Planning and managing Africa's cities: what place for technology innovations?

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OpenEdition
Journals

PLANNING AND MANAGING AFRICA'S CITIES: WHAT PLACE FOR TECHNOLOGY INNOVATIONS?

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Urbanization in Africa is mostly inflicted and informal. The past 50 years have seen plans created for many cities of Sub-Saharan Africa, but with no convincing end results. One of the key explanations for this failure lies in the lack of available basic data about cities and their inhabitants. The data exist but are not managed or exploited. However, working from correct information is essential for properly managed urban planning. It makes it possible to build the land use registers, and tax systems based on them, that are needed for the operation and financing of urban systems. Advances in digital technologies offer new perspectives for urban planning in very-high-growth cities. They are an opportunity to do more for less: satellite images, photo-interpretation software, crowdsourcing and participative cartography are just some of the new tools available to city planners. This is the aim of Wexity-Logiroad, the first turnkey city data management software platform to suit the realities of cities in emerging economies and strengthen capacity in local institutions. But though offering new possibilities, new technologies cannot be thought a panacea for urban planning challenges, which remain fundamentally political and human as well as highly dependent on the state of public finances.

INTRODUCTION

The speed of urbanization in Africa is clear to see – all Africa's cities will have doubled or tripled in population within a generation. Twenty or so megacities are emerging on the continent, three of them absolute giants: Cairo, Lagos and Kinshasa. The spectacular spread of these capitals should not, however, mask the equally fast growth of Africa's secondary cities. Small and medium-size towns and cities across the continent are seeing the same rate of expansion, so the entire urban framework is in fact growing. An enormous amount of effort is needed to support and manage this urbanization. Two fundamentals sum up the origins of the problems facing Africa's cities and the deficiencies in terms of developing access to urban services: difficulties in managing a fast-growing territory; and difficulties in financing services, given that towns and cities in Africa run on budgets around 100 times lower than their counterparts in the north.

Land registers, with accurate and up-to-date management of land use, are essential for proper planning as they make it possible to identify all the plots that together make up the city. But land use is not controlled in Africa: structured neighborhoods sit alongside informal ones, flood-risk zones are built on, and so on. Technological tools alone will never be the sole determining factor in changing planning practices, because people and money are the keys. However, the innovative solutions now available for dealing with current challenges make it possible to provide more for less in the planning and management of African cities.

AFRICAN CITIES: INFLICTED URBANIZATION

UNPLANNED URBANIZATION AND DEFICIENT SHARED SERVICES

Without shared services there is no city. Pooling resources to make it possible to build large-scale infrastructure is at the origin of the first cities of antiquity. Hospitals, universities, networks for energy, water, information, public transportation and so on all require capital for their construction and operation. Providing this capital is the natural role of the local government authorities in place. The services determine the quality of the environment, public services, information and economic opportunities expected of a city.

But urbanization in Africa is currently neither controlled nor supported by the continent's municipalities. More and more people are moving to towns and cities, but these are not developing the urban functions that people and territories require. In some ways we have the city, but without the urban way of life that is expected of it. This is especially true of sanitation or waste processing systems, which are very far from available to all residents. Almost 700 million people, over half the continent's entire population, have no access to a sanitation system.[1]

> *Without information it is impossible to build a land registry system, and without a land registry it is impossible to collect the taxes needed to finance shared services*

REASONS BEHIND THE URBAN PLANNING DEFICIENCIES

Three factors explain the lack of planning in African cities: absence of useable up-to-date information and data, inadequate land registry management, and lack of finance as a result of weak fiscal systems. These are inextricably linked, each strengthening the other: without information it is impossible to build a land registry system, and without a land registry it is impossible to collect the taxes needed to finance infrastructure and shared services.

(1) **Lack of information about the city and its inhabitants:** without access to simple data such as the number of residents or the state of existing buildings, success in public policy-making can only be very hit-and-miss. This information is essential to detecting people's needs, preventing risks and assessing costs. It could be said that Africa's cities are operating blind, such is the lack of basic data. In the Democratic Republic of the Congo, the last general census dates from 1984 and has been an ongoing saga for every subsequent government. Collecting the data isn't complicated, but it is expensive. It requires considerable technical and human resources to inventory, update and check an exhaustive database. In administrations that tend to be highly compartmentalized,

existing data are rarely digitized and shared between different municipal departments, let alone kept up to date.

