

**SECOND**  
**Annual State of**  
**Logistics Survey**  
**for South Africa**

**2005**

*Defining  
research priorities  
for  
developmental  
logistics*





**2005** **Second**  
**ANNUAL STATE OF**  
**LOGISTICS SURVEY**  
**FOR SOUTH AFRICA**

CSIR Built Environment  
*Centre for Logistics*  
Pretoria, South Africa  
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# CONTENT

|                                        | Page |
|----------------------------------------|------|
| ACKNOWLEDGEMENTS                       | 3    |
| EXECUTIVE SUMMARY                      | 4    |
| INTRODUCTION                           | 6    |
| RESEARCH APPROACH                      | 7    |
| THE CASE FOR DEVELOPMENTAL LOGISTICS   | 8    |
| MACRO-ECONOMIC PERSPECTIVE             | 14   |
| INDUSTRY-LEVEL PERSPECTIVE             | 20   |
| SMALL BUSINESS DEVELOPMENT PERSPECTIVE | 28   |
| RESEARCH PRIORITIES                    | 40   |



## PREAMBLE

The South African economy is in a healthy state and indications are that this will be sustained for the foreseeable future. Annual growth rates of 6% are being predicted - something that is almost unheard of in our country. These growth rates can be achieved through the commitment of both public and private sectors. In this context, the new National Freight Logistics Strategy, published recently by the Department of Transport, must be welcomed. This positive step towards establishing an efficient national logistics infrastructure is essential in supporting national developmental strategies. There is no doubt that the growth challenges are going to be dependent on how well the overall logistics infrastructure can cope with the demands placed on it and how well it will be able to support the envisaged growth. The South African industry needs to strive towards world-class supply chains within the country, but especially when operating in the global market.

Within this context it is appropriate for the Council for Scientific and Industrial Research (CSIR) and its associates to publish the second State of Logistics Survey for South Africa. The report is similar in format to the 2004 survey and allows for comparisons in trends - a vital means of keeping track of what is happening in the field. Indications are that envisaged improvements have not yet happened. This is to be expected, since the huge investment of government into the logistics infrastructure will take time to have the desired effect and impact. Nevertheless, all indications are that appropriate interventions have been planned and now need to be implemented. The National Freight Logistics Strategy also needs time to effect reform.

As stated in the first survey, we strongly believe that this initiative should set the stage for an ongoing conversation on various logistics and supply-chain management issues, as well as contribute to an appropriate research and development agenda. In this regard we urge all stakeholders to engage in conversation with the CSIR on this topic. It is only through these interactions that relevant research can be defined and conducted for the national benefit. The significant response to the first survey underlined the need for this work and we appreciate the feedback and interactions to date.

The CSIR would like to thank Spoornet for its financial contribution to this research and our partners for the work that led to this report.

*Hans W Ittmann*

Centre for Logistics, CSIR Built Environment, Pretoria, South Africa

November 2005

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## CSIR

The CSIR is one of the leading R&D, technology and innovation institutions in Africa, with a track record spanning 60 years. The Centre for Logistics is home to extensive expertise in operations research, quantitative modelling and logistics. It has a long history in research and consulting in various industries, and is the originator of the Annual State of Logistics Survey for South Africa.



## University of Stellenbosch, Business School Executive Development

USB-ED Consulting offers customised business solutions which combine the theory and practice of business science. This allows for strong research-based methodologies when assisting clients in fields such as strategy-setting, market research and change management.



## University of Stellenbosch, Department of Logistics

The Department of Logistics offers undergraduate and postgraduate programmes in logistics, as well as academic and professional research and the production of accredited publications.



We would like to thank the following organisations for participating in the survey:

|                                   |                                  |
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| Floppy Sprinklers                 | National Chemical Products (NCP) |
| Gwynne Foster Consulting          | Sasol Chemicity                  |
| Imperial Logistics                | Sasol Polymers                   |
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## SPOORNET

"We want to make sure we reduce the cost of doing business in this country. We can only do this by reducing the cost of logistics."

*Siyabonga Gama, Spoornet CEO, Business Day, 9 November 2005*



# EXECUTIVE SUMMARY

In the first State of Logistics Survey in 2004 the need for measurement and revitalisation of basic infrastructure in South Africa's dual economy was accentuated. The process of addressing these needs has started with the release of the National Freight Logistics Strategy, which delineates a comprehensive development framework, as well as Spoornet's growth plans for recapitalisation.

## The global context - the case for developmental logistics

Currently, the world's focus on logistics issues is divided with the first world caught in a three-way paradox, ie to:

- ❖ continue the efficient development of own economies and therefore logistics systems;
- ❖ contribute to sustainable development globally and stimulate global growth, poverty alleviation and open access, which require a different approach to global logistics;
- ❖ provide homeland security against perceived terror threats, which will tax logistics systems even more and bring new and unexpected inefficiencies into the system.

These paradoxical themes are all related to developmental logistics. The global village made competition difficult for the third world, but at the same time enabled it to catch up with the first world in new and important ways. These issues point towards a need for structural change to existing logistics systems that will improve efficiencies, while also enabling international access between the developed and developing world and between first and second economies locally.

## A macro-economic perspective

South Africa's 2004 production and imports increased by 7,4% on the 2003 volumes. While transport costs increased by 11%, the overall logistics cost remained flat at 15,2% of the GDP. In absolute terms the biggest cost driver is transportation, rising by about R13 billion in the freight sector. The gap between road and rail corridor freight transport has widened even further during the past year, compounding the structural inefficiency in the economy. The good news is that the declines experienced by rail between 1997-2003 have been halted, with rail maintaining similar tonnage levels over the past two years. However, the challenge facing the economy remains: while rail focuses on reversing historic trends, growth in tonnage available for transport is still captured by road. The structural changes required and indicated for developmental logistics are still South Africa's biggest challenge. Efficient long-haul corridors are required, alongside a focus on greater access for the second economy through focused investments.

## Industry innovation

The survey reflects the supply-chain challenges and innovations of the chemicals, processed foods and logistics service provider industries. The nature of supply-chain innovation reflects the varying levels of supply-chain maturity across the industries, as well as the fundamental challenges experienced by these industries. The high level of supply-chain maturity of the bulk chemical industry is reflected in the move to cross-industry collaboration to improve the utilisation of the national logistics infrastructure. In the highly competitive cost-

sensitive industries, such as processed foods, firm-level innovation to reduce costs dominates, sometimes at the expense of channel-level innovation.

### **Government service delivery**

The supply challenges faced by government in delivering services to its citizens are illustrated in an overview of the National Health Care System, where the need for inventory management is identified as the key challenge.

### **Small business development**

The case studies included in this survey illustrate the need for expanding small business support initiatives to include all the aspects involved in establishing channels to market and in developing supply chains. A comprehensive range of SMME networking and logistics interventions is required on a large scale. Innovative solutions to the integration of small and large businesses in a supply-chain context are emerging.

### **Research priorities**

The improvement of the performance of the national logistics system needs to be rooted in multiple-perspectives research, ranging from a macro-economic view to the reduction of the logistics divide between the first and second economies. This requires that a research agenda be developed that will continuously provide quality information that can be integrated to support both strategic and operational decision-making with respect to these varying perspectives. To this end, it is proposed that research is focused on the following areas:

- ❖ Structural inefficiencies in the logistics system
- ❖ Logistics modelling with both a macro-economic and industry focus
- ❖ Strategies for improved supply-chain efficiency
- ❖ Strategies for reducing the logistics divide
- ❖ Logistics for improved government service delivery.

# INTRODUCTION

Hans Ittmann

This State of Logistics Survey is the second such survey conducted by the CSIR and its partners. The aim is to provide a comprehensive picture of the state of logistics in South Africa and, as in the first report, it incorporates a macro-economic viewpoint (top-down), an industry-level perspective (bottom-up) and a small business development perspective, dealing with logistics as a developmental constraint for small, medium and micro enterprises (SMMEs) in urban and rural environments.

This survey follows closely on the heels of the publication of government's National Freight Logistics Strategy. With the tremendous economic growth taking place in the country, the growth in freight traffic has surpassed all predictions. This has resulted in a totally inadequate national logistics infrastructure that will severely hamper growth if not addressed timeously and adequately. The key challenges within the national system are given as<sup>1</sup>:

*"The freight system in South Africa is fraught with inefficiencies at the system and firm levels. There are infrastructure shortfalls and mismatches; the institutional structure of the freight sector is inappropriate, and there is a lack of integrated planning. Information gaps and asymmetries abound; the skills base is deficient, and the regulatory frameworks are incapable of resolving problems in the industry."*

A logistics strategy is overdue and implementation is now crucial. In addition, research priorities for sustained growth will need to be established and such work should be rigorously conducted to the benefit of all.

The South African situation should be considered within the global context. A number of logistics and supply-chain management forces have been identified as having a major impact on what is happening in the global market-place<sup>2</sup>. These forces include outsourcing, off-shoring, supply-chaining and insourcing within an environment where the amplifying force of wireless communications is revolutionising the way the world interacts. These forces have been around for a while, but have only recently come together. In essence there has been a triple convergence. Friedman puts it very eloquently: *"there is the convergence of new players, on a new playing field, developing new processes and habits for horizontal collaboration which I believe is the most important force shaping global economics and politics in the early twenty-first century. Giving so many people access to all these tools of collaboration, along with the ability through search engines and the Web to access billions of pages of raw information, ensures that the next generation of innovations will come from all over Planet Flat. The scale of the global community that is soon going to be able to participate in all sorts of discovery and innovation is something the world has simply never seen before."*

An inescapable fact is that South Africa is a social development economy in this global context, hence the focus of this study on developmental logistics.

For South Africa to continue competing in the global market it is essential that a comprehensive picture of the state of logistics is maintained, that the logistics research agenda is set and that all players collaborate in achieving the goal of making South Africa truly competitive.

1 National Freight Logistics Strategy, Department of Transport, Pretoria, South Africa, September 2005.

2 Friedman, T.L.: The World is Flat, New York: Farrar, Straus and Giroux. 2005.



# RESEARCH APPROACH

The multiple perspectives considered by the State of Logistics Survey include established areas of research, such as cost-modelling, transport economics and supply-chain analysis, as well as emerging research areas, such as the role of logistics in economic development. The research methodology reflects this holistic approach and the relative maturity of these research areas. A more formal and quantitative approach is adopted for the development of the cost of logistics, while a more qualitative and exploratory approach is applied to the small business and economic development perspective.

For the purposes of model development, logistics is considered to be that part of the supply-chain process that deals with the transportation, warehousing, inventory carrying, administration and management of physical products between the primary point of production and the point of delivery to the final consumer (or last customer in the supply chain whenever products are not delivered to consumers). Per definition this excludes the cost of passenger transport and the cost of transport, storage, packaging, handling etc of mail and luggage, as well as the storage and movement tasks that occur during the production process.

The research approach is summarised in Figure 1.

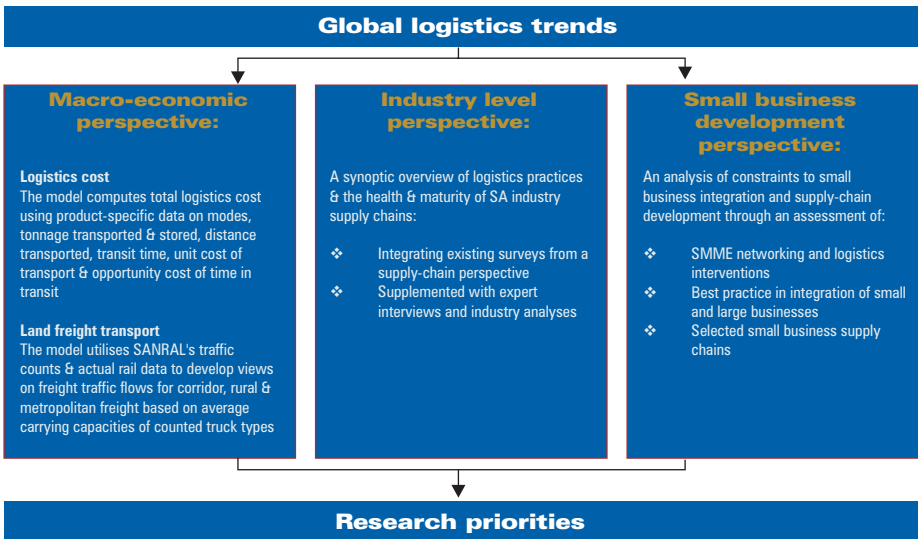


Figure 1: Research approach<sup>3,4</sup>

3 The Logistics Cost Model was developed by the Department of Logistics at the University of Stellenbosch: Botes, F.J., Jacobs, C.G. and Pienaar, W.J.  
The Land Freight Transport Model was developed by USB-ED: Havenga, J.H. and Hobbs, I.E.

