Prosperity Fund

GLOBAL FUTURE CITIES PROGRAMME

JOHANNESBURG

CITY CONTEXT REPORT

Foreign & Commonwealth Office

UN-HABITAT
FOR A BETTER URBAN FUTURE

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Global Future Cities Programme
JOHANNESBURG
City Context Report

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GLOBAL FUTURE CITIES PROGRAMME

Introduction

ABOUT THE GLOBAL FUTURE CITIES PROGRAMME

In 2015, the UK government created a new Cross-Government Prosperity Fund worth £1.3 billion from 2016-2021, in order to help promote economic growth in emerging economies. Its broad priorities include improving the business climate, competitiveness and operation of markets, energy and financial sector reform, and increasing the ability of governments to tackle corruption.

Emerging Economies still face considerable challenges such as uncontrolled urbanisation, climate change and high and persistent inequality which can lower long-term growth prospects. The Prosperity Fund supports the broad-based and inclusive growth needed to build prosperity and reduce poverty, but also make development overall more sustainable through the strengthening of Institutions and Improvement of the global business environment.

The Global Future Cities Programme (GFCP) is a specific component of the Prosperity Fund which aims to carry out targeted interventions to encourage sustainable urban development and increase prosperity whilst alleviating high levels of urban poverty. The programme will also create significant short and long-term business opportunities in growing markets, forecast to be regional growth hubs, including for UK exporters who are world recognised leaders in urban innovation.

The overall strategy of the Global Future Cities Programme is to deliver the Programme in two phases; a strategic development phase (2018), followed by an implementation phase (2019-2021). UN-Habitat, in collaboration with the International Growth Centre (IGC) and the UK Built Environment Advisory Group (UKBEAG), has been mandated by the UK Foreign and Commonwealth Office (UK FCO) to develop and undertake the strategic development phase. This in turn, will inform and shape the implementation phase, and collectively provide further evidence for the overall programme.

The Programme builds upon a coherent series of targeted interventions in 19 cities across 10 countries, to support and encourage the adoption of a more sustainable approach to urban development. In general, the proposed interventions aim to challenge urban sprawl and slum developments, thereby promoting more dense, connected and inclusive cities that in combination contribute to prosperity, achieving the Sustainable Development Goals (SDGs) and implementing the New Urban Agenda (NUA).

The Global Future Cities Programme builds upon three integrated pillars, that will address key barriers to prosperity, in selected cities:

- **Urban planning** – technical assistance for spatial restructuring (Public space, Heritage and urban renewal, Urban strategies and plans, Data systems for integrated urban planning);
- **Transportation** – technical assistance to support cities to develop integrated transport systems (Multi-modal mobility strategies and plans, Data systems for multi-modal mobility);
- **Resilience** – technical assistance to develop strategies to address the impact of climate change and ensure development is sustainable (Flood management plans and systems).

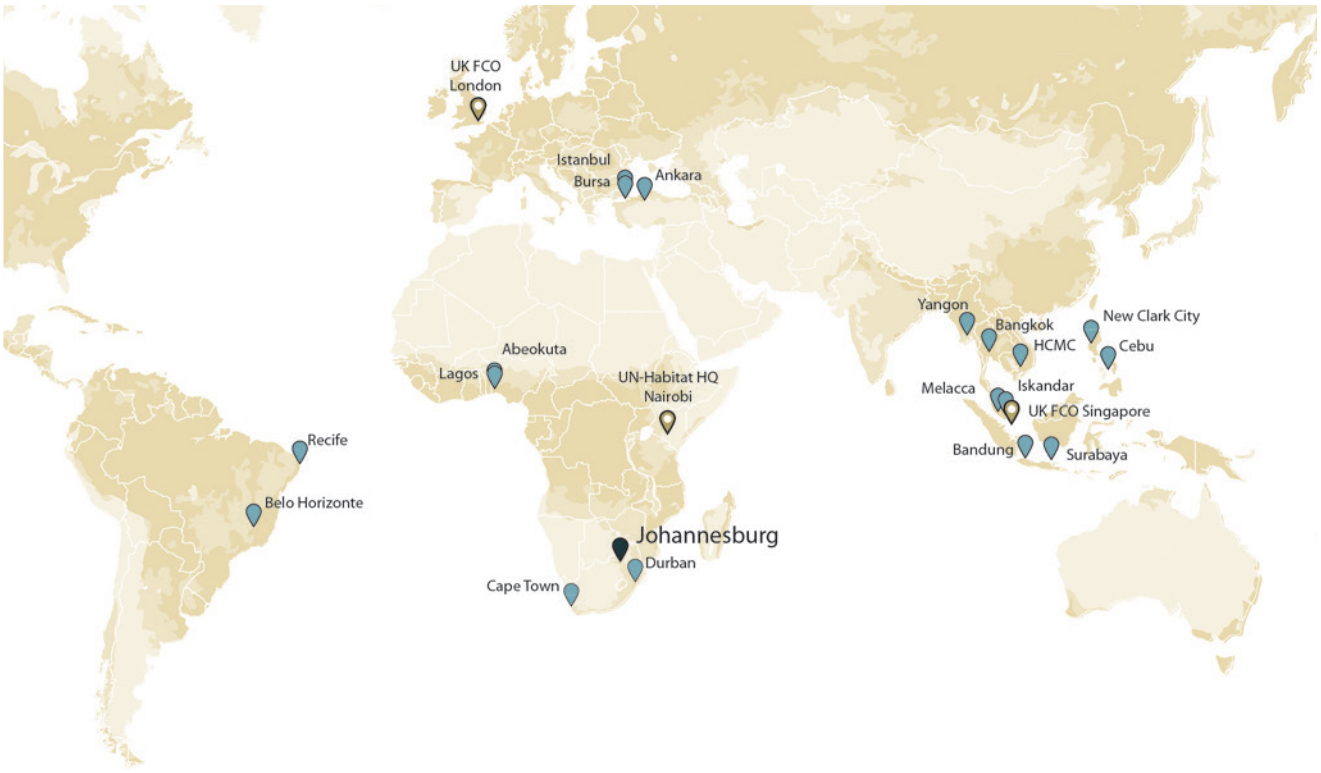
In order to capitalize on the proposed interventions and to ensure sustainability and impact in a longer-term perspective, the programme has a strong focus on technical support and institutional capacity development.

In many of the interventions, there is a particular focus on the potential of embedding smart/digital technology and data analysis platforms in urban governance and management processes. Integrating smart technologies is recognized as an instrumental area that significantly can improve the efficiency in the provision of key infrastructure services, enhance urban resilience, support evidence-based plans and strategies and promote integrated planning approaches across sectors.

INTERVENTION DEVELOPMENT AND VALIDATION

Based on initial scoping studies and government-to-government engagement carried out by UK FCO, the UN-Habitat team worked with partner local authorities and wider stakeholders to corroborate their city development strategies, and to confirm, enhance and develop the intervention proposals.

In each city, a Local City Specialist, supported by the national and regional country offices of UN-Habitat



and in liaison with the FCO local posts, took the lead in identifying stakeholders in a series of bilateral meetings, interviews and focal group discussions. This has collectively gathered information and provided more detailed knowledge and information on the City's visions and goals.

Based on this initial phase, a Charrette (planning workshop) involved high-level decision-makers from the public and private sectors together with civil society representatives. This facilitated discussion on the proposed and possible alternative interventions, related individual interests, technical opportunities and constraints, as well as political objectives. The outcome of the Charrette provided clarity on where stakeholders stand in relation to the strategic potential of the discussed projects and it allowed for the mobilisation of support.

At the same time, the Charrette allowed for the technical teams to proceed with the development of a Terms of Reference, outlining the specific scope and activities of each intervention. A final Validation Workshop assured consensus on the proposed projects and document's endorsement by the authorities.

Parallel to preparing the Terms of Reference, an evaluation of the interventions was initiated, aiming to address its feasibility within the local strategic context, identify potential impact on prosperity barriers and to explore the optimal delivery models. This process resulted in a set of City Context Reports as well as an analysis of the technical viability of the interventions. The analysis aimed at both informing the development of the Terms of Reference and the future implementation phase of the Programme.

THE CITY CONTEXT REPORT

Objectives

A City Context Report is provided for each city of the Global Future Cities Programme. It serves as a tool to frame the proposed Programme interventions within the characteristics and pre-conditions of each city.

The Report targets a variety of stakeholders in the Programme: administrators, city managers, policy makers, legislators, private sector actors, donors, and local as well as international researchers and knowledge generators. The Reports also provide UKFCO the contextual setting of each proposed intervention, and can in addition, be used by the Service Providers as an entry point for the implementation phase.

By addressing the specific challenges facing each city, the Report illustrates how the interventions can work towards inclusive prosperity and sustainable urban development. The benefits of each intervention, however, cannot be achieved without certain enabling conditions to ensure its success. Therefore, critical aspects for the delivery of the proposed interventions and its success from a long-term perspective are outlined. Using thematic

best practices and evidence from global learnings and research, contextualised recommendations are provided on the conditions necessary for the intervention to be viable and to reach a maximum impact.

Essentially, the City Context Report serves to ensure that all actors within the Global Futures Cities Programme are aware of the specific conditions to be considered in the delivery of the proposed interventions, on a case-by-case basis.

Set-up and Scope

The first part of the City Context Report (General Overview) provides an overview of the Global Future Cities Programme and introduces the city from the perspective of the urban challenge which the proposed intervention intends to address.

The second part of the Report (Urban Analysis) more critically and technically analyses a selection of factors which need to be considered or to be in place for the intervention to succeed, addressing its feasibility, potential impact on prosperity barriers from a long-term perspective.

The third part of the Report (International Alignment and Technical Recommendations) presents short–and mid-term expected outcomes as well as long-term potential impacts. It further elaborates the contribution of the intervention to the achievement of the SDGs and the implementation of the New Urban Agenda as well as the programme objectives of the Prosperity Fund.

As the City Context Report is tailored directly to the Programme interventions, the analysis does not aim to comprehensively present all aspects of urban development. It does not elaborate on long term planning and transformation strategies, the effectiveness of policy or urban legislation, nor the entire municipal financial system. As such, it also excludes urban policy recommendations.

However, the Report has the scope to illustrate the general capacity of the city for project delivery, and in this regard, make recommendations to support implementation of the interventions and reaching set goals. The City Context Reports will be part of knowledge management for the Programme to generate local information and data on the cities as well as identify gaps in knowledge, systems or governance.

Methodology

Urban Analysis

The City Context Report provides a general analysis of the spatial, financial and legal conditions in the city that can either facilitate or hinder the implementation and the long-term sustainability of the proposed interventions in transport, resilience and urban planning.

This framework follows UN-Habitat's three-pronged approach, recognising the three essential components for a successful and sustainable urbanisation: 1. urban planning and design; 2. urban economy and municipal finance; 3. urban legislation, rules and regulations.

Firstly, the spatial analysis describes the existing urban context specific to the intervention. Urban mobility systems, vulnerability of the built environment, spatial form and trends are considered as possible challenges in urban management that the intervention can address.

Secondly, the financial analysis aims to identify the mechanisms in place by which the intervention could be sustainably financed in the long-run. This section outlines the city's municipal capacity, existing regional, national and international financial ecosystem and existing financing mechanisms at the municipal level.

Thirdly, from a legal perspective, the Report critically analyses how the intervention could be facilitated or challenged by the vision of the city and its governance hierarchy. Enablers and obstacles resulting from any relevant legislation, as well as sectoral frameworks (e.g. strategies, policies, planning frameworks and development plans, detailed plans of relevance) are also described.

This approach aims to offer implementing partners, stakeholders and donors a general context of the city and, with it, demonstrate the appropriateness of the intervention from a spatial, financial and legal point of view, while at the same time informing about potential barriers and enablers for its implementation.

Potential Impact to the Program Objectives and the SDGs

The Report also outlines the potential impact of the interventions, based on the specific activities and outputs proposed. Impact can arise from a complex interaction of context-specific factors, rather than as result of a single action, which makes it difficult to empirically quantify longer-run effects that go beyond the identification of program outputs. An empirical, comprehensive impact assessment is therefore not part of the scope of this report.

Nevertheless, the report outlines potential benefits that are only achievable under certain preconditions and activities. Thereby, short-, medium- and long-term outcomes are defined with reference to a project-cycle approach, which considers all the project phases from

Planning and Design through *Building*, to *Operating and Maintaining.*

Short-term outcomes are directly achieved through the implementation of the technical assistance support, within the 2-3 years scope of the Global Future Cities Program.

Mid-term outcomes are only realised once the intervention is executed through either capital investment, implementation of pilot projects or the actual enactment of legal documents, plans or masterplans, within a possible timeframe of 3 to 7 years.

The broader long-term impact of the interventions is linked to the sustainability of the interventions in a 7-15 years timeframe and relates to the operation and maintenance phase of the project cycle.

The City Context Reports further connect potential impacts to the Programme's objectives, taking into account also the Cross-cutting issues at the core of UN-Habitat's mandate from the UN General Assembly. Consequently, the Programme's objectives are summarized into five principles:

- Climate Change;
- Gender Equality;
- Human Rights;
- Youth;
- Sustainable and Inclusive Economic Growth.