(2) **Inadequate land management:** without basic information it is impossible to manage land use or a land registry. But land has always been the fuel for urban development, with land and taxation inextricably linked. The ancient cities of Babylon and Basra were forerunners, establishing land registries to settle disputes between citizens, regulate urban growth and raise taxes. With a land registry system, citizens have to pay local taxes, duties or, in certain cases, contributions in kind. The trade-off is that individuals benefit from the wealth of the collective enterprise in the form of shared services and infrastructure. This is true of all "developed" cities. But land use is not controlled in Africa, apart from in South Africa and the Maghreb. And even if rules do exist, urbanization is primarily informal. Land registries are usually out of date because of a lack of data and human and financial resources, meaning that cities are unable to set up efficient systems of taxation.

(3) **Lack of the means to implement planning choices:** as a direct consequence of the absence of land registry and land use management, most cities in Africa do not have the financial resources to implement long-term planning policies. Whereas French municipalities have budgets of three to four thousand euros per resident per year, the amount is a hundred times lower in Africa. Cotonou has around 18 euros per year per resident, Dakar 100 euros and Kinshasa just two or three euros. Setting up a tax system may be an expensive operation, but it is also the only area where the return on investment is tangible and quantifiable over the long term. It is estimated that collecting 100 euros requires 10 euros spent on human and technical resources. A portion of this funding might come from external sources such as international lenders, but in reality such organizations will only provide funding for capital investments and related outgoings (support, technical assistance and capacity strengthening, and still from a capital investment standpoint and strictly over the short term). Development aid provides nothing for operational expenditure, which is every bit as much a financial burden. Operational costs are the responsibility of cities themselves, despite their extremely limited means.

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1 WHO, 2015
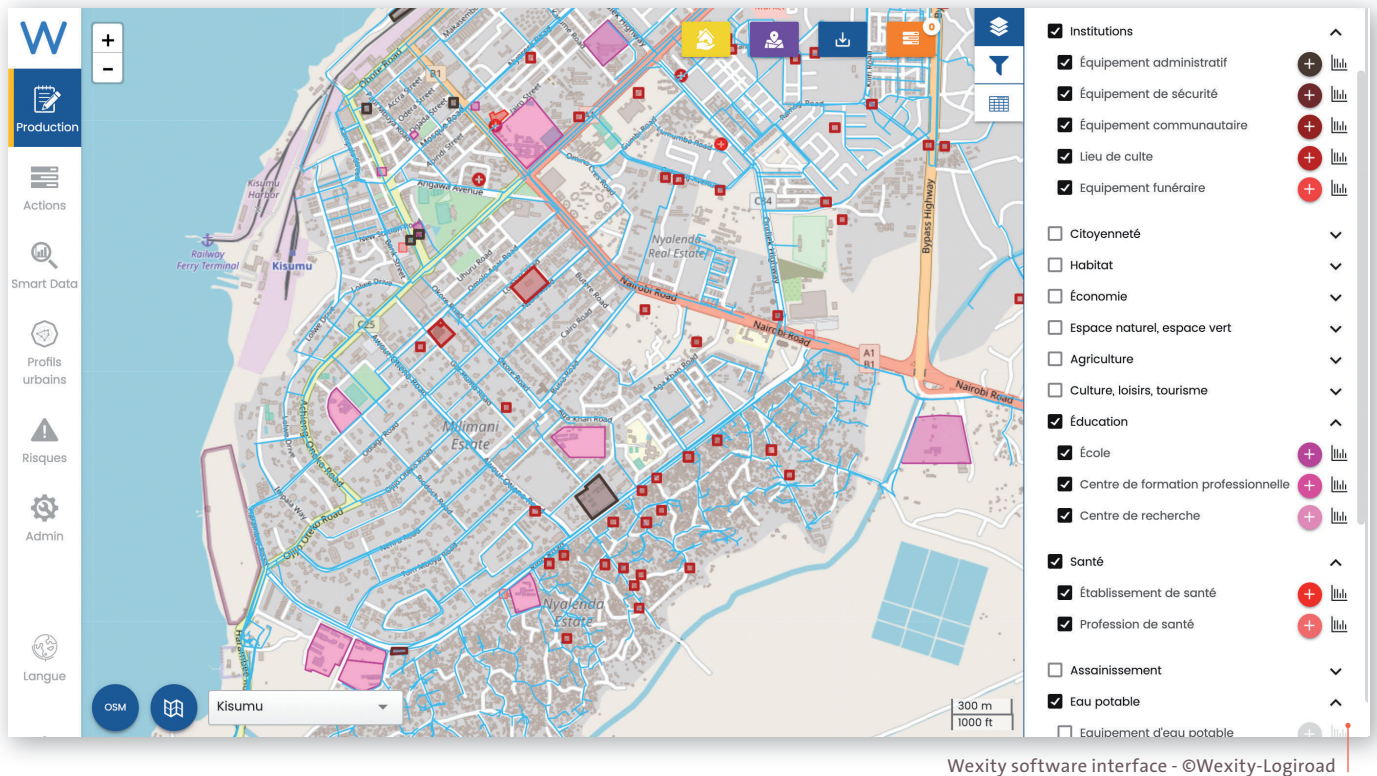
Wexity software interface - ©Wexity-Logiroad