4 SANRAL = South African National Roads Agency Limited

# THE CASE FOR DEVELOPMENTAL LOGISTICS

Jan Havenga and Wessel Pienaar

## Introduction - what has been achieved in the last year

In the first State of Logistics Survey (2004), the need for measurement and revitalisation of basic infrastructure in South Africa's dual economy was accentuated. The debate around these issues is robust and conceptually the country is starting to see the fruits of the research labour:

- ❖ The Department of Transport released the National Freight Logistics Strategy delineating a comprehensive development framework and showing commitment to the measurement ideal and its critical role in the implementation of national imperatives;
- ❖ Spoornet submitted optimistic growth plans for revitalisation and is in the process of backing it with a transport master plan that begins to address critical issues; and
- ❖ Government backs the ideals of a social economy and uses the current growth, stable economy and well-managed fiscus to fund poverty alleviation, employment creation and growth aggressively - an approach based on infrastructure revitalisation and investment.

These initiatives and events, however, arrived late in South Africa's development history and substantial damage has already been done. More damage will still need to be discounted as:

- ❖ the lag effect of the poor structural usage of the transport infrastructure continues to debilitate the economy;
- ❖ the opportunities that were lost continue to distract from economic growth;
- ❖ the uncertainty of investment priorities remains as the research backlog is filled; and
- ❖ the culture of non-cooperation between government, parastatals and business persists.

To manage this situation, a target was set by President Mbeki of *"higher rates of economic growth and development, to improve the quality of life of all our people, and consolidate our social cohesion"*. He states that this will be achieved *"by forging the necessary strategic alliances and partnerships to enhance job creation and grow the economy, with a particular focus on bridging the gap between 1st and 2nd economies"*<sup>5</sup>.

This confirms the economy's status as a social development economy, focusing on long-term sustainable development. It is therefore important for logistics professionals to understand the impact of sustainable development dynamics on South Africa's freight logistics issues.

## Sustainable development

Sustainable development has three pre-requisites for success:

- ❖ Economy: wealth creation is the core reason for the existence of the system
- ❖ Community: equitable wealth distribution qualifies and legitimises the system
- ❖ Environment: the extent to which the surrounding environment can sustainably accommodate the system and its development provides the future context of the system.

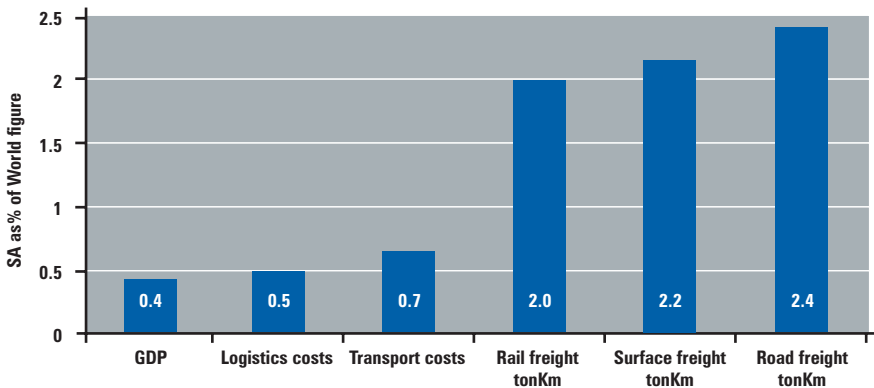
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5 Media briefing by the Minister of Trade and Industry Mandisi Mphahla: Economic, Investment and Employment Cluster's Programme of Action (Cycle Four report), Cape Town, 30 October 2005.

Globally, a rift is appearing between the developed and developing world - wealth is created, but not shared equitably and not in a sustainable fashion. This rift is clearly visible in resources, systems and production factors of economies.

### Production factor differentials

Developing countries produce 37% of the world's Gross Domestic Product (GDP), but pay 48% of the logistics bill<sup>6</sup>. The best economies in the world have achieved logistics costs of lower than 10% of GDP, while the worst could pay as much as 30%<sup>7</sup> with an average of between 11% and 16%<sup>8</sup>. In the field of logistics, notice should be taken of less obvious reasons for this, such as structural differences and policy. A more detailed analysis of South Africa's comparison to the world economy reveals some interesting statistics. (See Figure 2.)



**Figure 2: South Africa's GDP as % of the world's combined production and logistics characteristics<sup>9</sup>**

The country contributes less than 0,5% to the world's production, carries 0,5% of the logistics costs and contributes nearly 2,5% of world road tonkilometers. The country requires 4,4 times the tonkilometers for each dollar of production moved, compared to the rest of the world, and engineered a rail and highway system that does not impact costs as much as it could have.

6 Calculated from Rodrigues, A.M., Bowersox, D.J. and Calantone, R.J.: Estimation of Global and National Logistics Expenditures, in Journal of Business Logistics, vol. 26, No. 2, 2005.

7 Roberts, P.O.: Supply Chain Management: New Directions for Developing Economies, SAIC, World Bank, 2002.

8 The Department of Transport and Regional Services: The Commonwealth's Transport Directions, Commonwealth of Australia, 2004.

9 Calculated from Rodrigue, J-P et al.: Transport Geography on the Web, Hofstra University, Department of Economics & Geography, <http://people.hofstra.edu/geotransRodrigue>, 2005, Gielen, D. Transportation in the World and the EU. A bird's eye view. Presentation 7th EU Hitachi Science & Technology Forum 2004, and State of Logistics Survey modelling.

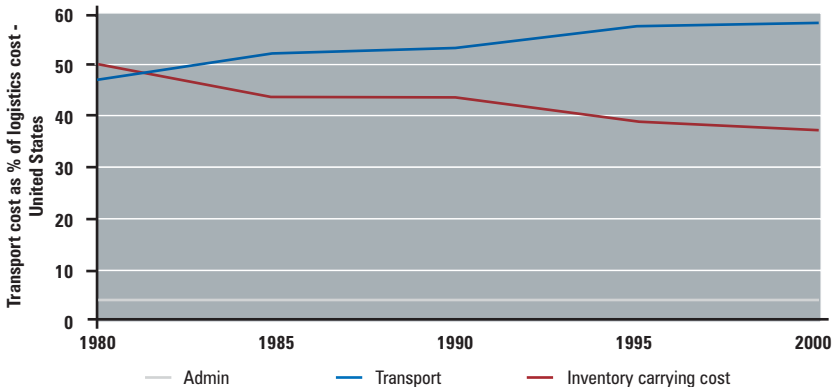
In addition, up to 15 years ago, the common carrier (rail) was required *inter alia* to provide low-cost solutions for unbeneficiated bulk exports, resulting in one of the cheapest bulk rail systems in the world with an unrivalled industrial logistics capability. Yet South Africa is unable to capitalise on this ability. Numerous studies over the past 15 years illustrated that a 25% shift in road freight volumes to an efficient rail system could release large economic potential. Many factors influence efficiency, but especially for high-value products it is “not so much the price that is important but reliability, both in taking proper care of the product and making sure it arrives on time”.<sup>10</sup> This concept is clearly defined by Pienaar:

“... emphasis is not on simply the cheapest or the fastest transport or reducing inventories, but rather on an integrated and coordinated logistics approach. The acceptance of the total-cost concept has changed the relative importance of the different logistics activities and has led to cost trade-offs between transport/goods flow services provided and the operation of warehouse and production facilities assuming greater importance.”<sup>11</sup>

In terms of total cost-effectiveness and especially in terms of transportation costs (being the largest component in our economy), Ravn and Mazzenga argue that:

“The welfare effects of changes in costs of transportation are more intriguing. We find larger welfare effects: a drop in the costs of transportation from 20% to 15% is equivalent to a permanent increase in consumption of just above 15%.”

The questions continually asked are whether rail-friendly cargo is currently moved on road and, more importantly, why does the rail system not attract this cargo? South Africa's position on structural inefficiencies follows the world position (both developed and underdeveloped) where savings in non-transport factors of logistics costs were pervasive, but are expected to flatten out. At the same time, the contribution of transport costs failed to improve over the last decades as illustrated in Figure 3.



**Figure 3: The rising contribution of transport costs in the US economy (as % of logistics costs)<sup>13</sup>**

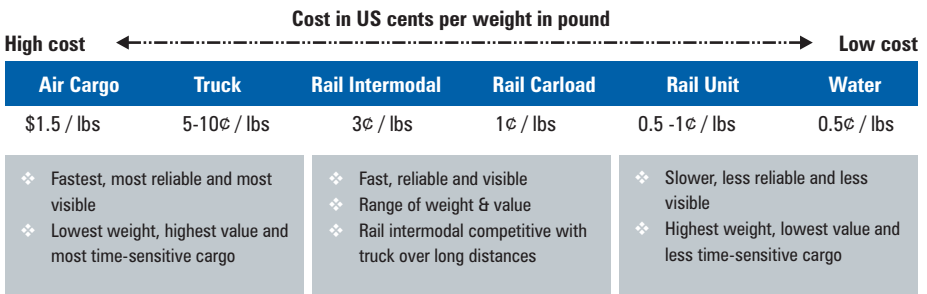
- 10. Meyer, F. Reliability is more important than price, in *International Transport Journal*, 14/2000, p.11-12.
- 11. Pienaar, W.J.: Transport cost and pricing principles, Chapter 12, in Vogt, J.J., Pienaar, W.J. and De Wit, P.W.C.: *Business Logistics Management, Theory and Practice*, 2nd. ed., Cape Town: Oxford University Press, 2005, p. 215.
- 12. Ravn, M.O. and Mazzenga, E.: International business cycles: the quantitative role of transportation costs, in *Journal of International Money and Finance* 23 (2004) p. 657.
- 13. Adapted from Hesse, M. and Rodrigue, J.P., The transport geography of logistics and freight distribution, in *Journal of Transport Geography* (2004), p. 10.

In a just-in-time world, logistics professionals have shifted freight from rail to road to:

- ❖ capitalise on speed and its contribution to carrying cost efficiency
- ❖ ensure punctual delivery (according to contract)
- ❖ improve through-put efficiency by eliminating double handling
- ❖ reduce pilferage, breakages and losses.

These factors are all important in individual decision-making situations. But when larger streams of traffic are analysed, such as the 18 million tons (mt) on road between Cape Town and Gauteng and the 34mt between Durban and Johannesburg, the density argument that should favour rail is unambiguous. An analysis of the traffic content clearly indicates a multimodal solution, and the country has known this for 16 years.

South Africa still has not moved on this, in spite of the fact that the country's economic development probably requires an even higher multimodal consciousness, comparative to that of Europe (where multimodality is more pervasive than in the USA). Comparative transport mode costs for the USA are clearly indicated in Figure 4.



**Figure 4: Comparative costs and efficiencies: various transport modes<sup>14</sup>**

In South Africa's transport-intensive economy, many opportunities have been missed and the time for development action is now. As this year's supply-chain foresight maintains, *"the issues around the inadequacies of the national logistics and transportation infrastructure are well documented ... the market's perception that the country is being let down by its infrastructure"*<sup>15</sup>. But the country should ensure that investments are made in those logistics production factors that will contribute to sustainable development:

- ❖ Economy: Invest in systems that can ensure a competitive modal distribution
- ❖ Community: Ensure equitable access to logistics infrastructure, confirmed once again by the Minister of Transport who recently said that, *"infrastructure development in particular is not a socially neutral activity: what, how and where we plan, and how we implement those plans will*

14 Adapted from American Association of State Highway and Transportation Officials: Transportation - Invest in America, Freight Rail Bottom Line Report, January 2003.

