SOUTH AFRICA'S EMERGING RAIL POLICY ENVIRONMENT: FROM MISGUIDED LIBERALISATION TO FUNDING IMPERATIVES

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Introduction

Increased freight transport efficiency is an important driver of national competitiveness, especially pertinent in South Africa where transport costs contribute 61% of logistics costs (Havenga and Simpson, 2012), compared to the global average of 39% (Rodrigue et al., 2009). South Africa's industrial heartland is in the centre of the country, developing around mining deposits, and now served by long, dense freight corridors to and from ports and distant agricultural communities. Almost 90% of the corridor tonne-kilometres (tonne-km) are delivered by road (Havenga and Simpson, 2012). Forty percent of road transport cost is attributable to fuel costs (Havenga and Simpson, 2012) and, with more than two-thirds of the country's crude oil being imported (EIA, 2013), this places the country under untenable exogenous risk. Dense long-distance corridors are ideal candidates for intermodal rail (Rodrigue et al., 2008), which is spearheading the global rail revival with US domestic intermodal showing volume growth of 25% in 2012 (Watson, 2013), and a 29% TEU growth between 2005 and 2011 in the EU for international and domestic intermodal combined (UIC, 2013). The American Trucking Association (2013) forecasts that intermodal rail will continue to be the fastest-growing freight mode in the next decade.

The failure of South Africa's freight railway to capture the domestic intermodal market is attributable to the lack of a national vision regarding the role of the two modes (road and rail) in the surface freight transport industry. This vision is required for the development of the optimal institutional structure for freight rail (DBSA, 2012). The role of the government is, primarily, to facilitate the development of a long-term logistics strategy that optimally equilibrates demand

and supply (Dollery and Wallis, 1985) through ‘anticipation’ of the market character (Antonowicz, 2011, p.277).

In this paper, the optimal role of South Africa’s freight railway is envisaged based on market demand. The historical context, and relevant global experience, will then be discussed in order to inform the freight reform discussions, followed by concluding remarks.

Transport demand

The historical lack of disaggregated volume data on the freight transport sector in South Africa, and a complete absence of road transport cost data, was corrected over the last two decades through extensive gravity-based freight flow analysis (including a 30-year forecast) based on a disaggregated input–output model of the economy, as well as logistics cost modelling (Havenga, 2007, 2010 and 2012).

In 2012, South Africa’s surface freight transport industry moved 1.8 billion tons of freight over an average transport distance of 246 kilometres, delivering 432 billion tonne-km to the economy. The total freight bill to provide this work was R247 billion ($25 billion), excluding externalities of approximately R40 billion ($4 billion). Rail’s share of this effort was 30% of tonne-km, 12% of tons shipped, 10% of cost, and a negligible share of externalities. Rail, however, delivered only 13% of the long-haul tonne-km (excluding bulk mining) (Havenga and Simpson, 2012). This poses a significant cost risk to the country as the long-haul modal imbalance results in two-thirds of total surface freight transport costs (road and rail) being spent on corridors, with 95% of the corridor transport costs attributable to road transport (Havenga, 2012). The composition of surface freight transport costs based on the macroeconomic value chain is depicted in

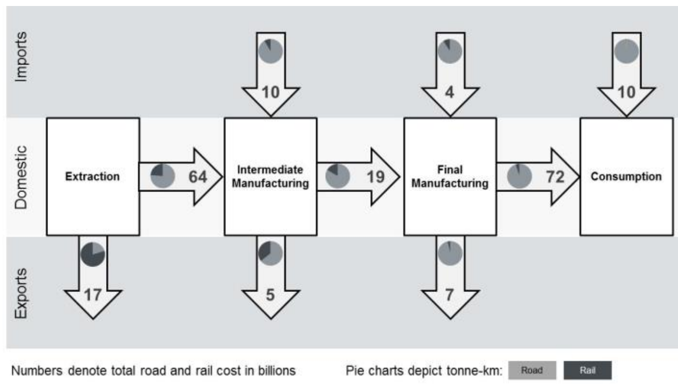

Figure **1**. Three quarters of transport costs are associated with domestic flows, with rail's downstream tonne-km market share reducing to negligible figures.

