Urban infrastructure in Sub-Saharan Africa – harnessing land values, housing and transport

Report on Africa Land and Infrastructure City Scan (ALICS)

Report number 1.10

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1 Introduction

This report is submitted to the UK Government, Department for International Development (DfID) by the African Centre for Cities as part of the 'Harnessing land values' project for the UK Government – Department of International Development.

The analysis fits into the structure of the project as shown in the diagram below.

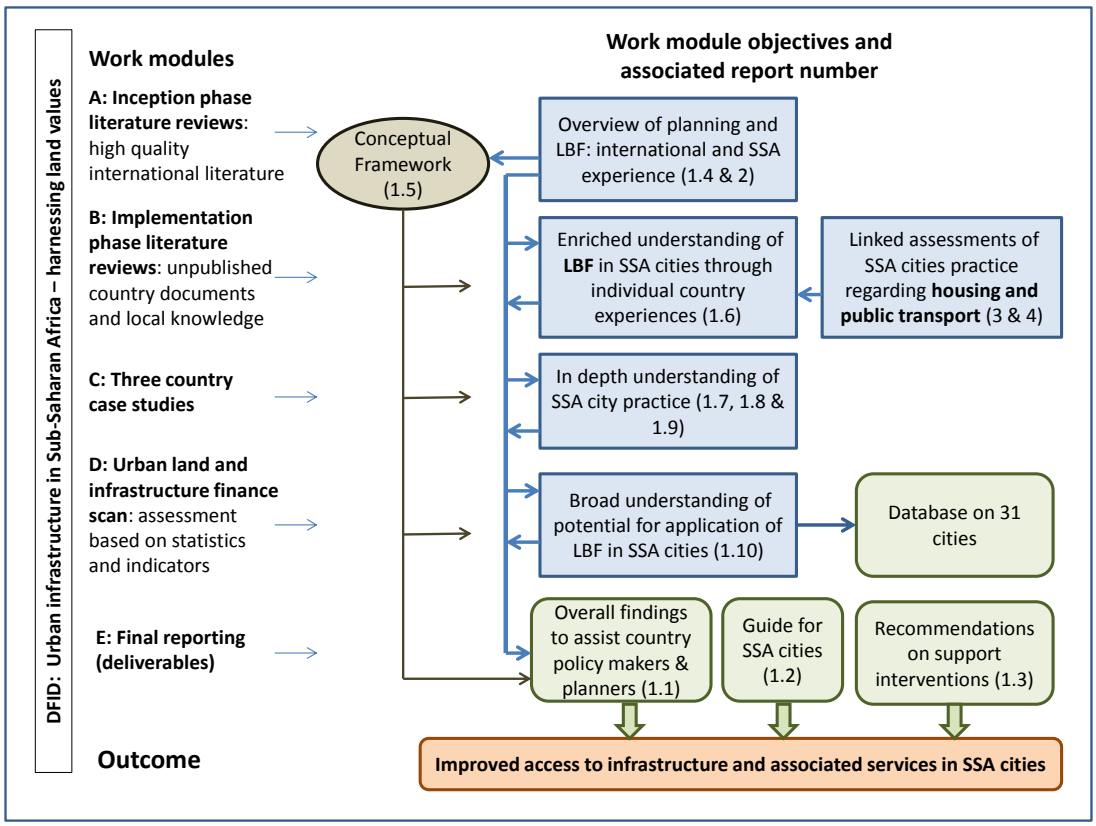


Figure 1: Diagrammatic arrangement of project structure, objectives and associated reporting

The project includes for a 'scan of cities in Sub-Saharan Africa aimed assessing the potential for land value capture to fund urban infrastructure' (Item D in above diagram). This scan has been named the 'Africa Land and Infrastructure City Scan' (ALICS) and this report, Report 1.10, is intended to describe the scan, including the structure for comparing cities, the criteria to be used, the data relating to each criterion, the analysis undertaken and the web-based tool developed for storing data and undertaking the analysis.

2 The selection of cities

It was agreed that 30 cities should be included in the analysis to reach a balance between what is manageable in terms of data and have sufficient cities to be representative. The 30 largest cities in Sub-Saharan Africa were selected based on the argument that it is in these cities that land value capture can have the greatest impact. Lilongwe in Malawi was added as an additional city. The list of cities is shown in the annexure to this report.

3 Conceptual framework for land-based financing of urban infrastructure

3.1 Definition of land-based financing

For the purposes of this research, the term 'land-based finance' includes land value capture: both of the terms are utilised internationally.

In the case of 'land value capture' the definition is best put by Suzuki et al (2015).

> *Land value capture (LVC) is defined as a public financing method by which governments (a) trigger an increase in land values via regulatory decisions (e.g., change in land use or FAR) and/or infrastructure investments (e.g., transit); (b) institute a process to share this land value increment by capturing part or all of the change; and (c) use LVC proceeds to finance infrastructure investments (e.g., investments in transit and TOD), any other improvements required to offset impacts related to the changes (e.g., densification), and/or implement public policies to promote equity (e.g., provision of affordable housing to alleviate shortages and offset potential gentrification).*

Suzuki goes on to describe the two different type of LVC, development based and tax or fee based LVC.

> *There are two main categories of LVC: development-based LVC and tax- or fee-based LVC. Development-based LVC can be facilitated through direct transaction of properties whose values have been increased by public regulatory decisions or infrastructure investment. Tax- or fee-based LVC is facilitated through indirect methods, such as extracting surplus from property owners, through various tax or fee instruments (e.g., property taxes, betterment charges, special assessments, etc.).*

The term 'land-based financing' (LBF) is more inclusive than land value capture in at least four ways:

1. LBF includes arrangements which result in infrastructure being provided or financed by a developer;
2. LBF includes special assessments which reflect the cost of improvements to serve a property, whether or not these result in actual increases in the property's value;
3. LBF usually includes property taxes (expressly excluded from this report), which are the foundation of land value capture instruments such as tax increment financing; and
4. LBF would include transfer taxes imposed when land is bought and sold.

Being more inclusive, the term 'land-based financing' is used in this report. But the concepts from Suzuki et al regarding triggers, the required process, the link to infrastructure finance and the separation between 'development-based' and 'tax- and fee-based' measures is retained. In this regard there is a strong argument for the developing cities in Sub-Saharan Africa to focus on development type land-based financing instruments to provide the basic infrastructure required to provide properties with water, sanitation, electricity and road services.

3.2 Trigger for land-based financing

The definition above identifies two triggers for land-based financing: regulatory decisions (e.g. change in land use or floor area ratio changes) and/or a commitment by the public sector to make infrastructure investments (e.g., transit). The regulatory decisions are appropriate for development based land-based financing as typically the decision is associated with more intense use of the land either for residential or

commercial and industrial purposes. This, in turn, generates a need to more infrastructure to serve the properties concerned. Land-based financing at this stage also has the advantage that there is a structured negotiation between developer and city over accessing the change in rights, with an incentive for the developer to pay for the increase in rights and improved infrastructure.

The alternative form of land-based financing in the form of a recurrent tax is considered to be more relevant for transit infrastructure and requires a more complex set of negotiations with a group of property owners often with no developer involved.

3.3 Diagrammatic representation of concept

The concept of capturing value to raise finance for public bodies to provide urban infrastructure is illustrated in the diagram below:

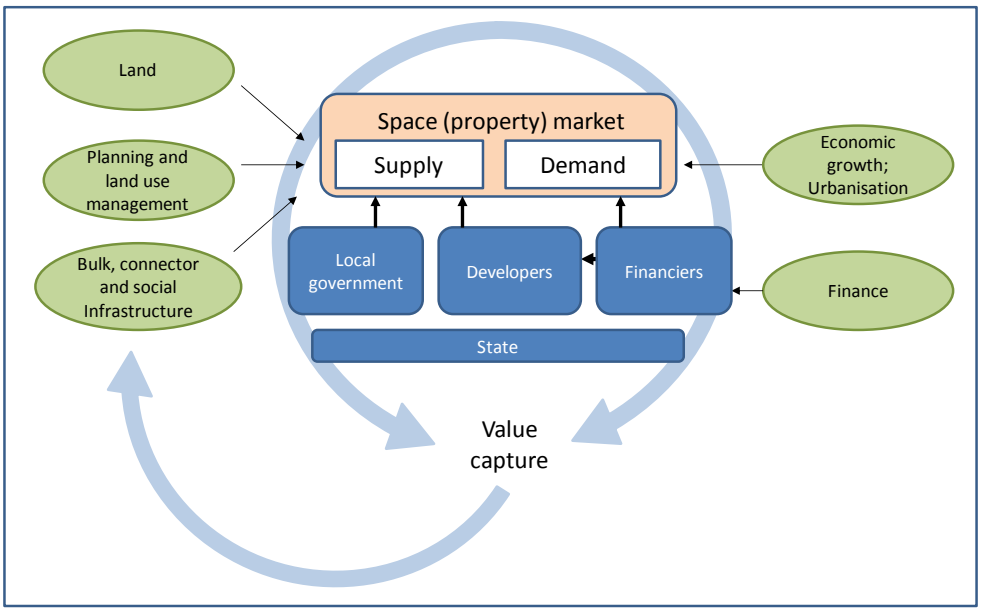


Figure 2: Diagrammatic representation of the land value concept

The diagram shows the interplay between the demand for property and the supply of property with key factors influencing this interplay and with the institutions which facilitate the process. This leads to the following discussion on the factors which influence the effectiveness of land-based financing.