HIGH-POTENTIAL INNOVATIONS TO DELIVER CONTROLLED URBAN PLANNING

DIGITAL TOOLS AT THE SERVICE OF CITY PLANNERS

The quality of urban and land use information does not depend on any form of technology – remember that land registries have existed since cities first emerged some 7,000 years ago. Better technology is not an end in itself but can help collect, process and share data. Digital transition can provide a set of technology innovations that make it possible to collect and process data in ways that are rapid, accurate and inexpensive. For land use management, new technologies make it possible to develop alternative forms for managing land tenure and addressing, storing data online, sharing information and working in networks. Digitization makes it possible to leap directly to digital without ever needing to create paper-based land registry records.

Urban planners now have a range of new digital tools at their disposal, including:

• satellite cartography, which has revolutionized geographical information. For many years, it was necessary to charter an aircraft if you needed aerial views of a city. Today, this is almost instant and free thanks to the Google Earth and Open Street Map databases.

• photo-interpretation software, which transforms satellite images into plan images.

• addressing and door-to-door data collection operations can be carried out using a tablet or smartphone and geolocation. The internet makes city-wide quantitative studies possible as it is easy to send questionnaires to residents.

• crowdsourcing techniques with resident participation can also be invaluable to urban planners. For example Know Your City, a campaign designed by Shack/Slum Dwellers International, promotes participative mapping in informal settlements.

There is a vast field of possibilities that offer new perspectives for urban planners. In 2017 Groupe Huit, in partnership with Orange and the French Development Agency (AFD), carried out a study of mobility in the Dakar agglomeration. Using cellphone data supplied by Orange, planners were able to map the daily journeys, from home to work and back, of thousands of people. The data were then modeled to extrapolate patterns across the city as a whole. This made it possible to accurately and exhaustively map primary journey flows.

The obstacles to planning are not the technical tools, as these exist; the obstacles are rather the ability of municipalities to lastingly appropriate those tools and provide them to staff charged with managing the territory and its services. Many city councils in Africa do not have the means to employ planners and specialists capable of processing and sharing city data, or have little access to such professionals as these skills are relatively rare on local labor markets.
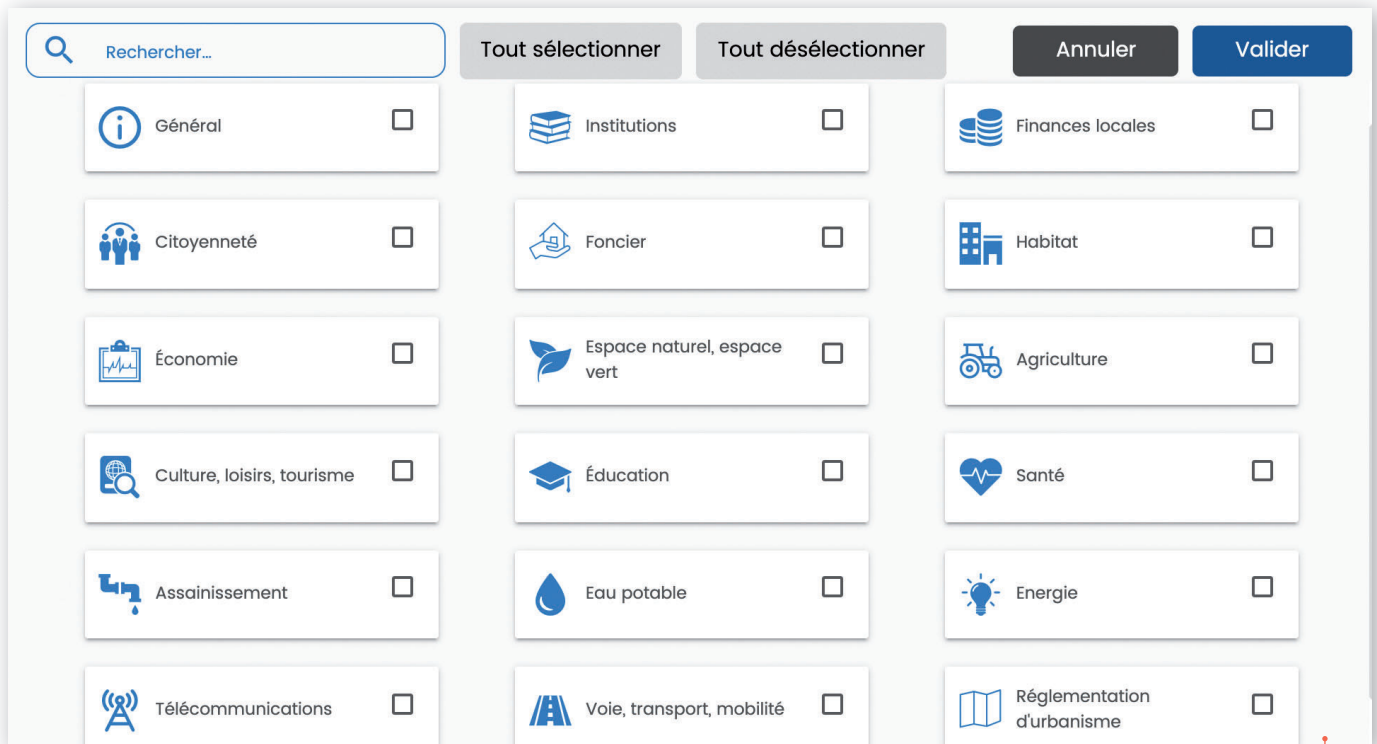
Domains handled by Wexity - ©Wexity-Logiroad