Rail's low market share is especially disconcerting when defining long-distance flows (flows in excess of 400 km), since each of these long-distance segments can be served by rail, as described in Table 1.

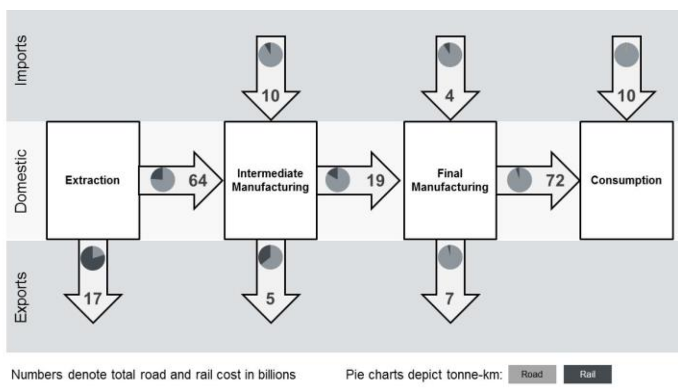

Figure 1: The overarching South African value chain and associated logistics costs (2011) (Havenga, 2013)

Table 1: Long-distance freight transport demand per economic sector (2011) (Havenga, 2013)

	Tonne-km (billions)	Rail share	Description	Rail solution
Agricultural commodities	20	6%	Low-density, uniform commodities between many rural collection centres and processing plants and ports	Shorter collection trains and some block trains
Mining commodities	114	85%	Dense flows, uniform commodities between mines, beneficiation centres and ports	Bulk block trains between sidings
Intermediate commodities	18	14%	Medium-density, non-uniform commodities between plants (siding-to-siding)	Medium-density trains with a wide variety of equipment
Finished products	47	3%	Very high-density, bi-directional flows of high-value palletisable commodities between a few large industrial metropoles	Domestic intermodal heavy-haul long-distance shuttles between logistics hubs

Mining is rail’s traditional strength. Compare, however, the rail market shares in the other long-distance segments to Allen and Gallamore’s (2011, p.37) statement that US railways were on ‘the brink of ruin’ with inter-city (long-distance) freight tonne-mile market share dropping to 35% in the mid-1970s.

The key rail economics principles are density (i.e. more tonne-km per route-kilometre), distance and freight uniformity (achieved through containerisation for finished products) (Havenga, 2012). The definition of rail freight’s role should thus strive for a core network with the greatest possible density. The missed opportunity of rail’s 3% long-distance finished-goods market share is highlighted when the freight segments are depicted according to these principles, as in Figure 2 (the depiction excludes rail’s world-class bulk export lines where a road solution is not possible).

The potential of rail to serve these long-distance segments is confirmed in the 2011 European Commission Transport White Paper where a modal shift of 50% of the road freight over 300 km to rail and waterborne transport by 2050 is targeted (Meers et al., 2013), enabled by intermodal transport (Allen and Gallamore, 2011; Antonowicz, 2011). This presupposes the creation of dedicated transport corridors aimed at improving the reliability, efficiency and competitiveness of all modes (Australian Government Productivity Commission, 2005; Antonowicz, 2011).

South Africa's freight task is expected to treble over the next 30 years, with further concentration on the long-distance corridors, as depicted in Figure 3.

