

The Future of Africa's Cities

Urbanisation is remaking Africa

Urban Youth Bulge in Nigeria:
Demographic Dividend or Dilemma?

Institutional & Financial Precursors for Success:
a quick look at 5 African Cities

StatsSA:
In conversation with the Statistician-General, StatsSA



Akanani

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FOREWORD



Nelson Mandela once said, *"I dream of an Africa which is at peace with itself"*. This peace today, is not only peace from wars. While wars are still a big part of many African countries, the peace referred to here is also about an Africa that is safe, accessible, resilient and sustainable. This is particularly important given that Africa is urbanising at 4% per year. African cities are estimated to house 2.5 billion people (60% of its population) by 2050 compared to the 1.23 billion people in 2015. This expansion is happening in the global context that, for the first time in history, humans are predominantly urban. Although cities occupy less than 2% of the earth's land surface, they house almost half of the population and use 75% of the earth's resources.

Much of Africa's urban expansion has been happening steadily over the last few decades. The conversation regarding the explosion of cities has however been centred elsewhere, for example on Asia, especially on megacities with populations of 10 million or more. This might be partly due to the fact that there are just three megacities in Africa; Cairo, Lagos and Kinshasa; with an expectation of a few more to join the cohort, such as the Gauteng city-region in the coming decade. Focusing on megacities is significant but not sufficient. Just like urbanisation globally, the rapid and most challenging growth in Africa's urban wave is occurring in smaller and medium-sized cities and towns. It is not necessarily their sizes but the speed of their growth that matters the most. It is critical to consider that 70% of Africa's urban growth will be in intermediary cities.

Africa's urbanisation has not been accompanied by economic gains as seen elsewhere in the world. Inequalities have been aggravated by factors such as infrastructure shortages, colonial urban planning postulating cities as centres for extraction, an absence of decentralised political power to the local level, and even more critical, insufficient planning and visioning for the future.





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It therefore gives me great pleasure to present the first issue of AKANANI with the theme “Inspiring Africa’s Future Cities”

Urban actors have attempted to address Africa’s spatial legacies retroactively but seemingly, the attempts haven’t been sufficient enough to leapfrog Africa’s cities into a more sustainable future. Clearly there are no simple solutions to the challenges. The complexities currently faced by our cities require a systemic, holistic and transdisciplinary approach that spans different disciplines and expertise such as urban planning, urban design, architecture, systems analysis, urban engineering, social sciences, policy making, communities and entrepreneurship, to name but a few.

It therefore gives me great pleasure to present the first issue of AKANANI with a theme “Inspiring Africa’s Cities”. This theme is particularly pertinent considering the urban revolution in Africa. Although we cannot absolutely predict what Africa’s cities will be like in the future, we should be able to think about probable future scenarios based on the current knowledge and trends. SALGA, together with its partners, aims to offer a platform to generate conversation, sharing and learning across the country and beyond its borders. We believe that cities are a product of the interventions of government, the private sector and

the people that exist within the urban spaces. We aim to showcase the possibilities that exist within cities, to provide a diverse range of voices to disrupt the reproduction of the problematic status quo ideas thus creating conditions for a vibrant and robust learning experience.

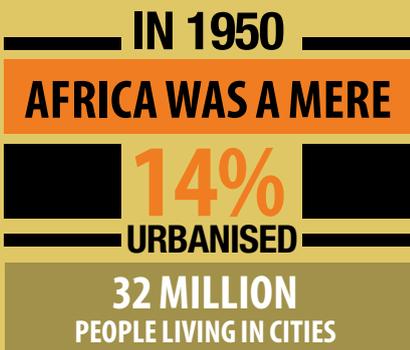
As alluded to, addressing the plethora of complex challenges currently faced by African cities requires players to transcend silos. In light of the need for this transdisciplinary approach, articles in this publication are contributions from local government, academia, private sector and researchers locally, on the Continent and further afield. A wide range of disciplines are covered in the publication including finance, mobility, waste management, governance and food security amongst others. The combination of these issues truly showcases the complexities confronting our cities. At the same time they highlight great opportunities that could be derived by co-creating the future we want.

Mr Xolile George: SALGA CEO



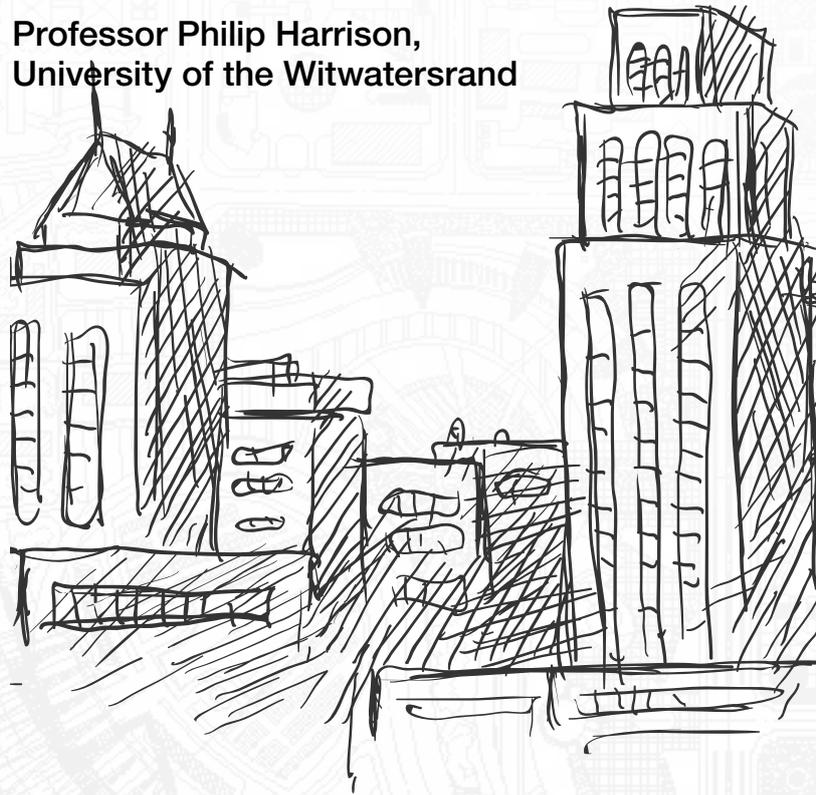
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-  Unblocking Africa's Energy Future

URBANISATION IS REMAKING AFRICA



The future of Africa's cities

Professor Philip Harrison,
University of the Witwatersrand



Urbanisation is remaking Africa. In 1950, at the tail end of the colonial era, Africa was a mere 14 percent urbanised, with only 32 million people living in cities. By 2015, the level of urbanisation stood at 40 percent with nearly 472 million city-dwellers. It is expected that by 2050, 55 percent of the population will be urbanised, with over 1339 million people living in cities (1). Without lessening the continued need to pay attention to Africa's still large rural population¹, we must proactively face the enormous challenge of absorbing within cities an additional 867 million plus people over the next three-and-a-half decades.

We do not, of course, have any way to know what the cities of Africa will be like in 2050. There may be some value in sketching probable futures into the medium term, drawing on available knowledge of established and emergent trends. Into the longer term, given the large "cone of uncertainty", even reasoned speculation of this sort may have little value. Rather than forecasting into the distant future we may rather ask what we might do now to improve the prospects of a better future.

If uncertainty is the one challenge in the writing of Africa's urban futures, the other is diversity. Africa is a global region with 54 nation states, each with its own political,

¹Africa is, in fact, the one region in the world where both urban and rural populations are growing robustly, with the 45 percent rural population projected for 2050 large in both absolute and proportional terms. Moreover, the urban and rural in Africa is often closely interconnected with simplistic categorisation, obscuring a complex, hybridised urban-rural reality.



economic, social and governmental contexts and arrangements. In 2014, the UN identified 183 urban agglomerations in Africa of which 56 had more than one million residents each. In the future there will be many more such urban centres, each with its own circumstances, requiring individual study and response. To speak generically of the future of African cities is, for example, to place Cape Town in South Africa in the same analytical category as Mogadishu in Somalia, or Tunis in the same category as Maseru.

In the sections below, I combine the methods of “futurology” by both exploring trends and possible futures, and asking what it will take to improve these futures. I do so with the acknowledgement of the diversity of Africa, and the hazards of speaking generally. Before turning to the future, I briefly sketch the circumstances of the present, and the recent past.

The baseline

The starting blocks across Africa vary enormously. In countries including South Africa, Botswana, Morocco, Algeria, Libya, Gabon and Djibouti, more than 60 percent of the population is already urbanised and further growth of the urban population will be limited. In Burundi, Malawi, Uganda and Ethiopia, levels of urbanisation are still less than 20 percent and rapid, disruptive urbanisation still lies ahead. There are, of course, many countries in-between.

The growth rates of individual cities have also been hugely uneven. The cities of Ouagadougou in Burkina Faso and Mogadishu in Somalia have topped growth rankings globally, with sustained increases of over 7 percent per annum. Other cities of rapid growth include Kinshasa, Luanda, Dar es Salaam, Yaoundé, Antananarivo, Douala, Bamako, Abuja and Lubumbashi. At the same time there are cities where population growth has been slow, including, for example, Alexandria, Tunis, Casablanca, Rabat, Cape Town, Port Elizabeth and Durban. Interestingly, and in contrast to other global regions, there is no obvious difference in growth rates across the size of cities. There are fast-, medium- and slow-growing cities in all categories - mega cities (more than 10 million people), large cities (5 to 10 million), medium-sized cities (1 to 5 million) and small cities (less than 1 million). Despite perceptions, only 9.3 percent of the urban population live in Africa's three mega cities (Cairo, Kinshasa and Lagos), with the remainder distributed across the urban network.

A discussion on the nature of Africa's cities is complicated by a discourse on Africa that is unhelpfully split between a gloomy afro-pessimism and an optimistic hype. Afro-pessimism offers a dystopian view of Africa's cities as places of poverty, informality, corruption, decay and conflict. The hype draws on the recent experience of economic growth, an expanding middle class, burgeoning city skylines, and new infrastructures. The reality is invariably more complex, variegated and hybrid, requiring a sober assessment of the mix of trends across very different cities.

Since the 1990s, Africa's cities have become more diverse, both between and within, requiring more careful empirical study. Slums and infrastructural decay are indeed still realities of urban Africa, but so are new nodes of global modernity, including the high rise development in CBDs and the growth of new satellite cities. These are, however, the extremes, with many in-betweens where formality and informality intersect, and where residents and business co-exist along the income spectrum.

The urbanisation of the recent past has brought both benefit and problems. Internationally, there is compelling evidence to suggest that urbanisation and economic growth are mutually reinforcing. The case of Africa is more ambiguous. Although the more urbanised countries in Africa generally have higher levels of GDP per capita than the less urbanised, there are African countries where urbanisation is associated with GDP per capita that is falling or stagnating. There is a growing consensus that a critical underlying cause is the disconnection in many parts of Africa between urbanisation and industrialisation (2). Colonial rule distorted Africa's economies towards the production and export of raw materials and the import of manufactured goods, and most countries have followed this pattern through the post-colonial era.

Where urbanisation proceeds together with industrialisation, rural-urban migrants move from low productivity agriculture into higher productivity manufacturing and this supports higher wages and better living standards. Also, the demands of manufacturing compel greater investment in education, and in the infrastructures needed for urban functionality. Eventually the economy may become more tertiary in character but it does so within the context of high labour productivity, established urban infrastructure, and a strong skills



Africa has the highest levels of “vulnerability” of any global region. 13 of the 15 most vulnerable countries worldwide are in Africa.

base. Where industrialisation does not occur, migrants move directly from low productivity agriculture into low productivity, and often informally-provided, services. Workers remain trapped in low wage sectors while the pressures to improve urban functionality are limited. Where the state lacks the capacity to provide meaningful social security, the urban poor rely mainly on social networks for support, but these, too, are often fractious and unreliable. Exacerbating vulnerability is the way in which the low earnings in Africa’s cities come together with high costs of food, transport and other necessary goods and services. For equivalent goods, Luanda is more expensive than Zurich and Kinshasa more than Shanghai.

In most parts of Africa, the structural economic transformation required to ensure a broad-based improvement in the productivity, wages and living standards of workers has not happened, and economic and social precariousness remains a norm. There has however been significant economic growth in the recent past across much of Africa although this growth has been driven largely by an increase in commodity prices. In some countries an oil boom or the extraction of diamonds or other minerals has enriched a tiny, rapacious elite but, in others, the wealth has spread more, creating a new middle class. Demand by the middle class has supported the growth of shopping malls, telecommunication networks, tourism, real estate and transport, but has not (yet) translated significantly into local manufacturing. The rise of the middle class has been hyped; it has, nonetheless, contributed to the remaking of Africa’s cities with new (formal) spaces of living, working and consumption. The continued poverty and neglect of the majority however produces cities of disparity where the elites and middle class retreat into protected enclaves surrounded by the slums and crumbling infrastructures of the poor (3).

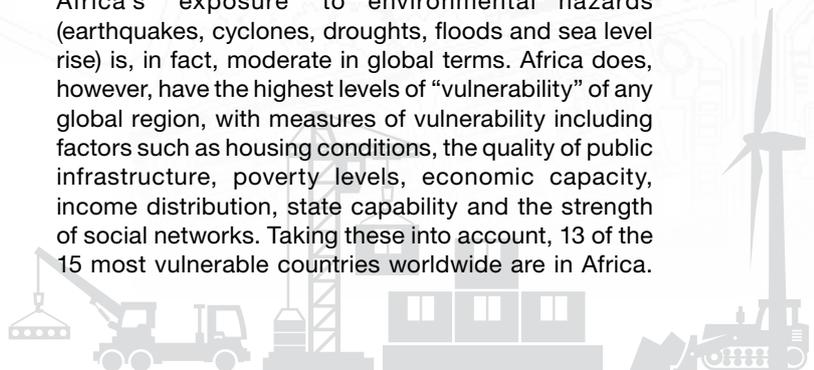
The critical shaping factors

The future remains open, and will be shaped by multiple, interacting factors. We cannot of course deal with the intricacy here but we may reasonably distil some of the complexity into three critical shaping factors – ‘resource threats’, ‘economic drivers’ and the ‘quality of governance’.

Resource threats

The water emergency in Cape Town has drawn our attention once again to our dependence on the natural environment. Here, a relatively well managed city faces a crisis that is commonplace in many other cities where infrastructural systems are barely functional and residents live in a persistent state of vulnerability.

Africa’s “exposure” to environmental hazards (earthquakes, cyclones, droughts, floods and sea level rise) is, in fact, moderate in global terms. Africa does, however, have the highest levels of “vulnerability” of any global region, with measures of vulnerability including factors such as housing conditions, the quality of public infrastructure, poverty levels, economic capacity, income distribution, state capability and the strength of social networks. Taking these into account, 13 of the 15 most vulnerable countries worldwide are in Africa.





Urbanisation has a double-edged effect on vulnerability – it brings greater numbers of people closer to economic and social support but also concentrates larger numbers of people in places of risk.

A particular risk, of course, is the effect of global climate change. Africa contributes only 3.6 percent of the world's greenhouse gas emissions but is the continent that is most vulnerable to the effects of climate change including rising sea level, intensified weather events, the expanding range of the malarial mosquito, food insecurity, endangered ecosystems, and water stress. With the exception of coal-dependent South Africa, and a handful of oil-producing countries such as Angola, Algeria and Gabon, Africa can do little to reduce the scale of climate change, but it is clearly possible to reduce the effects of climate change on vulnerable people through a range of adaptive and coping measures. This is particularly important for cities including Lagos, Abidjan, Alexandria and Dar es Salaam that face the creeping disaster of inundation by rising sea level.

Economic drivers

Africa has done well economically since the late 1990s, although with significant regional and national variation, and a dip in 2016 due to a slump in commodity prices. According to international agencies such as the World Bank, UN and ECA, economic prospects for Africa over the medium-term are moderately good, with the current set-back of a short-term nature. Although uncertainties and risks into the longer-term are huge, growth prospects are seemingly positive with the youthful population in Africa contrasting with the ageing populations of other regions of the world.

Africa's formal economy remains, however, very small in relation to the population size and this will remain the case for the foreseeable future. For a long time to come, the informal sector will remain a critical source of both livelihood and of access to affordable services. Governments in Africa will need to reassess their attitudes to informality, supporting residents who are forced by circumstances into often vulnerable informal employment and accommodation.

The decisive factor for the future, however, will be the extent to which Africa's economies will undergo structural economic transformation. Commodity-dependent economies must diversify while urban economies need to move up the value-added chain if real wages are to rise, allowing the urban majority to escape the low productivity, low wage trap. At the same time, the cost of living needs to be reduced through improvements to urban functionality. There are positive prospects but ongoing work is needed in promoting industrial strategy, investment in urban and economic infrastructures, reducing corruption, opening access to entrepreneurial and job opportunities, and improving governance and regulatory environments.

The prospects and challenges do, of course, vary across Africa. Many cities in North, West and Middle Africa, for example, remain overwhelmingly dependent on a mineral and oil economy, and are extremely vulnerable to the fluctuations that are characteristic of this economy. Here the challenge of diversification is greatest. East

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Africa, by contrast, is less commodity-dependent, and the recent growth of cities such as Nairobi, Addis Ababa, Dar es Salaam and Kigali has been more stable, although political instability is a worry in places.

Hopefully, across Africa, economies will gradually mature over time into sustainable, diversified and inclusive forms, and by 2050 most cities will have sizable, job-creating, formal economies. However, even economic success does not guarantee liveable cities. It is necessary for some of the benefits of this growth to be captured for the public good and, to achieve this, requires functional governance.

The Quality of Governance

The local state is the interface between government and citizens, with local government having to provide everyday services, as well as facing the responsibilities of managing often rapidly growing urban agglomerations through shaping and co-ordinating the often competing, needs and requirements of multiple urban actors. With some notable exceptions, the difficulty across Africa is that local governance is weak, with local authorities disempowered (and, in some cases, non-existent).

Urban governance in Africa is a complex matter with formal systems often bearing little resemblance to actual practices. Historically, local government has had few powers, lacked professional staff and own revenue, and has been closely controlled by central authorities. From the 1980s, however, there has been rhetoric of “decentralisation” across much of Africa, promoted by international agencies. The practice of decentralisation has however been varied owing to factors such as political resistance from central and provincial politicians, weak skills at local level, and a lack of financial resources locally to take on extra functions. In countries including the DRC, Uganda and Nigeria, political factors have undermined formal provision for decentralisation; in Cote d’Ivoire and Mali, regional conflict has delayed decentralisation; while, in countries such as Tanzania, Rwanda, Malawi, Mozambique, Zambia, Senegal and Sierra Leone, decentralisation has been constrained by limited local capacity. There are, however, countries where there has been apparent success. It is still early days to assess success in post Arab Spring North Africa, but (uneven) progress is evident in countries including South Africa, Botswana, Namibia and Mauritius.

Local governance does not only involve the formal operations and capabilities of municipal government, it also requires the decisions and activities of a range of other institutions and processes through which people’s everyday lives are managed including, for example, global agencies, private corporations, NGOs, traditional authorities and local associational networks. Some processes are formally structured but others involve informal networks and activities including various forms of patronage, clientelism, personal brokerage (and, outright, corruption).

The sustainability of Africa’s cities requires significant and systemic improvement in local governance, and in the support that cities receive from other levels. This will involve programmatic responses to: improving accountability to citizens; developing mechanisms for civic engagement and participation; strengthening

appropriate legal and institutional frameworks; fighting corruption and patronage; strengthening learning processes across government; improving the fiscal base of local government; improving skills and other capacities within the bureaucracy; more robust strategic, spatial and project planning; better use of technologies in governance; and, ethical, responsive and committed leadership.

The functionality of urban environments is closely tied to the quality of local governance, with local government playing a critical role in planning, coordinating and managing the development of the built environment. The successful management of urban growth requires: institutions and mechanisms that deliver property rights, allocate development rights, value land, and regulate land development; the means to finance and deliver critical services and infrastructure; and mechanisms to plan and coordinate growth in a way that aligns the provision of jobs, infrastructure and housing, and avoids problems such as long and costly daily commutes (4).

And so...the future?

So, what will the future bring? The work of the UN Population Division allows us to speculate with a level of confidence on the numbers. We know that Africa is likely to be the world’s foremost urbanisation hotspot to 2050, even surpassing East and South Asia, accounting for over 36 percent of new global urban growth. We anticipate, for example, an urban population increase of around 867 million by 2050, unevenly spread across the regions and countries of Africa. Western Africa is expected to contribute the largest increase (about 353 million) followed by Eastern Africa (278 mill), Middle Africa (129 mill), Northern Africa (90 mill) and Southern Africa (18 mill). At country level, Nigeria is expected to contribute the third largest absolute increase in urban population after India and China, with the other African countries among the world’s top ten contributors being the Democratic Republic of the Congo, United Republic of Tanzania and Ethiopia.

The mega cities of Africa will attract the greatest attention, with the challenges of urban governance most visible in these places. By 2030, the Central Witwatersrand (Johannesburg-Ekurhuleni) will have edged over into the mega city category, with Luanda and Dar es Salaam also included with Lagos, Cairo and Kinshasa as mega cities. However, much of the new growth will, in fact, happen in smaller and medium-sized cities.

The quality of growth is another matter. What will life be like for the anticipated 1.4 billion urban citizens in Africa in 2050? If we base future prediction on the immediate past (post-1990s) there is cause for cautious optimism. There has indeed been an improvement overall in economic performance, with the proportion of people living in extreme poverty gradually declining (although the absolute numbers in poverty remain worryingly high) (2). In places, the improved economy is translating into better urban functionality, although this is often only for the urban elite or middle class.

If we project this into the future there is likely to be a fitful and uneven improvement in the quality of Africa’s cities, although, possibly, with rising disparities between a glitzy afro-modernity and the continued vulnerability of





a majority living in slum-like conditions. The 'wild card', of course, is the effect of growing resource scarcity and of global climate change. There are looming problems of coastal and inland flooding, water shortages, spread of disease, and food insecurity, with some cities affected far more than others. Significantly improved governance may however moderate these effects and reduce overall vulnerability.

A broad-based improvement in the quality of life in Africa's growing cities requires changes in the economic growth path. International agencies such as the UN's Economic Commission for Africa are now arguing vigorously that industrialisation is necessary if the urban majority is to escape the low skill, low wage trap. The prospects for *ex post facto* industrialisation are, however, debateable. Given the nature of global competition, it is extremely difficult for new countries to enter the industrialised economy. Nevertheless, there are possible opportunities for Africa including: stronger local demand from a growing middle class; the promise of a Fourth Industrial Revolution which enables more geographically dispersed production; the spread of ICT across the continent; and, the possible relocation of lower end manufacturing from China.

Economic improvement will translate into more liveable cities if systems of local governance are improved. Without robust and accountable systems of governance, the expected growth of Africa's cities will massively strain the limited available resources. The governance system must be sufficiently capacitated and motivated to: capture value from economic growth for the public benefit; mediate social conflicts and address problems of social disaggregation; plan the city into the future; improve environmental quality; and, successfully manage critical urban systems such as water, energy, waste, health, education, transport, and digital infrastructure.

Invariably, cities will develop differently across the continent. North and Southern Africa generally have high existing levels of urbanisation and established economies. There are at least two possible trajectories for cities in these regions. First, slowing demographic change and economic maturity may diminish the dynamism of growth and change, with urban economies, systems and infrastructures entering a lifecycle stage of gradual decay. Alternatively, slowing demographic change may allow cities to give more attention to the quality, sustainability, inclusiveness and liveability of

urban infrastructures, services and environments. Much will depend on the leadership and strategic vision of individual countries and cities.

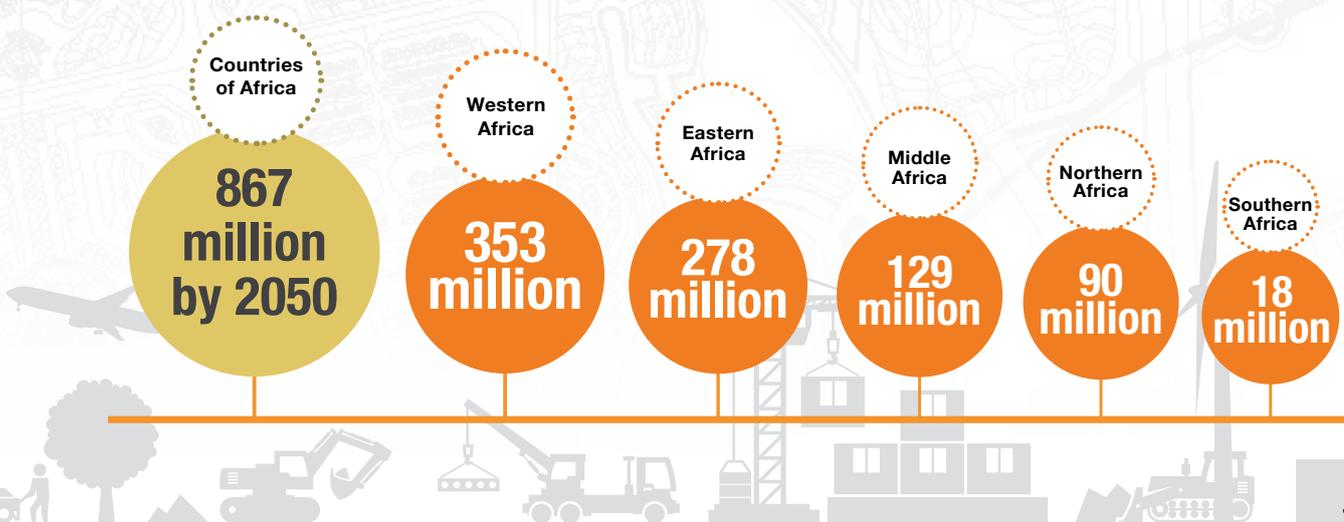
Across much of the rest of Africa, urbanisation is likely to be rapid to extremely rapid. The pace of urbanisation will be socially and politically disruptive but the question is whether the various countries and cities will evolve the strategic, coping and adaptive strategies to leverage this growth for inclusive social benefit. In the worst scenario, expanding urban agglomerations will be associated with increasing levels of economic, social and physical distress; except, perhaps, for the urban elite living and working in secured enclaves disconnected from the broader city. It is only with more inclusive and dynamic economies, and more robust systems of governance, that cities will, at the same time, achieve rapid population growth, better infrastructure and services, and more liveable environments.

The future of Africa's cities is, ultimately, unknowable. It is not out there waiting to be discovered through an act of clairvoyance. It will unfold, gradually, as multiple contingencies are brought to bear *but also* as agents of governance make conscious choices and act with intention. We can do little about the forces beyond our control but we can increase the *prospects* for a better future through present-day anticipation, planning and intervention. At the global level, progress is being made. We have, for example, the Sustainable Development Goals, the New Urban Agenda and the Paris Agreement. For Africa, we have Agenda 2063 and, in a number of individual countries, there have been improvements in the quality of governance nationally. Arguably, the most critical intervention in the immediate future for long term success is to build properly capacitated and accountable governance structures at local level, adequately supported by other levels of government. It is the cumulative effect of progressive decision-making and committed action over the decades that offers the best chances for a future that conforms neither to the dystopian vision of urban chaos and decay nor to the dazzle of an urban modernity serving a small elite.

Acknowledgement

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Anticipated urban population increase by 2050





Enhancing knowledge for **thinking differently** about future African cities

by Christina Culwick, The Gauteng City-Region Observatory (GCRO)

Urbanisation and rapid population growth in cities are widely regarded as the defining characteristics of the current era. It is anticipated that by 2050 some 60% of the world's population will live in cities (5). Not only has the balance tipped in terms of the proportion of people living in urban rather than rural areas, but the size of the global population has, and continues to grow at unprecedented rates (6). The first 'wave' of urbanisation, where the urban population grew to 30% of the global population, occurred mainly in cities in 'industrialised' / 'developed' countries – the global North. However, the second urbanisation wave, where the urban population will rise from 30% to 60%, is taking place primarily in the global South, and in particular Africa and Asia (7). While proportionally these two urbanisation waves are equivalent, both the size of population and the rate of growth in the second wave far exceeds that of the first.

Cities and urban infrastructure are necessary for meeting the needs of urban residents, however, the way cities have developed in the past has led to a range of negative consequences. Some of these include transforming and degrading land and natural systems, high consumption of natural resources, pollution and concentrated waste

production. Cities are also where the starkest inequality exists. Climate change projections and disaster risk assessments consistently identify urban residents, and in particular the urban poor, as the most vulnerable to the negative impacts. This is in part because urban development increases rainwater runoff and raises ambient temperatures (the urban heat island effect) which exacerbate disaster risks. Furthermore, the rate of urbanisation has led to a mismatch between the demand for housing, infrastructure and services, and the provision of these services. In the global South housing shortages result in people settling in marginal and vulnerable areas within cities (e.g. flood plains), further increasing their risk (8). Despite these negative consequences of urban development, cities are likely to be the best way to meet the needs of the growing populations through innovation and harnessing the opportunities that exist within cities.

