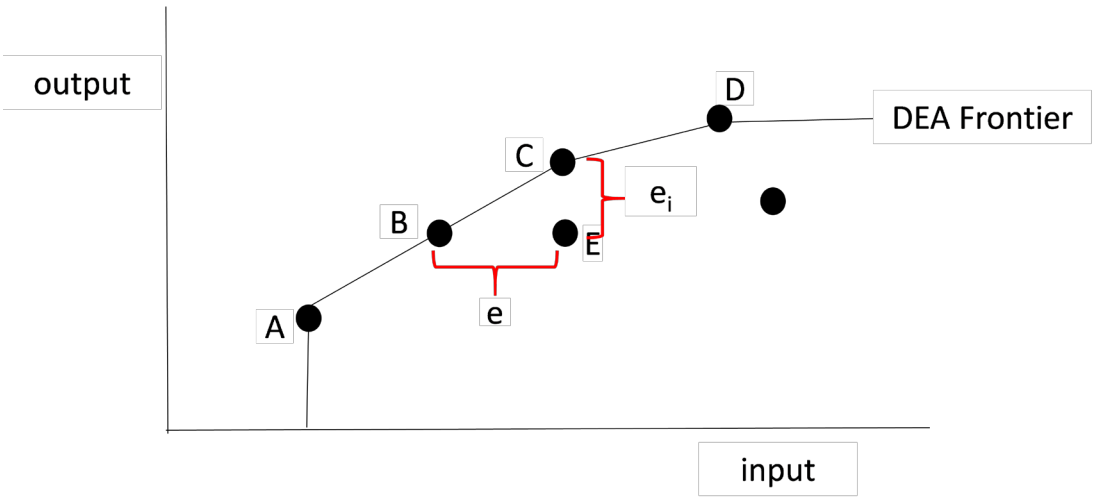
No known study has used these techniques to analyse productivity in the secondary education sector in South Africa.

6.4 Methodology

6.4.1 Two-stage model framework

The study follows the non-parametric DEA approach proposed by Farrell (1957) and further developed by researchers since then. The DEA can be solved using either constant returns to scale (CRS) or variable returns to scale (VRS). This study uses the VRS assumption, which is shown to be a more flexible frontier (Jacobs, 2001). An output-oriented framework was also used, as in a given year a school district would want to maximise its outputs for a certain level of inputs. The efficiency frontier of a DEA model is explained in Figure 35.

Figure 35: DEA frontier



Source: Adapted from Smith and Street (2005)

The units A, B, C and D all fall on the production frontier and are efficient, given the scale of operations. Unit E is inefficient, as it uses more input to produce the same amount of output as B, and uses the same amount of input as C, but produces less output. The inefficiency of E is the horizontal or vertical distance from the production frontier, represented by e and ei respectively.

Following Johnes (2006), the DEA model is specified as follows:

Maximise $\phi_k \epsilon \sum_{r=1}^{s} s_{r+\epsilon} \sum_{i=1}^{m} s_i$ (1)

Subject to $\phi_k y_{rk} - \sum_{j=1}^{n} \beta_{iy_{rj}} + s_r = 0$ (2)

r = 1,…..s

$x_{ik} - \sum_{r=1}^{n} \beta_j x_{ij} - s_i = 0 \qquad i = 1,\ldots..,m$ (3)

$\sum_{j}^{n} \beta_j = 1$ (4)

$\beta_{j,s_r}, s_i, \geq 0 \; \forall_j = 1,\ldots.,; r = 1,\ldots s;,$

$I = 1,\ldots, m,$

where there are s outputs and m inputs, with y_{rk} the amount of output r used by decision unit k; x_{ik} is the amount of input i used by unit k. Thus, if decision unit k is efficient, its score is 1. Variable returns differ from constant returns to scale by the constraint in equation (4).

DEA provides several advantages, including: (i) it does not impose assumptions of any functional form of the relationship between inputs and outputs; (ii) it can be used not only to identify inefficient schools but also to compute the precise efficiency gap, so that efforts to improve are properly quantified; and (iii) it

allows the analysis of multiple inputs and multiple outputs. Despite these strengths, an often-cited limitation of DEA is that it may overestimate efficiency scores if the number of factors in the model is too high.

After calculating the DEA efficiency scores for each school and identifying the efficient and inefficient schools, a regression model is run at the second stage to explain the determinants of efficiency. Given that the efficiency scores are necessarily limited to the [0,1] range, the ordinary least squares (OLS) regression model would produce biased estimates. To correct for this bias, a censured Tobit model is run instead. The Tobit model can thus be defined for DMU_k as:

$$\theta_k^* = \beta X_k + \varepsilon_k$$

$$\theta_k = \begin{cases} \theta_k^* \ if \ \theta_k^{'*} > 0 \\ 0 \ otherwise \end{cases}$$

where θ^*_k is an unobserved latent variable and θ_k is the DEA score. X_k is a row vector of observation-specific variables for DMU_k that affect its efficiency score through the vector of parameters β to be estimated.

6.4.2 The data

This study uses data from the 2011 Trends in International Maths and Science Survey (TIMSS), a worldwide survey that assesses student knowledge and performance in mathematics and science. Test-takers are selected using a two-stage sampling procedure: first schools are randomly selected, and then participating classrooms are randomly selected from within these schools. In South Africa, 285 secondary schools were selected, and 11 969 learners took the test. The TIMSS was chosen because the data is acclaimed for its high quality and rich student, school and neighbourhood background variables. The survey is also nationally representative, and the 2011 TIMSS version covers Grade 9 learners. This focus provides an opportunity to assess the efficiency of the largest pillar (and one of the most important pillars) of the South African education system. Furthermore, using the TIMSS survey provides the study variables required for both the DEA and regression analysis.

6.4.3 The variables

The literature on school efficiency using the two-stage DEA approach typically models the first stage as a simple production process, where school inputs are transformed into outputs. Each school's DEA score is simply the efficiency with which these inputs are transformed into outputs. The approach followed here is used in Alexander et al. (2010) and Bradley et al. (2001): only a tightly defined set of inputs is specified for the DEA model, with all other variables that might explain efficiency included only at the regression stage. The main DEA inputs will be teacher experience in mathematics and science and average class size. In the school efficiency literature, teacher experience is often considered a good proxy for teacher quality. We expect that, as in Hu et al. (2009), higher teacher experience (and hence better teacher quality) would have a positive impact on student performance. Teacher experience will be measured by number of years of teaching. In addition, the DEA model will include average class size as an input. Average class size is used an a proxy for school quality, as schools with classes containing fewer learners provide a more conducive learning environment (Mizala et al., 2002) and therefore are likely to record better outcomes compared to schools with larger classes.

The main output variables used in the DEA model are average student achievement scores in mathematics and science. Typically, student test scores are used as the principal outcome variables in DEA models (see for example; Alexander et al., 2010; Garret and Kwak, 2010; Hu et al., 2009).

The second step in the analysis involves finding the determinants of efficiency. This is achieved by regressing the DEA scores on various school- and community-level factors that could influence efficiency. The following variables were used in the Tobit regression model: neighbourhood socio-economic status, adequacy of instructional materials, adequacy of instructional space, teacher qualifications, teacher absenteeism, school size and school location. Socio-economic status is an important determinant of school efficiency, as better-off neighbourhoods are likely to offer their schools better support structures, which may improve school performance (Alexander et al., 2010). This study uses average neighbourhood income levels as a proxy for neighbourhood socio-economic status. It includes measures of the adequacy of general resources, e.g. instructional materials and availability of adequate instructional space such

as classrooms. As in Hu et al. (2009), we expect that learners in schools with adequate textbooks and classrooms will perform better than those in resource-constrained schools. In South Africa, poor teacher commitment is an often cited cause of unsatisfactory school outcomes, and so teacher absenteeism is included as a proxy for teacher commitment. We expect that schools with teachers who are more committed will record better school performance. Furthermore, the school size is included to measure any effect of economies of scale on efficiency. School size could potentially affect efficiency through certain size-related economies of scale (Alexander et al., 2010; Mizala et al., 2002). For example, it would be difficult for small schools to find the resources to employ sufficiently qualified teachers, while very big schools may face administrative or organisational challenges (Alexander et al., 2010). Finally, school location is included as a standard control variable, but with the expectation that schools located in rural areas or small towns are likely to have lower school outcomes compared to those in urban areas.

Table 34: Descriptive statistics

		Mean	Std. Dev.	Min
DEA input variables				
Teacher years of experience in mathematics	14.31	9.17	1	43
Teacher years of experience in science	14.08	9.12	1	42
Average class size	42.97	15.78	10	118
DEA output variables				
Pupil maths scores	376.03	80.18	248.55	625.90
Pupil science scores	364.46	100.07	190.58	629.76
Regression variables				
School efficiency score	66.05	15.86	40.42	100
Proportion of schools with moderate to serious constraints in instructional materials (e.g. books)	0.59	0.49	0	1
Proportion of schools with moderate to serious constraints in instructional space (e.g. classrooms)	0.49	0.50	0	1
School location (1=urban, 0=otherwise)	0.47	0.50	0	1
Socio-economic indicator(1=high income, 0=low income)	0.27	0.46	0	1
Teacher absenteeism (1=serious problem, 0=not a serious problem)	0.50	0.50	0	1
Class teachers with at least a degree in either maths or science	0.77	0.42	0	1
School size (enrolments)	865.80	432.76	42	2630

As Table 34 shows, the secondary school class has 43 learners, which is better than China (50 learners) but much higher than the average of 24 learners for OECD countries (OECD, 2011). About half the schools (59%) suffer from shortages of either instructional materials (e.g. textbooks) and/or sufficient instructional spaces (50%), e.g. classrooms. Teacher absenteeism is also a problem for half (50%) of the schools.

