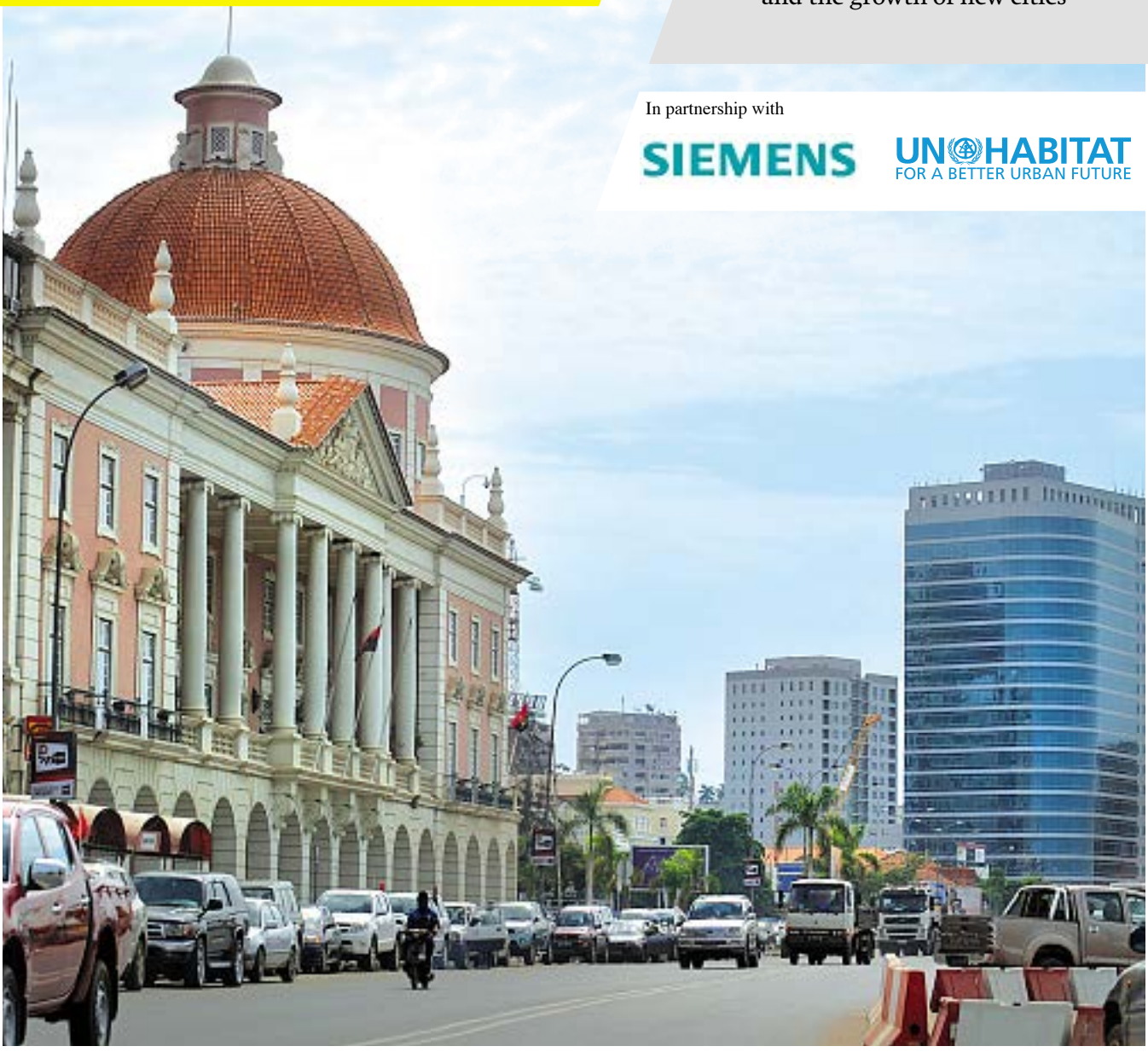
CITIES IN AFRICA



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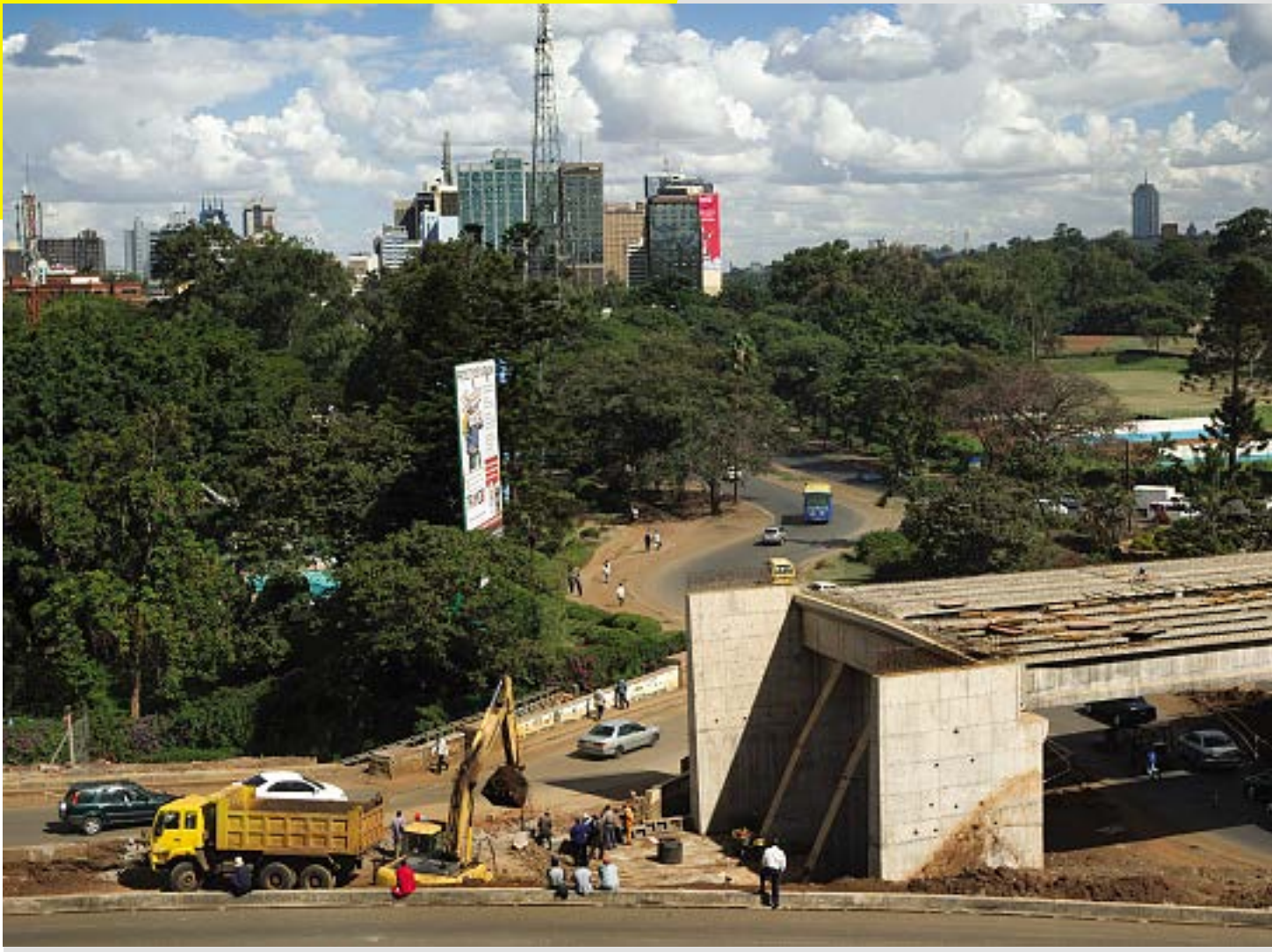
UN HABITAT
FOR A BETTER URBAN FUTURE

A CONTINENT OF CITIES

Just short of 40 percent of Africa's population lived in cities at the end of 2010, making it the world's least urbanised region. This figure will increase dramatically in the coming decades, a trend that will likely situate rapid urbanisation at the centre of economic and social change on the continent.

At present, sub-Saharan Africa is second only to Eastern Asia in terms of the pace of urbanisation, with estimated annual growth of 1.26 percent from 2010-2015. By 2035, the continent will reach tipping point, when more than 50 percent of Africans will live in urban centres. By 2050, more than 1bn – the equivalent to the continent's total population in 2010 – will live in cities.

"People still think of Africa as people living in remote villages, which in one sense



is still true, but the other 40 percent are urbanised which is more than India and getting close to the China level," says Acha Leke, a partner at McKinsey sub-Saharan Africa.

