Sustainable transport and intermodal solutions for urban growth and development: A case study of the Integrated Gauteng Transport Master Plan 2025.

Study Leader: Prof. CB Schoeman

C. Beytell : 21152578

November 2012

Sustainable transport and intermodal solutions for urban growth and development: A case study of the Integrated Gauteng Transport Master Plan 2025.

C. Beytell

21152578

Planning project submitted for partial fulfillment of the requirements for the degree of

Magister Artium et Scientiae (Planning) at North-West University

(Potchefstroom Campus)

Study leader

Prof. CB Schoeman

November 2012

Recognitions

Special note of gratitude must be made of the persons who aided in and informed the research conducted, without whom many of the conclusions drawn and recommendations made would have been impossible.

Special acknowledgement is warranted for:

- Study leader, Professor CB Schoeman, of the North-West University for his patience, consideration and contributions in the evaluation of the research conducted - I truly appreciate everything you've done.
- Thanks to all the people and organisations that contributed to the study.
- To my family and friends, thank you for your unfailing love, encouragement and enthusiasm.
- Fellow students, thank you all for the support, encouragement and assistance when needed.

Thank you all for contributing to the successful completion of this document.

Abstract

"Our next step is the future, but the future is here and now."

We live in a constantly changing world, with a continuous change in urban growth and development. There has been a significant growth in freight traffic over the last few decades. The development of road transport, which contributes to air pollution, noise, congestion, and safety concerns, is particularly a concern in South Africa, where freight traffic is concentrated on a limited number of routes and where topography results in the limited spreading of pollutions.

High national freight logistics costs, major road infrastructure challenges and environmental impact concerns of a road conquered freight transport market have fuelled this study's interest in intermodal transport solutions. Concerns of planning for sustainable and intermodal development have incited this study to reach a consensus surrounding the necessity of balancing the use of different transportation modes, and in particular, increasing rail mode share.

The issue of sustainable intermodal transport in South Africa is very critical due to the expansion of cities and that people do not pay attention to all aspects such as the significance of the environment, economy and social structures. Some challenges include high demand, inefficient and inadequate terminal and rail systems, high fuel costs, limited collaboration, process inefficiencies and skills shortages. The field of sustainable development can be conceptually broken into three legs: environmental protection, economic sustainability and social justice. The transport sector in South Africa runs at a significant cost to road infrastructure, resources and the environment.

This study investigates two corridors namely the Gauteng – Durban and the Gauteng – Cape Town corridors; if these two can be an example of a sustainable intermodal transport network it would reduce a lot of stress from the environment, economies and social activities. Intermodal solutions play an important role in the growth and development of sub-Saharan Africa and the Africa continent as a whole, efficiency-driven transportation systems enable growth and thereby, competitiveness.

Due to the fact that the Gauteng 25 year Integrated Transport Master Plan is still in progress and have not yet been finalised, this study can be a seen as a guideline for freight transport with regards to the final integrated transport master plan. The main aim of this study is to do a investigate sustainable and intermodal transport to determine whether there are an opening-break for this, and to recognise solutions and opportunities in our current postmodern world, to identify what the future (2025) beholds.

"The future lies before you, like paths of pure white snow. Be careful how you tread on it, for every step will show."

Opsomming:

"Ons volgende stap is die toekoms, maar die toekoms is hier en nou."

Ons leef in 'n konstante veranderende wêreld, met 'n deurlopende verandering in stedelike groei en ontwikkeling. Daar is 'n groot groei in vrag vervoer oor die afgelope paar dekades. Die ontwikkeling van padvervoer, wat bydra tot lugbesoedeling, geraas, opeenhoping van verkeer en kommer oor veiligheid, is veral 'n kritiese saak in Suid-Afrika, veral waar vrag vervoer gekonsentreerd voorkom op ‘n beperkte aantal roetes en waar daar ‘n beperkte verspreiding van besoedeling voorkom in die topografie.

Krisis in hoë nasionale vrag logistieke kostes, pad infrastruktuur uitdagings en omgewings impakte in die vrag vervoer mark het hierdie studie se belang in die intermodale vervoer oplossings aangevuur. Kommer ten opsigte van beplanning in volhoubare en intermodale ontwikkeling, het hierdie studie aangevuur om die balansering van verskillende vervoer stelsels, en in besonder, die verhoging van spoor vervoer te ondersoek.

Die kwessie van volhoubare intermodale vervoer in Suid-Afrika is baie krities as gevolg van die uitbreiding van stede en dat mense nie aandag gee aan aspekte soos die betekenis van die omgewing, ekonomie en sosiale strukture nie. Sommige uitdagings sluit in hoë aanvraag, ondoeltreffende en onvoldoende terminale en spoor stelsels, hoë brandstofkoste, beperkte samewerking, ondoeltreffendheid in prosesse en vaardigheids tekorte. Die gebied van volhoubare ontwikkeling kan verdeel word in drie bene: die beskerming van die omgewing, ekonomiese volhoubaarheid en sosiale geregtigheid. Die vervoer sektor in Suid-Afrika loop op 'n beduidende koste vir pad infrastruktuur, hulpbronne en die omgewing.