African cities are growing rapidly and the challenges that have been identified as key global concerns are concentrated on the continent. Global warming, for example, is projected to occur in Africa at a rate nearly double the global average (9). This means that if there is a global temperature increase of 2 °C, Africa will





and jobs can be met or facilitated. To be able to plan for future cities, it is valuable, if not critical, to understand the dynamics of cities and the extent to which cities, in their existing urban form, are able to meet the needs of current populations.

One of the defining features of African cities is the backlog of housing and infrastructure. This has led to growing numbers of people living informally, and a persistently poor level of access to basic services. It is becoming clear that the past visions of 'slum free cities' are unlikely to ever be achieved in African cities in the foreseeable future. These visions have been quite strongly critiqued and have been flagged as unhelpful in conceptualising future urban spaces. There is growing focus on better understanding the dynamics of informality, in its many forms, and how these dynamics can be used to enhance how cities are understood and managed. For example, Simon (10) highlights that the complex tenure systems and housing arrangements evident in many slums are inadequately considered or included in urban housing policy. Furthermore, a recent survey found that some eight percent of people who are currently living in an informal dwelling in Gauteng, South Africa, would choose to continue living informally. This suggests that while the living conditions are poor, these contexts provide other benefits and opportunities that may be more difficult to harness in more 'formalised' contexts, such as access to work opportunities.

Access to economic opportunities is an important consideration, particularly in light of high unemployment and poverty levels. African urban residents draw on a range of formal and informal employment opportunities to earn money or make a living. Where people live, access to transport, as well as demographic and social dynamics influence people's ability to make a living. While government is not responsible for, or well positioned to, create jobs, the way that cities are planned has a direct influence on connecting people with economic opportunities. The location of housing and the way urban transport systems are designed play a very important role in how far people must travel to work, or to look for work, how long these trips take and how much people spend to traverse the city. Many scholars have identified that housing development on the urban edge significantly increases resource consumption, pollution, congestion, environmental degradation, as well as increasing the cost of infrastructure, services and transport (11). However, decisions about how cities should be planned and developed require trade-offs between social, environmental and economic factors.

2. Doing things differently

Recent global commitments such as the 2030 Agenda for Sustainable Development and the Paris Climate Agreement, have sharpened the focus on the inadequacy of the past approaches to urban development for building cities that are liveable, inclusive and environmentally sustainable. There is growing acknowledgement that many traditionally separate goals are interdependent and thus need to be considered together. There are growing calls for deliberate integration of efforts towards sustainable development, disaster risk reduction, poverty reduction and addressing climate change.

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experience a 4 °C increase. This will have knock-on effects for climate-related risks such as droughts, floods, heat waves and famine, many of which are already being experienced across the continent.

African cities are faced with the challenge of accommodating the expanding urban populace, ensuring their basic service needs are met and enabling access to economic opportunities. However, this all needs to be done in ways that do not lead to or entrench existing unsustainable and unjust outcomes, or exacerbate climate and disaster risk. This requires understanding the scale and nature of the challenge as well as how approaches can be rethought to enable change in how things are done within the African city context.

1. Understanding African cities

The rapid growth of African cities, with a combined urban population expected to reach over one billion by 2050, will have significant implications for the way African cities function, as well as their planning and management. Cities need to consider a range of interconnected factors in planning how the demand for shelter, basic services



The need to rethink past approaches together with the current urbanisation context, highlight the necessity to look beyond experiences from the global North to guide visions and plans for future urban development (12). Not only is the need for doing things differently most acute in African cities, but there are also significant opportunities for mobilising new and innovative approaches that can enable leapfrogging. This type of opportunity has been evident in Africa already through the penetration of mobile phones that quickly made physical telephone infrastructure redundant.

While there are many opportunities for rethinking dominant urban development approaches in the African context, there are significant prospects for rethinking urban infrastructure, and the potential for enhanced, local knowledge and data to guide visions and decision-making in African cities.

Infrastructure transitions

Urban infrastructure plays a critical role in influencing a wide range of dynamics such as the overall liveability, resource intensity, accessibility, resilience and sustainability of cities and their inhabitants. While the chronic infrastructure backlog in many African cities is a significant challenge and barrier to achieving liveable cities, the fact that these cities are not locked into a trajectory because of the existing infrastructure network is a significant opportunity. This provides African cities with the potential to maximise on the progress in fields such as renewable energy and battery technology, transport innovation and the use of green infrastructure.

Green infrastructure, or ecologically based infrastructure, is increasingly being considered as an alternative to traditional infrastructure. Green infrastructure refers to the network of ecological features (e.g. trees, plants, grasses, wetlands) and includes constructed features such as green roofs, rain gardens and bioswales. This network can help deliver services such as stormwater management, air and water purification, and temperature control. It can also be designed to support, replace or be used in tandem with traditional infrastructure, integrated into the infrastructure network.

Green infrastructure has been labelled a sustainable, multifunctional and resource efficient way of providing urban infrastructure. It provides an opportunity to meet the service needs of cities while reducing greenhouse gas emissions; building resilience to disasters; and creating greener, more liveable cities. African cities tend to have larger proportions of undeveloped land than developed cities, thus providing African cities with greater opportunities to harness green infrastructure options. If cities in Africa are able to incorporate green infrastructure approaches at the beginning of planning and infrastructure design, they will avoid the costs that many cities in North America and Europe have faced to retrofit their existing infrastructure networks with green infrastructure.

However, a significant challenge in using green infrastructure approaches in African settings is that the majority of research, design standards and evidence comes from the global North. This means that many of the challenges that exist in African cities are not

considered within 'best practice', thus undermining the ease of adopting this new approach. For example, there is a paucity of research and green infrastructure solutions that can cope with high sewage levels, as is common in African cities where access to adequate sanitation is limited. This lack of evidence increases the risk and may limit the willingness for government officials to adopt this approach.

Enhancing data and knowledge

There are widespread calls for enhanced data and modelling to understand and address global urbanisation challenges, and African cities have a particular dearth of research that can inform how cities are envisioned and planned into the future (7, 13) (Culwick et al., 2017; Pieterse and Parnell, 2014). African cities, where some of the greatest challenges for sustainable development and disaster risk reduction are situated, typically struggle to apply data driven approaches because of gaps in the availability and quality of data (14, 15). While data and indicator-based approaches remain valuable, these data challenges put into question the sole reliance on such tools in finding ways to overcome urban challenges (13).

The current information gap in African cities prevents proper planning and limits the ability to respond to the current (and future) needs and dynamics of African cities. It is thus critical to build a knowledge base that will inform urban decision-making on the continent. Within this challenge lies an opportunity to draw on innovative approaches to data collection and analysis. The Digital Matatus project in Kenya is an example of how mobile technology was used to collect travel data, in order to improve public transport in Nairobi. This project not only mobilised technology to enhance the accessibility and usability of the city's public transport, but it has pushed the boundaries of traditional transport data collection around the world.

3. Where to from here?

Cities in Africa attract people for economic and other opportunities, however, their urban form can undermine the ease of connecting people with jobs, and enabling people to thrive. Reducing urban poverty and inequality is significantly hampered by the continued investment into unsustainable systems, and that it is necessary to shift the current wasteful expenditure that locks neighbourhoods and cities into resource intensive pathways (16). In the context of needing to respond rapidly to the complex implications of Africa's urbanisation, it is critical that decision-makers have a good understanding of the various trade-offs and likely consequences of different decisions. If African cities are to meet the needs of their growing populations, the visions and plans for each city must be rooted in the reality of their individual contexts. This is in turn dependent on detailed local knowledge and understanding of how cities in Africa grow, evolve and are shaped, and where opportunities exist to harness innovative approaches to knowledge generation and urban development.





Can the fourth industrial revolution find solutions to Africa's future urban food security?

by Rudolf du Plessis, Mundus Urbano,
Technical University of Darmstadt

Africa's cities are expanding in size and population, placing increasing pressure on rural areas to supply urban centres with food. Without appropriate technological, policy and governance interventions, increasingly vulnerable small-scale farmers may not be able to sustain rapidly growing urban populations' demand for food in the near future. In the absence of appropriate interventions, Africa's future urban food security is at risk. It is here that the technological innovations brought by the Fourth Industrial Revolution (4IR) may hold answers for Africa's future cities.

According to the African Centre for Cities, urban food insecurity can be identified by low food diversity, malnutrition and obesity and is closely tied to intra-household factors such as income stability, income level, and household structure; extra-household factors include rural production capacities, geographical factors, access to transport and stable food prices. While improving rural farmers' access to technology will not solve urban food insecurity, it will make substantial inroads to addressing these issues, and substantially improving the livelihoods of rural communities by bringing more efficiency to rural to urban food systems.

**By 2030, 15 cities in Africa
will have populations over
5 million
rising to 35 by 2050.**

The emergence of e-commerce, drone technologies, increased access to high-speed internet and disruptive business models such as Uber and AirBnB have led to what many scholars are describing as the emergence of a Fourth Industrial Revolution. At the same time, academics, policymakers, think tanks and the private sector are increasingly becoming aware of the possibilities that the Fourth Industrial Revolution may hold for Africa's future cities. However, in order for cities to fully benefit from this Revolution, it is essential that the promise of the 4IR be realised in rural communities as well. Innovations brought by the 4IR to small-scale agriculture may include, for example, more inclusive economies and better access to markets for farmers through e-commerce. Furthermore, innovations in satellite mapping and access to climate data may help farmers better plan production, while mechanisation and biotechnologies have the potential to increase agricultural yields.

However, a participatory and multi stakeholder approach is required to ensure that the 4IR truly benefits small-scale farmers, otherwise there is a risk of leaving Africa's rural regions even further behind, and hampering cities' progress too.

The urgent need for increased food security is recognised by the UN's Sustainable development goals, namely: Goal 2- Achieving zero hunger; Goal 12- Responsible consumption and production, and Goal 11-Make cities inclusive, safe, resilient and sustainable.

Bulls and bears in African Urbanisation

Africa's rapid urbanisation is well documented. According to the Brookings Institute, Africa is the second fastest urbanising region in the world, after Asia. By 2030, 15 cities in Africa will have populations over 5 million, rising to 35 by 2050, and 15 will be home to 10 million or more, according to the Emerging Markets Forum. Furthermore, the African continent will be home to four of the world's megacities by 2050: Cairo, Lagos, Kinshasa and the Gauteng city-region. The pressure these cities and many more like them place on rural farming communities increasingly places African urban food security at risk.

While these statistics are indeed eye-opening, debates around the future of African urban centres are seldom contrasted against the effects that expanding cities will have on the rural communities surrounding them.



A woman sells her produce at a market in Lilongwe, Malawi. Source: Stephen Morrison/ Africa Practice for AusAID, Wikimedia Commons

Rural farmers, already vulnerable to climate change and globalisation, are feeling the pressure of growing urban populations. These vulnerabilities include labour shortages due to rural to urban migration; increased exposure to climatological risks due to climate change; exposure to conflict and crime; economic vulnerability due to weak land management regimes; a fall in demand due to the emergence of commercial agriculture; price distortions due to intermediaries and middle men; and low access to financial services. Simultaneously, African farmers have low access to mechanised agricultural implements, fertilisers, irrigation, and quality seed stocks - leading to low yields compared to other regions in the global South.

Small-scale farming is vital to the health of Africa's cities - and it is in danger. The statistics are sobering: according to McKinsey, Africa is home to 60% of the



Two small class Crop Tiger combine harvesters at work on a field in Kerala, India. African farmers have less access to engine powered agricultural implements as compared to other regions in the global South. Source: Fotokannan, Wikimedia Commons

world's uncultivated arable land — yet produces far lower agricultural yields compared to other regions. Significantly, small-scale agriculture makes up the largest share of global employment: according to the FAO, about two-thirds of the developing world's 3 billion rural people live in about 475 million small farm households; at the same time, it is estimated that small-scale farmers supply a majority of global food demand.

African agriculture also suffers from a low degree of mechanisation and access to technology compared to other regions. According to the Economist, only 4% of sub-Saharan African land is irrigated; also, African farmers utilize only about 15 kg of fertiliser per hectare, compared to the 124 kg worldwide average. Furthermore, according to the FAO, less than 10% of actively cultivated lands make use of mechanisation provided by engine powered machinery; approximately 70% of farm implements are handheld, and less than 25% of rural farmers make use of draught animals.

This low degree of mechanisation, in combination with other factors, leads to lower yields, irregular harvests, and produce that is more expensive than commercially farmed products. Subsequently, more farmers migrate from rural areas for urban areas in search of better lives - often leaving women, children and the elderly behind. These dynamics are leading to increasingly unsustainable forms of small-scale agriculture — a particularly worrying trend as Africa's growing cities will need increasing yields to feed rapidly growing populations.

Evidence of growing food insecurity is emerging across the continent; in Johannesburg, approximately 42% of households are food insecure due to high food prices and unemployment. Furthermore, according to the African Urban Research Initiative, approximately 80% of poor urban households suffer from a degree food insecurity in sub-Saharan Africa.

Considerable attention must be given to Africa's farmers by academics, policymakers and the private sector in order to reduce the significant risks posed to urban food security. However, while it is critical that substantial investments be made and international capital be mobilised to invest in traditional sectors such as transport, electricity and water and sanitation infrastructure, stakeholders should not neglect to invest in the skills and technologies required for small-scale farmers to take advantage of the emerging technologies that can make African farmers competitive on a continental and global scale.

What the Fourth Industrial Revolution may hold

As urban populations continue to grow, small-scale farmers will have to look towards new technologies in order to improve their livelihoods and stay relevant in Africa's transitioning urban economies. It is in this intersect that emerging technologies and the Fourth Industrial Revolution may hold the answers to Africa's future urban food security. It is important to keep in mind, however, that the 4IR, like the revolutions that preceded it, may lead to significant disruptions to traditional sectors of the economy — effecting mind shifts in the way we view labour, trade, transport and investment as emerging industries such as e-commerce, robotics and artificial intelligence continue to proliferate.





A mobile money outlet in Uganda. Access to mobile phones have allowed for greater access to financial services across parts of East Africa. Source: Ndiwulira, Wikimedia Commons

While it is difficult to forecast what the 4IR may bring, it is critical that governments, policymakers and the private sector encourage discussions on how these changing economic dynamics will be approached in order to ensure that the 4IR brings inclusive growth rather than merely exacerbating existing inequalities. In light of this, improving the sustainability of small-scale farming through the 4IR should be prioritised by national and local governments.

The 4IR may bring significant opportunities and disruptions to small-scale agriculture. Technologies such as e-commerce link rural producers with urban consumers, cutting out the need for middle men, thereby decreasing price distortions and improving rural incomes. Similarly, these technologies could allow for farmers to more easily access agricultural inputs such as government subsidised fertilisers and seeds, minimising the possibilities of corruption. At the same time, these technologies could also deepen existing inequalities by crowding out smaller players by large multinationals such as Amazon and Alibaba.

Innovations in meteorological data collection, biotechnologies, and GIS mapping and communications could lead to more sustainable farming practices, whilst allowing farmers to produce greater yields at more regular intervals, and producing goods more in line with shifting consumer demands.

Improved access to smartphones and the internet can also allow small-scale farmers to gain access to financial services such as credit and insurance — while simultaneously providing platforms for these farmers to communicate more effectively in order to leverage collective bargaining when dealing with corporations such as supermarkets and food production firms.

However, while the potential of the 4IR is encouraging, progress cannot be achieved without investments in critical infrastructure such as electricity, transport, water, sanitation and irrigation. Furthermore, while 4IR technologies hold the potential of greatly improving agricultural yields, significant investments in mechanisation will be required in order to ensure small-scale farmers benefit from 4IR technologies — or else risk being left behind as the 'digital divide' widens.



**Approximately
70 %
of farm implements are
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of draught animals.**

What can be done?

Issues facing small-scale farmers can no longer be viewed as isolated from urban issues since food security is increasingly blurring the line between the rural and the urban. Stronger linkages between rural and urban communities are essential to ensure sustainable development of Africa's rapidly expanding cities.

It is essential that small farmers be empowered and that their role in our collective prosperity be realised by governments, international organisations, the private sector and non-profit organisations. Small-scale farming and more streamlined food systems hold the key to future cities that are prosperous, resilient and sustainable — and it is essential that development gains brought by the 4IR be inclusive of marginalised groups such as small-scale farmers, women, youth and the elderly. This can be done by encouraging bottom-up collective bargaining and organisation. This can be facilitated through local NGOs and labour unions.

Equally, it is also important to ensure that innovations brought by the 4IR are met with substantial investments in traditional sectors such as electricity, water and sanitation and transport infrastructure away from major urban centres. At the same time, rural communities need sustainable skills, solutions and infrastructure to leapfrog into the mid-21st century.

Skills development, especially for youth and women, must be prioritised across all schooling levels. Education is also key, and governments need to make a concerted effort to facilitate educational exchanges between rural regions so experts can share best practices in meeting digital challenges. Without basic literacy skills and technological knowledge, rural populations will remain unaware of advances that may benefit them. The role of organisations such as the Development Bank of South Africa (DBSA), the World Bank and UN agencies such as the International Fund for Agricultural Development (IFAD) and the Food and Agriculture Organization (FAO) is essential here. These organisations have unparalleled experience in development finance and consulting in the agricultural sector and are therefore well suited to serve as platforms for best practice exchanges.

It is also essential that national and local governments and funders move towards improving infrastructure for small-scale farmers. While there is a large demand for agricultural mechanisation and electric transport and irrigation infrastructure in the global South, there is an acute shortage of 'bankable', prepared projects. Funding organisations and governments need to work towards establishing adequate project preparation facilities that relate to small-scale farming. Here the role of organisations such as IFAD, Grameen Bank and other sources of local microfinance is essential.

It is vital that African cities find solutions tailored to their unique socio-economic and spatial contexts by, for example, combining solutions from the global North with those from emerging actors such as China, Brazil, India and South Africa. These countries have cut their teeth in emerging economies and recognise the limitations of western models of agricultural development. Moreover, they have experience in crafting low-cost solutions to rural and urban challenges due to limited financial resources among both citizens and public authorities. South Africa's G20 and BRICS links make it well suited to leverage these partnerships.

It is also important that issues relating to the Fourth Industrial Revolution are taken up in regional forums such as the SADC in order to encourage the development of regional and rural to urban value chains. The recent action plan for the body's industrialisation strategy recognises that 'centres of specialisation' need to be created to provide education, infrastructure and institutions required to build knowledge economies in SADC countries. It is essential that these centres are set up to cultivate skills related to the Fourth Industrial Revolution.

Exactly what the Fourth Industrial Revolution may hold for Africa's cities is uncertain, but it is clear that its likely impact on rural areas must be similarly considered. These areas produce the food on which Africa's cities depend, and by leaving them out of the equation in preparing for the 4IR, we risk threatening that food supply and leaving both cities and rural areas handicapped when it comes to capitalizing on the Revolutions' gains.





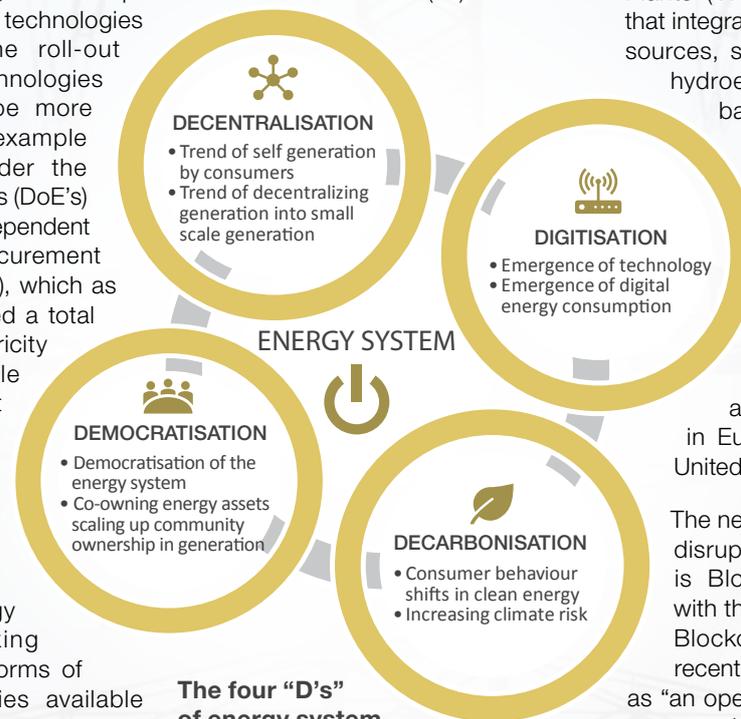
Unblocking Africa's energy future

by Angela Hobbs, AltGen Consulting

The electricity industry is facing one of its most disruptive phases since it was first commercialised in the late 19th century. Climate Change, was one the first aspects to challenge the traditional means of electricity generation, which stimulated the global movement, under the United Nations Framework Convention on Climate Change (UNFCCC), for nations to decarbonise their energy profiles, and adopt more energy efficient technologies and behaviours. The roll-out of clean energy technologies is also proving to be more cost effective, for example in South Africa, under the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), which as at June 2017, procured a total of 6,422 MW of electricity from 112 renewable energy Independent Power Producers (IPPs)(25), which, over the last four years, has seen significant tariff reductions of 80 % in solar PV and 60 % in wind energy technologies, making these the cheapest forms of new-build technologies available today (26).

Electricity consumers themselves, whether they be residential households or businesses, are also taking matters into their own hands. In the context of South Africa, there are a number of concerns that have prompted consumers to reduce their energy reliance on local municipalities and Eskom. These include uncertainty around Eskom's operational inefficiencies, evident from load-shedding in 2007/2008 and 2014/2015, governance issues and financial irregularities, as well as increases in Eskom's electricity tariffs to service their debt. In addition to these concerns, the implications of the carbon tax have further spurred consumers who can afford it, to generate their own clean energy. There has been an increased uptake

of solar home systems, roof-top solar PV, solar water heaters and small-to-medium scale wind technologies by consumers. As a consequence of this decentralisation, the National Planning Commission notes that the economic performance of municipalities and Eskom is being negatively impacted, as they are receiving less revenue from customers, which is forcing them to relook at their business model (26).



The four "D's" of energy system disruption (31)

Democratisation of the energy system is also challenging the traditional state of play, whereby private IPPs are more inclusive of the communities where their projects are based, affording them the opportunity to take up shareholding in clean energy projects. Under the REIPPPP, this community shareholding has been realised through the mechanism of a Community Trust. Communities are no longer consumers of electricity but are now owners of clean energy facilities themselves.

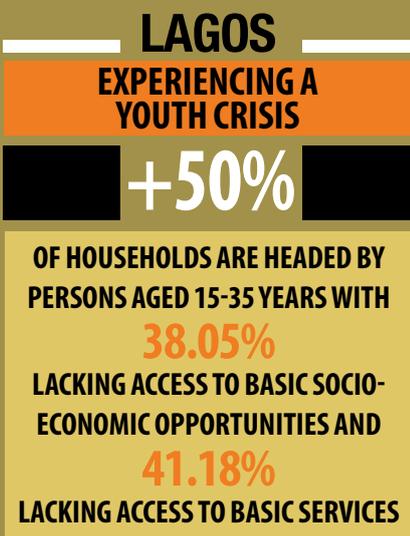
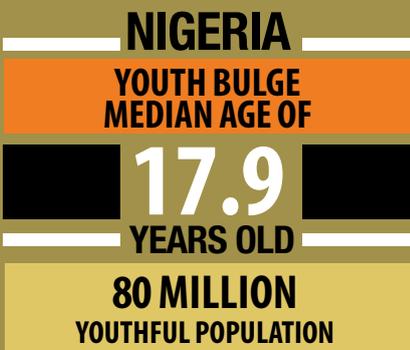
One of the biggest disruptions of this century is digitisation, which in the context of the electricity industry, is facilitating new business models and energy management

solutions. These include smart grid systems, that allow for two-way communication between utilities and their customers, underpinned by data sensing, whereby both the grid and consumers can digitally respond, in real-time, to changes in electricity demand. Smart grids therefore play a key role in increasing the reliability, availability, and efficiency of the grid (27). In addition, Virtual Power Plants (VPPs) are digital systems that integrate various types of power sources, such as wind, solar PV, hydroelectricity, biomass and back-up gensets, to give a reliable overall power supply, and have the ability to deliver peak load electricity on short notice. VPPs also act as platforms for trading or selling power on the open market, and have already been implemented in Europe, Australia and the United States (28).

The next phase of digitisation to disrupt the electricity industry is Blockchain, which ties in with the concept of smart grids. Blockchain is described in a recent Harvard Business Review as "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way" (29).

Blockchain could alleviate the administrative and data management challenges that currently face utilities and municipalities. For example, it takes approximately 60 to 80 days for an IPP to be remunerated. Meter readings of the buyer and seller need to be verified and approved before the seller raises invoices and the buyer completes their lengthy and administrative payment procedures. Blockchain could alleviate this process whereby data from electricity meters could be uploaded and verified directly, and further allow IPPs to trade electricity peer-to-peer with consumers. With a blockchain-based system, IPPs can get paid immediately (30).

-  Urban Youth Bulge in Nigeria: Demographic Dividend or Dilemma?
-  Urban Transit in growing African Cities
-  Institutional & financial precursors for success: a quick look at 5 African cities
-  Municipal solid waste planning – attributes for successful and sustainable waste management in a city



Urban youth bulge in Nigeria: demographic dividend or dilemma?

By Dr Taibat Lawanson,
University of Lagos

A youth is defined as a person aged between 15 and 35 years (32), and this cohort is growing faster in sub-Saharan Africa than anywhere else in the world, signifying a youth bulge (33). This is a situation where the population of the youth cohort is greater, relative to other age groups. Nigeria is currently experiencing a youth bulge with the national demographic outlay significantly skewed towards a youthful population (80 million), and the median age standing at 17.9 years old (34). The country has also grown from a national urban population of 10.2% in 1950 to an estimated urban majority by 2015, while experiencing a high rate of rural - urban migration, with young migrants preferring large cities, especially Lagos (35).

Migration to the city is considered a rite of passage into adulthood, and an opportunity to escape poverty (36). In Nigerian cities, young people are particularly impacted by urban challenges occasioned by high household formation rates and accelerated demands for housing, job opportunities and social services. In fact, Lagos, Nigeria's primate city, is currently experiencing a youth crisis - a situation where



of learning environment (10%) (42). Access to higher education is even more restrictive as fewer than 30% of those who apply for placement in Nigerian universities are successful (43). This is in spite of the deregulation policy which saw the number of universities increase from 54 in 2005 to 94 in 2008 and 158 in 2016 (44).

Limited access to education has been linked to social tensions, conflicts and violence, especially when large numbers of young people are denied access to education; the resulting poverty, unemployment, and sense of hopelessness can act as forceful recruiting agents for armed militia (45). This was seen in Sudan and Sierra Leone (46), and the Nigerian Niger delta where the level of education was the most significant indicator in predicting the willingness of youth to engage in violence (47).

Youth and Access to Decent Work

A youth bulge can either be a demographic dividend or time bomb, depending on the percentage of young people who find employment and earn satisfactory incomes (48).

**In Nigeria,
61.6%
(19.3million)
of Nigerians
aged 15 - 24
were either unemployed or
underemployed in 2016 (49).**

the transition to adulthood is blocked due to social and economic constraints (37). In Lagos, over 50% of households are headed by persons aged 15-35 years, with 38.05% lacking access to basic socio-economic opportunities and 41.18% lacking access to basic services (electricity, tenure, health, water and sanitation) (38).

The Nigerian Youth Policy of 2009 affirms the rights of the Nigerian youth to life; access to proper education and training, employment, housing, legal services, health care, and recreation; and a secure future through policies and practices ensuring sustainable development among many others. Therefore, it is important to understand the interface of the youth bulge, access to life improvement opportunities and urban development in Nigeria (39).

Youth and Access to Education

The National Policy on Education of 2004 adopted the Universal Basic Education (UBE) model which accords the Nigerian child the right to free, compulsory education in the first nine years of education (40). With the national school starting age of 6 years old, one should have completed at least nine years of schooling by age 15. However, only a third of the thirty million estimated school age population attend school, with almost 50% of out of school youth resident in cities (41). Furthermore, about a tenth of urban children drop out of school due to such reasons as paucity of funds (32%), child labour needed to supplement family income (16%) and poor quality

High youth unemployment is an impending threat to national stability as failure to secure decent livelihoods forces many to resort to criminal behavior and restiveness with social and political consequences. This is highlighted in the motive-oriented literature on civil violence and the Frustration-Aggression and Relative Deprivation theories which suggest that individuals turn aggressive when there are latent or real impediments to their route to success in life, especially when basic material needs are not met (50). This position has been reinforced in recent times with youth unemployment and poverty being important contributors to political violence. The case of the 'Arab Spring' in North Africa and 'Occupy Nigeria' fuel protests in major Nigerian cities driven by educated youth and sustained through social media activism are revealing (51).