It is a trend that will bring with it sweeping change, opening up vast new opportunities for economic growth and development. By 2025, 17 of Africa's largest cities will have a combined GDP of more than $1,000bn, almost matching the continent's total GDP in 2007. Lagos and Cairo alone will be home to more than 30m people, with the population of Kinshasa, in the Democratic Republic of Congo, more than doubling in size, from 7.5m in 2007 to 16.6m in 2025.

In the same period, the GDP per capita of cities such as Luanda, Angola, and Casablanca, Morocco, will almost triple. In major cities such as Lagos, Cairo and Johannesburg, this figure will double.

PHOTO: SARAH ELLIOTT

LEFT: Construction of an overpass at a roundabout near the city centre in Nairobi, Kenya
PREVIOUS PAGE: The view from Luanda's central business district

These cities will also be integral to the continent's economic fortunes – contributing an estimated 69 percent of all growth on the continent between 2007 and 2025.

Much of Africa's growing middle classes – which are already reshaping social and economic realities – will be concentrated in these major cities. According to a 2010 McKinsey report, 128m African households will have discretionary income in 2020, with consumer income hitting $1,400bn.

All of this brings with it a number of opportunities, says Mr Leke, a co-author of the report. "From the perspective of businesses... they can come to these big clusters and set up. If you look at some of the retail businesses or fast moving consumer goods, they can actually set up shop in these areas and cover a significant proportion of the population."

An increasingly concentrated urban populace may also be a boon for policy makers in trying to address the perennial challenge of infrastructure throughout sub-Saharan Africa, he argues. "It is easier for the government to provide the infrastructure required to support that growth because of the economies of scale and the concentrations," he says.

Along with new investment opportunities, however, rapid urbanisation also brings with it unprecedented challenges for countries and policy makers in the region.

The UN's 2010 *State of African Cities* report observes that "experience shows that across the world, urbanisation has been associated with improved human development, rising incomes and better living standards," but warns that unless immediate and decisive policy action is taken, rapid urbanisation could be more burden than opportunity for the region.

"These benefits do not come automatically; they require well-devised public policies that can steer demographic growth, turn urban accumulation of activities and resources into healthy economies, and ensure equitable distribution of wealth."

Public resources are already overburdened in most cities on the continent, particularly in sub-Saharan Africa. According to the UN, 72 percent of all urban dwellers in Africa today live in slums. "Socio-economic conditions in African cities are now the most unequal in the world. This situation threatens systemic stability, affecting not only the continuity of cities as socio-political human eco-systems but also entire nations.

"Not a single African government can afford to ignore the ongoing rapid urban transition," the report goes on to say, urging that "cities must become priority areas for public policies."

The infrastructure requirements alone to sustain the continent's current rate of growth are staggering. According to research carried out by the World Bank and the African Development Bank, $93bn of annual investment is required to meet the continent's current infrastructure needs. Current spending amounts to just $45bn, and even with potential efficiency savings of $17bn, the continent currently faces a financing gap of some $31bn per year, the majority of which is in power generation and water management – both central to sustainable urban development.

Managing rapid urbanisation in already overburdened cities will be one of the key challenges for African policy makers in the coming decades – a challenge that will require the development and implementation of innovative solutions to ensure that the potential benefits of the urban environment are not outweighed by the already apparent problems and difficulties that come with highly concentrated human populations.

"What you find is that our governments tend to be very reactive," says McKinsey's Mr Leke.

"Being a lot more proactive in thinking about this and being one step ahead in addressing these issues before they come up, is for me the biggest thing that needs to be done."

QUICK STAT

$1.4tr

Projected consumer spending power in Africa by 2020

Source: McKinsey

Over the next few months *This Is Africa* will explore the challenges and opportunities of rapid urbanisation in Africa from a variety of angles.

We start our *Cities in Africa* series by taking a closer look at how technology is redefining the way we understand the urban environment, and how the application of modern technologies can be an essential weapon to ensure sustainable urbanisation. In subsequent editions, we will explore issues that include the relationship between climate change and urbanisation, the actual building of Africa's cities of the future, and the challenge of sustainability in an urban world.

