THE STATE OF RURAL TRANSPORT RESEARCH IN SOUTH AFRICA – GAUGING THE POLICY SHIFTS: 1994 – 2014

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ABSTRACT

This paper explores the state of rural transport research in South Africa covering the period 1994 -2014 with a particular focus on gauging the policy shift. The sustainable development theoretical framework is employed as the over-arching analytical tool. The paper draws from an extensive desktop literature review of rural transport policy research output accessible in the public domain covering the twenty year period. The main findings confirm a discernible transport paradigm shift underpinned by contestations regarding rural transportation policy planning and implementation. The paper also discusses rural transport research blind-spots and opportunities for valorizing the research output for the benefit of rural communities across the country.

Key words: *Rural transport, research, policy, capacity building, South Africa*

1 INTRODUCTION

It is over 20 years since South Africa witnessed the ushering of the new political dispensation. While 20 years is not a long time in terms of the country's inclusive transformation agenda, it is nonetheless a good marker for taking stock of rural transport policy research developments with a view to:

- Seeking to locate and understand the context and place of rural transport in the broader socio-economic development discourse in South Africa
- Acting as a barometer to gauge and as a mirror to reflect on the extent to which South Africa's rural transport dreams have been achieved
- Identifying any rural transport strategy, policy, implementation and intervention obstacles, impediments and bottlenecks that require unblocking, and
- Prospecting on alternative pathways aimed at seeking to anchor rural transport in sustainable rural development endeavours in South Africa.

Literature confirms that South Africa has invested massive resources in crafting largely progressive policy and legal instruments aimed anchoring an inclusive and

shared socio-economic growth and development. From a rural transport perspective, the aim has been to attain the following outcomes among others:

- Improve rural transport infrastructure and service provision
- Improve rural transport passenger service levels and reliability
- Improve rural transport safety and security, and
- Ensure that rural transport interventions and innovations are implemented without compromising or debasing environmental resources.

1.1 Aim and Objectives of the Study

This paper explores the state of rural transport and development policy research trajectory in South Africa from 1994 - 2014. One of the expected outcomes of this paper is to encourage a deeper conversation on how the rural transport and development policy research and development agenda can be up-scaled to the next level. Consequently, in conducting this research the main focus was on interrogating and exploring thematic and discourse matters regarding the following rural transport and development policy indicators:

- Assessing the observable trends in rural transport research policy topics
- Seeking to identify and highlight emerging rural transport paradigms or shifts in thinking philosophies, and
- Attempting to use the findings of this research to sketch a representation of future rural transport and development research agenda.

Two organising research questions with respect to rural transport research were employed to assist with making sense of the existing situation:

- What are the main rural transport policy topics that were most frequently investigated?
- What were the major sources of funding for rural transport policy research in South Africa?

2 RESEARCH METHODOLOGY

Making use of the case study method, gap analysis and pattern matching technique the rural transport planning and development policy landscape in South Africa spanning the period 1994-2014 was assessed (Chakwizira, Bikam & Mashiri, 2014; 650-651). The *sustainable development theoretical framework* was employed as the over-arching analytical tool. The article is based on an extensive desktop literature review of rural transport policy research in South Africa. In addition, in-depth discussions on the topic were undertaken with selected key informants from government, the private sector, development agencies, research and academic institutions in South Africa. This information was analysed for emerging research policy trends and patterns, gaps as well as opportunities within the sector.

3 LITERATURE REVIEW

Literature review confirms the paradigm shifts that rural transport as a discipline and field of study has undergone since the beginning of civilization. In addition, a reflection on rural transport planning and practice show that paradigm shifts happen infrequently suggesting a profession in which periodic breakthroughs are seldom. This resonates with the stability and robustness of conventional and traditional transport planning and engineering approaches that irrigate the mainstream profession (Dawson & Barwell, 1993; ANC, 1994, 1997; Starkey et al., 2002; Donnges, 2003; Naude et al., 2005; Lee & Hine, 2008; Department of Transport, 2008; Mashiri et al., 2008; Grieco et al., 2009). Kaira (1983) and Johnston (1993) have termed the optimistic investment in roads transport planning paradigm in rural areas as a *"road and car approach"* and *"road and motor vehicle fix"* preponderance respectively.

These models under-estimated the reality that the majority of trips in the rural areas are short, have both origin-destination in the village and do not require to make the use of motor vehicles compulsory (Bryceson, Mbara & Maunder, 2003). Consequently, ILO and World Bank-sponsored research in rural Africa and Asia concluded that a considerable amount of time and transport effort were spent for providing for basic transport needs of households and thus limited the extent to which households could take advantage of socio-economic opportunities. Barwell, Howe & Zille (1987) concluded that the conventional transport planning approach, which exclusively focused on the improvement and expansion of motorable road networks, was unlikely to relieve the transport burden of rural communities. However, these studies have limitations regarding data analytical rigour. This is because the focus of these seminal rural transport and planning studies was the household level with techniques amplifying averages for different transport task related trip origin and destination measures and indicators (e.g. trip time, travel time, travel speed, travel shadow cost, transport effort etc.).

Another weakness of these approaches was the failure to engage in detailed statistical analysis to unravel hidden patterns and dimensions regarding, for example, household travel and transport patterns, such as, inter-household trips and decision matrix issues, inter-gender distribution of trips and travel activity patterns, rural travel and disability. As a result recent studies have started to locate modelling techniques as well as the use of scientific measures such as geographic positioning systems (GPS) and data loggers to collect and analyse detailed trip-making behaviour of different household members' travel patterns (Chakwizira et al., 2010:1-10; Venter & Venkatesh, 2009; Wouters et al., 2009).. However, it should be acknowledged that recent shifts have benefited from advances in technology such as information technology (IT), use of related transport software including GIS that was starting to emerge and to be utilized in the public and research fields especially during the 1990s. Figure 1 presents a graphical representation of how rural transport science has been changing owing to dynamic interactions with complex and complicated socio-economic environments throughout developing countries.