An impressive finding is that the average maths or science teacher has about 14 years' experience, when five years of teaching is considered good experience. However, this finding should be interpreted with caution because (i) the results are only for classes that participated in the test (not the entire school), and (ii) 77% of the classes in the sample were taught by teachers who had at least a first degree in either mathematics or science.

6.5 Findings

6.5.1 Model results

A mean efficiency score of 1 indicates that a school operates efficiently, while a score of less than 1 implies lower efficiency relative to the other schools being evaluated. Of the sample of 210 South African secondary schools, 9% were classified as efficient (i.e. had a score of 1) and therefore produce the highest combination of outputs for any given level of inputs. Half the schools in the sample had an efficiency score of 0.59 or higher. The mean efficiency score for secondary schools in South Africa is 0.66 with a standard deviation of 0.16. The distribution of the efficiency scores is shown in Figure 36.

Figure 36: Cumulative distribution of efficiency scores

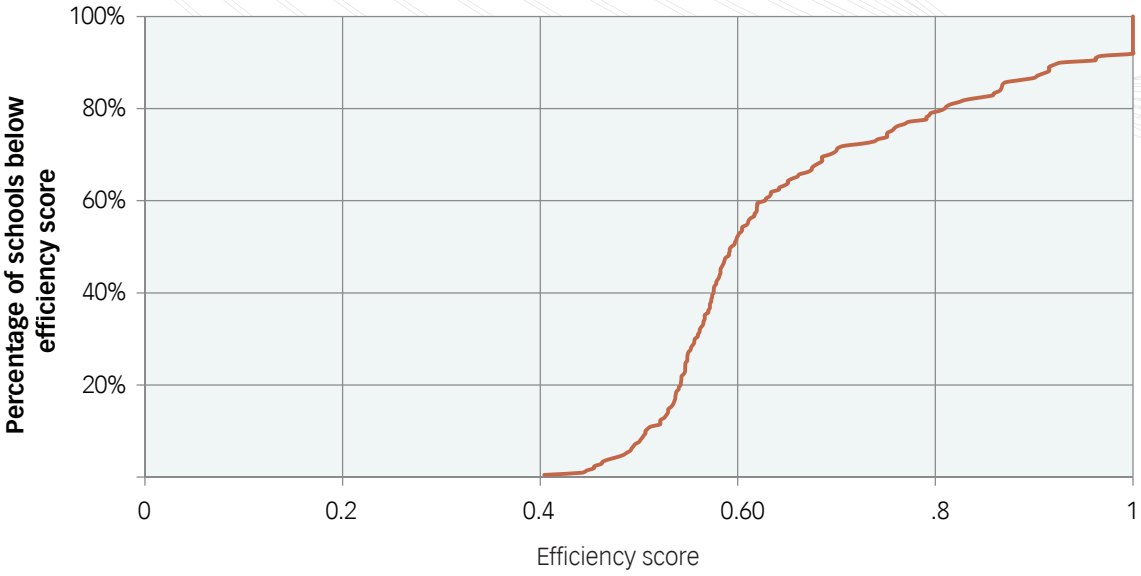


Table 35 presents efficiency scores calculated from the DEA model, together with the associated efficiency targets for a selected number of schools in the sample. Results for the full sample can be found in Appendix 1.

Table 35: Selected DEA efficiency scores and target levels

School	DEA score	Maths score	Target	%Δ	Science score	Target	%Δ
H24	1	361	361	0	328	328	0
H42	1	536	536	0	576	576	0
H52	1	346	346	0	326	326	0
H59	1	450	450	0	460	460	0
H62	1	417	417	0	412	412	0
H41	0.9678	515	574	11.46	571	590	3.33
H152	0.9622	587	624.4	6.37	606	629.8	3.93
H22	0.9619	540	577	6.86	570	592.6	3.97
H192	0.9275	539	603.6	11.98	578	623.2	7.82
H210	0.9205	524	576.8	10.08	546	593.2	8.64
H10	0.4551	279	613	119.7	234	628.6	168.6
H13	0.4542	278	612	120.1	230	628.4	173.2
H11	0.4472	266	594.8	123.6	199	605.3	204.2
H9	0.4424	269	608	126	220	628	185.5
H6	0.4042	249	616	147.4	193	628.9	225.9

As Table 35 shows, relatively inefficient schools could still improve their average maths and science test scores using existing levels of resources. Column 2 ("DEA score") shows the efficiency gap and thus the improvement required to achieve full efficiency. To illustrate:

- School H210 has an efficiency score of 0.92 (92%), which shows that the school has the potential to improve its efficiency by 8% using the current inputs.

- School H24 is fully efficient, with an efficiency score of 1 (100%). The implication is that the school is already efficiently converting inputs to outputs and, therefore, cannot improve its efficiency unless funding is increased.

In Table 35, Columns 3 and 6 give the current school achievements (scores) in maths and science respectively. Columns 4 and 7 show the target levels required for full efficiency (given the existing resources) in maths and science respectively. Columns 5 and 8 show the percentage improvement required to achieve efficiency. To illustrate:

- School H210 has a current maths score of 524 but the potential to achieve 577. Therefore, the schools efficiency gap is about 10%;

- School H24, being fully efficient, has an efficiency gap of zero.

A regression analysis was carried out to determine which of the selected variables could drive efficiency. The results are presented in Table 36.

Table 36: Regression results

Variables	coef.	s.error	t statistic	P>t
Instructional materials	-6.9	1.9	-3.6	0.000***
Instructional space	-0.2	1.8	-0.1	0.912
School location	7.3	2.0	3.7	0.000***
Higher income areas	14.3	2.4	6.0	0.000***
Absenteeism	-2.3	1.8	-1.3	0.210
Teaching degree	4.1	1.9	2.2	0.030**
School size	0.0	0.0	0.9	0.394
School size squared	0.0	0.0	-1.5	0.138
Constant	60.5	3.4	18.0	0.000***
log likelihood	150.99			-

Table 36 reveals that inadequate instructional materials, such as textbooks have a negative effect on learner outcomes. At schools with moderate to serious shortages of instructional materials, learner performance is seven points lower than at schools with few or no shortages. These results are statistically significant at 1% level. The inadequacy of learning space (e.g. classroom) does not seem to affect performance significantly. However, teacher qualifications do matter. Schools with teachers who have at least first degrees in either mathematics or science reported better learner outcomes than schools without any degree holders. This finding is statistically significant (5% level) and similar to findings by Alexander at al. (2010).

In common with other studies, such as those by Hu et al. (2009) and Alexander et al. (2010), the school's location and the neighbourhood's socio-economic status significantly affect learner outcomes. Schools in urban areas recorded higher scores in the TIMSS tests than those in rural areas and small towns, while schools in medium and high income areas had higher student scores than schools in low income areas. These locational and socio-economic impacts could indicate the impact of underlying nuances, such as the household's ability to purchase learner materials and motivate learners, and community involvement. Such an analysis could be a subject of a future study. Other factors investigated – school size and teacher absenteeism (as a proxy for teacher commitment) – were not found to be significant in South Africa.

6.5.2 Stakeholder inputs

To complement the empirical study's findings, input was obtained from key stakeholders through a structured questionnaire and semi-structured interviews. The stakeholders included senior officials from three provincial departments, National Treasury, DPSA and the departments of cooperative governance and basic education. Questions addressed were:

- Is there a common understanding of public productivity in South Africa?
- How is public productivity measured, and what measures can be taken to improve the system?
- What inefficiencies are in our schooling system and how can they be addressed?
- What steps should be taken to address teacher inefficiencies in the system?
- Are there any funding/budgetary incentives that could enhance better public school performance?

An overview of the main points raised by respondents is provided below.

The term "productivity" in the public sector is not well understood in South Africa. This may be because the services produced are often intangible, and assigning an economic value to these outputs or services is difficult. A clear and transparent measure of productivity is needed, similar to an internationally benchmarked index used to measure the productivity of organisations. Once such a measure is in place, other improvements can follow, such as redesigning the performance management system, putting in place a more innovative remuneration structure and reallocating resources to areas of need. For implementation, important considerations include training officials intensively to understand the concept of "productivity" and piloting productivity measures in certain cluster organisations before rolling it out en masse.

Clearly defined systems and processes are needed to improve productivity. This would encourage semi-productive persons to function optimally. Policy disincentives should be introduced for poor performance; organisations that score below the acceptable "productivity" level should be penalised through, for example, budget cuts. To address structural capacity challenges, the current funding approach needs to be differentiated, based on an institution's capabilities, and aligned with its priorities, which could be either a subset or the full allocation of the powers and functions outlined in the Constitution.