CITIES OF THE FUTURE

69%

The percentage of GDP growth cities will account for in sub-Saharan Africa between 2007-2025

LAGOS

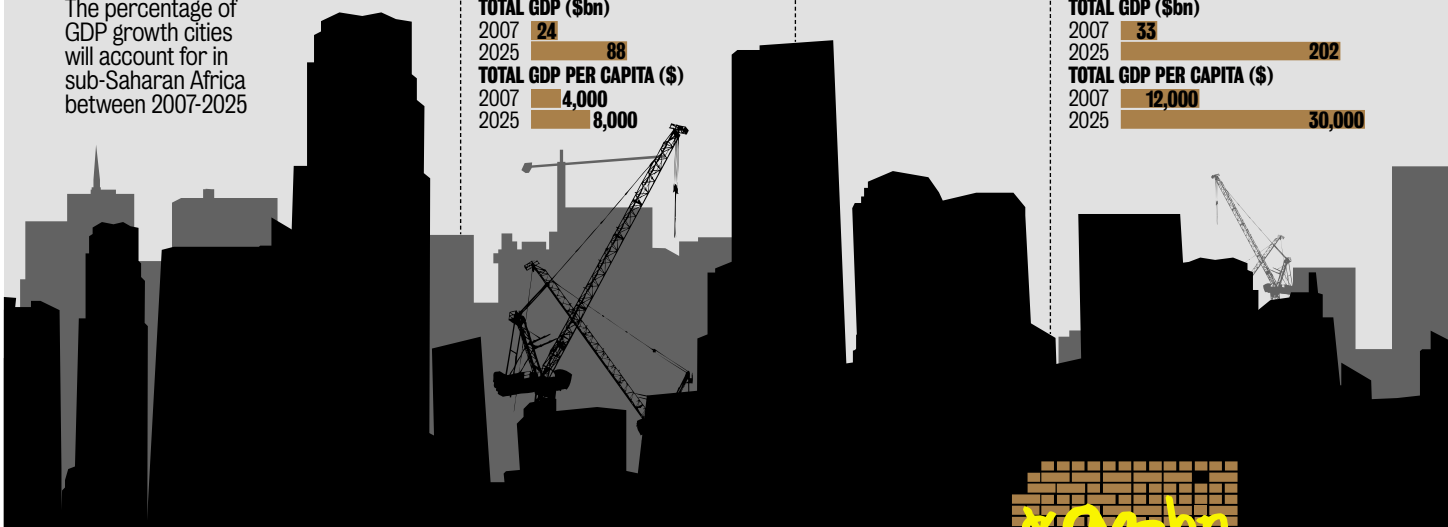
POPULATION (m)	
2007	9.46
2025	15.80
TOTAL GDP ($bn)	
2007	24
2025	88
TOTAL GDP PER CAPITA ($)	
2007	4,000
2025	8,000

KINSHASA

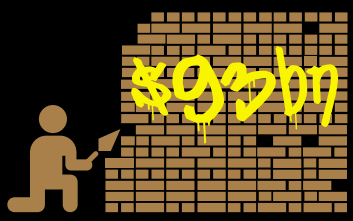
POPULATION (m)	
2007	7.84
2025	16.76
TOTAL GDP ($bn)	
2007	4
2025	16
TOTAL GDP PER CAPITA ($)	
2007	1,000
2025	2,000

LUANDA

POPULATION (m)	
2007	4
2025	8.24
TOTAL GDP ($bn)	
2007	33
2025	202
TOTAL GDP PER CAPITA ($)	
2007	12,000
2025	30,000



THE CHALLENGES



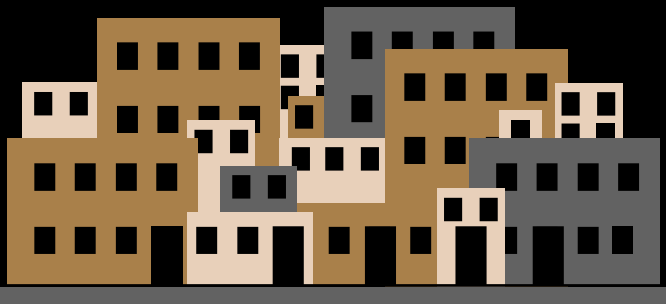
$93bn of investment is required annually to meet the funding needs in ICT, irrigation, power, transport, water and sanitation infrastructure