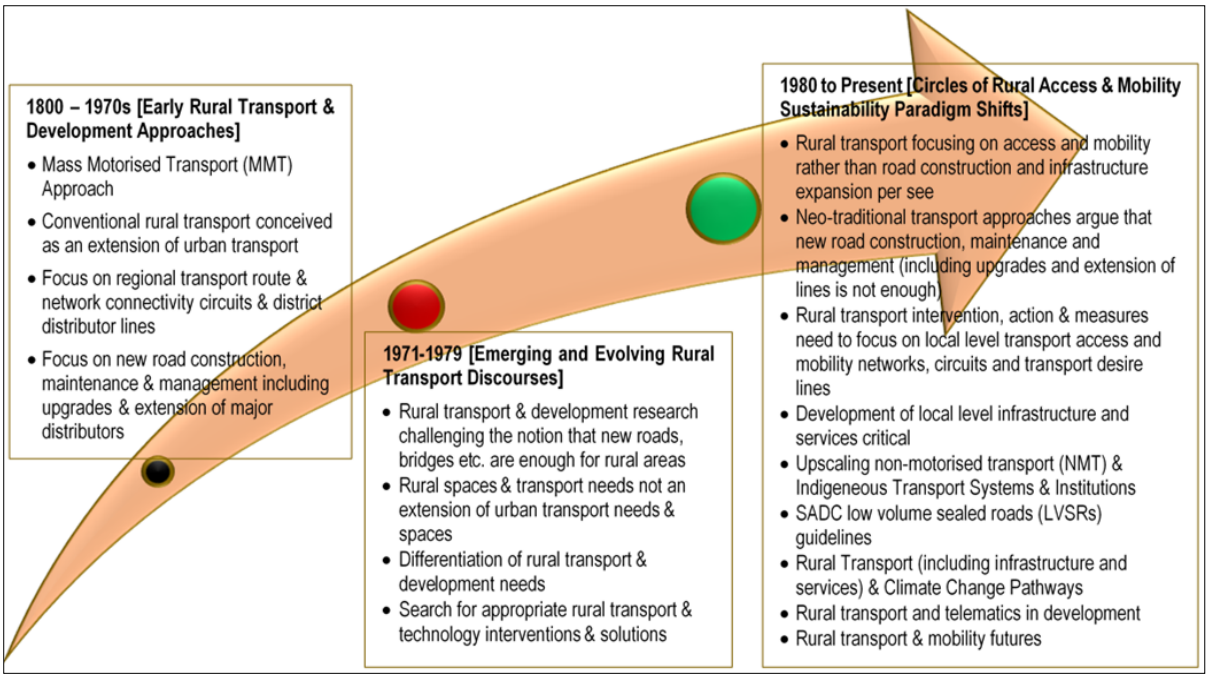

Figure 1: Tracking and tracing the evolution of transport planning and practice
Sources: Kane, 2004: 552-553; Chaitoo & Venkatesh, 2010: 819-820; Chakwizira, Bikam & Mashiri, 2014: 648; Authors conceptualisation

4 DISCUSSION OF RESULTS AND FINDINGS

4.1 Shifts, tensions and struggles in implementing rural transport policy agenda in South Africa post 1994

The reading and interpretation of the rural transport policy research outcomes in South Africa post 1994 pivot on:

"…contestations and shifts in tension regarding developing a focused agenda aimed at tackling rural transport matters in the country. On one hand, very clear policy statements and frameworks in terms of government policy enunciations aimed at bolstering rural development, and by extension, supporting rural transport research is clearly provided for. On the other hand, these bold intentions are not matched with the implementation of policy measures and actions, commensurate resources and operational guidelines to translate the visions into rural transport projects and programs. This is illustrative of the typical rural development challenges pitting the gap between theory and practice and again underlining the skills gap relating to the lack of critical mass of rural transport experts to provide transformative leadership in this space…" (Chakwizira, Bikam & Mashiri, 2014:648).

The foregoing quotation highlights the classical rural development challenges underlining:

- Perennial chasm between theory and practice
- Transport infrastructure and services deficits and backlogs prevalent in rural South Africa
- Transport sector funding and budgetary constraints hamstringing the implementation of the full gamut of innovative and transformative projects in the transport and related sectors, and
- Subtle skills and knowledge transfer gap regarding lack of a critical rural transport experts base to champion and provide leadership in this space.

Table 1 presents a synthesis of some of the major policy documents with direct implications and relevance to the rural transport and development policy research agenda post 1994 in South Africa.

Table 1: Some major policy documents with relevance to rural transport research agenda post 1994 South Africa

Policy document	Major policy provisions	Rural transport & development research implications
1996 White Paper on National Transport Policy(to be reviewed this year)	The vision for the South African transport system articulated in the White Paper is to: *Provide safe, reliable, effective, efficient, & fully integrated transport operations & infrastructure which will best meet the needs of freight & passenger customers at improving levels of service & cost in a fashion which supports governments strategies for economic & social development whilst being environmentally & economically sustainable*	The same vision should be cascaded down to rural transport research
	Policy goals & objectives that emphasized overcoming the negative transport effects of apartheid & the promotion of public transport over car travel	The development of non-motorized & intermediate means of transport is essential in rural transport research
	White Paper proposed an 80:20 percentage modal split between public & private transport, & also proposed the introduction of *"regulated competition"* with regard to public transport	Rural public transport provision & services to outreach deep & remote areas an important component in rural transport public passenger servicing.
Moving South Africa (MSA) 2000 Strategy	The MSA was intended to be a *"Vision 2020"* perspective on strategic action to extend the short- to medium-term policy formulation	The corollary was that a *"Vision 2020"* perspective on rural transport action to extend the short-term-to medium-term policy formulation needed to be generated, which was never done including the courting of "moving rural South Africa" agenda which could have entailed a difference in approach, pace & development urgency sense for South Africa.
	The MSA strategy introduced *'customer-based'* planning, a revised view of the relationship between congestion & road construction, & advocacy of the improvement of infrastructure for non-motorized	The need to establish rural transport key performance indicators (KPIs) & targets. The development & deployment of low-cost access & mobility interventions in rural areas.