Cross-cutting issues are addressed with explicit reference to the 2030 Sustainable Development Goals (SDGs) and the New Urban Agenda, in an attempt to ensure that the proposed interventions are in line with the design, implementation, review and success of the 2030 Agenda for Sustainable Development. Consistent with UN-Habitat's mandate, the SDG 11 Sustainable Cities and Communities is linked with the urban dimension of the other 16 goals as an essential part of the localisation of the SDGs. In this way, interventions can support localisation processes, to support local ownership and ensure SDG integration in sub-national strategies and plans.

Technical Recommendations and International Best Practices

The interventions proposed in the various cities of the Global Future Cities Programme were grouped into clusters according to their thematic entry-point, as an elaboration of the thematic pillars of Urban Planning, Transport and Resilience.

These clusters are:

- Public space
- Heritage and urban renewal
- Urban strategies and plans
- Data systems for integrated urban planning
- Multi-modal mobility strategies and plans
- Data systems for multi-modal mobility
- Flood management plans and systems

Combining the international experience in urban policy and project implementation of UN-Habitat and the leading academic research of IGC, each cluster was analysed to offer evidence-based recommendations for a successful Implementation and a maximised impact of the intervention. Specific reference was given to implemented plans and international best practices.

The recommendations inform the Planning and Design phase which coincides with the timeframe of the Global Future Cities Programme, and always aim for long-term sustainability of the interventions.

Fig. 1. Johannesburg aerial view (Source: UN-Habitat)

Johannesburg

GENERAL CONTEXT

Johannesburg is the capital of Gauteng. By size Guateng is the smallest of the nine South African provinces but by population it is the biggest, representing some 24 per cent of the overall population.[1]

As of 2016 Johannesburg had an estimated population of 4.4 million, more than one-third of the total population of Gauteng Province.[2] According to the censuses, the city has grown at extremely high rate, an average of 4.1 per cent between 1996 and 2001 and by 3.2 per cent between 2001 and 2011. Although this urbanisation boom which followed the end of Apartheid[3] is projected to slow, Johannesburg is expected to reach 7 million Inhabitants by 2040.

The city is a global financial centre and economic powerhouse and contributes around 17 per cent to national GDP.[4] Its economy has grown faster than South Africa as a whole and, despite inward migration, has managed to increase employment rate compared to the country's average.

At the same time, Johannesburg has high levels of unemployment, poverty and one of the highest levels of inequality in the world. Of the economically active population, 71 per cent are employed while the rest are either unemployed or discouraged work seekers. The finance sector occupies the biggest portion of the working population with 26.6 per cent, followed by the trade sector (21.1) among the formal sector workers. The informal sector employs around 395,000 people, which is 19.8 per cent of the labour force.[5]

The city has grown in a fairy sprawled fashion over the past 20 years although it has adopted a series of strategies and policies and become denser. Moreover, the practices of Apartheid and post-Apartheid planning have led to the development of a spatial structure with a series of shortcomings, including spatial inequality, fragmentation and spatial disconnection, limited land-use diversity and pressure on the natural environment.

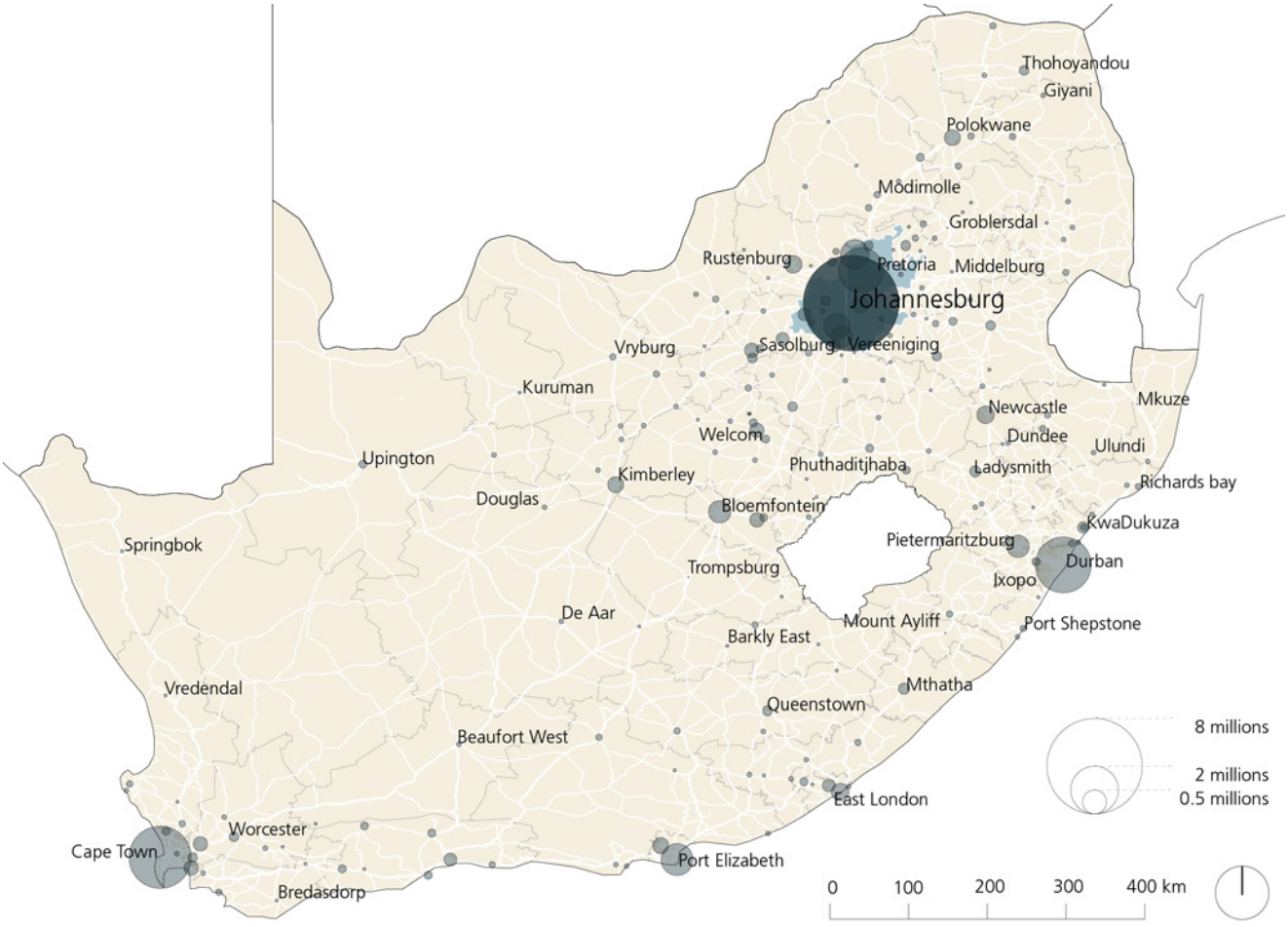


Fig. 2. South Africa and its towns by population

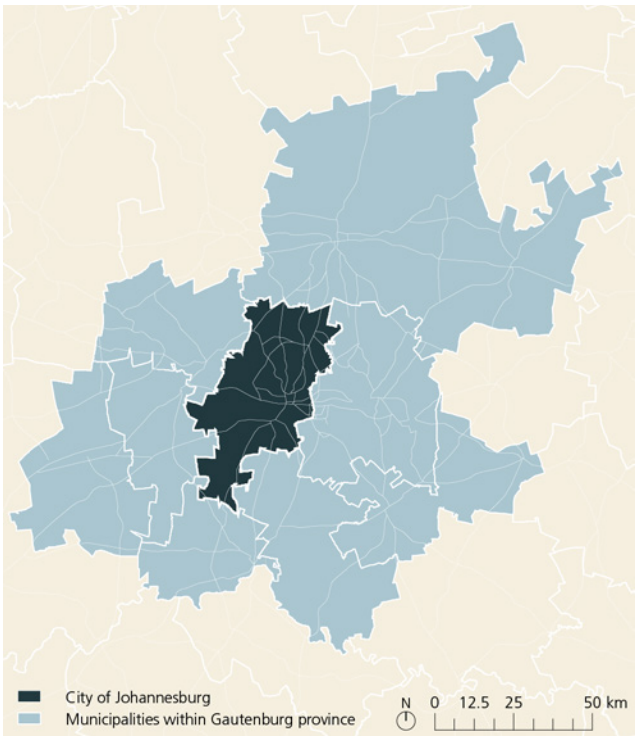


Fig. 3. Johannesburg and municipalities within Gautenberg province.

Of these, spatial inequality remains a defining characteristic of the settlement pattern of Johannesburg. The areas of highest densities of housing, the 'townships' inherited from Apartheid spatial policies, are also some of the most deprived areas in the city which are located far from economic opportunity. The city's economy is centred on two regions - the inner city and Sandton, which constitute 50 per cent of the economic output with just 23 per cent of the population. The region from Soweto to Orange Farm in the South-West, contributes just 13 per cent of the city's economy despite housing 41 per cent of the population.[6] The mining belt divides these two regions, emphasising the major spatial discontinuity in the city structure.

INTRODUCTION TO THE INTERVENTIONS

A series of consultative processes (bilateral meetings, a focal group discussion the City of Johannesburg's focal team and a larger workshop with local government and stakeholders from civil society, private sectors, academia) has enabled the City of Johannesburg Metropolitan Municipality (CoJ) and its departments of Planning, Transport and Environment, Infrastructure and Services, together with the UK FCO and UN-Habitat to Identify two areas of Intervention that could match priority programmes and processes currently underway within the city. These are a review of the Fourth Industrial Revolution (4IR) trends and effects on urban mobility in Johannesburg. Intervention A aims to assess current and future trends in technology that are impacting on or likely to impact on urban mobility in the city. The intervention will determine the likelihood of these trends happening in the city, their impact and determination of 'winners and losers'.

A Strategic Area Framework for Soweto: The aim of Intervention B is to develop a Strategic Area Framework (SAF) for Soweto that incorporates planning, transport and resilience considerations and develops specific tools to tackle development challenges.

A REVIEW OF THE FOURTH INDUSTRIAL REVOLUTION (4IR) TRENDS AND THEIR EFFECT ON URBAN MOBILITY IN JOHANNESBURG

Mobility in Johannesburg is an area of intervention that the Municipality highlights as strategic. It is in fact seen as the potential driver for the fundamental spatial transformation that will overcome the fragmentation and social exclusion which still affect the city. Although the City of Johannesburg has developed a series of transport strategies and programmes, which seek to meet the objectives and outcomes of the city's Joburg 2040 Growth and Development Strategy (GDS) as well as relevant statutory plans, the city faces a number of transport challenges:

- Congestion
- Crime
- Exclusion
- Lack to reliable, safe and affordable public transport

At the same time, mobility is one of the sectors most affected by technological advances and the new societal trends, which are sometimes referred to as the Fourth Industrial Revolution (4IR) or the Digital Revolution. The sharing economy, Internet of Things (IoT) and artificial intelligence have radically changed the way people move in cities and are developing at an exponential rate. Digital and technological advances offer new analytical tools and improvements in the transport modes that can enhance efficiency and security and open up new opportunities. However, they can also deepen social divides if not property understood, integrated and accessible.

The City of Johannesburg's transport strategy was completed in 2013 but did not capture comprehensively the challenges and opportunities that the 4IR offers. Hard interventions on infrastructure and mass transit, which need stability and predictability over time to be planned and executed, are influenced by the rate of change and general uncertainty that prevails currently in the city, especially politically, and that Is exacerbated

Fig. 4. Johannesburg aerial view (Source: Andrew More)

by tech-enabled disruptors. Societal changes and consumer behaviour patterns such as shopping and work are shifting and these are impacting on mobility patterns. Minibus taxis, the dominant transport modes, still depend on low tech-solutions and struggle to tackle inefficiencies.

The intervention proposed by the Global Future Cities Programme will assess which trends of the 4IR are impacting urban mobility in the City of Johannesburg. Key amongst this assessment will be the identification of the changes that can be considered positive and contribute to broader goals of creating a prosperous and equitable society. Based on this assessment, the city will determine the most appropriate pathways for Johannesburg and develop an implementation plan that details the policy, regulatory and fiscal interventions to be pursued.

The aims and objectives of the services are:

- To raise awareness of the City of Johannesburg and its urban decision-makers regarding potential future trends and technologies and help them reflect at an early stage on the best outcome for adoption
- To explore the effects and impacts that the influx of future trends and technologies could have on the quality of life, ease of movement and overall social equity in Johannesburg
- To guide policy, regulation, fiscal decision making, design and infrastructure in anticipation of future trends.
- To propose recommendations that urban planners need to consider in the present, to be able to achieve a sustainable and socially-inclusive path of technology adoption in the future.