In order to mitigate this threat in Nigeria, the federal government has conceived and implemented some intervention programmes, with the Bank of Industry and N-Power programme targeting unemployed graduates (52). However, they have only been able to empower a negligible percentage of youth in need (53).



Youth Bulge: Safety and Security Implications in Nigerian Cities

Lack of socio-economic opportunities and urban inequality are significant determinants of crime and violence in cities. In contexts where young people are increasing in number (both absolutely and relative to other age groups), and have fewer opportunities for education and income generation, safety and security concerns arise (54). This position aligns with Ciincotta et al's (55) study of 180 countries which revealed that many countries in Asia and Africa presented a higher risk of civil conflict based on three key stress factors: high proportion of youth; rapid urban growth; and exceptionally low levels of access to resources. In Nigeria, the high rate of unemployment and economic deprivation has resulted in a high proportion of aggrieved youth, and emergence of neighbourhood gangs (*area boys*), street urchins (*almajiri*) and violent militia groups (campus cults, Niger Delta and *Boko Haram*) who target the very society that alienated them (56).

The near crippling 2016 attack of the Nigerian petroleum sector was carried out by over 20,000-armed militants in the Niger Delta region, using violent means to protest the despoliation of their environment by oil exploration conglomerates. A socio-economic profile of the six Niger Delta states (Edo, Delta, Cross River, Rivers, Akwa Ibom and Bayelsa) revealed that over 60% of the 29 million population are aged below 30, with the regional youth unemployment rate at 40% and poor access to education (secondary school-student ratio of 1: 14,679) (57), thus corroborating the position of Oyefusi. Even though most of the militant attacks were in the creeks and hinterland, cities such as Warri and Port Harcourt were adversely affected as kidnappings, bombings, and turf wars between local militant groups were incessant (58). The recent brutal insurgency of the Boko Haram group has resulted in the loss of about 20 000 lives in cities of Northern Nigeria especially Maiduguri, Kano, Abuja and Kaduna (59). Boko Haram members are ideologically opposed to western education and are recruited from the Almajiri street children networks (60).

Young unemployed people in cities are also disproportionately recruited into local and transnational criminal networks in West Africa (61). In Nigeria, there were over 76,000 reported cases involving persons aged 15-35 in cyber-crime, aggravated assault, murder, armed robbery, and prostitution in 2016 (62). While cyber-crimes and kidnapping were almost exclusively perpetrated by young men, young women made up the greater percentage of those arrested for prostitution.

Conclusion: Towards a youth-friendly Urban future in Nigeria

An urban youth bulge can be an important demographic dividend because it represents a plethora of young people of working age capable of boosting production and providing an engine for economic growth. It can also be a challenge for development and to a large

extent, governance and security, if not well harnessed (63). The integration of demographic considerations in development planning is essential, in the elaboration, formulation and implementation of plans and policies targeted at addressing poverty, unemployment and inequality (64). International development commitments provide a framework for strategically achieving this.

The Sustainable Development Goals (65) and targets specifically mandate governments concerning youth, to work towards reducing poverty and inequality (Goals 1.1, 10.1, 10.2), providing improved safety, security and social protection measures for vulnerable groups including youth (1.3, 1.5, 10.4, 11.5, 16.1, 16.2, 16.4), improving access to economic resources (1.4, 8, 8.3), addressing youth unemployment (8.3, 8.b) and providing productive employment and decent work (8.5, 8.6, 8.7, 8.8). It also targets improving access to health (3.3, 3.5, 3.6, 3.7, 3.8, 5.6), education (4, 4.1, 4.6, 4.7), water and sanitation (6.1) and sustainable and resilient infrastructure (1.5, 9.1, 11.9, 11.6, 13. b). Goal 11 is aimed at making cities and human settlements inclusive, safe, resilient and sustainable with interventions in housing and basic services (11.1), transport (11.2), and participatory planning and governance (11.3, 16.7).

Agenda 2063 of the African Union (66) reiterates harnessing the potentials of youth as one of the key aspirations of the continent (par 6,49). Strategies for achieving this include inclusive growth and youth empowerment and the implementation of the African Youth Charter (54,55), provision of basic services (11), good governance and recognition of the leadership potential of the youth (31, 45), as well as development of conflict resolution mechanisms (32), youth employment, education and strengthening of creative and knowledge economies, entrepreneurship and innovation (56,57, 58).

At the urban scale, the 2016 Quito Declaration (67) mandates cities to better harness the demographic dividend by protecting urban youth from discrimination (clause #20); providing equitable and sustainable access to safe, healthy, inclusive, and secure environments (Clause #34, 39, 107 113); promoting opportunities for economic empowerment via access to education, skills development, productive employment and decent work (clause #48, 57, 61, 155); implementing targeted urban development programmes involving multi-stakeholder engagements (clause 148), and enhancing the voice and representation of youth (clause #155, 156).

It is therefore necessary to lean on the frameworks of these international documents to craft local strategies for creating an enabling environment for this demographic majority to thrive. Cities are safer when the youth are not restive. The threat of criminal gangs and more recently insurgency groups being made up of mostly young people must be contained, by providing access to the urban advantages of education, employment and dignity. The youth bulge will then be an instrument of sustainable urban development, rather than the urban quandary it currently is.





Urban Transit in growing African Cities

by Constant Cap

African Cities have grown sporadically over the last six decades. Independence in many African states in the 1950s and 1960s opened up new avenues, such as freedom of movement for the African people. One direct result of this has been the continuous rural-urban migration that has led to the sporadic growth of African towns and cities.

Unlike their European and North American counterparts that grew during the industrial revolution thus experiencing a job-driven migration, Africa's rural-urban migration has been mainly driven by job-seekers. The people continue to move away from real and perceived rural poverty hoping to find greener pastures in urban areas.

A larger workforce should be looked upon as an asset. However, with little supporting industrial development and economic growth in the city, an increased highly unskilled and semi-skilled workforce tends towards being a challenge. The result is visible in the large scale of urban poverty on the African continent. In most African urban areas, poverty is visible to all. Nairobi's 210 plus informal settlements where people live on literally less than a dollar a day stand out as a good example.

Informality on the continent has extended across sectors. In housing, people struggle to survive in semi-formal and informal structures. In business, street vending, informal temporary markets and hawking are a means for basic survival and the order of the day. Several municipal services are also offered through small scale informal means such as water provision, solid waste collection and basic education.

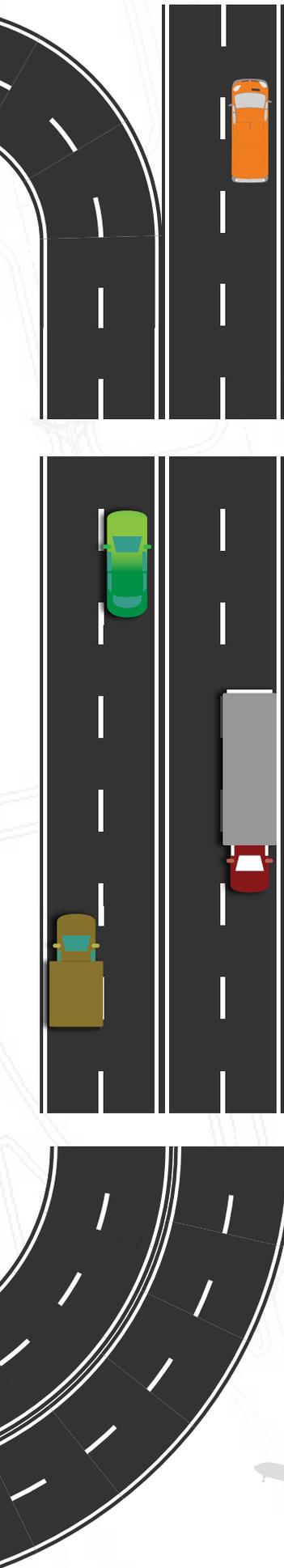
However, there is no sector that stands out in its informality like the transport sector. Urban transit in African cities has been dominated by various informal semi-structured means of transportation, from Kenya's matatus, Tanzania's Daladalas to Uganda's 'taxi' system. Even in north and south African cities that have more organized transport systems, the informal systems (mainly 14 seater minibuses) have a strong presence. These are also known as para-transit systems.

The vehicles tend to be privately owned and operate in a market driven system. As a result, though they do follow fixed routes, these may change depending on traffic, weather or presence of police. Most do not have fixed schedules or fixed pricing. In cities like Nairobi, fares can be doubled when it rains or when there is a grid lock for one reason or another. When the demand goes up, the supply is limited leading to increased pricing.

Poor investment in land use planning and urban transit by these cities has also led to the consequent evolution of

**Independence in many
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such as freedom of
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African people.**





the system. Most cities now have motorcycle taxi services. These were initially popular in Asian cities but zero-rating of tax on motor cycles in parts of Africa has led to their increased popularity. Like the other systems, they are internally regulated but often find themselves in cat and mouse games with the authorities.

A great concern with the transport sector on the continent is safety. Being a market driven system, profitability is viewed as the main priority leading to dangerous driving, unroadworthy vehicles and little or no consideration of the safety of vulnerable groups such as women, children and persons with disability. Coincidentally, the sector is also dominated by school drop-outs and youth and there are many doubts about their training.

The big question is always how long cities can sustain such means of mobility and remain competitive as well as tackle the current global environmental challenges. Some answers can be obtained from the various incremental attempts by different cities to handle their transit sectors.

The City of Nairobi tried (and failed) by attempting to directly intervene in the sector. The city did this through setting stringent laws that governed the sector forbidding standing passengers, requiring use of seatbelts and setting more stringent requirements on crew. Unfortunately, as most top-bottom approaches tend to be, the system did not look into ways of making the system more efficient for the customer/user and the result was a wider opportunity for police and other regulators to make money through bribes and collection of fees from the crew.

This approach, and many suggested by various development partners have always aimed at belittling those in the sector. There tends to be an assumption by policy makers that those in the sector are ignorant in planning matters. They are therefore rarely considered or consulted when new laws or regulations are created. This leads to lack of long term sustainability and appreciation of laws, rules and regulations.

What is unfortunate for a city like Nairobi is that it once had (for over 50 years) a vibrant timely urban bus system that followed fixed routes and schedules. Though it was privately run, its monopoly and part shareholding by the City Council enabled it to serve the bulk of the city. The city failed to upgrade the system with proper infrastructural upgrades, e.g. developing exclusive routes? as areas densified and new estates emerged. Continuous poor land use planning and the drive towards enabling more people (including politically correct people) to enter the transport business led to its downfall.

There have been, however, a number of success stories on the continent. Dar es Salaam was recently awarded the Global Sustainable Transit Award thanks to the success of their new Bus Rapid Transit (BRT) system. The system was launched in 2017 and has made an attempt to integrate the informal transport system to 'feed' it. This has helped avoid clashes between the different sectors. It has also increased efficiency in moving around the city (Dar is the most populous city in East Africa) and brought order and pride to the sector.

Dar es Salaam was following the trend set by several other African Cities that have moved towards more sustainable Urban Transport Mechanisms. Lagos, Nigeria, Africa's most populous city set up a BRT system in 2008. They were closely followed by Johannesburg (2009), Cape Town (My city) in 2011, George (2015), Marrakech and Accra (2016). Many are predicting that this will be one of the 'winds of change' on the continent, with many cities establishing BRTs over the next few decades.

Algiers and Constantine in Algeria, however, have also set a new trend for the future of African mobility. Though Cable Propelled Transit (CPT) was initially set up due to terrain and topographical challenges, it offers an interesting insight into how mobility on the continent can be approached in places where land use management is a problem. Many cities claim that BRTs and metro Rails are too costly because of land acquisition and metropolitan subsidies respectively. However, CPTs offer an opportunity for even informal settlements, riparian areas and built up environments to have cheap, sustainable means of mobility. The system has succeeded in parts of Asia such as Hong Kong and Singapore, and South America (Caracas and Medellin) and offers a big opportunity for modern transit without the need of displacing people or making big changes to urban land use.

However, before moving into any of these alternative projects there are critical factors that the continent needs to consider. First is land use management. African cities have grown with very little emphasis on land use management over the last few decades. Its criticality in establishing modern transit systems cannot be ignored. African cities, for example, have not taken transit oriented development to the expected levels and have focused more on how they can create more vehicular channels for mobility.

Stakeholder involvement is another important aspect that cannot be ignored. One of Dar es Salaam's successes was the involvement of the informal transport operators in understanding BRT system and how they could work together. Failure to do this, in an attempt to bring a top-bottom approach to planning will simply bring more tension across sectors.





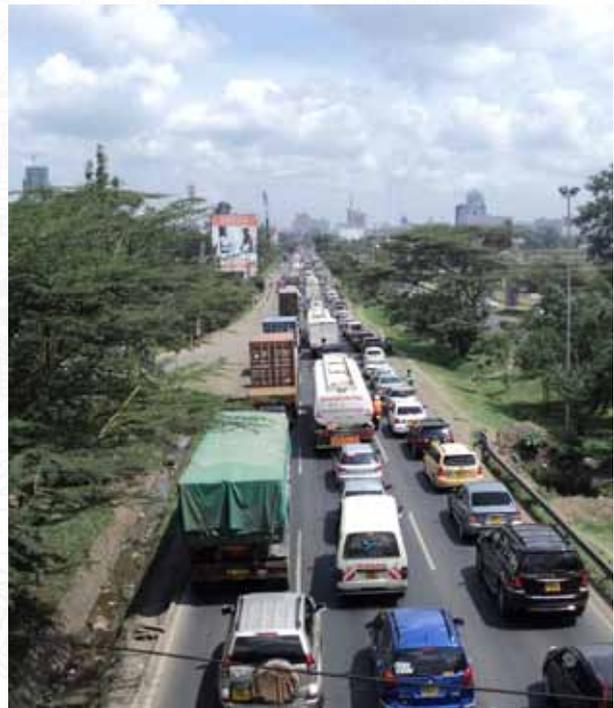
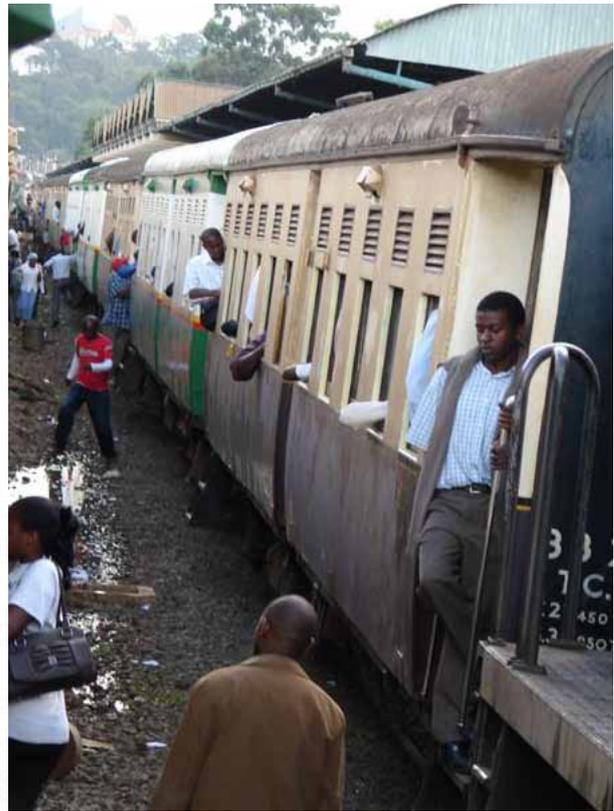
Customer experience is rarely thought about by policy makers. This is particularly true for those vulnerable groups like children, women and persons with disability. In India for instance, some trains have dedicated wagons for women. This ensures their safety and comfort. African cities will have to prioritize these groups in their transportation planning. This will range from vehicular design, bus stop design to street designs (e.g. cross junctions and traffic calming).

Transit must also be viewed across the realm and not just from the perspective of motorized mobility. Most African cities have over 60% of their populace walking to work but have very little investment in non-motorized transit. Good examples can be seen in the little or no investment in non-motorized facilities in the informal areas. Linking the informal areas with industrial areas via safe non-motorized facilities ought to be a priority.

The continent has also experienced several road expansion projects funded by foreign donors. These, like Nairobi's Thika Superhighway, did not take the local land use into consideration. As a result, pedestrian crossings were not constructed leading to several deaths as innocent citizens crossed the 8 lane highway. Pedestrian ways ought to be compulsory in all projects on the continent.

The continent is evolving and transforming. It is paramount that cities on the continent envision where they want to be in 10 and 25 years time and plan accordingly. Consideration of demographic, economic, environmental and regional expansion factors is critical. It is also important that the citizenry feel their presence and involvement in these plans. Further, it is clear that there will never be a 'best fix' solution to urban transit. The organic nature of cities and towns means that continuous changes and developments have to be made. Though there will continue to be several donor driven proposals and projects, it is also critical that the ownership of African cities lies with her people.

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Institutional & financial precursors for success: a quick look at 5 African cities

by Ian Palmer, PDG

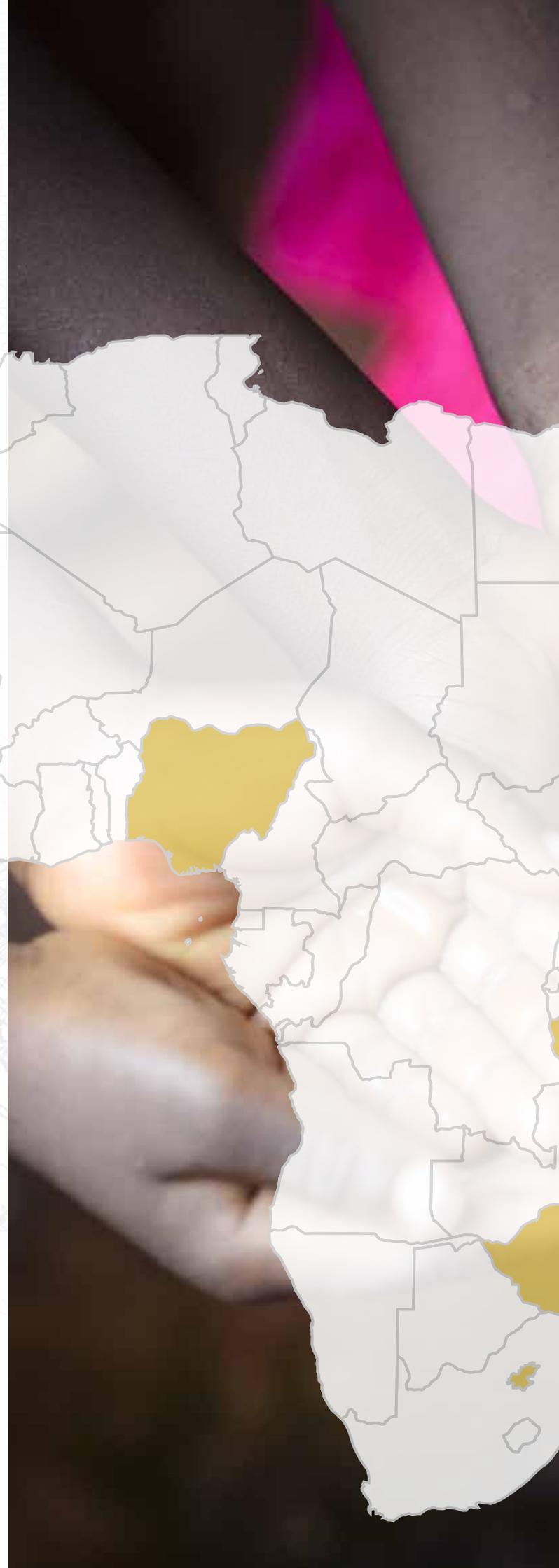
Cities in Sub-Saharan Africa are growing at an unprecedented rate, with populations of the 31 largest cities in the region growing at an average of 3.2% per annum and their economies growing at 6.2% per annum. Providing urban services and the related infrastructure to serve urban citizens who currently not have adequate services, and new urban citizens, is one of the greatest development challenges facing national and city governments in the region. Economic development of cities is also dependent on the growth of successful enterprises and they also depend on access to urban services.

Yet current levels of access to services in Sub-Saharan African cities is poor. In the largest 31 cities only 55% of citizens have access to reliable water supply, 41% to proper sanitation and 74% to electricity. Only 15% of urban roads are paved.

The extent to which this gap in access to services can be closed is dependent on the capability of institutions mandated to provide these services, and the extent to which they can raise the necessary finance to operate and maintain services properly, provide new infrastructure, and provide for renewing infrastructure which has reached the end of its useful life.

The purpose of this paper is to illustrate, firstly, the extent to which institutional complexity impacts on the ability of cities to function effectively and, secondly, the extent to which finance is available to provide the infrastructure and associated services required for cities to grow in a financially sustainable way. The emphasis of this paper is on city built environments and the main networked services which are at the core of viable cities: water supply, sanitation, electricity, roads and public transport infrastructure.

To create this illustration, five cities are selected as case studies, across East and Southern Africa: Cape Town, Addis Ababa, Nairobi, Harare and Dar es Salaam. These cities are selected both because of their importance in the Sub-Saharan Africa region, and because they are cities which the author has studied previously, albeit to a limited extent in some cases.





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KEY: Yellow line – administrative boundary
Red line – urban edge (as far as this could be determined)

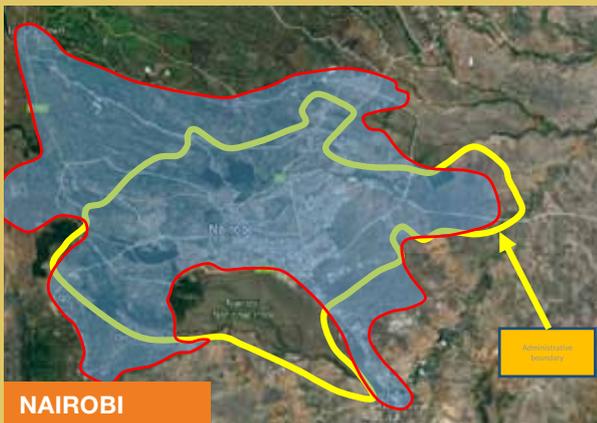
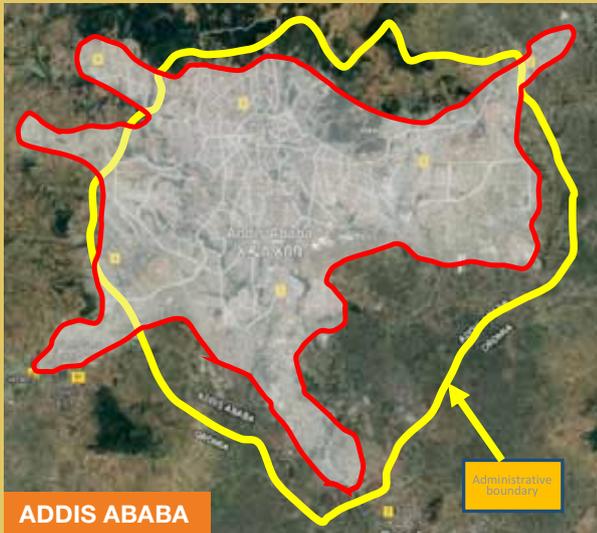


FIGURE 2: Maps showing city boundaries

The words in the title of this paper, a ‘quick look’, are pertinent. It would require a large scale study to get an accurate picture of what is happening with institutions and finance in these five large and complex cities. But there is sufficient information readily available which allows for this ‘quick look’ and allows for a useful picture to be drawn of how these cities function institutionally and financially.

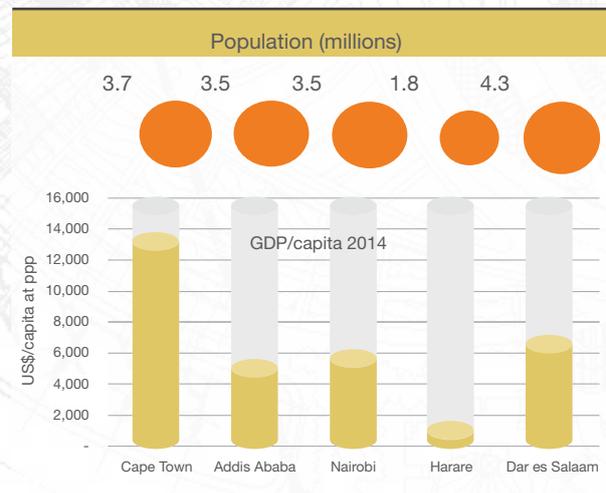
The data is drawn from five primary sources:

- Case studies undertaken by the African Centre for Cities, in 2015, as part of a study on land-based financing, undertaken for the UK Government’s Department for International Development.
- Financial analysis done in 2017 by Palmer Development Group for the City of Cape Town.
- An analysis undertaken by the author, as part of an African Centre for Cities team, in 2017, on the financial and institutional arrangements for urban services in Tanzania, for a New Climate Economy study on urban growth in Tanzania.
- Additional documents sourced via the internet on public finance related to the case study cities.
- Google Earth, as the source of the imagery used in the maps.

Overview of the five cities

The five cities have broadly comparable populations – although Harare is substantially smaller than the others – but very different economic circumstances, as shown in Figure 1.

FIGURE 1: Relative population and GDP per capita for five case study cities



The depressed state of the Harare economy is evident. Yet, as shown later in this paper, Harare’s history of strong urban development and effective local government has carried it through difficult times without a total collapse of the city financially.

Influence over the ‘functional’ urban area

A key argument in this paper is that managing a city, with its integrated spatial arrangement, physical infrastructure,



and social relationships, is easiest if a single administration is responsible for the whole 'functional' urban area.

While it is sometimes contentious as to what is the 'functional' urban area of a city, it is typically possible to identify the 'urban edge' within which there is contiguous urban settlement. For the purposes of this scan of five cities, the urban edge has been identified from Google Earth and related to the administrative boundary of each city, (See maps). In interpreting these maps, it is necessary to recognise that they represent a quick interpretation of boundaries by the author and do not have any formal status.

It is evident from these maps that Cape Town has the simplest arrangement: a single administration encompassing the whole area within the urban edge. In fact the city boundary has been drawn expansively, to include the settlement of Atlantis in the North, on the assumption that Atlantis is economically bound to the rest of the city.

The functional urban area of Dar es Salaam also fits within the administrative boundary of the city as a whole, the Dar es Salaam City Council jurisdiction. However, the situation is complicated by the fact that there is a two-tier local government system in Dar es Salaam, with three local municipalities, more recently increased to five.

Nairobi also has an administratively complex situation, with the functional urban area sprawling well outside the Nairobi County administrative boundary (the yellow administrative boundary shown on the map). While Nairobi County includes the majority of the urban settlement, the three neighbouring counties of Kiambu, Kajjado and Machakos also administer parts of the functional urban area.

Addis Ababa and Harare also face a situation where their functional urban areas are sprawling outside the administrative boundaries. In the case of Addis Ababa, this is causing political difficulties with the Oromia people, as rural land on the periphery of the city is giving way to urban development in the Oromia Region which surrounds Addis Ababa City.

Spheres and tiers of government

There has been debate over the extent to which functions associated with the built environment should be devolved to local government, cities specifically. However, the dominant position is one that favours devolution of responsibility to cities, as expressed in the Cities Alliance and United Cities and Local Governments of Africa's assessment of the institutional environment of local governments in Africa (68). This paper accepts this dominant position in the belief that devolution is necessary if cities are to function effectively as integrated urban environments. This requires a legal framework, backed up with a commitment by national government to implement legislated arrangements, for sharing powers and functions between the spheres (national, regional and local) and tiers (multiple levels of local government, if they exist) of the state as a whole.

Figure 3 shows an estimated comparison of how functions are shared across the spheres and tiers in the five cities, with assets under the control of each sphere and tier

KEY: Yellow line – administrative boundary

Red line – urban edge (as far as this could be determined)

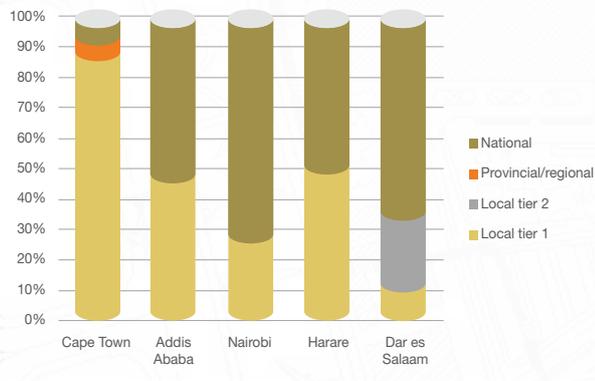


FIGURE 2: Maps showing city boundaries

Harare's history of strong urban development and effective local government has carried it through difficult times without a total collapse of the city financially.

being the measure. In this case 'control' implies providing the service directly – with associated direct ownership of assets – or owning a state-owned entity (SOE) which provides the service.