Policy document	Major policy provisions	Rural transport & development research implications
	transportation.	
Rural Transport Strategy (RTS) (2007)	The delivery of rural transport infrastructure & services is identified as comprised of the following main categories & related delivery actors: • Rural transport infrastructure – not only access roads, but also district roads, public transport interchanges, tracks & other non-motorized transport infrastructure • Village-level or intra-farm transportation, where communities – particularly women – & farmers themselves provide transport services that involve head loading, as well as the use of non-motorized & intermediate means of transport (such as tractor-trailers), trucks & light delivery vehicles (LDVs) • Rural passenger & (small-volume) freight transport services to & from "deep", rural areas, where operators of LDVs (the so-called "bakkie sector") & animal-drawn carts are the main service providers • Passenger transport services along the main connector routes (to towns, clinics & other facilities), served mainly by combi-taxis, converted LDVs & – in some areas – subsidized bus services • Special needs transportation services – to address the needs of persons with disabilities, the elderly, trauma & non-emergency patients, learners & tourists – provided, either in-house by the relevant sectors or on an out-sourced basis, and • Bulk freight transportation to & from processing plants, distribution centres, markets & suppliers– provided mainly by commercial producers & transport	Major rural transport research intervention & action areas include: • Rural Public Transport • Developmental Rural Freight Logistics • Rural Infrastructure & Services • Rural Transport & Development • Labour-based Rural Road Construction • Harnessing Information & Communication Technologies for development • Transport Institution & Governance Systems • Non-Motorized Transport and • Rural Access However the Rural Transport Strategy is silent on climate change & disaster risk reduction, albeit owing to the fact that these matters had not gained the significance & importance they currently enjoy.

Policy document	Major policy provisions	Rural transport & development research implications
	operators	
National Land Transport Strategic Framework (NLTSF) (2006)	The National Land Transport Act (NLTA), Act 5 of 2009, defines the NLTSF as a Strategic Framework that informs integrated transport & land use planning country-wide. The Framework should therefore: • Define National Objectives & Policy Statements that give direction to transport on a National scale • Encourage the coordination & integration of transport nationally • Form the basis for the preparation of the Provincial Land • Transport Frameworks & Integrated Transport Plans and • Provide a reporting mechanism on the progress of the respective transport plans & projects through the Key Performance Indicators (KPIs) in the NLTSF.	This has to be reviewed every five years. The Draft National Land Transport Strategic Framework: 2015 -2020 has just been released by DoT. This framework attempts to bring the strategic intent of transport with current trends such as Climate Changes, changes to legislation such as National Land Transport Act (NLTA) (2009), Spatial Planning Land use Management Act (SPLUMA) (2013); National Development Plan (NDP) 2030 Vision 2011, National Transport Master Plan (NATMAP) 2011 etc. among key policy documents & legislative instruments.
1997 Public Transport Strategy (PTS)	Sets the agenda for the transformation of the public transport network & service set-up in South Africa. The South African Cabinet approved the PTS & Action Plan 2007 – 2020 in March 2007. The PTS, which comprises a multi-billion rand transport infrastructure plan, is expected to reshape public transport travel in South Africa entirely. The strategy articulates a vision to shift public transport service delivery away from operator controlled, commuter-based, intermodal routes to user-oriented, publicly controlled, fully integrated, mass rapid public-transport networks. This includes transforming the bus & rail services into a public transport system integrated with re-capitalised taxi services. The key areas of the strategy consist of:	The major shortcoming of the PTS is that it sustains an inappropriate approach of seeking to transplant urban solutions to rural environments, which has to date failed to significantly transform & positively impact on the rural development trajectory as well as transport vale-addition component of rural growth & wealth creation. The Public Transport Strategy only focused on 13 large metropolitan municipalities whereas there is also a need for intervention in rural areas & other parts of the country. While an integrated rural public transport network (IRPTN) for rural areas framework &

Policy document	Major policy provisions	Rural transport & development research implications
	• Safe & secure operation monitoring by intelligent transport system-control centres • A car-use competitive public-transport option, which enables strict peak-period car-use management • Electronic fare integration & single ticketing when making transfers • An integrated feeder service, including walking, cycling, bus & taxi networks.	action plan has been developed with pilot rural areas identified, the challenge is the "snail pace" in implementing the projects. Currently significant & visible implementation is focused on the major cities in South Africa. The PTS has implications regarding the following, aspects which is at the centre of (re) structuring rural settlements, namely: • Compact settlements/infill/densifications • Transit orientated developments, peri-urban & peri-rural environments • Integrated Ticket Systems • Multimodal transport interchanges & facilities; and • Scaling & appropriate interventions for rural areas that is contextually relevant.
Draft Non-Motorised Transport (NMT) Policy - 2009	The promotion of NMT primarily aims to increase transport mobility & accessibility, mainly in rural areas. The Department of Transport has broadened its *Shova Kalula* ("Pedal Easy") Project into a more comprehensive NMT project that incorporates, among other things, cycling & animal-drawn carts. The project was first launched in 2001 & introduced in Limpopo in 2010. The project forms part of government's Programme of Action & is expected to contribute to its anti-poverty strategy & second-economy interventions. It is believed that these initiatives improve the mobility of & access to economic opportunities by rural communities. The Department of Transport expressed	While the project scope & intentions are noble, implementation of the full gamut of supportive NMT infrastructure & services is constrained by budgetary allocations & capacity matters.

