

ASSESSING THE POTENTIAL BENEFITS OF ROAD INFRASTRUCTURE DEVELOPMENT FOR POVERTY ALLEVIATION: LESSONS LEARNT FROM DEVELOPING ECONOMIES

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ABSTRACT

Poverty remains a critical challenge in developing economies, as presented in the Sustainable Development Goals. The South African government, in particular, has undertaken a number of initiatives to alleviate poverty. However, a symbiotic relationship can be created when infrastructure development and poverty alleviation are considered in unison. A clear distinction needs to be drawn between urban and rural road transport infrastructure development and the associated benefits for these differing contexts.

This study investigates the potential benefit that road transport infrastructure development has for poverty alleviation. The study was qualitative in nature and made extensive use of secondary sources, particularly focused on research from developing economies. Furthermore, an inductive research approach was followed. The contribution of the research is a theoretical overview of the potential benefits road infrastructure development has on prevailing and future poverty levels, from an emerging economies lens.

Results indicate a strong positive relationship between road infrastructure development and poverty alleviation. Both direct and indirect poverty-related benefits can be associated with this type of investment. In particular, the investment does not only result in the creation of job opportunities, but also has associated effects on standards of living, market accessibility, community development and local growth rates.

1 INTRODUCTION

1.1 Background

Poverty remains a challenge in the South African context. Poverty most commonly manifests itself in low income, poor health, low levels of education and feelings of hopelessness (Motloug & Mears, 2002:531). Investment in infrastructure plays an important role in addressing economic deprivation (Khumalo, 2013:5644). Particularly, investments in road infrastructure development carry significant

importance for the integrated development of a country. New road infrastructure is generally driven and financed by public funding due to road infrastructure being considered a public good, which should be equally accessible to all (Glavan, 2008:48). This means that the nature of road infrastructure development is not only beneficial for business, but also in creating a common good for a country's residents.

The importance of transport infrastructure is different in rural and urban areas. In rural areas, transport mainly plays an important role in promoting agricultural production and commercialisation. A reliable transport system in rural areas significantly reduces shipping costs of agricultural products, as well as increasing the distance to arable land. It has also been noted that economic interactions are in closer proximity in urban areas, as this allows more efficient use of space due to ease of access to nearby public facilities, employment opportunities and housing (Seetanah, 2012:62).

While a government should be the driving force behind maintaining and developing road infrastructure, it is concerning to note that too often development and maintenance are neglected, mainly due to lack of coordinated planning and funding (Bratland, 2010:40). This implies that a lack of investment in, and maintenance of, road infrastructure negatively affects the prospect of furthering the common good.

1.2 Methodology

The study was qualitative in nature and made extensive use of secondary sources, primarily in the form of articles and case studies on the effects of road infrastructure development on poverty alleviation in developing economies around the world, mainly outside of South Africa. The study further followed an inductive research approach as observations were made from researched articles and cases, and common patterns then described. Where studies were not found based on the below-mentioned criteria, purposive sampling was followed. Data was analysed by means of content analysis. The search for cases and articles included the following inclusion criteria:

- having been performed in a developing economy, primarily outside of South Africa
- having been performed in an urban or rural setting
- including elements of road infrastructure development and/or maintenance
- indicating direct and/or indirect effects of road infrastructure investment on poverty levels and/or standards of living

Exclusion criteria included for the studies:

- having been performed in a developed and/or 1st world economy
- purely focusing on general infrastructure development, e.g. electricity and water

1.3 Research Aims

This paper aims to provide an assessment of the potential benefits road infrastructure development has for poverty alleviation, by means of reviewing literature, as well as studies from developing economies, primarily from outside of South Africa. The study further aims to provide recommendations for policymakers based on the lessons learnt from other developing economies.

2 LITERATURE REVIEW

The below literature review aims to outline the nature of transport infrastructure, the lessons learnt from emerging economies, as well as an overview of poverty alleviation goals in South Africa.