321.4m

SUB-SAHARAN AFRICA'S URBAN POPULATION IN 2010

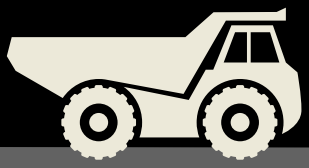
72%

of urban dwellers live in slums

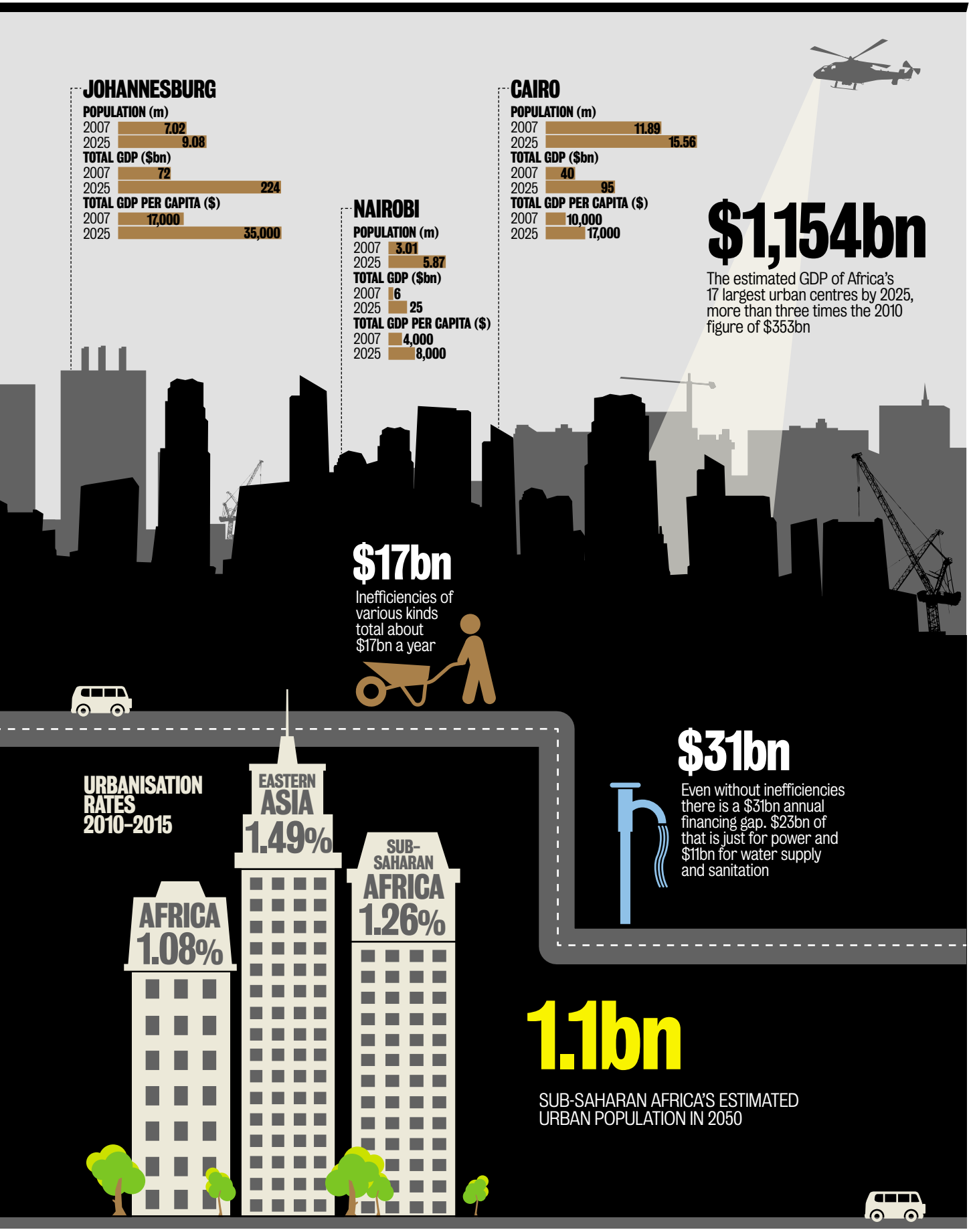


$45bn

The amount Africa spends on infrastructure per year



Source: McKinsey/AFDB/UN


JOHANNESBURG
POPULATION (m)
2007 7.02
2025 9.08
TOTAL GDP ($bn)
2007 72
2025 224
TOTAL GDP PER CAPITA ($)
2007 17,000
2025 35,000
NAIROBI
POPULATION (m)
2007 3.01
2025 5.87
TOTAL GDP ($bn)
2007 6
2025 25
TOTAL GDP PER CAPITA ($)
2007 4,000
2025 8,000
CAIRO
POPULATION (m)
2007 11.89
2025 15.56
TOTAL GDP ($bn)
2007 40
2025 95
TOTAL GDP PER CAPITA ($)
2007 10,000
2025 17,000
$1,154bn
The estimated GDP of Africa's 17 largest urban centres by 2025, more than three times the 2010 figure of $353bn
$17bn
Inefficiencies of various kinds total about $17bn a year
$31bn
Even without inefficiencies there is a $31bn annual financing gap. $23bn of that is just for power and $11bn for water supply and sanitation
URBANISATION RATES 2010–2015
AFRICA 1.08%
EASTERN ASIA 1.49%
SUB-SAHARAN AFRICA 1.26%
1.1bn
SUB-SAHARAN AFRICA'S ESTIMATED URBAN POPULATION IN 2050

Carlo Ratti

Director of the Massachusetts Institute of Technology SENSEable City Lab

"Allowing people to use social networks, and building applications on top of that, will really address the issues of urban life in cities. Everyone can contribute in some way or another"

INTERVIEW BY DAVID ANDERTON

CARLO RATTI: Modern techology can be used to ensure developing cities to not repeat the mistakes of the past

The application of modern technology could be a significant contributor to sustainable urbanisation in sub-Saharan Africa, by allowing cities in the region to leapfrog traditional processes of urban development and management, believes Carlo Ratti, director of the Senseable City Lab project at the Massachusetts Institute for Technology.

Historically, urban development has been largely responsive, usually developing solutions to problems retrospectively – resulting in slow adaptation to changes in the way people live and work. This has resulted in exceptionally high adaptation costs and a legacy of mismanagement that persists until today.

Many cities in the developing world – home to the most rapid rates of urbanisation on the planet – which are already desperately short of resources, risk repeating such mistakes. Avoiding such a scenario in the 21st century is essential, believes Mr Ratti: "The world cannot repeat the same mistakes. We cannot afford to build cities like in the past century; make mistakes and then little by little improve them."

Part of the answer to this dilemma, he suggests, can be found in the use of modern information technology, something that the Senseable City Lab initiative is actively involved in. Through the deployment of sensors and handheld monitoring devices throughout transportation, water and waste systems, the project is part of a wider effort aimed at developing ways to map contemporary cities in real-time. The objective is to better understand the built environment, and use such information to develop innovative strategies to manage the process of urbanisation.