4 Factors which influence the effectiveness of land-based financing

Conceptually, the city scan is intended to assess the extent to which land-based finance is applicable across a spectrum of Sub-Saharan African cities. In order to carry out such an assessment the factors which influence the success of the financing approach need to be identified. These factors have been addressed on the literature review (Report 1.4) undertaken as part of this study and this forms the basis for selecting the factors proposed below. The 'factors' can be considered as the criteria for success and, for this scan to be applied, some measure for each criterion needs to be available. The convention is to refer to these measures as 'indicators'.

As far as possible the criteria and associated indicators need to be city specific. However, there is often a lack of information for individual cities but national data may be available for indicators which can serve as a proxy for city data.

In the next section of this report, Section 5, the method for using these criteria and their associated indicators to make comparisons between cities is addressed, together with the source of information use to quantify these indicators.

4.1 Demand for property

For land-based financing to take place there needs to be an increase in the demand for property as this is directly associated with an increase in property value which may occur through the development of property on empty land or with improved intensity of use either through greater floor area ratio (ratio of building floor area to plot area). If there is no demand there will be no need for new property to be developed and, concomitantly, values will not increase in real terms. Typically this means that no new infrastructure is required either.

Demand for property is associated firstly with the level of economic development in a city: values are higher in more economically developed cities and this represents a strong base position for capturing value. Secondly demand is influenced by increased population and, thirdly, by an increase in the economy of a city. While population growth is important, it is arguable that economic growth is the more important driver as it directly creates a demand for commercial and industrial property and also for higher value residential property as household incomes in the city increase. The opportunity for land-based financing is associated mainly with middle to low income residential property and commercial and industrial properties which are all strongly influenced by economic growth.

In measuring the level of the economy, a common convention is to use gross value added within the city, per capita. However, this can be misleading from a residential property point of view as the value added may not 'trickle down' into the hands of households. Therefore the proportion of high income households may also be considered as this is a more direct measure of how much money is in the hands of households, particularly those which purchase higher value property suited to land-based financing.

Based on the above arguments the sub-criteria and indicators of demand for property are proposed as follows:

Secondary Criterion	Indicator	City (C)or National (N) Specific	Reference
Well-developed economy	City GVA/capita	C	Oxford Economics
Growing economy	City GVA growth	C	Oxford Economics
Growing Population	Rate of population growth	C	Oxford Economics
Ability to pay for property	% High income households	C	Oxford Economics

The data on each of the four secondary criteria is available from Oxford Economics for all 31 sample cities. However, although this data has been use in the analysis to assess the applicability of land based financing in the 31 cities, it is confidential and hence is not included in this report.

4.2 Supply of property

The supply of property to meet demand is contingent on the following primary criteria:

- Access to land: land must be available, purchasers of this land need to have secure tenure so that they can be assured the investments they make in land

and on it are secure. Further, there needs to be a system in place for ensuring that land is properly managed for the benefit of the purchasers of individual parcels of land and all other land owners and citizens in the city.

- Property developers, either as separate organisations acting for prospective property owners or as individual property owners themselves are needed to undertake the work required to locate land, gain the rights to use it, register it, service it and build structures upon it which will benefit the future owners and occupants of the properties. The extent to which property developers can function effectively is, therefore, a key success factor.
- Availability of property related finance: both prospective property owners and developers require finance to allow them to make large investments, in the case of owners, and bridge finance the property development, in the case of developers.

The availability of infrastructure is also a factor but it is argued that this is part of the public sector support system and is dealt with here under the 'effective city' and 'effective state' criteria covered in following sub-sections. Each of the other three primary criteria are dealt with below.

4.2.1 Access to land

It is assumed that land is always available for the expansion of cities in Sub-Saharan African cities, whether this be within the current city boundary or on the periphery. But for it to be 'supplied' in a way in which property owners will be willing to invest, and with the means for the City to capture part of the value of this investment, there are specific conditions which need to be in place. These conditions relate, firstly, to the security of tenure established through national legislation and the ease with which tenure can be registered. Secondly, the way in which the controls on the use of the land are managed influence both the quality of the built environment, which leads to investor confidence, and ability of the City to capture value associated with higher orders of land use.

There is a debatable issue here over land use management conditions. On the one hand property developers and owners will see this as a constraint to development (Economist, 2015). On the other hand land use management is necessary for several reasons:

- Control over property development promotes the evolution of effective and liveable cities, with equitable access to the benefits of city location for businesses and households.
- The process of infrastructure provision is aligned with land use.
- The stage at which the city grants land use rights to the developer is critical for land-based financing as it is at this stage where developers and the property owners they serve gain a step change in the value of their properties and therefore this is a the primary opportunity for the City to capture part of this value.

It is proposed that there are two criteria which reflect the existence of sound land use management practice: the extent to which land is formally approved and the ease with which land use management applications are processed. Based on experience gained in case studies undertaken for this project it has been evident that developers, particularly smaller property developers, bypass the land use management system through sub-dividing or increasing floor area ratios without approval, acting 'informally'. This may be in spite of the fact that a city may have established land use application and approval systems.

It is necessary to note here that the location of the land use management criteria under the primary criterion 'access to land' is also debatable. As it relates to the systems and capacity within the City these conditions could be located under the primary criterion 'Effective City'. However, it is argued that, in balance, it makes more sense to locate all the land and property development conditions and associated criteria here.

The secondary criteria and the indicators for measuring performance in relation to these criteria are summarised in the table below, followed by a discussion on each criterion.

Secondary Criterion	Indicator	City (C)or National (N) Specific	Reference
Degree of secure tenure	Rating of extent of property rights	N	Aggregate of EFW, MCC and WEF ratings
Ease of registering land	World ranking of country w.r.t. ease of registering property	N	WB 'doing business 2015'
Extent to which land use is formally approved	Team rating	C	Team experience (but not rated due to limited knowledge of all cities)
Ease with which land use applications are processed	Team rating	C	Team experience (but not rated due to limited knowledge of all cities)

Degree of secure tenure

There are several international agencies which assess tenure conditions by country across the world. These have been incorporated into a recent set of country studies undertaken by USAID which cover 14 of the 22 countries used in the ALICS database (USAID, 2014)[1]. However, for the ALICS analysis, the original data used by USAID was sourced with three primary references used:

- Economic Freedom of the World, 2014 report (Gwartney et al, 2014). Legal system and property rights index[2].
- Millennium Challenge Corporation – Country Scorebook, 2014 (MCC, 2014). Land Rights & Access score[3].
- World Economic Forum's Global Competitiveness Index 2014-15 (WEF, 2014). Property rights rating under 'First pillar: Institutions'[4].

[1] It is notable that the Property Rights Alliance also produces a property rights index. But this does not include primary data and for the ALICS analysis the original data was sourced.

[2] Benin score missing: score of 3 assumed, somewhat above DRC and Congo Rep.

[3] South Africa and Angola missing: SA given score equal to Rwanda (highest score in SSA); Angola given the same score it got in 2011.

[4] DRC, Congo Rep and Benin missing: DRC and Congo made equal to Angola and Benin equal to Cameroon.

As there are three reputable datasets on property rights the scores for the three were combined using a Multi-Criteria Analysis with the results given in the data annexure[5]. For this report each one was given an equal weighting.

Ease of registering land

The 'Doing Business' country survey of 2013 (World Bank, 2013) includes a ranking of countries with respect to registering property. This is used as the indicator for the 'ease of registering land' criterion.

Extent to which land use is formally approved

No international datasets covering this criterion for the majority of Sub-Saharan African countries could be located. Yet it is argued above that this is an important criterion in relation to the feasibility of applying land-based financing mechanisms. Therefore it is retained, with the intention of using research team member's judgement as an indicator. It has not been possible to complete this for this report. Opportunities for doing this will still be sought but in the interim all cities are given a similar score.

Ease with which land use applications are processed

The same situation with regard to data availability and the proposed scoring for this criterion applies as that for the 'Extent to which land use is formally approved' criterion.

