

An Analysis of Urbanization in Africa and its Implications for Korea: Future Demands for Urban Infrastructure

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Urbanization and Economic Growth

Although urbanization is not a required condition for economic development its importance cannot be undermined when discussing growth and transformation. Cities are the engines of economic growth as they mobilize and agglomerate labor and capital to create economies of scale that increase productivity. They also create a consumer base whose consumption of manufactured products encourages economic growth.

Lewis (1954), Harris and Todaro (1970) and Williamson (1986) explain the link between urbanization and economic structural transformation through the two-sector model. According to the model, modern urbanization develops with the expansion of capital-intensive industries within cities that attract surplus labor from rural areas. The high productivity of capital-intensive industries generates higher incomes that result in the movement of rural surplus labor in search of higher paying jobs. Profits are reinvested in the form of fixed capital that lead to a further demand for labor. Britain, China and Korea are cases of achiev-

ing economic growth through such accumulation of capital.

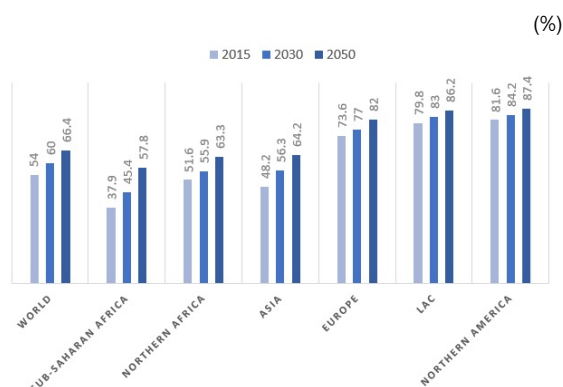
Another explanation of the link between cities and economic growth comes from the classification of cities into two categories: production cities and consumption cities. Production cities grow by “pulling” rural labor into cities through industrialization while consumption cities grow by “pushing” rural labor out because of green innovation and technological development. However, in the case of Africa, cities have expanded neither through industrialization nor technological innovation.

The “African” Urbanization

Africa’s urban population is still relatively small compared to other regions of the world but growth is expected to accelerate in the near future. Currently, Asia’s urban population is expanding at the fastest rate but Africa is expected to take over in 2020 in terms of speed, so that by 2050 more than 50 percent of Africans will be living in urban areas. In other words, the urban population will increase by 88 million to 560 million between 2015 and 2020 alone, which is more than twice the pop-

ulation in 1990, which was 197 million.¹ That is, while Europe took 110 years for its urban population to grow from 15 percent to 40 percent of the total population, Africa will achieve the same size of expansion in just 60 years.²

Figure 1. Percentage of urban populations by region



Source: UNDP Population Division (2015). *World Urbanization Prospects: The 2014 Revision*. pp. 204–214.

African cities will also expand economically. Currently, they produce almost \$700 billion, which amounts to 36 percent of Africa's total GDP. This is expected to increase to \$1.7 trillion by 2030.³ Worldwide, cities generate up to 80 percent of the global GDP.

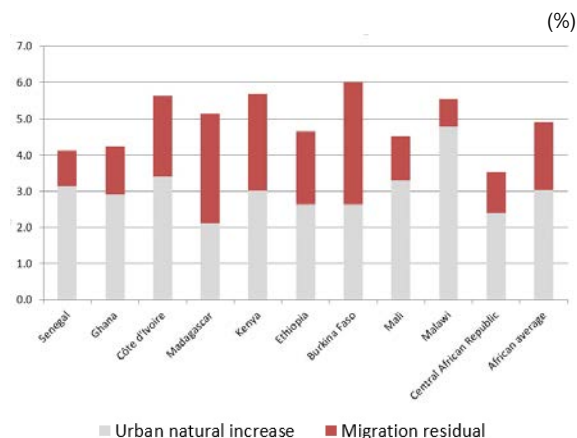
However, an urban population increase does not necessarily mean a rural population decrease in Africa. The urban population is growing because they are reproducing at a faster rate than rural migration on average. Although a certain deal of rural-to-urban migration has taken place, it is the stagnation of innovation and development in agriculture that is driving out populations, rather than industrialization or technological development.