Technology already available in Africa, such as mobile telecommunications – the use of which has grown exponentially over the last decade – could be integrated into the process of urbanisation in the region, argues Mr Ratti. In contrast to Asia, where lacking infrastructure is fully planned and deployed by the state in what he calls "top-down" urbanisation, he believes that resource and governance constraints necessitate a more collaborative form of urban development in sub-Saharan Africa.

"Technology today allows us to plan things in a much more collaborative, bottom-up way. People sync-up, do things

"Technology today allows us to plan things in a much more collaborative, bottom-up way. People sync-up, do things and take action together"

and take action together," he explains.

With Africa expected to have 127m smartphone users by 2015, this opens an array of possibilities for mobile applications to address logistical challenges in urban areas, such as traffic systems, water management and carbon emissions. Mr Ratti insists that the ability for users to generate content may partially compensate for infrastructure that is lacking elsewhere.

"Africa is the place where if you give enough power to individuals incredible things will happen in this bottom-up way," he suggests.

"Allowing people to use social networks, and building applications on top of that, will really address the issues of urban life in cities. Everyone can contribute in some way or another."

Cities in Africa are already struggling to meet current financing requirements for investment into infrastructure. Against this backdrop, developing a better understanding of how technological solutions could be effectively integrated to reduce expenditures while improving effectiveness will be essential for policy makers in the region.

The challenge of constructing efficient transportation networks has been complicated by the high costs associated with obtaining data that details the movements of people within the city, mainly in the form of origin-destination data.

Mr Ratti points out that due to prohibitive costs, many countries have conducted origin-destination surveys so rarely that it is difficult to meaningfully analyse the evolution of traffic systems within a given city. Even when surveys are conducted results can fall short. "It is usually quite expensive to do a big survey, and then you need to analyse the data. By the time you get the data it is probably out of date."

Mr Ratti is optimistic that mobile technology can help African cities in addressing such issues. "The good news is that if you take exhaust data – data collected for other purposes – from the cell phone network and analyse it you can actually calculate origin-destination matrices with good accuracy. Even in cities where you don't have any other type of infrastructure."