Certain critical areas influence productivity in the South African education system. These areas are effective and sound management, capable teaching staff and available learning and teaching resources. The broader society, i.e. civil society, also influences productivity, as learner outcomes are often affected by social issues such as crime, poverty and language barriers. Better school management teams should be selected, and in particular the appointment of the principal should not be solely at the discretion of the school governing body. The decision to hire should be based on competence.

Schools could master a particular field of study. Schools perform better if they focus on a particular field (e.g. school for accountants, physicians, etc.). In so doing, they enable learners to visualise the kind of career they are working towards and be more motivated in the process.

Government's socio-economic programmes contribute to a more conducive environment for learning in quintile 1–3 schools. These programmes include the school nutrition programme, no fee schools and scholar transport.

Ways to improve teacher performance include:

- Manage the learner–educator ratio, to ensure a better teaching environment and that learners get the attention they need to progress successfully from one grade to another.
- Keep temporary positions to a minimum, as teachers are more likely to be productive in a secure job environment.
- Ensure a pipeline of good quality teachers entering the schooling system, through strengthening programmes that ensure a professional and thorough recruitment, and setting standards against which teachers are held accountable.
- Support teachers through further training, especially in challenging content areas, presentation and resources. Teachers should also be given increased access to e-resources, as this will enhance independent learning and upskilling of teachers and learners alike.
- Address the time-on-task allocation, which is a major inefficiency in public schools. Teachers should come prepared for teaching, and curriculum coverage in all subjects and grades should be monitored.

Interestingly, the main challenge appears not to be resources or funding levels but rather the ethos in schools, which is created by good management and governance.

The Commission has previously investigated various fiscal areas of the public schooling system, including important functions that play an enabling role in school performance and learner outcomes. The appendix outlines key findings of these studies conducted from 2005 onwards. The findings highlight key areas of school performance that have an impact on school productivity and are still relevant today.

6.6 Conclusion

The study investigated the extent to which productivity in the public sector can be improved. A two-stage DEA approach was used to measure the productivity of secondary schools in South Africa and was complemented with feedback from structured questionnaires and interviews with key stakeholders.

The term "productivity" in the public sector does not appear to be well understood. Before productivity can be improved, a clear and transparent measure of productivity is needed, similar to an internationally benchmarked index used to measure the productivity of organisations.

There is substantial room for improving the productivity of secondary schools in South Africa. Only 9% of the schools included in the analysis were found to be fully efficient, but the study found that the schools have the potential to increase mathematics and science scores by an average of 60% and 74% respectively, using existing resources. The most important drivers of school productivity were found to be:

i) Availability of learning materials. The finding that learner materials have a positive impact on school outcomes is in line with previous studies, such as Michaelowa (2001) and World Bank (2004), and concurs with the stakeholder feedback received. It also reinforces previous Commission findings on problems with learner support materials, especially in rural areas, which is compounded by the limited budget available for non-personnel, non-capital educational inputs.

ii) Better qualified mathematics and science teachers, which is in line with research by Kasirye (2009) and Alexander at al. (2010). This is particularly important in South Africa, where teacher quality is a constant issue despite significant budgetary allocations to education. Teachers should be supported through further training and be given increased availability to e-resources, to enhance independent learning and upskilling of teachers and learners alike.

iii) Socio-economic status. Understanding the various ways in which the socio-economic status affects school outcomes is beyond the scope of this chapter. However, inadequate transport and high poverty rates are highly correlated with socio-economic status and could be driving the poor school outcomes. In previous years, the Commission has highlighted the critical role of various government programmes (e.g. national school nutrition programme and school transport) in contributing to better learner outcomes.

The dominant challenge in the schooling system is not primarily funding levels and resources, but rather the ethos in schools created by good management and governance. In this regard, the professional appointment of the principal is critical in developing such an ethos, and the school's senior management team play an important supportive role. The community should also be encouraged to play an instrumental role in holding the school accountable for its performance.

6.7 Recommendations

Arising from the above findings, this study recommends:

1. A framework on measuring public productivity is developed as a first step to benchmark improvements in the public sector over time. The framework should consider productivity measures for each sector and data variables required for measuring it. Officials should be trained on the concept of public productivity and productivity measures should be piloted in certain cluster organisations before rolling them out en masse.

2. The Division of Revenue Act implements the finalised framework on measuring productivity. This may require the implementing agent of a conditional grant to report on the attainment of both quantitative and qualitative indicators of an output, including productivity indicators that track improvements of the service over time.

3. Socio-economic programmes of government which improve living standards and income for households are continued, especially those that lead to improved educational outcomes. Such programmes include the school nutrition programme, no-fee school policy, scholar transport, social security grants and public employment programmes. Research shows higher human capital results in improved labour productivity.

4. Government investigates funding and non-funding mechanisms to improve productivity in public ordinary schools. Such mechanisms should involve enhancing governance and accountability in schools through the appropriate appointment of school principals and enforcing norms and standards that principals must adhere to. Teachers should be supported through training, and the performance management system for teachers should be linked to overall school outcomes. e-Education should be explored as a learning platform to provide both teachers and learners with access to new knowledge.

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Appendix 1: Previous FFC Findings and Recommendations on Basic Education

Focal Area	MECHANISM	Key Recommendations
Learner Support Materials (LSM)	• There are many problems with the provision of LSM, and these are more pronounced in rural areas (FFC, 2005) • Repetition rates are higher in secondary schools than in primary schools, with the consequence that textbooks and stationery do not circulate as intended (FFC, 2005) • Mother-tongue textbooks need to be provided, and often schools receive textbooks in the wrong mother tongue (FFC, 2005). • The non-personnel, non-capital (NPNC) classification for LSM is unclear and inconsistent across provinces. There are shortages of textbooks and stationery as a result of inadequate funding and low prioritisation of textbooks and stationery in the planning cycle (FFC, 2006). • More than 90% of primary and secondary school allocations are earmarked for personnel costs, leaving provinces with paltry resources for other essential NPNC education inputs (FFC, 2014).	• LSM should be clearly defined and should mean stationery, textbooks, and learner and teacher aids. A separate budget is needed for each of these items, and for maintenance, repairs and equipment (FFC, 2006). • The allocation framework to schools should take into account the full package of minimum inputs when deriving minimum adequate benchmark funding per learner (FFC, 2014).
National School Nutrition Programme (NSNP)	• The NSNP may positively contribute to school attendance and punctuality at school. It also has the potential to alleviate hunger and improve school outcomes (FFC, 2007).	• The NSNP should be extended to secondary schools (FFC, 2007).
School Infrastructure	• Providing better infrastructure may not result in large gains in student performance. Stronger arguments for better school infrastructure are human rights and greater equality of education and resources and therefore perceived equity (FFC, 2006).	• Schools require relevant ICT infrastructure to accommodate new ways of learning, while accounting for environmental concerns. The Provincial Infrastructure Grant should be targeted where it is most likely to improve school outcomes (FFC, 2006).
School Transport	• There is no specific national policy dealing with the provision of learner transport services. For many learners, especially in rural areas, long travelling distances and a lack of basic infrastructure, such as safe roads and pedestrian bridges still hampers access to school (FFC, 2006).	• National norms and standards for the provision of learner transport should be established. The Commission notes the problem of learner transport is particularly acute in rural areas (FFC, 2006).
e-Education	• Most teachers have limited access to new knowledge. Introducing and integrating ICTs, electronic and visual media into educational processes can provide a platform for increasing access to knowledge for teachers and leaners (FFC, 2011).	• Introduce e-Education as a way of improving the quality of education. An e-Education business model can be designed to make widespread introduction of technology affordable (FFC, 2011).

Focal Area	MECHANISM	Key Recommendations
Teaching Staff	• Affluent schools can use the school governing body reserves to employ additional teachers and attract experienced and qualified teachers. No prescribed norms and standards exist for allocating teachers across schools of different types (FFC, 2014).	• Government should finalise the implementation of occupation-specific dispensation and formalise the performance evaluation system (FFC, 2011). • Government should improve the quality of education by relieving teachers of administrative duties (through hiring administrative assistants), support the training and development of teachers (making explicit the amount spent for this purpose through the Division of Revenue) and improve schools accountability for learner performance (FFC, 2011).

Note: FFC references are to the various Submission for the Division of Revenue, available at www.ffc.co.za

CHAPTER 7

Improving Government Operations Through the Use of Information and Communication Technologies

CHAPTER 7

Improving Government Operations Through the Use of Information and Communication Technologies

Sasha Peters[69], Tertia Smit and Penny Smith

7.1 Introduction

As economies become increasingly knowledge based,[70] information and communication technology (ICT) infrastructure investment has come to the fore. Like investments in transport and energy, investments in ICT can lead to improved growth, productivity and efficiency. An ICT-led approach to public service delivery (also referred to as electronic government or eGovernment) can also result in productivity gains. eGovernment enables public administrations around the world to be more efficient, provide better services, promote social inclusion, better manage natural resources, enhance communication with citizens, and be more transparent and accountable. ICTs are also effective platforms for knowledge sharing, skills development, transferring innovative eGovernment solutions and building sustainable development capacity among countries. According to the United Nations (2014), eGovernment can result in new employment, and better health and education. Investment in (and greater use of) ICTs can also facilitate more inclusive growth and access to service delivery by enabling poor and rural communities to be reached.

