

## The State of Logistics™ – an overview of logistics in South Africa

Hans W Ittmann\*, David King

CSIR Built Environment, PO Box 395, Pretoria, 0001

\*Corresponding author: Hans W. Ittmann: [hittmann@csir.co.za](mailto:hittmann@csir.co.za)

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### Abstract

Logistics and supply chain management play a big role in any economy and are a critical contributor to the competitiveness of a country. The demand for products can only be satisfied through the proper and cost-effective delivery of goods and services. South Africa's main economic activity is located in Gauteng and this has a serious effect on logistics costs. In addition, most of the freight in the country is transported by road. Furthermore, for South Africa to grow its market share of various products in the global market, the supply chains need to be world class to ensure effective delivery of goods. These and other aspects of the logistics environment in South Africa will be presented and major issues affecting logistics costs will be discussed. In addition, reference is made to the recent World Bank report on logistics competitiveness, and comparisons are made with Brazil and the USA on logistics performance.

### 1. Introduction

The importance of logistics and supply chain management to a country's economy has been highlighted time and again in the recent past. A report by the Bureau of Transport Economics of Australia (BTE 2001) states that the performance of the logistics system has a major impact on the Australian economy: "*It affects the cost structures and revenues of Australian producers, their competitiveness in areas such as delivery times and product quality, and the responsiveness of producers to consumer requirements.*" In addition, Tseng, Yue and Taylor (2005) state that due to the trend of nationalisation and globalisation in recent decades, the importance of logistics management has been growing in various areas. Similarly, Rodrigue, Comtois and Slack (2006) affirm that an increase in freight flows has been a fundamental component of contemporary changes in economic systems on a global, regional and local scale.

More recently a World Bank report on logistics performance states that a competitive network of global logistics is the backbone of international trade and the importance of efficient logistics for trade and growth is now widely acknowledged: "*Better logistics performance is strongly associated with trade expansion, export diversification, ability to attract foreign direct investments, and economic growth. In other words, trade logistics matter*" (World Bank 2010). Similarly, the 6th Annual State of Logistics™ survey for South Africa (CSIR 2010) indicates that the global competitiveness of South Africa is dependent on the performance of the logistics and supply chain sector and that the value that logistics adds to the country should be greater than the costs.

For a better understanding of the terms supply chain management and logistics management, full definitions are given below (CSCMP 2010):

**Supply chain management as defined by the Council for Supply Chain Management Professionals (CSCMP):** "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it

also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.”

**Logistics Management as defined by the Council of Supply Chain Management Professionals (CSCMP):** "Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements. Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfilment, logistics network design, inventory management, supply/demand planning, and management of third party logistics services providers. To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service. It is involved in all levels of planning and execution – strategic, operational, and tactical. Logistics management is an integrating function which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other functions, including marketing, sales, manufacturing, finance, and information technology."

From the above it is clear that logistics and supply chain management play a big role in any economy and are a critical contributor to the competitiveness of a country. The demand for products can only be satisfied through the proper and cost-effective delivery of goods and services. South Africa's main economic activity is located in Gauteng in the centre of the country, and this has inherent challenges for the logistics industry (over 100 000 outlets need a constant supply of goods). In addition, the geographic position of the country implies long supply chains for local products to get to the global marketplace. For South Africa to grow its market share of various products in the global market, supply chains need to be world class to ensure effective delivery of goods. No business process can be managed properly without the necessary information and therefore it is critical to measure and quantify various logistics indicators.

According to Bowersox, Rodrigues and Calantone (2005), the world's logistics costs in 2002 were R41 129 billion, up by 5% from 2000. In the USA alone logistics costs represented 9.9% of Gross Domestic Product (GDP) in 2002. Logistics costs represented 13.7% of the world's accumulated GDP in 2000. These costs are thus huge and therefore need to be scrutinised for possible savings while pursuing better performance.

Up to 2004 there was no measure of logistics costs in South Africa or any related quantification of logistics indicators. The State of Logistics™ survey initiated by the CSIR tried to address this while at the same time reporting on other issues that affect the local logistics industry. In addition, the survey endeavours to sensitise the logistics community to new developments in the field.