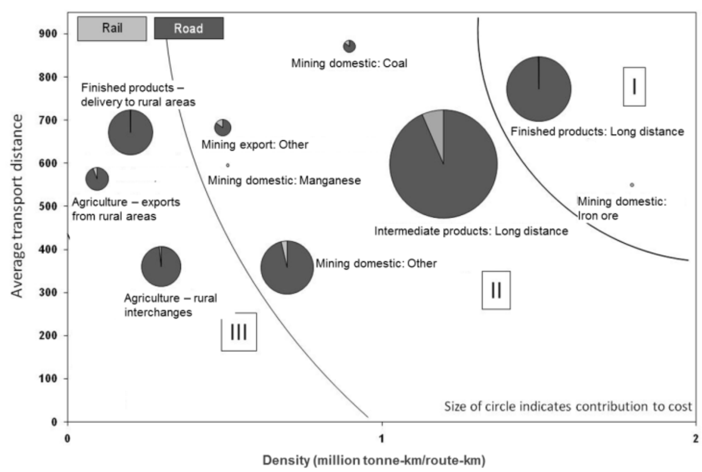

Figure 2: Freight market spaces based on distance, density and cost (2008) (excluding ring-fenced rail exports (Havenga, 2012)

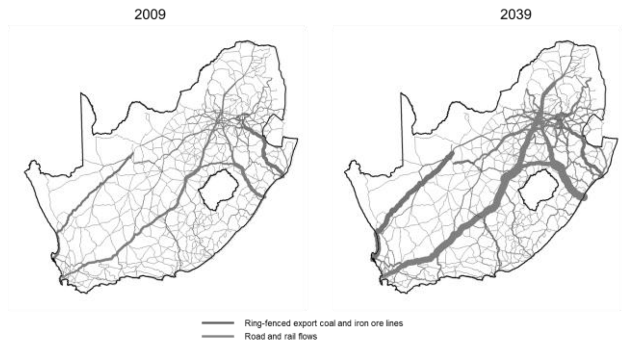

Figure 3: Growth of surface freight flows in South Africa – 2009 vs. 2039 (tonnes) (Havenga, 2013)

The significant growth lends even more weight to implement the clear priorities that emerge from Figure 2, i.e. to develop an intermodal service for long-distance finished products and develop strategies to further rail freight services for long-distance intermediate traffic (while maintaining and developing rail's core competency around the transport of mining commodities). This will result in a core network that can operate as a profitable business with returns that can satisfy both shareholders' and infrastructure capacity requirements, while reducing the country's freight transport bill, and alleviating the risk of fuel imports and externalities (especially congestion and emissions). The low density branch line network will require government involvement to ensure that it facilitates rural employment and equitable access to the core transport network.

In the development of South Africa's transport industry policy and subsequent regulation, these targets should be considered as it will lead to the most optimal modal split. The policy environment of the last century that led to the challenging status quo in the surface freight transport industry, is discussed in the next section.

Evolution of South Africa's surface freight transport industry

Expansive development characterised South Africa's rail network in the first two decades of the 20th century to support inland economic development through cheap transport services – without due regard for the future demand for this network. This resulted in explicit tariff cross-subsidisation from higher-value products to sustain the low-density portions of the network. The advent of road freight transport in the 1920s was specifically attractive to this higher-value traffic due to its flexibility and more transparent pricing structure, which placed rail's business model at risk. Instead of re-evaluating this business model, road transport risk was eliminated through the regulation of long-distance road freight transport (Dollery and Wallis, 1985). Market needs however dictated the development of a long haul road freight industry in the absence of satisfactory rail solutions.

Recommendations from the National Transport Policy Study led to a partial relaxation of this protection in 1977, and complete economic deregulation by 1988 (Martin, 2004) This was replaced with technical and safety regulation, encompassed in the Road Transport Quality System. Implementation was, however, a failure allowing road operators to overload, practise unsafe driving operations and poorly maintain equipment (Cronin, 2011). In addition, road-user charges were not adjusted to fully recover road infrastructure costs.