4.2.2 Active developers

The nature of developers is discussed in the inception reporting for this project (ACC, 2015). The supply of property is dependent on having developers which can locate property, liaise with potential owners, facilitate the planning and subdivision process and construct the internal infrastructure and buildings which make the property useable to future owners. For land-based financing to be effective this needs to be a private sector activity as the value of the property in private hands is 'captured' by the public sector in order to provide infrastructure[6].

No datasets could be located specifically relating to the functioning of private developers in Sub-Saharan African cities, therefore an approximation is assumed that developers face the same challenges as other businesses and therefore the 'Doing business' survey with associated country ranking undertaken by the Word Bank (World Bank, 2013) is taken as an appropriate indicator of the extent to which developers can function effectively in a country, at least potentially. The 'Doing business' composite ranking incorporates the following factors:

- Starting a business.
- Dealing with construction permits.
- Getting electricity.
- Registering property (used above as an individual indicator)
- Getting credit.
- Protecting investors.
- Paying taxes.

[5] It is recognised that this MCA could have been done in the ALICS web based calculations, this would require a third level in the criteria hierarchy which was considered unnecessary.

[6] Although it is acknowledged that if the public sector develops property and sells the property to a private buyer at a price which allows for bulk and connector infrastructure to be provided this a form of value capture.

- Trading across borders.
- Enforcing contracts.
- Resolving insolvency.

The criterion and indicator are summarised below:

Secondary Criterion	Indicator	City (C)or National (N) Specific	Reference
Ease of doing business	Ease of doing business: composite score	N	Doing Business – World Bank Group

4.2.3 Availability of property related finance

Access to finance is an important condition for property to be supplied both because developers require finance but, more importantly, because the purchasers of property require finance to buy both residential and commercial property. This has a direct link to value capture as the value is ultimately captured from the owner of the property who has to be able to raise this money in the first place.

The access to credit by developers is covered in the 'Doing business' criterion above and so the emphasis here is on broader access to finance by citizens and businesses. The World Development Indicators published by the World Bank include an indicator of bank branches per 100,000 population which is used in this analysis.

Secondary Criterion	Indicator	City (C)or National (N) Specific	Reference
Access to banking	Bank branches per 100,000 population	N	World Development indicators, 2014

4.3 Effective city

For land-based financing to take place successfully and generate substantial funds which can be used for infrastructure provision, the City plays a key role as it is through the process of engaging with developers and property owners to give them property rights and/or improved infrastructure that value is captured. Therefore effective land-based financing is dependent on having an effective City which has control over the land use management, finance of infrastructure and provision of infrastructure. For this analysis criteria for a city to be effective are taken as follows:

- Functions relating to land use management and the provision of infrastructure are devolved to local government.
- The City has proved itself by having a service provision track record.
- City is financially viable.
- There is adequate technical capacity.
- Planning and land-use-management is effective.
- Citizens and businesses are willing to pay for services.

Each of these sub-criteria are discussed below.

Functions devolved

While it is common for planning and land use management responsibilities to be developed to cities the responsibility for providing infrastructure is less commonly devolved although there is an international move towards greater devolution. This is important as if a city does not have responsibility for providing infrastructure, either directly or through control over a parastatal provider, the incentive does not exist for the City to take responsibility for financing this infrastructure.

The matter of devolution is addressed in the report by the Cities Alliance and United Cities and Local Governments of Africa (Cities and alliance and UCLGA, 2013) report which includes a ranking of cities based on the following:

1. Constitutional framework.
2. Legislative framework.
3. Local democracy.
4. Financial transfers from the central government to the local governments.
5. Local governments' own revenues.
6. Capacity building of local government administrations.
7. Transparency.
8. Citizen participation.
9. Local government performance.
10. Urban strategy.

The 'constitutional framework' indicator is based primarily on whether the constitution 'makes explicit mention of local governments as spheres of governance, detailing their recognised roles and responsibilities'. This is used in this analysis as an indicator of a commitment to devolution.

Service provision track record

The extent to which households within a city have access to services is a key indicator of the success of a city and the partners it works with to deliver services. Of course this could also be seen as the ultimate indicator of success of the value capture process, assuming that this plays a key part in successful service delivery. However, for this analysis it is confined to use as an indicator of an effective City.

The three indicators of service provision which are most commonly available are the percentage access which households in a city have to water supply, sanitation and electricity. Given the importance of urban road access as a service it would have been useful to include this but it is difficult to measure and internationally consistent data is not available.

In considering access to water and sanitation it is recognised that there is considerable variability in the way this is measured, with sanitation being the most variable, as there a range of views as to what constitutes an 'adequate' service (from a connection to a sewered system to an improved pit latrine, for example). It has not been possible in the time available for this scan to properly assess the way access is measured and the data is accepted as it is recorded in the various references used.

Overall it is evident that the quality of the data is poor, with some cities not having data reported at all and some of the figures outdated, going back to 2003. Nevertheless the best available figures have been used.

The data was drawn primarily from the 2014 'State of African cities report' (UN-Habitat, 2014). Where there are gaps in this dataset it is supplemented with

information from the UN-Habitat report on 'Planning sustainable cities' (UN-Habitat, 2009). This still did not cover a full set of information for all 31 cities in the ALICS database and hence this was further supplemented through:

- Hall (2006) for services in Nigerian cities.
- Smith (2008) for Kinshasa electricity.
- International Water Association (IWA). 'Water wiki' web site for water and sanitation access statistics.
- Energy-pedia web site for electricity access statistics.
- For Kumasi in Ghana data for Accra was used.
- In the case of Cameroon a UNEP study for the whole country was used to estimate water access to Yaoundé and Douala.

The resulting data for each of the three services is given in the data annexure to this report. In taking this into the overall Multi-Criteria Analysis a weighting for water-to-sanitation-to-electricity of 40:30:30 was used[7]. The argument for weighting water supply higher than the other two services is that it is assessed to be the most complex service to provide considering that local systems often include water resources development, bulk water systems and distribution systems[8].

Financially viable

Financial viability is central to the success of a city. This has been well illustrated in the country case studies where both Nairobi and Harare do not have nearly enough revenue to cover their operating costs and, therefore, any funds raised which are intended for infrastructure are used to cover operating expenses. Further a financially strong municipality is in a position to set up better systems and recruit more qualified staff.

For financial viability the indicator for this was taken from the Cities Alliance and UCLGA report (2014) taking their rating for 'Extent to which local government raises own revenue' (Their indictor No 5).

Adequate technical capacity

Both for sound land use management and effective infrastructure provision it is necessary to have well qualified staff – primarily planners and engineers. The best indicators available of the extent to which such technical capacity is available to cities. The World Economic Forum (WEF, 2014) keeps data on two indicators which, while they apply to national circumstances, serve as approximations for the situation with capacity in cities:

- Reliance on professional management.
- Availability of engineers and scientists.

These are both rated on a 1-7 score and the average of the scores are used for this analysis as a proxy for local government technical capacity.

Effective planning and land-use-management

This is an important indicator from the point of view of land-based financing. However it was not possible to locate good data with results across Sub-Saharan African cities.

[7] Again it would have been possible to take access to the three services separately into the ALICS database. However, this wold have required a third level criterion hierarchy which was considered to be unnecessary.

[8] In the case of electricity the bulk supply is not a local government responsibility in Sub-Saharan African countries.

The best available indictor is that in the African Cities Diagnostic database for 'Existence of a master plan' (World Bank, 2012). This is used for this analysis, accepting its limitations and that it is a yes/no indictor.

Citizens willing to pay for services

The extent to which citizens are willing to pay for municipal services, whether these are provided by the City or a parastatal working for the City, is an indicator of established relationships with consumers of the services and of potential financial viability. This criterion, it could be argued, also approximates a willingness to pay for infrastructure. Data on the amount citizens pay for water, electricity, gas and other fuels is kept by Oxford Economics and this is used to get a percentage of household expenditure on these items.

Summary of secondary criteria used for 'Effective city'

Secondary Criterion	Indicator	City (C)or National (N) Specific	Reference
Functions devolved	UCLGA indicator 1 Extent constitution provides for devolution	N	UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local Governments in Africa.
Service provision track record	Composite measure of water and electricity access	C	State of African Cities 2014 supplemented from various sources
Financially viable	UCLGA indicator No 5: Extent to which LG raises own revenue	N	UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local Governments in Africa.
Adequate technical capacity	Average of rating for 'professional management' and 'availability of engineers and scientists'	N	World Economic Forum's Global Competitiveness Index 2014-15
Effective planning and LUM	Existence of Urban Master Plan	C	African Cities Diagnostics
Citizens willing to pay for services	% hh consumer spending to services - 2014	C	Oxford economics[9]

[9] Note that, as stated earlier in this report, this Oxford Economics data is confidential and is therefore not included in this report.