FIGURE 3: Share of functions across spheres and tiers of government



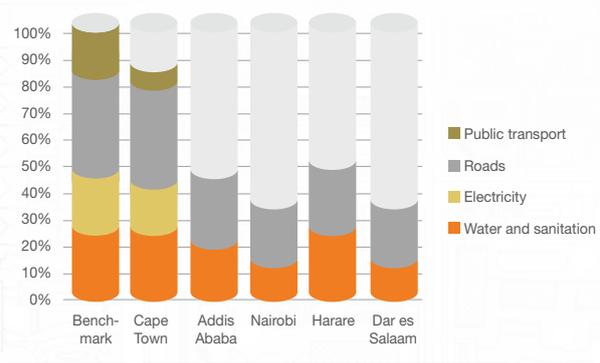
In Figure 3 the extent of sharing of assets between the two tiers is a rough estimate, as detailed data was not readily available to the author.

Cape Town has by far the greatest level of control, with only part of the public transport function (passenger rail) and a small part of the electricity service under the control of provincial and national government. Nairobi has the least control mainly because it does not have responsibility for urban roads. Dar es Salaam has a relatively low level of control, with the additional complication of two-tier local government.

The extent cities have of control over infrastructure

Taking the pattern of control by local government over infrastructure-intensive functions further, the control over each of the four major infrastructure groupings considered here is shown in Figure 4, again with the measure being the scale of assets under control. As with the sharing of functions across spheres and tiers, the term 'control', indicates either that the asset is owned and managed directly by the local authority, or that asset is owned and managed by a local authority-owned public entity (SOE). In the latter case the level of control is scaled down depending on the estimated influence the local authority has over the entity. So, for example, Addis Ababa City has a high level of control over the Addis Ababa Water and Sewerage Authority and Addis Ababa City Roads Authority. On the other hand, the indication is that Dar es Salaam City has less influence over the two entities responsible for water and sanitation: Dar es Salaam Water and Sewerage Authority, the asset owning entity, and Dar es Salaam Water and Sewerage Corporation, responsible to operating the service.

FIGURE 4: Specific infrastructure under the control of local government



The 'benchmark' bar in Figure 4 is an estimate of what the split in assets will be for a city with full control of all the assets in the four infrastructure groupings considered. In comparison to this benchmark, Cape Town, for example, controls only part of the public transport system (mainly bus-ways) and does not have full control over electricity. None of the other cities have control over electricity. Regarding public transport infrastructure in the other four cities, this is under a national entity in the case of Addis Ababa and a local entity in the case of Dar es Salaam (where the limited investigation here has possibly not recognised some influence of the Dar es Salaam City over the bus rapid transit system). In the case of Nairobi and Harare, dedicated public transport infrastructure of sufficient scale to warrant inclusion in this analysis was not in place, at the time of writing.

The extent to which cities have control over revenue

In order to function effectively as organisations, cities need to have access to sufficient revenue both to cover their governance, administration, planning and development facilitation activities, and to cover the costs of service provision. The major categories of revenue which are targeted towards covering these operating costs are:

- Transfers from the national fiscus
- Share of national tax
- Property rates & land rent
- Tariffs on trading services
- Fuel levy or road tax
- Other fees and fines

Based on figures available for the 2013/14 financial year, the results for the five cities are shown in Figure 5. In order to allow comparison between cities, the results are normalised to give per capita figures in US\$ per annum.

The most striking feature of the revenue patterns shown in Figure 5 is the high value of tariffs on trading services raised by the City of Cape Town. This is because they are directly responsible for supplying electricity, water, sanitation and solid waste services. Electricity tariffs are dominant and represent a key source of revenue for the city. Harare, also raises substantial revenue from water supply and sanitation services, while Addis Abba has a lower level of revenue from these two services (the revenue raised

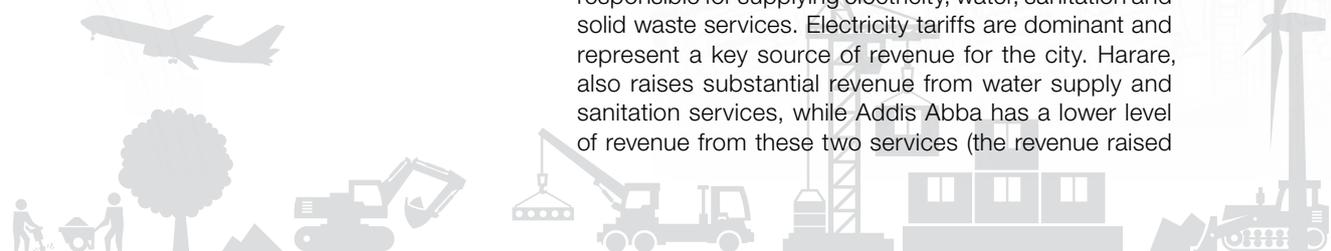
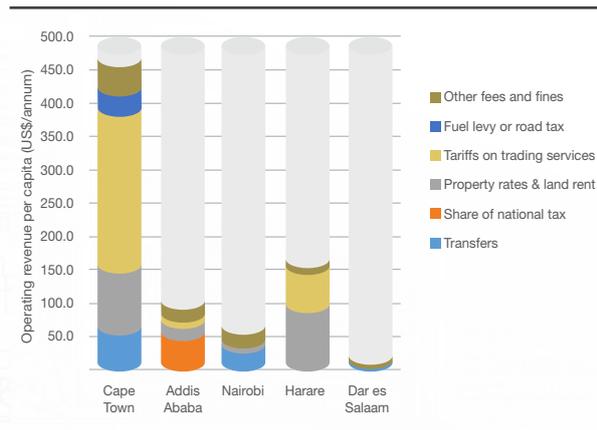




FIGURE 5: Revenue on city financial statements (2013/14)



through the Addis Ababa Water and Sewerage Authority is shown on the City accounts).

Considering transfers from the national fiscus, both Nairobi and Dar es Salaam are heavily dependent on this source of revenue (46% and 42% respectively). Addis Ababa does not receive transfers but, instead, is given authority to receive a share of income and company taxes which generates 47% of total revenue.

Both Cape Town and Harare have highly developed property tax regimes which allow them to cover a large proportion of operating expenditure (mainly governance and administration activities, and roads maintenance).

Finally, the most obvious observation from Figure 5 is the high level of revenue per capita raised by Cape Town in comparison to other cities. This is both because of the higher level of economic activity in the city and because of the greater devolution of functions to the city. Another important observation is that Harare does so well in raising tariff and property rates income, in spite of the poor state of the city's economy. Finally, the very weak financial position of Dar es Salaam is evident.

The dominance of SOEs in most African cities

State-owned entities (SOEs) – sometimes referred to as state-owned enterprises, if they are profit making – are public bodies in that they are majority owned by the state, either at national, regional or local level. They are responsible for urban infrastructure in all African countries to some degree, including electricity supply, water supply, sanitation (or sewerage), roads and public transport infrastructure. A listing of the SOEs which play a role in the five cities used as case studies in this paper is given as Table 1.

TABLE 1: List of SOEs in five cities

Name	Type of infrastructure	Ownership	Extent of long term debt finance raised
Cape Town			
Eskom	Electricity distribution	National government 100%	Raises substantial long term debt, partly through bond issue
Passenger Rail Agency of South Africa (PRASA)	Passenger rail	National government 100%	Not permitted to borrow
Addis Ababa			
Addis Ababa Water and Sewerage Authority (AAWSA)	Water supply and sewerage	City of Addis Ababa 100%	Debt finance raised on City balance sheet, not SOE
Addis Ababa City Roads Authority (AACRA)	Urban roads	City of Addis Ababa 100%	Debt finance raised on City balance sheet, not SOE
Ethiopian Electrical Services (EES)	Electricity distribution	National government 100%	Assumed to be funded primarily from loans from development finance institutions
Ethiopian Railways Corporation (ERC)	Passenger rail	National government	Loans raised by ERC from China but guaranteed by national government
Nairobi			
Nairobi City Water and Sewerage Company (NCWSC) ²	Water and sewerage	Owned by Nairobi County 100%.	Able to borrow; currently relatively low level of borrowing.

²Also companies in neighbouring counties serving city

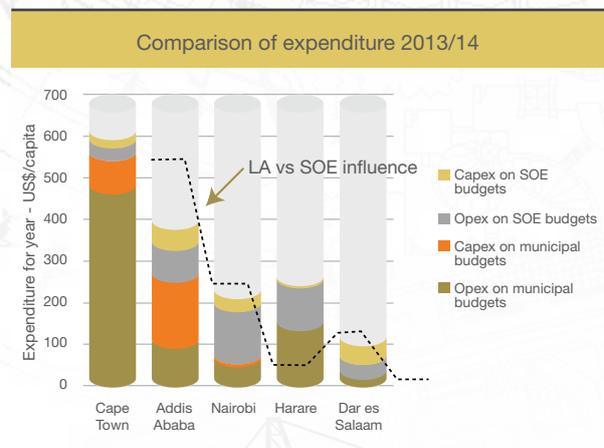


Kenya Power	Electricity distribution	51% owned by national government; remainder privately owned	Raises substantial finance from private sources and development finance institutions
Kenya Urban Roads Authority (KURA)	Urban roads	National government 100%	No borrowing
Harare			
Zimbabwe Electricity Supply Authority (ZESA)	Electricity distribution	National government 100%	Can borrow theoretically but very low credit rating currently
Zimbabwe National Road Administration (ZINARA)	Controls funding to Harare City for roads	National government 100%	No borrowing
Dar es Salaam			
Dar es Salaam Water and Sewerage Authority (DAWASA)	Water and Sewerage (owner of assets)	Dar es Salaam city 100%	Borrows from development finance institutions. Probably guaranteed by national government.
Dar es Salaam Water and Sewerage Corporation (DAWASCO)	Water and sewerage (operator of service)	Dar es Salaam city 100%	No borrowing
Tanzania Electric Supply Company (TANESCO)	Electricity distribution	National government 100% but plans to sell of 49%	Borrows from development finance institutions but low credit rating
Tanzania National Roads Agency (TANROADS)	Provides distributor roads within city	National government 100%	Borrows from development finance institutions. Probably guaranteed by national government.
Dar es Salaam Urban Transport Authority (DUTA)	Owner of bus rapid transport assets	National government ³	Borrows from development finance institutions. Probably guaranteed by national government.
Dar es Salaam Rapid Transit (DART)	Bus rapid transit operator	Falls under DUTA which is nationally controlled	No borrowing

This quick summary of SOEs involved with urban services in the five case study cities indicates the level of complexity of urban infrastructure institutions, with Dar es Salaam having the most complex structure and Cape Town the simplest. Aligning the way all these SOEs plan for infrastructure in cities with the city development plans is a major challenge. Table 1 also shows the extent to which the SOEs raise finance for building new infrastructure and renewing existing infrastructure. This is important as one of the reasons for having SOEs providing urban infrastructure is that they can provide finance. Yet few do this on the strength of their own balance sheets, with most relying on 'soft' loans from development finance institutions which are guaranteed by national governments. This is taken up later in this paper.

The extent to which SOEs dominate expenditure in infrastructure and related services (capital and operating expenditure) within the five cities is shown in Figure 6.

FIGURE 6: Relative expenditure by SOEs on urban infrastructure and related services



³The Dar es Salaam 'Transport policy and system development master plan' indicates that DUTA has hierarchical connections to national departments, 'but does not eliminate the role of DCC as a facilitator of DUTA'.



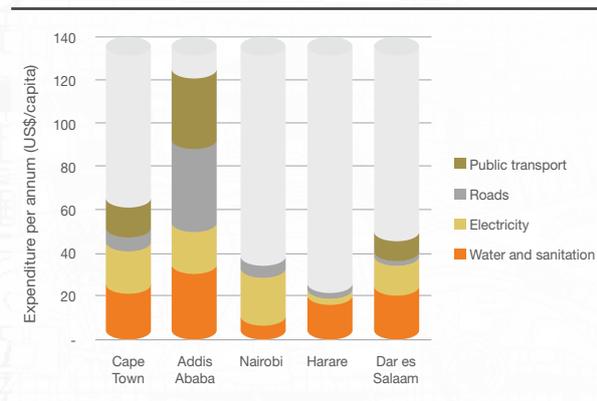


Figure 6 shows the high degree of reliance on SOEs in Nairobi and Dar es Salaam contrasted with the low degree of reliance in Cape Town. It is notable that in Addis Ababa the roads, water and sewerage service is operated by locally owned SOEs but the expenditure is shown on the financial statements of the City of Addis Ababa. Hence the picture of relatively low reliance on SOEs.

Capital expenditure: building cities

The growth of viable cities is dependent on the provision of infrastructure which, in turn, is dependent on having access to capital. The estimated capital expenditure profiles for the five case study cities is shown in Figure 7.

FIGURE 7: Capital expenditure in five cities – 2013/14



These capital expenditure figures do not have a high degree of reliability as not all of the expenditure is reflected on the financial statements of local authorities and SOEs. For example, expenditure funded by development finance institutions is often on national financial statements and is difficult to track. This applies particularly to Nairobi where water, sanitation and roads expenditure is likely to be significantly underestimated. However, the patterns of expenditure remain relevant, with the high level of expenditure in Addis Ababa evident, in contrast with Harare. The relatively modest level of expenditure in Cape Town is likely to relate to the fact that the city's infrastructure systems are well developed and do not require large scale expansion.

Access to capital finance

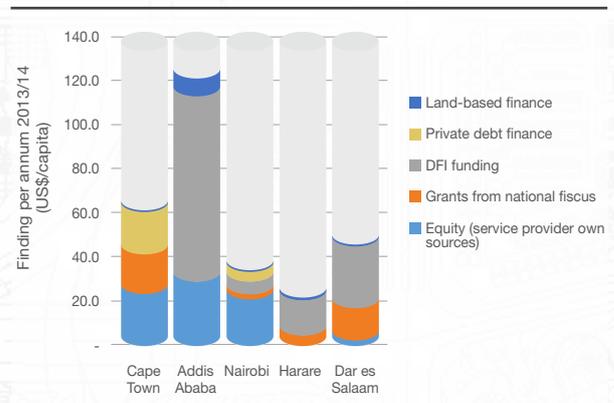
The level at which capital can be spent is obviously related to the extent to which capital finance is available. The major sources of finance considered here are:

- Equity, which is the cash and cash reserves used by local authorities and SOEs for capital works. In order to generate this cash it is necessary for the organisations to be able to make generous surpluses on their operating accounts.
- Grants from the national fiscus, which may also be referred to as transfers.

- Development finance institution (DFI) funding where the funding may be made as relatively 'soft' loans, but with DFIs often requiring guarantees from national governments. This funding may or may not be shown on local government and SOE financial statements.
- Private debt funding: loans or bonds from private financial institutions taken out by local government or SOEs. These are shown on the financial statements of the organisations concerned. They may be associated with guarantees from national government in some cases. The extent to which private financial institutions are prepared to lend to local authorities and SOEs is an indication of their financial viability.
- Land-based financing: this includes a range of instruments though which property developers contribute funding infrastructure. This includes the land lease arrangements applied in Addis Ababa and development charges applied in Cape Town. It is notable that only finance reflected on local government financial statements is considered here. This misses what is probably the most important land-based financing instrument where developers provide bulk and connector infrastructure linking to their property developments themselves. In effect they are providing this infrastructure on behalf of local authorities but it is not shown on local authority accounts.

Figure 8 shows the relative scale of finance from the different sources listed above, expressed as US\$ per capita for the 2013/14 year.

FIGURE 8: Sources of capital finance for five cities – 2013/14



The total amount of finance shown in Figure 8 matches the totals of capital expenditure in Figure 7. In fact, as mentioned above, the level of capital expenditure is constrained by the finance available. The extent to which development finance institutions (DFIs) have favoured Addis Ababa in 2013/14 is evident, with the financing of the commuter rail system being a major contributor. In the case of Harare the DFI contribution is primarily related to the China Eximbank loan for the water and sanitation system upgrade which was in its early phase. As mentioned previously, the DFI funding allocated to Nairobi for water, sanitation and roads is likely to be an under-estimate.



**There is,
a strong link
between the financial
viability of a city and the
level of finance which can
be raised which leads to the
sustainability of the city
over the long term.**



Conclusions

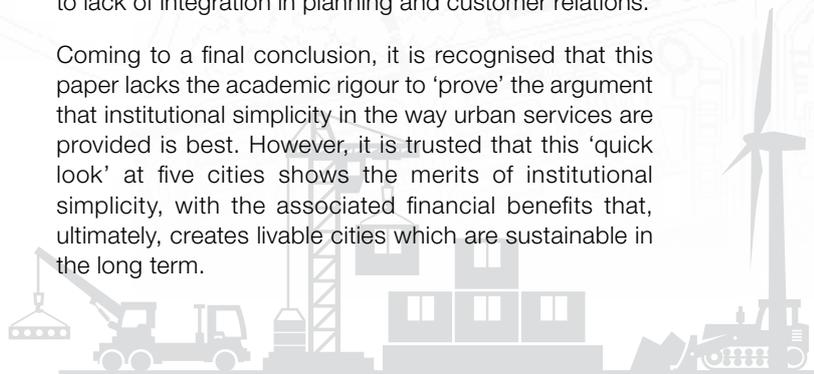
In comparing the five cities used as case studies in this paper, it is important to keep their different economic and historic circumstances in mind. At the one extreme, Cape Town is a city with a four hundred year history and one which has reached middle income status. Harare has a hundred and twenty year history and developed from its early years as an autonomous local authority responsible for urban services, (other than electricity). The three East African cities also have origins as settlements in the late nineteenth century, but their evolution into modern cities, responsible for a full suite of urban services, has been more recent, with Dar es Salaam and Nairobi still having relatively little control over urban services within their functional urban areas.

From an institutional point of view, the argument in this paper is that institutional simplicity, with cities having full 'in house' responsibility for the major networked infrastructure within their functional urban boundaries, brings major benefits in managing urban development. One governance structure and administration, integrated planning, a single revenue management system, one point of contact for service beneficiaries, and integrated capital finance arrangements all make for an efficient city, one which is best able to serve its citizens and enterprises. As the number of SOEs and other agencies involved with urban development increases, the governance and administration costs increase and coordination of planning, customer relations and urban development becomes more difficult.

From a financial point of view, having access to a strong revenue stream, particularly one which includes revenue from electricity tariffs, creates the ability to operate and maintain services effectively and generate operating account surpluses. These surpluses can be used directly for providing infrastructure or can be used to service debt which gears up the rate at which infrastructure can be provided. There is, therefore, a strong link between the financial viability of a city and the level of finance which can be raised which leads to the sustainability of the city over the long term.

There are counter arguments to the simple institutional arrangement with integrated service delivery. The primary one is that cities as local authorities do not have good enough governance and the related ability to attract high level technical expertise needed to manage complex infrastructure systems. So, the argument goes, it is best to leave service provision to separate 'businesses' run by SOEs. However, the track record of SOEs has not always been good and, even if their governance and administration arrangements are sound, they do not necessarily bring cost efficiency and, of course, contribute to lack of integration in planning and customer relations.

Coming to a final conclusion, it is recognised that this paper lacks the academic rigour to 'prove' the argument that institutional simplicity in the way urban services are provided is best. However, it is trusted that this 'quick look' at five cities shows the merits of institutional simplicity, with the associated financial benefits that, ultimately, creates livable cities which are sustainable in the long term.





Municipal solid waste planning – attributes for successful and sustainable waste management in a city

by Nick Mannie, AURECON

Waste management is a challenge in most cities in South Africa. This is a growing trend and continues to be an issue for Public and Municipal officials. Rising costs, limited revenue and alternative “fit for purpose” solutions continue to challenge cities in rendering an effective, successful and sustainable waste service.

Progressive city development places pressures on service delivery and solid waste management is an area that is often affected by this. The lack of service, poor service or non-existent service or infrastructure creates sustainability and health concerns for communities and authorities. In particular, urban centres or metropolises are the ones that

face these challenges as they are often the economic centres. The metropolises are a magnet for job creation, housing, industrial development, and in some cases tourism (69). The critical point that arises is, what factors contribute and make solid waste management successful in a city? Whilst many cities in developing countries have progressively rapid population growth, the question arises as to whether governments have planned accordingly to cater for this.

For solid waste management to be successful and sustainable, the vision, the assembly of thoughts and ideas needs to be shared to make it work. The two key words, “successful” and “sustainable” in the phrase must be

defined in the solid waste management perspective:

Successful: The collection, treatment, disposal and overall management of solid waste has been achieved.

- **Sustainable:** The management of solid waste satisfies the economic, social and environmental factors.
- “Successful and Sustainable” can be achieved, however, it requires an integrated approach. Wilson, et al. (70) describe it as bringing all the processes together that would make it all work well.

The key attributes for successful and sustainable solid waste management are listed in the table:

Attributes	Considerations
Waste collection	Frequency, does it happen often?
Route planning	Is the route planned, optimized?
Spatial analysis	Is the municipal solid waste spatially analysed to effectively route the collection of solid waste?
Infrastructure	Do you have enough and the right type of infrastructure for your waste management need? Is this infrastructure maintained? Does the infrastructure need an upgrade?
Fleet management	Do you have the right type of fleet? Is the fleet maintained? Is the fleet “fit for purpose”?
Resourcing	Are you adequately resourced? Correct skill base?
Institutional requirements	Are you prescribing to the legislative and/or institutional frameworks?
Waste characterization	Do you know what the municipal waste profile within the municipal boundary is?
Socio economic model	Do you know the socio-economic factors that influence solid waste generation? (households size, cultural patterns, education, personal attitudes)
Integrated planning	Do you have an approved and implemented waste management plan?
Solid waste data	Is there waste data in existence per waste category and is it valid?
Future city spatial development framework	Have you aligned the waste service to the future spatial development framework?



STRATEGY AND PLANNING

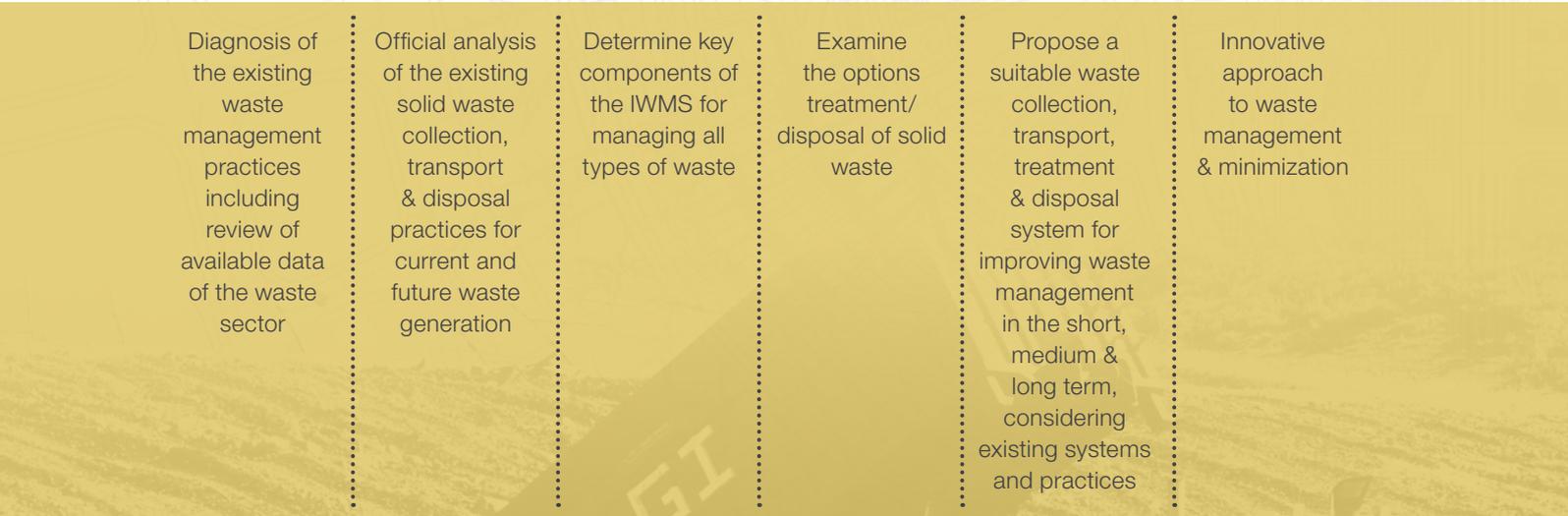
For most cities, no optimal planning or strategy is carried out to understand the current needs versus the future needs of the city. Many cities in developing countries do not have suitable decision making tools or baseline data to assist them in establishing an integrated waste management service. In some instances, cities do

not have a waste management strategy (WMS) or an integrated waste management plan (IWMP). These documents normally provide baseline direction for the city for waste management. The following figure outlines the various aspects that are assessed and addressed through the WMS.



Focus of Waste Management Strategy

The planning process around waste activities at municipal level for both local and district cities:



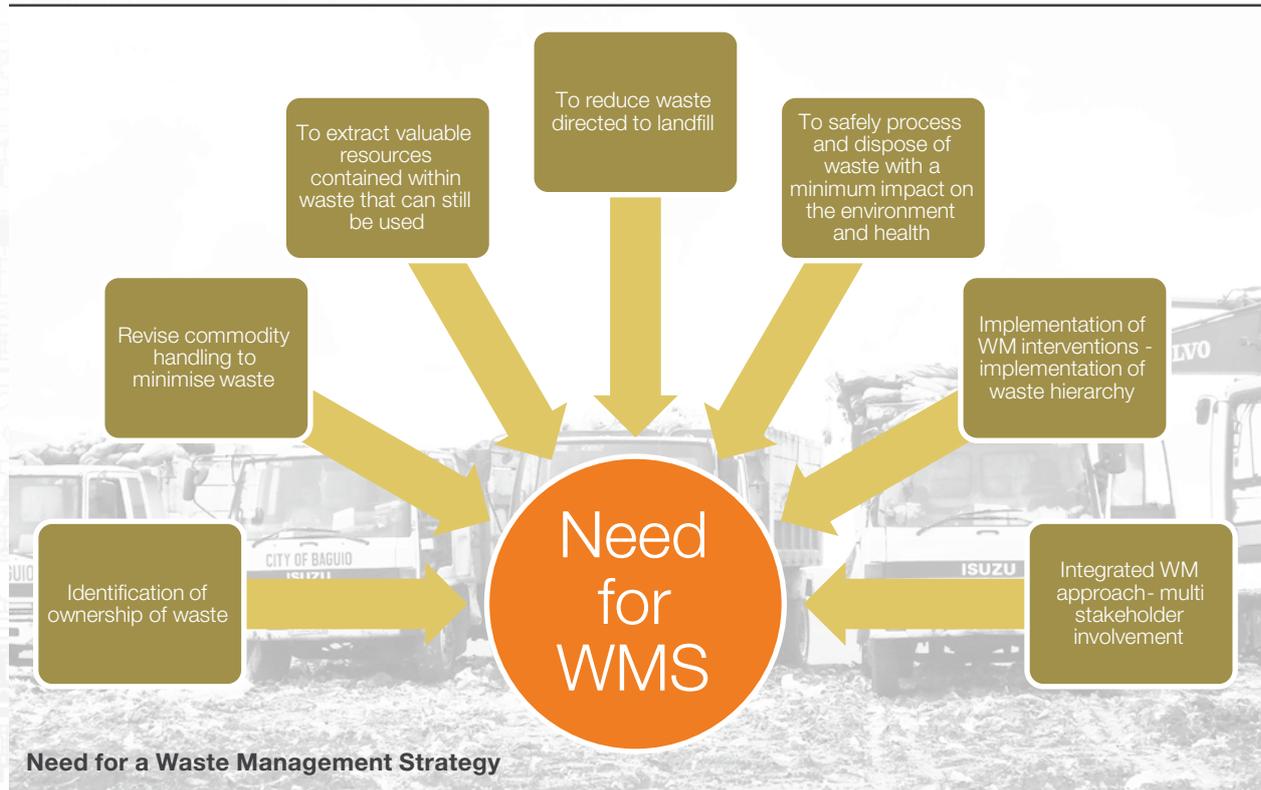


The planning process

Adequate waste management knowledge, understanding waste in the larger context, training, institutional and technical ability and awareness underpin a city waste official's ability to implement the integrated waste management service. Due to the scarce skills in waste management and particularly at municipal level, one often finds inappropriate persons taking charge of the waste department or leading the waste program. The poor background in waste management know-how further impacts on the operations which affects the

utilization of waste management resources, managing the environmental compliance requirements and planning of daily operations.