Investment in railway infrastructure and services (such as intermodal) that could compete with road was a non-starter because of a lack of capital brought about by political turmoil in the late 1980s during the last years of the apartheid government. These events were exacerbated by an increase in the maximum permissible vehicle mass from 22 tons in 1970 to 56 tons in 1989 (Parliamentary Monitoring Group, 2000; Cronin, 2011). (Compare this to the maximum weight of trucks in the majority of EU countries of 40 tons (International Transport Forum, 2011).) This was compounded by considerable ageing of the rail fleet (making it less suitable for the changing market needs). The end result of all these factors was an unprecedented growth in road freight and a failure of rail to exploit the density advantage of the freight corridors that were beginning to form. The growth in road freight is evidenced by the exponential rise in South Africa's truck fleet from 20 000 vehicles in 1950 to 340 000 in 2012, a compound annual growth rate of 5% (eNatis, 2012).

The deregulation of the freight transport industry was followed by a freight transport policy implementation vacuum that has lasted for almost two decades. Acute skills shortages in government combined with discomfort surrounding the potential employment and social fall-out of freight transport industry reform, unfortunately resulted in non-implementation. In addition, by 2005 the growth of freight traffic had surpassed most of the 20-year growth forecasts made by government in 1998 – at least 14 years before they were expected (DoT, 2005). The significant burden placed on the freight system to service this growth in demand increased pressure on government to overhaul the industry, resulting in the release of the National Freight Logistics Strategy (NFLS) in 2005 (DoT, 2005). The proposed solutions were integrated planning, vertical separation and more direct government involvement, especially by taking over control of rail infrastructure. The NFLS was met with resistance, mainly due to contradictory data regarding the benefits of vertical separation in the international arena (refer section 0), and the suggested single-network characteristic of South Africa's railway system (Havenga, 2012).

This was followed by a Green Paper on rail policy in 2011 (Mahlalela, 2011) that was opposed by many experts in South Africa prior to publication and subsequently withdrawn. Its treatment of open access and vertical separation still met with significant opposition. Indications are that the updated Green Paper from the Department of Transport (DoT), expected to be released in 2014, is a complete turnaround 'to change the thrust of rail policy away from one that is focused on institutional reform and clarity' towards one 'that encourages development and investment' (Smith, 2012a).

The idea of investment-led reform is a shift in the right direction, but the canonical approach of business design based on an analysis of market needs, followed by investment and implementation through the standard management and planning cycle, is still lacking. Regulation, restructuring and liberalisation is part of the last step and by moving investment up on the agenda the current Green Paper has however made significant progress. Rail economic regulation was still urged recently (Mahlalela, 2011) with the overarching objective of more efficient and effective rail services (Khuthele Projects, 2007). Increased efficiency and effectiveness should, however, be considered for South Africa's freight system and not railways in isolation, and this principle is reflected in policy statements by the Transport Ministry (Martins, 2013). It is implied that modal shift will decrease total freight costs, but one of the direct drivers is in fact the cross-subsidisation of road freight by other road users. Given the above analysis, a role for a transport economic regulator should be specifically related to facilitating integrated planning and investment, and achieving competitive neutrality across all transport modes through the internalisation of all costs.

Rail reform: global experience with vertical separation

The specific benefits that were expected to follow from vertical separation of railway infrastructure and operations, and/or open access, were to encourage competition (as in Australia), facilitation of international services (as in Europe) and to put different modes on an equal footing (as in Scandinavia) (Gomez-Ibanez and De Rus, 2006). According to Drew and Nash (2011), on existing evidence, there is, however, little reason to conclude that vertical separation improves competition, growth in rail traffic or rail's modal share. Beria et al. (2010) confirm that the empirical evidence regarding vertical unbundling is inconclusive. In contrast, in a comparative analysis of vertically integrated and separated railways in the EU, Drew and Nash (2011) show that, for the period 1998–2008, tonne-km traffic on vertically separated railways hardly grew whilst traffic on vertically integrated railways grew by about 40%.