¹ AfDB, OECD, and UNDP (2017). *African Economic Outlook 2016*. p. 147.

² Ibid.

³ Oxford Economics (2014). *Bright Continent: The future of Africa's opportunity cities*. p. 3.

Figure 2. Urban growth rates for selected African countries, 1960-2010



Source: AfDB, OECD, and UNDP (2017). *African Economic Outlook 2016*. p. 155.

Unfortunately, this rate of expansion and attention is unaccompanied by an improvement in physical and institutional infrastructure. African governments are aware of this boom and have developed national policies to respond to the rapid change. Many have included the development and enhancement of infrastructure as a focal point but not much has improved. Several surveys, including the Quality of Living Survey by Mercer and the Global Cities Index by AT Kearney, place African cities in the mid-lower ranks. Future prospects on the development of African cities are also dim. The Global Cities Outlook by AT Kearney ranks Nairobi in 101st place out of 125 cities surveyed while other African cities are below Nairobi. Furthermore, only 7 African countries are expected to be competitive in 2025 amongst 120 cities worldwide according to the EIU Global City Competitiveness Index.

The African Urban Identity

1. Urbanization without industrialization

Modern African cities were built principally through colonization in the early 20th century. Cities were developed to facilitate the export of raw materials that were shipped for Europe's industrialization. Dependence on the export of raw materials continues to this day as can be witnessed by the mono-culture structure of African economies. With the exception of a few countries including South Africa, Kenya and Tanzania, African countries rely on less than 20 items for 75 percent of their export, most of which are raw materials.⁴ In the case of Angola, oil comprises 96 percent of exports. Countries such as Nigeria and Botswana, whose economies depend heavily on the export of raw materials, have rather deindustrialized since independence.

2. Sprawling slums

The deficiency of urban planning has created sprawling slums that have attached themselves to African cities. Approximately a quarter of the global slum population resides in Africa while the proportion of the urban population living in slums in Africa is at 62 percent.⁵

In addition, with the absence of industrialization, most employment in urban areas occurs in the service sector which, in the case of Africa, is generally informal. According to current estimates, over 60 percent of urban employment occurs in the informal sector, which is largely composed of small and micro enterprises. Such jobs are unstable and underpaid and therefore, those employed in the informal

sector cannot afford decent housing within the city. Moreover, because economic activities in the informal sector are beyond the tax radar, social capital for the development of basic services such as power, clean water and sanitation is greatly lacking. This is reflected in the City Prosperity Index (CPI) of the UN Habitat, where African cities rank at the bottom ten.

3. Infrastructure deficit

A. Road infrastructure

Although the condition of roads differs between countries, the status of road infrastructure in terms of both length and quality is extremely poor in general. For example, Chad has 40,000 km of total road network, of which 28,238 km is classified as fit for transport. However, only 3.49 percent of the classified road is paved. Rwanda is slightly more advanced, with 4,625 km out of 4,700 km evaluated as fit for transport. Still, the percentage of paved roads remains at 22.91 percent.⁶

This in turn raises the cost of transportation and deteriorates the trade environment. Lower income households spend at least 30 percent of their income on transportation,⁷ while expenses for a 20 ft container from Chad or Rwanda to reach adjacent ports are 12 and 6 times higher than China respectively.⁸

B. Power and electricity

Access to power has improved over the years. Access to power in the major cities of Africa

⁴ AfDB, OECD, and UNDP (2017). *African Economic Outlook 2016*. p. 350.

⁵ UN Habitat (2010). *State of the World's Cities 2010/2011: Bridging the urban divide*. p. 179.

⁶ CIA DB. <https://www.cia.gov/library/publications/resources/the-world-factbook/rankorder/rankorderguide.html> (accessed 23.04.2017).