Policy document	Major policy provisions	Rural transport & development research implications
	interest in establishing a local bicycle-manufacturing plant to produce bicycles for the project. The *Shova Kalula* Project also incorporates microbusinesses, which sell, repair & maintain bicycles to ensure the sustainability of the project.	
Road Infrastructure Strategic Framework for South Africa (RISFSA) - 2006	According to RISFSA (DOT, 2006), the classification & management of the road network is a fundamental component for the planning & development of road infrastructure in South Africa in order to optimise efficiency & effectiveness in the delivery of roads. The road network is considered to be the heartbeat of development, because it performs the basic yet critical function of providing the lifeblood of access & mobility for the execution of economic & social activities. Appropriate access management assures that roads can indeed play their role in the country's economy[1]. Consequently, road authorities in South Africa have an obligation to plan, design, construct & maintain the road network, to protect the public investment in the road infrastructure, to ensure the continued functionality of the transportation system & to promote the safety of traffic on the road network. Furthermore, road authorities have the added obligation to provide a reliable, effective, efficient & integrated transport system that supports the sustainable economic & social development of the country.	The South African Road Classification Manual (TRH 26 South African Road Classification & Access Management Manual - 2011) builds & expands on the classification system of the *Road Infrastructure Strategic Framework for South Africa* (RISFSA) of the South African Department of Transport (DOT, 2006) & supersedes both the draft *National Guidelines for Road Access Management in South Africa* (COTO, 2005) & the *Manual for the Redefinition of the South African Road Network* (DOT, 2008). The continued focus & improvement of road manuals has implications regarding the need for road asset management systems, continuous capacity building & training to facilitate timely & up to date road maintenance, rehabilitation & new road construction.
National	The Cabinet of South Africa initiated the NATMAP in	An oversight matter in NATMAP is that the

[1] Classic economic theory suggests that productive infrastructure, including road and transport assets, is one of several key preconditions for national economic growth. The theory holds that, by *"investing in assets like bridges, roads, ports, or even telephone lines, a nation can structure development by reducing transport and communications costs"*

Policy document	Major policy provisions	Rural transport & development research implications
Transport Master Plan (NATMAP) - 2011	2007 to develop & establish a multimodal transport system to meet South Africa's needs up to 2050. NATMAP aims to: • Facilitate long-term & sustainable socio-economic growth Promote comprehensive integrated development planning; • Act as the infrastructure implementation/action plan of macro-scale projects for the whole country. NATMAP's goals include: • Maximising the use of existing infrastructure facilities including their maintenance • Developing future infrastructure facilities • Developing an up-to-date & accurate central land-use/transportation data bank. NATMAP intent is to ensure that by 2050 "transportation development will meet the needs of freight & passenger customers; to ensure accessible, affordable, safe, frequent, high quality, reliable, efficient & seamless transport operations & infrastructure provision & development". Overall, NATMAP seeks to make a legacy imprint regarding contributing to addressing & reversing apartheid induced distorted land use & transportation terrain that manifests itself both provincially & nationally.	rural transportation component is inadequate & currently needs to be work-shopped with stakeholders. This was further corroborated by the Minister of Transport Speech at Southern African Transport Conference (SATC) 2014 Official opening & welcome address to delegates. Themes such as transport & climate change & deeper transport disaster risk reduction measures not adequately treated. Consequently, the environmental issue regarding the carbon transport footprint & transition to a low carbon economy are inadequately covered. The question of urban transport bias & themes still persist while transport funding including the need for *"ring fencing"* rural transport fund remain largely un-tackled. The assumptions that a critical mass of projects & experts exists or will be available as well as that existing transport & related governance systems are flexible & adaptable to the changing & projected 2050 transport vision may be misplaced. While NATMAP makes provision for a process of continued upgrading, innovative, flexible, economically & environmentally sustainable transportation that will support & enable government strategies, growth, development, redistribution, employment &

Policy document	Major policy provisions	Rural transport & development research implications
		social integration within the national spatial system, the challenge is that no specific budget for science, technology, engineering & mathematics (STEM) is provided to provide the anchor & support to realise anticipated norms & standards. For example most developed countries allocate at least 2% of national budget to research & development (RandD). In South Africa this figure is still below 1% & anticipating that this will change in response to various strategies government documents may be too ambitious. One of the greatest challenges that South Africa transport sector has to tackle is the reality that land use & transport development are not integrated owing to a fragmentation of responsibilities regarding the administration, planning & regulation of the various aspects of land use, infrastructure, operations & regulations. This fragmentation & the legacy of apartheid policies have led to low density development, spatially dislocated settlements & urban sprawl, resulting in inordinately long commuting distances & times, low occupancy levels, high transport costs & low cost recovery.
National Land Transport Act (2009)	The purpose of this Act is - • to further the process of transformation & restructuring the national land transport system initiated by the Transition Act;	Act based on assumptions that transport authorities have the capacity & resources to execute transport services as demanded by public. The reality is that the differentiated