The development of the intervention will focus on the following tasks:

i. Undertake a review of international and domestic Fourth Industrial Revolution (4IR) trends and patterns that impact urban mobility (passenger and freight)
ii. Assess the likelihood of each of these being realised in Johannesburg
iii. Determine the impact of each of the likely initiatives on a variety of stakeholders, consumers, and operators with a focus on inclusion and equity
iv. With respect to those interventions with a high likelihood and significant impact, determine associated risks and opportunities
v. Recommend a suite of actions (policies, regulations, financial and planning frameworks) to be undertaken by the City of Johannesburg to mitigate negative impacts and enhance positive outcomes in anticipation of the most likely mobility trends

Fig. 5. Street in Soweto (Source: UN-Habitat)

INTERVENTION B: STRATEGIC AREA FRAMEWORK AND ASSOCIATED IMPLEMENTATION TOOLS FOR SOWETO TRIANGLE

Soweto is mainly residential, lacking social services and employment opportunities. It has one of the highest population densities but the lowest concentration of formal jobs within Johannesburg. Soweto also faces environmental sensitivities and is prone to, amongst other issues, flooding. Nonetheless, the township's adequate spatial form and its location along public transport corridors offer the potential to develop it as a liveable city district.

The City of Johannesburg's approved Spatial Development Framework (SDF) defines Soweto as one of the priority areas for future growth, redevelopment and intensification. In general, the aim of the SDF is to diversify and better service single-use, high-density parts of the city, such as Soweto, into true city districts where people can live, work, learn and play.

Capital investment prioritised in Soweto would have the capacity to trigger positive effects on a city-wide and metropolitan scale. The strategy is to develop Soweto into a series of self-sufficient mixed-use nodes, starting around public transit stations and nodes.

The Intervention aims to compile a development framework for a defined part of Soweto in line with the SDF. The study area (the 'triangle') is bounded by Van Onsellen Road to the north; Klipspruit Valley Road to the east; Chris Hani Road to the south and Koma Road and Elias Motsoaledi to the west.

The plan should integrate the socio economic, environmental, spatial and transport challenges related to Soweto. The primary objective of this study is to define clearly a sustainable spatial and economic development vision and trajectory for the broader study area.

This should include:

- Description and analysis of the status quo and baseline data and trends
- Identification and description of key precincts and nodes, based on transit infrastructure, economic and social activity and ecological assets
- Definition of the ideal land use mix for the identified nodes or precincts
- Propose spatial, urban design and resilient infrastructure (social, engineering and mobility) interventions to unlock development potential and promote inclusive and sustainable development

The secondary objective is to prioritise, package and design projects and interventions that will catalyse and support the achievement of the development vision and ideal land use mix.

This should include:

- Quantification and structuring the development potential of the study area
- Prioritisation and differentiation of nodes and precincts
- Identification of opportunities and projects to unlock or initiate public and private development in the short-, medium- and long-term
- Definition of infrastructure provision, requirements and cost, determined within a phased approach
- Description of the key levers to realise the development potential relating to land use regulations, incentives, urban management and alternative financing and funding approaches to sustainably execute identified projects and interventions

Main Stakeholder

Transport Department of the City of Johannesburg
City of Johannesburg Metropolitan Municipality

Possible Project Partners

- Gauteng Department of Roads and Transport
- National Passenger Rail Authority of South Africa (PRASA)
- Metrorail
- Gautrain
- Bombela Concession Company
- Metrobus
- Taxi associations and operators
- Development planning department of CoJ
- Johannesburg Roads Agency (JRA)

Thematic Cluster

Integrated/Multimodal Transport Systems

Keywords

Mobility, Mega trends, Fourth Industrial Revolution

Main Stakeholder

City of Johannesburg Metropolitan Municipality
Development planning department of City of Johannesburg

Possible Project Partners

- City of Johannesburg:
  - Economic Development Department
  - Environment and Infrastructure and Services Department
  - Transport Department of the City of Johannesburg
- Citizens assembly

Thematic Cluster

Urban Strategies and Masterplans

Keywords

Urban Planning, Economic development, Environment, Mobility

URBAN ANALYSIS

Spatial Analysis

EXISTING MOBILITY SYSTEM

Johannesburg's mobility relies on a complex network of roads and a growing public transport system, coordinated by the Transport Department.

Public transport is made available through a variety of modes, operated by different companies, both private and public. One of the main challenges of the administration of the City of Johannesburg is the integration of the different operators that currently have autonomous schedules, itineraries, tariffs and don't share a common ticket system.

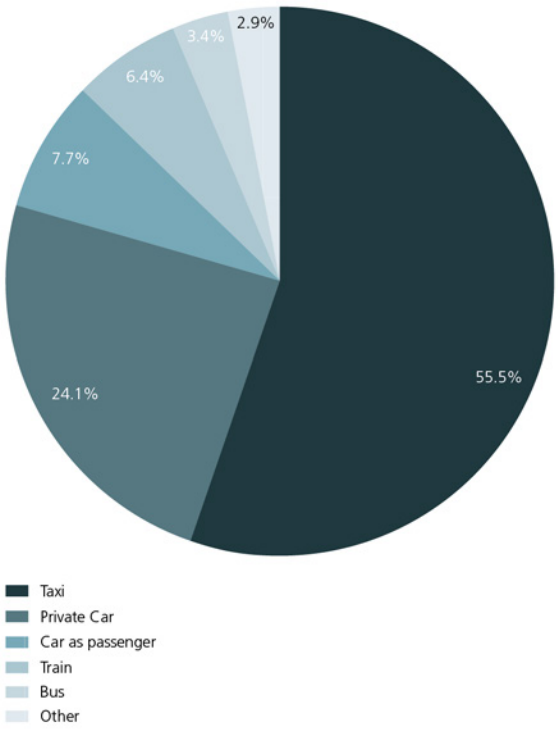


Fig. 6. Transport types in the City of Johannesburg

Figure 6 below provides the most frequent types of transport used in the City of Johannesburg (CoJ).[7] This is based on a 2011 survey of 4502 respondents in the city. The category of taxi mainly refers to the minibus taxis.

Road Network

The responsibility of the road network In Johannesburg is shared among different government levels. The national government is responsible for the freeways (N routes). The provincial Department of Roads and Transport builds and maintains various provincially-owned roads in Johannesburg. The CoJ builds and maintains the remaining network of public roads, including two freeways: the M1, connecting southern areas with the city centre and Sandton into the highway to Pretoria, and the M2 and M2, running east-west just above the mining belt.

Rail System

The Johannesburg rail system is run by the National Passenger Rail Authority of South Africa (PRASA). Its commuter rail operator is Metrorail. The rail network is east-west aligned, only covers the southern area of Johannesburg and does not fit entirely with existing residential and economic nodes, as shown in Figure 6. There are in total 55 railway stations but some major destinations within the city are not served, such as OR Tambo International Airport, Midrand and Sandton although all are now served by Gautrain.[8]

Gautrain

Joburg has a provincially-implemented rapid rail system known as Gautrain. Completed in 2012, it links Johannesburg, Tshwane and OR Tambo International Airport in the northern suburbs that do not have a heavy rail/metro system. The 80km network comprises two lines and ten stations, five of which are in Joburg. Access to and from stations is through park and ride and via a feeder/distribution network of buses serving a catchment area of 5km radius from each station, operated by the Bombela Concession Company. The Gautrain works on a smartcard system, used also for the feeder buses.[9]

The BRT System

The Rea Vaya Bus Rapid Transit (BRT) system is the city's choice of mass public transport mode for its busier corridors. Phase 1A and 1B of Rea Vaya BRT was completed and brought into operation between 2009 and 2013, including 48 stations and 42.2km of trunk route. It runs between the city centre and surrounding areas, including the main university campuses, to destinations in Soweto.[10] Phase 1C is under finalisation,

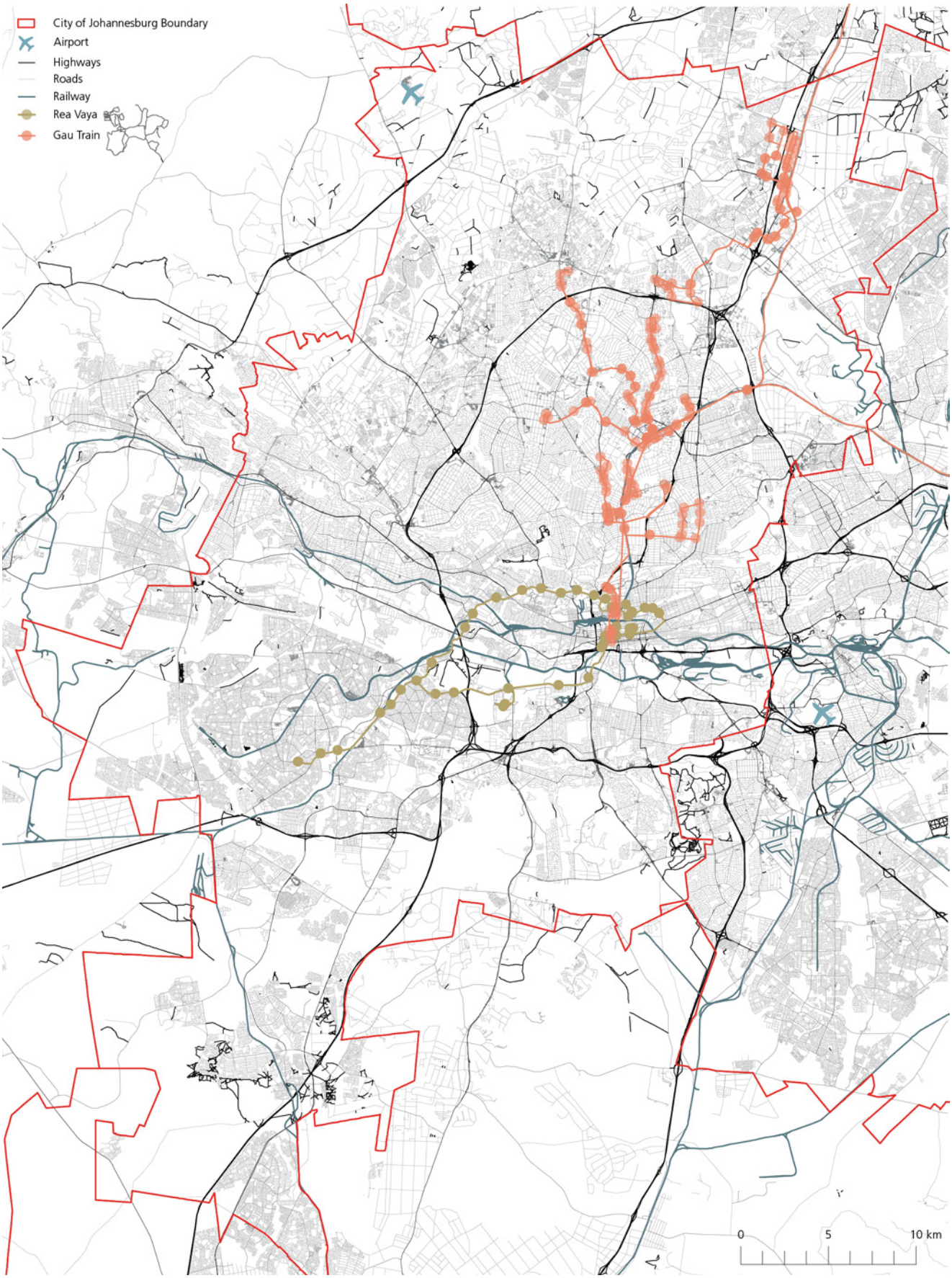


Fig. 7. Strategic public transport network and flagship project routes

and will extend the lines to the northern part of the city. The Rea Vaya is run by the CoJ and uses a smartcard payment which allows for automated fare collection.

Bus System

The network of bus services in Joburg is widespread. All regular lines are subsidised and their management is split between the City of Johannesburg and Gauteng Province, without a shared system of schedules or tariffs established.

A fleet of 418 buses is operated by Metrobus, more than 229 routes covering most of the Metropolitan Municipality. Metrobus is run by the CoJ but has a different ticket system to the Rea Vaya.[11] Other private companies are contracted by the Gauteng Province with the largest being Putco.

Minibus System

The minibus taxi, although informal in status, is remarkably regulated and to every extent the dominant public transport mode in Joburg. There are 32 taxi associations, controlling at least 1,013 different routes.

Apart from the estimated 12,300 short distance minibus taxis in Joburg , there are substantial long-distance taxi operations to and from the City, operating to about 100 different destinations, including international.[12]

The radial minibus-taxi route network is focused on the Central Business District with an average taxi route length of 17.8km. Many passengers are able to make their trips using one taxi all the way (about 65 per cent) but 24 per cent require a taxi-taxi combination and 11 per cent involve transfers to trains or buses.[13]

Metered Taxi System

It is estimated that Joburg has 1800 to 2000 metered taxis. Apart from a range of services with several formal large companies there are also many individual no name taxis, i.e. their rooflights indicate "Taxi" rather than a company name. This comprises about 44 per cent of taxis.[14]

Legally, it is compulsory for metered taxi vehicles to be equipped with a sealed meter to measure the cost of the trip. The Gauteng Provincial Government is in charge of regulating fares, registering licences and grading taxi services.

Tuk-tuk

Several tuk-tuk operations have been licenced to operate in Joburg. However, there's no policy in the former ITP about these vehicles or motorcycles use in public transport, a condition which raises concerns about safety, competition and their proliferation.