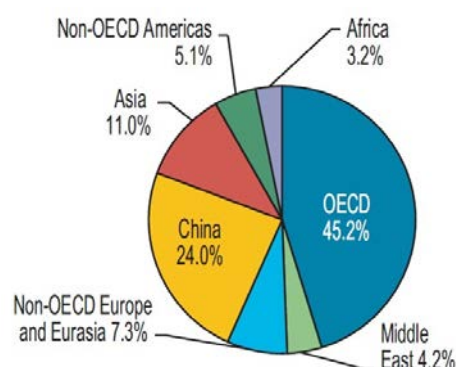
⁷ AfDB, OECD and UNDP (2016). *African Economic Outlook: Sustainable Cities and Structural Transformation*. p. 176.

⁸ World Economic Forum (2015). *The Africa Competitiveness Report 2015*. p. 78.

such as Abidjan (Cote D'Ivoire) and Lagos (Nigeria) were at 96.1 percent and 96.2 percent. Addis Ababa (Ethiopia) also had high access at 98.6 percent. However, most cities in Africa had lower access to power than Phnom Penh (Cambodia, 96.1 percent), which has the least access to power in Southeast Asia. Access was critically limited for Monrovia (Liberia) and Lilongwe (Malawi) at 11 percent and 25.1 percent.⁹ However, increasing access to power in rural areas is still a challenge as the gap between urban and rural areas remains at 51.3 percent.¹⁰

Moreover, power generation and distribution is still insecure as many depend on high-cost diesel powered generators as a backup power source in the frequent cases of blackouts. The total share of electricity generated in Africa does not even match a fifth of China's production.

Figure 3. Regional shares of electricity generation, 2014



Note: Asia excludes China and OECD countries of Asia.
Source: IEA (2016). *Key world energy statistics*. p. 26.

C. Water supply and sewage

Although some major cities such as Banjul (Gambia), Abidjan (Cote D'Ivoire) and Mapu-

to (Mozambique) have more than 80 percent of houses with piped water, about half of urban households do not have water supply systems.¹¹ Only 4.5 percent of the population has access to piped water in Lagos, a city with 17.9 million inhabitants.¹²

In regards to access to safe drinking water, rural Africa has improved over the past 25 years to some degree while urban Africa has shown little improvement. Accordingly, while more than 90 percent of the total population in Southeast Asia and Latin America has access to safe drinking water, Africa only has 68 percent with the same “luxury.” Connection to sewage facilities is at a critical state. Banjul (Gambia) and Nairobi (Kenya) are better off, with over 60 percent of the population with connections. However, most other major cities have less than 20 percent of the population connected to sewage facilities. For example, Kampala (Uganda) stands at 2.6 percent and Kinshasa (DRC) at 0.8 percent.

D. Sanitation

When looking at the regional status of access to improved sanitation facilities, 70 percent of the population in Africa still uses shared facilities or defecate openly while 89 percent of the population in Northern Africa has improved facilities.¹³ It also has the worst improvement record, with only 17 percent of the population benefiting from an improvement in facilities since 1990.

E. Industrial production facilities

⁹ UN Habitat (2016). *World Cities Report 2016: Urbanization and Development*. pp. 217-220.

¹⁰ World Bank Databank. <http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators&Type=TABLE&preview=on> (accessed 24.04.2017).

¹¹ The term “water supply” is defined very broadly by the UN Habitat, referring to water supply from within the household, in the yard, and from neighboring households.

¹² UN Habitat (2016). *World Cities Report 2016: Urbanization and Development*. pp. 217-220.

¹³ Ibid. p. 64.

Industrial clusters have been promoted by many countries as a means of achieving industrialization because they encourage growth in various sectors: employment, export diversification, FDI, government revenue and others.