A WMS should therefore be developed to assist the cities and minimise the waste volumes generated, ultimately reducing waste volumes disposed to landfills. The WMS requires co-operative effort from the city and waste generators. The next figure outlines the need for a WMS.



Integrated Sustainable Waste Management

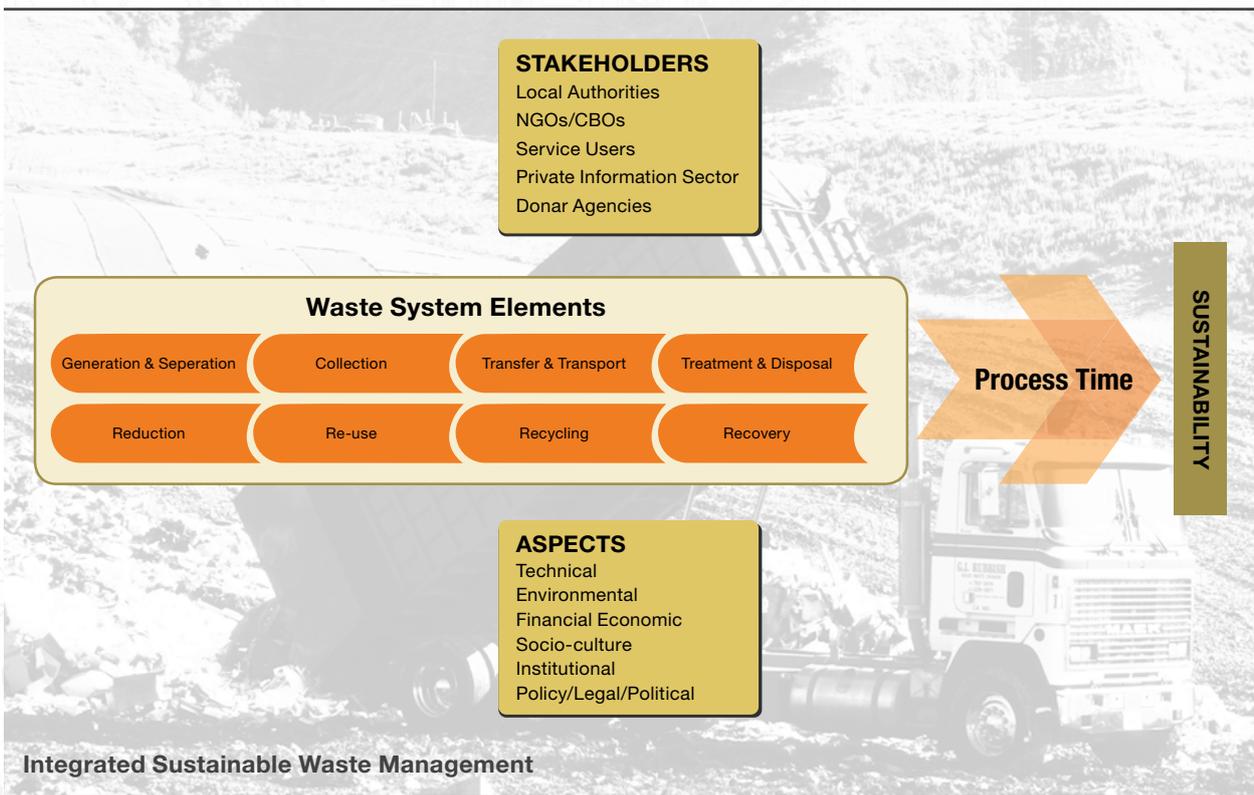
Providing integrated sustainable waste management services in cities can prove to be a challenge with collection, disposal and treatment of waste. National governments should commit themselves to provide a basic waste service with access to basic services in rural areas. Households in these areas specifically discard waste in open fields in an uncontrolled way, often as a result of no adequate waste infrastructure being in place. Cities do not often invest in these areas mainly owing to access and waste streams primarily being organic. Burning of waste is common practice in these areas and it increases health and safety risks.

Often decision makers neglect to apply a “back to basics” approach failing to acknowledge that simple cost effective solutions are what is required to overcome waste management challenges in local municipalities.

Promoting cost efficiencies is often overlooked. Labour, logistics (transport), and maintenance are cost drivers in waste management. Transport costs contribute a large portion of the cost associated with waste management and the long distances to transport waste to landfills continue to be debated. Questions arise over the feasibility of having landfills built at such long distances or if exercising the right to explore all cost effective alternatives has a cost benefit. Therefore municipalities should look holistically at waste management in terms of integrated sustainable waste management.

An Integrated waste management system has three major dimensions as shown in the next figure:

- Stakeholders involved in waste management;
- The (practical and technical) elements of the waste system; and
- The aspects of the local context that should be taken into account when assessing and planning a waste management system.



Towards Sustainable Solid Waste Management Systems

Strengthening inter-sectoral partnerships supports a long-term vision of the goals of waste management. This goal is to achieve sustainable solid waste management systems which are stable over time, and which are beneficial to the society, the economy and the environment. In this context it is useful to review the normal progression of motivations for setting up solid waste management systems.

- Environmental Sustainability I think some introductory lines are always necessary before bulleted points. The intro also helps with the wording of the points

Among the factors required for sustainability to be attained are:

- Transformation of MSW into a closed-cycle system.
- Implementation of waste hierarchy principles by minimizing resource extraction at the beginning of the production cycle and final disposal at the end of the cycle.
- Support and promotion of clean technology, together with the prevention or avoidance of unnecessary waste production.

Treatment of waste and recyclables as close to the source of generation as possible.

- Institutional Sustainability

Institutional sustainability is attained by:

- The municipal government retaining ultimate control and being ultimately accountable for the functioning of the waste management service, specifically related to the following roles and functions:
 - o the democratically managed spending of taxpayers' money in relation to the performance of role players in the solid waste management system; and
 - o the control and protection of the environmental health of the city and its citizens.

- Decentralization of tasks, accompanied by a decentralization of powers and resources.
- An adequate legislative and regulatory framework, with appropriate compliance and enforcement mechanisms.

- Financial and Economic Sustainability

The following should be put in place:

- Full-cost accounting, combined with the implementation of cost-based fee collection systems; this is a more sustainable approach than reliance on donor financing or international lending.
- Fee systems, which aim to achieve full-cost recovery.





- Social Sustainability

Consideration must be given to:

- Provision of MSW to all the citizens within a city, regardless of income, ethnic group, or social status. Informal waste collection and handling is often driven by poverty.
- Improvement of living conditions for the poor.

Community Based Organizations (CBOs)

Through implementing CBOs in underdeveloped countries successful and sustainable MSW will be achieved. The community and its representatives have a direct interest in waste management, as residents, service users and tax payers. Communities in the low-income areas generally receive minimal or no services, which includes MSW. Therefore communities can take the initiative to organize themselves into CBOs, with the goal of helping themselves and improving their living conditions. Such CBOs should receive external assistance in the form of technical and/or financial aid from the city. CBOs may also take a role in the actual provision of services, including operations and maintenance, and even in the construction of facilities.

The benefits and advantages resulting from CBO participation are listed below. Potential benefits to a successful and sustainable MSW system include:

- The contribution to problem-solving at the local level, e.g. by setting up and supporting primary waste collection schemes.
- Experimentation with innovations at neighbourhood level and within the informal sector.
- Mobilization of citizens and enhancing their participation in MSW.
- Promotion of environmental awareness.
- Provision of environmental health education.
- Provision of waste removal services to underserved, marginalized, or hardly accessible areas.
- Social benefits include:
 - Support for the poorer groups in the society, the low-income communities as well as the waste pickers, with technical assistance and advocacy.
 - The provision of countervailing power.
 - The stimulation of income-generating activities among the urban poor.
 - The strengthening of organizational capacities of communities and informal individuals and entrepreneurs.



Communities can take the initiative to organize themselves into CBOs, with the goal of helping themselves and improving their living conditions.



Forward

The table details major goals in municipal solid waste management and the main action areas for their accomplishment.

Key Action area	Principle goal	Supplementary goal
Financial Management	To improve the cost management of MSW in the city and the enhancement of cost recovery in relation to an affordable sustainable solid waste system for all citizens.	To gain insight into the costs and possible revenues of the current MSW and to disseminate the results to relevant municipal personnel. To develop financial mechanisms for involving the private and community sector. To encourage recycling as a means of achieving enhanced cost recovery.
Legal and Institutional Constraints	To create a legal framework for enabling sustainable MSW	To facilitate the creation of sustainable, legally protected partnerships between municipal governments, the informal private sector, and the formal sector on a legal basis. To create the possibility of democratic control and participation in decision making by the residents of communities, together with a decentralised budgeting process for community residents to participate in financing the solid waste management system in their area.
Education for Sustainable SWM	To raise the level of awareness as to the complexity of solid waste management	To provide information on waste management program in information and orientation sessions. To conduct staff training for key groups To implement ongoing campaigns, workshops, and other educational efforts To create a waste management committee. To communicate progress and efforts to the city and users.
Partnership Development	To enable the development of consultative and cooperative processes between all the actors in the solid waste management system, in order that their activities be coordinated to create an optimal sustainable solid waste management system.	To facilitate the formation of cooperatives, unions, guilds, and other organizational institutions.
Solid Waste and Recycling Technology		To promote and develop appropriate technology. To improve existing informal waste collection and recycling activities in terms of occupational health, but also concerning environmental pollution To promote the use of recovered materials in the production of useful and needed products and services.
Capacity Building in the (Formal and Informal) Private and Community Sector	To support the formal and informal private sector in becoming capable of serving as partners for municipal governments and to extend collection services to all areas	To improve formal private sector performance. To enhance and develop strategies for enabling private contracting. To improve informal sector performance. To encourage recognition of informal sector activities. To support primary waste collection systems and to deliver adequate waste collection services to low, middle and high-income areas. To raise awareness within the city and the general public on waste needs and services.

The achievement and success of implementing integrated waste management is largely dependent on the planning process and identifying and meeting specific requirements. The upskilling of staff needs attention and equally, the education of officials and waste officers needs to be included as part of the planning. Training of waste officers in the current legislation and the requirements thereof are equally important for successfully implementing

the right solutions in the municipalities. Obtaining the correct technical advice and support is another factor in overcoming the challenges of making the right decisions; experts are able to provide direction and guidance in this regard. Waste officers need to thoroughly evaluate the “needs” and demand requisites for waste services and specific types of waste infrastructure.





..... The City of Ekurhuleni's
Aerotropolis Masterplan



..... Restructuring South
African Cities: The
City of Cape Town's
approach to Spatial
Transformation through
Transit Oriented
Development (TOD)

BY 2014

SOUTH AFRICA HANDLED

390 000

TONNES

**OF AIR FREIGHT WITH 90% OF THIS
PASSING THROUGH OR TAMBO
INTERNATIONAL AIRPORT**

**IT IS PROJECTED THAT
AIR CARGO TRAFFIC
THROUGH THE OR TAMBO
INTERNATIONAL AIRPORT
WILL REACH**

**1 MILLION
TONNES**

BY 2034

**WHEREAS PASSENGER
MOVEMENTS ARE
PROJECTED TO REACH**

43 MILLION

PER ANNUM BY 2034



The City of Ekurhuleni's Metropolitan Municipality Aerotropolis masterplan

by Andile Sitshaluza & Sbusiso Dlamini,
Ekurhuleni

The Ekurhuleni Aerotropolis programme is envisaged to be a game-changing intervention that would facilitate spatial, economic and social transformation, in order to reposition the regional economy as an ideal destination for trade, investment and tourism. The City of Ekurhuleni, the Gauteng Provincial Government and the Airports Company South Africa have embarked on the development of Ekurhuleni Aerotropolis. This programme is a deliberate growth trajectory that aims to reposition and enhance the value proposition of the Gauteng City Region, with a particular emphasis of the Ekurhuleni Regional Economy as the footprint of the first Aerotropolis in the African continent.

The Ekurhuleni Aerotropolis leverages the presence of OR Tambo International Airport which handles 19 million passengers every year and has the capacity for 60 million passengers. OR Tambo International Airport also handles 83% of all air cargo movements, thus playing a catalytic economic role for South Africa, Gauteng and Ekurhuleni. A 30 year master plan for the Ekurhuleni Aerotropolis has been developed, which identifies catalytic projects in sectors such as retail, aerospace, advanced manufacturing, logistics and distribution, research and development, health and life sciences, etc.

Furthermore, critical road infrastructure networks are being prioritized to unlock the footprint of the Aerotropolis in order to enable mobility, integration and densification. To date, several investment projects have been committed in the Aerotropolis footprint. This report provides a synopsis of the 30 year Ekurhuleni Aerotropolis Masterplan (AMP) development in as far as the following critical areas are concerned:

- The value proposition of the Aerotropolis;
- The rationale for the development of the AMP;
- The outcomes of the AMP;
- The implementation programme of the AMP;
- The resource requirements for the implementation of the AMP.

It is envisaged that the adoption and approval of the AMP will unlock the development potential of the regional economy as well as facilitate the inflow of large-scale investments that



will stimulate economic activity and create empowerment and job creation opportunities for the people of the city.

The City of Ekurhuleni espoused the Aerotropolis programme as the overarching growth trajectory of the regional economy in order to drive, influence and inform the development of the City from an economic, spatial and social perspective by leveraging economic infrastructure investments. The amalgamation of the nine former towns and seventeen townships in 2000 to form what is presently called the "City of Ekurhuleni" jurisdiction has consolidated the regional economy as a hub for logistics, aviation, rail and manufacturing.

At the center of these economic capabilities is the presence of the OR Tambo International Airport, which is one of the busiest airports in the southern hemisphere. In realizing these capabilities and assets, the leadership of the City took a bold decision in 2009 to bid for hosting rights of the Airport Cities Conference and Exhibition in 2013.

Furthermore, in 2010, the Aerotropolis concept was adopted in the Municipal Spatial Development Framework wherein in 2011, the Aerotropolis Strategic Roadmap was developed as a business case to pursue the Aerotropolis concept as an economic strategy and plan for the City of Ekurhuleni. In 2012, the Ekurhuleni Growth and Development Strategy 2055 further adopted the Ekurhuleni Aerotropolis programme as a growth accelerator wherein the value-proposition of Ekurhuleni, Gauteng and South Africa as ideal to live-in, invest-in and prosper-in was enhanced. To this end, the aim and approach was to leverage location strengths, including the production and movement of goods, agribusiness, food production, aerospace, manufacturing, tourism, and its human capital to stimulate and drive economic diversification, transformation, growth and development.

Ekurhuleni Aerotropolis Vision

The Ekurhuleni Aerotropolis Master Plan is a study of an area of significant size and dimensions. It includes all of the area inside Ekurhuleni, including the 9 former towns which comprise Ekurhuleni, OR Tambo International Airport, the various roads and transshipment connections within the study area, and green spaces and agricultural lands beyond. The Ekurhuleni Aerotropolis programme is developed on the following fundamental principles:

- Community - build strong neighbourhoods that allow people to realize their full potential;
- Collaborate - streamlined and effective governance that meets or surpasses global standards;
- Concentrate - dense transit-oriented developments

that leverage and complement existing communities;

- Connect - move goods, services and people economically, efficiently and effectively; and
- Compete - identify and amplify the value chains which South Africa can dominate in the global economy.

As a government led study, the Aerotropolis Master Plan is designed to build upon and reinforce the key goals and policies set out by the government, including the principles of "Batho Pele". The Ekurhuleni Aerotropolis has emerged as the Hub of Africa, a safe haven for business on the continent, and the economic centre of the Southern Hemisphere. The plans and principles embodied in the Aerotropolis effort will lead the way to a thriving future for the City of Ekurhuleni, Gauteng, and South Africa at large.

Aerotropolis Value Proposition

The concept of Aerotropolis has been identified as one of the projects that will have an impact on the growth trajectory and a vehicle that will reposition the City of Ekurhuleni to attract investment and create jobs. The value proposition for the City can be summarised in two parts; (i) the City is home to the OR Tambo International Airport, the busiest airport on the African Continent; (2) and is the manufacturing hub of the country. The principles behind an Aerotropolis have a strategic alignment to National, Provincial and Municipal Policies, including the New Growth Path, the Industrial Policy Action Plan, Gauteng Employment Growth and Development Strategy, Gauteng Industrial Policy Framework, the Gauteng City Region Vision, the Municipal Spatial Development Framework and its Growth and Development Strategy.

The City of Ekurhuleni is exploring ways of leveraging the economic opportunities created from having the OR Tambo International Airport located in its municipal jurisdiction and positioning the City to become a preferred destination for investors seeking to relocate their operations. However, there is recognition that the OR Tambo International Airport services the City, the Province and the country and the economic impact will have a





reach far beyond the City of Ekurhuleni. An Ekurhuleni Aerotropolis will be an urban development form most suited to the region given its unique history and developmental challenges. This urban form will seek to create synergy between regional, economic and development planning to obtain the best possible outcome for the industrial mix, business competitiveness, job creation, and improving citizen's quality of life.

The concept calls for the City's layout, infrastructure and economy to be centred on a major airport in order to take full advantage of the business spin-offs associated with such proximity. The OR Tambo already provides a ground-to-air shipping network and accessibility. Furthermore, because an Aerotropolis relies on efficiency in logistics, the primary infrastructure required is logistics related. The Ekurhuleni MSDF 2011, calls for Ekurhuleni to build an Ekurhuleni City Identity around the airport by leveraging the Aerotropolis concept. In drafting the MSDF, various alternatives were considered for unifying and consolidating the Ekurhuleni identity.

equipment, as well as textiles and footwear for nearby countries. Unlike other major cargo airports, the amount of transshipments coming through the airport is fairly small, meaning that the contents of this freight are largely consumed or produced in South Africa, or transported to neighbouring countries through air freight or other modes.

Manufacturing Sector Enhancement

In this instance, the Ekurhuleni Aerotropolis Master Plan leverages the existence of OR Tambo International Airport and its extensive connectivity to increase access to African and Global markets for local businesses. The Master Plan also identifies those economic activities that could potentially base their operations in South Africa as a Gateway to Africa and the emerging markets. In addition to economic activities that rely on airport connectivity, target industries that are integral to the growth of the South African economy form an important aspect of the success of the Ekurhuleni Aerotropolis. In this regard, the Ekurhuleni Aerotropolis Master Plan is a wide-ranging Economic Development Strategy.

The target industries and sectors for the Ekurhuleni Aerotropolis are a result of identifying Ekurhuleni's existing economic activity, strategic objectives of the public sector, international best practices and industry growth drivers related to trade. An array of upstream and downstream activities will allow the Ekurhuleni Aerotropolis to provide working opportunities for citizens with different skill sets, talents and ambitions relating to critical economic clustered and catalytic projects presented in the following figure:

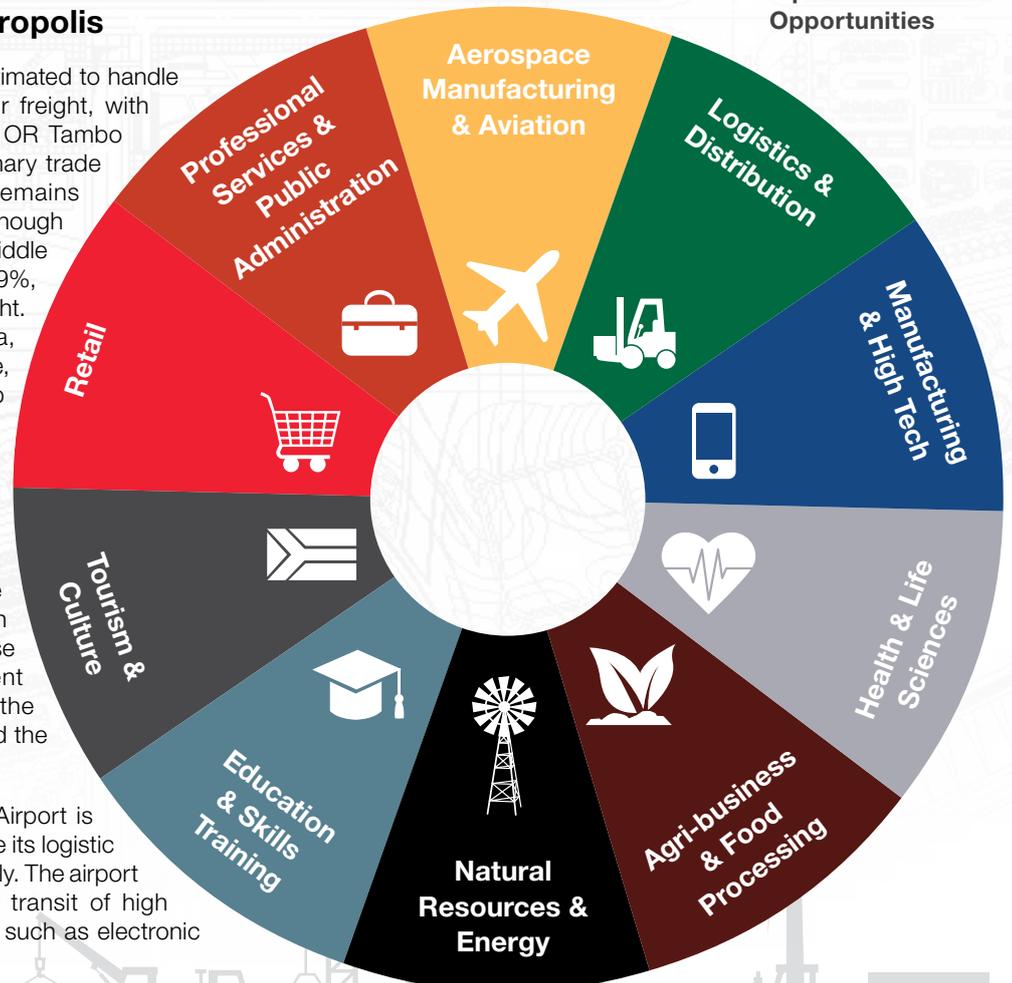
OR Tambo International Airport and the Ekurhuleni Aerotropolis

By 2014, South Africa was estimated to handle almost 390 000 tonnes of air freight, with 90% of this passing through OR Tambo International Airport. The primary trade flow through the airport remains Western Europe at over 60%, though other major flows include the Middle East at 17%, North America at 9%, and East Asia at 6% of air freight. Airfreight to the rest of Africa, South America, Eastern Europe, and Southeast Asia makes up the balance.

It is projected that air cargo traffic through the OR Tambo International Airport will reach 1 million tonnes by 2034, whereas passenger movements are projected to reach 43 million per annum by 2034, hence these projections can only present a strong business case for the development of the airport and the Ekurhuleni Aerotropolis.

The OR Tambo International Airport is in a good position to accelerate its logistic and air cargo activities regionally. The airport is already a gateway for the transit of high value time sensitive products, such as electronic

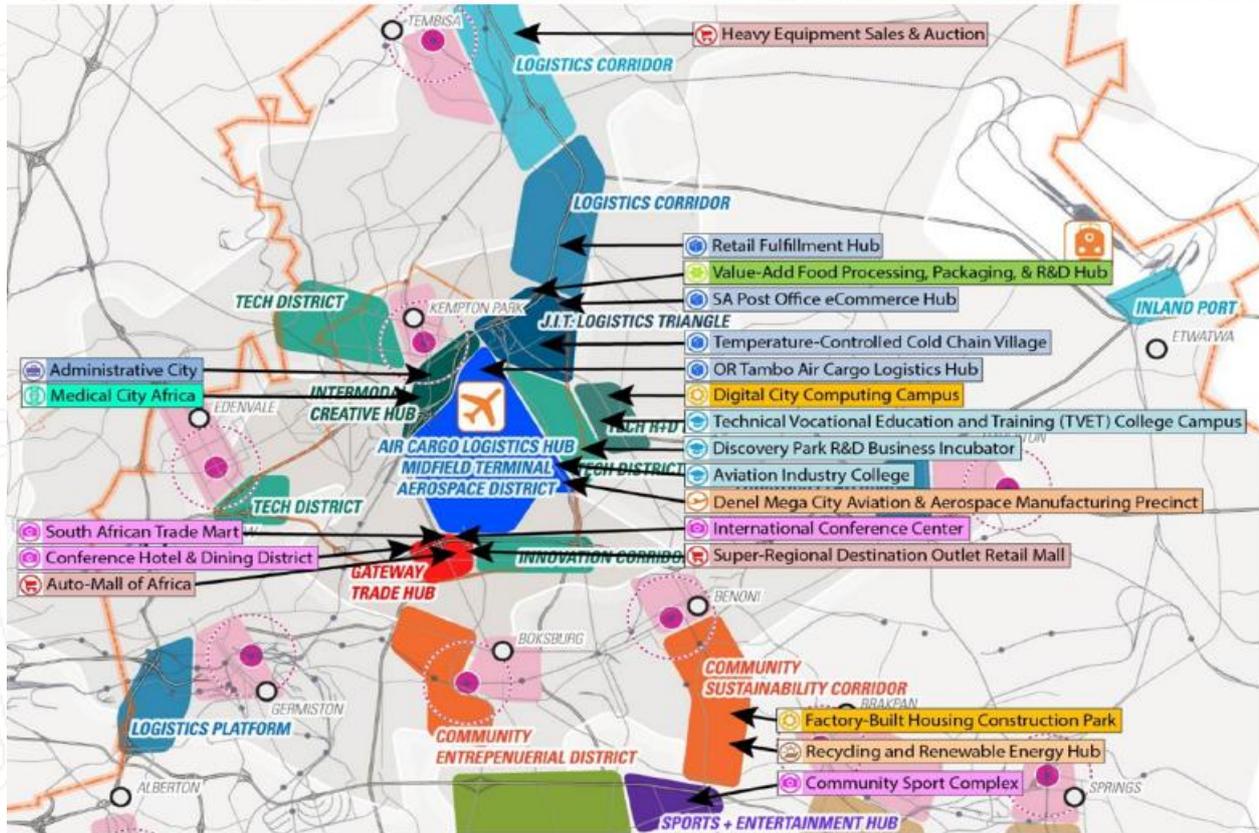
Aerotropolis Sector Opportunities





The Ekurhuleni Aerotropolis Master Plan has identified twenty-one (21) catalytic projects for large scale development in the region that are aligned to the 10 key economic clusters as follows:

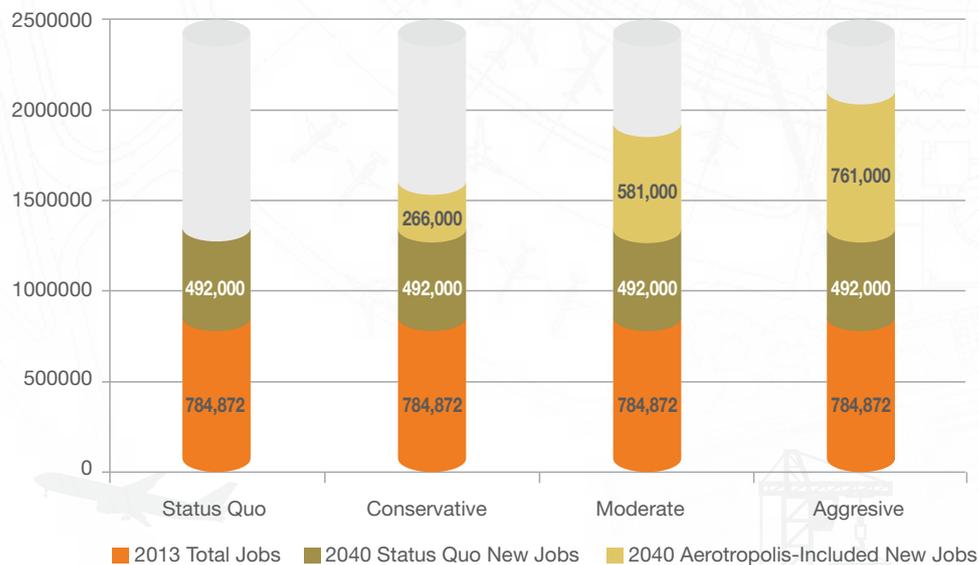
Ekurhuleni Aerotropolis 21 Commercial Catalytic Projects



Envisaged Economic Impact

The socio-economic effect of implementing only one component of the Aerotropolis programme in the Gauteng provinces' GDP, (i.e. Aerotropolis catalytic projects) is projected at R8,1 billion per annum at 2013 prices with a 0.67% annual contribution/adjustment to the Gauteng GDP. Furthermore, the projected employment impact of only the Aerotropolis catalytic projects using labour intensive scenarios, projects the following scenarios in comparison to the status quo:

Ekurhuleni Aerotropolis Economic Envisaged Impact





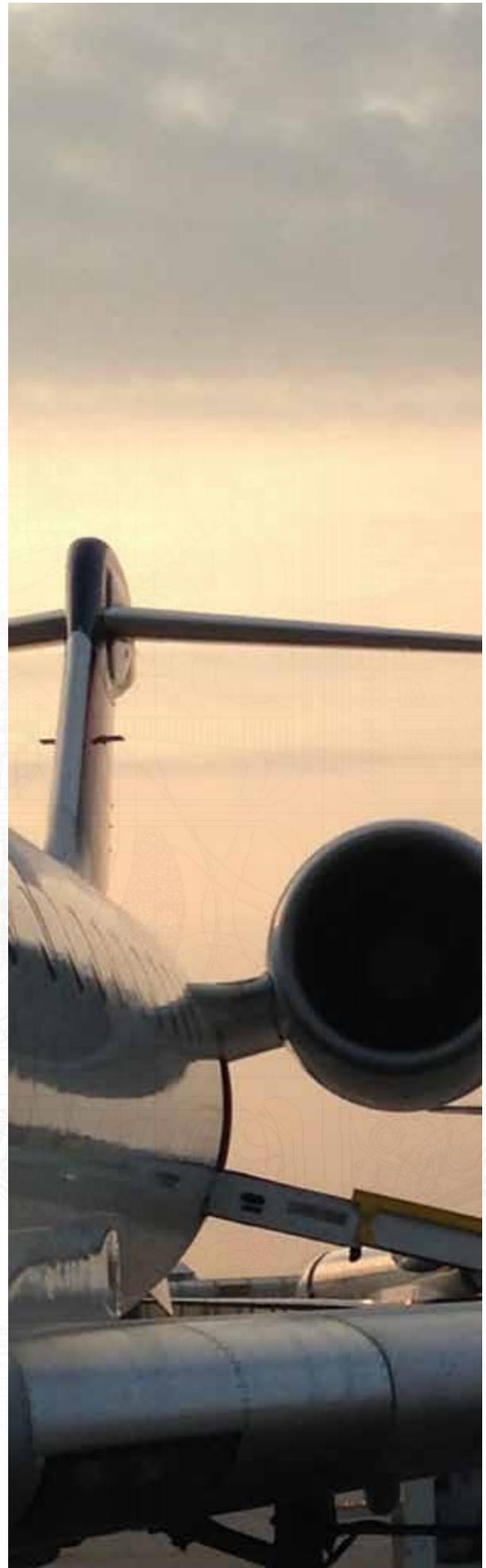
Lessons Learnt to Date

Airports are increasingly being recognized as the new gateways for economic development in industries that are reliant upon air connectivity and seamless air-to-ground integration. The emergence of “Airport Cities” and the regional “Aerotropolis” are a natural reflection of this growing recognition. The lands around Airports have a significant latent development potential when seen as part of a wider strategic development vision. This potential has been successfully unlocked at a number of Airport Cities throughout the world. As the global economy grows ever more inter-connected, the evolution of the Airport City and Aerotropolis becomes refined, reflecting the local context to leverage the key assets and strengths of each region.