2.1 Nature of transport Infrastructure

Transport infrastructure play a vital role in a country's development, since it connects different regions of a country (Cuciureanu, 2012:155). According to Ivanova & Masarova (2013:264), road infrastructure constitutes "all types of roads in a given area, including various structures and generally serves to transport passengers and goods. It further comprises of all road categories, facilities, structures, signage, markings and electrical systems needed for safe, trouble free and efficient traffic". In addition, transport infrastructure directly improves standards of living of all income groups.

Worldwide, there exists consensus that infrastructure holds the key to improving standards of living. In particular, a well-developed transport infrastructure is associated with improved access to markets and services, but also positively affects income levels due to lower transport costs. This also has a positive impact on the pricing of consumer goods and services (Gannon & Liu, 1997:11).

Perkins (2010:24) indicates that economic infrastructure includes investments in related services that raise the productivity of other types of physical capital such as transport, power, water systems, and communication on one hand. On the other hand, social infrastructure includes investments that increase the productivity of human capital, such as education and health.

Bayes (2014:2) states that public investment in road infrastructure attracts additional investment from the private sector in the form of "investment in trade and business, transport services and enabled mobility of the factors of production". The benefits of investment in road infrastructure, particularly in rural areas, are therefore amplified through private investment. Glavan (2008:51) further argues that while the development of road infrastructure can be privatised, with an expectation of profit from the developers by means of construction profit or tolling, the nature of road infrastructure development is one that serves a common good, which can not always be monetised depending on the circumstances a country finds itself in.

2.2 State of Road Transport Infrastructure in South Africa

The Development Bank of Southern Africa (2014:47) states that South Africa has a total road network of 153,719km of paved roads and 593,259km of gravel roads. While South Africa has a large road network, the state of road infrastructure is concerning. Close to 50% of paved roads in KwaZulu-Natal are regarded as being in poor or very poor condition, closely followed by Mpumalanga, North West and the Eastern Cape (Development Bank of Southern Africa, 2014:49). The impact is that road user costs are twice as high for roads in poor condition, when compared to roads in good condition. Further, the costs to repair roads are estimated to be seven times higher than if regular and appropriate maintenance had been done

(Automobile Association, 2000 cited in Development Bank of Southern Africa, 2014:50).

The Development Bank of Southern Africa (2014:51) also highlighted the huge backlog in road infrastructure maintenance and investment in South Africa, together with the need to establish a dedicated road fund in order to allocate scarce resources more efficiently and effectively. In fact, the Minister of Economic Development, Ebrahim Patel, announced in a media briefing in March 2013 that the South African road maintenance programme included maintenance of 21,000km of roads, which culminated in the creation of thousands of job opportunities, a factor positively impacting poverty by enabling economic contribution.

The Presidential Infrastructure Coordinating Committee concluded that one of the main barriers to job creation is lack of infrastructure, in particular lack of road infrastructure which inhibits market accessibility. As a result, 645 infrastructure projects are currently underway in South Africa to improve this situation (Mostert & van Heerden, 2015:228). Mostert & van Heerden (2015:228) further explain that the transport of minerals on South African roads is damaging the road infrastructure. As a result, a conscious investment is being made to invest additional funds into rail infrastructure in order to save on the maintenance of road infrastructure. Additionally, Massey (2013:606) mentions that the development of road infrastructure is lacking in informal settlements, with the result that movements are generally restricted after dark, due to unsafe conditions. This impacts the quality of life of residents in informal settlements.

2.3 Poverty alleviation

Poverty alleviation primarily refers to the combatting of poverty by means of targeted policy interventions, addressing structural and social inequalities, as well as addressing the causes of poverty (Khumalo, 2013:5644). Further, poverty alleviation efforts can target absolute or relative poverty. The lack of access to basic necessities is referred to as absolute poverty, while the comparatively lower standard of living of a population group is referred to as relative poverty (Khumalo, 2013:5644).

Sachs (2012:2206) explains that the Millennium Development Goals (MDG) were created as part of a global effort to address social issues worldwide, such as hunger, poverty, lack of schooling, disease and inequality. While developing nations have made substantial progress in meeting some of the goals, a need arose to create long-lasting benefits of these efforts. In response to this need, the Sustainable Development Goals were created which follow a triple bottom-line approach and aim to create a sustainable benefit trajectory based on collaborative intergovernmental efforts. This is in stark contrast to the MDG which were mainly achieved by rich countries providing financial assistance to poorer countries (Sachs, 2012:2208)

Nicolson (2015:1) cites a 2015 report by the World Bank, which suggests that the poverty rate in South Africa is improving due to progressive and targeted government spending, which has allowed around 3.6 million people to be lifted out of poverty. Therefore, the poverty rate dropped from 46.2% to 39% (Nicolson, 2015:1).