This paper reports on the results of the latest survey and endeavours to put this in context with what happens elsewhere in the world. Section 2 deals with international logistics performance and South Africa's position in relation to other countries. It leads into Section 3, which discusses the cost of logistics to South Africa. Section 4 compares South Africa's costs to that of other countries. Sections 4, 5 and 6 deal with additional issues affecting logistics costs in South Africa, specific areas that need attention and research priorities for South Africa respectively. This paper does not cover all aspects affecting the logistics industry but tries to identify the most important issues that need attention.

## **2. International logistics performance and indicators**

The World Bank acknowledged the importance of logistics performance and initiated a study to measure the logistics competitiveness of countries. The first study was conducted in 2007 and was repeated in 2010 (World Bank 2007 and 2010). The second edition of this report, based on a new dataset for 2010, compares the logistics profiles of 155 countries. The Logistics Performance Index (LPI), which is calculated for each country, is an assessment of logistics performance (ranked on a scale of 1 to 5, with 5 being the best and 1 the worst) and is based on surveys conducted with nearly 1 000 global freight

forwarders and express carriers. The LPI is a comprehensive index created to help countries identify the challenges and opportunities they face in trade logistics performance.

The 2010 LPI summarises the performance of countries in the following six areas which capture the most important aspects of the current logistics environment:

- Efficiency of the customs clearance process;
- Quality of trade and transport-related infrastructure;
- Ease of arranging competitively priced shipments;
- Competence and quality of logistics services;
- Ability to track and trace consignments; and
- Frequency with which shipments reach the consignee within the scheduled or expected time (timeliness).

The top five logistics performers in 2010 were (in order): Germany (4.11), Singapore (4.09), Sweden (4.08), the Netherlands (4.07) and Luxembourg (3.98), and the bottom five were Somalia (1.34), Eritrea (1.70), Sierra Leone (1.97), Namibia (2.02) and Rwanda (2.04). Table 1 shows the top 10 upper middle-income countries, of which South Africa is the top performer.

**Table 1: Top 10 logistics performers 2010, upper middle-income countries**

Economy	2010 LPI			2007 LPI		
	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
South Africa	28	3.46	78.9	24	3.53	79.4
Malaysia	29	3.44	78.4	27	3.48	77.7
Poland	30	3.44	78.2	40	3.04	63.9
Lebanon	33	3.34	75.1	98	2.37	42.9
Latvia	37	3.25	72.2	42	3.02	63.2
Turkey	39	3.22	71.4	34	3.15	67.5
Brazil	41	3.20	70.6	61	2.75	54.9
Lithuania	45	3.13	68.5	58	2.78	55.7
Argentina	48	3.10	67.4	45	2.98	62.1
Chile	49	3.09	67.3	32	3.25	70.5

Source: World Bank 2010

South Africa is regarded as a logistics over-performer when comparing the LPI score relative to income per capita, as are countries such as China and India. China and India are ranked 27<sup>th</sup> and 47<sup>th</sup> respectively, but are seen as lower middle-income countries. South Africa dropped four places on the ranking and had a marginally lower LPI score of 3.46 (it was 3.53 in 2007), but when taking into account factors such as distance to market, domestic logistics costs, inland spatial challenges and road/rail imbalances, South Africa's performance is currently more than acceptable. Table 2 shows that in the case of all indicators South Africa's performance was relatively constant when comparing the scores, but in most instances the ranking dropped. This gives an indication and acts as a warning that other countries are improving their logistics competencies faster than South Africa.