15 Barloworld Logistics: supplychainforesight, 2005, p. 11.

16 Keynote address by the Minister of Transport, Mr Jeff Radebe, MP, at the Free State Province Inter-governmental Infrastructure Development Summit, Bloemfontein, 3 November 2005.

*have far-reaching effects on local communities that we cannot ignore.*<sup>16</sup>

- ❖ Environment: SA will move 400 billion tonkilometers by 2010 (currently 300) and 1 000 by 2050. Planners critically need to think differently about major capital investments to meet this demand sustainably, addressing factors such as the spatial imbalance of the economy where major production occurs far from ports, and population migration and capital investment continue to follow this long-term unsustainable structure.

## The global scene

The world's focus on logistics issues is divided at the moment, with the first world caught in a three-way paradox:

- ❖ Continue the efficient development of own economies and therefore logistics systems:
  - Non-transportation charges have been reduced by collaborative and integrative strategies, but structural inefficiencies continue to rise. Even in first world economies, congestion, delays and infrastructure shortcomings are becoming more visible.
- ❖ Contribute to sustainable development globally and stimulate global growth, poverty alleviation and open access, which require a different approach to global logistics:
  - The third world lags in efficiency, expertise and access to over-protected first-world markets, exacerbated by a global economy that has no idea yet how it will deal with the forecasted 46 000 billion tonkilometers by 2050 (currently less than 15 000 billion).
- ❖ Provide homeland security against perceived terror threats, which will tax logistics systems even more and bring new and unexpected inefficiencies into the system:
  - Homeland security dealt with air safety first, but currently the biggest safety issue is containers, a must for solving the global development issue.<sup>17</sup> This is at the heart of the paradox - some containerisation efficiency gains will be lost on security issues.

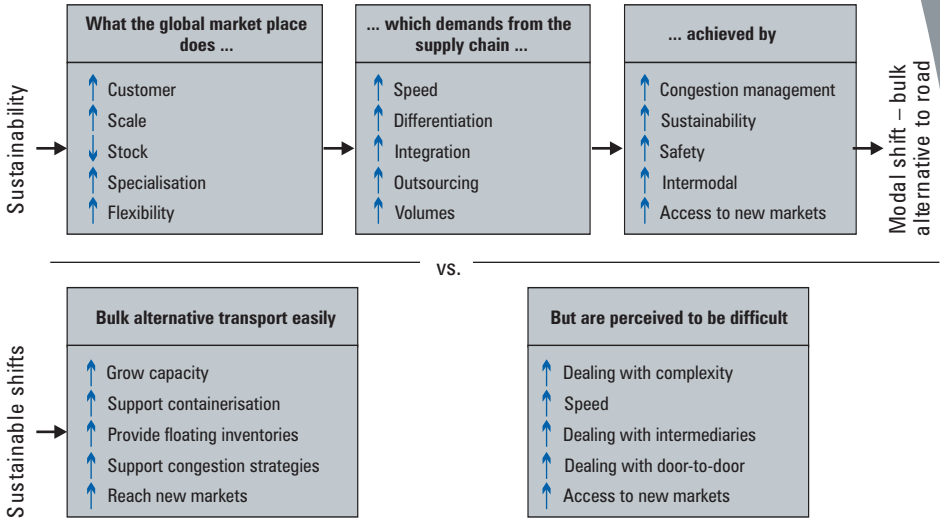
These paradoxical themes are all related to developmental logistics. The global village made competition difficult for the third world, but has, at the same time, caught up with the first world in new and important ways. These issues point towards a quest for structural change as alternative, bulk and intermodal systems will grow efficiencies and access between the first and third worlds and improve sustainability. Changes will enhance dialogue and equitable wealth distribution, the leading indicators of safety improvements around the world. But how can logistics professionals deal with the quest for global structural changes?

## The global quest for structural change

The global market place requires customisation, increased capacity, lower stockholding, specialisation, service delivery and flexibility (Figure 5). This, in turn, requires logistics to provide faster, differentiated, integrated and higher volume services which can be achieved by strategies on congestion management, sustainability, safety, intermodalism and access to new markets, in short, a structural modal shift for suitable commodities from road to one or a combination of other bulk solutions with intermodal interfaces.

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17. Wilson, R. Security Report Card Not Making the Grade, in 16th Annual State of Logistics Report, Council of Supply Chain Management Professionals, 27 June, 2005.



**Figure 5: Structural change in global transport logistics**<sup>18</sup>

The bulk alternative will enhance capacity, support containerisation, provide floating inventories, support congestion management and exploit density and make it possible to reach new markets. However, it also means dealing with a greater degree of complexity, speed issues, intermediaries and the door-to-door service minimum. But aren't these challenges exactly those that South Africa's logistics professionals have equipped themselves to deal with? The time has come to deploy these skills for integration, collaboration and complexity management in the macro-arena where the world most needs it over the next few decades.

18. Adapted from Kooijman, S. et.al. Market development, organisation, intermodality and logistics, Inland Navigation Workshop, Brussels, 2005.

# MACRO-ECONOMIC PERSPECTIVE

Data developed by Francois Botes, Niel Jacobs and Wessel Pienaar

Interpreted by Jan Havenga and Ilse Hobbs

In 2004 South Africa's production and imports required the movement of about 830 million tons, which can be divided between sectors as depicted in Figure 6.

This is an increase of 7,4% on volumes in 2003. The relative split between economic sectors, however, remained constant.

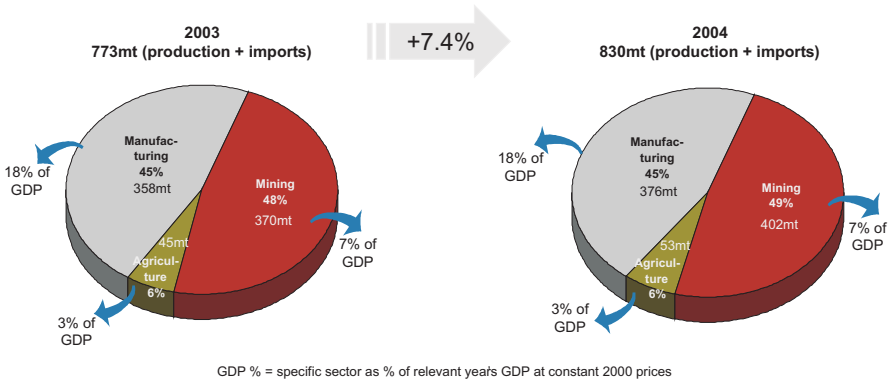


Figure 6: Throughput (production and imports)<sup>19</sup>

## Logistics cost<sup>20</sup>

It costs the South African economy R130 billion to transport this tonnage, an increase of 11% compared to 2003 (See Figure 7).

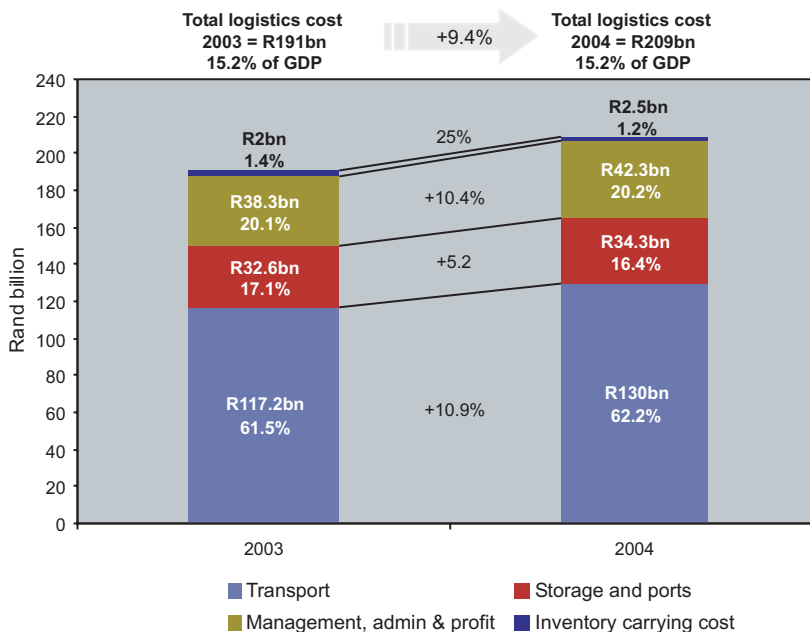
Inventory carrying costs rose more, but from a low base, probably the lowest it has ever been in a low-interest, "just-in-time" environment. Overall logistics costs, however, remained flat at 15,2% of the GDP.<sup>21</sup> This has different implications for the primary and secondary sectors of the economy.

19 The 2003 import figure was adjusted upward due to new data published by the National Ports Authority for the tonnage imported through SA ports.

20 Logistics cost data developed by Botes, F.J., Jacobs, C.G. and Pienaar, W.J. Interpreted by Havenga, J.H. and Hobbs, I.E.

21 The figure for 2003 was adjusted to 15.2% following the Reserve Bank and SSA's adjustment of GDP figures and further refinements to the model.

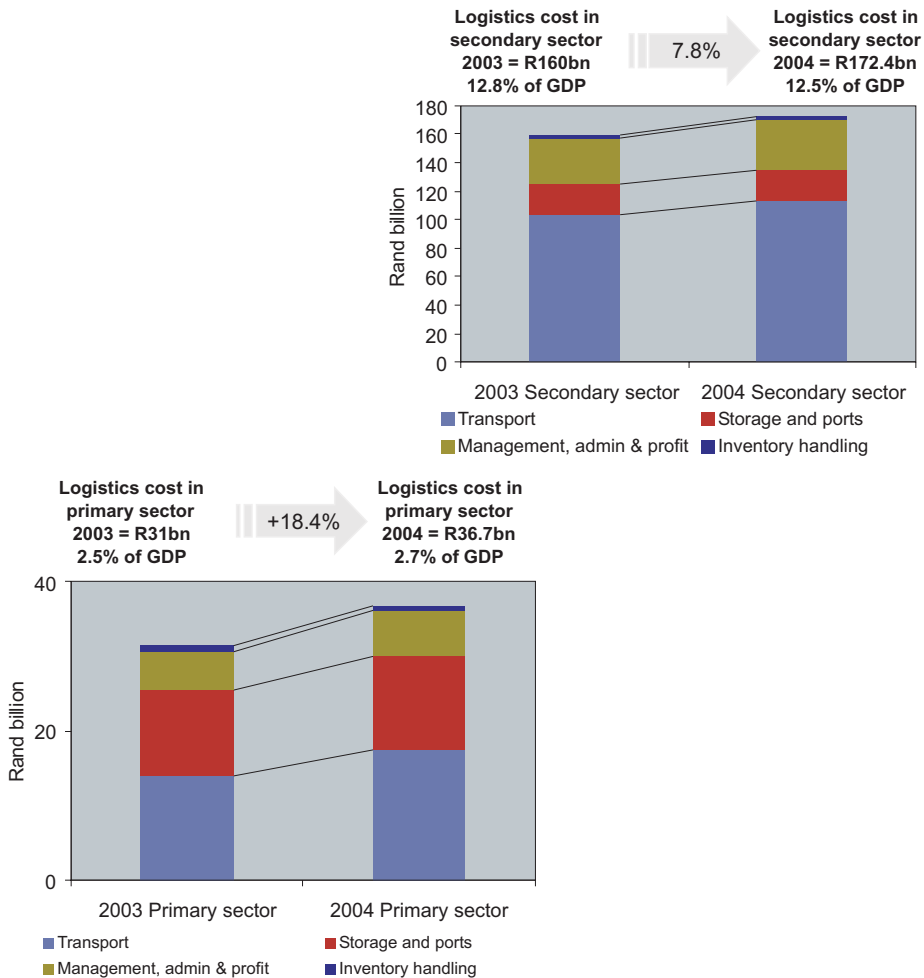




**Figure 7: South Africa's logistics stack elements<sup>22</sup>**

The rise in logistics cost was more pronounced in the primary sectors, where the growth was 18,4% or 0,2% of the GDP of the primary sector. This could explain this sector's valid pre-occupation with the state of logistics in South Africa (Figure 8). In absolute terms, the biggest driver of costs is transportation costs, which has risen by about R13 billion in the freight sector.

