

INFRASTRUCTURE DEVELOPMENT IN RWANDA: CHALLENGES AND SOCIO-ECONOMIC PROSPECTS

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Abstract

Access to adequate and affordable infrastructure in Rwanda remains one of the key challenges to local economic development despite efforts made by both government and non-government organizations. The fact that infrastructure can be an important tool for the Rwandan economic development; Rwanda has not yet met the requirements for a successful infrastructure revolution. This has led to growing in the international development community about infrastructure's relevance to growth and poverty reduction. This paper sought to analyze the role of infrastructure in development process of Rwanda and to identify the key challenges factors for infrastructure development in Rwanda. Secondary data was used for the analysis and it is based on data-gathering from different sources of published and unpublished Journals, Thesis, Foreign Government Report, Rwandan Ministry of Infrastructure annual report, the World Bank Report and African Development Banks Report. The study shows that the improving infrastructure could increase the quality of life of the Rwandan population and could contribute significantly to growth and poverty reduction. The study recommends that both Government of Rwanda, Private sectors, Donors and Non-government Institutions need to promote the development of new strategies that can enhance an effectiveness of infrastructure in order to access markets and to provide a country's economic development.

Keywords: Infrastructure, Economic Development, Challenges, Rwanda

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1. Introduction

A majority of Sub-Sahara Africa suffer from the lack of infrastructure in rural areas where poverty is most severe. Rwanda is one of the countries located in Sub-Saharan Africa in the East Africa great lakes region. At 26,338 square kilometers, Rwanda is bordered by Democratic Republic of Congo to the West, Uganda to the North, Tanzania to the East and Burundi to the South. Its capital is named Kigali. Rwanda's population was estimated at more than 12 million in mid 2013 (National Institute of Statistics of Rwanda, 2013 Report).

Rwanda's long-term development goals are embedded in its Vision 2020 which seeks to transform Rwanda from a low-income infrastructure based economy to a knowledge based, service oriented economy with a middle-income country status by 2020. One theme that lies at the heart of Vision 2020 is the development of the country's core economic infrastructure (Word Bank, 2005). This commitment to infrastructure improvement reflects the government's recognition of the central role that accessible infrastructure plays in supporting poverty eradication and economic growth.

About tenth of Rwanda's annual budget is committed to infrastructure development. The Government of Rwanda has invested approximately seven hundred million dollars in transport, water and sanitation, energy, communication, ICT and other infrastructures over the past three years with the specific focus of reducing cost of doing business and ensures both internal and external connectivity of the economy (Rwanda Development Board, 2013).

Encouraging greater private participation in infrastructure is accordingly a major element in the government's policy for infrastructure renovation and improvement (Allen, 2003). In part, the importance given to private participation in infrastructure reflects the need to connect financial resources that substantially exceed what government and donors can be expected or will be able to provide (Argy & al, 1999). The Rwanda Country Framework Report sets out a review of Rwanda's infrastructure in the transport, energy, housing, water and sanitation, and telecommunications sectors. Although, the Country Framework Report focused in particular on the potential that exists to involve the private sectors in infrastructure and the policies that are necessary to bring this involvement. Although the government of Rwanda has achieved much, it

recognizes fully the room that exists for improvement (James, 2012). However, significant progress in Rwanda has been made in developing infrastructure to enhance economic competitiveness. For instance, electricity generation more than doubled from 45MW to 110.8MW between 2005 and 2013, increasing electricity access from 2 percent to 17 percent of the population during the same period (United Nations, 2014). The share of national roads (paved and unpaved) classified to be in good condition increased from 11 percent in 2005 to 63.5 percent in 2013, while the ICT composite network coverage rate increased from 75 percent to 90 percent (African Development Bank , 2012).

Therefore, Rwanda has not yet met the requirements of successful infrastructural revolution. Accessibility to adequate and affordable infrastructure remain one of the key challenges to local economic development despite efforts made by both government and private sectors organizations to address the problem. Issues of availability of roads, energy (lack of access to electricity), clean water and sanitation, housing and communication network are some of the major constraints to economic development of the country. The financial resources for financing local infrastructure remain also the most important challenges to local economic development in Rwanda.

Both Government and non-Governmental institutions need to guide the development of new strategies that can enhance the efficacy of current and future initiatives associated policies to be undertaken by government, private sector, donors and non- Government Organizations. Various policies have been developed that target different segment of business. This has led to growing in the international development community about infrastructure's relevance to growth and poverty reduction.