Pittman (2005, p.2) remarks that 'one of the specific lessons of the experience to date is that the freight railways sector may not be a very promising sector for vertical separation'. This is due to high proportions of fixed cost, upstream economies of scale and the locus of vertical separation. Research suggests that 25% of delivered costs of railroads are infrastructure costs versus 5% for electricity and 2.5% for gas (Thompson, 2003). In addition, small power plants, for instance, can be just as competitive as bigger plants, whereas density is the holy grail of railroads. As Pittman (2005, p.5) states, 'the effectiveness of the operations depends on the exact point where vertical integration or vertical separation takes place' – that is, at the interface point between fixed and rolling infrastructure (Sanchez, 2001). As such, only the very busiest railway networks, which can exploit the density potential of volume growth, are likely to generate sufficiently high financial returns to attract substantial risk capital in long-term railway infrastructure (Amos, 2006).

Paradoxically, the problems associated with information asymmetries during vertical separation and the successful processes to address them lead to deep relationships between interested parties. The mooted advantages of vertical separation are then negated by the fact that an industry with a few highly specialised players and highly integrated operations will require these relationships to be successful (Sanchez, 2001). This inevitably leads to 'co-operation, quasi-reintegration, all that contribute to limit the role of market forces contrary to what was apparently planned in the first years of the railway reform' (Bouf et al., 2005, p.11). Vertical separation also has a negative impact on decision making and gives rise to the potential for underinvestment (Australian Government Productivity Commission, 2005; Amos, 2006; Drew and Nash, 2011). A recent report on UK rail privatisation states that privatisation has failed to deliver benefits with train-operating companies entirely reliant upon public subsidies to run services, and that 90% of new investments have been made by the government-owned infrastructure company (TUC, 2013). In many circles, this failure is blamed on the adverse impact of vertical separation on railway functioning since 'in a railroad, the operation is so tightly connected with infrastructure' (Smith, 2012b). Despite the concepts of vertical separation and open access being around for more than a decade, success could at best be described as limited. By 2006, 97% of rail traffic was still handled by vertically integrated railways (Amos, 2007).

Closing remarks

The canonical planning approach was effectively summarised in the Moving South Africa document 15 years ago:

> The choices break into three tiers – those about the breadth and reach, or density of the system, those about the desired scale of the system and the optimal role of modes, and those about enhancing the platform for transport providers. Institutional and regulatory structures are viewed as an outcome of choices made around the density and scale of the system, as a consequence of choices which require a playing field within which they can become effective (DoT, 1998, p.8).

These recommendations have also formed the core of countless thought pieces and other policy statements over the past decades on how to address the challenges of South Africa's surface freight transport industry (for example Dollery and Wallis, 1985; Naude, 1999; Mitchell, 2004; Martins, 2013).

Despite implementation challenges, there have been major advances that will enable the fast-tracking of an integrated freight transport vision. One-third of public-sector infrastructure expenditure over the period 2010/11 to 2014/15 is allocated to transport and logistics infrastructure spending (DBSA, 2012). Over the past two decades, Transnet has sold off its non-core assets, focusing solely on freight transport, introduced separated reporting and commercialised management, and has made unprecedented infrastructure investments, culminating in a record R23bn capital investment in 2013 (Transnet, 2013). The management of national roads is under a separate entity, SANRAL, and major road investments are on-going (DBSA, 2012). Global logistics players are on board with the imperative for the development of intermodal solutions (Imperial Logistics, 2013).

The pressing reform issue for South Africa, however, is agreement on the design of an optimal freight logistics network based on an integrated long-term strategy to address the country's freight transport requirements, funding for the establishment of that network and the governance (regulation) of the rollout. There is sufficient information available regarding the country's freight transport requirements. The integrated long-term strategy and optimal network design are the key next steps to avoid the ad hoc policy responses of the previous century, which led to sub-optimisation, increasing complexity and decreasing end-user quality – also referred to as the tragedy of the commons (Hardin, 1968). To paraphrase Fletcher (1966, quoted in Hardin, 1968, p.1245), it is time for freight transport reform in South Africa to rise above the 'state of the system at the time it is performed'. Hardin referred to this in the context of morality, which is not entirely inappropriate since the current policy and investment decisions will have far-reaching consequences for future generations.

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