22 Adjustments to the first State of Logistics Survey data: Transport cost of the 2004 survey has been adjusted downwards while Management and Administration has been adjusted upwards. Profits and company overheads were previously listed under "Transport", but are now allocated to "Management & Administration". Storage cost was adjusted upwards due to more comprehensive assessment of port charges. An in-depth analysis of port costs revealed an underestimation of these charges. In addition, there were also some refinements of the storage cost model inputs, which further contributed to the higher than previously calculated storage cost. Inventory holding cost is higher due to an adjustment to the more accurate modelling of the time that goods spend in ports.



**Figure 8: South Africa's logistics stack elements - primary and secondary sectors**

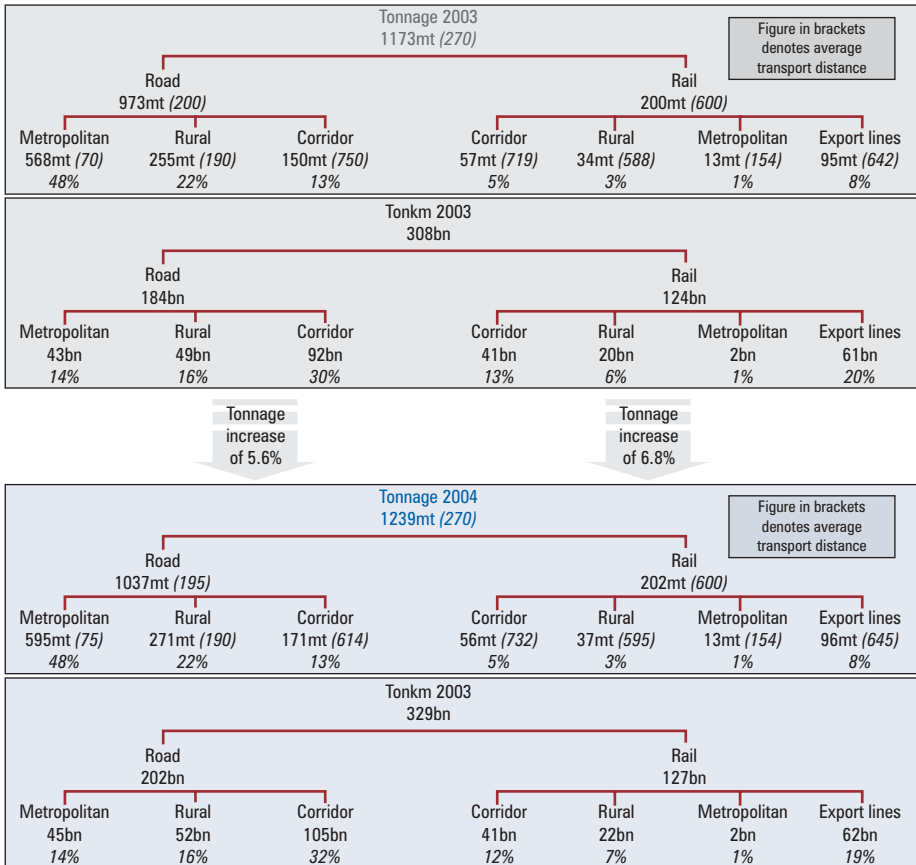
This indicates that a clearer understanding of transport costs (being more than 60% of total costs) is necessary.

### Land freight transport<sup>23</sup>

The 830mt produced, imported and transported by surface freight (maritime, air and pipeline excluded) is shipped an average of 1,4 times in the South African economy. This is a normal phenomenon, since some goods are shipped more than once.

23 Data developed and interpreted by Havenga, J.H. and Hobbs, I.E.

This figure has not changed significantly during the past year and indicates that although production increased, double-handling of freight did not increase proportionately. This translates into shipments of 1 190 million tons (based on the production and imports of 830mt). These shipments are considered as movements within certain metropolitan areas, within certain rural areas and on certain corridors. Some goods will be shipped on some combinations of these categories in which freight shipments are observed. These combinations result in shipped goods being observed 1,12 times per shipment (a double-counting of around 12%) in terms of relative position (ie metropolitan, rural or corridor), adding up to 1 239mt of total transport. These observations are depicted in Figure 9 below.



**Figure 9: Land freight transport in South Africa (Percentage denotes share of total)<sup>24</sup>**

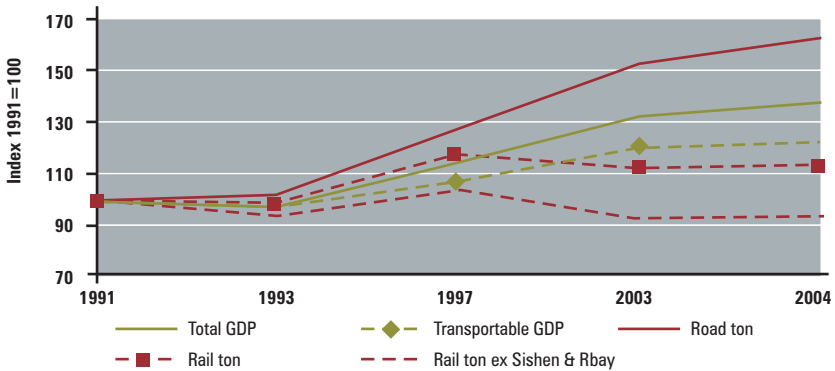
24 The upward adjustment in 2003 data is due to model refinement, an increased ability to define corridor flows in more detail, and to account for double counting in our transport system

The important deduction from the figures above is that the gap between road and rail corridor transport has widened even further during the past year (depicted in Figure 10), thus compounding the structural inefficiency in our economy.

|                                             | Tonnage |       | Tonkm  |      |
|---------------------------------------------|---------|-------|--------|------|
|                                             | Road    | Rail  | Road   | Rail |
| <b>Corridor</b><br>(excl rail export lines) | +14.0%  | -1.8% | +14.1% | 0%   |
| <b>Metropolitan</b>                         | +4.8%   | 0%    | +4.7%  | 0%   |
| <b>Rural</b>                                | +6.3%   | +8.8% | +6.1%  | +10% |

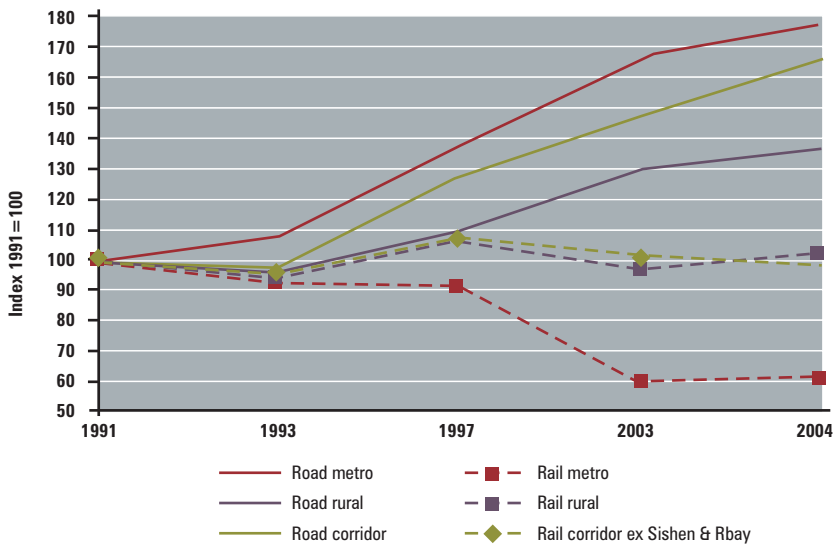
**Figure 10: Percentage change from 2003 to 2004**

As noted in last year's survey, corridor traffic amounts to 19% of tonnage transported in the economy and 45% of traffic by basic unit measurement (tonkilometres). We still maintain that this is where the majority of structural changes occurred and the biggest percentage of costs could be saved. The nature of these structural changes is depicted in Figure 11, which illustrates the huge gap between road and rail.



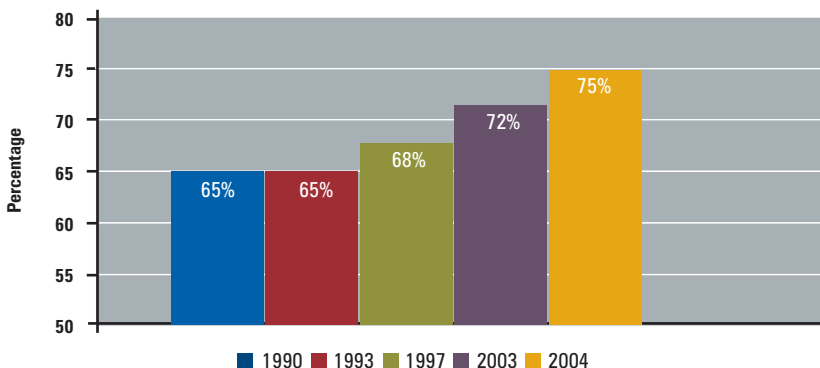
**Figure 11: Structural changes in freight transportation**

Freight traffic was further analysed according to the three areas mentioned earlier, ie corridor, rural and metropolitan. A positive development is that declines experienced by rail between 1997-2003 have been halted, with rail maintaining similar tonnage levels over the past two years. The challenge facing the economy is, however, that while rail still focuses on reversing historic trends, growth in tonnage available for transport continues to be captured by road.



**Figure 12: Road/rail trends for the three traffic types**

The widening gap in corridor traffic, where more and more tonnages are shipped over long-haul, densely populated road corridors, is still evident. The increasing market share of roads is depicted in Figure 13.



**Figure 13: Corridors: Roads market share**

### Structural changes to enhance developmental logistics

The structural changes required and indicated for developmental logistics are still South Africa's biggest challenge. If an efficient shift on long-haul corridors could be engineered, greater access could be realised for the second economy, through focused investments.

# INDUSTRY-LEVEL PERSPECTIVE

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## Introduction

In a challenging macro-environment, industries have had to devise their own means of creating and maintaining globally competitive supply chains. An economic up-turn is anticipated in the short term, which is expected to out-pace the rate at which investments in logistics infrastructure will take effect. Industries must therefore continue to turn to innovative solutions to address supply-chain challenges. In this survey, we reflect on the supply-chain challenges and innovations of the chemicals, processed foods and logistics service provider industries.

Similar to the private sector, government also faces significant supply-chain challenges in its efforts to deliver services to its citizens. These are illustrated by an analysis of the complexities of health-care service provision, and an overview of innovations in government delivery of health care.

## Chemicals

### Industry overview

The South African chemical industry developed primarily around the gasification of coal to produce petrochemicals. Apart from producing synthetic fuels, the “synfuel” plants are now also the major sources of chemical feed stocks and intermediates. This has led to a geographic clustering of the industry near inland coal fields.

Contributing around 5% to GDP and approximately 25% of its manufacturing sales, this industry is of substantial economic significance to the country. Annual industry sales are around R126 billion. The sector is dominated by the production of base chemicals and petroleum, which constitute 60% of the production value. The industry is highly complex and diversified, with end-products often being composed of a number of chemicals. It can be divided into four broad categories:

- ❖ Base chemicals (ethylene and other petrochemical building blocks, ammonia, acids)
- ❖ Intermediate chemicals (waxes, solvents, plastics)
- ❖ Chemical end-products (paints, explosives, fertilisers)
- ❖ Speciality end-products (pharmaceuticals, agro-chemicals).

Global trends in the industry include consolidation of businesses to increase economies of scale, specialisation with respect to specific market sectors or products, and cost reduction and price deflation as a result of consumer pressure. Overall, the industry invests heavily in R&D to support continuous product and process innovation.