Non-motorised Transport

Walking is one of most important main mode of transport in Gauteng, ranking only after the car and minibus taxis. In the morning peak, 34 per cent of travels in the province are completed on foot (car accounts for 30.8 per cent and minibus-taxi for 21.9 per cent), although this figure is declining compared to the previous survey in 2000.[15] In addition, walking is the most significant feeder mode for access to public transport including railway stations, bus stops and taxi ranks. However, cycling accounts for only a marginal amount of travels, 0.3 per cent.

Of the total amount of walkers and cyclists in the city, only about 10 per cent choose to walk or cycle for longer than 30 minutes because they cannot afford motorised transport.

Intelligent Transport System

In the past ten years the Johannesburg Roads Agency (JRA) has been using the Intelligent Transport System (ITS) to improve the operation of the road network. Measures include remote monitoring of motorways and signalized intersections using CCTV cameras, incident detection and management, real-time information provision to drivers and so on. The city's policy and investment focus has shifted towards ITS instruments to enhance the operation of the city's public transport network including the BRT network.

TRANSPORT CHALLENGES

Urban Form and its Negative Transport Effects

Joburg's urban form is sprawling, low-density and polycentric, a characteristic derived from a car-oriented planning, and spatial segregation and inequality in residence and jobs inherited from the Apartheid. This has many negative effects on transport, including increased travel times and structural car-dependency, which have the highest impact on low-income communities who have to travel long distances to reach jobs and services.

Congestion

Traffic congestion in the city is quite severe and mobility is quite compromised on many of the arterials and freeways in peak periods.[16] A 2011 survey estimated that almost 80 per cent of drivers on roads are stuck in severe traffic jams daily. The increased use of private cars and taxis has resulted in increased traffic congestion. In addition, the city's transport sector continues to be the highest (38 per cent) carbon emitter when compared to other sectors such as the industrial (28 per cent) and the residential (26 per cent) sectors.[17]

It is estimated that, by 2040, Joburg will have an extra 2.5 million inhabitants.[18] Based on current patterns, this increased figure would mean more vehicles and more congestion. Consequent negative effects would include poor air quality, increased road accidents, increased greenhouse gas emissions and longer travel times, which will affect negatively on the competitiveness and attractiveness of the city and the quality of life of its inhabitants.

Weak Integration and Negative Competition Among Different Modes of Transport

As described briefly before, management of public transport is split among a variety of public and private operators. Despite good intentions within the planning instruments, integration among different operators, even formal ones, is extremely low. No uniform ticketing tariff system is in place and often the planning and operation of new infrastructure for mobility follows competitive interests and political agendas.

Various BRT routes have been designed to include Gautrain stations but there remains limited integration due to significant difference in fares as well as the rigid nature of the Public Private artnership signed between the Gauteng Province and the Bombela Concession Company.[19]

Fig. 8. Strees over Capacity in Johannesburg

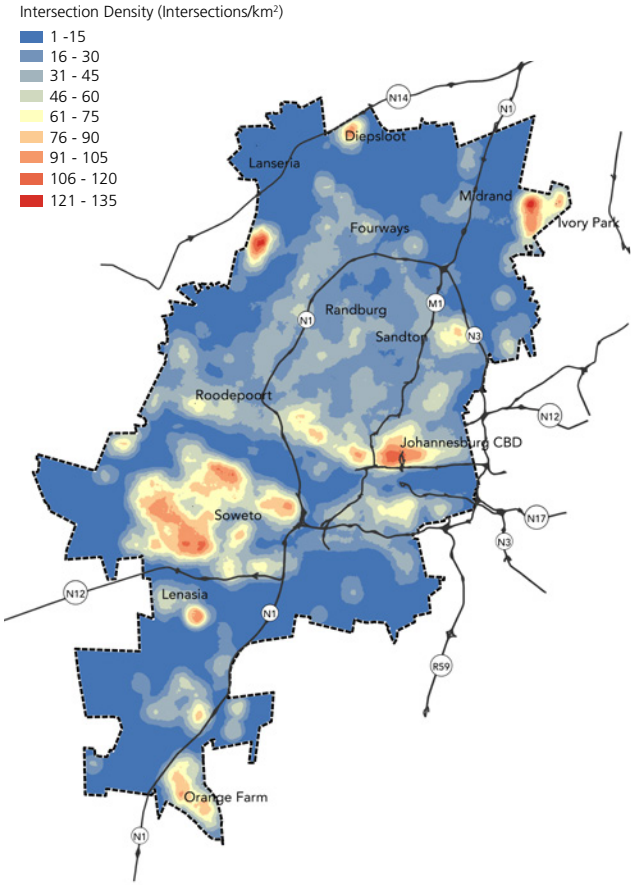


Fig. 9. Intersection Density within Johannesburg

HISTORICAL CONTEXT AND OVERVIEW OF SOWETO

Being a product of Apartheid planning, Soweto's urban structure evolved over a period of more than 100 years and it remains to function as a segregated 'township', one of the most deprived, high-density residential areas, inherited from apartheid spatial policies.

The first two areas to be developed were Pimvile (Klipspruite) and Orlando during the 1930s as the demand for housing grew exponentially for the large number of black people migrated to Johannesburg for job opportunities in the gold mining industry.

It was only after the democratic elections in 1994 that Soweto became a functional part of Joburg and was integrated into the governance of the city. Black Local Authorities came to an end and non-racial administrations became louder.

Soweto is also one of the most deprived, high density residential areas. The census 2011 reported 355,351 households in Soweto. Among these, only 55% had piped water inside their dwelling, while around 93% had electricity of lighting, and around 91% had access to a flush toilet connected to a sewerage system.[20]

The City of Johannesburg's approved Spatial Development Framework (SDF) 2016 identifies Soweto as one of the key intervention areas that has the potential of developing into a significant district.

While attention and resources have been deployed to improve infrastructure, there are some parts of Soweto that remain under serviced and the carrying capacity of existing infrastructure would need to be upgraded to accommodate additional growth. Approaches to infrastructure provision need to be resilient and

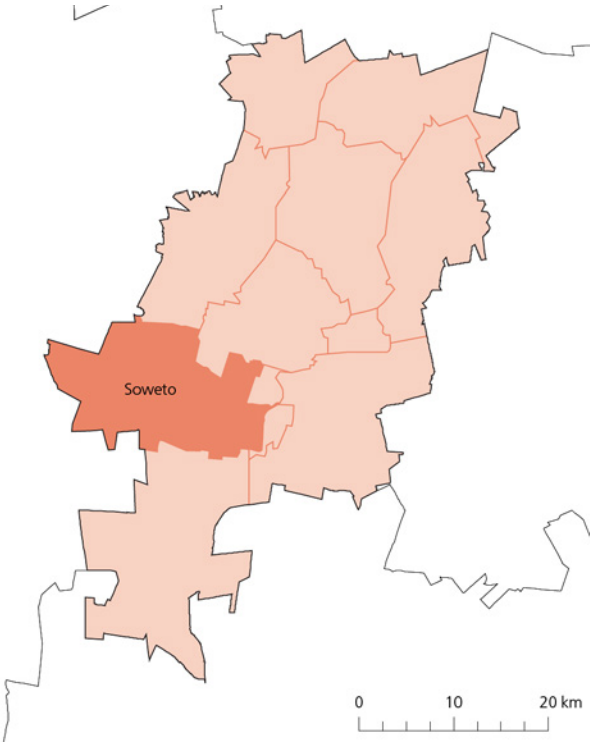


Fig. 10. Location of Soweto in Johannesburg

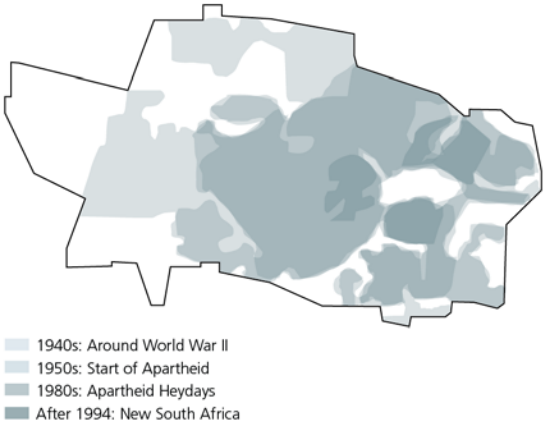


Fig. 11. Historical growth of Soweto

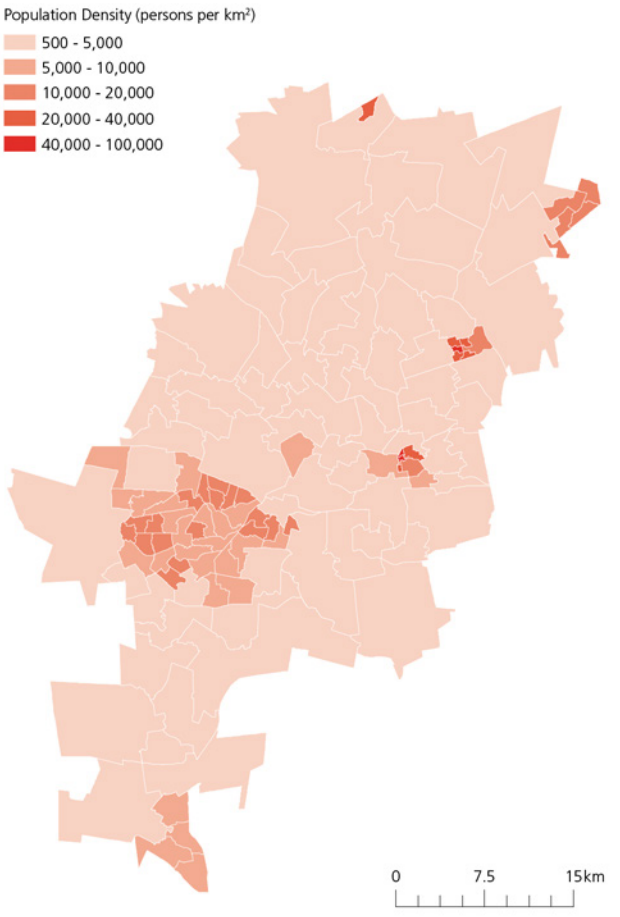


Fig. 12. Population Density

incorporate technological advances. Finally, given the population densities in Soweto and the mono-functional nature of the area, it is a significant generator of traffic. While a transport strategy exists for Soweto, it requires revision to incorporate and inform land-use considerations that will emanate from this planning framework.

SPATIAL STRUCTURE AND MAIN CHALLENGES IN SOWETO

Despite the vast gains made through public investment over the past two decades, Soweto still faces a limited range of housing typologies, sometimes poor living conditions with overcrowding in places, high unemployment and insufficient infrastructure. Soweto lacks diversity in terms of mixed-use activities, social infrastructure and consolidated public spaces.
While Soweto has a relatively high intersection density, indicating good levels of walkability, higher order roads and connectivity across natural barriers such as streams, across railway lines and between districts of Soweto should be improved.

ENVIRONMENTAL CHALLENGES

The effects of climate change will increase cities' vulnerability to natural hazards and increase the risk of climate-induced displacement.[21]

Soweto lacks diversity in terms of mixed-use activities, social infrastructure and consolidated public spaces. High levels of pollution, traffic congestion, limited water supply and energy insecurity, infrastructure backlog and under-maintained infrastructure are leading to increase vulnerability to the impacts of climate change and natural disasters. The growing population contributes to the increasing pressure on the natural environment even more.

