

APPROACHES TO TRANSITION INTO TRANSPORT INFRASTRUCTURE PROVISION AND MANAGEMENT

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ABSTRACT

South Africa has been engaging in multibillion rand transport infrastructure planning and construction projects that have the potential to spur the economy into generating significant growth. These mega-projects were conceptualized by government and private sector with the intent of unlocking economic opportunities within the transport infrastructure mainstream. Such initiatives lead to accelerated investments in large infrastructure projects such as for example the Gautrain rapid rail link and other mega projects.

The future success of South Africa's transport economy depends on how the country thinks about unlocking opportunities. This thinking need to consider the manner in which procurement processes are done, and how the delivering of infrastructure takes place in order to create opportunities for funding leveraging existing capacity and resources for such projects. A paradigm shift in thinking about how South Africa invests in large infrastructure projects can create a stable and credible environment in the transport sector that can generate and stimulate local job creation in the future.

This paper considers the provision and management of transport infrastructure projects in the long-term and explores the relationships needed between various critical stakeholders for large infrastructure projects to flourish. It is critical that decision-makers embark on clearly crafted plans that outline long-term management of projects that are able to provide a conducive and enabling environment for successfully rolling out transport infrastructure projects.

1. INTRODUCTION

Transport infrastructure provision is a fixed component of the transport system. Transport infrastructure provides economic and physical space that provides opportunities for social and economic activities that enable development. As such, there is a need for effective management systems or models that focus on innovative advances, through collective efforts by relevant stakeholders. Stakeholders include for example the construction industry, government and private sector (Blauwens, de Baere & Van de Voorde, 2008). Generally speaking, infrastructure that is designed, constructed and functioning without collective efforts makes no success since it happens with partial waste of potential resources (Gutman, Sy & Chattopadhyaya, 2015).

2. BACKGROUND

2.1. Transport infrastructure for economic and social development

The transport system is the backbone of the global economy and infrastructural components contribute to economic growth and sustainability in a country (Schuckmann, Gnatzy, Darkow, & von der Gracht, 2012). Literature highlights the wider impacts of transport infrastructure such as reducing the cost of doing business, thereby facilitating economies of scale as well as trade liberalization. The transport infrastructure system is a network, made-up of several routes that are connecting numerous terminals (Clevenger, Ozbek & Simpson, 2013). This infrastructure system together with vehicles that circulate on it and the transport of passengers or cargo forms the transportation system (Blauwens, De Baere, & Van de Voorde, 2008).

Transport infrastructure includes transportation lines, roads and highways; road interchanges and overpass bridges and tunnels; railway tracks, terminals, logistics centres and other constructions that ensure effective and safe operation during the transportation of passengers and freight consignments (Petrov, 2014).

2.2. Investment and management of transportation infrastructure

Investment in transport infrastructure is widely regarded as an essential vehicle for promoting economic growth. Moreover, infrastructure management has a critical and often irreversible role in locking the patterns of development (Moodely, 2018).

Transportation infrastructure provision and management involve long-term investments and huge financial resources. Looking at transport infrastructure provision and the long life span of infrastructure means that there is a need to adopt a long-term perspective that provides a balance between quality of transport infrastructure provision and its management.

Meadows et al (2012) emphasise that investment in transport infrastructure projects should correspond with the principles of a future sustainable society. Further, the provision of transport infrastructure need to be attributed to the formation of sound management models to achieve sustainable economies based on the principles of efficiency and effectiveness (Petrov, 2014). Under an economic perspective, transport infrastructure management and provision are essential modules that can potentially impact positively on the economics of the infrastructure system. These investments require serious consideration pertaining to planning and skills composition (Moodley, 2018). Hence, its involvement in achieving sustainable development efforts is essential.

In order to meet the needs towards sustainable development, sustainability assessment systems have been implemented by the construction industry (Clevenger et al., 2013). Recently, several sustainability infrastructure assessment systems have been developed or are under development to measure the sustainability of infrastructure projects (Clevenger et al., 2013; Lim, 2009). These systems are usually created by governmental institutions, non-governmental institutions, and sometimes in collaboration with academia, in order to measure the development impact emanating from investments. Surprisingly little is known about the history of transportation infrastructure provision in Africa, even though it represents a substantial investment. Transport infrastructure accounted for 14%

of World Bank lending and 22% of African Development Bank disbursements between 2012-2015 (World Bank, 2016; African Development Bank, 2012-2015).