A study carried out by Trade and Industry South Africa in 2001 highlighted specific supply-chain challenges from different perspectives. Some of these challenges are listed below:

- ❖ **Industry perspective** - the lack of integrated planning between industry players through sharing common transport infrastructure for bulk chemicals leads to sub-optimal use of infrastructure. The lack of consolidation of loads for inbound goods, such as the co-shipping of raw materials in the bulk chemicals

sector, is of concern. There is no industry learning forum, which results in high learning costs for first-time exporters.

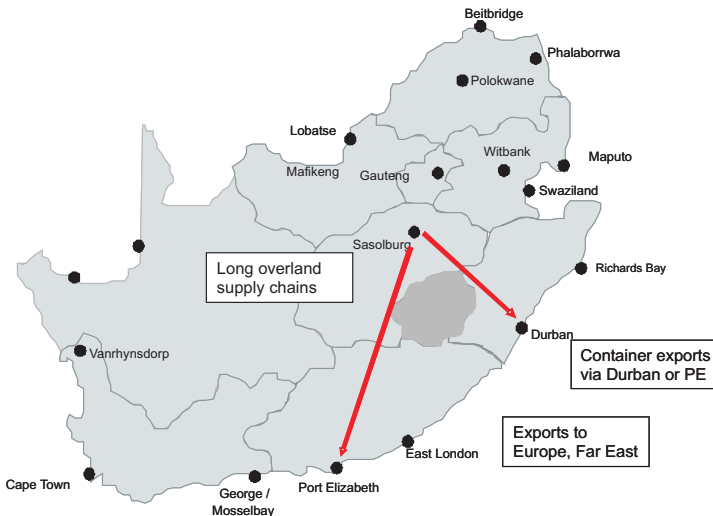
- ❖ **Firm-level perspective** - sub-optimal responsiveness due to issues such as low adoption of management structures to ensure end-to-end responsibility of supply-chain processes, and failure to translate reductions in manufacturing cycle times into reduced order lead times, is a significant challenge.
- ❖ **Logistics service provider perspective** - the transport of rail-friendly bulk chemicals has shifted to road, with an accompanying impact on cost. Inadequate port facilities for handling large export and import volumes of petroleum products are a further challenge.

The supply-chain overviews discussed below will illustrate some of the responses to these challenges.

### Supply-chain overview: Polymer exports

Polymer exports are the raw materials for downstream cost-sensitive enterprises and the key challenge for this industry is to remain as cost-competitive as possible in both local and global markets. Cost competition is exacerbated by cheap imports of plastics goods from China and long supply chains (as a result of South Africa's location relative to global markets).

The key supply-chain challenges are to save transport costs while retaining reliability, given the long overland and over-sea supply chains. This requires appropriate sophistication to lower supply-chain costs without adding unnecessary overheads.



**Figure 14: Polymer exports**

Supply-chain innovation has been driven by cost reduction. In order to avoid fees associated with the return of empty containers to the port, collaboration with an importer in another industry has led to the return-trip use of containers, which in turn results in better utilisation of corridor

capacity. An enabling factor has been the visibility of systems of all role players involved. Similar innovation with respect to the utilisation of rail could in future result from joint operational planning with Spoornet.

### **Supply-chain overview: chlorine and salts**

All final products in the chlorine industry are hazardous and the key challenge for the chlorine industry relates to the safe handling, distribution and storage of products. Raw materials are imported from Namibia via Richards Bay and consistency of supply is critical to the industry. Chlorine producers primarily serve the local market. The growth potential in neighbouring countries is constrained by the lack of reliability of road and rail transport into Africa.

The key supply-chain challenges are to save transport costs while retaining reliability and, at the same time, ensuring safety in dealing with hazardous products. Inland supply chains are long and inventory is currently kept centrally. Legislation hampers attempts to decentralise depots across the country. A reverse-logistics cycle of cleaning and re-using containers needs to be managed by producers. Logistics cost-drivers include the cost of containers, as well as the cost of distribution in the forward and reverse logistics processes.

Supply-chain innovation has been driven by cost reduction and the need for a reliable service. In order to ensure predictable, reliable and controllable costs for the importation of raw materials, cross-industry collaboration with a ferrochrome exporter, using road transport, has achieved the desired effect. This is an example of better utilisation of scarce resources, achieving a faster and more reliable service cost-effectively.

## **Processed foods**

### **Industry overview**

According to a 2005 report,<sup>25</sup> world sales in processed foods have grown tremendously in the last three decades, reaching US\$3,2 trillion, or about 75% of the total world food sales. However, this has not led to a significant growth in global trade, due to the constraints of multilateral trade rules and the changing nature of competition in the global food industry. Consumers have forced suppliers to engage in local processing to meet local preferences, even as the food industry becomes more global.

While the market share is dominated by developed countries, market growth has been faster among lower-middle-income countries such as China and Morocco. The food industry has grown its operations in these nations via exports and local processing.

The structure of the food industry has changed in developing countries through the massive growth of supermarkets that are increasingly owned by multinationals. Their ability to offer wider varieties of products year-round is based upon economies of scale and on supply chains with a global reach that can handle large volumes of time-sensitive goods. Centralisation of procurement has increased and large distribution centres have emerged. For example, a Carrefour distribution centre in São Paulo may serve 50 million consumers in three different countries. Growth in processed foods exports has been hampered, partially as a result of tariff escalation in countries seeking to increase local value-addition.

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25 Regmi, A. and Gehlhar, M, "Processed Food Trade Pressured by Evolving Global Supply Chains", Economic Research Service of the US Department of Agriculture, 2005. [<http://www.ers.usda.gov/AmberWaves/February05/Features/ProcessedFood.htm>] [accessed 7 November 2005].



Food safety is amongst the most important global food industry issues. Consumer concern has led to the mandatory traceability of the complete supply chain through legislation in the major markets of America and Europe. While this legislation is important, it also poses barriers to trade. Changing demand patterns, with consumers becoming more health-conscious, have placed pressure on the processed foods industry to engage in significant research and development.

### **Supply-chain overview: food manufacturing**

The key challenge for the food industry is to maintain absolute food product safety and adhere to international regulations and customer standards. The industry must be agile enough to respond to constantly changing customer tastes through innovation, new product development and longer shelf availability of food products. Competition is fierce and the industry is dominated by multinationals with extensive supply chains.

The key supply-chain challenges are to reduce costs in the supply chain while retaining reliability and consistency in the supply of products to customers. Proper and accurate demand planning to enable factory-level capacity planning is also essential. Limited industry collaboration takes place in reducing inventory levels, electronic trading and reducing return claims (reverse logistics). Delays in delivery to customers during normal day-time operating hours are forcing the industry to look at the possibility of 24-hour operations. There is a shortage of skilled people in the logistics/supply-chain management environment, especially skilled warehouse workers. Supply chains have improved considerably over the last five to 10 years but there is still room for improvement. Cost management of third and fourth-party service providers are problematic. Stock pilferage remains a significant challenge.

Supply-chain innovation has thus far been driven by cost reduction. In order to avoid unnecessary inventory, safety stock is kept in “mother” warehouses close to production sites. Triangulation or cross-industry collaboration is on the increase. While this creates opportunities for brokerage, the effective utilisation of transport is still a challenge. Products are distributed when needed, using cross-docking at other sites, which has had significant impact on inventory levels. Tracking and tracing technology has resulted in increased supply-chain visibility, although collaboration between just two parties is still the norm, preventing true benefits from being achieved. Management trends include improved control and a drive towards vendor-managed inventory.

### **Supply-chain overview: retail**

The key challenge for this industry is to maintain high levels of consumer satisfaction, which requires excellent on-shelf product availability, service and attention to detail. The industry sources a wide variety of products and distributes them nationally to a large number of stores. Distribution models either include regional sourcing and distribution or national sourcing and distribution from a central point. The retail industry is growing with increasing investment in retail footprint, but with less space for holding inventory. The retail industry is complex and includes formalised grocery chains, pervasive convenience stores and, increasingly important, informal trading outlets. The industry is highly competitive, leading to insular behaviour and a perceived lack of opportunity for collaboration.

The key supply-chain challenges are to move from the current focus on supplier/vendor management and logistics to a more holistic focus on supply-chain management and reduced distribution inefficiencies. Synergies between the retailer's own distribution channels and the supplier's direct store delivery channels need to be explored to reduce costs and could include increased collaboration with suppliers, delivery-scheduling, reducing warehouse duplication and exploiting

road-transport synergies, which would at the same time address the imbalance in traffic between Gauteng and Cape Town.

The focus of supply-chain innovation is predominantly on service-level innovation and the lowering of costs via the improvement of operational processes and an improved understanding of supply-chain management. The use of tools, such as the six sigma model, drives innovation through technical expertise.

### **Supply-chain overview: dairy products**

The key challenge for this industry is to maintain the national availability of high-quality fresh products with a limited shelf-life. Perishable products should ideally move from the farm to the shelf in less than 11 days to maximise the remaining shelf-life. The industry has a multitude of suppliers, but very few large clients - the retail market is dominated by five clients that constitute 75% of the market.

The key supply-chain challenges are to deliver the fresh product as quickly as possible to a multitude of delivery points, while efficiently maintaining the cold chain. Due to the limited shelf-life, frequent deliveries are required which result in much higher supply-chain costs. Customers are more discerning and vigilant than ever before and manufacturers of fast-moving consumer goods (FMCGs) are under intense pressure to diversify product ranges while meeting increased health and safety standards amongst fluctuating consumption patterns. The final leg of the distribution is reportedly the most inefficient: traffic congestion causes delays which, coupled with a lengthy turn-around time at the retail back door, results in an inflated transport fleet. A lack of collaboration between the suppliers and the retailers is a long-standing issue: one of the conclusions reached by the 2005 supply-chain foresight study is that *"SA manufacturers are not engaging retailers constructively to manage costs and service levels"*.<sup>26</sup> At the same time, the study found that one of the key objectives for FMCG companies is to increase collaboration in the supply chain.

There are many opportunities for supply-chain innovation. Dairy suppliers have collaborated with food product producers to share inbound transport to shared depots. Onboard tracking systems have improved the primary distribution network flow. Business-to-business e-commerce has reduced the transaction costs of dealing with a multitude of transport suppliers. Suppliers contend that an increase in trust between the retailers and suppliers will reduce retailer security checks and decrease the turnaround times at the backdoor.

### **Logistics service providers**

#### **Overview**

Over time, the logistics service provider has evolved from being a transporter and warehouse to long-term strategic partner. The service offering has grown to include functions such as procurement, demand-forecasting, clearing and forwarding, network-planning and channel design, as well as supply-chain strategy development. Total visibility of the supply chain can be obtained through the use of the service provider's information technology.

The 2005 Barloworld supply-chain foresight study found that more than 80% of the respondents indicated collaboration in the supply chain as a key objective for the next year, almost double the percentage in the previous year's study. This is encouraging for logistics service providers who aim to form strategic alliances with clients. Currently the degree of collaboration varies according to the industry sector; in the retail sector, the

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26 "Improving Supply Efficiencies", a presentation by Brett Bowes of Terranova at the 7th CGSA/ECR-SA conference on the FMCG and Retail aspects of the 2005 Barloworld supplychainforesight study.

retailers try to maintain the power, while there is close collaboration between manufacturers and logistics service providers in the automotive industry.

### **Key industry challenges**

There is still a lack of awareness among clients about logistics and supply-chain management, resulting in significant potential for outsourcing to logistics service providers. Logistics is often perceived to be limited to transport and warehousing. Some former transport companies now call themselves logistics service providers although they offer the same services as previously. These are mostly small companies. The mega-carriers, however, offer a large basket of products and services to support their clients' total supply chain.

It is a small margin industry where some "fly-by-night" service providers overload and/or sacrifice safety and quality of service in order to undercut the rates of competitors. The industry is also adversely affected by the soaring cost of fuel and high labour costs. Labour costs include the cost of training unskilled staff, loss of productivity due to HIV/Aids, the cost of replacing staff and training new staff due to HIV/Aids.