WEXITY, A TURNKEY TOOL FOR CITIES

The Wexity platform from Logiroad started from the realization that one of the brakes on planning is not technology but knowledge sharing. Wexity is an IT tool used to assemble all city data on a single platform and to manage all the related components (utility networks, habitat, environment, local economy, tax system, etc.). Previously, the only IT planning systems available were complex and required skilled in-house staff who are hard to find and GIS-type tools that also need expert users, who are also hard to find and expensive to employ. On occasion, urban modeling solutions can be so complex that they require permanent oversight by international experts, even after extensive local training.

The first innovation offered by Wexity is a clean break from this overly complex model, with an interface that is simple to use. The platform adapts to suit its users' varying degrees of expertise, whether elected officials, city executives or municipal employees. The core aim was to build a tool that would be easy to learn for everybody in a municipality who needs to use it. This implied offering a solution that people could learn how to use quickly and would then be happy to keep using. Wexity is a ready-to-use solution that can be set up simply by entering the city's administrative boundaries, loading existing data and creating user accounts. This makes it very fast and inexpensive to set up, but most importantly of all it means that useful urban planning work can get under way rapidly, collecting data and producing results. Wexity makes it possible to opt for shared and collaborative working methods. The platform gives municipal staff the chance to work in networks rather than silos, which is still too often the case. This practice, absent from other available urban planning IT systems, re-establishes coherency in urban planning by allowing all decision-makers to work on a single platform at the same time and with the same data. It can then be used to establish relationships between the data and the needs that a municipality may faces. This means, in particular, that the software is capable of producing result-oriented analyses: how many residents live in flood zones? Which installations face environmental risks? Where are the areas without access to safe drinking water? Which residential areas are furthest from schools?, etc. These are all straightforward questions, but ones that municipalities are not always able to answer without turning to consultants in a process that is generally long and costly. The algorithms used by Wexity automatically detect needs in different neighborhoods and transmit this information to municipal departments that are then able to take rapid remedial action.