Table 1. Estimated number of industrial complexes in the top 5 economies of Africa and Southeast Asia

	Country	GDP (Billion USD, 2015)	Industrial Complexes
Africa	Nigeria	557	32
	South Africa	315	1-5
	Egypt	296	153
	Algeria	176	1-5
	Angola	129	1-5
Southeast Asia	Indonesia	861	270
	Thailand	395	50
	Malaysia	296	224
	Philippines	291	90
	Vietnam	200	313

Source: IHS (2016). *IHS Economics World Overview First-quarter 2016*. pp. 81-83, UNDP and IPRCC (2015). *Comparative Study on Special Economic Zones in Africa and China*. p.10, UNIDO Country Office in Vietnam (2015). *Economic Zones in the ASEAN Industrial Parks, Special Economic Zones, Eco Industrial Parks, Innovation Districts as Strategies for Industrial Competitiveness*. p. 80, General Authority for Investment and Free Zone of Egypt, Nigeria Export Processing Zones Authority.

Africa has not witnessed much development in regards to industrial complexes. There are various causes for this relative underdevelopment, such as the lack of legal and institutional support, inadequate policies and poor business environment. However, the deficiency of basic infrastructure needed for the operation of industrial production facilities is the main cause.

Estimated Future Demand for Infrastructure in Africa

Africa's infrastructure deficit and demographic increase triggers a number of side effects which could be alleviated through the development of physical and institutional infrastructure. To identify the potential demand for in-

frastructure and its costs, the pooled OLS and fixed effects model were used under the assumption that countries under review would continue to expand economically.¹⁴ The System GMM was used in tandem to control estimate errors that occur in the fixed effects model when reviewing dynamic panel regressions.¹⁵

According to the results, income per capita, level of urbanization, and population density were statistically significant to all sectors of infrastructure demand, indicating the importance of cities for economic growth. Lower income countries, in particular, will be more economically dependent on cities than higher income countries.

When looking at the costs for future infrastructure demand, the need was greatest in the power sector, followed by road, drinking water and sanitation. From a regional perspective, the demand for power was greatest in North Africa in 2016. However, West Africa's demand is expected to increase to 50 percent of the total by 2030. As for road infrastructure, West and East Africa each required around 30 percent of the total demand. They also required the most investment in regards to drinking water at 82.7 percent. Although West Africa had the largest demand for sanitation infrastructure in 2016 East Africa is expected to take over in 2029. On average, a sum of \$60.5 billion will be required each year.

¹⁴ The study focused on the infrastructure demand for road, power, and water and sanitation for the years 2016-2030. The areas of housing and ICT were excluded due to the lack of data.

¹⁵ A detailed explanation on the methodology and source of data can be found in Park et al. (2016). *An Analysis of Urbanization in Africa and its Implication for Korea's Infrastructure Development*. KIEP. (in Korean)

Table 2. Estimated costs for potential infrastructure demand

(Billion USD, constant 2010)

Year	Power	Road	Drinking water	Sanitation
2016	33.6	3.8	3.2	1.9
2017	36.5	3.9	3.2	2.7
2018	38.9	4.0	3.3	2.9
2019	41.3	4.2	3.4	2.9
2020	43.8	4.5	3.5	3.0
2021	45.9	4.7	3.6	3.1
2022	48.5	4.9	3.7	3.2
2023	50.9	5.1	3.8	3.3
2024	48.2	5.4	3.8	3.4
2025	49.0	5.6	3.9	3.5
2026	51.7	5.8	4.0	3.6
2027	54.4	6.0	4.1	3.6
2028	57.3	6.2	4.2	3.7
2029	60.2	6.4	4.3	3.8
2030	63.2	6.6	4.4	4.0
Total	724	77.7	57.0	49.5

Feasible Areas of Cooperation between Korea and Africa

1. Policies for urban planning

Despite the rapid growth of the urban population in Africa only 16 countries have urban development policies at the national level. The number of capable policy makers concerning urbanization is also insufficient. Such circumstances create conflict between stakeholders as urban areas expand.