### **Innovation**

Logistics service providers innovate in order to retain a competitive edge and become the logistics service provider of choice for clients. Innovations mainly focus on service offerings and vehicle design, such as:

- ❖ redesigning the vehicle to optimise the payload, eg to carry one extra car on a car-carrier and to carry containers and normal bulk on a car-carrier to replace the empty return leg; and
- ❖ a service to inform the customer if his delivery is going to deviate from the scheduled delivery time, made possible through real-time tracking of vehicles.

## **National health care**

### **Overview**

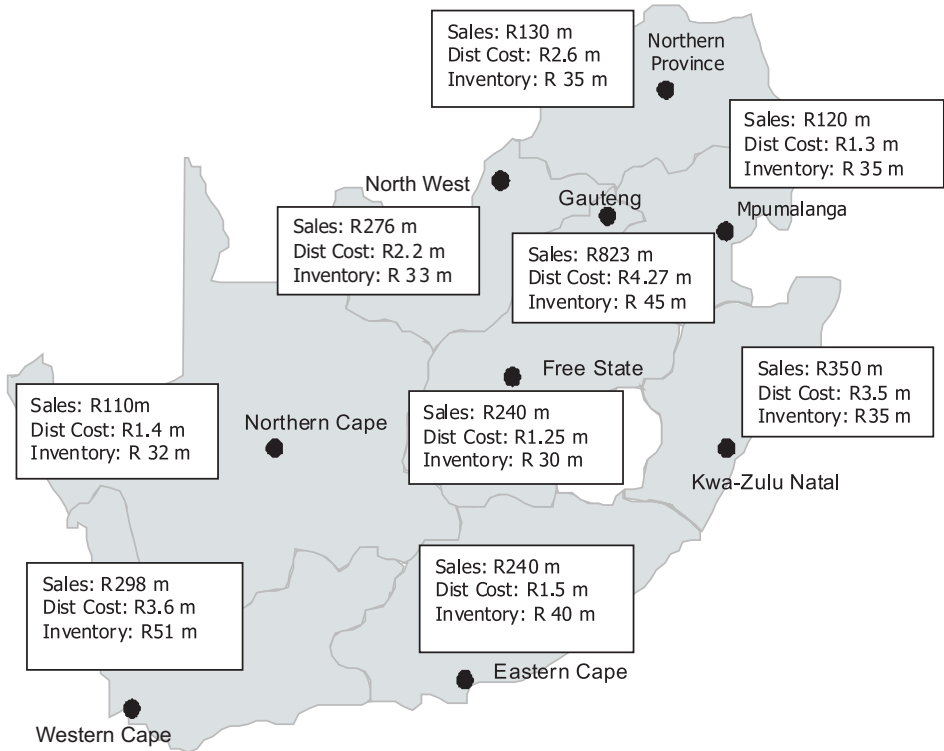
National government is tasked with the delivery of a health-care system that is accessible, caring and affordable, while ensuring high quality and efficiency. Efficient delivery requires the management and integration of six different delivery channels, with end-users located in both urban and rural areas. Against this background, the National Department of Health is defining its supply-chain management as a core part of its financial strategy. The magnitude of the task, and the efficiency with which it is currently carried out, are demonstrated by the provincial sales, distribution costs and inventory figures for pharmaceuticals. Distribution costs are relatively small at R21,62m or 0,8% of total sales. The chain carries pharmaceutical inventory to a value of R336 m, which amounts to 12,9% of total sales.<sup>27</sup> (see Figure 15)

### **Key industry challenges**

Policy and legislation are key elements that govern the industry and thus contribute to the speed of conducting business. The industry is being suffocated by the slow processing of financial transactions, which negatively affects new entrants such as BEE companies, as cash flow becomes problematic for continued operations within these companies.

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27 Sourced from National and Provincial Department of Health Annual Reports and interviews with Medical Depots



**Figure 15: Government pharmaceutical supply chain - some cost elements**

**Key supply chain challenges**

Inventory management is the key factor since it affects the industry in several ways. About R340 million is tied up in inventory nationally (in medical supply depots) and it is critical to manage obsolete stock since reversals and credits put a strain on the system. Inefficient handling of delivery notes also leads to financial transactions being delayed and costs stakeholders and the supply-chain channels unnecessary penalties in interest.

**Supply-chain innovation**

The Gauteng medical supply depot has devised innovative ways of improving supply-chain efficiency, including:

- ❖ pre-packing prescription medicine, which allows pharmacists to focus on their core competency, thus speeding up throughput times in hospital dispensary units;
- ❖ setting up procedures for the management of donations as part of the existing financial and distribution systems, resulting in cost-effective uptake into the system;

- ❖ using statistical inventory management to determine product classification, thereby improving availability of products, and reducing complicated financial credit transactions between the depot and the manufacturers; and
- ❖ reducing stock-theft by colour-coding government medical supplies, rendering these un-saleable to private sector institutions.

### **Summary: Supply-chain innovations**

The nature of supply-chain innovation reflects the varying levels of supply-chain maturity across the industries and the fundamental drivers of the industries. In the highly competitive, cost-sensitive industries, such as retail, firm-level innovation to reduce costs dominates. Innovation is hampered by the lack of trust between suppliers and retailers.

The high level of supply-chain maturity of the bulk chemical industry is reflected in the move to cross-industry collaboration to improve utilisation of the national logistics infrastructure.

The relatively low level of maturity of the clients of logistics service providers impacts on their ability to innovate. This is reflected in the predominantly operational focus of innovation.

# SMALL BUSINESS DEVELOPMENT PERSPECTIVE

*Andries Naudé, Enoch Ralehoko, Chanel de Jager,  
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## Introduction

In defining small business support programmes, the focus is often on increasing the start-up rate through developing skills and facilitating access to finance. In the long run, however, businesses need to operate in a supportive environment that allows sustainable and cost-effective operations. In this context, the ability to develop channels to market, as well as the accompanying supply chains for the physical movement of goods, is often overlooked. The supply-chain challenges of such businesses are significant. SMMEs are cash-constrained, and have limited resources that can be allocated to channel development. In addition, global demands, such as traceability, are placed on small and large businesses alike, without support that will enable SMMEs to comply with such regulations.

The 2004 Global Entrepreneurship Monitor<sup>28</sup> confirms entrepreneurship as one of the key enabling factors for economic growth in South Africa. At the same time it highlights current government policy for entrepreneurial support as one of the key areas of improvement, suggesting that direct government support be abandoned in favour of support of private sector initiatives. The focus on BEE procurement has led private sector companies to attempt to integrate SMMEs into their supply chains. However, a number of challenges still persist. A focus on the ability of small businesses to develop interfaces that enable integration will be of increasing relevance in future.

## Reducing the logistics divide

One of the key issues highlighted by the first State of Logistics Survey was the existence of a persistent “logistics-divide” between mainstream supply chains involving large or technologically advanced firms and the local or informal supply chains, where emerging or rural SMMEs tend to be involved.

This is not only a problem in the contexts of South Africa and other developing countries. One of the findings of a European study of freight logistics and transport systems was that many supply chains involving SMMEs are inefficiently organised and that participants are generally unaware of best logistical practices.<sup>29</sup> There are nevertheless important distinctions that can be drawn between the conditions facing European and South African first economy SMMEs and the logistics and other structural economic conditions that typify South African rural/second economy environments.

These include:

- ❖ The high proportion of emerging farmers and other small enterprises currently operating at a sub-critical scale;

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28 Orford, J Herrington, M. and Wood, E. Global Entrepreneurship Monitor South African Report 2004, University of Cape Town Graduate School of Business.

29 Freight Logistics and Transport Systems in Europe: Executive Summary, European Council of Applied Sciences and Engineering, 2001, p.22.

- ❖ The fragile and limited economic base, typically consisting of agriculture (subsistence and/or commercial), related extension, business support and processing services, tourism and related activities, with perhaps some forestry, mariculture, fishing and other more specialised forms of resource-based economic activity;
- ❖ The sheer physical remoteness and low population densities of many rural areas and the attendant transport provision and logistical problems, such as long distances, vast networks of poor, low-volume roads and low-demand thresholds; and
- ❖ The comparatively limited technical and managerial capacity of municipalities and institutions responsible for service delivery in these areas.

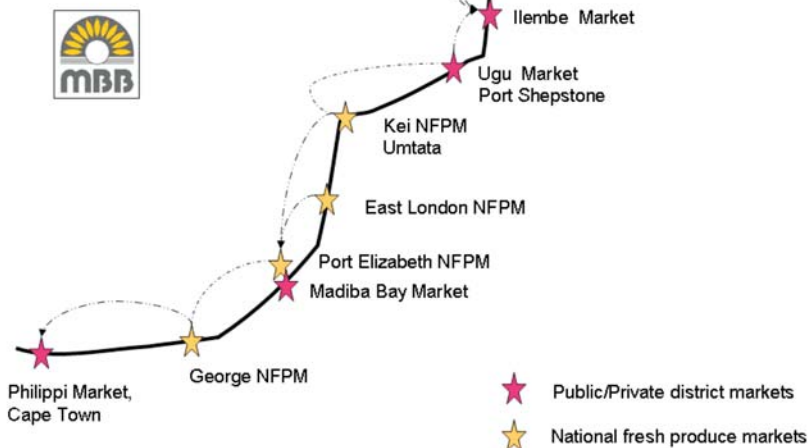
Against this background, it will not be sufficient to target and attempt to improve only the logistics management skills of resource-poor SMMEs. A more comprehensive range of SMME networking and logistics interventions is needed, guided by the following objectives:

- ❖ to promote the formation of scale-efficient SMME clusters and networks;
- ❖ to establish cost-effective networks of brokers, logistics depots, information systems and other mechanisms to consolidate loads, increase average shipment sizes and reduce the average costs of freight or parcel shipments to and from SMMEs;
- ❖ to improve the local supply linkages and multiplier effects of fresh produce, supermarket and other trading systems in traditional rural or second economy areas (ie remove the bias towards external, first economy suppliers);
- ❖ to develop better integrated, hub-satellite networks of markets, processing centres and depots; and
- ❖ to create new business and/or “upscaling” opportunities for existing small-scale or informal transport operators (e.g. involvement of “bakkie” operators in health logistics systems).

Although there is not yet any evidence of a formal, integrated strategy to address these objectives, or align the logistics development and related infrastructure initiatives of relevant national, provincial and local government departments, there are several recent examples of initiatives that could potentially be linked (and leveraged) to achieve the desired outcomes.

The first example is the possibility of developing an inter-linked set of national fresh produce markets and new district agricultural markets along the N2 development corridor, as shown in Figure 16.

## The AgNRG N2 link



**Figure 16: National fresh produce markets and new district agricultural markets along the N2 development corridor (conceptual)**

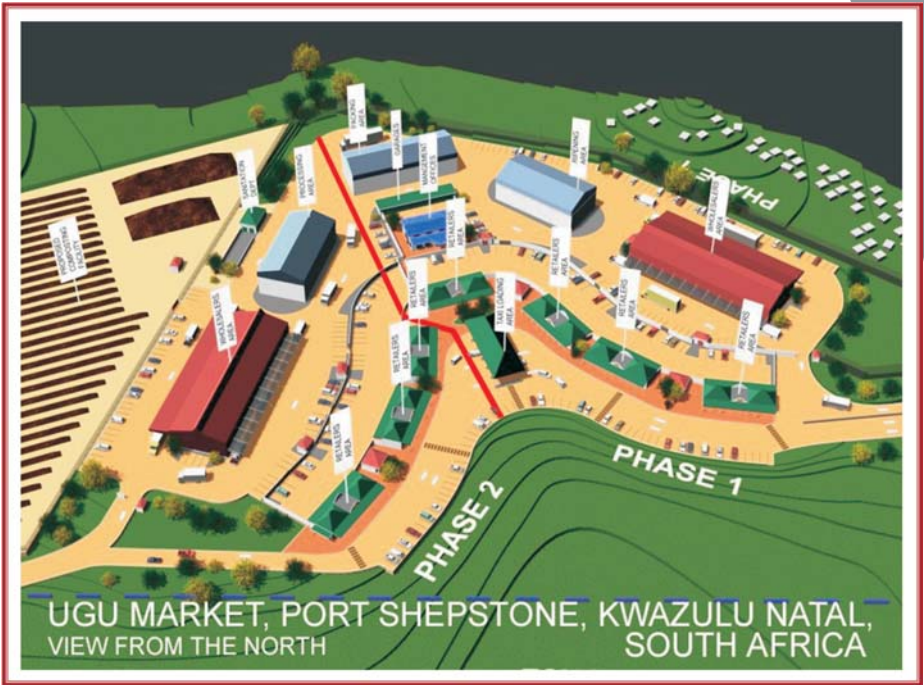
The second example that is integrated into this developing national and regional grid of emerging markets, is the Ugu Market initiative at Port Shepstone, which the Ugu District Municipality is promoting as part of its local economic development (LED) strategy and to support and develop the emerging farming sector. Funding from the municipality's LED budget and from the Gijima Fund, sponsored by the European Union, has been secured to identify and equip the first four of a number of collection/distribution depots in the rural areas of the Ugu district. Also included in the approved LED budget for 2005/06 is an allocation for subsidised transport between the depots and the Ugu Agricultural Market.