Policy document	Major policy provisions	Rural transport & development research implications
	• to give effect to national policy; • to prescribe national principles, requirements, guidelines, frameworks & national norms & standards that must be applied uniformly in the provinces & other matters contemplated in section 146 (2) of the Constitution; and • to consolidate land transport functions & locate them in the appropriate sphere of government. (NLTA, 2009:9)	local government system in South Africa may require differentiated skill & resource support at scale, by region & over time prior to municipalities building required capacity & competencies (i.e. technical & managerial) to execute the full gamut of transport functions & activities as enshrined in the NLTA (2009). The case is more acute for resource constrained rural municipalities. From the responsibilities of the three spheres of government defined in the NLTA (2009) there is an implicit & salient need for the integration of the three spheres as well as the integration of transportation planning, land use management & spatial development. However, in practice, these responsibilities as they exist in South African spheres of government lack integration leading to compromised outcomes. This further makes integrated rural land use & transportation planning a complex & complicated matter.
Household Travel Survey 2003 & Household Travel Survey 2013	Even though Administrative systems provide a wide variety of travel data, but most transport strategies & policies have to be based on an understanding of the travel patterns of households & individuals. The National Department of Transport (DOT) conducted the first & second National Household Travel Survey (NHTS) in 2003 & 2013 in collaboration with Statistics South Africa. The main aim of the National Household Travel Survey of 2003 & 2013 was to gain an insight	While the 2003 Household Travel survey reporting & analysis was mainly focused on urban areas, the second iteration i.e. 2013 Household Travel Survey is beginning to generate relatively good data for rural transportation planning purposes. In future a balanced transportation analysis that recognises transportation differentiation by urban & rural areas is anticipated.

Policy document	Major policy provisions	Rural transport & development research implications
	into the travel patterns & transport problems of the people of South Africa by collecting information for the following purposes: • To serve as the basis for DoT research, planning & policy formulation; • To assist transport authorities to effectively target subsidies, and • To serve as a data source for the definition & measurement of Key Performance Indicators (KPIs) for land passenger transport	
Various provincial land transport strategic frameworks	The Provincial Land Transport Framework (PLTF) is a strategic document, whose purpose is to inform all transport & land-use related provincial decision making with respect to transport infrastructure maintenance & investments, public transport, road traffic safety & management, as well as guide district-wide & local integrated transport planning. In summary, the purpose of the PLTF is to: • State provincial objectives & policies that give direction to transport on a provincial-wide scale. • Ensure national planning objectives & policies are implemented at the provincial scale. • Assist in coordinating & integrating transport in the province. • Serve as the basis for the preparation of Integrate d Transport Plans (ITP's) & Public Transport Plan s (PTP's) in the province.	The major challenge with existing & previous documents is that they have largely been urban biased in terms of data collection & analysis, which has had implications in very strong urban transportation strategic frameworks. Consequently, these frameworks are however weak in terms of incorporation & projection of rural transportation matters. This raises further issues regarding appropriate rural transportation research methods, tools/materials/equipment & techniques as well as upgrading transportation curricula at Universities & Colleges.
Various ITPs	The types of plans to be prepared by a planning authority were stipulated in 2007 under regulations prepared under the National Land Transport Transition	Literature review indicates that the vast majority of the municipalities does not have a transport plan in place or alternatively have

Policy document	Major policy provisions	Rural transport & development research implications
	Act. In terms of these Regulations, there are three types of plans that a planning authority can produce, namely: • ***Type 1:*** Comprehensive Integrated Transport Plan (CITP). Planning Authorities required to prepare a comprehensive integrated transport plan are the selected 12 cities identified by the National Department of Transport for the purpose. The cities are Cape Town, Tshwane, Johannesburg, Ekurhuleni, eThekwini, Nelson Mandela Bay, Buffalo City, Msunduzi, Mbombela, Polokwane, Rustenburg, & Mangaung. • ***Type 2:*** District Integrated Transport Plan (DITP). These are plans to be prepared by all district municipalities. The regulations stipulate that in the case where a local municipality has prepared a CITP, the CITP must be incorporated as part of the DITP. • ***Type 3:*** Local Integrated Transport Plan (LITP). These are plans to be prepared by all other municipalities not preparing the above plans. In terms of the Act, the MEC may consider assisting a planning authority to carry out the required planning, partly or wholly, where such a planning authority has insufficient capacity to do so. The capacity of each planning authority must be assessed through formal discussions with planning authorities. Following the determination of the capacity of a planning authority to undertake planning, its status must be formally documented & published in the provincial gazette.	outdated ITPs, & indications are that they are not in the process of developing the plans. This raises legal issues of compliance. In addition, various ITPs especially for rural based municipalities have been largely urban extensions raising questions about their credibility & capacity to respond to germane rural transportation & development matters. Without integrated transport plans, as is the case in many municipalities in the country & by extension provinces, transport service delivery is hypothesized to continue to deteriorate. It is imperative that provinces ensure, through transport forum engagements, that municipalities are assisted to develop & implement their integrated transport plans. To this end the province will for example need to ensure that the integrated transport plans are adequately reflective of national & provincial transport policies. The need to explore the feasibility of implementing a ITPs dashboard or barometer that takes the form of an observatory should be keenly explored.
Various Integrated	An Integrated Development Plan is a super plan for an area that gives an overall framework for development.	Overall, IDPs exhibit a weak projection, incorporation & analysis of the land use,

Policy document	Major policy provisions	Rural transport & development research implications
Development Plans (IDPs)	All municipalities have to produce an Integrated Development Plan (IDP). The municipality is responsible for the co-ordination of the IDP & must draw in other stakeholders in the area who can impact on and/or benefit from development in the area. The IDP aims to co-ordinate the work of local & other spheres of government in a coherent plan to improve the quality of life for all the people living in an area. It should take into account the existing conditions & problems & resources available for development.	projects, programmes & transportation nexus. Given that most transport forums are not very active throughout the country the input from the transport sector & consequently its reflection is constrained & compromised.