**Table 2: Comparison of South Africa's LPI components between 2010 and 2007**

Indicators	2010 Rank	2010 Score	2007 Rank	2007 Score
Customs clearance process efficiency	31	3.22	27	3.22
Trade and transport-related infrastructure quality	29	3.42	26	3.42
Ease of arranging competitively priced shipments	31	3.26	22	3.56
Logistics quality and competence	25	3.59	25	3.54
Tracking and tracing ability	24	3.73	18	3.71
Timeliness	57	3.57	31	3.78
Domestic logistics costs	-	-	124	2.61
<b>Total</b>	<b>28</b>	<b>3.46</b>	<b>24</b>	<b>3.53</b>

In 2007 the LPI included a seventh indicator, domestic logistics costs, which was removed for the 2010 study (incidentally, this was also the indicator in which South Africa performed the worst with a ranking of 124<sup>th</sup>). Domestic logistics costs are difficult to estimate or calculate due to data shortages, and methods can vary significantly between countries that do actually calculate these costs (of which there are only a few). The two most common methods are a mathematical cost calculation or a survey-based method. It is therefore inappropriate for benchmarking between countries and this indicator was therefore dropped. However, the World Bank is driving an initiative to standardise the way in which these methods are used so that the results are comparable across countries.

As mentioned in Section 1, South Africa has been measuring its logistics costs since 2004 and the way in which this is done is based on the American mathematical cost calculation method. However, incremental improvements have been made over the years to make the South African logistics cost model more applicable to local conditions. Section 3 gives an overview of logistics costs in South Africa for the 2008 reporting year.

### 3. The cost of logistics to South Africa

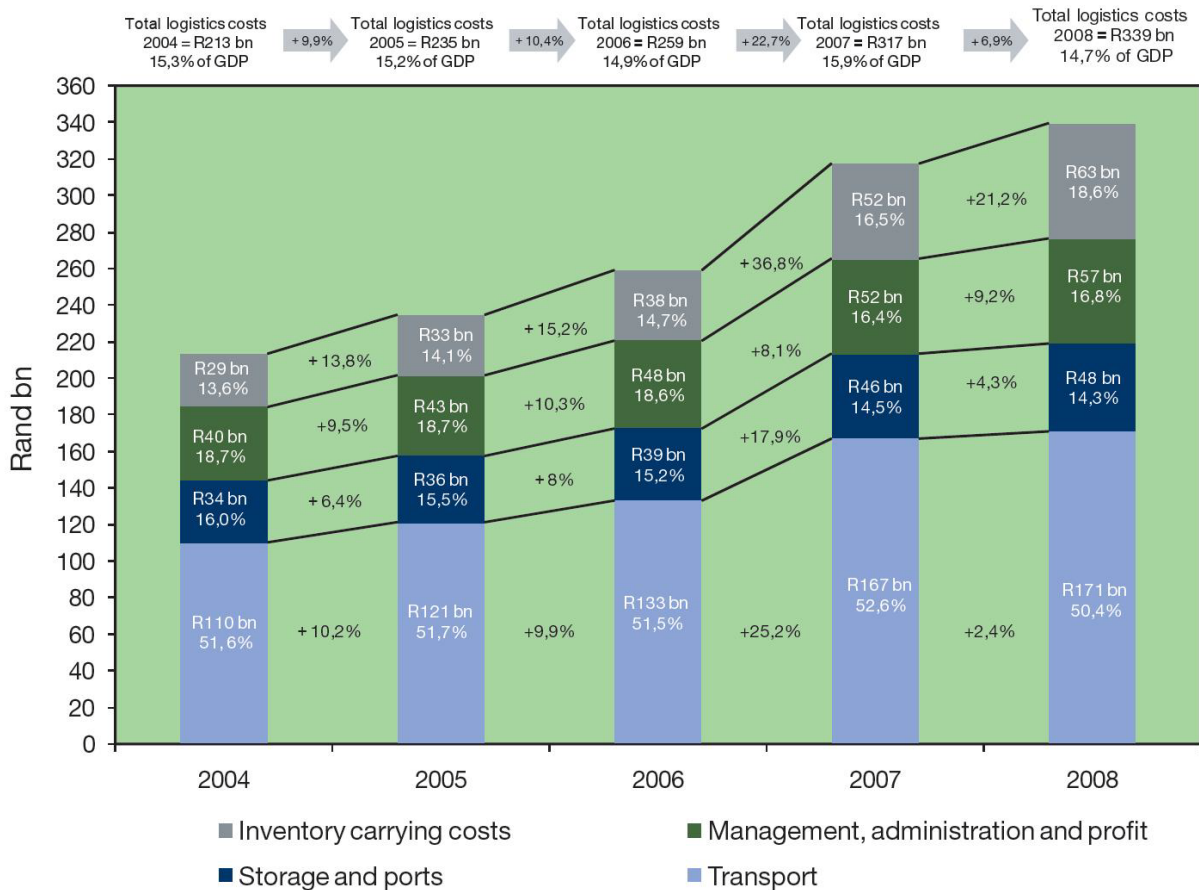
Different ways exist to compute and present logistics costs, namely as a percentage of sales or turnover, as absolute costs or as a percentage of GDP (Rantasila 2010). In 2004 the USA was the only country that computed these costs on an annual basis and the method used was logistics costs as a percentage of GDP (CSCMP 2005). For benchmarking purposes the same methodology was followed to compute the logistics costs of South Africa (Botes, Jacobs and Pienaar 2006).