Hierdie studie ondersoek twee korridors, naamlik die Gauteng-Durban en die Gauteng-Kaapstad korridors, die korridors poog om 'n riglyn van 'n volhoubare intermodale vervoer netwerk te wees, dit sal baie stres verminder op die omgewing, ekonomie en sosiale aspekte. Intermodale oplossings speel 'n belangrike rol in die groei en ontwikkeling van sub-Sahara Afrika en die Afrika-kontinent as 'n geheel, doeltreffende vervoer stelsels kan groei en sodoende mededingendheid verbeter.

As gevolg van die feit dat die Gauteng 25 jaar Geïntegreerde Vervoer Meester Plan nogsteeds in die proses van ontwikkeling is, kan hierdie studie gesien word as 'n riglyn vir vrag vervoer tot die finale geïntegreerde vervoer meester plan. Die hoofdoel van hierdie studie is om ondersoek in te stel om volhoubaarheid en intermodaliteit te bepaal en te identifiseer of daar gapings, oplossings en geleenthede is in ons huidige postmoderne wêreld, en dan te identifiseer wat die toekoms (2025) voorspel.

"Die toekoms lê voor jou, soos paaie van suiwer wit sneeu. Wees versigtig hoe jy trap, omdat elke stap sal wys. "

List of Content:

List of Figures:

List of Tables:

List of Maps:

Terminology, Definitions and Explanations

The following are important definitions of applicable terminology that were used in this study. These definitions have been formulated to relate to the context of the research theme. It refers to existing policy and legal frameworks applicable to the research.

Table 2: Terminology and Explanations

Terms:	Explanation
Corridor	Linear mixed land use element of urban structure which occurs on a series of transportation routes working together. The sphere of influence stretches in a wide band and is characterised by areas of agglomeration
Intermodal	Carriage by more than a single mode, with a transfer between modes, to complete a trip or a freight movement. In passenger transportation intermodal usually refers to trips involving more than one mode. For freight and goods movement, the definition refers to transfers between all freight modes including ships, rail, truck, barge, etc. taken as a system for moving freight. It also refers to the movement of an intermodal container (BEBR, 2003).
Intermodal transport	Transportation movement involving more than one mode (e.g. rail/motor, motor/air, or rail/water). It has been defined as a process of addressing the linkages, interactions and movements between two or more modes of transportation (BEBR, 2003). It is the concept of transporting freight in such a way that all the parts and facets of the transportation process, including information exchange, are efficiently linked and coordinated, offering flexibility, irrespective of the particular transport mode or modes used. It is not just the infrastructure, vehicles, rolling stock or equipment involved, but the management and operation processes.

Spatial Planning	Planning of the way in which different activities, land uses and buildings are located in relation to each other, in terms of distance between them, proximity to each other and the way in which spatial considerations influence and are influenced by economic, social, political, infrastructural and environmental considerations.
Land-use planning	Planning of human activity to ensure that land is put to the optimal use, taking into account the different effects that land-uses can have in relation to social, political, economic and environmental concerns.
Concession	Is the authority and contract to operate a road, rail line, or network at an agreed price. It could be awarded to either the public or private sector.
Framework	Is an outline or skeleton which provides the structure and form around which a plan or policy or strategy is constructed.
Goal	A goal is an idealised end-state of the system or a desired direction of the evolution of the system.
Integrated plans	Plans which encompass a system which includes land use, spatial development, infrastructure, services and the finance thereof.
Issue	An issue arises in a national, district or local community when there are conflicting goals and objectives (desires or perceptions) within the community.
Logistics	Is the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements
Objective	An objective is a target, the attainment of which will help towards reaching a stated goal
Plans and planning	A plan is a product of the process of planning which is an organised method by which things are to be done. In the transport context, a plan is a vision of the desired future condition, a set of objectives to achieve the vision, policies to

	regulate the transport system, strategies, actions and projects to implement the plan and a financial statement and budget.
Policy	A policy is an adopted framework or basis for the action needed to overcome identified problems and achieve stated goals and objectives.
Problem	A problem is an unfulfilled or unattained goal or objective.
Public transport	Is the conveyance of people or freight for reward by any travel mode whether car, metered taxi, minibus-taxi, bus, tram and light and heavy rail.
Seamless transport services	An user-friendly service from origin to destination which is not disrupted by time-consuming or costly transfers between uncoordinated modes or carriers, or by compliance with non-integrated formalities at border crossings
Spatial Planning	Spatial Planning aims to intervene to shape the development outcomes affecting a specific area, whether in a region or a neighbourhood, it is a place-shaping and space-mediating mechanism.
Strategy	A strategy is a plan or programme of action to be taken in terms of a policy. Such action may often take the form of a series of projects.
Sustainable Development	Meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainability	It is about how environmental, economic, and social systems interact to their mutual advantage or disadvantage at various space-based scales of operation.
Vision	A vision is a commonly-shared foresight of future conditions.

Source: Own construction, 2012.

Acronyms

Table 3: Abbreviations

ANPR	Automatic Number Plate Recognition
DoT	Department of Transport
EU	European Union
GIS	Geographic Information System
GPS	Geographic Positioning System
IGTMP	Integrated Gauteng Transport Master Plan
IRRT	Intermodal Rail Road Transport
NATMAP	National Transport Master Plan
NFMF	National Freight Monitoring Framework
SA	South Africa
SADC	Southern African Development Community
SANRAL	South African National Roads Agency Limited
TRANSNET	Transnet Limited, with operational divisions of Autonet, Petronet, Portnet, SAA and Spoornet.
RFID	Radio Frequency Identification Device

Source: Own construction, 2012.