The City of Johannesburg has a multitude of ecological assets which need to be preserved for its intrinsic natural value as well as to create a liveable and sustainable urban form for the citizens. The Region D, where Soweto is located, has environmental sensitivities which include ridges such as Naturena Ridge, Dobsonville koppies, Zondi koppies and Vista koppies; rivers and wetlands such as Greater Soweto, Klipriver and Klipspruit wetlands

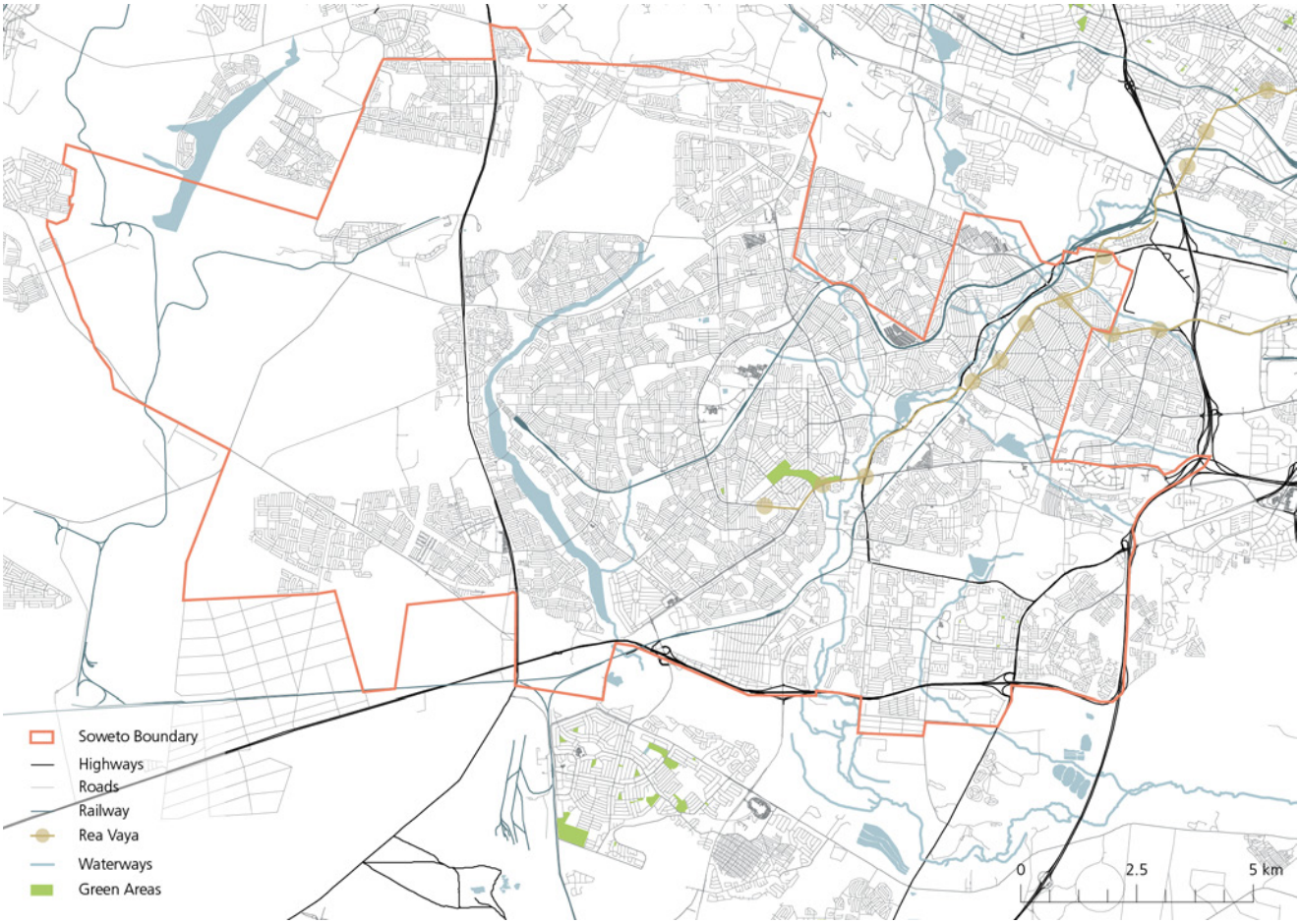


Fig. 13. Spatial structure of Soweto

and dolomitic areas such as Protea Glen and Doornkop. Klipspruit Valley in particular is heavily impacted by flooding. The area is earmarked as having high development potential due to its location along the public transport backbone. Infrastructure provision needs to be resilient and incorporate technological advances.

Dependence of fossil fuels in the domestic sector, mining dust and increases in private traffic volumes causes poor air quality and reduces the quality of life. Furthermore, increased waste generation and disposal In Soweto due to population growth, lack of awareness and uncoordinated planning causes environmental challenges. Sowetans experience energy insecurity, which is the result of increasing energy demand, high reliance on electricity and network outages. Sources should be diversified with a focus on clean energy and energy efficiency in order to mitigate the climate change-related issues.

However, a strong structure of open space provides the opportunity to establish corridors with public space functions and ecological quality, potentially offering the base for a resilience strategy.

ACCESS, MOBILITY AND TRANSPORTATION

Soweto remains highly dependent on the wider city and specifically the inner city for jobs, with many residents making long daily commutes. The discrepancy between the relatively high residential density of Soweto and its lack of job opportunities, caused by a limited diversity in land use, is a generator of peak uni-directional travel demand towards the city centre which affects the whole of Johannesburg.

In order to solve this problem huge investment has been made to improve the connectivity of the area. As illustrated in fig X, several railway stations and minibus taxi routes are active in the area. The first implemented phase of the Rea Vaya connects Soweto to the Central Business District, and the Bus Rapid Transit operational plan identifies interchanges that will be a key point of origin for planned feeder and complementary routes to greater Soweto.

Additionally, a proposed Gautrain extension should reach Jabulani. Further to public transport access, the area is connected to primary highways via arterial routes, namely Klipspruit Valley Road, Soweto Highway,

Fig. 14. Green areas and water bodies distribution in Soweto

Randshow Road and Old Potchefstroom Road, although road connections should be expanded - especially across the mining belt. These arterials also provide good neighbourhood connectivity between Soweto and surrounding areas such as Lenasia, Rooderpoort and so on.

Higher order roads and connectivity across natural barriers such as streams, across railway lines and between districts of Soweto constitute a barrier for the integration of the different inner areas.

Large-scale monofunctional and underutilised land uses also cause fragmentation. In addition, the low-built form also leaves large stretches of unutilised land, which are often illegally appropriated.

At the same time, the relatively high intersection density indicates good levels of walkability. The population of Soweto, one of the biggest in Johannesburg, brings along an intrinsic demand for goods, services and jobs. Matched with densification strategies and local economic development incentives, there is the potential to trigger the generation of a well-functioning compact urban area.

Fig. 15. Isolated neighbourhoods in Soweto, divided by railway, creeks and highways

Financial Analysis

MUNICIPAL FINANCIAL CAPACITY

For the 2017-18 fiscal year, the City of Johannesburg's total revenue was ZAR 48.6 billion. This corresponds to approximately USD 3.2 billion and is roughly equivalent to a per capita municipal revenue of USD 740 based on population figures from the 2011 Census.[22] This per capita figure is roughly similar to the municipal budgets of Cape Town and Durban, whose revenues stand at 760 USD and 740 USD respectively, indicating that Johannesburg has a similar revenue intake to other major cities in South Africa.

A breakdown of the major revenue sources for the City of Johannesburg is provided in the pie chart in figure 16. As is consistent with other municipalities across the world,[23] revenue from the provision of utility services – chiefly, electricity and water – represents a major own-source revenue for Johannesburg. Overall, there appears to be a strong indication for Johannesburg to able to raise own-source revenue.

A particularly important indicator of the city's capacity for generating own-source revenue is the receipts that are generated from property taxation, as this represents the city's ability to capture appreciating land values which occur as a matter of course as the city develops. In South Africa, property taxation is empowered by the Local Government: Municipal Property Rates Act [No. 6 of 2004] which created a uniform mechanism across the country through which property tax can take place. Since its enactment, municipalities in South Africa have taxed properties based on the value of land and improvements, offering a large source of city revenue to tap into.[24]

In 2013/14, the revenue from property rates ranged from 19 per cent of total own revenue in Ekurhuleni to 27 per cent in eThekwini with an average of 22 per cent across cities in South Africa.[25] For the City of Johannesburg as a whole, this stands at approximately

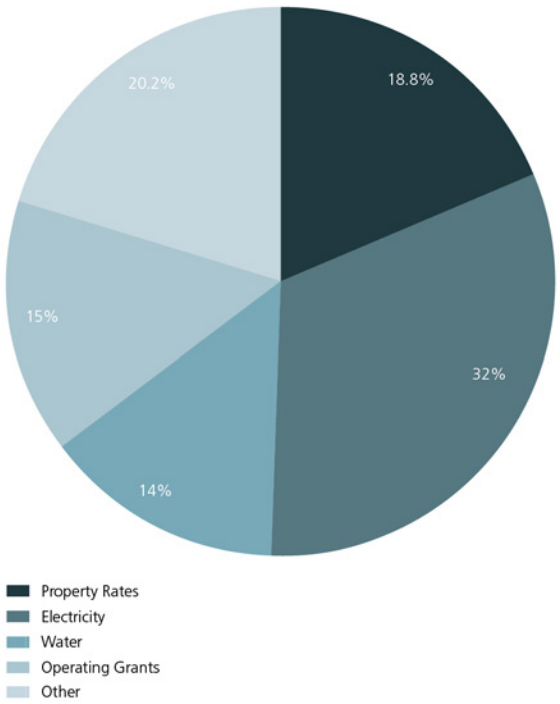


Fig. 16. Johannesburg revenue sources

19 per cent, which is slightly below the South African average. However, the fact that there is a presence of land value-capture mechanisms in general does indicate the potential to expand municipal revenues through these means if needed.

CAPITAL INVESTMENT CAPACITY

The expected operational expenditure for the City of Johannesburg in 2017-18 stands at ZAR 47.3 billion, meaning the city will have slight budget surplus of around ZAR 1.3 billion. The pie chart in figure 17 provides a breakdown of planned expenditure in areas that are of particular interest to the proposed interventions.[26] With regards to transport, road transport accounts for 7.3 per cent of expenditure while planning represents 2.9 per cent and housing 2.3 per cent.

Focusing on capital expenditure, CoJ expects to spend approximately ZAR 8.6 billion, which represents a reasonably large decline compared to the ZAR9.9 billion that was spent on capital expenditure in the 2016/17 fiscal year. This is, however, expected to rise again to approximately ZAR 9.4 billion by the 2018/19 fiscal year. These changes are illustrated in the bar chart in figure 18 which show how capital expenditures are below 25 per cent, indicating that the municipality has mostly limited capacity in capital expenditure and spends most of its revenue in maintenance.[27]

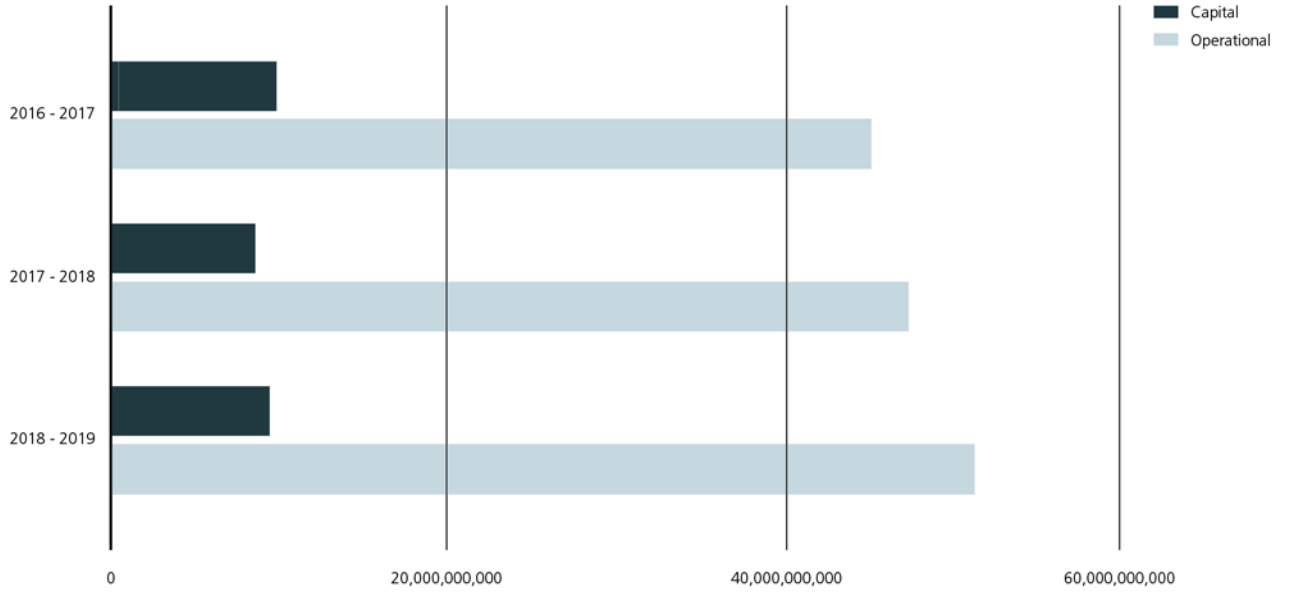


Fig. 18. Capital vc operational projected and real spending

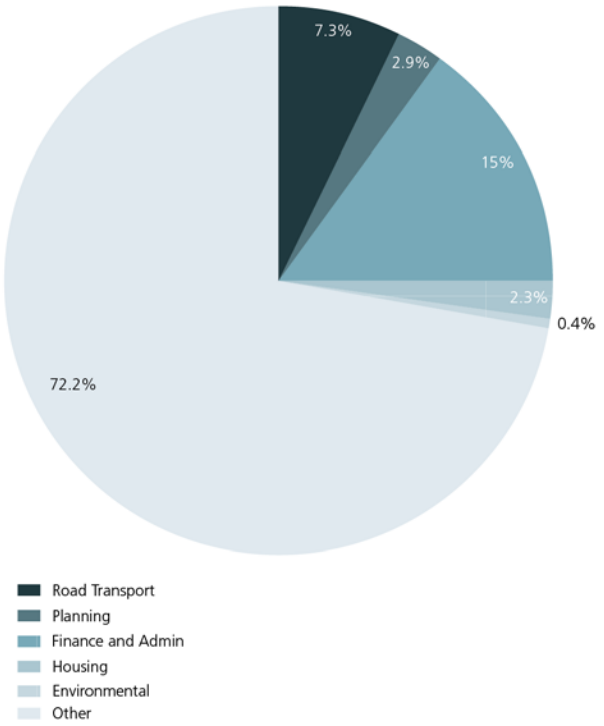


Fig. 17. Classification of heads of expenditures (2017-18)

FINANCING MECHANISMS

As Johannesburg already derives the majority of its finances from own-source revenue, including property tax which already takes into account the value of the land, this shows that there is sufficient data for land value capture instruments. These instruments can be relevant for both interventions in Johannesburg as, when implemented, they can have an impact on land values.