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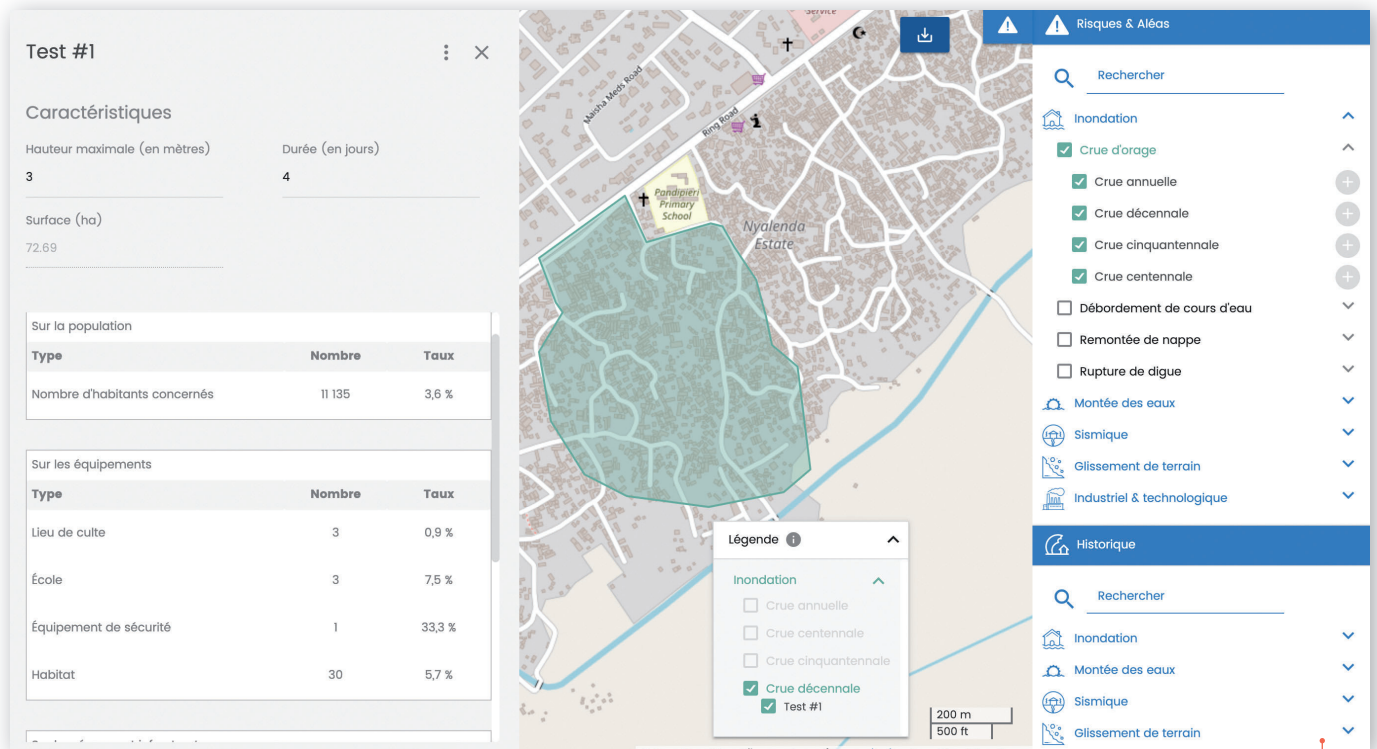
View of flood risk in a district - ©Wexity-Logiroad

In concrete terms, the Wexity platform from Logiroad incorporates the following functions:

- ready-to-use GIS (Geographical Information System)
- city database including non-cartographic data (demographic, socioeconomic)
- library of urban objects, used to classify all elements of the city
- analytical module for cross-referencing all city data
- SaaS (Software as a Service) database
- standards adaptable to any city, anywhere in the world
- module for managing data obsolescence.

Over and above being a digital tool specially tailored for the cities of Africa, Wexity is a project focused on capacity strengthening. The Wexity teams make sure to set up a local city data team that serves as a laboratory for re-thinking the city. This local team is trained so that it can be quickly and enduringly autonomous.

TECHNOLOGY WILL NEVER BE A PANACEA FOR SUCCESSFUL CITY PLANNING

Technological or managerial innovations alone will never genuinely revolutionize how cities are planned and managed. The ability of cities to finance these changes, which implies raising tax revenues, must not be ignored. If taxation systems remain inadequate in most African cities, it is because political leaders are unable to enact far-reaching fiscal reforms. Fiscal reform is counter-productive in terms of the political calculations that govern the

thinking of local leaders and external lenders. Improving the system is an extremely long and involved process, and only the drawbacks are ever pointed out, with the short-term advantages hard to discern. It's a process certain to be unpopular, as people who are already poor have very little inclination to accept tax hikes to finance public services that they don't yet have access to. For lenders, supporting reform of the tax system is a small-scale project that requires little expenditure compared to the scale of the investments needed, and is something that demands specific support over the long term.