While South Africa has been a democracy for 22 years in 2016, challenges such as poverty, high unemployment rates and social inequality remain. As a result, the government adopted the New Path Growth policy to address structural challenges. The policy aims to create a minimum of five million jobs by 2020. This will be achieved by addressing structural problems in the economy and focusing on industries which are regarded as job drivers. Infrastructure spend is one such job driver (Presidential Infrastructure Coordinating Commission, 2012:7).

The National Infrastructure plan was introduced in 2012, with the aim of transforming South Africa's economic landscape. One primary aim of the plan is job creation and improvement in service delivery. To achieve these goals, the government is investing R827 billion in new and existing infrastructure. The investment is also focused on transport infrastructure, ports of entry, electricity generating capacity and improving other public facilities. The aim is to promote economic growth in South Africa (Presidential Infrastructure Coordinating Commission, 2012).

2.4 Lessons from emerging economies

2.4.1 African studies

Seetanah (2012:60) investigated data from 21 African economies for the period 1980-2007. The author explains that road infrastructure development has both direct and indirect benefits. Indirectly, an investment in road infrastructure spurs economic growth. Directly, Seetanah (2012:62) states that "roads link the rural population to the economic mainstream, thus making the poor better off through increased agricultural outputs and income, and improved living conditions". Additionally, Seetanah (2012:62) proposes that improved road infrastructure allows the population in rural areas to access better quality education and health facilities. More directly, the construction and inherent maintenance of road infrastructure generates job opportunities.

In a study of 15 Sub-Saharan African countries, Shalini, Boopen & Rojid (2009:7) found that out all the various types of infrastructure investment, investment in road infrastructure, directly correlated to the length of the upgraded road, had the biggest impact on poverty alleviation. Improved road infrastructure yielded several benefits in this study. Firstly, road infrastructure gives the rural poor access to major economic nodes with many job opportunities, as the primary mode of transport was changed from walking to public transport. Secondly, the construction of new roads creates job opportunities.

Notably, the rural poor benefit more from road infrastructure investments than the urban poor, as the former group is growing off a lower baseline (Shalini, Boopen & Rojid, 2009:9). Mostert & van Heerden (2015:230) concur with this finding by stating that the improved provision of road infrastructure will ease access to markets and other services.

2.4.2 Asian studies

A number of studies were conducted in Asia on the impact road infrastructure investment has on poverty, Fan, Zhang & Zhang (2002:1) explain that in China, road investment over the period 1970-1997 reduced poverty by increasing non-

agricultural employment, as well increasing agricultural productivity. Further, Jalan and Ravallion (2002:338) found in Chinese studies that for every 1% increase in road length, household consumption rose by 0.08%. Jie (2015:2) also investigated the effects of road infrastructure on poverty alleviation in rural China. Despite the fact that China is the second-largest economy in the world, its population represents half of the total poor in the whole world. The study concluded that investments in road infrastructure development projects have a positive impact and significant effect on the per capita income of people living in rural areas in China. In addition, the researcher also highlighted the fact that building road infrastructure is not a unique solution in order to alleviate poverty. However, an integrated rural road network would enable higher economic growth by reducing transport cost and stimulating the local economy as villagers now have more opportunities to see the outside world. In another study conducted in China, Fan & Kang (2005:67-68) discovered that for every 1 million yuan invested in road infrastructure, 13 rural poor households are raised above the poverty line. Also, every million yuan invested in low-quality roads yielded an even greater benefit by raising 161 rural poor above the poverty line.