Sources: McCarthy and Swilling, 1985; White Paper on Transport Policy, 1996; Moving South Africa, 2000; DOT, 2007; Schoeman, 2010: 23-24; 28-29; Chakwizira, Bikam and Mashiri, 2014: 649-650

4.2 Shifts and Circles of Sustainability in Rural Transport Infrastructure and Services Provision

The review confirms the emergence of *'shifts and circles of sustainability in rural transport infrastructure and services conceptual, implementation and sustainability'* policy wheels. The original concept of Integrated Rural Accessibility Planning (IRAP) was developed by the International Labour Organisation (ILO) starting in the 1980s in terms of application work outcomes in several African and Asian countries. The concept concretised and matured on the back of intensive demonstration and development work peaking in the Philippines (i.e. during the period 1990-95). The outcome of these efforts and initiatives culminated in the unveiling of the IRAP procedure (which is an eclectic planning tool, methodology and approach). IRAP is consequently a recognized local level access and mobility movement instrument for steering transportation changes and impacts in a context of limited financial budgets by local level planners. Nigeria and South Africa have since further developed the concept and customized IRAP to suit their own conditions (Chakwizira, Mashiri & Nhemachena, 2008: 3). This has seen the mutation, evolution and further refinement of IRAP into a rural access and mobility program (RAMP) as well as the expansion of the integrated rural mobility and accessibility (IRMA) respectively (Chakwizira, Bikam & Mashiri, 2014:647).

IRMA was spawned from the Rural Transport Strategy for South Africa (DOT, 2007). However, in the concept of developing low volume roads not only for South Africa but the Southern African Development Community (SADC), guidelines have been developed with the African Community Access Program (AFCAP) teaming up with researchers from research institutes in Botswana (i.e. Botswana Technology Centre (BOTEC)), South Africa (i.e. Council for Scientific and Industrial Research (CSIR)) and Zimbabwe (i.e. Scientific, Industrial Research and Development Centre (SIRDC)) to name a few. The SADC low volume sealed roads (LVSRs) guidelines presents a major departure from traditional practice in all aspects of LVSR provision by examining procedures, practices and methods used in: planning, appraisal and environment; construction and drainage; geometric design and road safety; maintenance; pavement design, materials and surfacing. Overall, the guideline promotes the use of a holistic approach to LVSR's, which recognizes that criteria need to be satisfied in the different and often interacting dimensions of road provision (SADC, 2003: xi). Combining IRMA and the SADC LVSR offers expanded scope and ability to respond to climate change that affects the road sector in rural areas. This is critical given that 40% of South African road network has reached the 20 year design life-span and the DOT requires R75 billion investments over the next five years to arrest this decline.

4.3 IRMA concept revisited: Emergent issues

The problem of depleting low volume roads natural resources for re-gravelling i.e. replacing gravel loss could be as much as 60% of the total maintenance costs (Verhaenghe et al., 2010; TRL, 2007; The World Bank, 2005). Overby and Pinard (2008) emphasised the development of appropriate technologies or systems relevant to the situations in Botswana where locally prevailing conditions are very different from those for which the traditional approaches were developed. Early in a pavement life, preventive maintenance is needed to retard the normal aging process, prevent the intrusion of water, and improve the road conditions (BRMM , 2010; Henning et al., 2008). These are activities with a fixed cost that are carried out irrespective of the

engineering characteristics of the road or the traffic volume. Van Zyl (2009) highlighted the following as the routine maintenance; light and heavy blading, maintaining drainage systems, vegetation control, fence repair, patching and signage maintenance. Moreover, routine maintenance comprises a range of small scale and simple activities. Associated activities are dispersed regularly over the time. Typical activities include roadside verge clearing and cutting back encroaching vegetation, cleaning of silted ditches and culverts, repairing minor erosion, pothole repair, and light grading/reshaping of unsealed surfaces. This maintenance may be able to use unskilled as well as skilled labour, or labour-based methods supported by light equipment. Conventional or community contracting may be appropriate. These regular operations are a good opportunity to identify periodic maintenance needs. The Guideline on Low-Volume Sealed Roads provides a practical way of infusing the ILO IRAP, RUMP (Nigeria) and IRMA (South Africa) for enhanced appropriate low volume sealed roads construction and maintenance regimes suitable for developing countries (SATCC, 2003; Oladele, 2014:171; Pienard, 2014). While IRMA brings the need for the integration of wider rural development initiatives to make rural transportation interventions work for the rural poor, the SADC guideline provides in-depth technical low volume sealed road solutions necessary to prop up and support low-cost and low-volume road technology interventions suitable for rural and remote communities in developing countries. The implementation of these initiatives supported by a sustainable platform build on rural roads asset management systems (RRAMS) will ensure better asset planning, construction, management and sustainability (Mashiri et al., 2013: 192).

4.4 Application of Aerotropolis in Rural Small and Medium Sized Airports: Some clues from Mthatha

Making use of an airport city or regional(rural) model allows the development of airport expressway links (*aerolanes*), airport freight links (*aerotrucks*) complemented by airport express trains (*aerotrains*), bring cars, taxis, buses, trucks and rail together with air infrastructure at the multimodal commercial core – the airport city/region. Aviation-linked business clusters and residences radiate from the airport city/region, forming an extended airport-centric urban/rural region, the *aerotropolis*. Applying the concept to a rural town in South Africa, Mthatha, Mashiri et al. (2014: 321) concluded that *"In order for the regional rural development agenda to take root, Mthatha must cast the 'regular town' label and carve out a pragmatic and proactive leading role in support of shared growth for the region"* that includes the incorporation of the *aerotropolis* approach in catalysing the development trajectory. Adopting the *aerotropolis* concept for small and medium sized rural towns in South Africa is an area that holds potential in transforming rural spaces, cultures and places. According to Mashiri et al., (2014) the airport is expected to contribute R1,4 billion to the gross domestic product (GDP) of the province over the first five years and R857 million to the catchment area GDP in the same period. Direct and indirect jobs created as a result of the airport would be in the construction, transport, storage and communication sectors. Well planned transportation systems improve the quality of life and economic attractiveness of small and medium sized towns, by providing access to regional job markets, facilitating access to locally made goods to markets, and bringing tourists and other consumers to community businesses.