The data relating to each of these criteria is given as an annexure to this report (with Oxford Economics data excluded).

4.4 Effective State

While the City is the primary agent through which land-based financing takes place, it is important, if not essential, for the backing for land-based financing to be supported and promoted by the State. There are a number of reasons for this. Firstly, legislation needs to be in place which allow for land-based financing or at least does not preclude it. Secondly, land-based financing can be difficult to implement and the support that a State and development agencies can give to cities is a key success factor. Thirdly, without a firm position on this from the State, cities have a tendency to play off against each other to offer developers the best property 'deal'[10]. This is not in the national interest. And finally it is in the interest of the State for land-based financing to be applied as it reduces the obligation from the national fiscus to fund a portion of urban infrastructure.

In assessing potential indicators for the capacity of the State to support land-based financing, the following secondary criteria are proposed:

- Extent to which governance is effective.
- Commitment to support local government.
- Extent to which transfers are made to local government.

Effective governance

Sound governance by national government, with proper financial controls and minimal corruption is necessary if cities are to flourish and be assisted to raise their own finance.

In measuring this the World Bank has a worldwide governance indicators project (World Bank, 2013) with the following sets of indicators:

- Voice and Accountability
- Political Stability and Absence of Violence
- Government Effectiveness
- Regulatory Quality
- Rule of Law
- Control of Corruption

The government effectiveness indicator is used for this secondary criterion on effective governance.

Extent to which transfers are made to local government

While the ultimate aim is for cities to be fiscally independent of national government, Sub-Saharan African cities are a long way from achieving this and their success, and the success of their own efforts to raise finance, is strongly dependent on transfers from the national fiscus or through appropriate revenue sharing arrangements.

The Cities Alliance and UCLGA have addressed this aspect in their report on assessing the intuitional environment in African countries (Cities Appliance and UCLGA, 2013). UCLGA indicator No 4, which deals with the extent to which central government makes transfers to local government is applied here as an indicator for this criterion.

[10] This has occurred with development charges in South Africa and is one of the motivations for National Treasury to set up a policy to be applied across the country.

Commitment to support local government

As noted above, the success of a land-based financing programme is influenced strongly by the extent to which national government supports local government. Once again the Cities Alliance and UCLGA report (Cities Appliance and UCLGA, 2013) is used to source an indicator for this criterion. The approach here is to use the full set of indicators excluding those used for other criteria in this analysis. This includes a composite of the indicators for:

- Legislative framework.
- Local democracy.
- Capacity building of local government administrations.
- Transparency.
- Citizen participation.
- Local government performance.
- Urban strategy.

Summary of secondary indictors of 'Effective State'

A summary of the above sub-criteria, indicators and information sources is given below. The data is contained in the annexure to this report.

Secondary Criterion	Indicator	City (C)or National (N) Specific	Reference
Extent to which governance is effective	Overall Governance rating	N	World Bank: Worldwide governance indicators 2012
Commitment to support LG	UCLGA Combined ranking, excluding indicators 1,4 and 5	N	UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local Governments in Africa.
Extent to which transfers are made to LG	UCLGA indicator No 4: Extent to which central govt makes transfers to LG	N	UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local Governments in Africa.

5 Multi-criteria analysis: methodology

Multi-Criteria Analysis (MCA) is a technique for comparing a number of options with each having a range of attributes (See, for example, DCLG, 2009 for more in this technique). The attributes can be framed as criteria and the technique requires all criteria to be associated either to a measureable indicator or to be assessed through expert judgement or through the opinions of stakeholders. Each option is then scored in relation to each criterion. MCA then provides for the weighting of criteria to get a final 'score' for each option which allows for them to be ranked in relation to each other.

In the case of this analysis of the potential of Sub-Saharan African cities to apply land-based financing methods, the MCA is the technique used for comparing them.

The criteria for making this comparison are covered in the previous section of this report and the indicators and data for each city relating to each indicator are described there with the detail given as an annexure to this report. The criteria are structured into a decision making 'tree' as shown in the diagram below:

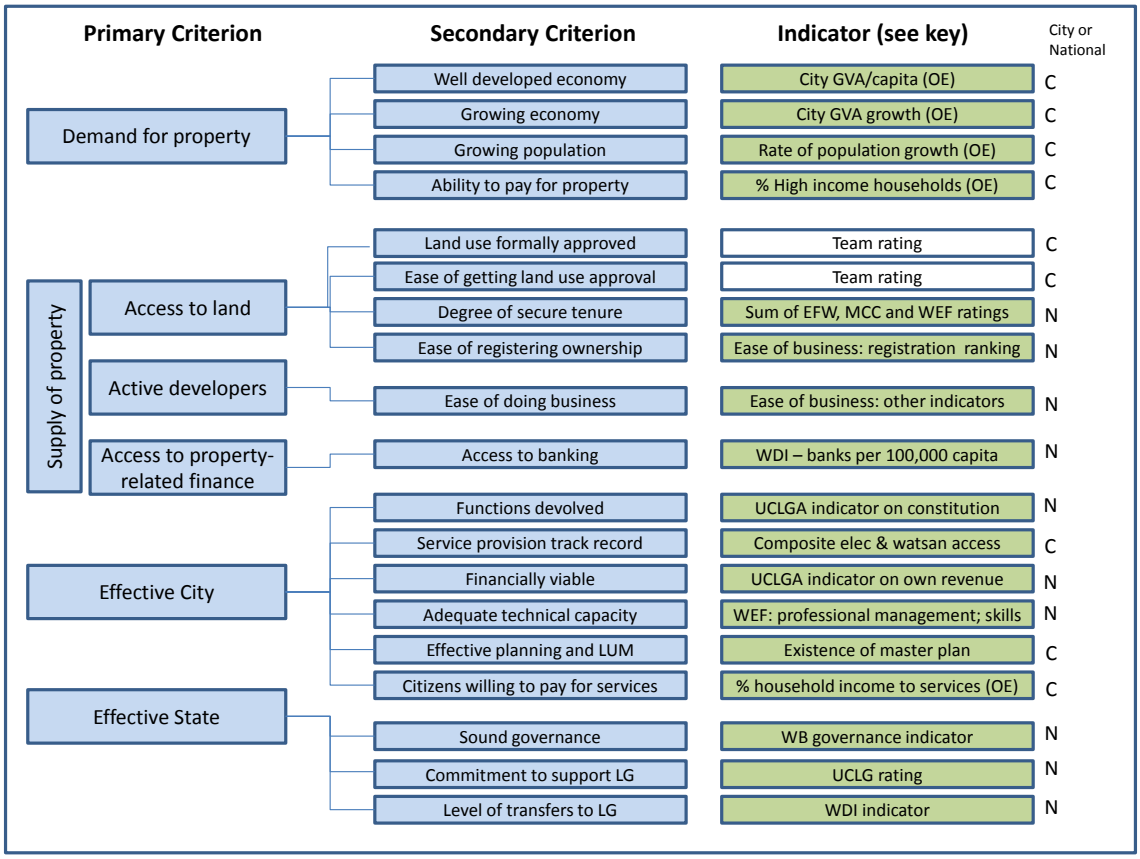


Figure 3: Decision-making tree for Multi-Criteria Analysis

The criteria are grouped into six primary criteria, four of which have secondary criteria associated with them. The technique requires the secondary criteria to be applied to the cities being investigated first, to get a score for each primary criterion. This is done through weighting relative importance of each secondary criteria under each primary criterion. The primary criteria can then be applied with a weighing of each of these against each other to get a final result. This result is in the form of a score out of 100 for each city.

Weighting of criteria

The weighting of the criteria in relation to each other is a matter for judgement and the MCA technique requires that those most informed about land-based financing to agree on the weighting and for the impact of changes in weighting on the final result to be tested. For the purposes of this scan the judgement of the research team is applied. The approach requires that a best assessment of the weights is made initially and then the variability of the results if the weighting is changed is assessed. The best assessment is proposed as follows:

Table 1: Base weighting of criteria for Multi-Criteria Analysis

Primary criterion	Primary Weight	Secondary criterion	Secondary Weight	Argument for secondary weighting
Demand for property	10	Well-developed economy	20	All criteria have influence but it has

Primary criterion	Primary Weight	Secondary criterion	Secondary Weight	Argument for secondary weighting
		Growing economy	30	been argued elsewhere in the reporting for this study that economic growth is most important and is complemented in the ability to pay for property.
		Growing population	20	
		Ability to pay for property	30	
Access to land	30	Land use formally approved	30	Only the ease of registering land was considered less important. Others could not easily be differentiated in terms of importance.
		Ease of getting land use approval	30	
		Degree of secure tenure	30	
		Ease of registering land	10	
Active developers	10	Extent to which developers can function easily	100	
Ease of access to property related finance	10	Access to banking	100	
Effective city	30	Functions devolved	20	As noted in the text, service provision track record is considered to be the best indicator of effectiveness. The devolution of functions and technical capacity re considered to be more important than the remaining three indicators.
		Service provision track record	30	
		Financially viable	10	
		Adequate technical capacity	20	
		Effective planning and LUM	10	
		Citizens willing to pay for services	10	
Effective State	10	Extent to which governance is effective	40	The 'transfers' indicator is held to be considerably less important than the other two as land-based financing can happen without transfers (although not as well). Other two criteria considered more-or-less equal.
		Commitment to support LG	50	
		Extent to which transfers are made to LG	10	

The final results of the analysis, after the MCA has been applied with the above weightings, is shown in Section 7. A discussion on the impact of shifting weights is also included in Section 7.