Utilising this data effectively could enable both the real-time monitoring of people's movements and the identification of traffic patterns across cities, allowing planners to make better decisions in order to avoid bottlenecks in the system. With cities across the globe investing heavily in the deployment of sensors throughout transportation and sanitation systems, the amount of time between sensing the urban environment and actuating policy responses could be dramatically reduced – from months and years to minutes and hours.

"Cities in Africa probably will not have to go the old fashioned way with the origin-destination surveys or other technologies from the past, but just jump onto these new dynamic systems that are much cheaper and more efficient."

With Africa's urban population set to more than triple in the next 40 years, cities will have to contend with a broad contingent of challenges – developmental and managerial – in which the innovative use of modern technologies can play a vital role.

Mr Ratti argues that the application of technology-based solutions may be a foregone conclusion. What remains is for policy makers and African business to prepare to fully integrate these technologies into urban systems and promote incentives for the general population to participate in both the development and execution of the bottom-up city.

"This is really going to be the future. You don't have many limitations and African cities will probably embrace this faster than cities in the developed world because they have no alternative – they will leapfrog."

SMART CITIES

The availability and quality of information on the contemporary urban environment is opening up new possibilities in the management of cities – a trend that could be an essential part of urbanisation in Africa

BY DAVID ANDERTON AND LANRE AKINOLA

In 2008 a historic milestone was reached – for the first time ever, the majority of the world's population lived in urban, rather than rural, communities. As we move deeper into the 21st century, the rate of urbanisation is increasing at breakneck speed. It is estimated that a staggering 200,000 people move into cities each day, and virtually all population growth in the next 30 years will be in urban centres. The vast majority of this growth will be in the developing regions of Asia, Latin America, the Middle East and Africa.

Managing these demographic shifts will present policy makers across the globe with unprecedented challenges in the handling of urbanisation. Infrastructure networks and public services are already overwhelmed, particularly in regions such as sub-Saharan Africa, where the urban population is expected to outstrip the rural by 2032. Inequality and economic disparity is also accentuated in the sprawling

PHOTOS: GETTY

ABOVE LEFT: Potential buyers look at models of properties at a housing and architecture technology industry exposition in Xian, China
ABOVE: A busy street in Lagos, Nigeria

"megacities" of the developing world, from Mumbai and São Paulo, to Lagos and Cairo. According to the UN, socio-economic conditions in African cities are already the world's most unequal.

"Essentially we are an urban planet for the first time – and certainly for the first time on this scale," says Mathieu Lefevre, executive director of the Swiss-based New Cities Foundation, adding that "African cities face particularly colossal challenges in infrastructure, energy, water, sanitation and so on."

Ensuring that this mushrooming of urban populations in regions that face substantial resource constraints is both sustainable and equitable will require nothing short of a fundamental shift in public policy. It is a process in which information technology looks set to play an essential role. At the heart of this is the concept of the "smart city".

The notion of the smart city is rooted in an increasing appreciation of the role of information in the management and growth of cities. At its centre is the real time monitoring of urban systems such as electricity grids, water systems and transportation networks through the use of sensors and mobile devices – made possible by modern information technology. This in turn allows for the integration of hitherto isolated systems within a city. Through the acquisition of such information, municipal leaders are then able to more efficiently analyse data, anticipate problems and coordinate resources in a given city.

Ultimately, this will allow policy makers and businesses to move from a highly inefficient reactive way of managing the urban environment, to a much more time sensitive, proactive approach.

"Technology really offers the chance for leapfrogging the problems of the past. As many parts of Africa grow it allows them to make smarter investments," says the NCF's Mr Lefevre.

"If you have water, transportation ➤

and energy grids that can communicate to one another for example, it allows those investments to be much cheaper and easier to run in the medium term because you have one control system. The problems of cities today cannot be addressed in silos: you can't think about transport if you don't think about water and so on."

The idea of smart cities has already gained considerable traction, with major information technology companies such as IBM and Cisco investing heavily in technologies aimed at allowing city leaders to respond to the challenges of urbanisation in new ways.

"There is recognition that there is a lot of waste within the system. They are always reactive, they have neither good insight on the traffic flow, nor when there are problems with the electricity grid, and this leads to the question of sense. Being able to sense is key. The ability to sense, predict and respond is central to this whole thing about a smarter planet," says Tony Mwai, country general manager for IBM East Africa.