4.5 Modernisation and improvement of rural passenger transport operations and services

The Department of Transport (DOT) has plans to expand incrementally the Integrated Public Transport Networks beyond the 13 metropolitan municipalities to ensure affordable, higher quality services in other areas that will be less infrastructure intensive than the larger cities. In terms of this master plan, urban and regional or rural *"integrated"* public transport networks (IPTN) and processes will be brought together, particularly, in respect of minibus taxi involvement and the transition (transformation) of informal operations to formal, scheduled and contracted services. The implementation of integrated public transport networks should over time allow for a more nuanced and differentiated strategy, acknowledging that in the medium-sized and smaller cities where congestion is not a problem, network development and industry transformation is a priority than infrastructure development. It is envisaged that specific rural public transport initiatives will commence after the demand for services has been determined making use of the public transport findings of the 2013 National Household Travel Survey (NHTS) and trends and changes since the 2003 NHTS to identify revealed demand, particularly for work and scholar trips by mode of travel and accessibility to activities. A recent report by the Financial and Fiscal Commission (FFC) done on behalf of DOT (2014) concluded that South Africa's transport system problems are largely characterised, and should be acknowledged, as service delivery backlogs. Despite the recent funding increases, the cumulative shortfall has not yet been adequately addressed. This applies across all modes including in the development of alternative forms such as non-motorised transport. Thus, addressing such backlogs will take a significant amount of time and requires focused interventions and appropriate consolidation of functions. Injection of funds alone will not be adequate to solve these public transport problems largely because:

- The transport system operates as isolated transport modes, rather than as an integrated network, leading to a suboptimal system
- The lack of comprehensive transport policy targets means that reporting on service delivery progress is difficult
- No transport strategy is in place for vulnerable groups, such as persons with disabilities and the elderly, and
- The infrastructure to support walking is mostly unavailable or grossly inadequate, despite most trips in South Africa involving walking.

DOT (2014) indicates that public transport has been neglected for 25 years, and by extension, there has been significant under-investment in rural areas, which explains the emergence of a vast backlog of public transport needs that require attention. Figure 2 presents a graphical representation of the ratio of transport storage and communication investment to GDP in South Africa.

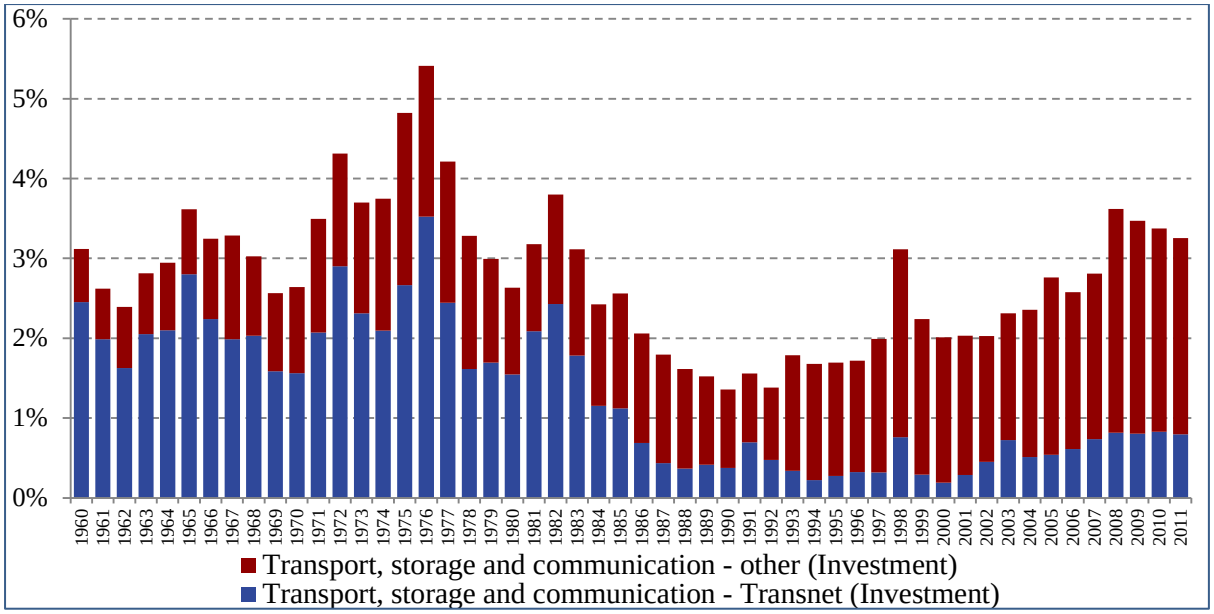

Figure 2: Ratio of transport, storage and communication investment to GDP
Source: DOT, 2014

Figure 2 indicates that a 3%-4% funding of the total GDP was injected into the overall transport investment between the 60's up to the mid 80's. This funding regime dropped to 1.5%-2.5% for the next 20 years until 2008. Currently for the major 12 cities in the country there is a backlog equivalent to R8 billion per annum which is required for public transport for 20 years (DOT, 2014). To make meaningful progress and catch on infrastructure requirements, the following actions and measures are required:

- There is need for significant improvements in high impact public transport interventions including integrated rural public transport networks
- Acknowledgement and realization that transforming public transport infrastructure and systems is not a *'quick fix'* matter; and
- Current projections by DOT estimate that it will take at least until the year 2025 for a minimum bundle of acceptable integrated, sustainable and universally accessible networks to be implemented, completed and commissioned. Prior to this projected year, public transport improvement matters will need to be fast tracked on a continuous basis.