6 The ALICS website

All the data for each city and each criterion is stored in a web based database referred to as the 'ALICS website'. The MCA analysis is undertaken on this site and provision is made for adding information including additional criteria and the data associated with these criteria. The decision-making tree can be amended and calculations undertaken to develop new criteria. The implications of weighting changes can be easily assessed.

6.1 Website access and structure

The site is set up to allow two levels of access: an 'admin' section which is accessible only to DFID and research team and a 'public' section which is accessible to any approved user. A user of the public section can view all results but cannot see certain data which is subject to a confidentiality agreement and a public user cannot make changes to the analysis which includes confidential data.

6.1.1 "Admin" Section

When a user is logged into the "admin" section of the website, he/she has access to the following functionality (depending on the user's permission level):

- Data Management
  - Manage the list of Cities
  - Manage the list of Years
  - Manage the list of Indicators
  - Manage the Facts (data points)
  - Run the calculations for calculated indicators
  - Upload data using a CSV import tool
- Results
  - View indicators on a map
  - Create a composite multi-criteria analysis
  - Export data to an Excel file
- System Management
  - Manage the list of Users
  - Manage the system settings
- Login Management
  - Change password
  - Log out

6.1.2 Public Section

The public section of the website has the following functionality:

Home Page

The home page introduces the project/website, and has a link to reveal the cities included in the system. Clicking the link shows a map of the cities, with a list of the cities below it. Clicking on a city on the map will open a small info box on the city, with a link through to the City profile page. (This page can also be reached by clicking the city name in the list).

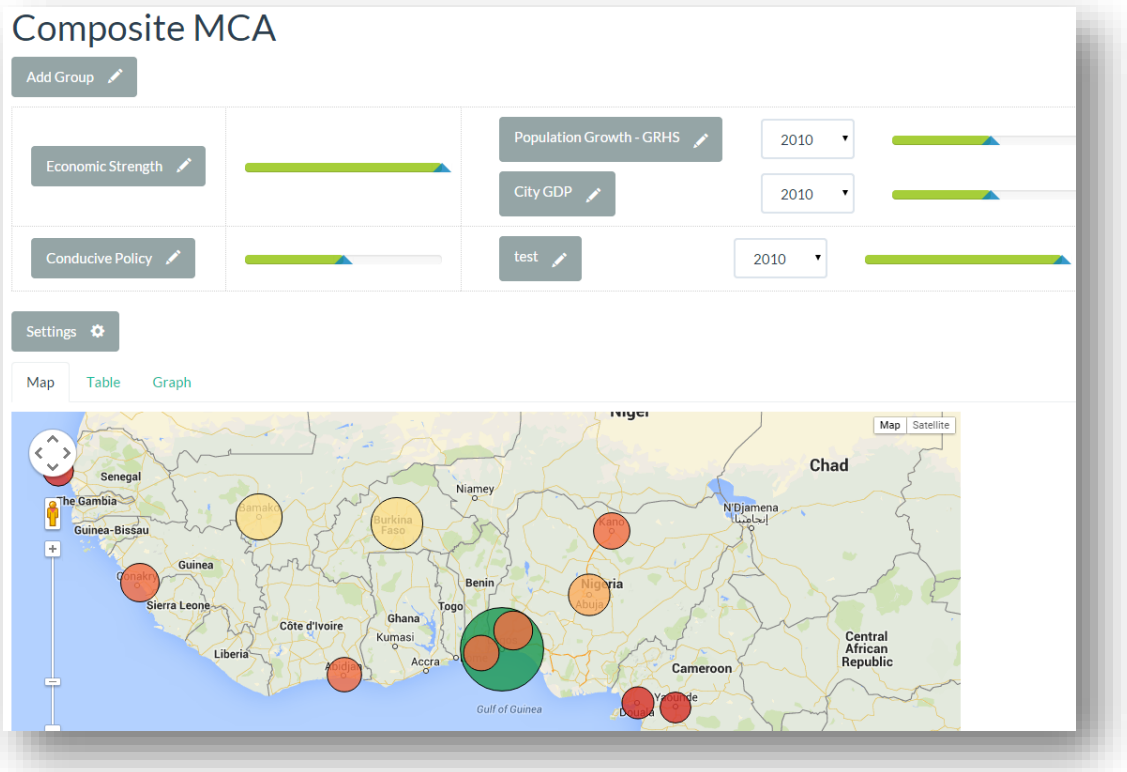
City Profile Page

The City Profile page shows a map of the city at the top, followed by a table containing the data stored in the system for that city (for indicators that have been marked as "Published").

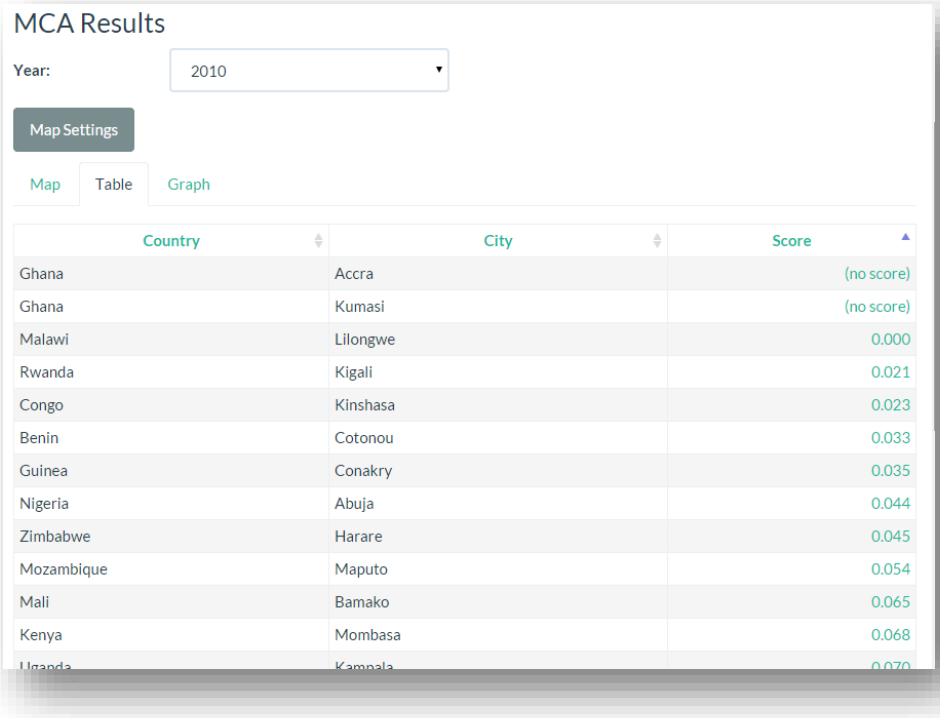
The user can view data for different years by changing the year in the drop down list box.

6.2 Sample outputs

Screenshot 1: The image below shows a Composite MCA with the map zoomed into West African countries.