The National Development Plan (NDP) sets two time-bound ICT-related goals for South Africa: (i) 100% broadband penetration by 2020, and (ii) the adoption of a full eGovernment approach by 2030. It envisages a "seamless information infrastructure to meet the needs of citizens, business and the public sector, providing access to the wide range of services required for effective economic and social participation" (NPC, 2011: 170). This implies a well-functioning eGovernment approach to service delivery and interaction with citizens. Taking its lead from the NDP's vision of ICT, in 2012 government embarked on a process of reviewing and evaluating the relevance of existing policies, and debating the future developments required within the sector

The aim of this chapter is to determine the priority attached to ICT investment within government and to highlight barriers that hamper greater prioritisation of the use of ICTs to enhance service delivery reach and performance. The specific objectives of the research are to:

- assess spending on ICT across the three levels of government, and
- to identify potential barriers that hamper ICT investments from being a lever for improving internal government functioning and service delivery.

7.2 Literature Review

7.2.1 Defining concepts

According to the Department of Public Service and Administration (DPSA), electronic government or eGovernment entails the "use of information and communication technologies in the public service to improve its internal functioning and to render services to the public" (DPSA, 2012: ix). For the purposes of this study, ICTs can be divided up into the subcategories outlined in Table 37.

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[70] For a knowledge-based economy, the generation and exploitation of knowledge underpins economic processes and is the main driver of growth (El-Sherbiny, n.d.).

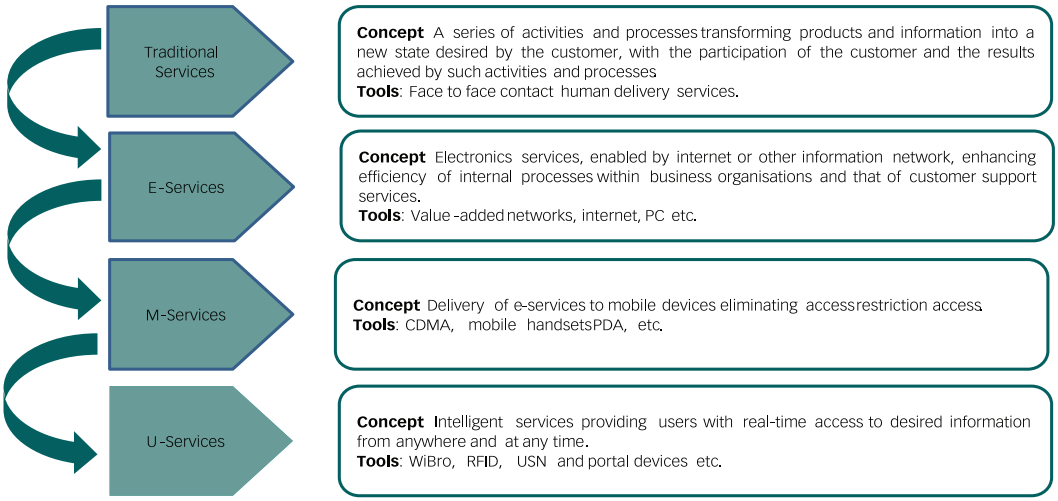
Table 37: ICT subcategories

Category	Subcategory	Category	Subcategory
TELEKOMS	Telecoms infrastructure	IT SERVICES	Information services
	Telecoms equipment		Mainframe time
	Telecoms fixed voice/fax		Systems advisory
	Telecoms data lines		Systems development
	Telecoms internet charges		State Information Technology Agency (SITA) specialised services
	Telecoms mobile equipment and accessories		
	Telecoms mobile phone contracts		
HARDWARE	Hardware and systems		
	Hardware audiovisual	SOFTWARE	Software assets
	Hardware peripherals		Software licences
	Hardware printers		Software licences – SITA

Source: BMI-T (2015)

eGovernment includes the use of technologies to make government work processes more efficient, strengthen public service delivery and enhance communication channels with citizens. The progression from traditional government services (also known as conventional government or cGovernment) to ubiquitous government, or uGovernment, is depicted in Figure 37.

Figure 37: Development of government service concepts



Source: OECD and ITU (2011)

Mobile government or mGovernment is "the extension of eGovernment to mobile platforms, such as laptops, tablets and other forms of mobile devices. The main advantage of the mobile platform is its ubiquity, that is, the potential availability of services anytime, anywhere." (Western Cape Government, 2012).

For the purposes of this research, a barrier is defined as legal, social, technological or institutional characteristics (either real or perceived) that work against developing eGovernment. This is either because they impede demand, by acting as a disincentive or obstacle for users to engage with eGovernment services, or because they impede supply, by acting as a disincentive or obstacle for public sector organisations to provide government services (European Commission, 2008).

7.2.2 Impact of eGovernment: considerations

Advantages and disadvantages

Table 38 describes some benefits of effective eGovernment implementation, grouped under: (i) direct financial benefits, (ii) direct non-financial benefits, (iii) programme benefits and (iv) good governance benefits.

Table 38: Benefits of the effective implementation of eGovernment

	Beneficiaries		
Type of Benefit	**Business**	**Citizens**	**Government**
Direct financial benefits	Reducing burden: administrative simplification	Reducing burden: administrative simplification	Realising efficiency savings: freeing resources for public and private innovation
Direct non-financial benefits	Meeting public expectations: improving customer satisfaction and equity; meeting security and privacy concerns; transparency and choice		
Programme benefits (direct and indirect)	Improving policy effectiveness: achieving overall policy and programme outcomes		
Good governance benefits (indirect for society)	Supporting growth and legitimacy: good governance contributes to a sound business environment and democratic legitimacy; promotion of the information economy; supporting public sector reform; creating business opportunities		

Source: Western Cape Government (2012)

Based on the above, the following benefits can be expected from effectively deploying an eGovernment strategy:

- efficiency gains, which will free up capacity from back-office to front-office operations;
- value for money, from more efficient services;
- citizens who feel more connected and engaged with their government;
- employees who will have better tools to undertake their jobs and, in so doing, improve the services they provide;
- a leaner public service, resulting in less wastage and a reduced impact on the environment;
- a connected service delivery, between departments and levels of government;
- an overall enhanced public sector capability.

Notwithstanding the potential benefits, eGovernment does have disadvantages, such as the high costs of changing over to an eGovernment system and the significant resources required to maintain the system. Furthermore, if eGovernment is not viewed as a basic right for all (especially for those living in rural areas), the shift to eGovernment may highlight, and even exacerbate, inequalities in the access to services.

Whole-of-government approach

The "whole-of-government" concept refers to the ability of multiple government and non-government organisations to share and integrate information across their traditional organisational boundaries. Adopting a whole-of-government approach is essential when shifting to a full eGovernment service delivery approach. The foundation underlying a fully functional eGovernment approach is appropriate access to a wide array of end user information, which may be held across numerous government departments/spheres. Integrating services under the banner of the whole-of-government approach requires reorganising institutional frameworks, back-office processes, accountability mechanisms and work modalities. Further, good governance requires the protection of sensitive and confidential data and user confidence that government online systems are protected from risks.

Collaboration and coordination among agencies cannot be developed in the absence of a supportive institutional infrastructure. An important catalyst is a coordinating authority that can facilitate and mobilise governance stakeholders in designing and adopting a whole-of-government approach. The institutional level of chief information officers (CIOs) – and their office's functions, roles and responsibilities – seems to have an important impact on the overall sustainability of whole-of-government approaches and collaborative governance. Africa lags the rest of the world in creating entities responsible for eGovernment strategies and designating CIOs. The eGovernment survey of 2014 found that only 16 out of 54 African countries (30% of the continent) have created such an entity (United Nations, 2014).

7.2.3 Implementation barriers

According to the European Union (European Commission, 2008), the seven primary barriers to successful eGovernment are:

- Leadership failures. Slow and patchy progress to eGovernment can result from a lack of adequate leadership during any stage in the initiation, implementation, promotion and ongoing support of developments.

- Financial inhibitors. Concerns about the costs of implementing and developing eGovernment, together with inappropriate cost/benefit analyses, can constrain or block the flow of investment at the levels necessary to support future eGovernment innovation.

- Poor coordination. A lack of coordination and harmonisation can slow down the establishment of appropriate eGovernment networks and services that cross governance, administrative and geographic boundaries.

- Workplace and organisational inflexibility. Realising eGovernment benefits can be constrained or blocked by inflexible responses to the need to make necessary changes in public administration practices, processes and organisational structures.

- Poor technical design. Interoperability[71] blockages caused by incompatibilities between ICT systems or difficult-to-use interfaces to eGovernment services are examples of practical flaws that can become serious operational obstacles to taking up what otherwise appear to be valuable eGovernment systems.

- Digital divides and choices. eGovernment take-up can be limited and fragmented by inequalities in skills and access, and a failure to address clearly the needs of potential eGovernment users, as even those citizens and businesses with appropriate levels of access may choose not to use available eGovernment services.