Figure 17 provides an artist's impression of the Ugu Agricultural Market, to become operational in the first half of 2006.

A similar link is being planned for the N7 development corridor, eventually linking Philippi Market in Cape Town with production areas and markets as far as Rundu and Ondangwa in Namibia. Further extensions into Angola might also become possible.

The other pivotal point of this distribution system is the Philippi Market in the Cape Metropole, currently being constructed as part of the national and regional grid. The land and infrastructure of Philippi Market are funded by the City of Cape Town and the Western Cape Provincial Department of Economic Development. An active two-way transport system between the Philippi Market and Ugu Agricultural Market is being planned, through which fresh produce, such as apples and pears being produced in the Western Cape, will be transported to KwaZulu-





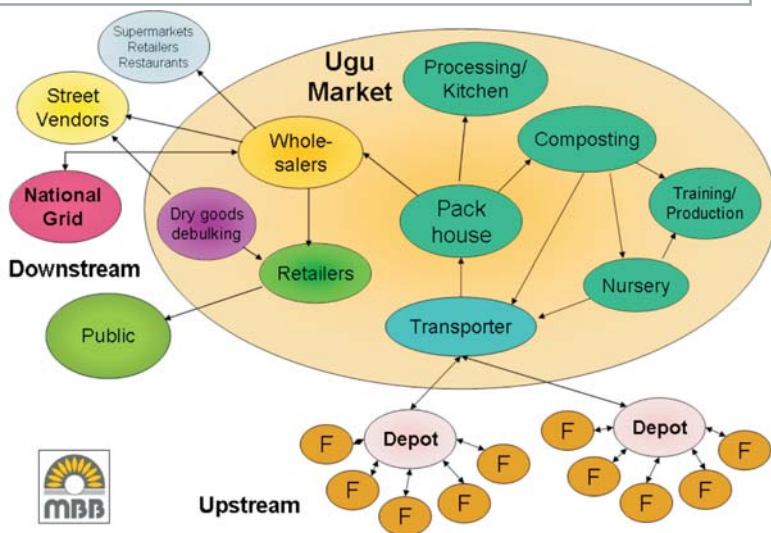
**Figure 17: Ugu Agricultural Market**

Natal, while green bananas and other fresh produce from the Ugu region will be transported on the return trip to the Western Cape. Drop-offs will be possible at all the markets along the route.

Another aspect of this integrated collection and distribution system that requires innovative solutions is transport requirements between farms in rural areas and local depots, involving long distances in some cases. Unsorted harvested crops need to be transported in bulk bins (330kg per bin) to local depots for collection by the market's truck, while farming inputs such as compost in bulk (produced on-site at the market from recycled organic waste) need to be transported on return trips in the same bulk bins.

The integrated local model for this new-style district market concept could be represented in the flow diagram in Figure 18 overleaf.

The third example, which deals with the innovative use of light delivery vehicles (LDVs) to improve local freight as well as health logistics, comes from a proposal for the Port St John's area prepared in terms of the Department of Transport's Integrated Rural Mobility and Access (IRMA) programme. In essence, the idea is to use multi-purpose (passenger/freight transport) LDVs (these are prototypes commissioned by the Eastern Cape Department of Transport) to provide patient transport services from several rural clinics to the local hospital and then use the same vehicles to transport small-produce containers to a local logistics depot located next to one of the clinics. This will be supplemented by the use of



**Figure 18: Flow diagram of new-style district market**

converted containers to create a cross-docking facility at the depot and the establishment of a logistics brokering service at a nearby Multi-Purpose Community Centre (MPCC).

### Global demands on small business supply chains: traceability

In 2002 the European Union (EU) introduced changes relating to traceability regulation that had adverse consequences for developing countries exporting food products to the EU. The onus is now on the private sector to prove that it has taken all possible precautions to avoid contamination of fruit and vegetables sold to the EU. This has significant implications for the handling of goods, transport, record-keeping and management. Small exporters are typically not equipped to comply with these regulations. The practical impact of such demands on emerging farmers in the fruit sector is discussed below:

#### Key areas for traceability

The following operational issues require interventions for maintaining and promoting food safety and traceability on the farm as it impacts on emerging farmers:

##### ❖ Packhouse / coldstore on the farm

The unavailability of a packhouse/coldstore on the farm means that farmers have to travel long distances to the packhouses/coldstores where their produce is stored, sorted, graded, packed and dispatched to various buyers and consumers. This has cost implications for already cost-inefficient businesses. There is a traceability challenge when the lower-grade produce from different farmers is mixed for either selling to fruit processors or fruit distributors. Food safety during transportation to the facility is also a concern.

##### ❖ Multi-usage of transport

Farmers use small vans to transport both input products and produce. Inputs, such as chemical sprays or fertilisers, could come into contact with the produce.

#### ❖ **Designated chemical storage facilities**

Chemical storage facilities are a concern for food safety and certification of a farm. Some farmers do not have designated chemical storage areas.

#### ❖ **Personnel training**

There is a need to train farm personnel in food safety management.

#### ❖ **Record-keeping**

Keeping and maintaining up-to-date records are essential requirements for traceability. Farmers require training in keeping useful records for every activity on the farm.

Emerging farmer support programmes typically focus on access to land, technical farming skills transfer and the provision of input goods. Aspects that enable compliance to traceability requirements are often not supported.

### **Integrating small and large enterprises**

Integration of and interaction between small and large businesses in a supply chain take place on at least three levels:

- ❖ Integration of SMMEs as suppliers into a channel
- ❖ SMMEs and development projects as clients of larger suppliers
- ❖ Developing SMMEs to address new markets.

#### **SMMEs as suppliers to large businesses**

Challenges that were raised in interviews are as follows:

- ❖ Product quality: SMMEs struggle to achieve and maintain adequate product quality;
- ❖ Reliability: many small businesses over-promise and under-deliver to get the business;
- ❖ The creation of dependencies: some SMMEs depend on only one buyer and do not have the capacity to develop alternative markets while focusing on supplying the big client. The client wants to create an arms-length commercial arrangement; and
- ❖ IT systems: SMMEs cannot afford the information systems that enable seamless integration with larger businesses' supply chains.

Examples of local innovations in overcoming some of the issues mentioned above are South African Breweries' (SAB) programmes and the Lumus<sup>30</sup> initiative. SAB has developed the following practices:

- ❖ Joint task groups to provide technical assistance over a period of 18 months to three years to develop and embed technical skills and quality systems;
- ❖ "Supply nurseries" where SMMEs initially supply to only one brewery. Intensive support is provided;
- ❖ A showcase farm where sophisticated farming techniques are used in order to improve the skills of farmers; and
- ❖ Supporting new barley farmers by pledging to buy all their barley, thus enabling them to raise start-up capital.

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30 <http://lumusnet.com/>

The Lumus standard for the assessment and development of suppliers, established by local industry and academic experts, has been in use since 2001. The Lumus IT system, launched in January 2005, allows buyers to find the best fit in terms of supplier maturity. Small suppliers use the system to identify their development gaps and how to address them.

### **SMMEs as clients**

Small farmers are used as an example of the challenges facing suppliers of SMMEs:

- ❖ The lack of economies of scale make SMMEs unattractive as clients of big suppliers;
- ❖ SMMEs pose a credit risk due to their limited cash flow;
- ❖ In farming, land tenure is required to secure production loans. Without it, the crop is the only form of security; and
- ❖ The use of sophisticated products requires product support and some farmers are not equipped to absorb such support.

The sugar industry is an example of local innovation in overcoming these obstacles. The sugar industry has sold off land in economic units to emerging farmers and provides financing of input costs, as well as technical assistance, such as agricultural experts, to assist in the spraying of crops.

### **Developing SMMEs to address new markets**

SASOL focuses on chemical commodities and is developing downstream chemical SMMEs that add extra value by extending SASOL's product range to include small-volume, high-value speciality chemicals. These SMMEs face several barriers to market entry, including:

- ❖ lack of technical know-how required to enter high-technology markets; and
- ❖ lack of expensive, specialised infrastructure and services required to participate in the industry.

SASOL has adopted the following approaches to overcome these obstacles:

- ❖ ChemCity, a wholly-owned subsidiary of SASOL, acts as an incubator for SMMEs, providing comprehensive business development support;
- ❖ SMMEs use the ChemCity branding, which indicates SASOL's technological support and attracts investment;
- ❖ Co-location of the ChemCity chemical park and the SASOL plant provides easy access to raw materials and specialised services;
- ❖ Providing research support to develop products with a technological edge; and
- ❖ Providing access to SASOL's distribution channels in selected cases where synergies exist.

### **Excellence in small business supply chains**

SMMEs follow a long and difficult road to establish themselves and in the process overcome a number of obstacles. Some of these relate to logistics/supply-chain management and, specifically, channel development. Achievement in logistics/supply-chain management is typically reported on and rewarded within large organisations, as is the case with the Logistics Achiever Awards. Without reference points it is impossible to identify local best practice in small business supply chains and many businesses could be selected as reference

points. To share current practice, this survey reflects on the challenges experienced, and innovation applied, by two SMMEs that have established themselves over more than a decade.

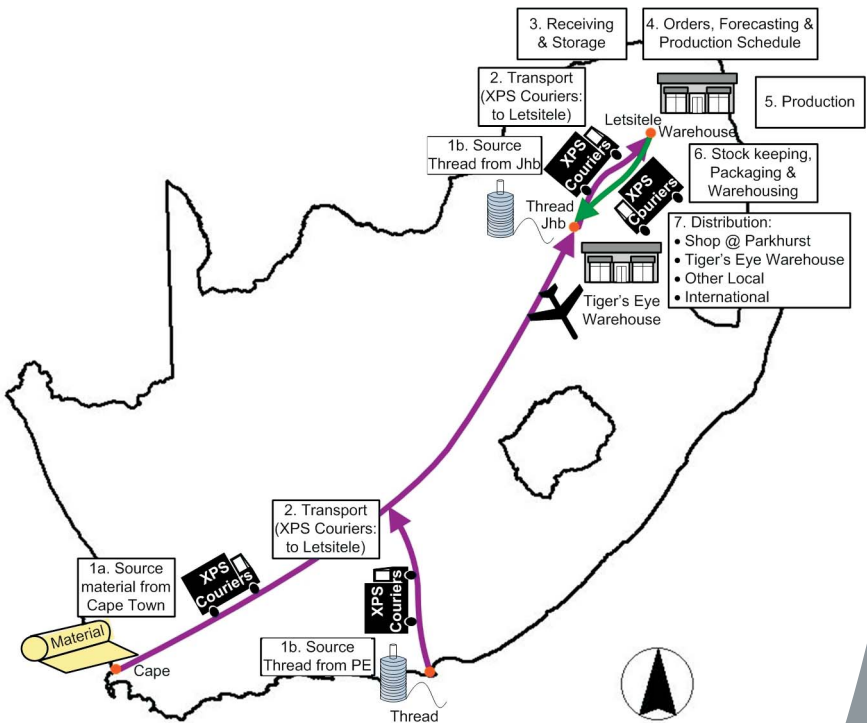
**CASE STUDY: CRAFTS**

**Evolution**

The craft SMME on which this case study is based was started in 1988 on a farm in Letsitele (in the Tzaneen region) by an artist/farmer's wife who wanted to empower the local community with a venture unique to them. Since the Shangaan people of the area were skilled embroiderers, the idea came about to produce uniquely Shangaan embroidery products. The venture started with five embroiderers and has since grown to include 900 Shangaan women of the region. Today, the company is a multi-million rand business, with products being sold in shops and galleries throughout South Africa and exported to the USA, Italy and Australia.