2. Objectives of the study

- To analyze the role of infrastructure in development process of Rwanda
- To identify the key challenges factors for infrastructure development in Rwanda
- To examine the current status and performance of infrastructure in Rwanda

3. Significance of the study

A developed infrastructure system is one of the pillars to meet long run Rwandan economic development objectives stipulated in the Vision 2020. It is also stated in the Millennium Development Goals (MDGs) that access to infrastructure is expected to play a critical role in poverty alleviation. Poor infrastructure, lack of energy, lack of clean water and sanitation, poor communication and the absence of attractive investment opportunities are considered to be key reasons behind inadequate economic development in many countries. This is why an attempt is made in most public and private institutions to encourage, through development policy measures as well as the supply of financial aid. However, few studies address the role of infrastructure in the development process in Rwanda. This study takes the approach that investment in infrastructure is an indicator of economic growth. The outcome of the study would be useful to identify innovative options and institutional arrangements that would serve as an input for policy makers in formulating infrastructure policy.

4. Methodology and Sources of Data

Secondary data was used for the analysis and the information were collected from published and unpublished sources such as Journals, Thesis, Foreign Government Report , Rwandan Ministry of Infrastructure annual report, the World Bank Report and African Development Banks Report and Rwanda Development Board Report.

5. Infrastructure Development in Rwanda

The rehabilitation and development of infrastructure is a crucial aspect in lowering the costs of doing business in Rwanda, which will attract domestic and foreign investment.

5.1. Urban development

Rwanda is characterized by low but accelerating urbanization. This has happened in a rapid and uncoordinated manner, meaning that social services and employment opportunities are lagging behind. Now, each town has regularly updated urban master plans and specific land management

plans. The country has developed basic infrastructure in urban centers and in other development poles, enabling the decongestion of agricultural zones (World Bank, 2006).

5.2. Transport

The transport sector has proved to be one of the keys to inclusive growth in Rwanda. It is essential to linking farmers to their markets. Across Rwanda's region, the density of the road network correlates closely with progress on poverty reduction. Transport is also an important part of the services sector contributing 7 percent of GDP (African Development Bank, 2012). In its vision 2020 document, Rwanda has identified closer economic integration with the East African Community as keys to its growth strategies. In 2006, only 11 percent of the classified roads network was rated as a good condition. By 2011 that proportion had reached 60 percent (Ministry of Finance and Economic Planning, 2006). However, the local unpaved road network is still in dire state with as little as 15 percent in good condition. The development of a sustainable transport system in Rwanda requires an integrated transport system for ensuring the mobility, accessibility and safety for all road users (Kumaran, 2011).

Transport infrastructure in Rwanda, comprises:

- **Road transport :** It is the main form of passengers and cargo transportation

- **Water transport:** Although the water transport sub-sector is currently very limited in extent, there are potential opportunities for in the further development of water transport on Lake Kivu. A serious constraint is the current absence of any boatyard facilities for construction or maintenance on the Rwandan shore of the Lake.

- **Railway Network:** Rail in Rwanda is currently not served by any railway system. The government's key policy objective for rail is to investigate the feasibility of establishing a railway to connect to the ports of Dar -Es -Salaam in Tanzania or Mombasa in Kenya through one of the other regional railway systems, with the aim of reducing costs for the transport of goods in bulk. The government is also to consider the possibility of establishing a southern transport corridor linking the countries of the Great Lakes region with South Africa, as part of the Great Lakes Railway Project.

5.3. Communication & Information and Communication Technology (ICT)

The communication network is another key enable of regional integration. Information Communication Technology has spread rapidly in Rwanda in particular telephony. The number of fixed line and mobile phone subscribe has increased by 27 percent from 2005 to 2011. The internet used has also improved dramatically (Ministry of Infrastructure, 2010 report).

By 2020, Rwanda projects to have internet access at all administrative levels, for all secondary schools and for a large number of primary schools. Telephone services were widespread in rural areas and efficiency of public services was increased through the application of e-government principles (Albert& al, 2009).

Key contributions to other ICT sectors

E-Soko

E-soko is an electronic market price information system developed to collect and provide real time market prices for agricultural commodities on Rwandan markets. This system seeks to empower farmers by enabling them to make more informed market pricing decisions in order to improve on their livelihood.

TRACnet

TRACnet is a Health Management Information System which has been deployed to increase the efficiency of Rwanda's HIV/AIDS program management, and enhance the quality of patient care. Specifically, this system ensures real-time access to information on HIV/AIDS and Anti-Retroviral drugs (ARVs) nationwide through the use of ICT (Rwanda Development Board, 2013).

The system is designed to collect, store, recover, show, and disseminate critical program information, drug distribution, and patient information related to the care and treatment of HIV/AIDS. The system supports the Rwandan Government's vision of rapidly scaling up HIV/AIDS clinical services in a variety of health care settings.

The system is deployed in all 134 health facilities in Rwanda. More than 90 percent of the users access the system via the toll-free telephone interface with an Interactive Voice Response (IVR) system which is a recent advance in telecommunications technology and have created opportunities to enhance the quality of health care services through the use of telecommunications and information technologies to deliver health care.