The cost of logistics in South Africa in 2008, represented as a percentage of GDP, is at its lowest point since it was measured for the first time in 2003. The 2008 total logistics cost figure was R339 billion or 14.7% of GDP, a decline of 1.2% from the previous year (Havenga, Van Eeden and Simpson 2010).

The decline in logistics costs compared to GDP can be ascribed to efficiencies that were realised in the transport sector. Due to the severe oil price fluctuations in 2008 (a peak of \$147 per barrel in July to \$34 a barrel in December, with an average of \$91 per barrel for 2008), many road freight transport service providers increased their efficiency through load factor improvements (e.g. eliminating empty transport legs or consolidating more loads). This meant that transport costs only increased by 2.4% in 2008, a marked improvement from 2007 when transport costs increased by 25.2%, mostly due to very high fuel prices (Havenga *et al.* 2010).

Less inventory was stored at lower real storage rates but for a longer period of time, which led to a net increase of R1.2 billion in storage costs (or 4.3%). The inventory carrying costs rose by 21.2% in 2008, following on from a big increase of 36.8% in 2007 (inventory carrying cost has more than doubled over the past five years). The huge increases were due to a rise in interest rates of 4% between 2006 and 2008 and due to the fact that more stock was tied in inventory for the same period.

Figure 1 shows a summary of the logistics cost stack elements for the period 2004 to 2008 (Havenga *et al.* 2010).



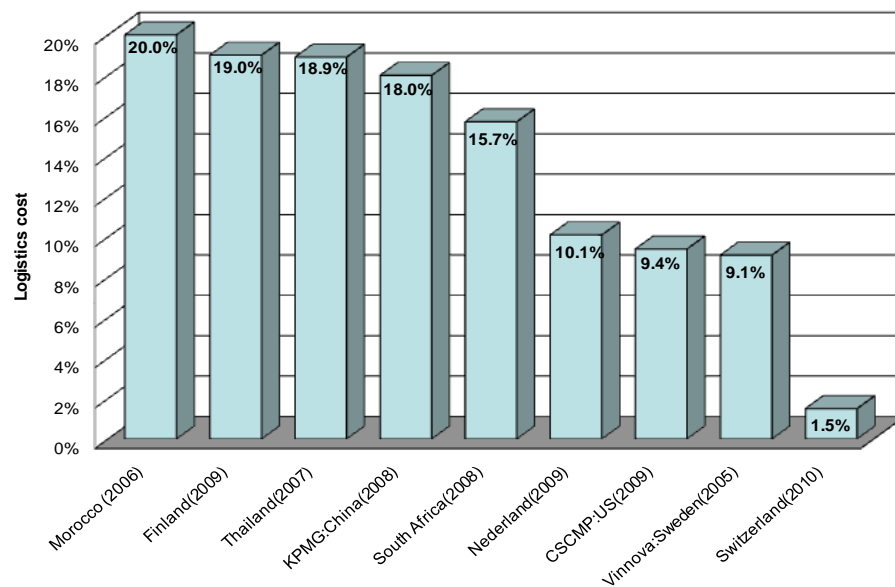
**Figure 1: Logistics costs for South Africa (2004–2008)**

The two major drivers of logistics costs in South Africa, as can be seen from the previous discussion, are the international oil price and interest rates, both of which are external drivers and cannot be controlled by logisticians. The interest rate has since declined and it will be interesting to see if inventory carrying costs will follow suite when the next State of Logistics™ survey is released.