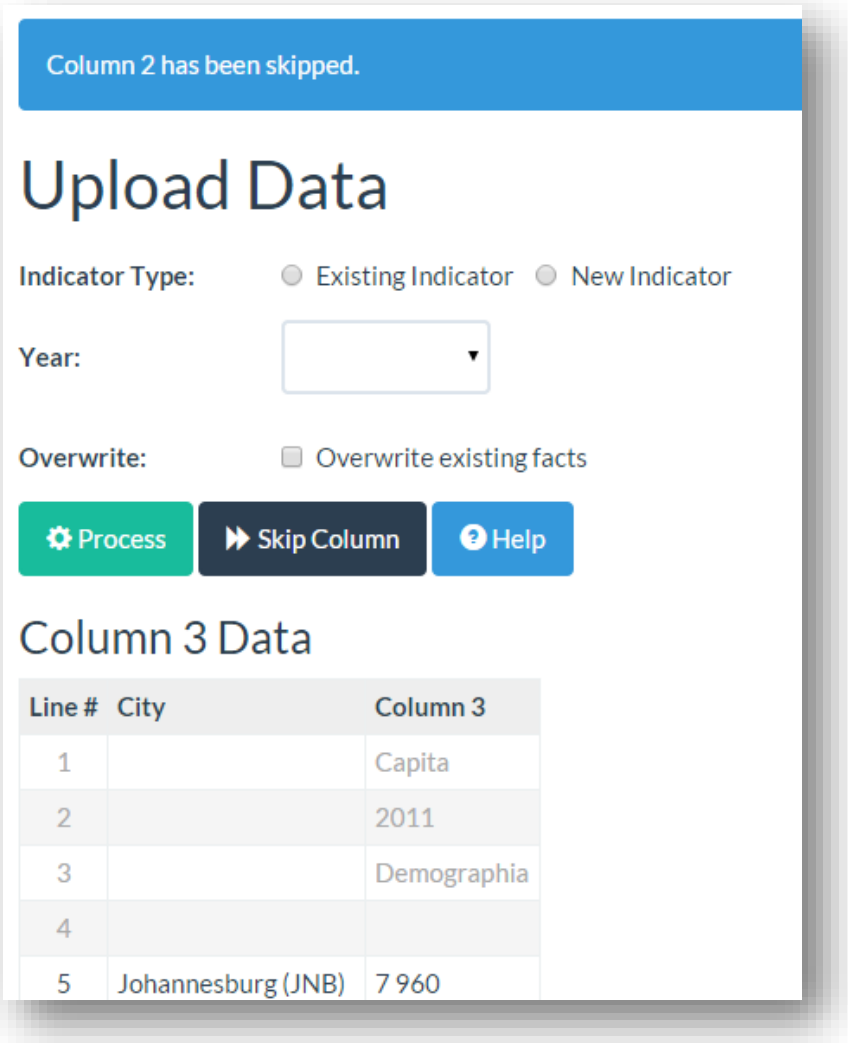
Screenshot 2: The image below shows a table of the results of a multi-criteria analysis using data from 2010.



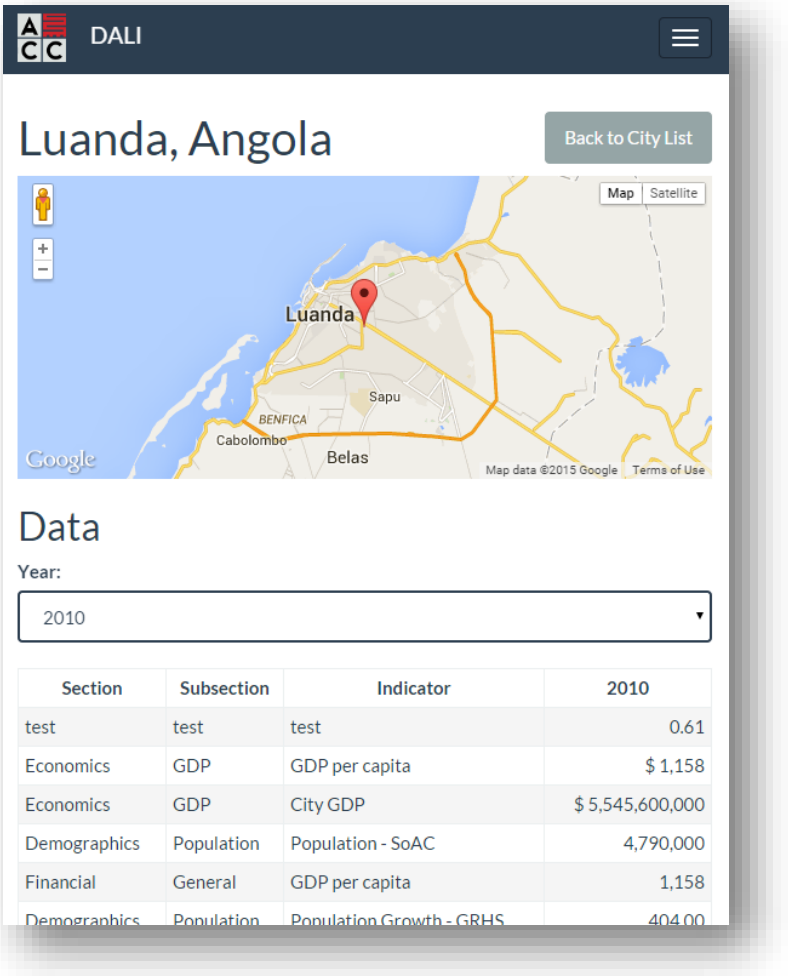
Country	City	Score
Ghana	Accra	(no score)
Ghana	Kumasi	(no score)
Malawi	Lilongwe	0.000
Rwanda	Kigali	0.021
Congo	Kinshasa	0.023
Benin	Cotonou	0.033
Guinea	Conakry	0.035
Nigeria	Abuja	0.044
Zimbabwe	Harare	0.045
Mozambique	Maputo	0.054
Mali	Bamako	0.065
Kenya	Mombasa	0.068
Uganda	Kampala	0.070

Screenshot 3: The image below shows a graph of two indicators for 2010: the bars represent the population (primary Y axis) and the dots represent population (secondary Y axis). The dots determine the colour of the circle on the map (and also the colour of the bar in the chart).

Screenshot 4: The image below shows part of the CSV import tool.



Screenshot 5: The image below shows the City Profile page for Luanda.



6.3 Hosting of the website

The web site is currently hosted by Sean Walsh the web site developer and a team member on the ACC team. The future hosting arrangements are still to be decided but will take place under the auspices of ACC and DFID. Over the remainder of 2015, ACC, assisted by Sean Walsh, are committed to hosting and maintaining the website.

6.4 Accessing the website

The public section of the website can be accessed at www.pdgdemo.co.za/dali

7 Headline results

The analysis for the purposes of this report has been completed although there are still improvements which can be made in the future, particularly by adding qualitative scores to two of the land use management criteria[11]. However, the results as they

[11] While provision is made for two criteria on 'extent to which land use is formally approved' and 'ease with which land use applications are processed'. However, no data was found for these criteria and reliance needs to be made on a qualitative assessment which was not possible under this project.

are reported here are considered to be sufficiently robust for the purposes of this scan.

7.1 Relative potential of cities to apply land-based financing

The primary result from the first MCA round is the relative scores for cities representing the relative potential for applying land-based financing techniques. The results, using the weighting of criteria proposed in Section 5, are shown as Figure 4.

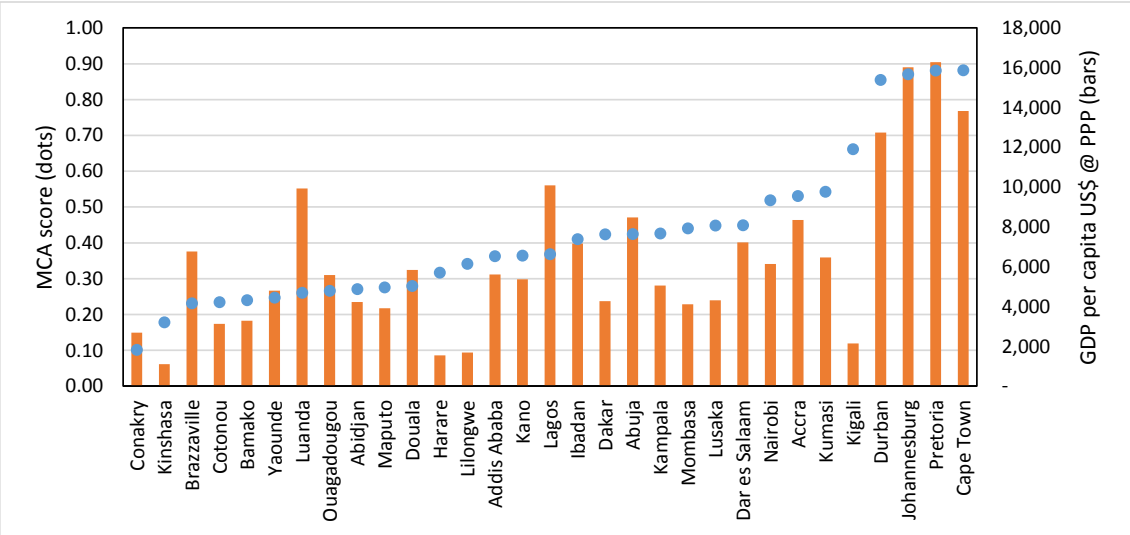


Figure 4: Results of first run MCA for 31 cities

The MCA results (blue dots on graph) can be plotted against any of the criteria. In this case the GDP per capita for the Cities is chosen as there is a correlation between the economic development of a city and the opportunities for land-based financing of urban infrastructure. Based on the results of this analysis cities can be divided into three groups:

- At the top end the four South African cities, Kigali (Rwanda), Accra and Kumasi (Ghana) and Nairobi (Kenya), all above a score of 0.5.
- The cities with the lowest indicated potential for land-based financing: Conakry (Guinea) and Kinshasa (DRC) with scores below 0.2.
- The remainder ranged across a relatively continuous spectrum with scores from 0.23 (Brazzaville, Congo Republic) to 0.45 (Dar es Salaam, Tanzania).