Telemedicine

As a supplement to traditional patterns of health care delivery, Telemedicine and e-Diagnosis has improved the way medical professionals share medical expertise. Numerous benefits ranging from creation of a network of specialists; improving access by health care practitioners to specialists; to improving the quality of diagnostics and treatment. Collaborative programs of practice-based initiatives have streamlined intake, improved communication, reduced gaps in referrals and services and reduced duplicate information collection among health care service providers.

One Laptop per Child

Rwanda has embraced the use of a low-cost, low-power connected laptop, “The XO-Laptop”, developed by One Laptop per Child (OLPC) association. This laptop is loaded with content and software designed for collaborative, joyful and self-empowered learning in order to provide educational opportunities for children with limited access. This project is in line with Rwanda’s vision of transforming the country’s economy into a knowledge-based, technology-led economy, and with providing an opportunity for the young generation to access information and services easily. Students and teachers with laptops from different schools connect and exchange ideas thus improving teaching, learning opportunities (Rwanda Development Board, 2013 Report).

5.4. Energy

In Rwanda, inadequate and expensive electricity supply is considered as one of the most pressing constraints on economic growth and urban development. Wood is the source of energy for 99 percent of the population, which leads to massive deforestation and soil destruction. Imported petroleum products consume more than 40 percent of foreign exchange. Rwanda will therefore increase energy production and diversify into alternative energy sources (Niyonsaba, 2013).

To achieve this, Rwanda has considerable hydroelectric potential, in addition to large deposits of renewable methane gas in Lake Kivu, estimated at 60 billion cubic meters. Rwanda projects that by 2020, at least 35 percent of the population will be connected to electricity (up from the current 6percent) and the consumption of wood will decrease from the current 94 percent to 50 percent national energy consumption (Ministry of Infrastructure, 2011).

From the Rwanda Ministry of Infrastructure (MININFRA), the principal objective of the energy sector is to contribute to the accelerated sustainable socio-economic development of Rwanda so as to improve the well-being and the quality of life of the population by powering the social and economic sectors to meet the essential needs.

To achieve this main objective, the following specific objectives need to be addressed:

- ✓ Increase access to electricity for enterprises and households
- ✓ Reduce cost of service in the supply of electricity, and introduce cost reflective electricity tariffs
- ✓ Diversify energy supply sources and ensure security of supply
- ✓ Strengthen the governance framework and institutional capacity of the energy sector

5.5. Water and Sanitation

The importance of adequate water supply and sanitation services as drivers for social and economic development, poverty reduction and public health is fully acknowledged in Rwanda's main policies and strategies. Only 52 percent of Rwandans have access to clean water. Daily consumption of water is estimated at 8.15 litres per person in rural areas, far below the international standard of 20 litres (Ministry of Finance and Economic Planning, 2012). In order to accelerate the move towards the national 2020 targets of 100 percent access to water supply and sanitation country wide, Rwanda adopted a 7 Year- programme to achieve 100 percent access to improved water supply and sanitation facilities by 2017. To monitor progress, the Government established a Management Information System (MIS), through the Energy, Water and Sanitation Authority (EWSA), which has been functional since 2012 (James, 2012).

The government's core policy objectives for the water supply and sanitation sector are to improve the provision of water, extend the water supply network, and increase access to sanitation services that promote technically and financially viable projects based on strong community participation, as well as to strengthen capacity at both the central government and the district levels.

5.6. Housing Sector/Buildings

Building materials: The majority of accommodation units in Rwanda are constructed with raw bricks (75 percent) since the use of fuel-wood for burning bricks is prohibited (for ecological reasons). Other building materials such as the concrete blocks, the quick-lime, other innovative new building materials and tiles are yet to be popularized and made acceptable to the general public. For accommodation, the planned housing construction has been initiated in Rwanda to cater for the low and middle class and upper-end by. Many hospitals and Schools had been constructed at systematic manner (Kumaran, 2011)

6. Challenges facing the Rwandan Infrastructure

6.1. Challenges in transport

Despite this good achievement done by the Government pf Rwanda, there are some key challenges faced by the infrastructural sector in the implementation and evaluation of its program for energy, water and sanitation, and transportation.

a) **Inadequacies in transport:** Infrastructure imposes significant additional costs on the country's economy and represents a serious impediment to improving per capita incomes. Because of such inadequacies, the poorest rural communities face considerable problems gaining access to markets for their produce.

b) **The inadequate rural roads:** The lack of rural road also affects the ability of the poor to gain access to key services, such as health and education, and access to markets which represent serious obstacles to alleviating poverty. Moreover, deficiencies in Rwanda's transport systems spill over into the other infrastructure sectors, adding to maintenance costs and reducing the quality of service.