Given South Africa's history of spatial segregation, the city wants to ensure that the rise in land values does not exacerbate urban spatial inequality. Therefore, the city may consider instruments such as impact fees or exaction that place the burden of paying on property developers rather than the citizens. A relatively new and innovative instrument to mobilise land value increment generated by large-scale urban projects is construction bonds, which work as an incentive for developers to share the gains from additional building rights.

The capital investment requirements of both interventions can also be financed in the future through borrowing. Empowered by the Municipal Finance Management Act, the City of Johannesburg (CoJ) has the capacity and a strong precedent to borrow domestically and internationally both from private sector and international financial institutions. Since 2004, the CoJ has launched four municipal bonds in the domestic and international market to finance its operations and investments, with

one of these bonds being secured by the International Finance Corporation.[28] As of October 2018, Moody has rated Johannesburg's debt to be 'stable', indicating at first order the CoJ has a relative ease to borrow from the international market.[29]

Some components of the interventions may be also suitable to be implemented through Public Private Partnerships (PPPs). Subject to central government guidelines, CoJ also has the legal capacity and the precedent to enter into PPPs. The Municipal Finance Management Act (2003) and the Section 86A of the Municipal Systems Act (2000) provide the legal ability for municipalities in South Africa to enter into PPPs. The two laws establish similar provisions and, based on them, the Minister of Finance and the Minister for Provincial and Local Government have set up uniform guidelines – known as Municipal Public-Private Partnership Regulations - for municipalities to follow while undertaking a PPP agreement. It is stipulated that they are able to deviate from these guidelines only if the National Treasury preapproves it.

Broadly, these guidelines establish a framework under which important pre-requisites to PPP agreements and processes can be made. These Include feasibility studies, standard procurement measures, amendment to a PPP agreement and broader contract management proposals.[30] To give an example of past PPP projects, in 2011, the CoJ entered into a PPP for Alternative Waste Treatment Technology. In another precedent from 2011, CoJ entered into a PPP for fresh market produce.[31] PPPs have also been undertaken at the provincial level with one example being the Gautrain Rapid Rail Link Project, which was developed, operated and maintained through a PPP between Gauteng and Bombela Concession Company.

Legal Analysis

GOVERNANCE STRUCTURE

As defined by the Municipal Structures Act, No. 117 of 1998, the City of Johannesburg Metropolitan Municipality (CoJ) has exclusive executive and legislative authority in its jurisdiction. This gives a clarity of role in all domains. The only exception is public transport, where, as seen in the spatial analysis, provincial, national and private stakeholders maintain a wide involvement.

CoJ's structure is split between administrative and decision-making. The administrative wing is headed by the City Manager, who is appointed by the City Council. The City Manager oversees the Executive Management Team running the local bureaucracy. The elected City Council acts as the principal decision-making body for actions such as passing by-laws, passing the budget and electing the executive Mayor, who is delegated as the head of the executive branch and hence oversees the City Manager and the administration branch.

The illustration in Figure 19 below provides a highly simplified illustration of this structure of CoJ, while Figure 20 represents the organisational structure of the executive branch.[32]

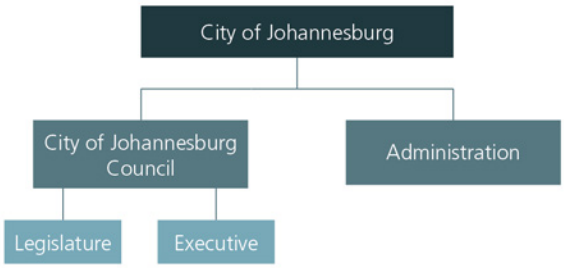


Fig. 19. Joburg organizational structure

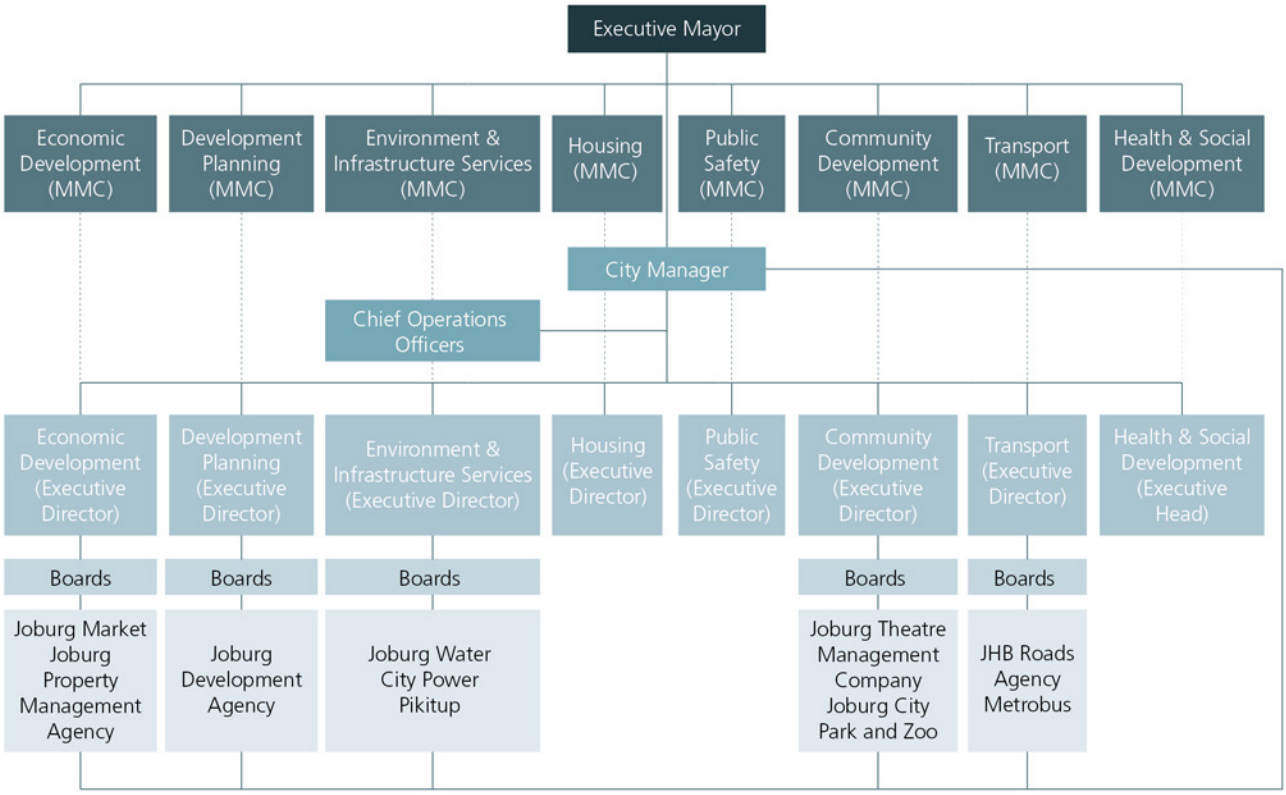


Fig. 20. Organisational structure of the executive branch

Intergovernmental Cooperation

There is presence of several coordination mechanisms between the CoJ and the provincial and central governments. However, most of these mechanisms are non-statutory. The central government's Department of Cooperative Governance and Traditional Affairs is tasked for supporting and coordinating with municipalities across South Africa.[33]

The South African Local Government Association (SALGA) is a statutory autonomous association of all municipalities which lobbies for the municipalities. SALGA plays an active role in intergovernmental relations. For example, it is often invited to the Presidential Coordination Council (PCC) to coordinate with provincial and central government officials. Gauteng Premier's Coordinating Forum is mandated to coordinate between the provincial and the municipal governments, including CoJ.[34]

Transport Governance

While the CoJ has the legal mandate to regulate the transport infrastructure in the city, the operations are split between several public and private operators. There are several actors in the transport arena. They are summarised in figure 21 below.

Stakeholder	What do they do?
Provincial Department of Roads and Transport	They build and maintain many provincially-owned roads and are also the contracting authority for various bus services in Johannesburg.
City of Johannesburg Metropolitan Municipality (CoJ)	They operate the metrobus and Rea Vaya Bus Rapid Transit (BRT) system and maintain local roads and two free highways. Some of these functions are done through the subsidiary Johannesburg Roads Agency.
The central government's Passenger Rail Authority of South Africa (PRASA)	They operate the metrorail network, connecting various parts of the city, and to other parts of the country. However, it is generally acknowledged that the traditional rail system is run down.

Fig. 21. Transport governance

The transport system in the city is heavily dependent on the minibus taxi service, made up of privately-owned vehicles. They are, however, not operated under an integrated system. Hence, there is no set schedule and there is operational autonomy by the owners of these minibuses.[35] The Table below charts the key public transport types used in the city.

Public Transport	Who runs it?
Rail	Passenger Rail Agency of South Africa (PRASA)
Rea Vaya Bus Rapid Transport (BRT)	CoJ's Johannesburg Metropolitan Bus Service.
Gautrain Rapid Rail Link	Gauteng Department of Finance and Economic Affairs
Minibus taxis	Privately owned but regulated by CoJ

Fig. 22. Key public transport types used in the city

PLANNING HIERARCHY

According to its governance structure, the planning hierarchy in Johannesburg delineates a significant amount of policy power and influence to the city government. This is evident by the hierarchy of the main planning strategies, most of which are created at the city level.

At the national level, the key plan is the Integrated Urban Development Framework, drafted by the Department of Cooperative Governance and Traditional Affairs, which sets up a broad policy framework for urbanisation in South Africa.

The City of Johannesburg's long-term growth and development strategy is known as Jo'burg 2040 Strategy, which was drafted in 2011.36 This sets up broad principles which the city aims to address by 2040. Furthermore, in accordance with the Spatial Planning and Land Use Management Act (SPLUMA) of 2013, in 2016 the CoJ approved the Spatial Development Framework for Johannesburg 2040 (SDF), a city-wide spatial vision for the city, outlining a set of strategies that would lead to the realisation of that vision.37 While SPLUMA requires a 5 and 10-20 year vision for the Framework, the Joburg one has taken a 25-year schedule, in line with the Jo'burg 2040 Strategy.

As required by the Municipal Systems Act of 2000, the CoJ also drafted the Integrated Development Plan (IDP) which is the key statutory development plan in the city.

This Plan is drafted every five years and the current version covers the 2016-21 period.38 It includes the programmes and projects needed under the umbrella of the principles set by the Jo'burg 2040 Strategy.

The city also adopts a Service Delivery and Budget Implementation Plan (or SDBI) annually, which Is made up of departmental plans to deliver the programmes and projects set under the IDP.

VISIONS AND STRATEGIES FOR TRANSPORT

History of Transport Plans and Strategies

The city has shifted from the historic emphasis on improving mobility for cars to an emphasis on improving mobility for people through improvements to the public transport system. A Strategic Public Transport Network (SPTN) was proposed in the city's first Integrated Transport Plan (ITP) 2003-2008.[39] This SPTN not only identified the major public transport connections to be made but also was designed to provide a legible public transport grid of high-frequency public transport routes. Among the 325km of Joburg's primary network, two flagship routes were selected for implementation one from Soweto to Sandton, the other from Alexandra-Sandton-Randburg, to Cresta and Roodepoort.
At first the city began to build a curb-side bus and minibus-taxi priority on the first flagship route in 2005. Then South Africa was selected as the venue of the 2010 FIFA World Cup, resulting in an increase in funding available and a determination to leave a significant public transport legacy, which turned into the Rea Vaya Bus Rapid Transit system.

Integrated Transport Plan and Strategies

The City of Johannesburg's First Integrated Transport Plan (ITP) – 2003-200840, since updated four times— in 2004, 2006, 2007 and 2013— developed transport strategies and programmes to meet the policy objectives of the City's Jo'burg 2040 Growth and Development Strategy as well as the imperatives described in other key government plans.

Moreover, the Strategic Integrated Transport Plan Framework (SITPF), developed in 2013, sets out outcomes and outputs for nine strategic topics, or 'thrusts', to achieve the city's transport vision and goals.

vi. Restructure and integrate the city
vii. Improve and expand provision of quality public transport and use of non-motorised transport
viii. Maintain, improve, extend and integrate transport infrastructure
ix. Support economic growth through improving freight mobility
x. Manage congestion, travel demand and parking
xi. Actively engage citizenry in improving the transport system
xii. Transform the transport sector and encourage new, efficient and profitable transport enterprises and employment creation
xiii. Plan and regulate the transport system
xiv. Resource and finance the transport plan

The SITPF is further supported by a number of tactical and operational plans, strategies and activities. The detail and hierarchy of these are depicted in the Figure below.