The Asia News Monitor (2010:1) reported that investments from the Asian Development Bank in road infrastructure in Bangladesh have resulted in numerous benefits for the poor, most notably by reducing household transport costs, providing access to higher-paying industries and improving crop profitability owing to lower transport costs. Furthermore, well developed all-weather roads in Bangladesh have also resulted in the creation of paved trading areas, as well as reduced the impact of extreme weather events due to improved road drainage systems. Additionally, Jacoby (2000:22) found in a study in Nepal that investment in road infrastructure alleviated poverty by connecting mainly agricultural rural areas to the markets they serve.

Ali and Pernia (2003:3) confirm in an Indonesian study that the benefits of infrastructure investment and development can be split into direct and indirect categories. Direct benefits include increased wages through job creation required for infrastructure projects, while indirect benefits generally include rural economic growth. Lastly, the increase in income and associated consumption of the poor has a profound impact on poverty reduction as standards of living are increased. Ali and Pernia (2003:4) also state that road infrastructure investment is directly correlated to agricultural & non-agricultural productivity, as well as non-agricultural employment levels. These can be classed as direct areas of influence. Further, a 1% improvement in roads infrastructure development is directly associated with a 0.11% increase in the poor's income. In addition, the study highlighted the fact that provincial roads appeared to directly improve the employment and wages of the poor due to the fact that a 1% increase in road investment project was associated with a 0.3% drop in poverty incidence over a five year period (Ali & Pernia, 2003:5).

The Financial Express (2012:2) reported that in Bangladesh, China and India, marketing of inputs and outputs were much more pronounced in areas with good and improved road infrastructure, when compared to areas with poor road infrastructure. Furthermore, villages in Bangladesh with improved road infrastructure showed lower overall levels of extreme poverty. A trade-off situation however exists. The Financial Express (2012:1) reported that road maintenance and upkeep is often being neglected due to a focus on construction of new roads. This implies that the benefits

of road infrastructure investment are eroded over a period of time due to lack of investment in road maintenance. Gannon and Liu (1997:9) expand on the benefits of developing a good road infrastructure and outline the following main benefits, namely “the transporting passengers and carrying goods regardless of distance directly to a destination, the relatively high speed and no time restrictions. Therefore, road transport and its infrastructure enable to carry people as well as raw materials, materials, semi-finished and finished products intended for sale”.

2.4.3 Latin-America & Caribbean & other studies

Jaitman (2015:12) found that Latin-America and the Caribbean had a very low road density when compared to other developing nations in the world. The impact is that the rural poor lack convenient and easy access to markets, job opportunities and healthcare services. Paradoxically, the well-developed road infrastructure in urban areas has led to intense traffic congestion, which is creating economic barriers for the urban population (Jaitman, 2015:13).

Gonzalez-Navarro and Quintana-Domeque (2010:2) found in a Mexican study that an investment in paved areas along improved main roads led to increased investment in the upgrading of homes along the paved areas, as well as increased levels of motor vehicle purchases. This had a direct benefit in improving standards of living, as well as creating job opportunities in the upgrading of homes.

As an emerging economy in the recently liberated cluster of Eastern Europe, the Czech Republic invested in their road infrastructure. Lehovec (2004:31) outlines the benefits of this investment by stating that investments in new infrastructure can have both indirect and direct benefits on socioeconomic territorial development. Indirect benefits include the following: a greater number of job opportunities, setting limits for sustainable territorial development, improved territorial access for the tourist trade and population leisure time, increased economic power of municipalities due to better accessibility to transport, growth in the value of a territory due to the creation of commercial and industrial zones in one hand. On the other hand, direct benefits include the following: time economies, energy (fuel) economies, reduced vehicle wear and reduced accident rates.

2.4.4 Summary of Findings

The below table summarises the key findings of studies from developing economies on road infrastructure investment and its effects on poverty alleviation.