While it is not intended to show correlations between MCA scores and each of the criteria which make up the scores, it is interesting to note the obvious correlation between the level of economic development of the city and the potential for land-based financing. There are obvious outliers with some cities rated below what one would expect from the level of economic activity: the cities of Brazzaville, Luanda and Lagos in countries with oil-based economies have less potential for land-based financing than expected. On the other hand Kigali, Harare (Zimbabwe) and Lilongwe (Malawi) are indicted with high potential even though the cities are economically at the low end of the spectrum. Kigali rates fairly high as it is growing fast (albeit from a low base), has a relatively effective City and State and a high degree of tenure security.

7.2 Impact of weighting changes

A noted above the weighting of criteria is subjective and the results above are based only on the judgement of the research team. But the MCA technique allows for the impact of weighting changes to be tested. This can be done for the primary and secondary criteria. Only the shifts in the primary criteria weighting are considered here as these will have the biggest impact. Further, in order to allow for a high level assessment of weighting impact the four supply side criteria are grouped together ('Access to land', 'Active developers' and 'Ease of access to property related finance')

The results are shown in the table below:

Criterion grouping	Weight shift	Relative weights				Swing in MCA score
		Demand for property	Supply side factors	Effective city	Effective State	
Default		10	50	30	10	
Effective city	30 to 50	7	36	50	7	0.22
Effective city	30 to 10	13	64	10	13	0.21
Demand for property	10 to 30	30	39	23	8	0.24
Effective state	10 to 30	7	39	24	30	0.12
Supply side factors	50 to 30	14	30	42	14	0.20

The results show that the 'Effective State' primary criterion has the least swing, related to the fact that there is a low level of difference between countries in the sample with regard to the effectiveness of state. The other primary criteria have swings of a similar scale with 'Demand for property' being the highest largely as the as the levels of economic development of cities in the sample are so variable.

The impact of applying any of these weight changes on the ranking of cities has also been assessed. At the bottom end of the score spectrum none of the above changes in weighting shift Conakry off the lowest rating or shift Kinshasa more than one rank higher, to third. At the top end none of the weighting changes shift the South African cities out of the highest four positions. In the case of Kigali, only one of the weighting shifts (effective city) shifts it one position down. For the rest it retains its position 5 from the top. For the middle grouping the weighting changes does obviously cause a shift in position, partly because the gaps in scores are small. Ibadan (Nigeria), Maputo (Mozambique) and Harare (Zimbabwe) are the only cities which shift by more than 8 positions with any of the weight changes tested. Maputo and Harare are sensitive to changes in 'City effectiveness' weighting and Nigerian cities are sensitive to changes in supply side criteria weighting shifts.

7.3 Conclusions

On the results of the analysis

It is important to note at the outset that this analysis is related to **potential** for land-based financing only. A concerted action by State and City, supported by international development agencies, has the potential to create a successful system of land-based financing in most cities. In addition, specific land-based financing instruments, 'in kind' contributions by developers specifically, have the potential to be applied almost anywhere if the Developer is sufficiently sure of the market for the properties being developed. At the extreme, developers may build a complete system of infrastructure to serve their development. But this type of land-based financing instrument has

limited application and other instruments are far more reliant on City, State and effective land management arrangements.

Secondly the analysis is reliant on the quality of data used for the indicators and the extent to which these indicators fairly represent the criteria for which they are used as a measure. In both cases there are uncertainties. The realm of infrastructure finance, and the factors which influence it, is complex and it is only possible to measure this to a limited extent.

Given these limitations and the fact that this analysis is intended as a 'scan' it is concluded that the results produce a useful picture of where land based financing will be most readily applied in Sub-Saharan African cities.

On the methodology and the ALICS website as a tool

An important contribution from this research has been the development of the ALICS interactive web-based database. This has allowed for all the data to be stored in a way which is easily accessible to other users and it provides a tool for undertaking multi-criteria analysis. It has been developed to be expandable to include other cities and other data.

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Annexure – data tables

Demand for property

The data used for this criterion is confidential, as explained in the text.

Access to land

Secondary criterion		Extent to which land use is formally approved	Ease with which land use applications are processed	Degree of secure tenure	Ease of registering land
Indicator		Team rating	Team rating	Rating of extent of property rights	World ranking of country wrt ease of registering property
Source		Team experience	Team experience	Aggregate of EFW, MCC and WEF ratings	WB 'doing business 2015'
Measure		Rating 1-4	Rating 1-5	Score 0-100	Ranking
High or low best?		High	High	High	Low
ABJ	Abidjan	2	2	17.7	168
ABV	Abuja	2	2	25.6	185
ACC	Accra	2	2	56.8	43
ADD	Addis Ababa	2	2	48.6	104
BKO	Bamako	2	2	31.0	133
BZV	Brazzaville	2	2	21.4	142
CKY	Conakry	2	2	4.0	122
COO	Cotonou	2	2	17.8	165
CPT	Cape Town	2	2	77.7	97
DAR	Dar es Salaam	2	2	50.5	123
DKR	Dakar	2	2	36.2	167
DLA	Douala	2	2	28.4	172
DUR	Durban	2	2	77.7	97
FIH	Kinshasa	2	2	12.8	124
HRE	Harare	2	2	9.9	94
IBA	Ibadan	2	2	25.6	185
JNB	Johannesburg	2	2	77.7	97
KAM	Kampala	2	2	51.7	125
KAN	Kano	2	2	25.6	185
KGL	Kigali	2	2	85.9	15
KMS	Kumasi	2	2	56.8	43
LAD	Luanda	2	2	4.3	164
LLW	Lilongwe	2	2	50.0	76
LOS	Lagos	2	2	25.6	185
LUN	Lusaka	2	2	56.4	152
MBA	Mombasa	2	2	53.9	136
MPM	Maputo	2	2	40.6	101
NBO	Nairobi	2	2	53.9	136
OUA	Ouagadougou	2	2	32.5	147
PTA	Pretoria	2	2	77.7	97
YAO	Yaounde	2	2	28.4	172

Access to land – breakdown of scores used for 'extent of property rights'

	Sub-criterion	EFW legal system & property rights	MCC land rights & access	WEF property rights
		Score 0 - 10	Score 0 - 1	Score 1-7
ABJ	Abidjan	3.8	0.39	3.5
ABV	Abuja	3.4	0.56	3.4
ACC	Accra	5.6	0.71	4.3
ADD	Addis Ababa	5.2	0.76	3.4
BKO	Bamako	3.9	0.60	3.4
BZV	Brazzaville	2.8	0.53	3.5
CKY	Conakry	3.0	0.39	2.6
COO	Cotonou	4.2	0.50	2.6
CPT	Cape Town	5.9	0.80	5.6
DAR	Dar es Salaam	5.6	0.74	3.5
DKR	Dakar	4.4	0.56	3.9
DLA	Douala	3.9	0.53	3.6
DUR	Durban	5.9	0.80	5.6
FIH	Kinshasa	2.8	0.54	2.6
HRE	Harare	4.1	0.42	2.4
IBA	Ibadan	3.4	0.56	3.4
JNB	Johannesburg	5.9	0.80	5.6
KAM	Kampala	4.7	0.85	3.4
KAN	Kano	3.4	0.56	3.4
KGL	Kigali	7.0	0.88	5.3
KMS	Kumasi	5.6	0.71	4.3
LAD	Luanda	3.4	0.38	2.5
LLW	Lilongwe	5	0.72	3.9
LOS	Lagos	3.4	0.56	3.4
LUN	Lusaka	5.8	0.64	4.6
MBA	Mombasa	4.9	0.74	4.2
MPM	Maputo	4.1	0.73	3.4
NBO	Nairobi	4.9	0.74	4.2
OUA	Ouagadougou	4	0.60	3.5
PTA	Pretoria	5.9	0.80	5.6
YAO	Yaounde	3.9	0.53	3.6