- Lack of trust. Heightened fears about inadequate security and privacy safeguards in electronic networks and a general distrust of government can undermine confidence in eGovernment.

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[71] Interoperability refers to the ability of systems to work together.

Figure 38 illustrates some of the eGovernment service implementation challenges, divided into organisational, technical, governance and social issues. Many of these challenges need to be addressed in the South African context.

Figure 38: eGovernment service implementation challenges

Source: El Kiki (2009)

7.3 Methodology

First, a desktop literature review analysed the institutional arrangements, in order to identify the potential barriers to adopting an eGovernment approach to public service delivery. The review suggested that regulatory/policy-type barriers are common, which informed the paper's emphasis on the policy/administrative and regulatory environments that guide ICT developments. To this end, key pieces of legislation, including the 2014 Green Paper on a National Integrated ICT Policy (DTPS, 2014) and the National Broadband Policy (DOC, 2013), were assessed to establish whether they incentivise or hinder greater public investment in ICT.

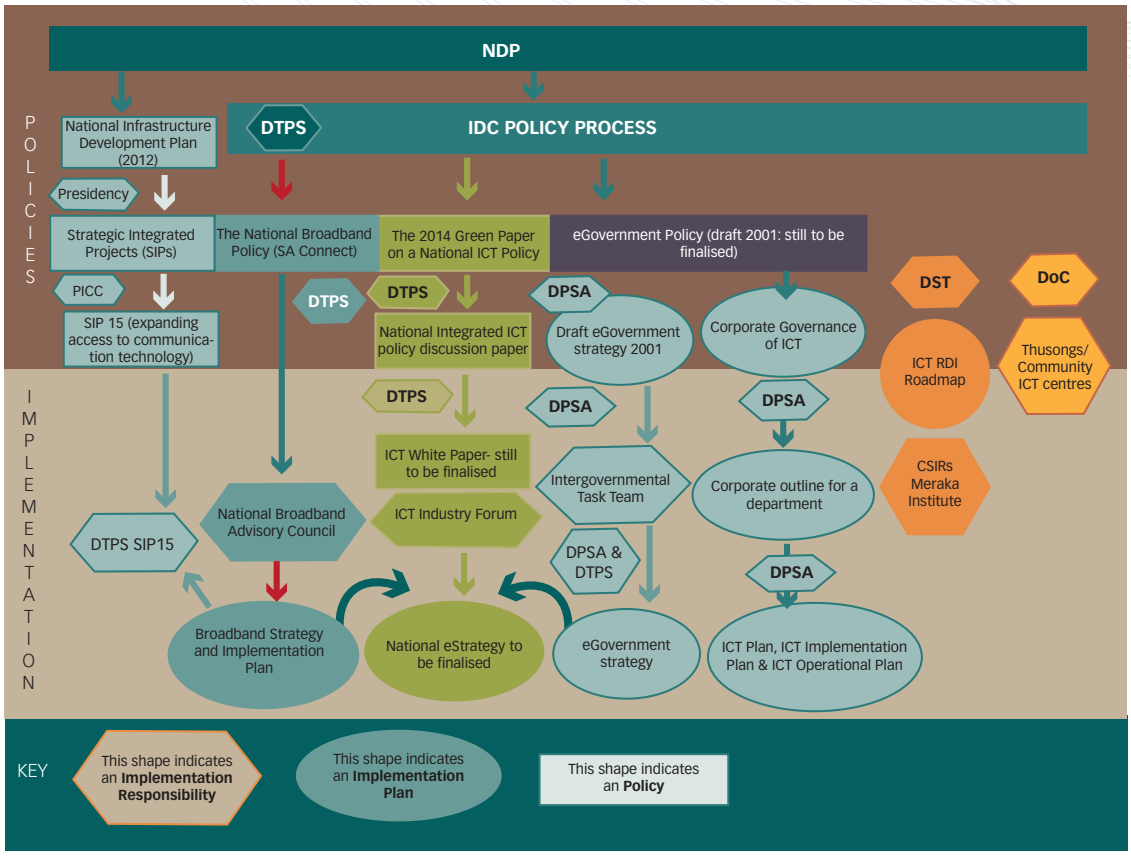
Second, government budgets were analysed to gauge current spending on ICT across the three spheres (national, provincial and local). The budget analysis was restricted to 2011/12 because ICT expenditure is not aggregated within government financial reporting. The extent of government's ICT investment had to be ascertained from various sources, which was made more challenging by the lack of clear line items specifying ICT budgets and expenditures.

7.4 Overview of Policy and Regulatory Framework

7.4.1 Policy framework

The NDP advocates that technology can be the answer to some of the biggest challenges facing the country and that state-owned entities need to improve their role in advancing key national objectives. Entities, such as the State Information Technology Agency (SITA), and Telkom and Broadband Infraco, are a strategic part of ICT delivery. The NDP states that "a new policy framework will be needed to realise the vision of a fully connected society" (NPC, 2011: 191). The ICT policy for South Africa, currently at Green Paper stage, is meant to be the broad, overarching policy that will set the context and direction for broadband and eGovernment plans. The Broadband Policy was finalised in 2013, and the eGovernment Policy is still in draft form. Figure 39 illustrates the relationship between ICT and eGovernment-related policies, implementation plans and implementation entities.

Figure 39: ICT and eGovernment-related policies, plans and implementation entities

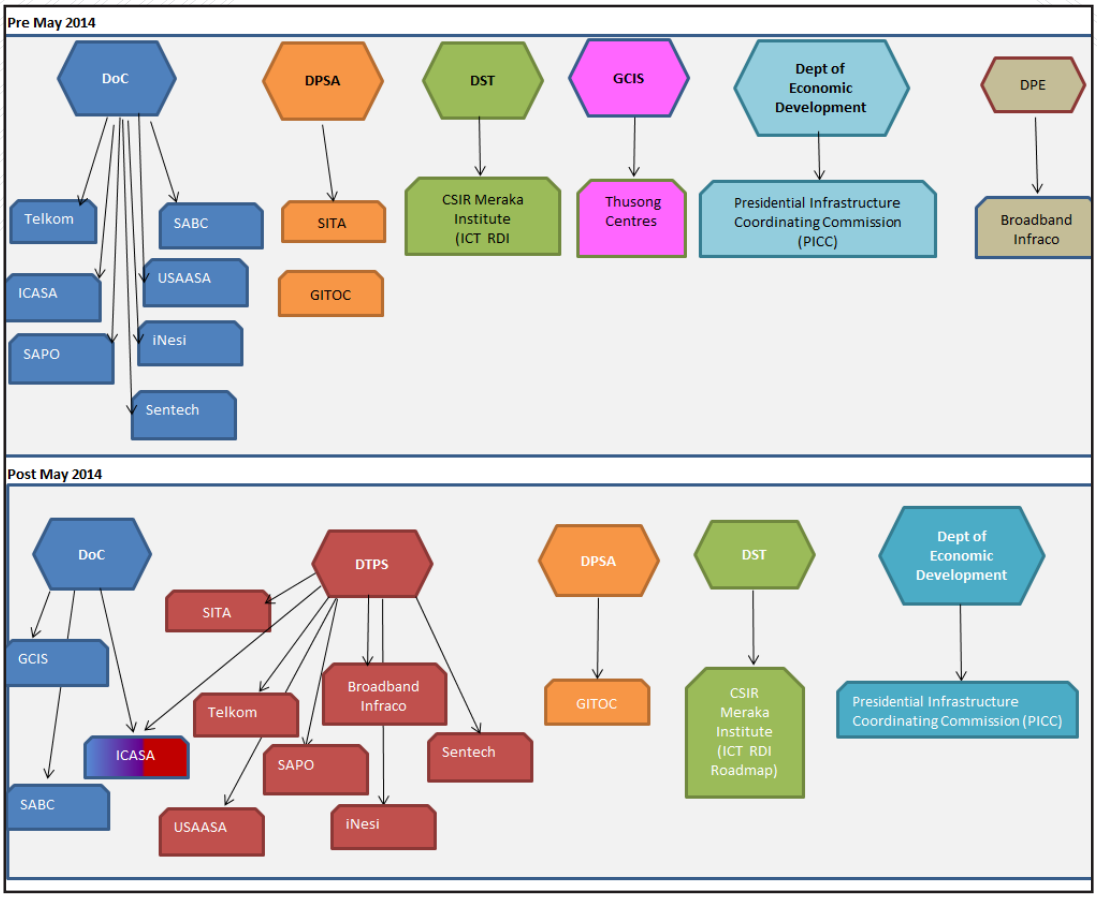


Source: Authors (2014)

7.4.2 Roles and responsibilities

Notwithstanding the policy strides made, the ICT sector involves many role-players, including the Department of Telecommunications and Postal Services (DTPS), the DPSA, the Department of Science and Technology (DST), and various sector departments, such as education, health, justice, as well as individual municipalities. In May 2014, the Department of Communications (DoC) was split into a newly created DTPS and a new DoC (see Figure 40).