Table 1: Summary of Benefits of road infrastructure investment

Year	Author	Benefit derived	Country
1997	Gannon & Liu	<ul style="list-style-type: none"> ▪ Lower price of consumer goods ▪ Enhances accessibility of services 	China
2000	Jacoby	<ul style="list-style-type: none"> ▪ Enhanced market access for agricultural producers 	Nepal
2002	Fan, Zhang & Zhang	<ul style="list-style-type: none"> ▪ Increase non-agricultural employment, increase in agricultural Productivity 	China

2003	Ali & Pernia	<ul style="list-style-type: none"> ▪ GDP growth ▪ Job creation during road construction ▪ Economic growth ▪ Increase in disposable income 	Indonesia Philippines
2004	Lehovec	<ul style="list-style-type: none"> ▪ Territorial benefit ▪ Increase in tourism ▪ Job creation ▪ Creation of commercial zones ▪ Reduced accident rates 	Czech Republic
2009	Shalini, Boopen & Rojid	<ul style="list-style-type: none"> ▪ Enhanced market accessibility for the poor ▪ Job creation during road construction 	Benin, Burundi, Cameroon, Gambia, Ghana, Kenya, Mauritius, Niger, Nigeria, Senegal, South Africa, Tanzania, Uganda, Zambia and Zimbabwe.
2010	Asia News Monitor	<ul style="list-style-type: none"> ▪ Reduced transport cost ▪ Enhanced market access ▪ Increase in trading activities adjacent to roads 	Bangladesh
2010	Gonzalez-Navarro & Quintana-Domeque	<ul style="list-style-type: none"> ▪ Purchase of motor vehicles (increased mobility). ▪ Rise in property values 	Mexico
2012	Cuciureanu	<ul style="list-style-type: none"> ▪ Link areas of economic activity 	Romania
2012	Seetanah	<ul style="list-style-type: none"> ▪ Increase in economic growth ▪ Improved living conditions ▪ Enhanced accessibility to employment opportunities ▪ Enhanced accessibility to health services ▪ Enhanced accessibility to education 	Benin, Burkina Faso, Burundi, Cameroon, Egypt, Ethiopia, Gambia, Ghana, Kenya, Madagascar, Malawi, Mauritius, Niger, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia, Zimbabwe.
2012	Financial Express	<ul style="list-style-type: none"> ▪ Improved marketing of factors of production 	Bangladesh, China, India
2014	Rahman	<ul style="list-style-type: none"> ▪ Reduction of marketing costs ▪ Reduction of transport costs ▪ Lower input costs ▪ Improved market accessibility 	Bangladesh
2015	Jie	<ul style="list-style-type: none"> ▪ Increased per capita income ▪ Improved market accessibility for the poor 	China
2015	Jaitman	<ul style="list-style-type: none"> ▪ Improved access to markets ▪ Access to job opportunities ▪ Access to healthcare services 	Latin-America & the Carribean

Source: Authors' compilation

3 CONCLUSION AND RECOMMENDATIONS

This study aimed to assess the potential benefits road infrastructure investment holds for poverty alleviation in developing economies, primarily outside of South Africa. The focus on countries other than South Africa allowed the researchers to investigate the lessons other developing nations have learnt, and apply these to the South African context. A number of studies from select developing economies were investigated and all noted a positive relationship between road infrastructure development and poverty alleviation. This relationship takes the form of direct and indirect benefits for urban and rural area households. Findings show that the benefits are more pronounced for rural households, as these are developing off a lower standard of living, when compared to their urban counterparts.

It is important that road infrastructure upkeep and maintenance is not neglected due to a focus on constructing new roads, as this over time reversed the benefits brought on by the initial investment. Further, the greatest benefits are experienced when road infrastructure investments are made in rural areas. This implies that government planning departments should prioritise investment in road infrastructure in rural areas as this is where the plight of the poor is directly addressed, mainly in the form of providing market & service access, lowering of transport costs and facilitating economic growth. The relevant bodies responsible for road infrastructure planning, maintenance and development should focus on upgrading existing gravel roads to tarred roads, as currently the overwhelming majority of roads are unpaved. This will further lead to job creation, thereby positively affecting poverty and stimulating economic growth.

It is further recommended that the private sector is consulted and involved when new road infrastructure is planned, as research has shown that private sector investment tends to follow public road infrastructure investment. This will allow governments, and the private sector, to maximise the benefits derived from these investments. In addition, stakeholders involved in road planning activities should map which areas would derive the most benefit from being linked to economic zones/hubs. When considering the purpose of the Millennium and Sustainable Development Goals, it is further recommended that development of road infrastructure is prioritised in areas where a lack of health and education services exists.

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