Developers and property related finance

Primary criterion		Active developers	Ease of access to property related finance
Secondary criterion		Extent to which developers can function easily	Access to banking
Indicator		Ease of doing business: composite score	Bank branches per 100,000 population
Source		WB 'doing business 2015'	World Development indicators, 2014
Measure		Ranking	Number
High or low best?		Low	High
ABJ	Abidjan	178	4.6
ABV	Abuja	170	5.8
ACC	Accra	70	5.7
ADD	Addis Ababa	132	2.9
BKO	Bamako	146	3.9
BZV	Brazzaville	184	2.9
CKY	Conakry	169	1.3
COO	Cotonou	151	3.5
CPT	Cape Town	43	10.4
DAR	Dar es Salaam	131	2.2
DKR	Dakar	161	3.9
DLA	Douala	158	1.7
DUR	Durban	43	10.4
FIH	Kinshasa	147	0.7
HRE	Harare	171	7.1
IBA	Ibadan	170	5.8
JNB	Johannesburg	43	10.4
KAM	Kampala	150	2.6
KAN	Kano	170	5.8
KGL	Kigali	46	7.6
KMS	Kumasi	70	5.7
LAD	Luanda	181	11.4
LLW	Lilongwe	164	3.3
LOS	Lagos	170	5.8
LUN	Lusaka	111	4.4
MBA	Mombasa	136	5.5
MPM	Maputo	127	3.8
NBO	Nairobi	136	5.5
OUA	Ouagadougou	167	3.9
PTA	Pretoria	43	10.4
YAO	Yaounde	158	1.7

Effective city (1)

Secondary criterion		Functions devolved	Service provision track record	Finanically viable
Indicator		UCLGA indicator 1 Extent constitution provides for devolution	Composite measure of water and electricity access	UCLGA indicator No 5: Extent to which LG raises own revenue
Source		UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local	State of African Cities 2014 supplemented from various sources	UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local
Measure		Rating 1-4	%	Rating 1-4
High or low best?		High	High	High
ABJ	Abidjan	3	75	1
ABV	Abuja	4	62	2
ACC	Accra	3	61	2
ADD	Addis Ababa	2	59	2
BKO	Bamako	3	42	1
BZV	Brazzaville	3	46	1
CKY	Conakry	3	50	1
COO	Cotonou	3	55	2
CPT	Cape Town	4	94	4
DAR	Dar es Salaam	3	46	4
DKR	Dakar	3	85	2
DLA	Douala	3	52	1
DUR	Durban	4	86	4
FIH	Kinshasa	3	54	1
HRE	Harare	2	89	4
IBA	Ibadan	4	73	2
JNB	Johannesburg	4	87	4
KAM	Kampala	4	31	2
KAN	Kano	4	62	2
KGL	Kigali	3	23	2
KMS	Kumasi	3	62	2
LAD	Luanda	4	53	3
LLW	Lilongwe	3	15	2
LOS	Lagos	4	48	2
LUN	Lusaka	3	38	1
MBA	Mombasa	4	40	3
MPM	Maputo	1	38	1
NBO	Nairobi	4	79	3
OUA	Ouagadougou	3	36	1
PTA	Pretoria	4	87	4
YAO	Yaounde	3	38	1

Effective city – detail relating to access to services

			Weighting	40%	30%	30%
% with access		Weighted average access to water, sanitation and electricity	Year	Water	Sewerage	Electricity
ABJ	Abidjan	75	2005	83.8	42.7	95
ABV	Abuja	62		72	48	62
ACC	Accra	61	2008	55.5	37.1	90.8
ADD	Addis Aba	59	2005	68.8	8.9	96.9
BKO	Bamako	42	2006	41.2	12.2	72.1
BZV	Brazzaville	46		35	10.5	94.5
CKY	Conakry	50	2005	45.2	11.1	94.5
COO	Cotonou	55		78	24	54
CPT	Cape Tow	94	1998	95.7	93.8	92
DAR	Dar es Sal	46	2004	62.1	10	59.8
DKR	Dakar	85	2005	87.8	78.3	89.5
DLA	Douala	52		85%	86.9	84.3
DUR	Durban	86	1998	87.7	86.9	84.3
FIH	Kinshasa	54		62	20	77
HRE	Harare	89	2005	92.7	87.1	86.3
IBA	Ibadan	73		72	48	98.9
JNB	Johannesb	87		87.1	87.5	84.9
KAM	Kampala	31	2006	26	10.7	59
KAN	Kano	62		72	48	62
KGL	Kigali	23	2005	20.5	8.4	40.8
KMS	Kumasi	62		72	48	62
LAD	Luanda	53	2006	36.6	53.2	75.5
LLW	Lilongwe	15	2006	20.2	6	18
LOS	Lagos	48	2008	5.4	56.3	98
LUN	Lusaka	38	2007	31.6	27.4	57
MBA	Mombasa	40	2008	36.4	28.5	57.9
MPM	Maputo	38	2003	66.4	8	28.8
NBO	Nairobi	79	2008	78.2	71.3	86.6
OUA	Ouagadou	36	2006	39.4	4.6	61.6
PTA	Pretoria	87	1998	87.1	87.5	84.9
YAO	Yaounde	38		85%	26.4	98.2

Effective city (2)

Note: Data from Oxford Economics is confidential

Primary criterion		Effective city	Effective city	Effective city
Secondary criterion		Adequate technical capacity	Effective planning and LUM	Citizens willing to pay for services
Indicator		Average of rating for 'professional management' and 'availability of	Existence of Urban Master Plan	% hh consumer spending to services - 2014
Source		World Economic Forum's Global Competititveness Index 2014-15	African Cities Diagnostics	Oxford economics
Measure		Rating 1-7	Yes (1) or No (0)	%
High or low best?		High	High	High
FIH	Kinshasa	2.9	1	
HRE	Harare	4.2	0	
LLW	Lilongwe	4.1	1	
BZV	Brazzaville	4.1	1	
COO	Cotonou	2.9	1	
KAM	Kampala	3.7	1	
DAR	Dar es Salaam	3.7	1	
BKO	Bamako	3.6	0	
LUN	Lusaka	4.5	1	
OUA	Ouagadougou	3.2	1	
CKY	Conakry	2.9	0	
ABJ	Abidjan	4.1	0	
ADD	Addis Ababa	3.4	0	
MPM	Maputo	3.2	1	
KMS	Kumasi	4.0	0	
MBA	Mombasa	4.6	0	
KGL	Kigali	4.5	0	
ACC	Accra	4.0	0	
YAO	Yaounde	3.9	1	
NBO	Nairobi	4.6	0	
DLA	Douala	3.9	1	
KAN	Kano	4.2	1	
LOS	Lagos	4.2	1	
DUR	Durban	4.5	1	
LAD	Luanda	2.4	0	
DKR	Dakar	4.1	1	
IBA	Ibadan	4.2	1	
CPT	Cape Town	4.5	1	
JNB	Johannesburg	4.5	1	
ABV	Abuja	4.2	1	
PTA	Pretoria	4.5	1	

Effective state

Secondary criterion		Extent to which governance is effective	Commitment to support LG	Extent to which transfers are made to LG
Indicator		Overall Governance rating	UCLGA Combined ranking, excluding indicators 1,4 and 5	UCLGA indicator No 4: Extent to which central govt makes transfers to LG
Source		World Bank: Worldwide governance indicators 2012	UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local	UCLGA & Cities Alliance, 2013, Assessing the Institutional Environment of Local
Measure		Rating -2.5 (worst) to 2.5 (best)	Rating 1-38	Rating 1-4
High or low best?		High	High	High
ABJ	Abidjan	-0.99	15	1
ABV	Abuja	-1.14	14	4
ACC	Accra	0.07	20	1
ADD	Addis Ababa	-0.93	14	2
BKO	Bamako	-0.9	17	1
BZV	Brazzaville	-1.09	12	1
CKY	Conakry	-1.2	11	1
COO	Cotonou	-0.35	16	1
CPT	Cape Town	0.2	23	2
DAR	Dar es Salaam	-0.45	17	1
DKR	Dakar	-0.23	18	1
DLA	Douala	-0.95	15	4
DUR	Durban	0.2	23	2
FIH	Kinshasa	-1.63	10	1
HRE	Harare	-1.36	16	1
IBA	Ibadan	-1.14	14	4
JNB	Johannesburg	0.2	23	2
KAM	Kampala	-0.58	23	2
KAN	Kano	-1.14	14	4
KGL	Kigali	-0.2	21	2
KMS	Kumasi	0.07	20	1
LAD	Luanda	-1.01	12	1
LLW	Lilongwe	-0.36	12	1
LOS	Lagos	-1.14	14	4
LUN	Lusaka	-0.21	15	1
MBA	Mombasa	-0.73	18	3
MPM	Maputo	-0.35	13	1
NBO	Nairobi	-1.26	18	3
OUA	Ouagadougou	-0.44	17	1
PTA	Pretoria	0.2	23	2
YAO	Yaounde	-0.95	15	4