Land ownership has been at the center of such conflict for a while as local residents and the government have disagreed over urban development and construction plans. In Africa, land is mainly held through government, private and communal ownership. However, approximately 90 percent of land is unregistered, which acts as a major barrier for attracting FDI or building industrial complexes. Moreover, 70 percent of the total ownership is communal, meaning that community members do not have the right to sell, transfer or rent land individually. Recently Malawi, Ethiopia, and Chad have taken measures to reform the land

system while others are seeking to shift from a customary law-based practice to a statutory law-based policy.

The Korea Land and Geospatial Informatix Corporation and the National Geographic Information Institute are well known for their ability to develop databases, systems and spatial data infrastructure related to land administration. They have developed land registration systems in Latin America, Southeast and Central Asia. Their experience can help solve Africa's land conflicts and support its urban development.

2. Physical infrastructure

The population boom in Africa's cities is creating severe traffic congestions as the number of cars has increased without sufficient expansion of road networks and effective traffic management systems. To improve the efficiency and safety of the traffic system, a comprehensive and systematic urban transportation masterplan is in demand. In order to respond to Africa's needs, the masterplan should include the development of a demand forecasting model, transportation network plan, parking management system and traffic management system.

Korea has already established the Intelligent Transport System (ITS) in various developing countries. The ITS combines cutting edge technology with existing traffic management systems. It gathers information through CCTVs, ground detectors and other technologies that are analyzed and sent to drivers and other road users to resolve congestions and prevent accidents. In the case of Mongolia, Korea provided 75 percent of the total construction expenses through the Economic Development Cooperation Fund. Many African countries have shown interest in the system,

which creates opportunities of cooperation with Korea.

3. Financial cooperation

Recently, Ethiopia built a tram network through Addis Ababa as part of its urban infrastructure establishment plan. Most of the construction cost was provided by Chinese loans. As such, urban infrastructure is in high demand but due to high political instability, foreign exchange regulations and immature financial markets Africa faces difficulties in attracting financial aid from the international financial market.

In light of such circumstances, Korea should expand its cooperation with development finance institutions (DFIs) such as the World Bank, African Development Bank and European Investment Bank. DFIs have actively participated in the development of urban infrastructure. The International Development Association has provided \$300 million for the improvement of the traffic system in Addis Ababa while CDC, Proparco and other European bilateral DFIs are funding energy and power projects in Tanzania.

The Chinese Development Bank (CDB) should also be considered as a partner. CDB has a larger funding capacity than the World Bank, Asian Development Bank and African Development Bank combined. It is vigorously funding infrastructure development projects in Africa. Therefore, creating a partnership with CDB can better support Africa's urban development.

4. Industrial complexes

Industrial complexes play an important role for economic transformation because they create jobs, enhance productivity and attract foreign investment. There are many business op-

portunities in Africa, in sectors such as agricultural goods processing, communications and financing, but there is a lack of capable companies to lead investment and growth. Around 90 percent of companies in Africa are micro-enterprises that have less than 10 employees. With such limitations, it is difficult to enhance competitiveness through economies of scale. Industrial complexes can help by building a network of producers.

East Africa provides the best conditions for building industrial complexes because it has a large consumer market¹⁶ and stable business environment. Ethiopia and Kenya in particular have dynamic industrialization policies that have increased their business competitiveness. Therefore, Ethiopia and Kenya are good entry points for a Korean industrial complex. However, as China and India have already well established themselves in East Africa, Korea needs to search for new strategic locations within the area.

Africa is experiencing urbanization at a faster rate than any other region. However, opportunities for economic growth and transformation through urbanization are limited by the underdevelopment of urban infrastructure. As a result, Africa is undergoing an “urbanization of poverty” that encourages a vicious circle of growth. To support the sustainable transformation of Africa's cities Korea can provide aid for both soft infrastructure and hard infrastructure through policy development, financial support and establishment of physical infrastructure. **KIEP**

¹⁶ Around 30 percent of the total African population resides in East Africa.