While the city's transport plans have been instrumental in informing policy, regulation and investment decisions, the extent to which they have anticipated the evolving 4th Industrial Revolution and its effect on urban mobility has been limited.

A Compact, Polycentric Urban Model

The city's Spatial Development Framework [41] proposed a spatial transformation to enable the city to shift from the apartheid-era spatial form into a compact, polycentric city model to reduce physical distances, travel times and costs, bringing residents closer to job opportunities.
With regard to environmental policy, the current Climate Change Adaptation Plan for the City of Johannesburg is going through a comprehensive review.[42] The Climate Change Strategic Framework of the City of Johannesburg already included integration of the plan with a broader urban resilience strategy, in preparation of CoP 21 in Paris.[43]

VISIONS AND STRATEGIES FOR SOWETO

Soweto was defined as one of the Transformation Zones in the Spatial Development Framework, where capital investment should be prioritised for future urban intensification and expansion. In the short-term, affordable and efficient public transport connections are needed to the south of the city to link people to jobs and, in the medium- to long-term, economic development and job growth in the south of the city is needed to allow people to lead productive lives close to where they live.

Soweto has also been identified as one of the three principal Metropolitan sub-centres. Soweto provides all of the potential elements of a principal Metropolitan sub-centre but has a weak economic structure and a low level of diversification. The strategy is therefore to build a strong mixed use and dense urban core around the existing public transport network that includes both rail and BRT. This core will be concentrated around the

Jabulani, Kliptown and Baralink nodes and supported by smaller nodes. Improved access to Soweto and connectivity to the inner City and other economic nodes such as Roodepoort is essential for increasing the economic base of Soweto.

The potential of the mining belt for economic development and job creation also provides an opportunity to draw economic energy into the Soweto core area. The construction of the N17, access to Soweto from the N1 and cross-mining belt connections are critical. Detailed economic strategies and the creation of viable economic clusters would start to develop Soweto into a vibrant and diversified Metropolitan sub-centre forming the southern anchor of the polycentric network.

Fig. 23. Soweto aerial view (Source: UN-Habitat)

INTERNATIONAL ALIGNMENT AND TECHNICAL RECOMMENDATIONS

Potential Impact

The potential impact analysis outlines the main benefits that can potentially be achieved through the Global Future Cities Programme in each city. The impact analysis covers three phases: short-, medium- and long-term. Given that impact can arise from the complex interaction of context-specific factors, rather than as result of a single action, an empirical impact assessment is not part of the scope of this report.

Short-term aspects refer to outcomes that can be achieved through the implementation of the technical assistance that is provided through the interventions within the 2-3 year scope of the Global Future Cities Programme. The mid-term outcomes are only achievable once the intervention is executed at the city level, either through capital investments or the legal validation of key polices and plans. This phase is understood to take 3-7 years. The long-term impact of the interventions is linked to their sustainability in a 7-15 year timeframe and is related to the project cycle phase of operation and maintenance.

SHORT-TERM OUTCOME

Within the 2-3 years of the Global Future Cities Programme implementation, the city will have increased capacity for planning and prioritising projects and strategies, for integrating plans and approaches and for developing better strategies to foster economic growth.

In the case of the Review of the Fourth Industrial Revolution (4ir) Trends, the city will be able to understand better the possible impact of new technologies thus enabling better investment decision making in new technologies for improving transport planning.

Besides, through the support of the development framework in the selected area of Soweto, the prioritisation of investments will b\e facilitated following their potential contribution to implement the plan and to address the identified infrastructure needs. Moreover, the framework will include spatial, economic, transport and environmental strategies thereby contributing to the development of integrated approaches towards planning.

Following an assessment of the economic activity and potential of the area, the Plan will propose economic activation strategies. Considering that Soweto is one of the main economic centres of Johannesburg, this will equip the city with better capacity for economic development planning. Providing a clear development and economic strategy for these areas in Soweto can spark interests from businesses and enterprises to settle in the area.

MEDIUM-TERM OUTCOME

Beyond the Programme, if the Review of the Fourth Industrial Revolution (4ir) Trends develops into investments in new transport technologies this can have an effect in reducing the negative effects of private car use and can enhance more efficient and sustainable transportation in the city. Moreover, it can contribute to open a new market sector in the city that can spark the economy. As the investments will be selected following a cost-benefit analysis that takes the social and physical impact of the technologies into account, the implementation of these new systems can be expected to enhance inclusivity and environmental and urban sustainability.

In the mid-term, the Plan for Soweto should be enforced as a condition to facilitate developments that promote adequate and sustainable density and mixed-use land use, which should create an urban layout that promotes connectivity, street vibrancy and economic development. As environmental-risk prone areas will be identified and delimitated if the plan gets enforced then vulnerable communities will be protected from living on hazardous land.

Moreover, infrastructure investments are expected to happen in the area following the needs identified by the Plan. This can include investments in roads, streets, basic services and affordable housing, which should enhance service provision in the area. Through the actual implementation of the identified strategies in the Plan for economic activation, businesses and enterprises can settle in the area and job opportunities can be created, especially for women, youth and disadvantaged groups.

Given that the Plan in Soweto integrates the identification of pilot projects to apply land development-enabling tools in a mid-term period these pilots could be implemented. This can serve to facilitate the Plan as a whole and contribute to the establishment of land-based finance mechanisms that can generate increased revenues for the municipality. The application of these pilots can serve as a learning experience that could be replicated in other areas of Soweto or Johannesburg, thereby contributing to strengthening municipal finances in the city as a whole.

LONG-TERM POTENTIAL IMPACT

In the long-term, if the interventions are sustained and expanded they can contribute to a wider impact on sustainable urbanisation. Soweto can consolidate as a thriving economic centre of the city attracting enterprises and businesses as well as investments in the area. Moreover, increased connectivity within Soweto and between it and the rest of the city can contribute to enhanced access to employment, services and opportunities for Soweto dwellers.

The introduction of new technologies such as Mobility as a Service (MaaS), Artificial Intelligence (AI), Sharing Economies, Internet of Things (IoT), Unmanned Aerial Vehicles (UAV) and so on can contribute to more efficient and sustainable transport in Johannesburg having an overall effect in reducing traffic congestion and air pollution. Additionally, given the country's emergent economy in new technologies and the shared economy, new investments in this sector can contribute to enhance this economic activity.

Contribution to Sustainable Urban Development

2030 SUSTAINABLE DEVELOPMENT GOALS

The Global Future Cities Programme aims to contribute the implementation of the 2030 Agenda for Sustainable Development whilst mobilising efforts to end all forms of poverty, fight inequalities and tackle climate change while ensuring that no one is left behind.

The Programme's interventions in Johannesburg can broadly contribute to:

SUSTAINABLE CITIES AND COMMUNITIES

Sustainable and Inclusive Cities (SDG 11) by promoting more efficient transport planning and more connected, mixed use and inclusive cities

ENHANCING MUNICIPAL FINANCE

Enhancing municipal finance (SDG 17) by supporting the city in applying land-based finance tools for increasing expenditure capacity for key public infrastructure

JOB CREATION AND ECONOMIC PROSPERITY

Job creation and economic prosperity (SDG 9 and 8) by enabling the structures for business creation and new market opportunities in emerging economic sectors

SERVICE DELIVERY AND AFFORDABLE HOUSING

Service delivery and affordable housing (SDG 6 and 7) by increasing service and infrastructure provision in deprived areas

EQUAL ACCESS TO JOBS AND SERVICES

Equal access to jobs and services (SDG 10) by improving connectivity across the city and supporting local economic development

INCREASED RESILIENT PLANNING

Increased resilient planning (SDG 13) by supporting a resilient built environment that avoids development on hazardous land

NEW URBAN AGENDA ALIGNMENT

The United Nations Conference on Housing and Sustainable Urban Development (Habitat III) held in Quito, Ecuador, in 2016 adopted the New Urban Agenda, a new framework that that lays out how cities should be planned and managed to best promote sustainable urbanisation.

The New Urban Agenda encourages UN-Habitat and others "to generate evidence-based and practical guidance for the implementation and the urban dimension of the SDGs in close collaboration with Member States, local authorities, major groups and other relevant stakeholders, as well as through the mobilization of experts."

The Programme is directly related with the UN-Habitat's draft Action Framework for Implementation of the New Urban Agenda (AFINUA). This framework is organised under five categories: (1) national urban policies, (2) urban legislation, rules and regulations, (3) urban planning and design, (4) urban economy and municipal finance and (5) local implementation.

On the urban planning and design side, the interventions aim to contribute to more connected, mixed use, resilient and inclusive cities. The Plan for Soweto will promote a vision for sustainable urban development

in the area that will be aligned with international principles. Moreover, it will support the wider city-wide Spatial Development Framework, thereby contributing to the overall goals of the city for urban transformation. The Fourth Industrial Revolution (4ir) Trends will also enhance more sustainable urban mobility in the city, contributing to a more sustainable urban form.

Regarding the AFINUA targets for Urban Legislation, Rules and Regulation if the Plan for Soweto gets enforced, it will contribute to establishing a legal basis in Soweto that ensures public space, adequate density, housing and commercial space in the area. Besides, if the proposed land tools are applied, there can be implementation of equitable and legal instruments to capture and share the increased of land.

Urban Economy and Municipal finance can be specifically enhanced through increased land-based finance tools for revenue generation. Additionally, given the focus of the Soweto Plan in developing economic and business activation strategies, the Programme can directly contribute to improving existing value chains by linking productivity strategies to the urban layout and physical landscape.

ALIGNMENT WITH CROSS-CUTTING ISSUES AND THE PROSPERITY FUND

The Global Future Cities Programme seeks to achieve higher rates of sustainable and inclusive growth while increasing long-term investments in sustainable urban projects. The two interventions for Johannesburg provide greater awareness, capability and confidence, while establish regulatory frameworks resulting in higher incentives for partnerships and financial mechanisms.

The four Cross-Cutting Issues of UN-Habitat, as identified in the Strategic Plan 2014-2019, are mainstreamed to ensure that all UN-Habitat work targets those with the most need and promotes socially- and environmentally-sustainable cities.[44] In this regard, the interventions detailed for Johannesburg are shaped under the mainstreaming of environmental safeguards, youth, gender equality and human rights.

With regards to the Programme's goals of enhancing sustainable and inclusive economic growth, the interventions will contribute to increased connectivity and more efficient transport as well as to job creation and the development of market opportunities for one of the most deprived areas of the city, which is Soweto.

The Plan in Soweto will specifically address the issue of human rights, as the intervention aims to facilitate service delivery and the provision of key infrastructure for low-income communities. It is important to note, however, that the Programme will provide a general framework and indicate infrastructure needs. In order for service delivery to happen the intervention should be followed by capital investment.

Climate change will be addressed by the promotion of new transport technology investments that improve connectivity, decrease congestion and improve air quality in the future. Similarly, here it is important to note that the Programme will only provide strategic advice for In which new technologies to invest and the city will have to ensure future investments to achieve the potential impact of these improvements. Additionally, the Soweto Plan, when enforced, can contribute to avoiding development in hazardous areas.

Gender and youth inclusiveness can be especially enhanced through the investments in new transport technologies that have taken into account uses by gender and age. Proposed investments in new technologies will have taken into account how it can contribute to enhanced access for women and youth as well as increased safety. Moreover, the Soweto Plan in its economic activation will have taken into account the importance of job creation for women and the youth of whom a high percentage is normally unemployed.

Success Factors

The following statements are considered to be evidenced success factors, based on international best practices, for the interventions in Johannesburg. This is in order to achieve maximum impact in line with the Goals, the Prosperity Fund and the cross-cutting issues. Success factors are divided into design and planning, legal and financial and aim to address potential barriers for the long-term sustainability of the interventions.

SPATIAL CONSIDERATIONS

Enhance a Sustainable Urban Layout

Currently, Soweto lacks diversity in terms of mixed-use activities, social infrastructure and consolidated public spaces. Through the Soweto Plan a sustainable urban layout can be enhanced through a city model that follows international principles of sustainable urbanisation and promotes compactness, connectivity and inclusiveness. The Plan can thereby follow the Five Principles of Neighbourhood Planning from UN-Habitat that promotes adequate space for streets, high-density, mixed-use developments with an enhancement of land allocated for commercial space, social mix and limited land-use specialisation.45 At the same time, the strategy should include adequate provision of affordable housing that is secured throughout the city and facilitates access to basic services and economic opportunities.

Credible Plans to Foster Economic Development

The Plan in Soweto aims to activate the economic activity in the area by attracting businesses and enhancing local economic development. Clustering firms and enterprises can be a good strategy as companies may profit from, for example, the spillover of ideas and inputs. However, it may be difficult to start attracting new firms within the project activation phase as it can seem a risky investment with no assurance that other firms will follow. The existence of a credible strategy and plan can enhance the attractiveness of the area as a location and can help coordinate and guide the private companies' expectations.

Public investments in transport links such as roads, bus lanes and light train stations can also act to anchor private investment expectations. By improving the connectivity and desirability of the surrounding property, these investments provide a credible signal of planned future investments in surrounding areas.