4.6 NHTS 2013 versus 2003: Gazing into the rural transport crystal ball

According to the NHTS (2013) access to public transport services, particularly for learners in the rural areas need to be improved. This is so given that 8.3% of learners walk more than 60 minutes to their educational facilities because of the lack of access to transport services and educational facilities in their respective communities, confirming earlier research (Mashiri et al., 2008; Venter et al., 2011). Furthermore, walking remains the main mode of travel to school in rural areas with 64 percent of learners walking to school. Although the figure has declined from 76.3 percent in 2003, it still remains high. It is interesting to observe that very little has changed in terms of rationalising public transport subsidies policy since the subsidies philosophy still remains mode based, limited to the rail and bus modes while persisting in excluding minibus taxis. Scope exists to explore the advisability and feasibility of reviewing the existing bus subsidy system including the way in which

public transport funds are allocated with a view to potentially enact reforms aimed at supporting and promoting the realization of an inclusive sustainable integrated public transport system.

In addition, the NHTS, 2013 revealed that the percentage of people walking more than 15 minutes to access public transport increased from 10.9% in 2003, to 14.4% in 2013. Walking time for taxis specifically was beyond 15 minutes for 18% of urban households and beyond 30% for rural households. This suggests that transport facilities were much further away from where people resided ten years ago. Spatial fragmentation and dislocation of socio-economic opportunities still remain key land use and transportation challenges in contemporary South Africa. It will be important to recognise that transport problems can be resolved by non-transport solutions such as spatial planning, location of facilities as well as the use of ICT to act as transport substitutes (Dlodlo, 2009: 11; Dlodlo, 2013: 3). In addition, the role that targeted training which equips transport stakeholders with responsive transport curricula is essential (Mbara, 2009:343).

4.7 Collaboration and Partnership in Solving Rural Development Challenges

Solving rural transportation and development matters require not just the combined leadership resolve of sectors directly associated with rural development such as DOT, Department of Human Settlements, Department of Rural Development and Land Reform, Treasury, Department of Cooperative Governance and Traditional Affairs and research institutions, but also the collective involvement of beneficiary communities in a collaborative and partnership pact. In addition, there is a need to tackle the skewed budgeting favouring urban areas – owing to the economies of scale and density factor considerations. While tilting the scale will not be easy, a start has been made in respect of the rural roads asset management systems (RRAMS) as an informed decision making platform that compels investment in rural areas.

4.8 Towards a rural transport school of excellence or academy: Implications for curriculum

Overall, the policy challenges and issues that speak to research methods, modelling shortcomings and implementation bottlenecks suggest the need for work towards the establishment of a school of excellence/academy in rural transportation as a response to the need. This has also implications regarding reforming existing transportation curricula to adopt much more focused and perhaps stand-alone rural transportation modules instead of treating these as discussion topics, module or course sub-topics or sentences in the traditional transportation engineering modules.

5 RECOMMENDATIONS

5.1 Need for the development of a rural transport observatory

Clearly, there is a need to investigate the advisability and feasibility of establishing a rural transport observatory producing a bi-annual state of rural transport report. This observatory could be hosted by a University that has over the years, demonstrated significant presence in the domain. Funding to establish the observatory and a Chair in Rural Transport Excellence could be solicited from the National Research

Foundation, Department of Science and Technology, DRDLR and DOT. The main mandate for the observatory would among others include:

- Providing leadership and scholarship excellence in teaching (i.e. curriculum development), research and publications in rural transport and science
- Facilitate the development of a critical mass of rural transport experts to service the rural transport needs of South Africa and beyond through increased post-graduate throughput in rural transport as a specialty area, and
- Compilation, production and dissemination of rural transport intelligence and foresight studies in terms of bi-annual state of rural transport.

5.2 Ring fencing rural transport development funds

The review of literature has further corroborated the fact that there are inadequate budgetary provisions for the transport sector in general and rural transport in particular. Scaling up rural transport interventions and activities requires an improved budgetary system than currently provided. One way of doing this is through establishing a dedicated and ring fenced rural roads funds. While this requirement has long been identified, challenges exist regarding the practical logistics and operational requirements of establishing such a system.

5.3 Critical mass of rural transport expertise

Like other critical development skills in South Africa, there is a shortage of transportation planners generally in the country and in particular of rural transport experts which is a specialised area. The need to explore and find innovative ways to grow and expand this skill area is therefore an area that should be addressed as a matter of urgency.

6 CONCLUSION

Despite improvements and innovations in the transport sector and, by extension, the rural sector, the challenges facing the development of sustainable and accessible rural transport infrastructure and services in rural South Africa remains strong. Fault-lines requiring sealing include building a critical mass of rural transport experts, improving the priority and budgeting in-flows towards building rural transport and infrastructure investment meant to support South Africa's growth and development trajectory. A perennial problem that runs through the rural transport sector is the need to go over organizational and sector challenges of fragmentation, ad-hoc initiatives and distorted policy and implementation disconnects so that the transport and allied sectors can be much more focused and directed towards integrated and sustainable transport solutions that can assist in creating inclusive rural spaces, places and cultures that make significant development contribution to civilization.

The policy shift in terms of treating rural transport as an extension and appendage of *"traditional urban mass motorised transport and traffic engineering"* to embracing approaches that place understanding rural transport and local travel requirements as the *"heart and soul"* of interventions suggest a more nuanced and differentiated understanding of the similarities and differences between rural and urban transport domains. The development and enactment of progressive rural transport plans, policies and actions all bear testimony to shifts from a *"motorway"* based approach towards an expanded view of the *"motorway"* plus people-based, centred and place-

targeting inclusive development approaches. However, while progressive shifts in policy have occurred, implementation challenges persist given the lack of a critical mass of qualified rural transport and development experts as well as lack of sustained and ring fenced budgeting or funds making it difficult to implement and manage sustainable and integrated rural transport interventions.

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