The National Development Plan 2030 requires public transport infrastructure and systems to be supported by road-based services including the renewal of commuter rail fleet. This means the country is required to spend 10 percent of the gross domestic product (GDP) on public infrastructure investment in order to grow the economy and create employment. Further, the Infrastructure Development Act 23 of 2014 makes provision for the coordination of public infrastructure development and provision which support social and economic development. This ensures that priority is given in planning, approval and implementation processes to improve the management and provision of such infrastructure.

In the past decade, there has been a substantial increase in transport infrastructure investment, with many African countries initiating high profile transportation infrastructure projects including the rehabilitation of existing roads and building new ones (The Economist, 2015). These investments have been enabled by stable growth after the year 2000, and relatively low debt levels. Gutman et al (2015) maintain that there has been important external funding from private partnerships and China which played an important role, each tripling between 2004 and 2012. This led to an expectation from government and funding agencies that there would be transformative results.

The important role of transport infrastructure provision and its management is confirmed in reducing the cost of doing business, thereby facilitating economies of scale as well as knowledge accumulation. There was also some consideration of limiting effect that inadequate transport infrastructure can have on economic growth.

3. PROBLEM STATEMENT

This research paper explores the manner in which infrastructure provision can affect an economy's growth rate and how the management mechanisms can ensure its long-term existence.

Only government have the necessary long-term vision and resources to engage in projects that will have a return on investment, over time. Secondly, only government is potentially large enough to afford the financial requirements that are needed for infrastructure provision. Regardless of the above-mentioned, governments have proved to not be the best actors to efficiently manage transport infrastructure.

4. PURPOSE OF THE INVESTIGATION

The purpose of this paper is to provide an overview of the role that transport projects can play in the transitioning and management of the transport infrastructure provision.

The aim of this is two-fold:

- i) To look at the provision and management of transport infrastructure projects in the long-term.
- ii) To identify approaches to achieve going forward between various critical stakeholders.

5. METHODOLOGY

A stakeholder workshop was held on the 20 September 2018 following the completion of the CSIR Parliamentary Grant project. The reason for undertaking this process was to establish the current state of infrastructure provision and management with respect to transport infrastructure projects. The purpose was to get perceptions from experts on the issues and the processes followed to do planning for long-term infrastructure provision and management as well as identifying approaches that can facilitate more effective stakeholder relations.

Delegates highlighted the need to have a common approach for the provision infrastructure. This common approach need to enable long-term solutions towards infrastructure planning and delivery. Of course, such long-term planning requires a proper commitment between government and private sector.

It was made clear that the research should consider both the provision and management part of infrastructure provision. In particular, questions were asked about the number of projects planned but never implemented in relation to availability of allocated resources. The research team was therefore requested to consider various approaches that can be adopted to realize the provision and management of infrastructure.

The research used two approaches. These include:

A literature review that consists of (i) theoretical literature obtained from academic material and (ii) face-to-face interviews with experts within transport industry. The experts were chosen according to the following criteria:

- i) Their recognition in the industry based on knowledge and skills.
- ii) Their willingness to engage with the research team.
- iii) Their representation from different organisations.

6. RESULTS AND DISCUSSIONS

6.1. Industry representatives' analysis

Figure 1 below indicates the number of responses received from the industry representatives regarding the state of current transport infrastructure.

More than 20 respondents believed that existing transport infrastructure would boost South Africa's ailing economy if it can be utilised and managed properly. This follows after a serious concern was raised that although the transport infrastructure is managed but the infrastructure is not maintained at a satisfactory level. More efforts and resources are required to keep the infrastructure network in good condition.

Table 1 below provides an overview of responses to questions (from the questionnaire). Twenty five (25) industry representatives were selected and interviewed in order to get an understanding of the state of transport infrastructure provision and management thereof in the country. The general feeling amongst the transport practitioners and other experts are that there is good transport infrastructure available to stimulate the economic growth. Routine maintenance is required to keep the infrastructure in a good condition.