Havenga *et al.* (2010) postulate that the threat of fuel price increases can be mitigated up to a point by improvements in equipment or more efficient practices, but the most sustainable solution involves decreasing the dependence on imported oil through higher local fuel production or a structural shift to a better balanced freight transport system which includes an effective intermodal solution (incorporating road and rail transport). Furthermore, although consensus exists on issues such as regeneration and use of rail capacity in conjunction with road in an intermodal solution, “*the competitiveness and sustainability of South Africa’s logistics system remain at risk and moving from consensus to action is long overdue.*”

#### 4. Comparing logistics costs with those of other countries

There is growing interest in computing logistics costs for different countries. In 1990 there were two such studies, while in 2009 there were about 10 (Rantasila 2010). A comparison is also made of logistics costs for different countries as shown in Figure 2. The results were computed differently, some through modelling the costs, while others were obtained through survey-based questionnaires, and this needs to be taken into consideration when comparing the numbers. Nevertheless, insight is gained when comparing South Africa with other countries. What is immediately obvious from Figure 2 is that the costs of developing countries are, in general, higher than those of developed countries (with the exception of Finland).

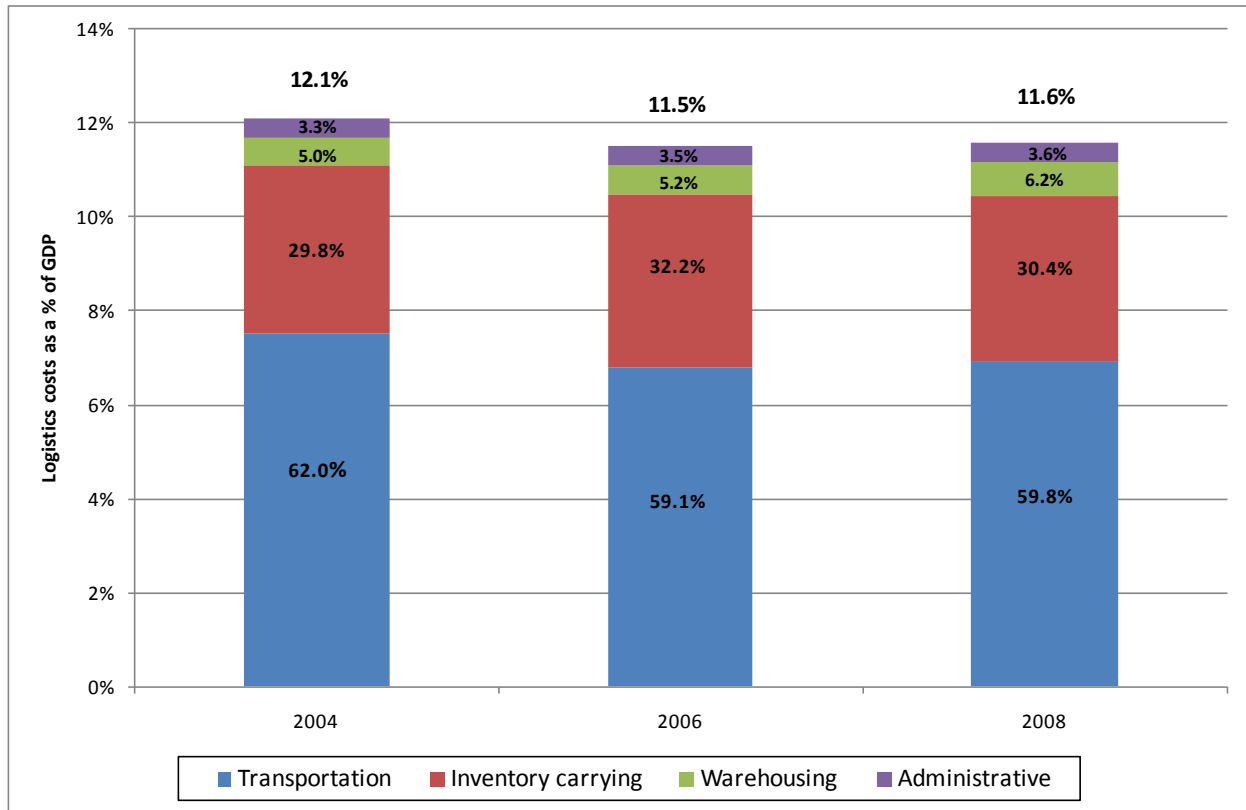


**Figure 2: Total logistics costs as a percentage of GDP for different countries**

In China the logistics costs were 18% of GDP in 2008 (KPMG 2008), whereas in the USA, where the costs have been computed for the last 21 years, the percentage was 9.4% in 2009 and has now dropped to 7.7% in 2010, the lowest ever. In the latter case, the main reason for this low percentage was the decline in the economy which affected the USA more than many other countries. South Africa is positioned somewhere in the middle, with its logistics costs being higher than those of developed countries, but lower than those of other developing countries.

Brazil is an upper middle-income developing country and its logistics costs can thus be compared with those of South Africa. Figure 3 presents the logistics costs for Brazil for three different years (ILOS 2010).

The logistics costs were 11.6% of GDP in 2008, which is 3.1% lower than South Africa's costs for the same period. Transport costs made up 60% of the total logistics costs, and represented 6.9% of Brazil's GDP. South Africa's transport costs were 50.4% of the total logistics costs, and represented 7.4% of GDP. In this regard Brazil is very similar to South Africa.



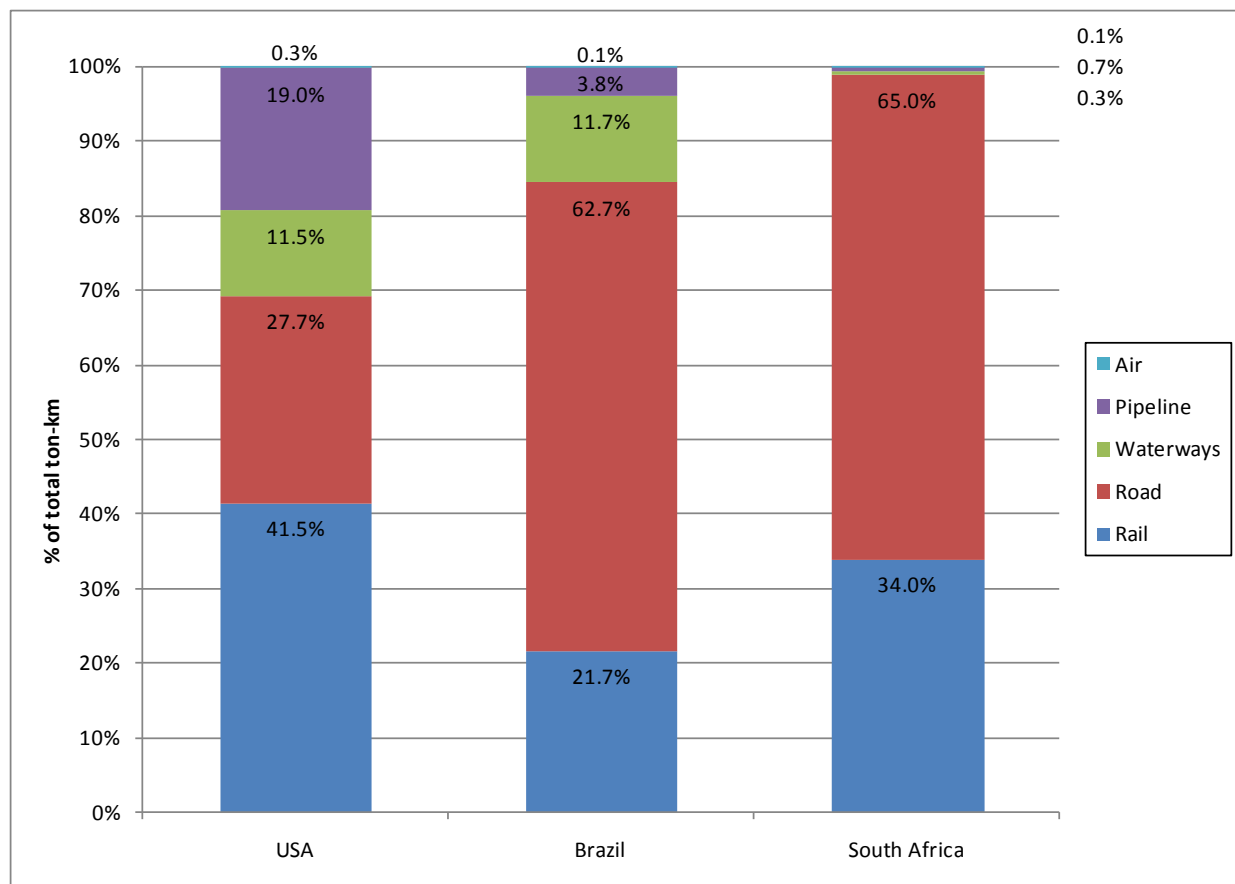
**Figure 3: Logistics costs for Brazil (2004, 2006, 2008)**