Established Airport Cities and Aerotropolis convey lessons to the Ekurhuleni Aerotropolis about the type of economic activities and clusters that rely upon the connectivity of airports and their fast-cycle logistics capacities. These inform Ekurhuleni Aerotropolis. Furthermore, the case studies provide a point of discussion to illustrate what is possible, and the initial steps toward achieving a successful Airport City and Aerotropolis. The Airport City and Aerotropolis concepts profiled are those that reflect direct or indirect application to the Ekurhuleni Aerotropolis Economic Opportunity. Relevant Economic Clusters are identified and explored as they relate to existing clusters identified by Economic Development in Ekurhuleni, and emerging clusters that may warrant further consideration. In each of the case studies, implications for the Ekurhuleni Aerotropolis are examined as well as the catalytic investments or turning points that bolstered each strategy to success. Similar methods of incentives or economic development should be considered moving forward in Ekurhuleni.

In essence, the effective implementation of the Aerotropolis Master Plan hinges on the city's ability to attract and retain investments within its municipal jurisdiction. In this regard, it is imperative for the city to create: (i) a favourable business climate to promote and attract investment; (ii) an investment friendly environment to attract and encourage domestic investment; (iii) a stronger commitment to a policy environment that is responsive to attract stable and increasing DDI/FDI (direct domestic investment/foreign direct investment) inflows; (iv) a policy and process certainty through a predictable transparent and efficient development facilitation intervention programme.

Airports are increasingly being recognized as the new gateways for economic development in industries that are reliant upon air connectivity and seamless air-to-ground integration.





In conversation with Ms Dorah Modise CEO of the GBCSA



Please tell us about yourself in relation to your journey in sustainability culminating to where you are now at the Council.

I hold an MBA from the University of Pretoria's Gordon Institute for Business Science (GIBS), A Master's Degree in Environment and Development from the University of Sussex, UK; a Post-Graduate Diploma in Environmental Diplomacy from the University of Geneva, Switzerland and a first Degree in Environmental Health from the Tshwane University of Technology.

Prior to taking over the role of CEO of the GBCSA, I was Strategic Executive Director: City Sustainability at the City of Tshwane where I was responsible for leading the sustainability programmes and ensuring that the City becomes the greenest most sustainable city in the African Region. Until December 2012, I was a Chief Policy Advisor for Sustainable Development at the South African Government Department of

Environmental Affairs where I spearheaded the development and implementation of the National Strategy for Sustainable Development, South Africa's engagements in global sustainable development negotiations, the environment sector green economy response including the establishment and management of the national green fund. I also led the national environmental outlook reporting processes and the generation of environmental statistics.

I have more than 20 years work experience spanning from community development and environmental health to academia where I lectured environmental pollution control (waste, water and air) at the then Technikon Witwatersrand (later merged with RAU University to become University of Johannesburg).

While increased urbanisation is inevitable, how do you think cities can still grow in "climate positive" ways?

We choose to view urbanisation in a positive light. It gives us an opportunity to implement bold, cutting edge design methods that will ensure minimum environmental impact.

Cities can adopt Net zero and net positive policies, not just for buildings but their infrastructure programmes.

Buildings are one of the main contributors to climate change. What are your thoughts on the emerging narrative of a need to broaden the conversation beyond just green buildings and expanding it to green cities, the idea that cities should be the focus, in order for the impact to be greater than singular buildings?

Cities are without doubt the pulse of any nation, and the rate of urbanisation will continue to increase well into the future. How then do we make cities sustainable and resilient? My previous experience as the head of the City Sustainability Unit at the City of Tshwane (CoT) has given me unique insight into the project of making cities more sustainable.

I have learned that competing mandates for SA Municipalities make it difficult for city administrators to directly prioritise sustainability initiatives. However, that is a wrong way of looking at it. You see, sustainability needs to be integrated into the fabric of decision-making. Aligned to that, is the issue of goal-setting to drive the sustainability of





cities. Here are what I regard as crucial goals:

- Develop spatial plans that are people focused and take the aspect of liveability and mixed use into consideration;
- Work with National Treasury to review revenue and incentives structure of municipalities in order to de-couple city revenue from coal-based electricity income as this remains a tricky factor in enabling the adoption of renewable energy solutions at local government level;
- Get back to basics. Actively engage citizens. And this should not be by the way of a rigid consultation session where a political head

would address a group of community members in a town hall, but rather a real activation process where small projects are done at different localities by residents. Such projects create a sense of “joint implementation” and generates an appetite to do more;

- Get the by-laws and policy frameworks with clear monitoring and verification systems in place. This will ensure focused interventions while providing certainty to private sector; and
- Integrate efficiency savings in all municipal infrastructure programmes, especially electricity supply, water supply, housing development and roads & transport.

What are the benefits of green building and sustainability of the built environment in general?

Green Building is a building which is energy efficient, resource efficient and environmentally responsible – it incorporates design, construction and operational practices that significantly reduce or eliminate the negative impact of development on the environment and occupants.

The environmental benefits of green building are beyond dispute. With the construction and on-going operation of building consuming 40% of total energy usage worldwide and generating one third of all carbon emissions, green building is a major part of the solution to addressing climate change and resource scarcity.

It has become common practice for new buildings to be built and certified as green, making them more attractive to the market, not only with lower operational costs but also offering many other short and long term benefits for the environment, building occupants and the building owner.

Energy & Water: Green Star SA rated buildings cite energy savings of between 25% and 50% compared to a building designed to regular SANS 204 standards. The payback periods of energy and water saving initiatives are becoming markedly shorter as a result of increasing utility costs and the wider availability of more affordable green building technology. Waste will soon become a great opportunity for cost savings in green buildings with an imminent increase in waste removal as landfill sites start to run out of airspace.

Higher returns on assets: Extensive studies in the US and Australia have shown rental rates in green buildings to be approximately 6% and 5% higher, respectively.

Increased property values: Green buildings result in increased property values as a result of decreased operating costs, higher lease premiums and more competitive, less risky, future-proofed buildings. This has been empirically proven in the US and Australia with 11% and 12% valuation premiums, respectively. Mainly due to increased desirability, tenants want to be in green buildings, especially corporates who have sustainability targets to meet. We are beginning to see this trend in the South African property market.

Reduced liability and risk: Green buildings are future-proofed against increases in utility costs, potential energy and water supply problems, tightening legislation, carbon taxes, and the impact of mandatory energy efficiency disclosure, as well as costly retrofits to ensure they are not at a competitive disadvantage in future, or even obsolescence.

Ability to attract and retain government and other major tenants: The South African Department of Public Works' planned 'Green Building Framework' Policy is likely to include certain green building requirements for government accommodation. This will increasingly apply to large multi-national tenants too. In a number of countries, government and leading companies have committed to only build or occupy green certified premises in order to show commitment and leadership. Green leasing is also becoming a key focus for many corporates and governments who require specific green building elements as part of the lease.



Responsible investing: Investment in green building forms an integral part of the worldwide trend to more responsible, sustainable and ethical investing. The Triple Bottom Line concept developed by John Elkington looks at the economic, social and environmental impact of an organisation. The Triple Bottom Line and its core value of sustainability have become compelling in the business world due to accumulating anecdotal evidence of greater long-term profitability.

Increased productivity: Improved internal environment quality (IEQ) from increased ventilation, temperature and lighting control, as well as day-lighting and the absence of toxic materials, result in improved health, comfort and wellbeing of building occupants. This has been shown to lead to increased productivity – an important area of focus due to its significant

potential impact on the profitability of a business. Studies show resulting improvements in productivity of up to 20% – easily covering the premium, which may be paid for by the higher quality green space.

Competitive edge in attracting and retaining talent: Employees and younger graduates who are increasingly aware of environmental and health issues, are making this part of their decision making process in applying for work or staying with the same socially and environmentally responsible companies.

Minimising the costs and impacts of churn: Employees and tenants often remain with a company as a result of increased comfort and occupant satisfaction, and more flexible spaces. With lease terms in South Africa typically ranging between three and five years, churn (tenant changeover) can lead to significant costs.

Can you quantify the impact that green building has made on the effective management of climate change?

Buildings are one of the main contributors to climate change and significantly impact on a broad range of other environmental, social and economic issues through their design, construction and operation. Building green is an opportunity to use resources more efficiently, to address environmental issues including climate change, while creating healthier and more productive environments for people and communities.

Key elements of a building's carbon footprint include: Materials (mainly the embedded energy of materials); Energy –source and usage; Water use; connectivity (proximity to and facilities that enable mass transportation and non-motorised transportation); percentage of indigenous vegetation that can serve as carbon sinks.

Concerns in the industry have centered on the belief that there is lack of accurate quantifiable information regarding the financial cost and economic impacts of high-performance buildings. How does the Council challenge the belief that green buildings cost much more than conventional buildings? Highlight some quantifiable costs vs benefits of green building

Our inaugural Green Building in South Africa: Guide to Costs and Trends Report, compiled in conjunction with the Association of SA Quantity Surveyors (ASAQS) and the University Of Pretoria (UP), which found that the average cost premium of building green over and above the cost of conventional construction is just 5.0% and can be as low as 1.1%. We must remember that this was based on projects to the end of 2014 and that there was probably an element of “early adopter”

premium included in these early projects. As the experience curve starts taking effect, costs will inevitably come down. These findings, together with the joint MSCI/GBCSA Sustainability Index which continues to show that in South Africa green buildings yield a higher return on investment, make a very strong business case for green buildings to developers, property owners and corporates.





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What should cities be thinking about in general, and what should African Cities in particular be thinking about regarding sustainable practices and green building? From your perspective, what is the role and purpose of the local government sector, in particular the necessary governance configurations to bring about the change?

Local Government is a driver of development and growth. This sector needs to lead by example through developing and implementing policies that are geared for future sustainability. Cities need to collapse silos created through rigid organisational structures that fail to recognise the need for holistic spatial development.

Africa remains the “youngest” continent in terms of average age of population and is fast urbanising. This level of energy calls for robust and innovative urban solutions.

What leadership capability / capacity and mindset do you think is required in the industry in order to ensure that Cities promote buildings that are designed, built and operated in an environmentally sustainable way?

Bold leadership is required to take us to the next level of sustainability. Being “safe” is no longer an option. Decisive action has seen many cities

across the globe transform in short periods of time, there are examples of best practices, lets learn from them and take the next step.

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Restructuring South African Cities: The City of Cape Town’s approach to spatial transformation through transit oriented development (TOD)

by Vernon Moonsamy & Jaco Petzer for the City of Cape Town’s Transport and Urban Development Authority (TDA)



The urban form of South African cities is characterised by dispersed development patterns impacting access and mobility options for many of its users. This is historically attributed to planned segregation – a legacy which limits movement, access and integration within and around Cape Town. It is exacerbated by inefficiencies and encumbrances present in the urban system, including physical barriers to movement, socio-economic inequality, negative perceptions and beliefs regarding public transit areas and densification, uncoordinated and fragmented planning and service delivery, limited financial resources, and a lack of commitment to a shared spatial vision.

In Cape Town, population and residential densities in many of the planned areas of the city remain low by international comparison. As a result, the required thresholds for the provision and maintenance of high-quality public transport in many areas are unsustainable to the City, and the cost unaffordable to the user.

The City’s approach to begin to address these challenges was through a comprehensive analysis of the interaction between land and building development, and public and private transportation; followed by the modelling of an ideal transit-oriented future. Like acupuncture, the approach spatially targets key locations on the transport network with the intention of intensifying and/ or diversifying land use depending on what is required to optimise the public transportation network.

Such a Transit-Oriented Development (TOD) approach enables the dynamic interplay between land use and transport resulting in a virtuous cycle of benefits for future growth (see Figure 1). These were translated into the following spatial strategies in the draft spatial development framework:

- Build an inclusive, integrated, vibrant city
- Manage urban growth, and create a balance between urban development and environmental protection
- Plan for employment, and improve access to economic opportunities

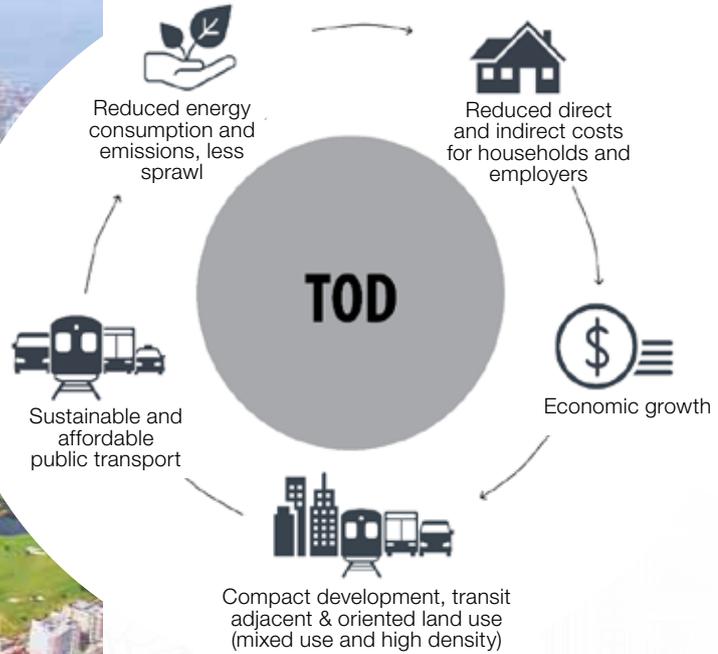
The City of Cape Town’s Approach

The City’s spatial vision summarises the approach: “the City is intent on building – in partnership with the private and public sector – a more inclusive, integrated and vibrant city that addresses the legacies of apartheid, rectifies existing imbalances in the distribution of different types of residential development, and avoids the creation of new structural imbalances in the delivery of services. Key to achieving this spatial transformation is transit-oriented development and the densification and diversification of land uses” (Cape Town Metropolitan Spatial Development Framework, 2018 (draft)).





FIGURE 1: Virtuous cycle of TOD



Integrated land use intensification premised on TOD

Land use intensification implies a greater mix of residential and non-residential land use (diversification) through the increased use of space, both horizontally and vertically (densification). Transit-oriented development is the City's basis for land use intensification and targets higher-density, mixed land use development in close proximity to high-capacity, high-quality public transport. On this basis the City developed a land use model which best encompasses the core principles of sustainable development to ensure that the urban structure of Cape Town is more accessible and operates more efficiently and affordably.

Restructuring the urban form

Land use scenario planning undertaken by the City has confirmed the mutually supportive relationship between land use and transportation within the City.

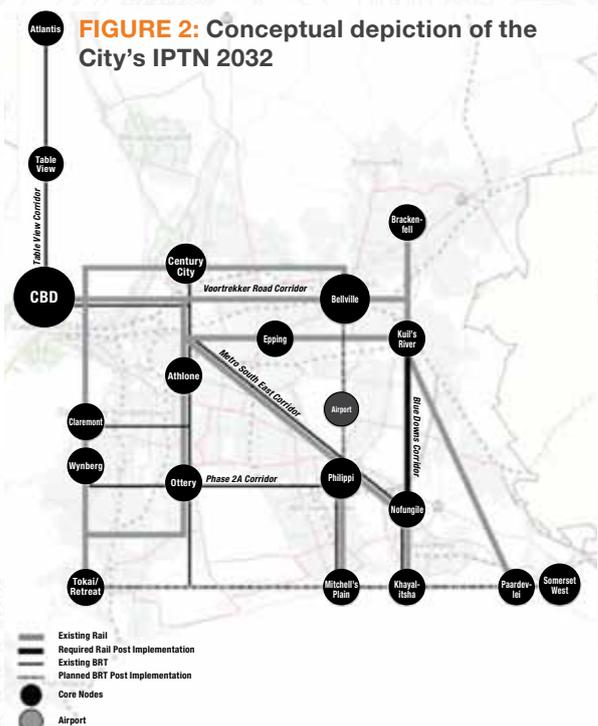
Integrated Public Transport Network (IPTN)

The Comprehensive Integrated Transport Plan (CITP) provides the strategic and guiding framework within which the IPTN has been developed for 2032. It outlines the strategic approach to designing an integrated public transport network for Cape Town that:

- responds to the mobility needs of the future city;
- achieves an appropriate mix of modes; and
- provides a sustainable balance of adequate capacity and reduced travel time for all trips.

The IPTN encompasses the rail and road based modes as well as making proposals for improving non-motorised transport access and park-and-ride facilities at modal interchanges. It determines which modes are best suited to cater for the existing and future public transport demand, route descriptions and modal interchanges, station and stop locations, system operational parameters, infrastructure needs and estimates of total system costs. The long-term network plan indicates prioritised public transport corridors for implementation according to available funding.

FIGURE 2: Conceptual depiction of the City's IPTN 2032

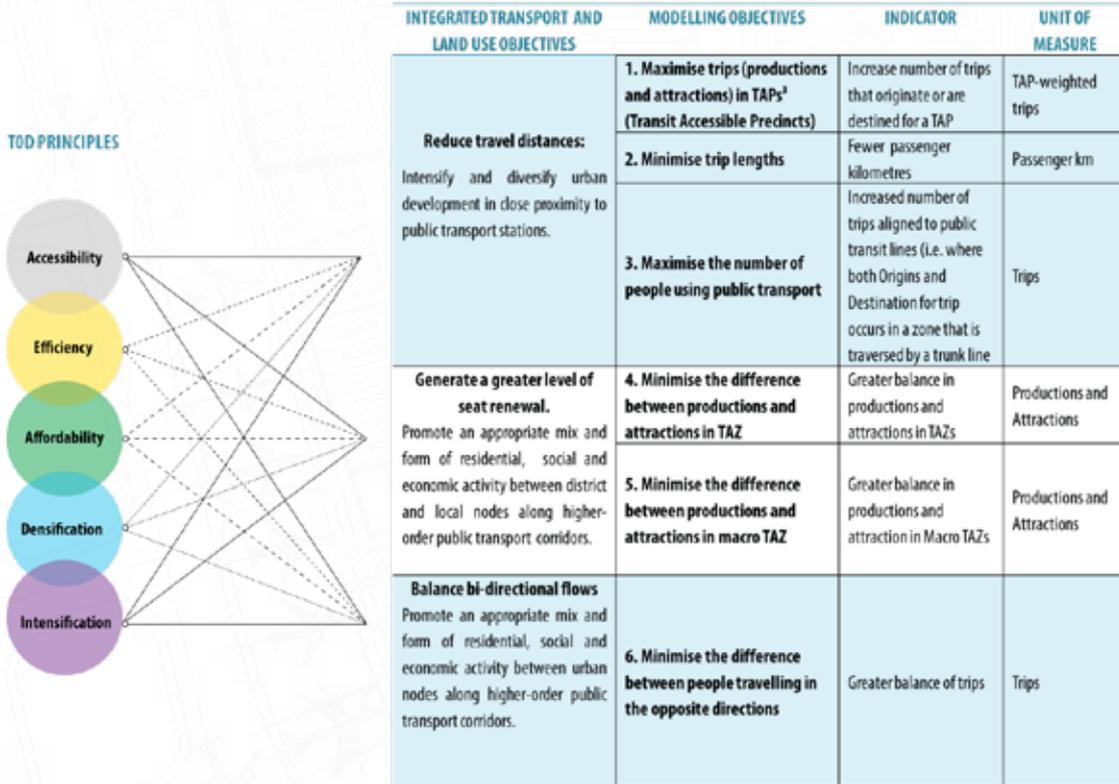


The following briefly describes the process of developing the so-called TOD Comprehensive (TODC) land use-transportation model:

STEP 1: TRANSPORT OPTIMISATION

Transport optimisation employs a heuristic model to spatially assign the future travel demand patterns, namely trip productions⁴ and trip attractions⁵ across the city, using indicators aligned to the core principles and objectives of TOD (Figure 3).

FIGURE 3: Transport Modelling Objectives and Indicators



The heuristic method uses a genetic algorithm for multi-objective optimisation to produce a series of trip productions and attractions, referred to as a “generation”. The generation contains a population made up of individuals. An individual comprises a set of trip productions and attractions (refer to Figure 3 for conceptual depiction). In this context an earlier result is regarded as an individual, thus the algorithm produces “genetically enhanced” or improved variants of it.

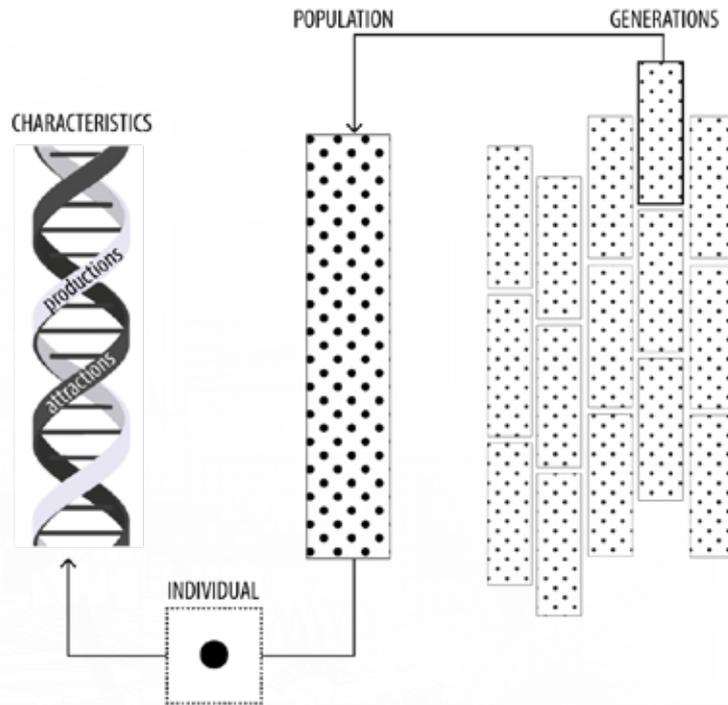
The indicators are then used to measure each individual’s performance according to their specific modelling objectives in Figure 3. The score of each individual within the population is weighted and ranked. The group of individuals is then assigned into pairings using a semi-random process, and the characteristics from each individual are shared to produce a new set of individuals. The model then scores the new individuals using the same performance indicators. This is followed by a process of natural selection until the best individual, or the optimum transport network is identified.

⁴Trip producing residential locations

⁵Trip attracting activities e.g. employment, school, shopping etc.



FIGURE 4: Genetic Analogy for Heuristic Optimisation

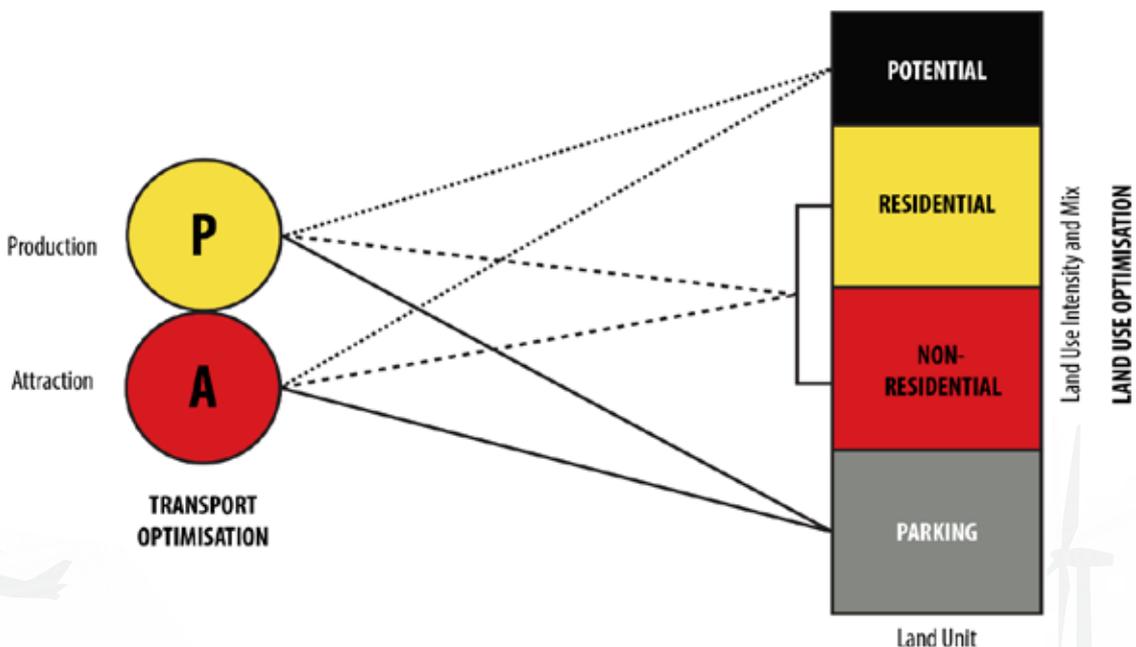


STEP 2: LAND USE OPTIMISATION

The initial stage of land use optimisation determines if the product of the optimised trip productions and attractions (step one), also referred to as the demand⁶, can be accommodated within the current land use regulatory environment. This is achieved by calculating the supply or the total building floor area in the city (dwelling units and GLA) using existing zoning rights for underdeveloped/partially developed land (greenfield sites) and residual

or latent floor area of developed land (brownfield sites) that has not been taken up, parking requirements and forward planning policy (refer to Figure 4). In this phase of the methodology productions were converted to dwelling units and attractions to GLA (gross leasable area). Density and diversity was viewed as an output of the optimisation process, ideally to manage the form of optimised productions (residential growth) and attractions (commercial and public facility growth), in support of the grade/level of transport network in the IPTN.