IBM has established itself as one of the leaders in the development of smart city solutions, and offers products that cover everything from social services, education and healthcare, to energy and utilities, as well as transportation. These are already widely deployed across the industrial world, and increasingly in emerging market regions, including Africa. IBM has smart city projects active in Dar es Salaam, Tanzania, and Nairobi, Kenya.

Mr Mwai argues that these solutions are especially relevant in a region such as sub-Saharan Africa. "City planners in Africa are looking to what cities across developed nations have done, and they do not want to repeat the same mistakes. They are very conscious about the opportunity to leapfrog."

Talking about integrating cutting edge technology into urban systems to create smart cities in a region where infrastructure networks are already hopelessly overburdened and 72 percent of all urban dwellers live in slums may seem far fetched. Yet such steps may be highly applicable to sub-Saharan Africa.

"Technology transfer now is much easier to do than it was 30 years ago. If you were an African city then you really could not hope to access the same technology that existed in the developed word. It was just not feasible," observes NCF's Mr Lefevre.

"Now at least some of the technology is accessible. I would really encourage mayors and city governments and business and a whole range of actors interested in urbanisation to look to some of the cities that have positioned themselves as laboratories for ideas and technology."

Leading the charge

Examples can be found in a number of places, including the South Korean city of Incheon. Cisco, together with private real estate developer, Gale International, is helping to build the Songdo International Business District, a new 1,500-acre city on the coast of Incheon which will be one of the most technologically advanced smart cities on the planet. Yet developed economies such as South Korea are not the only ones leading the charge in the promotion of smart cities.

In 2009, Cisco launched the "Intelligent Urbanisation" initiative in Bangalore, India, one of the world's fastest growing cities, which is home to almost 6m people. The project is part of a global programme by Cisco designed to assist cities around the world in the use of information technology to design more efficient urban systems. Its initial focus is on sustainable solutions for public safety and security, transportation, buildings, energy, health care and education.

Transferring such technologies to major

PHOTOS: GETTY

ABOVE LEFT: Shenzhen, China, is one of the fastest growing cities in the world. The now bustling former fishing village is considered southern China's major financial centre
ABOVE RIGHT: A subway station in São Paulo which opened in August last year
LEFT: Songdo International Business District in South Korea
BELOW LEFT: Mayor of Incheon Metropolitan City, and John B. Hynes, CEO and president of Gale International, celebrate at the site of a new convention centre in New Songdo City

African cities such as Lagos, Cairo and Johannesburg is not only feasible on the back of the telecommunications revolution that has swept the continent in the last decade – according to IBM's Mr Mwai, it is essential. "The cost of not doing anything is higher than the cost of going for cutting edge technology," he says.

Integrating such technologies into policy planning on the continent could help to address what is widely recognised to be one of the biggest hurdles to sustainable urbanisation: infrastructure. Nowhere is the need for infrastructure greater and financing more constrained than in sub-Saharan Africa. At present, just to cope with existing requirements, the region is faced with an annual shortfall of close to $50bn of investment into transport, power, water supply and sanitation.

With the urban population in Africa set to more than triple in the coming decades, reducing that cost will be critical. By allowing business and policy makers to not only use resources more efficiently, the ability to formulate more proactive policies around urbanisation can, in principle, dramatically reduce the cost associated with the management of the urban space.

IBM's Mr Mwai says that some governments in the region are already recognising the potential of building smart cities in Africa.

Authorities in Kenya, for example, are "realising that they have an opportunity to leapfrog some of the legacy systems that exist in the developed world".

"We are starting to engage with the local government and the state government," he says, adding that "in other emerging markets and developing countries, city planners are looking to what other cities in the developed nations have done. They don't want to repeat the mistakes."

As the role of information technology in the expansion and construction of cities continues to grow, it seems beyond doubt that it will play a vital role in developing regions such as sub-Saharan Africa. Integrating that technology in the right way will be essential if urbanisation in the 21st century is to be an engine of growth in middle and low income regions, rather than a magnet for inequality and social disenfranchisement.

"City planners in Africa are looking to what cities across developed nations have done, and they do not want to repeat the same mistakes. They are very conscious about the opportunity to leapfrog"

"Technology will need to play an enormous role," says NCF's Mr Lefevre. "I think it really offers the possibility of charting a new course for cities and it offers the possibility of laying down smarter infrastructure. If we don't get cities right in the 21st century we will not get the 21st century right."