Transportation costs are a significant element of total logistics costs in most countries, and the situation is similar in South Africa and in Brazil as can be seen from Figures 1 and 3. Even in the USA the percentage stands at 62% of total logistics costs, but the major difference is that it accounts for only 4.9% of GDP.

Figure 4 shows a comparison between the USA, Brazil and South Africa in terms of the percentage contribution per mode to total ton-km (ILOS 2010, CSIR 2010). Both South Africa and Brazil have significant road transport volumes of over 60%, whereas the figure in the USA is 28%, with over 40% of freight ton-km attributed to rail. Rail's contribution in South Africa is 34% whereas in Brazil it is only 21.7%, but Brazil has the benefit of waterways that contribute an additional 12%.

It can therefore be postulated that for countries such as Brazil and South Africa one of the ways in which total logistics costs can be lowered is by reducing the volume of goods transported by road and use more cost-effective modes such as rail, water or pipeline. One of the main recommendations that has been put forward repeatedly in the South African State of Logistics™ surveys is that an intermodal solution incorporating more rail on long-distance corridors is necessary to create a sustainable logistics environment, and this is affirmed by the above.





**Figure 4: Modal contribution to total ton-km for USA, Brazil and South Africa in 2008**

### 5. Additional issues affecting logistics costs in South Africa

The fact that most of the economic activity in South Africa happens in the centre of the country increases logistics costs, while the location of the country in the world also impacts logistics costs negatively. In addition, costs have been affected by congestion on the country's roads especially during peak hours. In the metros this has been alleviated somewhat by the recent upgrading of the main highways. Most of these roads will be tolled in future and this could have a significant impact on logistics costs as well.

Throughout the country secondary roads are not well maintained, and additionally, the large, heavily loaded vehicles using these badly maintained roads over many years, are causing the decay of these roads. In areas of the country where coal needs to be supplied to power stations the coal is transported by road, and in many cases this aggravates the situation even further on those roads. The effect of bad roads on logistics costs has been quantified and reported on in the 6th State of Logistics™ survey. A case study was conducted which showed that a company's logistics costs could increase by as much as 10% when travelling on a poorly maintained road (CSIR 2010).