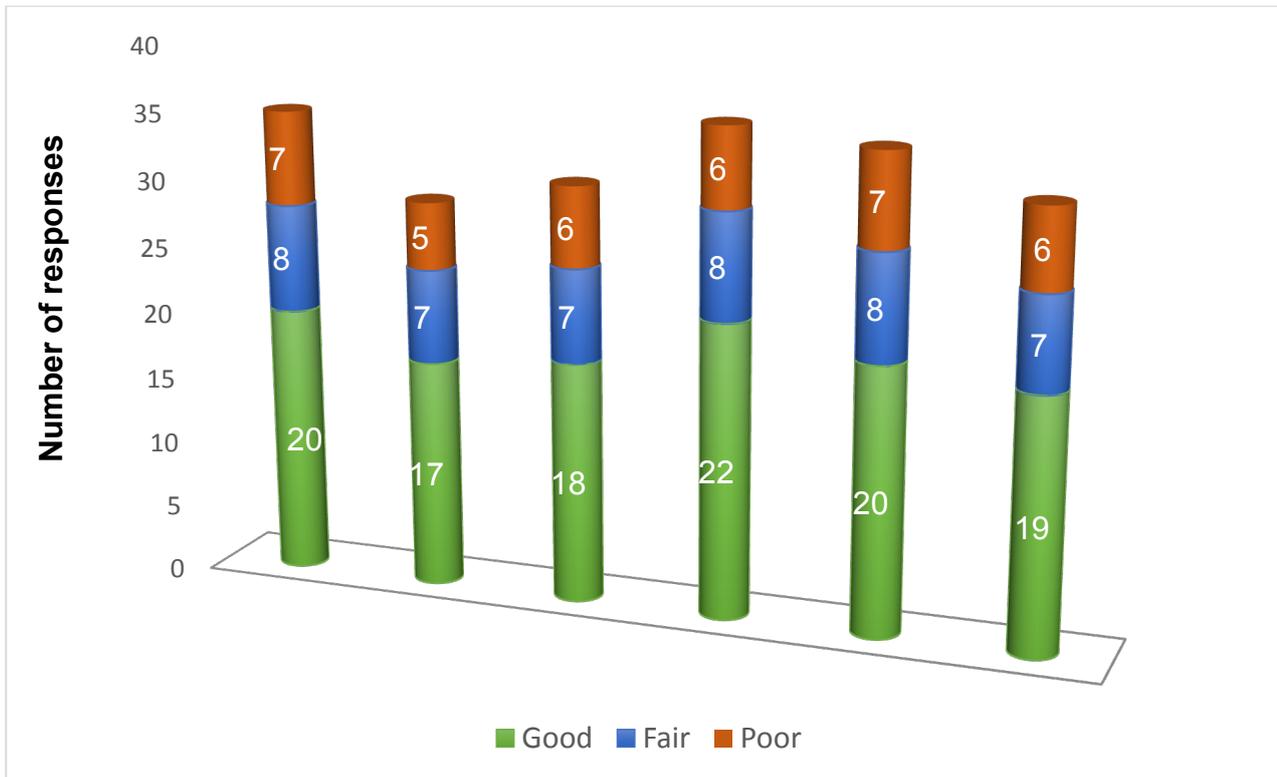


Figure 1: Number of responses from industry

Table 1: Number of responses from representatives

Questions	Good	Fair	Bad
What is the condition of infrastructure in South Africa?	20	8	7
Construction done properly?	17	7	5
Is it managed properly?	18	7	6
Is it properly maintained?	15	8	6
Does it boost our economy?	20	8	7
Is it sufficient for the country?	19	7	6

6.2. Industry experts' analysis

Figure 2 below provides an overview of the responses obtained from interactions with transport industry experts from public, private and academic sectors respectively.

Forty three (43) industry experts participated. Respondents felt that that the country has sustainable funding options to maintain transport infrastructure but these resources need to be used efficiently.

There is enough capability to plan and implement the infrastructure but interventions are needed as some spheres of government where there is a need to improve planning and implementation approaches. The fact that the government is not able to deliver required

transport infrastructure during difficult economic conditions, suggests that it is crucial to find alternative measures that will accelerate transport infrastructure provision. More than 20 respondents emphasized that it has become increasingly popular to finance public transport infrastructure through public-private partnership methods. This has been a practice around the world and it has yielded value for money.

These industry experts from the construction and built environment conceded that it is critical for government to clearly plan and outline how it intends to drive its long-term approach to transport infrastructure roll-out. What is needed is a significant commitment and investment from both private sector and government to realize it. This should be based on credible and long-term solutions to curtail the surge of loss being inflicted on many legitimate large and small contractors which depends entirely on infrastructure spend for many years, and which have been left to survive in the mega-project vacuum.