FIGURE 5: Land Use Optimisation Process



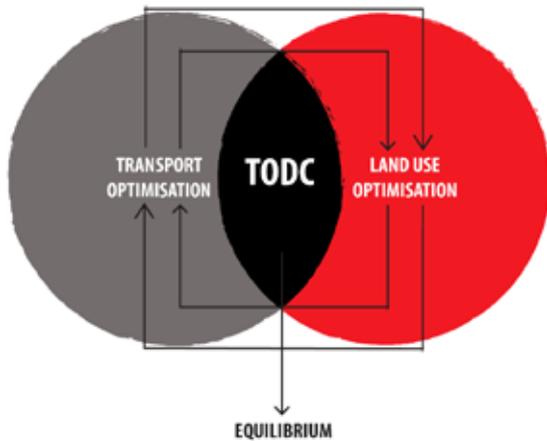
⁶Demand: Optimised set of trip productions and attractions (product of step 2) converted into dwelling units and GLA.

If the demand (optimised set of trip productions and attractions) cannot be contained within the existing regulatory land use environment (referred to as the supply⁷), the unmet demand⁸ will require further transport and land use optimisation to determine the extent to which it can be accommodated through further intensification of building floor space (persons per m²): household size/employment density) or relocation to neighbouring transport analysis zones (TAZs), without compromising the sustainability of the optimised transport network.

STEP 3: REACHING EQUILIBRIUM

Taking the above into account, equilibrium in the context of TOD is reached when land use and public transport become mutually beneficial (or where they positively reinforce one another). This phase can therefore be seen

FIGURE 6: Reaching Equilibrium



as an iterative and dynamic continuum (see Figure 6) where each optimisation process becomes more refined and informative to the other. It seeks to find the optimum balance between sustainable public transport operation and strategic long term development, and identify where future development patterns and regulatory parameters can be modified to accommodate an operationally efficient city structure.

Following the optimisation process, Figure 8 shows the optimal location of new trips in 2032 per TAZ (Transport Analysis Zone) based on the indicators depicted in Figure 11. Yellow depicts new trip productions (generated from future residential development) and red depicts new trip attractions (generated from future non-residential development such as retail, office, industrial and community facilities). When juxtaposed to the current spatial distribution of existing trips (refer to Figure 7) the following key conclusions can be made:

- There is an increase in trip producing land uses in TAZs located along transport corridors that contain high levels of trip attracting land uses. This requires the development of more residential opportunities in existing economic areas/nodes.
- There is also a need, although not as prevalent as above, to locate more trip attracting land uses (economic and social opportunities) in TAZs that are dominated by residential development, most noticeably in the MSE (Metro South East).
- The optimised scenario in Figure 16 illustrates a more compact distribution of future growth with less growth towards the edge of the City.



⁷Supply: The total available building floor area for development converted into dwelling units and GLA.

⁸Unmet demand: The demand which cannot be accommodated through the available supply.



FIGURE 7: Current spatial distribution of trips

CURRENT SITUATION

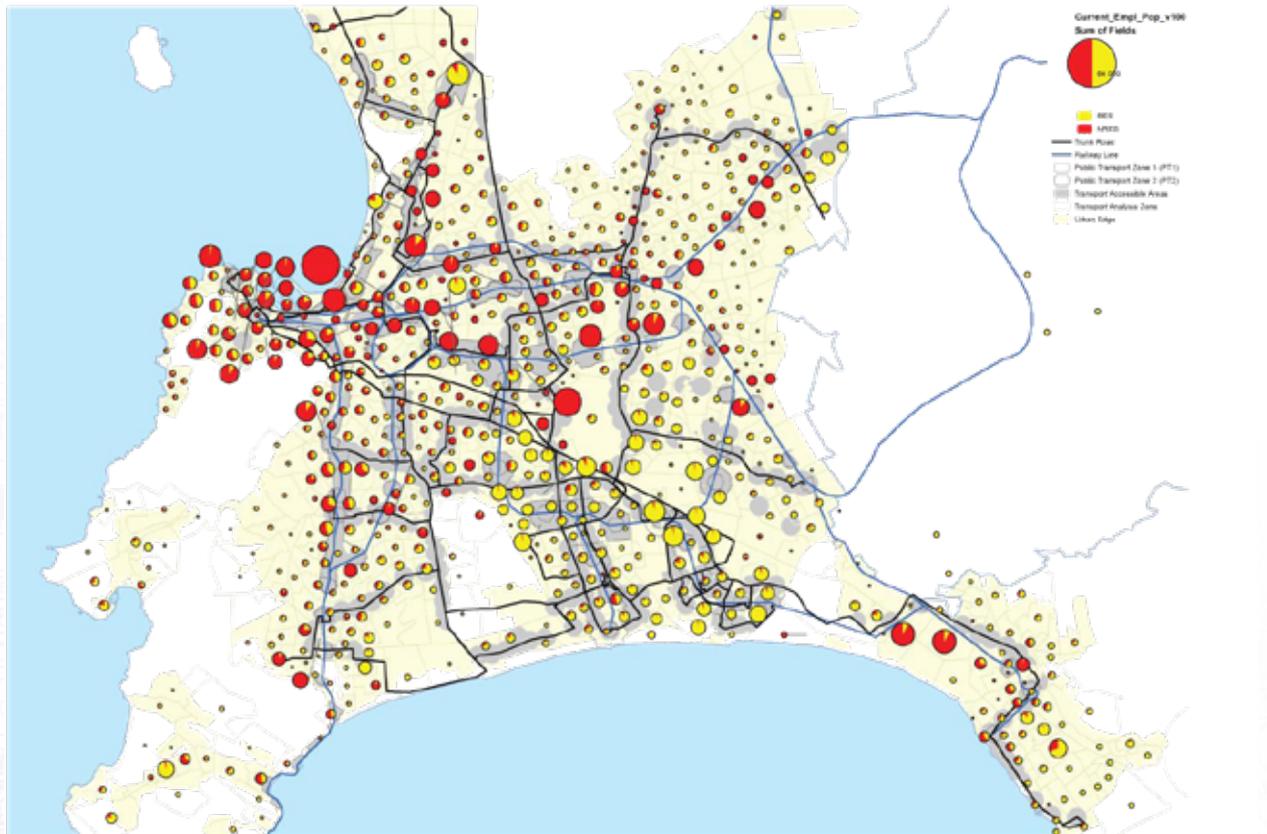


FIGURE 8: Spatial allocation of new trips following transport optimisation process

DEMAND

Following Transport's optimisation process

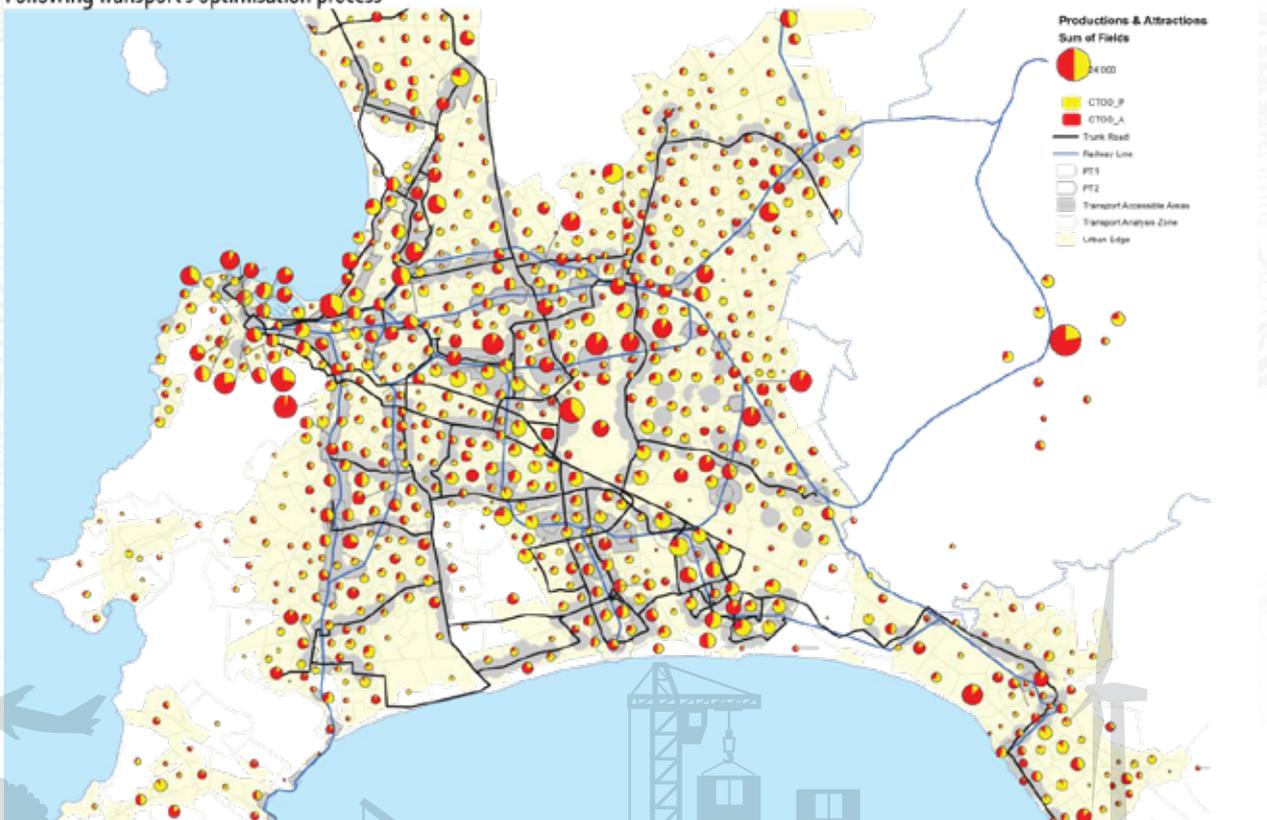
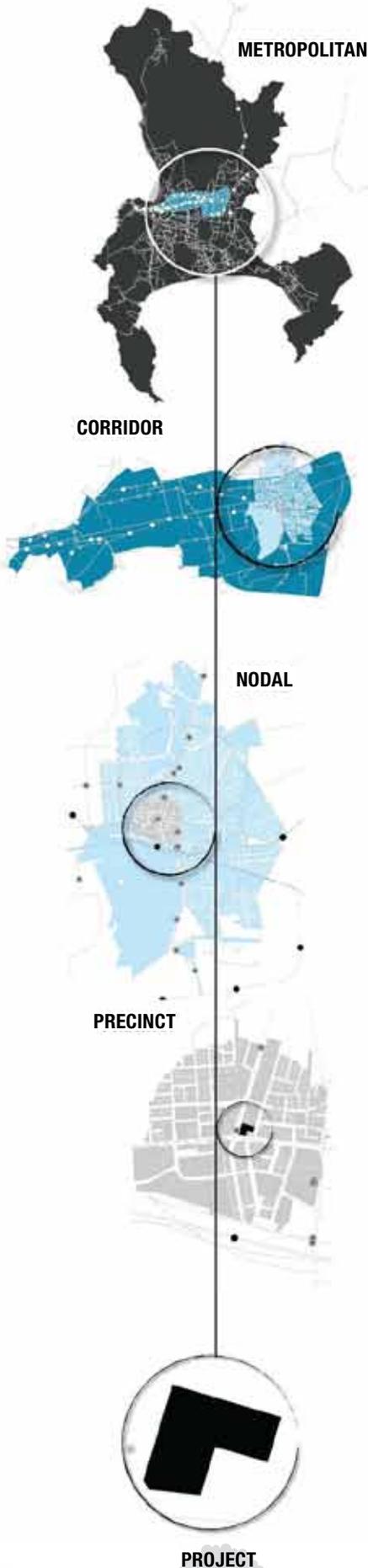


FIGURE 9: Scales of TOD in Cape Town

Implementation

Scale

The various elements above have been developed according to their scale of impact. Understanding this difference helps to identify the appropriate tools and mechanisms to implement TOD and the scale of planning at which they should be applied.

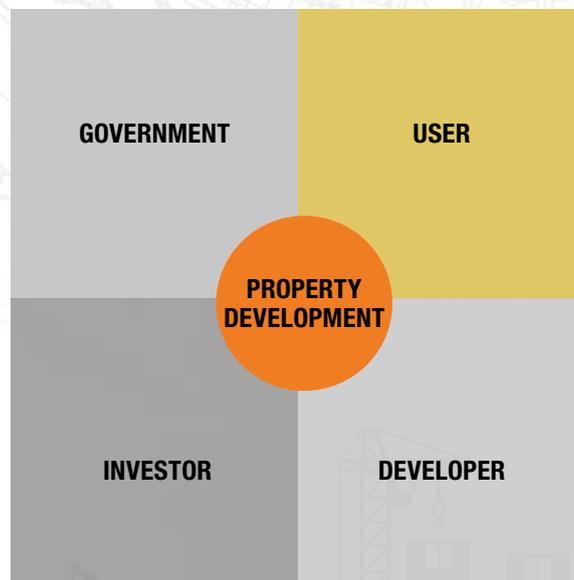
TOD at the metropolitan scale (see Figure 9 for different scales) as applied to Cape Town currently seeks to employ the future growth of the City by spatially distributing optimum land uses to ideal locations at the ideal time to optimise city wide travel patterns toward long term efficiency and sustainability.

The next level of TOD can be applied at a corridor level where the focus must be on land development to promote bi-directional flow of trips. Integrated transport and land use planning at a corridor scale is required to give context to local area and precinct planning initiatives. This will promote land development along selected transit corridors, where the combination of transport investment and development would optimise the utilisation of transport and promote compact development.

At a nodal, precinct and project level TOD principles can be applied to build integrated communities and facilitate better interfaces between the transport, development and people. The concept of building integrated communities goes beyond providing housing, but creating places that support the social, physical, and economic integration of housing developments into existing urban areas through the creation of quality living environments for people. A key consideration is the allocation of space, creation of more opportunities for walking and cycling and greater use of public spaces with sound urban design to create a sense of place.

Role-players

Development is ultimately a product of the decisions made by people; therefore, it is essential to understand the different roles and responsibilities they play in the development process, and in particular the factors that inform their decisions and actions. This is necessary to begin to identify the appropriate tools and mechanisms to shift their behaviour, which will in turn alter the form and manner in which development occurs across Cape Town and facilitate the orientation of development around transit. The four key agents or stakeholders are shown in Figure 10.

FIGURE 10: Key role players in the property development process



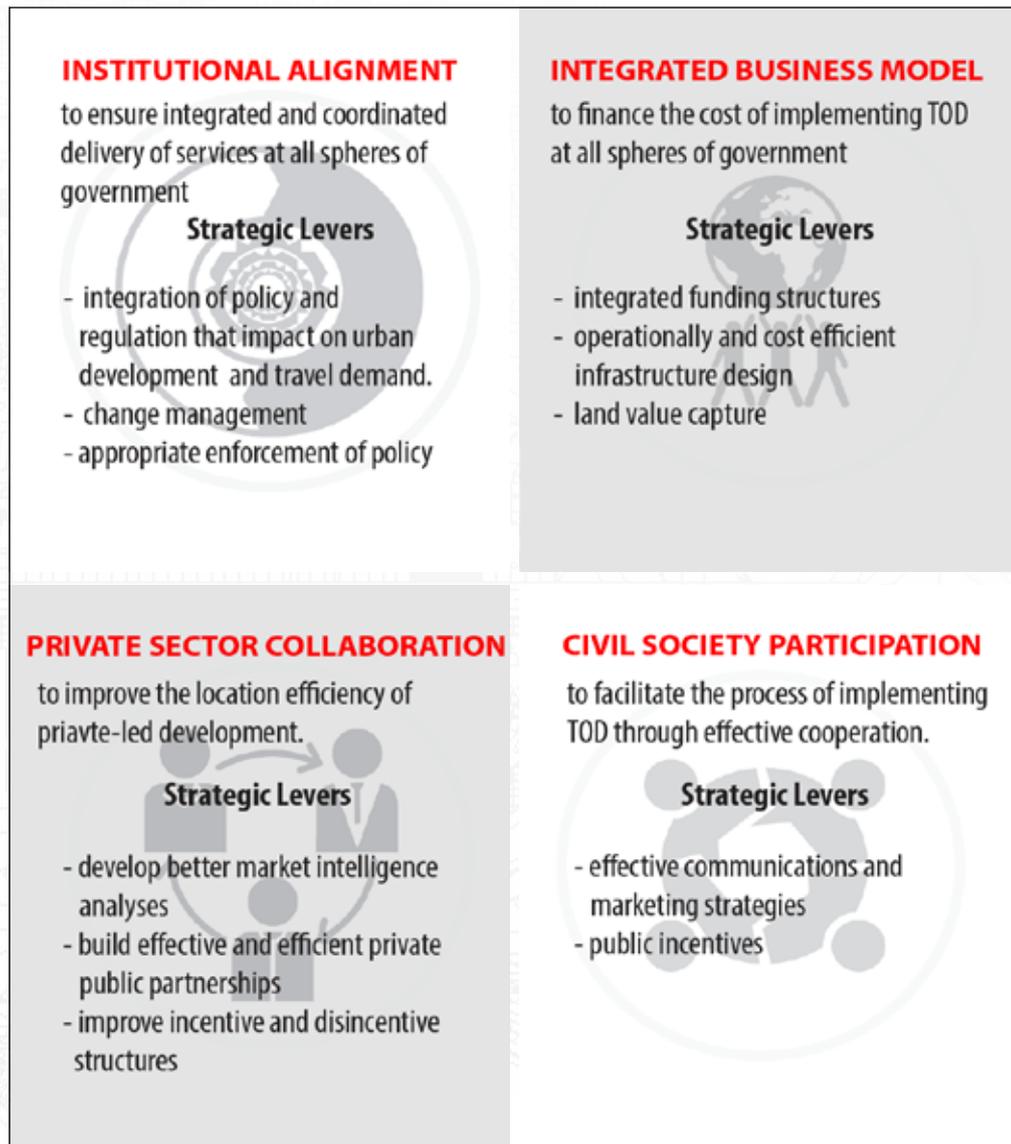
To implement the restructuring elements identified previously, the City established a TOD Strategic Framework, which attempts to consolidate the City's resources towards changing the behaviour of the key role players that drive development. It specifically attempts to optimise the factors that underlie their motives for engaging

in the development process, and in so doing, shift their current business as usual approach to one aligned to the principles and objectives of TOD. This requires an effective form of urban growth and travel demand management, which centres on the following programmes depicted in Figure 11:

FIGURE 11: TOD Strategic Programmes

TOD TRANSFORMATIONAL PROGRAMMES

TOD objectives can only be realised through effective urban growth and travel demand management. This requires strategic intervention in the following key focus areas:



Institutional Alignment

All existing corporate strategic policy, by-laws and development frameworks (IDP, SDF, IHSF, EDS, CDS, BEPP etc.) must incorporate TOD principles and objectives (to the extent that they have not already been embedded) in order to institutionalise TOD within all directorates of the City, and ensure that TOD principles and objectives are key considerations in the assessment of all private sector development approvals and public sector led development across Cape Town.

Working towards an Integrated Business Model

It is widely believed that TOD can lower infrastructure costs in the long run but the initial TOD infrastructure needs can be considerable and can require extensive public investment (Sustainable Cities Institute, 2013). A number of funding sources are needed to enable integrated development. Furthermore, it is important that the City safeguard against excessive expenditure to ensure that it is financially secure to continue the long

term implementation of TOD related projects. Tools to consider are to:

- Investigate parking related income (which includes the improvement of Parking Management and Tariff structures)
- Promote commercialisation of strategic public transport stations and precincts
- Align public grants to give effect to TOD outcomes
- Pursue the cross-subsidisation of funding sources to supplement TOD initiatives
- Explore land value capture opportunities

Private Sector Collaboration

This programme centres on levers to influence a change in behaviour of businesses and developers to move progressively towards TOD. Tools to consider include are to:

- Investigate and adopt incentives to stimulate development consistent with TOD development guidelines (these may include financial rewards such as discounts on development contributions, leveraging of city's property assets, rebates, tax holidays and subsidies or they may involve non-financial inducements in the form of exemptions from certain regulation or reporting standards).
- Develop an appropriate TOD land acquisition and release programme, targeted at, and incentivising development in appropriate TOD locations.
- Streamline land use planning approvals in TOD priority areas.
- Use the property cycle as a forecasting tool for planning intervention.

Civil Society Participation

Unsustainable user behaviour is to be challenged through Travel Demand Management (TDM), effective communication and the formation of a public sustainable-rewards programme.

Tools to consider include:

- Travel Demand Management (TDM)
- Public Incentives which propose that all rates-based and development contribution frameworks are aligned to TAPS and the TOD Comprehensive land use scenario
- Marketing and Communication

Way Forward

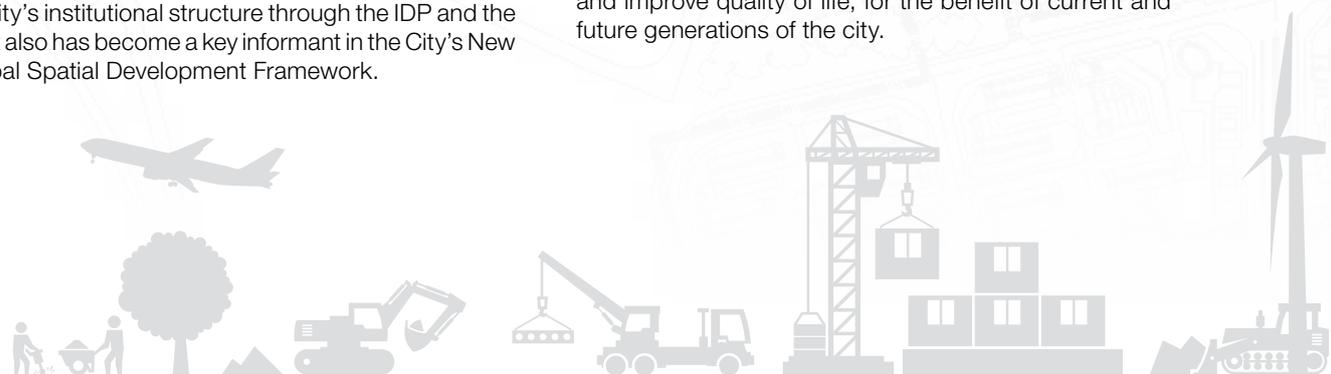
The TOD Strategic Framework was adopted by the City of Cape Town in 2016; since then it has become embedded in the City's institutional structure through the IDP and the BEPP. It also has become a key informant in the City's New Municipal Spatial Development Framework.

FIGURE 12: Model for Integrated and Sustainable Development



As part of the City's Organisational Development and Transformation Plan (OTDP) in 2016, the Transport and Urban Development Authority (TDA) was formed, which attempts to unify and coordinate the key elements that make up the built environment and urban form of the city so as to facilitate sustainable development (see Figure 12). By combining the functions of transport, urban planning, public housing and environmental sustainability into one sphere of control, TDA Cape Town has the overarching aim of reversing the effects of apartheid through performance-oriented and investment-led service delivery.

A fundamental objective of The newly formed TDA in the City of Cape Town is to drive the deliverables in the TOD Strategic Framework and continue to implement integrated development and change management programmes to unlock the synergies, investment partnerships and creativity needed in order to grow Cape Town's economy, and improve quality of life, for the benefit of current and future generations of the city.





In conversation with Risenga Maluleke Statistician-General, StatsSA



The framework created by the Millennium Development Goals, contributed to the progress made on statistics at the national level. How is StatsSA giving support to the localisation framework as required by the SDGs?

One of the key areas of the localization process is to ensure that the SDGs are adapted to the national circumstances (in the case of Municipalities read "local"). To this end Stats SA is involved in a few key initiatives:

One of the key initiatives has been the integration of the SDGs, the NDP and other key development agendas into a single framework (IIF-Integrated Indicator Framework). The key component of this framework is that it places our own national framework at the centre of the measurement exercise (this process is in line with the UN localization view). Using this as a base Municipalities could link their own development agendas (IDPs) to the national and international ones to gauge the extent to which they contribute to the attainment of the SDGs (and by extension the NDPs)

Stats SA will be initiating discussions on a National Strategy for the Development of Statistics (NSDS), which will assist departments and Municipalities to structure the measurement of statistics for which they would be responsible for. Stats SA will provide statistical support and advice to producing agencies with setting up statistical units and guidelines on the development of statistical plans (including the key indicators to cover) that will guide them in the production of quality statistics towards monitoring their progress in terms of their IDP, the NDP and the SDGs.

Stats SA uses SASQAF as a tool to assist departments in improving the quality of the data (survey, administrative or spatial) they produce.

In the quest to localise the SDGs, how can municipalities ensure that they balance ambition and reality when setting their targets and indicators?

Municipalities need to understand their current position. To that extent, the establishment of key baseline indicators are critical. They furthermore need to have an understanding of how they performed previously. If historical data on the issues at hand is available, this should be used to establish trends which will give some indication of what could be expected should things remain the same. Using these two measures as a basis, will give municipalities some idea of what would be possible in the time left to achieve the goals. This may lead to more

realistic targets being set. [There are of course other dependencies/obstacles that may impede success, so awareness of possible risk factors such as availability of human resources, skills, budget etc. that may influence achievement of targets, is important]

Equally important as the availability of data for measurement (baseline, trends, etc.), is the quality of the data used. Municipalities should carefully scrutinize the credibility of data sources used as inputs to the evaluation of progress as this may have a profound effect on their results.





How can data be used to improve city intelligence as a policy tool for advancing the goals of urban development? And related to this, some critiques say data is available but policy is not always responsive, what is your view on this?

This question deals with policy, which is outside our domain

What would you say are the main challenges and opportunities for how data is used by cities?

Cities are involved in a number of activities that require data. Cities namely require data to report to a variety of institutions on a variety of indicators. The approach to data collection, extraction and reporting is complicated and uncoordinated and new processes are required. Data is often, multi-modal and heterogeneous, noisy and incomplete, and is time and location dependent. Privacy, security and biasedness are also considerations

More broadly cities often do not have access to appropriate data to inform planning or monitoring of service delivery initiatives. Although survey

data (such as the census, CS and GHS) provide valuable information, the surveys are often either ad hoc or very irregular (censuses only take place every 10 years), or not particularly applicable due to the fact that surveys are often not developed for cities, or that sample sizes are too small.

Opportunities however can be gained through faster and more accurate reporting as well as the ability to integrate processes allowing cities to learn from each other greater transparency and improved management can also occur under these circumstances.

There have been discussions about the need for open data and the integration of new data sources. How can cities contribute to and benefit from this?

Open data is the idea that some data should be freely available to use and replenish without restrictions of copyright, patents or other control mechanisms.

Cities, by their nature, collect a lot of information on a wide variety of services such as rates and taxes, indigence, food safety, bus ridership, crime reports, pet licences, property valuations, energy and water consumption, building permits etc. Most of the data has been collected at tax payer expense over many years and making it available for mining will greatly benefit they city and all its residents, including the rate paying businesses etc.

Keeping factors such as privacy and security, cities can contribute to available open data by making all public data available, unless such data is subject to valid privacy, security of privilege limitations. Make available data that is collected at the source with the highest granularity possible in as rapid a release cycle as possible. Consideration should also be given to making the data free and without license considerations

The benefits should lead to public service improvements by providing citizens with data required to engage governments and to improve service delivery and provide for social innovation and economic growth. Gives citizens information to understand governance and provision of services, as well as potential markets.





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Some analysts have raised concerns about some of South Africa's vital statistics being unsuitable for monitoring progress of some of the SDGs, for example the targets on injury and violence. How is Stats SA ensuring that the data gaps and differences in data collection are addressed?

Usual challenges related to Civil Registration and Vital Statistics (CRVS) such as mortality and causes of deaths include among others timeliness, completeness and ill defined causes of deaths to mention a few. The accuracy and completeness of civil registration mortality statistics depends on both coverage and the ability of medical practitioners to correctly identify and certify the cause of death. Data assessment is valuable for improvements to be realised in coverage, quality and consistency of cause-of-death statistics.

The data on MoCD published by Stats SA annually emanates from administrative data, based on the DHA-1663 forms completed by Doctors (and in the case of non-natural deaths information is completed by forensic pathologists) at the time of death. There is broad agreement that this information is not properly completed at source (which is the DoH) part of the reason is reluctance to attribute causes of death to violence as it could have legal consequence. The CRVS assessment report has made recommendation for the review the Inquest Act in order to improve coverage of data on non-natural causes.

In order to respond to urbanisation, amongst other things, it is critical to understand the inter-related megatrends that accompany urban growth. How is Stats SA helping cities to monitor and track the complex issues involved?

A global process that aims to manage movement of people in a more co-ordinated way and which addresses migration and urbanisation more holistically is currently being negotiated which aims to address migration and urbanisation issues globally but in partnership with cities as part of its implementation plan. This process is the Global Compact for Migration which is a non-binding agreement which will become a best practice blue print for issues related to migration and urbanisation worldwide. At the core of the Global Compact is the need for more data which is responsive to policy priorities and which inform users of the critical issues. Of course plenty of the data which is available is spaced far apart such as Census, representative at higher geographic levels such as province in the case of household

surveys or is not responsive to city needs in terms of administrative data collected by DHA. It is key that as part of a National Statistics System that systems of data collection and statistical production at city level be prioritised. Defining what the city is, is a starting point and thereafter harnessing the data collected by cities in a manner that is complementary, comparable and which identifies key indicator by regions of the city is critical. Of course data integrity and anonymity of respondents is key as per the principles of official statistics but translating administrative data into a format which is comparable, open to analytical scrutiny and which is based on defined time series units will be helpful in tracking issues and indicators related to urbanisation.