### 6. Areas that need attention

In the 1st State of Logistics survey for South Africa (CSIR 2004) the issue of "small business logistics" was raised as a critical aspect that needs attention in the country. The following was stated: *"South Africa's unemployment issue will not be solved simply through intervention from big business – the mainstream economy is limited in its reach. In addition, people outside the mainstream economy will always be forced to engage in entrepreneurial business activities to sustain some form of livelihood. It is therefore imperative to create an environment that is conducive to entrepreneurship so as to enable the*



*unemployed to become economically active within the small business environment. There is, however, a significant logistics divide between medium to large industries located within major industrial-logistical hubs and small and emerging businesses located within resource-poor environments with poor access to the major logistical hubs and corridors.”*

This situation still largely persists today in South Africa. Unemployment in the country will only be addressed by the creation of large numbers of small businesses both in rural and urban areas. Many of these businesses will produce goods, in most cases small quantities, that need to find their way into the local, national and even global marketplace. There is no focused, formal and central effort by anyone to assist such enterprises, through supply chain management services, to get their goods, products, etc. transported and distributed to the demand points. There are examples of very successful small enterprises which manage very effective and efficient supply chains on their own. These are, however, the exception. Government needs to intervene in some kind of way. An aspect that has been discussed recently is the issue of rail branch lines – rail infrastructure that serves many of the rural areas. These would be ideal to use for goods from small businesses in rural areas. The critical aspect is who will operate them, who will pay for them and run them in a financially sustainable manner. This is a very complex and sensitive matter that requires careful consideration.

Over the years, against a background of increasing worldwide public and government concerns for the environment, companies have come under mounting pressure to reduce the environmental impact of their logistics operations. The impact of logistics on climate change has attracted increasing attention while research has revealed that global warming presents a much greater and more immediate threat than previously thought. For example, it is estimated that freight transport accounts for roughly 8% of energy-related CO<sub>2</sub> emissions worldwide (Kahn, Ribeiro and Kobayashi 2007). These concerns have led to what is now known as “green logistics”. In essence the environmental consequences of logistics are analysed and measures developed to deal with them effectively. It is focused on improving the environmental sustainability of logistics. In South Africa logisticians have reacted slower to these concerns than the rest of the world. However, they cannot be ignored and require serious attention. Over the past year the importance of green logistics has been acknowledged in South Africa with the introduction of two different logistics awards for those companies addressing this matter in the most effective way. More needs to be done in ways which will affect the entire supply chain.

## **7. Research priorities for South Africa**

The logistics/supply chain management area is a critical one with many aspects that require further research to find appropriate solutions. Most of these will have a positive impact on costs, i.e. they will reduce costs if tackled properly while at the same time endeavouring to enhance performance in supply chains. Some of these were reported previously (CSIR 2005; Ittmann, King and Havenga 2009). A few additional ones are listed below:

- Commodities that are currently transported on road that could potentially move to rail;
- Measures to get such commodities back to rail;
- Cost implications, and savings, of transporting the above commodities by rail;
- Intermodal solutions required;
- Benchmarking of costs for companies in specific industry sectors, i.e. more micro-level cost calculations and comparisons;
- The effect on logistics costs of service-oriented industries;
- The effect of toll roads on logistics costs;
- Drive to Green Logistics
- The feasibility of re-introducing the rail branch lines; and
- The feasibility of more government-led initiatives to encourage industries, especially those that want to export, to locate closer to coastal areas and ports.

## 8. Conclusion

In any study of this nature it is impossible to address all the various aspects. However, in the current South African context, the most important logistics issues have been addressed in this paper. The logistics costs as a percentage of GDP in South Africa are too high. It may be impossible to lower this percentage to the level of countries such as Brazil, but even a small percentage decrease will be significant and will imply millions in cost savings. This should be the aim of all concerned. In parallel there should be a conscious effort to move certain classes of freight from road to rail, especially on the long-distance corridors. Again this will imply considerable cost savings. Why this is not already happening is difficult to understand. The bad state of roads in the country is already adding to logistics costs and this will deteriorate if the situation is not attended to. Aspects such as tolling of certain roads and the non-maintenance of roads will increase logistics costs, while efforts around Green Logistics could add value without necessarily adding costs. Finally, when all aspects are considered, the logistics sector in South Africa is doing fairly well.

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