Ensuring Inclusiveness and Equal Opportunities for all

Improvements in the urban fabric and infrastructure provision in Soweto can have an impact in increasing land values. This can displace those current dwellers in the area who are unable to afford housing prices. Therefore, the Plan should ensure the provision of affordable housing that secures availability for low-income communities. Strategies for activating the economy in Soweto should ensure that they take into account the current economic basis in the area and focus on improving the existing value chains. This should ensure that the existing community can access the increased job opportunities in the area.

Impact of new Transport Technologies on Sustainable Urbanisation

The new transport technologies identified by the Review of the Fourth Industrial Revolution (4ir) Trends should contribute to the wider principles of sustainable urbanisation, including the promotion of an inclusive and compact city. Identified technologies should thereby promote affordability and the use of transport by low-income communities, woman, youth and people with disabilities. In the identification of potential technologies, the impact of these on the urban physical space should be considered and technologies should be prioritised that do not require increased space and infrastructure in the city.

FINANCIAL CONSIDERATIONS

Land-based Financing for Inclusiveness

Following the Plan in Soweto, land prices are expected to rise and this can be an opportunity for applying land value-capture mechanisms. This can, however, mean an increase in taxes to be paid by dwellers, which can displace those citizens unable to afford them. Therefore, the city may consider land-based finance instruments that put the burden on property developers such as impact or extraction fees46 or construction bonds.47

Consequently, these mechanisms can help with cross-subsidising social housing, basic services and key public infrastructure. These mechanisms, however, can only work if there is a real estate market that is interested in building in the area. In this regard, the provision of a Plan for the area that is solid and provides a clear strategy that attracts developers can contribute to apply these mechanisms.

Mitigate the Risks of PPPs for new Transport Technologies

Given that the Review of the Fourth Industrial Revolution (4ir) Trends will identify suitable new transport technologies for Johannesburg, when investing in these technologies there is scope to bring in the private sector in the form of public-private partnerships (PPPs). Private firms will most probably have the adequate skills, capacity and technical expertise for applying and managing these technologies. However, the city needs to ensure that the system and technologies applied are indeed designed and managed to the city's advantage and not the vested interests of the private sector.

LEGAL CONSIDERATIONS

Land Acquisition for Urban Transformation

In order to apply the Soweto Plan, land acquisition may be necessary for improving land use efficiency through vital infrastructure projects or placement of large job-creating industries. Where possible, this should be facilitated through voluntary market exchange but compulsory land acquisition is also justified if adequate compensation is given to those displaced. Resettlement strategies need to comply with international law, including UN Guidelines.

When eviction is justified to be necessary, it should follow the International Covenant on Social, Economic and Cultural Rights, Article 11, which contains the right to adequate housing as a component of the right to an adequate standard of living. This should also take in to account existing South African legislation on compensation, housing and relocation. Investment in legal and administrative capacity to run a smooth appeals process is also necessary to limit social unrest and ensure land ownership rights are observed. Relocation areas should be well connected to avoid socio-economic exclusion and incentivising informal settlements.

Knowledge and Human Capabilities in Transport Planning

While investment in new technologies may be beneficial for transport planning in Johannesburg, it is crucial to develop in parallel human capabilities and quantitative skills within the transport planning profession. This is essential to ensure that these new technologies are incorporated into transport plans and strategies and ultimately contribute to increased benefits for users and operators.

Integrated Transport Planning and Inclusion of Informal Operators

One barrier regarding transport planning in Johannesburg is the multiple and fragmented actors involved in transport in the city. This often creates an overlap in jurisdiction and unclear mandates. New transport technologies should consider this in their design and incorporate strategies to mitigate this risk. Additionally, semi-informal paratransit operators, being the main transport modes in the city of Johannesburg, should be integrated within new transport management tools and solutions. As a general principle it is easier to engage the informal sector in transport planning when there is a single or only a few operators, while the engagement is more complicated when operators are fragmented and compete against each other.

ENDNOTES

1 2011 census

2 Spatial Development Framework 2040, City of Johannesburg Metropolitan Municipality (2016)

3 Harrison, p., Gotz, g., Todes, a., and Wray, C. (2014). Materialities, subjectivities, and spatial transformation in Johannesburg. in p. Harrison, g. Gotz, a. Todes, and C. Wray (eds.), Changing space Changing City: Johannesburg After Apartheid (pp. 2-41). Johannesburg: Wits press

4 UN-Habitat (2010). state of the World's Cites 2010/2011 Bridging the urban Divide. pp.20

5 Stats SA. (2018, October 30). Quarterly labour force survey, Quarter 3: 2018. retrieved October 30, 2018, from stats sa: http://www.statssa.gov.za/publications/P0211/P02113rdQuarter2018.pdf

6 Spatial Development Framework 2040, City of Johannesburg Metropolitan Municipality (2016)

7 Based on the data from Weakley, D., & Bickford, G. (2015). Transport and urban development: Two studies from Johannesburg.

8 Johannesburg Strategic ITP Framework, 2013

9 Ibid 8

10 Ibid 8

11 Metrobus Annual Report 2017/2018

12 City of Johannesburg, Integrated Transport Plan 2003-2008

13 Ibid 12

14 Ibid 12

15 Gauteng Province Household Travel Survey, 2014

16 ITP,2018/19

17 IDP,2018/19

18 Spatial strategic framework

19 Ibid 16

20 Census 2011

21 Global Platform for Sustainable Cities. World Bank 2018: "Urban Sustainable Framework", 1st Ed.

22 The last official population estimates from the South African census are in 2011 and population within the CoJ jurisdiction in 2011 stood at 4,434,827, as can be found here: http://citypopulation.de/php/southafrica-cityofjohannesburg.php. Note that population will have grown since 2011, thus diluting the per capita population figure somewhat. The Spatial Development Framework 2040 estimates that population in 2018 could be as high as 5.4 million which would signify a municipal revenue per capita closer to 580 USD.

23 Example of cities in the US https://www.brookings.edu/wp-content/uploads/2018/07/20180718_Brookings-Metro_City-fiscal-policy-Pagano-Hoene-final.pdf

24 The law can be read here: http://www.cogta.gov.za/cgta_2016/wp-content/uploads/2016/09/LG-Municipal-Property-Rates-Act-no.6-2004.pdf

25 South African Cities Network (2015) State of City Finances. ISBN: 978-0-620-68573-3 Online: http://www.sacities.net/wp-content/uploads/2015/11/SACN_SOCF_FINAL.pdf

26 The complete expenditure breakdown can be accessed at Table A2 (pg. 20) of the budget book Online: https://www.joburg.org.za/documents_/Documents/Budget/2017-18%20BUDGET%20BOOK.pdf

27 This trend is based on the projections by the CoJ made in the Medium-term Budget 2017/18 – 2019/20. The figures for 2016-17 are real, while the rest are projected spending.

28 For more on this, read: http://siteresources.worldbank.org/EXTWAT/Resources/4602122-1213366294492/5106220-1213804320899/19.1Municipal_Fund_South_Africa.pdf

29 Business Report. City of Johannesburg debt Is stable - Moddy's. https://www.iol.co.za/business-report/economy/city-of-johannesburg-debt-is-stable-moodys-17633646. [accessed 30 November 2018]

30 The guidelines can be read here: https://www.gtac.gov.za/Publications/1090-Municipal%20Service%20Delivery%20and%20PPP%20Guidelines%20new.pdf

31 The complete list of municipal PPPs can be read here: http://www.ppp.gov.za/Pages/municipal.aspx. It should be noted that each of these PPPs are a different stage of the process.

32 The image is extracted from the City of Johannesburg 2016/17 Integrated Annual Report.

33 Source: https://nationalgovernment.co.za/units/view/10/department-cooperative-governance-cogta

34 Fesseha, Y., & Steytler, N. (2006). Provincial Intergovernmental forums: A post-Intergovernmental relations Framework Act compliance assessment, Community Law Centre, University of the Western Cape

35 Kgwedi, R., & Krygsman, S. (2017, July). Minibus-taxis as providers of scheduled, park & ride services: a concept for Stellenbosch. Southern African Transport Conference.

36 City of Johannesburg Metropolitan Municipality, Joburg 2040 Growth and Development Strategy (2011), Online: https://www.joburg.org.za/about_/Documents/joburg2040.pdf

37 The SDF was developed with the support of UN-Habitat, and is available here: https://unhabitat.org/books/spatial-development-framework-2040-city-of-johannesburg-metropolitan-municipality/

38 The plan can be read here: https://drive.google.com/file/d/0B9bSjvbPH7EGbDV6N045MklUMm8/view

39 Ibid 37

40 Ibid 37

41 Ibid 37

42 City of Joburg, (2009) Climate Change Adaptation Plan for the City of Johannesburg. Online: https://www.joburg.org.za/Campaigns/Documents/2014%20Documents/climate%20change%20adaptation%20plan_city%20of%20joburg.pdf

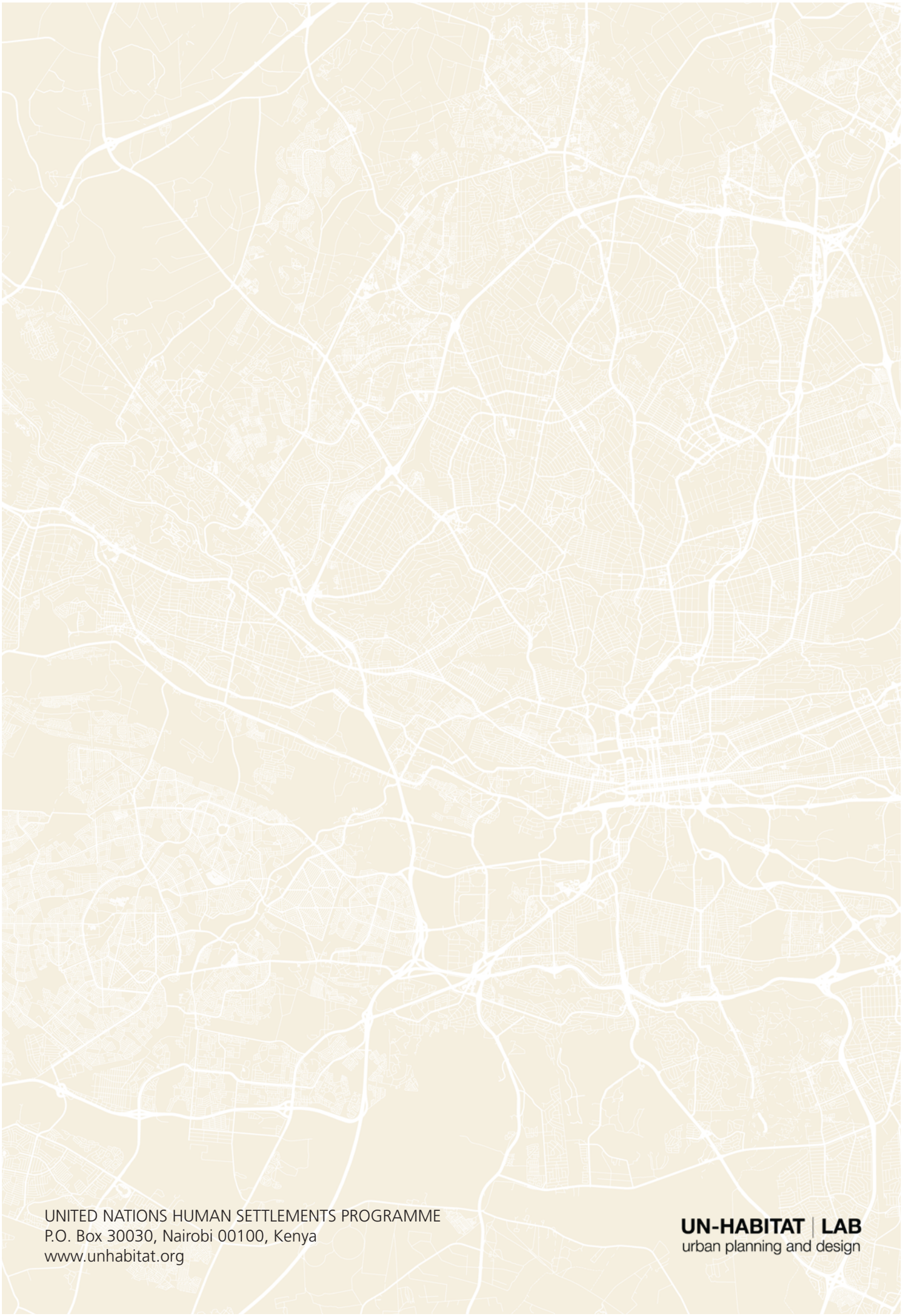
43 Ibid 43

44 UN-Habitat Cross-Cutting Report 2017

45 https://unhabitat.org/wp-content/uploads/2014/05/5-Principles_web.pdf

46 Impact fees includes all costs necessary to ultimately service the developed piece of land and is to be paid to the city upfront in conjunction with issuing the development rights to the land. Extraction fee is when the developer receives the rights to develop a piece of land but has also to invest in the infrastructure that will be necessary to service that land.

47 Construction bonds give the rights to a developer to build at a higher density than allowed by zoning regulations. These bonds can be sold or auctioned off resulting in revenue for the city from their anticipated value.



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