**Supply-chain overview**

The extent of the supply chain of this business is depicted in Figure 19 below:



**Figure 19: Craft SMME supply chain**

The supply-chain challenges facing SMMEs, especially in the start-up phase, relate to the lack of scale of the enterprise, hence its inability to attract the attention of larger enterprises as a potential source of business. For this enterprise, the following are of relevance:

- ❖ Inability to secure consistent-quality raw materials from suppliers without placing bulk orders;
- ❖ Difficulty in securing credit facilities from suppliers due to lack of credit history;
- ❖ Stock-keeping, credit and cash flow: a slow production process requires large amounts of stock, which ties up capital; and
- ❖ Exports and control over distribution channel: the product competes on its brand, but the enterprise does not have the capacity to protect its brand off-shore.

The enterprise needs to protect its brand and image. Due to its lack of capacity it is forced to make supply-chain and market access sacrifices to do so. It needs a presence in foreign markets to act as link with the overseas market needs, but cannot rely on agents who are profit-driven and not committed to the brand. Foreign market distribution facilities are also required. As a result, the enterprise is currently selecting not to develop the international market presence that would enable significant growth.

### **Innovation and enablers**

The enterprise had to devise various means of overcoming its business and supply-chain challenges:

- ❖ Access to labour and quality control: a contract system is in place in which employment is paid for on the basis of the quality delivered;
- ❖ Market development: over a 10-year period, the owner acted as a link between workers and the market and had to exploit her outside contacts, create a market, determine its product requirements and adapt the products accordingly,
- ❖ Access to funding: due to its organic growth and the availability of unused infrastructure on the farm, the SMME never had to lend money; and
- ❖ Access to distribution channels: a single entry point into a third-party distribution channel is available to the SMME in this sector, which reduced the time and funds required for marketing.

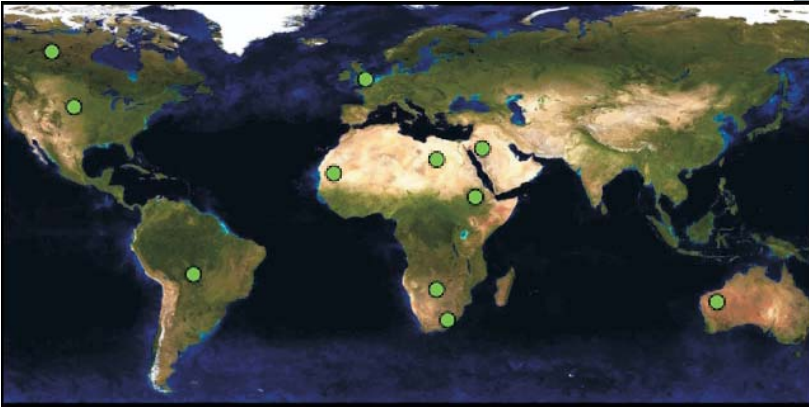
### ***CASE STUDY: IRRIGATION PRODUCTS***

#### **Evolution**

The irrigation company on which this case study is based has been in existence for the past 16 years. The company developed a unique irrigation system that involves substantial water and energy savings and is patented in 34 countries. This year will be the first in which a significant return on investment is realised, due to securing large government contracts.

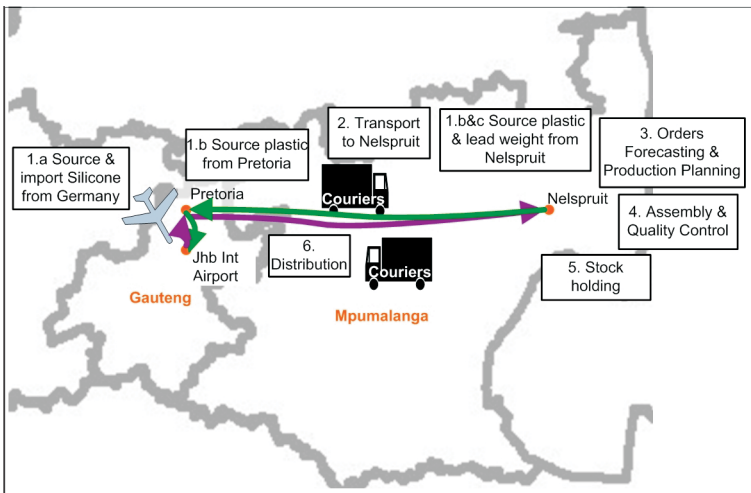
#### **Markets and distribution**

The company has an office in Cairo and representatives in various countries. Products are exported to Australia, Canada, Chile, Egypt, Kenya, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe and other SADC countries.



**Figure 20: International representation of irrigation SMME**

**Supply-chain overview**



**Figure 21: Irrigation product supply-chain**

The challenges encountered by this enterprise relate largely to bringing an innovative product to market:

- ❖ Funding the venture: a considerable amount of start-up capital was required for R&D, patenting and marketing. Twenty-seven financial institutions were approached, without success, indicative of a resistance to investing large amounts in R&D and marketing.
- ❖ Obtaining suitable raw material to manufacture the product: liquid silicone did not exist but product development took place in the faith that the required material would be invented in future.

- ❖ The company experienced difficulty in local market penetration and accessing the distribution network (in the form of agents, who had very strong ties to existing irrigation companies).
- ❖ Extensive market knowledge, capital and workforce were required for penetrating international markets. Specific network development constraints included a lack of contact persons and networks in international markets.
- ❖ Imitations surfaced in Egypt and China and the company did not have the financial resources to protect itself through legal channels.
- ❖ BEE partners were required to obtain big government projects. The company's growth was delayed by an extensive search for a BEE partner with knowledge in the field to contribute to the venture.
- ❖ Quality control: since this was a 'new' product, no guidelines existed and the company had to develop its own quality standards/rules in order to get accreditation. Existing test equipment was too expensive to acquire and the company had to invent its own testing equipment.

### **Innovation and enablers**

The challenges of bringing an innovative product to market led to secondary innovations:

- ❖ Product design and manufacturing innovation: a unique raw material was developed to support the production of this unique product;
- ❖ Process innovation: the lack of quality-control equipment led to self-developed testing procedures and equipment; and
- ❖ Distribution channels: An Agent's Licensing Model was developed in which irrigation agents were selected, trained and given exclusive rights to sell in a specific area. They could continue selling their legacy products, but the agent's commission on sales of the new irrigation product was substantially higher than for conventional irrigation products.

### **Implications for small business support**

When considering small business support from a supply-chain perspective, one should consider a support framework that consists of the following elements:

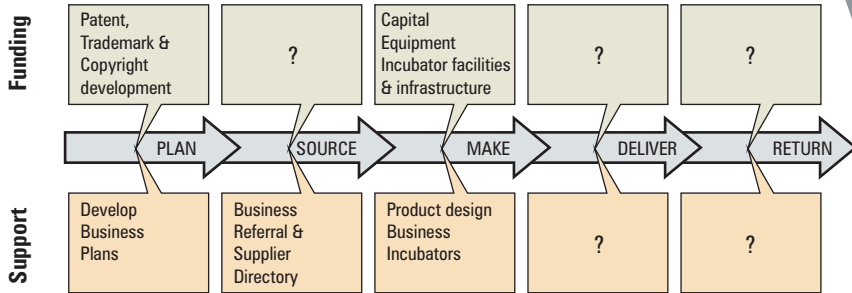
- ❖ firm-level support
- ❖ channel-level support
- ❖ logistics infrastructure support.

In keeping with our supply-chain focus, we use the SCOR framework<sup>31</sup> to illustrate gaps in current thinking about small business development support. Figure 22 overleaf shows the predominant existing small business support mechanisms.

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31 Supply-Chain Operations Reference Model [<http://www.supply-chain.org>]





**Figure 22: Predominant existing small business support mechanisms**

In general, support exists for selected elements along the chain. Recurring problems include a lack of reach and awareness of the various support programmes, as emphasised by the 2004 GEM survey. In addition, the complexity of accessing government support mechanisms is problematic. At enterprise level, a number of supply-chain elements are not supported. In addition, support for enabling transactions between small and large enterprises with respect to sourcing and distribution in the supply chain is limited. Some gaps include:

**Plan**

- ❖ Limited focus on logistics issues in business-planning support
- ❖ Lack of financial support for defining distribution channels
- ❖ Lack of support for developing channel strategies
- ❖ No access to best practice in small business supply-chain planning

**Source**

- ❖ Lack of financial incentives for suppliers to provide credit to small businesses
- ❖ No mechanisms to enable bulk purchasing for small enterprises
- ❖ Lack of support for the identification and assessment of suppliers. The locally developed Lumus standard for assessing suppliers is a promising start.

**Make**

- ❖ Lack of financial support for R&D to test product quality

**Deliver**

- ❖ Lack of access to best practice in establishing distribution channels
- ❖ Lack of access to shared facilities, such as storage and warehousing

**Return**

- ❖ Support for improving quality standards
- ❖ Lack of support for establishing traceability systems.

# RESEARCH PRIORITIES

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The national ability to improve logistics performance needs to be supported by research that considers multiple perspectives on the problem and that enables integrative thinking about solutions. During the course of this study, industry players were asked to express their views on research priorities for logistics. Using this input, we define the following five research areas as key to improving future logistics performance:

## **Structural inefficiencies in the logistics system**

- ❖ Where are the biggest structural gaps in logistics efficiencies and what strategies could contribute to alleviating the situation?
- ❖ How should infrastructure investment funding be spent to ensure the greatest contribution to efficiency, wealth creation, poverty alleviation and job creation in our economy?

## **Logistics modelling**

- ❖ Development of a portfolio of cost-and-flow models that will support decision-making with respect to infrastructure investment;
- ❖ Continued quantification of total logistics costs from a macro-economic perspective, to support strategy development;
- ❖ Quantification of total logistics and supply-chain costs from an industry perspective and identification of the underlying drivers of inefficiency to support firm-level efficiency improvement; and
- ❖ Benchmarking of the productivity of various elements of the national logistics system.

## **Strategies for improved supply-chain efficiency**

- ❖ Interpret global market trends, such as security, traceability and standardisation, and the effect thereof on local supply chains;
- ❖ Identify and build specialist sectors within which a competitive advantage can be established within the global supply chain;
- ❖ Follow best practice with respect to implementation of solutions based on technical and process developments in supply-chain management;
- ❖ Follow best practice with respect to appropriate adoption of new technologies;
- ❖ Introduce new innovative technologies;
- ❖ Follow best practice with respect to inter-firm collaboration for demand management; and
- ❖ Promote cross-industry collaboration to achieve more effective transport utilisation.

## **Strategies for reducing the logistics divide**

- ❖ How can logistics infrastructure specifically support the second economy?
- ❖ Which mechanisms are required to enable the private sector to integrate small businesses into their supply chains?
- ❖ Which small business support models will enable small businesses to be sustainable supply-chain participants?
- ❖ What interventions are required to support small business channel development?

## **Logistics for improved government service delivery**

- ❖ What are the key elements of and solutions for efficient supply-chain design for distributed nationwide service delivery?
- ❖ What are appropriate models of outsourcing to enable efficient service delivery?
- ❖ How should government business processes be designed to enable financially sustainable interaction with small suppliers?





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