Figure 40: National departments and responsibilities for ICT: pre- and post-2014 elections



Source: Authors (2014)

While it is too early to assess their practicality and effectiveness, these changes have resulted in uncertainty over roles and responsibilities. For example:

- The ICT policy process is the responsibility of the newly formed DTPS, but the DPSA, through the Public Administration Act (No. 11 of 2014) regulates the use of ICT in government and establishes norms and standards around the use of ICT in the public service. The DPSA's role also includes minimising, controlling and maintaining ICT-related risks and costs in the public sector. With the reconfiguration of the sector, it is unclear which government department is responsible for eGovernment and rolling out the eGovernment Policy (which has been in draft form since 2001).

- Communication policy and strategy is the responsibility of the new DoC but, according to the Electronic Communications Act (No. 36 of 2005), the DTPS makes policy and policy directives relating to electronic communications and broadcasting, for example digital migration.

The reconfiguration of the sector has also raised regulatory oversight issues. The Independent Communications Authority of South Africa (ICASA) is the sector regulator and now reports to the DoC, but regulates entities in both the DoC and the DTPS. The concern is ICT convergence makes clearly separating the functions difficult.

Two main bodies provide oversight and regulate the ICT sector:

ICASA is the sector regulator. Its mandate is derived from the ICASA Act (No. 13 of 2000), the Broadcasting Act (No. 4 of 1999), the Electronic Communications Act (No. 36 of 2005), and the Postal Services Act (No. 124 of 1998). In addition to developing ICT regulations, ICASA is also responsible for issuing electronic communications network services, electronic communications services and broadcasting services licences to service providers. The regulator is further required to enforce compliance with rules and regu-

lations, as well as to act in the public interest by protecting consumers from unfair business practices and poor quality services. Lastly, ICASA has to manage the effective use of radio frequency spectrum in South Africa. The ICASA Act was amended first in 2006 (to include postal regulation), when the Electronic Communications Act was introduced, and then again in 2013, with the Electronic Communications Amendment Bill 2013.

The SITA's role is to consolidate and coordinate the state's information technology resources in order to achieve cost savings through scale and to increase delivery capabilities. It was established in 1999 in terms of the SITA Act (No. 88 of 1998). SITA must also set standards for the interoperability of information systems between departments and for comprehensive information systems security for all departments. These are key duties that will assist an easier shift to a fully functional and integrated eGovernment approach.

Both SITA and ICASA have faced many challenges in exercising regulatory oversight and have struggled with a lack of capacity to fulfil their mandates effectively. Allegations of (and investigations into) claims of incompetence, fraud or corruption also mar their images. For these bodies to provide sound oversight within the sector, it is imperative that they are beyond reproach.

7.4.3 Stimulating demand

A successful shift to an eGovernment approach to service delivery ultimately depends on improved access (and ease of access) to services. To this end, citizen demand for such services could be stimulated through Thusong centres. The aim of these multi-purpose community centres is to improve service delivery and increase access to government services for the poor and previously disadvantaged. However, the funding and operational responsibility for Thusong centres are unclear. Funding comes from both national government grants and donations, while operational responsibility rests with several national departments, municipalities, the private sector and non-government organisations (NGOs). Furthermore, the centres struggle with connectivity problems, security and maintenance of hardware, inadequate e-skills and operational skills among management, and reluctance of communities to participate.

7.5 ICT Spending

Government financial reporting does not require ICT expenditure to be aggregated. Thus, the extent of government ICT investment must be ascertained from various sources. Tracking ICT allocations is challenging, as there are not always clear line items specifying ICT budgeted and spending amounts. As can be seen in Table 39, the terminology used is often ambiguous or not specific enough.

Table 39: ICT financial reporting in government financial schedules

Category of spend	National	Provincial	Municipal
Opex	Communication (telecommunications)	Communication (telecommunications)	Telecommunications or telephone services
Opex	Computer services	Computer services	Computer services and software, or information technology
Opex	Percentage of consulting services	Percentage of consulting services	Percentage of consulting services
Capex or Opex	Software and other intangible assets	Software and other intangible assets	Software licences
Capex	Percentage of machinery and equipment	Percentage of machinery and equipment	Computers – hardware/ equipment
Capex			Computers – software and programming
Capex			Variable descriptions in project capex budget schedules

Source: National Treasury (2014a)

Table 40 provides an overview of ICT spending in 2011/2012. The following is noted:

- Of the R17.6-billion spent on ICT, national government departments spent 53%, provincial government departments 27% and municipalities the remaining 20%.
- R9.8-billion was spent directly with service providers or vendors and R4.2-billion was spent through SITA.

Table 40: ICT spending (2011/12)

Sphere	Non-SITA vs SITA (R million)			ICT spend by service type (R million)			
	Grand Total	Non-SITA	SITA	Hardware	Software	Services	Telecoms
National	9 299	6 088	3 211	2 255	429	1 371	2 033
Provincial	4 736	3 731	1 005	1 311	389	410	1 621
Local government	3 533	unknown	unknown				
Total	**17 567**	**9 819**	**4 215**	**3 567**	**818**	**1 781**	**3 654**

Source: Authors' calculations based on National Treasury (2012a) and (2012b)

7.5.1 National spending on ICT

Table 41 disaggregates the R9.3-billion that national government departments spent on ICT by type of spend.

Table 41: National departments' ICT spend by type (2011/12)

ICT type	Grand total (R'000)	Percentage of ICT spend
Hardware	2 255 322	24%
Software	428 775	5%
Services	1 371 042	15%
Telecommunications	2 033 159	22%
SITA	3 210 810	24%
Grand total	**9 299 110**	**100%**

Source: Authors' calculations based on National Treasury (2012a)

Table 42 lists the R9.3-billion spent on ICT by 38 national departments in 2011/2012.

Table 42: National departments' ICT spend (2011/12)

Vote	Grand total (R'000)	Percentage of ICT spend
Vote 01: The Presidency	44 793	0.49%
Vote 02: Parliament	no information	no information
Vote 03: Cooperative Governance and Traditional Affairs	28 444	0.31%
Vote 04: Home Affairs	842 418	9.13%
Vote 05: International Relations and Cooperation	194 682	2.11%
Vote 06: Performance Monitoring and Evaluation	25 141	0.27%
Vote 07: Public Works	127 238	1.38%
Vote 08: Women, Children and Disabled People	8 394	0.09%
Vote 09: Government Comm. and Info. System	28 110	0.30%
Vote 10: National Treasury	309 885	3.36%
Vote 11: Public Enterprises	9 436	0.10%
Vote 12: Public Service and Administration	41 667	0.45%
Vote 13: Statistics South Africa	203 728	2.21%
Vote 14: Arts and Culture	21 353	0.23%
Vote 15: Basic Education	566 582	6.14%
Vote 16: Health	80 127	0.87%
Vote 17: Higher Education and Training	50 748	0.55%
Vote 18: Labour	94 907	1.03%
Vote 19: Social Development	39 684	0.43%
Vote 20: Sport and Recreation South Africa	6 788	0.07%
Vote 21: Correctional Services	298 921	3.24%
Vote 22: Defence and Military Veterans	1 139 475	12.34%
Vote 23: Independent Complaints Directorate	13 678	0.15%
Vote 24: Justice and Constitutional Development	633 669	6.86%
Vote 25: Police	3 641 944	39.45%
Vote 26: Agriculture, Forestry and Fisheries	70 173	0.76%
Vote 27: Communications	14 460	0.16%
Vote 28: Economic Development	3 806	0.04%
Vote 29: Energy	16 115	0.17%
Vote 30: Environmental Affairs	62 821	0.68%
Vote 31: Human Settlements	31 619	0.34%
Vote 32: Mineral Resources	40 863	0.44%
Vote 33: Rural Development and Land Reform	197 337	2.14%
Vote 34: Science and Technology	18 359	0.20%
Vote 35: Tourism	25 732	0.28%
Vote 36: Trade and Industry	55 886	0.61%
Vote 37: Transport	24 525	0.27%
Vote 38: Water Affairs	217 606	2.36%
All national departments	**9 299 110**	**100%**

Note: Various national departments have since changed, but no information on ICT for the reallocated ministries is available at this stage.
Source: Authors' calculations based on National Treasury (2012a)

ICT spending is being driven by big national transversal ICT projects, with 38 departments accounting for 87% of the ICT spend (Table 43). The Justice Cluster alone makes up 62%, with Police accounting for 39% of all national ICT spend.

Table 43: Top ICT spenders in the national sphere (2011/12)

	Grand total (R'000)	Percentage of ICT spend
Top 10 ICT spenders: Police, Defence, Justice, Home Affairs, Basic Education, National Treasury, Correctional Services, Stats SA, Water Affairs, Rural Development	8 051 564	87%
Justice Cluster: Police, Defence, Justice, Correctional Services, Independent Complaints Directorate, National Prosecuting Authority	5 795 685	62%
All national departments	**9 299 110**	**100%**

Source: Authors' calculations based on National Treasury (2012a)

National government is responsible for certain major transversal ICT projects. Some transverse only the departmental cluster (e.g. Justice), some are across national departments, while others apply to subnational government.

7.5.2 Provincial spending on ICT

Provincial budgets have a similar structure to the national budget, and the ICT-related items are reported in the same way. ICT investment can also be found in provincial Annual Performance Plans, plans of action and other strategic documents, as well as departmental annual reports. Table 44 segments the R 4.7-billion provincial ICT spend by type.