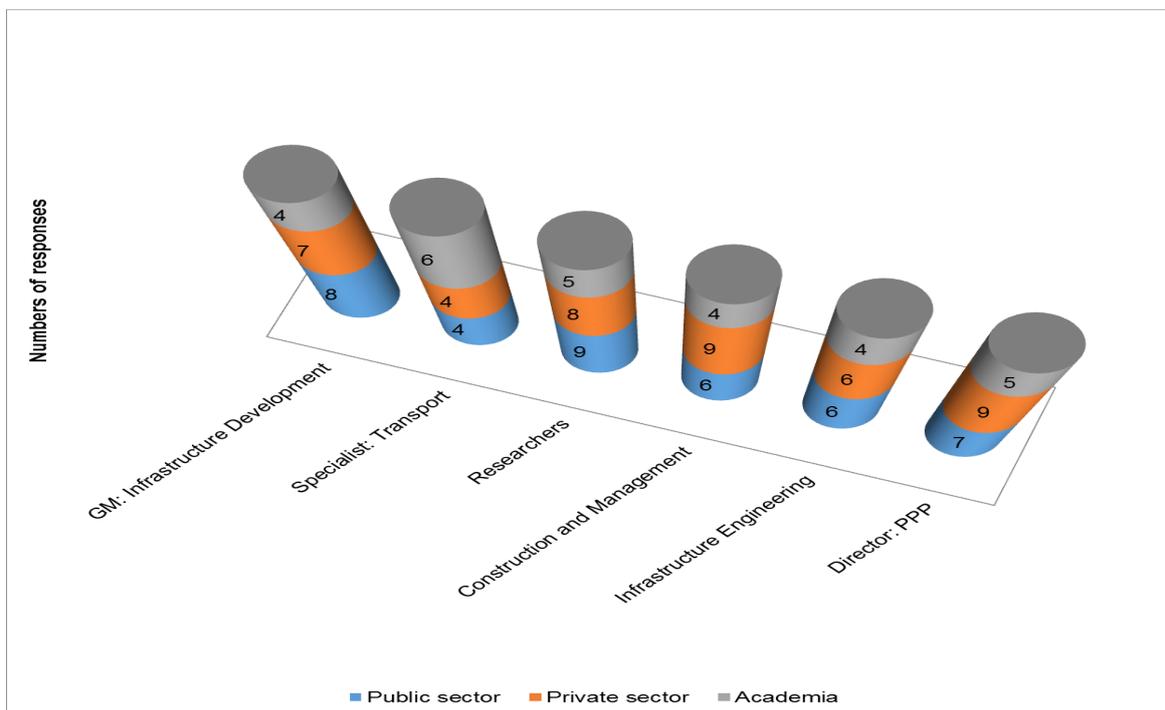


Figure 2: Number of responses from experts

7. SUGGESTIONS TO IMPROVE TRANSPORT INFRASTRUCTURE PROVISION AND MANAGEMENT

The discussions and analysis of data from the select industry representatives led to the conclusion that transport infrastructure provision and its management requires robust interactions in terms of sustainability and resilience from stakeholders. There has been a common understanding that a certain direction and approach needs to be adopted in order to transit into better ways of managing and providing transport infrastructure.

The following approaches can be adopted to implement better infrastructure projects:

- i) Encourage combination of skills sets from the public and private sector authorities towards implementation of quality projects.
- ii) Have experts on the economic, financial and social sector that can influence necessity of the state participation to define the project implementation conditions.
- iii) Increase technological uniqueness and innovation to minimise long term risk.

- iv) Encourage interactions between numerous participants during project implementation to enhance capacity building.

There are also new opportunities which transportation infrastructure managers must exploit including emerging technologies, advanced tools for analytics and knowledge from other disciplines. The future life-cycle of transport infrastructure management will be guided in part by how we address the evolving challenges and harness the power of expanding opportunities.

8. CONCLUSION

This paper (1) explored the provision and management of transport infrastructure projects in the long-term, and (2) proposed an approach to facilitate interactions between various stakeholders. It is therefore critical that decision-makers embark on clearly crafted plans and outlines how they intend to rollout such long-term plans successfully.

Transport infrastructure is a functional and service oriented subsystem which in the value chain influences the activities of various economic systems into integrated development. The future of sustainable transport infrastructure provision will be achieved by how well the evolving challenges are addressed and by harnessing the power of expanding opportunities.

The country is currently striving to build adequate capacity in order to serve the demand and supply of any services that require movement of goods and services. Nonetheless, the quality of this available transportation infrastructure must be improved. This will require concerted efforts from various stakeholders to work together to achieve a sustainable transport system.

This will also require maintenance practices to be improved substantially for the benefit of the economy at large. Such sustainability can serve as a yardstick upon which transport practitioners can measure the planning and implementation of future infrastructure provision. Further, there is a common understanding that the country needs the right set of mind-set to achieve a sustainable transport system rather than more funding. This suggests the need to conceptualise transport projects guided by resource capacity and need assessment plans.

As a country we are moving closer to the smart transport environment and infrastructure managers must be able to manage the physical condition of transport infrastructure in order to facilitate timely and cost-effective interventions that will preserve the physical and operational integrity of systems. The analysis indicates that there is an adequate existing portfolio of transport infrastructure in the country. This portfolio paves the way for to transition into better ways and methods of providing the state of transport infrastructure that is needed for social and economic development.

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