c) **High transport cost:** The condition of the whole road network has deteriorated substantially in the past decade, resulting in a significant cost to the economy. Vehicle operating costs in Rwanda are high, as a direct consequence of the poor condition of the roads, and access to both product markets and essential public services is impaired, especially in poor rural areas.

d) **Lack of Airports:** Overall responsibility for the airport subsector rests with the Ministry of Infrastructure. In Rwanda, there are only two airports and five airfields in Rwanda, including one international airport located at Kanombe, Kigali. Traffic at Kanombe is significantly below the capacity of the airport. Kanombe is currently served by only one European airline, four African airlines, and one local airline. As with road transport, the cost of air transport is high owing to the lack of competition and the small size of the markets.

e) **Lack of Railroad system:** Although it is linked to the Uganda-Kenya railroad system by road. Since Rwanda is landlocked, most of its international trade is transported through the Kenyan port of Mombasa.

6.2. Challenges in Water and Sanitation sector

- Insufficient funding and decreasing allocations of the government development budget for the water and sanitation sector.
- Disparities in access to water in both rural and urban areas
- Low sustainability of water supply services in rural areas
- High water tariffs in rural areas.
- Water tariffs in urban areas that do not reflect operation and maintenance costs.
- Rapid increase of urbanization and population leading to pollution risk due to unplanned and scattered housing with a subsequent high cost for treatment of water.

6.3. Others challenges

- Professional staff lack specialized training in procurement, analysis and design of complex road systems, and contract management.

- Government and development Partner s' resources are not sufficient for infrastructure maintenance and development.
- Insufficient capacity to take advantage of scientific and technological developments.
- Inadequate and expensive electricity supply constitutes a limiting factor to development.
- Telecommunication coverage in Rwanda is very low especially in information and communications technology ICT in rural areas.

Conclusion and Recommendations

This paper analyzed the role of infrastructure in development process of Rwanda and indentified the key challenges for infrastructure development. The study found that the infrastructure plays a very important role in improving the quality of life of the Rwandan population and could contribute significantly to growth and poverty reduction.

The study recommends that the infrastructure need to be promoted both by the Government of Rwanda, Private sectors, Donors and Non-government Institutions for the development of new strategies that can enhance an effectiveness of infrastructure in order to access markets and to provide a country' s economic development. From this point of view, the design of policymaking for infrastructural investment in Rwanda particularly should be more sensitive to the real characteristics of the infrastructure development.

References

- African Development Bank (2011). Country Strategy Paper 2012-2016
- African Development Bank (2012). Development Effectiveness Review, Rwanda
- Albert Nsegiyumva and E. Habumuremyi (2009). A Review of Telecommunications Policy Development and Challenges in Rwanda, Association for Progressive Communications
- Allen Consulting Group (2003). Funding Urban Public Infrastructure: Approaches Compared, Property Council of Australia, Canberra, ACT
- Argy, F, Lindfield, M. Stimson, B & Hollingsworth (1999). Infrastructure and Economic Development, CEDA Information Paper No. 60, Committee for Economic Development of Australia, Melbourne

- James Sano (2012). Financing of the Water, Sanitation and Hygiene Sector in Rwanda: A Case Study. Development Finance International, Water Aid
- Kumaran G. Senthil (2011). Concrete and Infrastructure Development in Rwanda and Its Challenges, Kigali Institute of Science & Technology. Paper presented in Germany
- Ministry of Finance and Economic Planning (2006). Annual Aid Effectiveness Report, Government printer, Kigali-Rwanda
- Ministry of Finance and Economic Planning (2011). Getting Africa to meet the sanitation MDG: Lessons from Rwanda. Rwanda
- Ministry of Finance and Economic Planning (2012). Water and sanitation financing. Government printer, Kigali-Rwanda
- Ministry of Infrastructure (2010). National Policy and Strategy for Water Supply and Sanitation Services, Annual Report, Rwanda
- Ministry of Infrastructure (2011). Development of walking and cycling facilities for urban and semi-urban on classified national road network of Rwanda, Concept paper
- National Institute of Statistics of Rwanda (NISR) 2013 Report, Government printer, Kigali-Rwanda
- Niyonsaba Maximilien (2013). Design, Costing and Feasibility of Bukaba Micro-Hydro Power Plant: Rwanda Electrification Rural Electrification: Case Study. Unpublished Msc Thesis at Royal Institute of Technology, Stockholm, Sweden.
- Rwanda Development Board (2014). Annual Report, Government printer, Kigali-Rwanda
- United Nations (2014). Services Policy Review in Rwanda. Paper presented in the Conference ‘‘On Trade and Development’’ scheduled in Rwanda.
- World Bank (2005). Private Solutions for Infrastructure in Rwanda. Country Framework Report, Washington, DC
- World Bank (2006). Building Capacities for Public Private Partnership, Report overview, Rwanda