Table 44: Provincial departments' ICT spend by type (2011/12)

ICT type	Grand total (R'000)	Percentage of ICT spend
Hardware	1 311 274	28%
Software	389 281	8%
Services	**409 667**	**9%**
Telecommunications	1 620 847	34%
SITA	1 004 546	21%
Grand total	**4 735 617**	**100%**

Source: Authors' calculations based on National Treasury (2012b)

Although provinces generate some own income, the bulk of their income comes from transfers from national departments, based on each province's equitable share and conditional allocations to provinces as provided for in the Division of Revenue Act. KwaZulu-Natal accounts for 22% and Eastern Cape for 16% of the total provincial ICT spend of R4.7-billion (Table 45). This is largely explained by the provinces' high populations and correspondingly high spend on health and education in particular.

Table 45: Provincial departments' ICT spend (2011/12)

Province	Total (R'000)	Percentage of ICT spend
Eastern Cape	750 630	16%
Free State	310 731	7%
Gauteng	729 442	15%
KwaZulu-Natal	1 053 228	22%
Limpopo	402 964	9%
Mpumalanga	361 284	8%
North West	285 761	6%
Northern Cape	157 952	3%
Western Cape	683 627	14%
All provinces	**4 735 618**	**100%**

Source: Authors' calculations based on National Treasury (2012b)

Table 46 outlines the biggest ICT spenders at provincial level. Health departments account for 30% of ICT spend, followed by education at 18%.

Table 46: Top ICT spenders in the provincial sphere (2011/12)

Major provincial departments/ votes	Total (R'000)	Percentage of ICT spend
Department of the Premier	456 046	10%
Provincial Treasury/Finance	486 498	10%
Education	849 022	18%
Health	1 421 310	30%
Public Works, Roads and Transport	425 43	9%
Social Development	276 280	6%
Subtotal ICT spend	3 914 590	83%
Total provincial ICT spend	**4 735 618**	**100%**

Source: Authors' calculations based on National Treasury (2012b)

7.5.3 Local government spending on ICT

Table 47 provides a high-level overview of spending at local government level. The bulk (65%) of ICT spending occurs in urban areas, particularly within the better-resourced metropolitan municipalities that account for only 39% of the population (BMI-T, 2015). The danger is that the large rural population (the poorest of the poor) may miss out on the benefits and opportunities of an eGovernment approach to service delivery. An overhaul of the prioritisation and location of ICT and additional funding will therefore be required in order to attain the NDP's ICT-related goals for 2030.

Table 47: Local government ICT spending (2011/12)

	Total (R'000)	Percentage of ICT spend
Eight metropolitan municipalities	2 281 591	65%
All other local municipalities	659 511	19%
District municipalities	230 112	7%
Total local government spend	**3 532 520**	**100%**

Source: Authors' calculations based on National Treasury (2014b)

The eight metros are able to implement major ICT projects because of their greater flexibility and resources, which allows benefits of scale. More substantive details of ICT spend can sometimes be found for the metros and larger cities, particularly if part of a specific project, such as a broadband rollout programme.

Table 48 segments the R2.3-billion ICT spending by metropolitan municipalities by type of ICT.

Table 48: Metro ICT spend by type (2011/12 and 2014/15)

	2011/2012 (R'000)	Percentage of ICT spend	2014/15 (R'000))	Percentage of ICT spend
Telecommunications	433 503	19%	389 040	9%
Information technology	1 711 195	75%	53 376	1%
Broadband		4%	2 133 359	52%
Software	91 264	2%	1 331 878	32%
Other	45 632		115 348	3%
Total metro spend	**2 281 593**	**100%**	**4 109 708**	**100%**

Source: Authors' calculations based on National Treasury (2014b)

The ICT spend is forecast to grow to R4.2-billion in 2014/2015, with the big increase primarily for the deployment of broadband by the City of Johannesburg and, to a lesser extent, the City of Cape Town. As Table 49 shows, in 2014/15 the City of Johannesburg's budget increased by over R1-billion.

Table 49: Metro spending on ICT (2011/12 and 2014/15)

	Total (R'000)	Percentage of ICT spend
City of Johannesburg	418 540	1 610 263
City of Cape Town	682 321	814 352
eThekwini	357 612	488 238
City of Tshwane	313 077	415 778
Ekurhuleni	226 232	400 566
Nelson Mandela Bay	127 343	170 659
Buffalo City	68 737	93 148
Mangaung	87 731	116 703
Total metros ICT spend	2 281 593	4 109 708

Source: Authors calculations based on National Treasury (2014b)

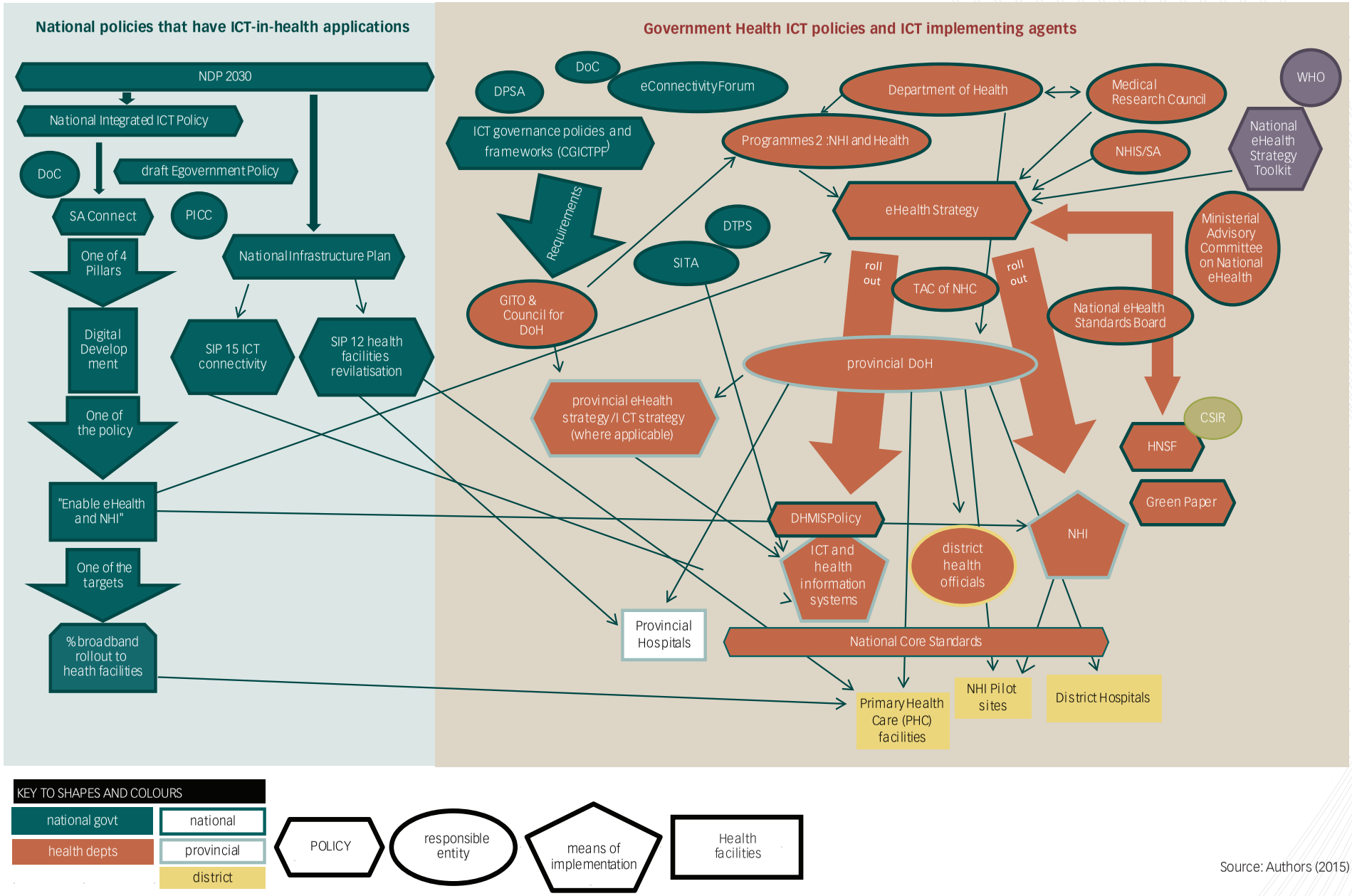
Broadband is a big ICT expenditure item at municipal level. Table 50 lists some major broadband-related projects being rolled out in four of the major metros.