Many African countries lack properly functioning civil registration and vital statistics (CRVS), how then can they plan for development and make evidence-based policies?

The need for CRVS data has been recognised by the continent and hence the statistical community on the continent has initiated a CRVS programme across Africa aimed at establishing

systems that will provide baseline information for evidenced based policy making.

There are a number of initiatives to improve CRVS at continental level;

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- The APAI-CRVS programme was initiated to undertake comprehensive assessments of CRVS systems and develop strategic and action plans for improving the CRVS.
- The institutionalization of the African civil registration minister's conference to ensure continued political support for CRVS.
- The African Symposium for Statistical Development (ASSD) was tasked to mobilise Africa to improve CRVS systems and ensure the alignment of health and CRVS systems to improve sharing data on births, deaths and causes of deaths with national statistical offices and CRVS authorities.

In South Africa, the APAI-CRVS programme provided the framework for the South African Civil

Registration and Vital Statistics system (CRVS) assessment undertaken between October 2014 and March 2015. The report has been finalised and plans are underway to undertake the strategic planning process.

Statistics South Africa (2013) estimated birth and death registration completeness levels of 89.2% and 94%, respectively in the 2007 to 2011 intercensal period.

On an implementation level: Department of Home Affairs (DHA) has made mobile units to make services available to communities to assist them to have easier access to registering deaths and births as well as Thusong centers. DHA satellite facilities are available in a number of hospitals to assist in the registration of deaths and births.

Given that migration and urbanisation are linked to urban transition on the continent, how can South African cities work with other African cities when there is such a lack of CRVS?

The issue of civil registration and Vital Statistics by definition is something that refers to registration of vital event and events that impact on the content and makeup of the civil register. The term is perhaps not used correctly in the context of migration and urbanisation as well as the urban transition at continental level. What is however evident is the lack of administrative data related to internal movement of people, the fragmented administration of processing the entry or non-entry of foreign nationals into the country and by so doing into cities.

It is therefore imperative that statistical systems at city level be developed in a co-ordinated manner across the continent in a manner that is comparable and which generates a core set of indicators in order to take cognisance of changes to the urban landscape on the continent.

The number of African cities exceeding 5 million as well as the megacities exceeding 10 million will increase but there are already cities who have been exposed to being a member of this group and shared lessons and strategies in urban management and administration must advanced. Central to this concept is the initiative

which forms part of the objective 1 of the zero draft of the Global Compact on Migration which speaks to data collection and herein lies the relevance of regionalised expertise and capacity in data collection.

Investment in the collection, analysis and dissemination of accurate, reliable, comparable data, disaggregated by sex, age and migration status is a key part of the puzzle. This evidence must enable the production of research that guides well-informed and coherent policy-making and public discourse, and allows for effective monitoring of the implementation of commitments over time. The harnessing of the usage of administrative data that cities collect should be seen as an extra layer that tells a richer story that conventional data sources such as Census and household surveys tell at a higher level. The two approaches are not in competition with each other but instead complement each other. Capacities in this regard on the continent with reference to the challenges that African cities face must be consolidated and shared at relevant platforms for African cities to be able to be seen as modern, productive and global cities of the 21st century.





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It has been said that “Statistics is a conduit of trust. A currency that holds a global promise for Transparency, Results, Accountability, Sustainability and Transformation (TRAST).” How then can Africa cities that lack data diver on this TRAST?

There is a full understanding for the need for quality statistics and to this end the African Union Commission Dept. of Economic Affairs has committed to the process of improving the statistical capacity. A Pan African Statistics

Training Center and the Pan African Statistics Institute is in the process of being established. Strategy for Harmonization of Statistics in Africa (SHASA) is also being aligned to Agenda 2063.

It goes without saying that accurate, reliable, timely, disaggregated data is important. However, at local government level there has been a lack of disaggregated data, how is Stats SA working with municipalities to address this?

Over and above census data and to some extent the Community Survey data, administrative data originating within municipalities themselves should be a major source of reliable information for municipalities to use. Stats SA has worked

with a number of municipalities in an attempt to improve the usefulness of administrative data for statistical purposes. This effort has however has not fully realised the desired outcomes for a variety of reasons.

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 6.1 Johannesburg Development Agency: Co-producing city making

 6.2 Urban Planning and Development: The need for collaborative governance processes



Johannesburg development agency: co-producing city making

by Douglas Cohen, JDA



“When residents can engage with objects, spaces, people and practices in a complex manner is the point where they themselves become social infrastructure. They are thereby capable of facilitating the intersection of socialities so that expanded space of economic and cultural operation can become available to those with limited means.”

Simone, 2008, p. 69

A city is a living organism. It consists of human beings coming together to interact in order to satisfy human needs. Cities are made up of nodes of activity whether it be living, working or for recreation and these nodes of activity are linked to one another through various networks i.e. transportation, communication, electrical. Urban renewal sets out to regenerate a part of this organism while it remains a fully functional part of this organism. It is like repairing the engine of a passenger bus while the bus is

continuing to transport passengers from point A to point B. This is the nature and challenge of urban renewal. It is going about what needs to be done while the people that live in the area continue going about their daily business. Hence, urban renewal is less about the realisation of a Utopian vision and more about crafting real practical solutions to the daily challenges of a poor resident population. In this regard sustainable urban development is therefore a process, with strategies that are negotiated, revised and implemented

with communities rather than imposed from the top (72). Living in higher-density areas, there is ever greater competition for access to increasingly scarce resources. This requires a new social compact between city dwellers and the way we behave in, and interact with, public spaces and what we regard as private space. This is an essential component of development intervention in cities. Globally, and particularly in South Africa, there is an entrenched tradition of creating urban development solutions for people, rather than with them.





The Johannesburg Development Agency (JDA) was established at a critical moment in Johannesburg's history as part of the iGoli 2002 re-engineering process. Since then, its role has evolved significantly. Urban development agencies around the world operate on slightly different institutional models. In order to respond to the challenges, opportunities and local needs in Johannesburg, the agency has evolved with the changing requirements of Johannesburg and its people. It has also learnt from place making experiences over the years. JDA has shifted its focus from triple bottom line outcomes (economic, social and environmental) in the inner city and marginalised areas only to having an emphasis on resilient, sustainable and liveable urban areas in identified transit nodes and corridors. This means that as an area-based development agency, the JDA has to be more than just project a management agency or an economic development agency.

The mandate of the JDA is to implement area based development and regeneration projects. This mandate positions the focus of the JDA on long term change of a neighbourhood through implementing a range of projects in specific areas rather than the short term implementation of a single project somewhere in Johannesburg.

There are three core development tasks that are crucial to the fulfilment of this mission:

- The JDA plans
- The JDA facilitates development
- The JDA constructs



Every area-based development undertaken by the JDA is therefore supported in the pre-development and post-development phases to enhance the value added by the capital works interventions and improve the longer-term sustainability of the capital investment. To do so, the JDA places much emphasis on the co-production of solutions in partnership with local communities and stakeholders to meet local needs and mitigate challenges. The JDA strives for a more responsible and effective approach which is to work with local stakeholders to produce solutions, drawing on their knowledge of the development context. This can cultivate a much more sustainable sense of ownership, civic pride and citizenship. This also involves continuing to draw on our established partnerships with professional bodies, and the academic fraternity to extend co-production opportunities and democratise the process of spatially restructuring the city.

Co-produced solutions in urban design and development have over

many years proven to be more sustainable and robust than technical expert-driven ones because they are more responsive to local needs and context and draw on a range of alternative knowledge forms (e.g. tacit and experiential knowledge).

The JDA always seeks to engage the public in a meaningful way at every stage of development. This includes public participation in the planning stage, consultations with communities and affected parties during design stage, and value-adding activities involving community members in projects such as the peoples' history, heritage exhibitions and public art projects that tell the story of the neighbourhood. Methods of engaging with local stakeholder communities also need to respond to the evolving needs and lifestyles of city users in the 21st century. Conventional methods must be enhanced by the use of social media platforms, electronic communication and other more engaging and relevant forms of sharing knowledge and ideas between professional teams and local communities.



**A city is a
living organism.
It consists of human beings coming
together to interact in order to
satisfy human needs.**

To this end the JDA strives to:

- Enable the City to keep stakeholders informed, making sure there is accurate understanding of the impact of City developments in their area. This is about ensuring that stakeholders are actively engaged from the very inception of the project concept and play a meaningful role in shaping the development outcomes and future custodianship of the development
- Enable the City to manage expectations and perceptions of all stakeholder groups throughout the project by providing clear and regular communication and mobilization activities, explaining the purpose, scope and outcomes of each project to minimize misunderstanding and misinformation.
- Enable the City to make sure all stakeholders understand, support and develop buy-in and ownership of the City Project

The following examples provide a sense of the JDAs approach to co-production in place-making: #My Alex Project, #JoziWalks and My City Our Block. A summary of these initiatives are outlined below.

#MyAlex

Youth Perceptions of Place was an exciting initiative developed by the Johannesburg Development Agency (JDA) to engage with youth aged 18-25 on their views of Alexandra. Fifteen young people from Alexandra township, were selected through an open audition, went through a crash course in artistic/entrepreneurial training, to give the public a whole new take on Alex. They were mentored in graphic design, social media, performance, photography, online mapping and virtual reality design through a month of intense workshoping facilitated by four creative entrepreneurs. The youth participants used Facebook to record and reflect on their learning process, sharing images, photos, interviews and ideas relating to Alex. The process culminated with two events, both coinciding with national Youth Month, and gave audiences new insight into the perceptions, visions, hopes and plans that young people living in Alexandra have for the place they call home.

#JoziWalks

In order to assess the impact of its developments, the JDA annually conducts various project and area based impact or baseline assessments. The outcomes? of such impact or baseline assessments can



sometimes present a challenge in that they are done by the JDA itself and are either too closely linked to a specific project, or too wide and general to draw any meaningful learnings linking the development to the outcomes. To address these challenges and to get a fresh perspective on the nature and outcomes of previous (and possibly future) development the JDA looks at more community-based impact assessments. A more responsible and effective approach is to work with local stakeholders to produce solutions, drawing on their knowledge of the development context. This can cultivate a much more sustainable sense of ownership, civic pride and citizenship. With the above in mind, the JDA is also sought in aligning the principles and objectives of the Jane's Walk movement. Jane's Walk is a series of neighbourhood walking tours named after urban activist and writer Jane Jacobs. Jane Jacobs was passionate about community and city life and the aim of the walks is to get people to explore their cities and connect with neighbours. Participants are encouraged to share their stories, insights and ideas about their community or favourite part of the City. Therefore, the aim of #JoziWalks was to find synergies between the Jane's Walk approach and the current JDA practices and to encourage Joburgers to get out of their cars and engage with urban communities in ways they might not do otherwise.

My City, Our Block

As cities globally face the challenge of converting large-scale urban plans into meaningful social impact a new understanding of the real city and its actual needs calls for urban projects that are small-scale, rooted in society and spatial structures, imminently useful, and able to actually deliver on their promises. The "My City, Our Block" initiative is geared at transforming and revitalising the inner city by establishing formal and informal collaborative partnerships to create sustainable benefits in the inner city. The objective of such productive partnerships is to develop:

- Symbiotic City-Business-Community Trust Relationships
- Rebranding of the Inner City – harnessing existing or latent precinct identity and activity
- Rewarding and supporting active citizenry and civic pride

Inner city stakeholders interested in being part of this project were invited to identify small-scale interventions in the Inner City by engaging with a wide range of sectors and industries in the Inner City (such as non-government organisations, private developers, investors, residents' organisations, faith-based organisations, education institutions and social support organisations) offering the opportunity for them to pitch their ideas for a project based within the Inner City, where the JDA could contribute through capital investment in improving or transforming the public realm that would support the reciprocal socio-economic contribution from the partnership. The call from Inner City stakeholders was to create formal and informal collaborative partnerships at a neighbourhood or precinct level and to identify neighbourhood or precinct-scale capital projects that would in return offer sustainable benefits to inner city users. Submissions were assessed as a two-stage competition, with the winning entries having the necessary combination of responsiveness, impact and most importantly, sustainability.

Douglas Cohen is the Executive Manager: Planning and Strategy at Johannesburg Development Agency (JDA, an Agency of the City Of Johannesburg).

www.jda.org.za

The JDA has implemented over 600 projects across all administrative regions of the City in 17 years of operation. Over the past five years, the JDA has grown by almost 100% from 50 employees to 98 employees. This has resulted in an increased capital budget and increased number of projects to implement on behalf of client departments. The Total capex allocation increased to just over R5 Billion over the last 5 years.





social structures (in the form of street committees, development forums, community based organisations (CBO's), social coalitions and other collectives) and socio-cultural infrastructure (in the form of healthy recreational and educational spaces) are in place and functional, urban challenges such as densification are more likely to be rooted in social environments conducive to implementation.

In our experience, while legislation is clear about the need and benefits of having *'communities that are active and involved in managing their own development, claiming their rights, exercising their responsibilities, contributing to governance structures at different levels - notably so at ward and municipal level'*, in practice this is not happening. So, what are some of the obstacles to having active residents and communities and what are some of the options to rectify this?

We know, from our experience from previous projects that service delivery challenges (and protests) often emanate not from service related matters, but from communication failures; citizens feel they are not being heard, not being involved or at least consulted or informed. Community engagement practices are often rigid and ineffective. Our work in places such as The Heights and Nyanga in Cape Town suggests that there is a need to move from public participation as compliance, and shift towards attentive engagements with the public. In practice this means officials going into communities to implement projects which do not only have clear outcomes (i.e. to improve a service or situation) but are also sustained as a greater objective; conversing with residents to collectively reflect on the actual situations on the ground and identify needs and changes. Urban planning efforts following this approach will be meaningful as they are results-based, but also principle driven.

This approach requires clear and good communication between the city and residents, between city departments and among community members. As it will be grounded on inclusive social dialogue and participation, it depends almost entirely on the existence and functionality of community leadership and structures. While as discussed before there are major weaknesses and gaps in this front, we believe as researchers that there are ways to address this and set the ground, or at least the seeds to overcome leadership or community vacuums. One of the options is implementing small but significant local projects grounded in the principles of Community Based Participatory Research (CBPR).

A CBPR project (which could be implemented in any field) as an entry point in a community, could ensure collaboration happens as a process and an outcome. This is the approach we used when we piloted and adapted the Community Scorecard methodology in Nyanga and The Heights during the period 2014-2017. This methodology allows for ordinary citizens to understand governance systems and urban challenges, and for officials and researchers to understand the full spectrum of local social realities. It is used to engage local governments and communities in conversations to discuss challenges and opportunities around the provision of specific services. It is significant as it allows the building of trust over time and observation and learning from realities on the ground, bringing together city officials and residents into focused conversations, even difficult ones.

Collaborative governance processes require an iterative approach allowing for steps backwards and sideways when required. In a rapidly urbanising environment urban planning efforts framed under this approach and using methodologies such as the Community Scorecard will ensure that citizens and officials deal with actual realities, and not expected or ideal circumstances.





In conversation with Mr Carlo Ratti Senseable Cities Lab, Massachusetts Institute of Technology (MIT)



Please tell us about yourself

I was born in Turin, Italy, in the early 1970s, but then grew up in different countries (Italy, France, UK and then the USA). Probably that's why I still like to live on the road, and especially enjoy the emerging world. My friends say that I live in the Cloud (the physical one, I mean). However, I wash my underwear in Boston, New York, Turin and Singapore.

From a professional point of view I wear three different hats: I am on the faculty at the

Massachusetts Institute of Technology (MIT) in Boston where I run the Senseable City Lab; I am a founding partner of the design and innovation firm Carlo Ratti Associati (CRA); and over the past few years I have been the co-founder of different start-ups. The vision is similar: exploring how we can create new interactions between the built environment and ourselves. However, each 'hat' has a different focus: research, projects, and products.

Your main topic- Senseable Cities; what does this mean?

I do not like much the term "Smart City". I prefer the word "Senseable" City - as in the name of our research center - as it emphasizes the human, as opposed to technological, side of things: a city that is "able to sense" but also "sensible". In both cases however we are dealing with the manifestation of a broad technological trend: the

Internet is entering the spaces we live in, and is becoming Internet of Things (IoT), allowing us to create a myriad sensing-and-actuating loops in cities that were not possible before. Applications can be manifold: from waste management, to mobility, to energy, public health, civic participation, etc...

Cities are highly complex systems; they comprise of people and communities interacting with one another and with objects and dimensions within a range of urban settings or contexts. From your experience, how have you managed the trans-disciplinary nature of the Lab and what have been the benefits of such a broad team?

Collaborative and interdisciplinary approaches are increasingly crucial today. Architecture and design are no exception. Both at the Senseable City Lab and Carlo Ratti Associati we work in teams with people with varied geographic, cultural and professional backgrounds. Some

people come from architecture, design and planning, but we have also mathematicians, economists, sociologists, physicists and many others. "Diversity" - in all its forms - is one of our greatest assets.

There is a saying that, "Those who have knowledge, don't predict. Those who predict, don't have knowledge". With that said, what do you think the trends are saying about Africa's future?

I never heard the saying, but I like it; in general, I am not someone who likes to predict - which, based on your statement should make me

knowledgeable... Failed predictions from the past quickly turn into paleofutures - early speculations about tomorrow that never came to pass.





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Regarding Africa, we need to be aware of the fact that every technology needs to start somewhere – and often it starts in the developed world. Hence at the beginning, new technologies unfortunately might increase existing societal gaps. However, subsequent dissemination can cause a “leapfrogging” effect, and help reduce the gap. Take for instance what happened with cell phones; when they started they were the exclusive preserve of the

Western upper classes. Fast forward a couple of decades and they have become tremendously widespread across the world, in particular in the African continent, where countries without an existing telecommunications infrastructure are now leapfrogging into the future. Different parts of Africa are now leading the way in many applications, from mobile banking to the empowerment of farmers with real-time crop information.

From your perspective, what is the role and purpose of cities? What are the relevant questions needed to be asked about cities and technologies, and the interplay between the digital and the real world?

Cities emerged around 10,000 years ago with the purpose of bringing people together – and allow us to exchange goods, ideas, chromosomes... That primordial function of the city is still its main engine today. The city is an archaeology of human experiences, cemented in art, buildings, and piazzas.

Regarding technology, we should always remember that cities are open platforms, which come into existence through a myriad of individual accretive actions, not by top-down decisions. In general I think that we should encourage primarily citizens to take action. If we can develop the right platforms, people can be the ones to transform cities in a bottom-up fashion.

In conversations relating to possible futures, the narrative often centers on the idea of deconstruction and redesigning cities to something new, shinier and brighter; what are your views of this notion?

In my opinion, it is incredibly hard to build a full city from scratch – as many disappointing results show us, from Brasilia to Masdar. Cities built top-down tend to be rather dull and uninteresting; since their emergence, cities have always been the result of both top-down and bottom-up collaborative processes.

As I mentioned before, such formula can hardly be reproduced artificially. Rather, urban development is the result of thousands of nested feedback loops, which can take multiple forms and engage a myriad of people. Again, cities are open platforms, which come into existence through individual accretion, not by top-down decree.

What do you think the potential is for big data to transform public policies relating to urban planning, and this is also considering the real time happenings of the urban environment? What are the necessary conditions and non-negotiables that the public sector ought to bear in mind in order to optimize on the offerings of big data?

The world today is awash with Big Data. In 2015, mankind produced as much information as was created in all previous years of human civilization

[<http://www.industrytap.com/knowledge-doubling-every-12-months-soon-to-be-every-12-hours/3950>]. Every time we send a message, make a call, or complete a transaction, we leave digital traces.

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Big Data is impacting on many dimensions of society. In cities — the focus of most of our work — it can help us better understand the world around ourselves and plan its transformation. Collecting data and responding accordingly has always been a crucial endeavour. Over a century ago, Élisée Reclus stated that good “surveying,” i.e. data collection, is the first fundamental step in city planning. It is not different today — if not for the fact that we know our cities much better and can plan their transformation accordingly.

However, let me add this: Data ownership and accessibility is a crucial issue that goes much beyond “Smart” or “Senseable Cities”. It deals with

all the digital traces we generate online — when we use our smartphones, post on social media or browse the Internet. All of this produces a digital copy of our lives that sits somewhere in the Cloud and which is accessible just to some large corporations and governments.

I am particularly concerned by such asymmetry and I believe that in order to address it we should have an open conversation. Towards this goal, at MIT we have been working extensively on the ethical and moral issues connected to Big Data and in recent years we have convened a Forum called “Engaging Data” - involving leading figures from government, privacy rights groups, academia, and business.

Do you think the investment of energy should be on the individual, ideas of personal agency or intervening at the structural level to bring about systemic behavioural change which might have a wider scope of impact? What would be the role of government, or more precisely, the role of local government?

As I mentioned before, we should always remember that cities are open platforms. In general I think that governments should encourage primarily citizens to take action.

That isn't to say that governments should take a completely hands-off approach to urban development. Government certainly has an important role to play in supporting academic research and promoting applications in fields that might be less appealing to private capital — unglamorous but crucial domains, such as municipal waste or water services. The public sector can also promote the use of open platforms and standards in such projects, which

would speed up adoption in cities worldwide.

But, most importantly, governments should use their funds to develop a bottom-up, innovative ecosystem geared toward smart cities. Policy-makers must go beyond supporting traditional incubators by producing and nurturing the regulatory frameworks that allow innovation to thrive. However, they should steer away from the temptation to play a more deterministic and top-down role. It is not their prerogative to decide what the next smart-city solution should be — or, worse, to use their citizens' money to bolster the position of the technology multinationals that are now marketing themselves in this field.





Leading Change: Delivering the New Urban Agenda through Urban and Territorial Planning



SALGA in partnership with the Department of Human Settlements and the Government of South Africa are happy to present the book; *Leading Change: Delivering the New Urban Agenda through Urban and Territorial Planning*. This is an addition to the suite of knowledge products focused on urban planning and design being developed by UN-Habitat and its partners, to build a better understanding of the Guidelines and support their implementation.

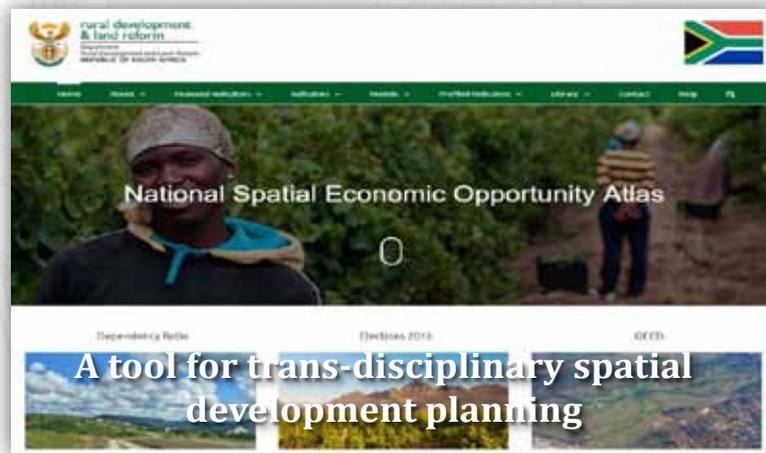
Available at: <http://urbanpolicyplatform.org/wp-content/uploads/2017/08/Leading-Change-Web-Version-01022018.pdf>





NATIONAL SPATIAL ECONOMIC OPPORTUNITY ATLAS

by Enkosi Mpondo and Mfanafuthi Gama, DRDLR



Department of Rural Development and Land Reform, Branch: Spatial Planning and Land Use Management

1. INTRODUCTION

Technology, research and innovation are at the forefront of the 4th industrial revolution which is largely driven by evidence-based approaches to development strongly informed and supported by data and information systems.

The Department of Rural Development and Land Reform has developed a **Spatial Economic Opportunity Atlas for South Africa (NSOEA)**, which highlights the role and relative importance that different places throughout the country play in contributing towards the economy.

The Atlas tool provides information on a variety of sectors indicating the threats, opportunities and weaknesses in our spatial economy and forms an important informational basis for the development of Spatial Development Frameworks and other spatial plans.

URL:
<http://atlas.co.za.dedi672.inb1.host-h.net/>

2. NATIONAL SPATIAL ECONOMIC OPPORTUNITY ATLAS

The NSEO is web-based system that provides Government, academics, civil society, the private sector and decision makers with spatial information and data to analyse and understand the urban and rural landscape, as well as identify development opportunities in South Africa.

What is it?	What is its content?	What does it show?	How does it show it?
<ul style="list-style-type: none"> Atlas Diagnostic tool Mapping platform Decision making support tool Big data Analytics Scenario modeling 	<ul style="list-style-type: none"> Spatial Information Statistical data Economic Development and Growth factor 	<ul style="list-style-type: none"> Spatial patterns and distribution Status quo Location of infrastructure Investment opportunities Economic Activity Trends Spatial economy 	<ul style="list-style-type: none"> Maps Graphs Tables Summaries and profiles Modelled and unmodelled Data (excel)

3. KEY FOCUS AREAS AND CATEGORIES OF THE ATLAS

-  Demographics and Migration
-  Human settlements, land, tenure and land restitution.
-  Spatial Economy and Growth.
-  Unemployment, labour, education and skills levels.
-  Movement & Transport
-  Basic Services Infrastructure
-  Natural Environment and Resources
-  Institutional context





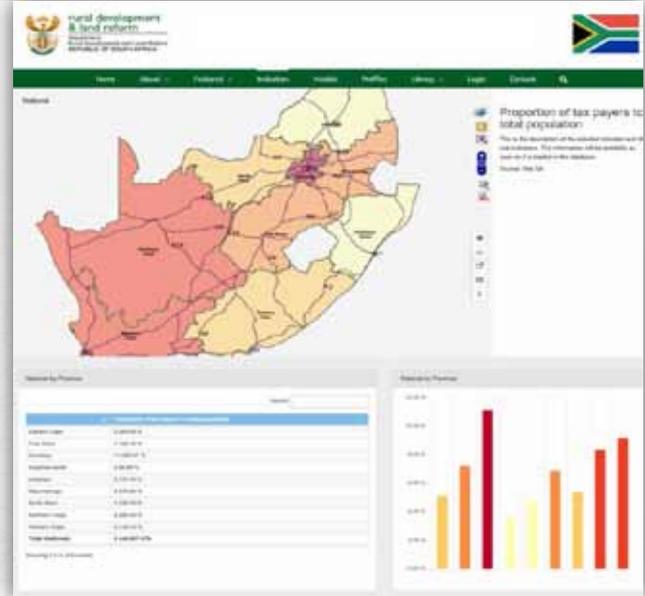
FEATURES OF THE ATLAS

1. INDICATORS MODEL

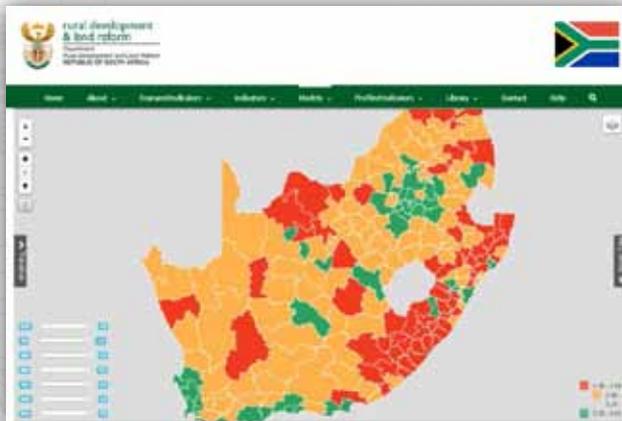
This feature is the most interactive, allowing the user to select indicators, jurisdictions, timeframes and layers.

The 7 Categories of Indicators, each containing one or more sub-indicators. This feature allows modelling of indicators which will ensure descriptive and analytic data can be used to:

- Determine situational analysis
- Highlight the opportunity factors in particular areas
- Understand change factors
- Allow forecasting and forward planning
- Understand some of the constraining factors to economic growth.



2. ECONOMIC OPPORTUNITIES MODEL



This feature allows for scenario modelling. Users can explore where opportunities exist across the country and establish the health of municipalities; the level of infrastructure and services; levels of education, and the financial health of the municipality.

3. AREA PROFILES

This feature provides a statistical summary and overview of areas at Provincial, District and Municipal level, which includes population, access to water, sanitation, housing, etc.





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