Cities have a broad spread of tax instruments available to them (levies, business taxes, fees for exploitation of natural resources, land taxes, etc.). Keeping in mind that Rome and Babylon managed to fund their growth by raising taxes two to three thousand years ago, it's a question that is not so much technological as institutional: how do you incite the entire local administrative system to change? The role of technology is to act as a catalyzer by optimizing systems for tax collection, issuing tax demands or maybe using cellphones to make payments. There are no technical reasons that prevent deploying these types of solutions.

AFRICAN CITIES IN 2030: CONDITIONS FOR SUCCESSFULLY CREATING A CITY THAT IS CALMER AND MORE PLANNED

REASONS FOR OPTIMISM

The outline above shows urbanization in African cities as an inflicted phenomenon freighted with inevitable social, political and environmental problems. But there are reasons to be optimistic about advances in urban planning and access to essential services in the city.

- First, people want to see change and are themselves a hotbed of initiatives. The youthfulness of African people – 60% of Africans are aged under 24[2] – represents a great opportunity and a source of dynamism for the years ahead.

- Next, it would be a mistake to underestimate the political will of mayors across Africa to change approaches to urban planning. As part of efforts to promote Wexity commercially, we encountered clear enthusiasm for new city planning tools among local politicians and a clear determination to use them to improve the range of services offered to residents. In Senegal, for example, many municipalities have ambitious land use and tax projects. These may not yet be ready for deployment, but there is widespread acceptance of the need to improve management of land use and tax systems.

- Global geopolitical shifts and the rise of new powers may change the balance of power in North-South relations and augur the establishment of new ties between the hemispheres in terms of development.

- A new acceptance among the international community of the need to create and roll out local urban planning systems is making a difference. For example, UN Habitat's New Urban Agenda, adopted in fall 2016, assumes that urban planning is the core tool and component of urban development.

The only question is the timeframe. These are long-term changes: it takes 10 or more years for land use and tax reforms to produce tangible benefits. It will probably be closer to 2040 before major change will become clear on the ground.

THREE CONDITIONS FOR SUCCESS

GOVERNANCE AND INSTITUTIONS

Nothing can be done without genuine political will. Fiscal reform cannot be driven by administrations that are hesitant or hamstrung by conflicts of interest. For the urban data essential for the establishment of shared services, improving ways in which data are collected and processed is also a political issue. All too often, certain municipalities are reticent about collecting quality urban data because this may shine a light on the true extent of their failings in terms of the provision of public facilities. Building local capacity needs to take place outside the constraints of electoral mandates.

CHANGE MANAGEMENT

The success of an urban plan is heavily dependent on the willingness of local leaders to commit for the long term, to collaborate, change their working habits and take risks. Planning is fundamentally a political process, requiring that issues surrounding stakeholder consultation and involvement be addressed. Urban planning raises many change management issues. This means that local teams need support and time to get used to new tools and procedures. The key is having a commitment to a long-term process and the active backing of teams from the local administration, without whom nothing can be achieved.

PLANNING MUST BE REALISTIC TO REFLECT AVAILABLE MEANS

African municipalities have been designing urban plans for more than 50 years, too often with zero noticeable results in terms of social and economic development. The plans are usually very well designed, but in most cases their failure on deployment results from a lack of realism about the means available to city halls. With 56% of the population of towns and cities in Sub-Saharan Africa living in informal settlements, the challenges to urban development are colossal[3]. Without access to reliable data it is hard to prioritize and select key sectors or neighborhoods to target. Urban planning must adapt to the city, not vice versa.

CONCLUSION

Running a city and financing shared services costs a great deal of money; wherever you are in the world, this has always been the case. African cities have two priorities if they are to move from inflicted to controlled urbanization: optimize land use management and improve local tax systems, to give them the capacity to operate an efficient local administration. The tools to improve land use management exist and have been known for many years (land register, addressing, zoning plan, etc.), but first of all the basic data have to be accessed and managed. However, collecting and updating data is a costly undertaking. This is where recent technologies are of interest, offering a range of new tools to assist planners. The challenge is to help local authorities take ownership and incorporate these tools at every level, human and organizational in particular. The innovations that will help bring about real change in African cities are those that combine technology with capacity strengthening to spread expertise throughout the cities and develop solutions that align with local contexts. These technical and technological tools will never be the sole solution for successful urban planning, but they are an indispensable complementary resource in the light of the global challenge represented by the growth of cities in the Global South. They can play a twin role as facilitator and detector while simultaneously optimizing management of land use and local tax systems, which lie at the center of the development of city services.

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2 Department of Economic and Social Affairs, UN, 2015

3 UN-Habitat, World Cities Report, 2015