Table 50: Major broadband projects by metros

Description	Amount	Comments on status
City of Tshwane, in partnership with an NGO Project Isizwe		The first metropolitan to roll out free wi-fi to poor communities and educational institutions through the installation of fully managed free internet zones (FIZ). The first phase provided capacity to 25 000 users in Hatfield, Church Square, Soshanguve, Mamelodi and the CBD. In 2015 about 600 additional wi-fi hot spots will be rolled out, prioritising institutions of learning.
Ekurhuleni wi-fi network		From 2014 rolling out wi-fi access services network and an ICT operations centre to ensure the fibre and wireless grid is properly connected, maintained and monitored. The network aims to provide wi-fi services for the city's employees, households and businesses by 2016.
City of Johannesburg broadband project	R1.1-billion. CitiConnect's contract to manage the network for 12 years will cost R280-million per year (R3.3-billion in total).	The project aims to offer full WAN accessibility, VPN services, and bring internet to all of the City of Joburg (CoJ) buildings in the region. CoJ also promises the roll-out of 1000 wi-fi hotspots by 2016. A build, operate and transfer contract was signed with Ericsson who set up a company (BWired) to operate the network for 12 years. Ericsson then ceded the contract to CitiConnect. In August 2014, CoJ terminated the agreement with CitiConnect, claiming non-compliance. Settlement terms are not resolved and the project is not complete.
City of Cape Town broadband infrastructure	R140-million in 2013/2014 and R180-million per year for the next three years	Amount budgeted for the rolling out of dark fibre broadband infrastructure.
City of Cape Town- Khayelitsha/ Mitchells Plain	R100-million	The rolling out of a wireless mesh broadband network over the next three years.

Source: Authors (2015)

Figure 41: ICT policy landscape in the public health-care sector



Source: Authors (2015)

Key ICT Challenges in Public Health Care

In 2012, the national Department of Health (DoH) produced an ICT Health Strategy that is aligned to the World Health Organisation's definitions and targets for e-health. It covers electronic health records, electronic health management information, computerised registration of death or births, electronic access to health knowledge by patients and professionals, mHealth, telemedicine, virtual healthcare, and health research.

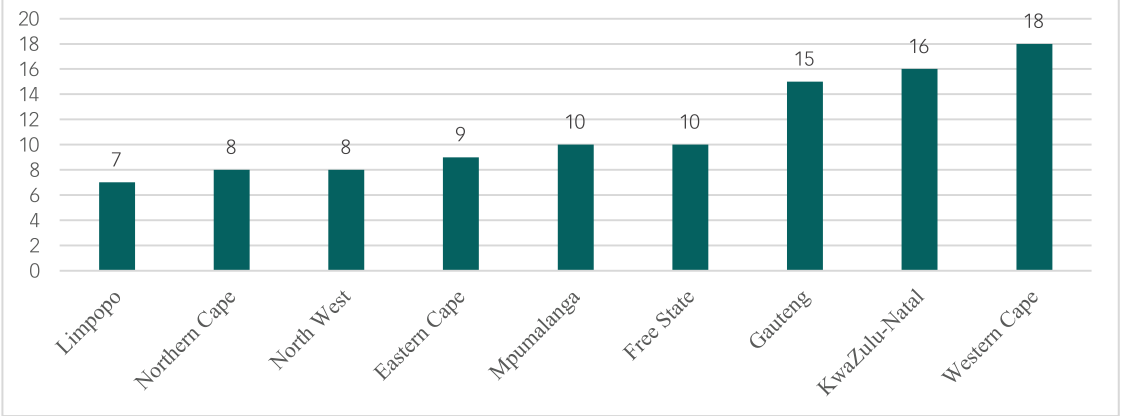
The adoption of the NDP as the blueprint for South Africa's long-term development has resulted in the reprioritisation of key focus areas (and subsequently resources) across government departments. For the DoH, its priority is to provide affordable and quality healthcare for all, which will be achieved through the National Health Insurance (NHI). Critical for successfully implementing NHI is a well-functioning national health information system, and various forms of electronic medical record-keeping already exist, i.e.:

- A national electronic tuberculosis register, which is used across all nine provincial departments of health;
- A national three-tier monitoring and evaluation system for antiretroviral therapy, which was developed in the Western Cape and subsequently endorsed by the National Health Council for implementation across all nine provinces;
- The Western Cape Primary Healthcare Information System and Patient Master Index – a government-owned system that has won two awards: the 2008 African ICT Achievers Award for the Best ICT Project in Africa, and the IT@Networking Award 2012 in Brussels.

However, the complicated and incoherent policy landscape of the broader government ICT sector seems to have permeated the health sector, with many different policies and implementation agents (Figure 41). Although the DoH has finalised its eHealth Strategy, ideally such sector-specific e-strategies should emanate from the overall eGovernment Strategy. The lack of progress in this regard has resulted in various departments, such as health and education, devising their own sector-based strategies.

The result of unclear policy direction has resulted in a silo-based approach to ICT and eGovernment developments. This is mirrored in eHealth, with uneven progress among the nine provincial health departments. As a result, South Africa's health care information system has a history of being fragmented, unwieldy and inoperable – provincial health departments procure systems that are neither compatible nor interoperable with each other. In 2009, the National Health Council decided to halt the acquisition of software solutions that were not interoperable until an eHealth strategy for the country was finalised (HST, 2014). Various electronic medical recordkeeping systems have been implemented in the country. At present there are 42 different types of health information systems installed across the nine provinces, with five of the systems being in all nine provinces and the majority of others in only one province. Figure 42 shows the number of systems deployed by provinces.

Figure 42: Number of health information systems per province



Source: CSIR and Department of Health (2014)

With respect to primary health care, a District Health Information System (DHIS) currently operates nationally, facilitating the processes of gathering, sharing, analysing and using health-related data for decision-making. The DHIS now contains routine data representing around 1.4 billion patient encounters (HST, 2014).

The challenges surrounding a greater use of ICT in the health sector are summarised in Table 51.

Table 51: Challenges to the greater use of ICT in the health sector

Description	Comments on status
ICT technological developments	The eHealth Strategy acknowledges that continuous technological advancements make it impossible for eHealth leaders to remain abreast of all opportunities. Successful eHealth requires decision-makers to have appropriate teams in place and to recognise political, executive and clinical leaders who can identify and leverage appropriate opportunities within an appropriate governance structure.
Poor connectivity at local level and high cost of such connectivity	Primary health centres were meant to have been connected by May 2013. Challenges are the cost associated with connectivity and the lack of health sector resources allocated to connectivity.
Lack of expertise in senior appointees	MECs appoint heads of public hospitals, and such appointments are very often based on political motivation rather than expertise. This results in health administrations that are subject to political pressures and driven by political motives, and heads of health administration who lack the knowledge to do their job.
Lack of planning and failure to use health data to plan	Despite being mandated to use data to improve health systems' performance, to respond to emergent threats and to improve health, many district managers do not consistently and effectively use data for evidence-based decision-making, citing outdated data, questionable data integrity, and confusion over interpreting the excessive quantity of data and understanding presentation formats.
Tight, unrealistic policy time-frames	The time-frames for implementing policies such as the eHealth Strategy do not provide much leeway for the interoperability of various aspects of such a wide-ranging policy.

Source: Authors (2015)

In March 2014, the DoH published the national Health Normative Standards Framework for Interoperability in eHealth in South Africa, in fulfilment of objectives of the eHealth Strategy South Africa. The National eHealth Standards Board was created in 2012 to govern and maintain the implementation of the national Health Normative Standards Framework for Interoperability in eHealth, and the standards referenced in the Framework. (DoH, 2014). Given these developments, interoperability across provincial health departments should become a reality in the near future.

7.7 Summary and Recommendations

The use of ICTs has the potential to aid service delivery innovations, improve transparency, reduce corruption, aid revenue growth and reduce costs. To date, government has made considerable progress in the ICT arena. Since a policy review process initiated in 2012, a National Broadband Policy now exists and a National ICT Policy is in the process of being finalised. Notwithstanding these areas of progress, issues around sector roles and responsibilities need to be clarified if the 2030 NDP goals for ICT are to be met.

Significant public resources are being allocated to government's ICT, but the spending is neither coordinated nor strategic. In the past year, the ICT sector was restructured, which resulted in a relatively converged sector being split into two government departments. The restructuring has created uncertainty about the responsibility for various functions. In addition, the policy framework underpinning the ICT sector is not streamlined and consists of multiple role-players and interventions. Key policy framework issues need to be addressed before finalising funding arrangements, as funding follows function in a well-functioning intergovernmental fiscal relations system. It is therefore critical that roles and responsibilities are clarified, so that eGovernment can receive strategic attention and funding, and start yielding the benefits associated with such an approach to service delivery. As a result, whereas this chapter considers ICT spending across the three spheres and ICT in health care, priority must be attached to the broader, national ICT policy arena prior to addressing funding and/or sectoral issues. As a result, the recommendations primarily focus on addressing the broader policy issues.

Despite government's commitment to specific ICT-related targets, developments and progress to date indicate that these goals will not be reached within the given time-frames.

With respect to improving government operations through the use of ICT, the Commission recommends that:

1. The policy and regulatory framework underpinning the ICT sector is simplified, and roles and responsibilities are clearly delineated, particularly for the roll-out of broadband and eGovernment.

2. The department responsible for devising and finalising the eGovernment policy is identified. Finalisation of the policy along with a fully costed implementation plan should be expedited if the NDP goals around eGovernment are to be met within the required time-frame.

3. To aid achievement of NDP goals regarding the roll-out of broadband and to ensure that sufficient funding is prioritised, a fully costed implementation plan should be published and publicly available.

4. eGovernment services are made more attractive to citizens, by offering a wide range of services and ease of access.

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