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Sectoral Growth and Employment Prospects

Key findings:

- The co-evolution of skills and technological learning and the institutional context to combine them is the key challenge to economic 'catching up', including at the regional level.
- Co-evolution of knowledge infrastructure is not an automatic process – there is a significant role for provincial government here.
- The dynamics of world exports are primarily driven by skill- and technology-intensive products. SA and the Western Cape are under-represented in these activities.
- Over the last decade, output growth was highest in service sectors, whilst manufacturing has grown relatively slowly.
- Average annual employment growth over the last decade has averaged 2,1 per cent, with the highest growth rates in the service sectors.
- Key challenges confront the Province – its lack of presence in dynamic export products, the relative absence of exploitable natural resources and the lack of control that the Province has over factors such as global warming and water stress.
- Success will depend on knowledge intensification of both low- and high-skill activities as a means to drive growth, create jobs and improve the equitable share of economic progress.



1. Introduction: understanding sectoral dynamics

Economic activity in the Western Cape is inextricably connected to economic developments in the rest of SA. In turn, the national economy is firmly embedded in the global economy. National and global economic events and trends therefore offer opportunities for, and pose constraints to, shared growth and integrated development in the Western Cape. Understanding these trends and the challenges they imply for firm-level growth and employment creation is critical.

Also important is understanding the role that government plays in accelerating and broad-basing economic growth and employment creation. This, in turn, requires insights into what has made catch-up of entire developing countries – and regions within them – successful in the past, and which factors are likely to be crucial for the accelerated development of the Western Cape in the years to come.

This is a major endeavour that depends to a large extent on investment in the systematic collection and analysis of information that describes and evaluates the dynamic make-up and nature of economic activities in the Western Cape.

This chapter makes further strides in such direction. First, it summarises key insights into the economic development catch-up process, and more particularly the role of knowledge. Next, it describes salient features of sectoral activity in the global economy, complementing earlier work completed by the Province's Microeconomic Development Strategy (MEDS). These are then compared to national and provincial sectoral trends in an effort to outline the complexities facing sectoral activity in the Western Cape.

The chapter builds on ground first laid by the 2005 PER&O and the MEDS Synthesis Report that presented a preliminary rationale for the role of the Provincial government in regional development. The 2006 PER&O advances the argument, drawing out the types of market failures that are less likely to be overcome in the absence of a dedicated and highly capable provincial government.

Taken together, these sections comprise the contextual framework and give the strategic or 'big picture'.

An overview of the Western Cape economy follows, supported by detailed sector intelligence available through the MEDS process. In addition, the rationale for prioritising select economic activities by the MEDS is reflected upon briefly.

Economic activities take place in well-defined locations – and thus defy statistical aggregates at the provincial level that abstract from the spatial distribution of growth and jobs across communities, villages, towns and metropolitan areas. Therefore some consideration is

given to the differential impact on municipalities in the Province. In sum, this is a close-up look at what is happening on the ground.

The final section links the strategic, 'big picture' and the local lens. With the benefit of hindsight, it offers explanations for key developments that have characterised the Western Cape economy. For others, it points to analytical and information gaps that must be closed before further informed judgements can be made. Finally, it suggests a few major challenges to which the Western Cape must pay attention in its efforts to bring about shared growth and integrated development in the Province. This includes making informed, strategic assessments on global, national and provincial economic developments. At times, these may be inaccurate – future scenarios are based on assumptions that may turn out to be erroneous or imprecise as events take place.

More important than accuracy is the reasoning on which economic scenarios and strategic assessments are based. Economic development is a complex process that is hard enough to understand *ex post*, let alone to predict. Yet assessments like these help to fashion discussions amongst various stakeholders about what is likely as opposed to what would be desirable to happen, and how big the gap between the two is. Such a discussion is in itself an important vehicle to find the bridge that links the two, and as such is a key ingredient to local and regional economic development.

2. Knowledge, capabilities and catch-up¹

Countries – and regions within them – with above-average track records in economic development tend to have a sizeable skilled and knowledgeable labour force.

Such human capital accumulation is a result of considerable education and training planning and provision, whether public or private, through appropriate incentives. It involves the stimulation of competences and skills of young children in their first years of schooling (early childhood development, or ECD) and goes all the way to advanced training in science and engineering in high-quality tertiary institutions.

Sizeable proportions of the cohorts coming out of such an education system either opt for productive employment in industry or join public institutions with mission-oriented research remits that are of benefit to the private sector, and to industrial firms in particular.

Since the very definition of development ‘latecomer’ implies a certain distance to the technology frontier, it is important for the realisation of ‘catch-up’ that external, advanced knowledge is accessible and affordable. It is the significance of the latter that has earned the Trade-related Intellectual Property Rights (TRIPS) Agreement of the World Trade Organisation (WTO) – in essence the codification of the large-scale privatisation and policing of intellectual property rights – such antipathy from many developing countries. In other words, local capabilities go only so far if the origins and sources of external knowledge remain barred because of prohibitively expensive patent regimes and the like.

The catch-up potential of a region furthermore depends prominently on three factors. The first is the absorptive capacities of individual firms that invest in technological learning and upgrading and thus reduce the distance between themselves and their global competitors.

The second is the accumulation of these capacities over time – suggesting that one-off investments in research and development (R&D), for example, are insufficient – and across firms, making for an increasingly knowledge-intensive industrial sector.

The third is the systemic character of the interactions with the institutional context without which firms are unlikely to thrive, namely the education system, the research infrastructure, input suppliers, financial institutions, the regulatory environment and the like. This feature of catch-up explains the prominence of innovation systems in policies supporting economic development in SA and indeed throughout the world.

The systemic character of capacity-building suggests that having a first-class knowledge infrastructure is by itself not sufficient to generate a fruitful interaction between the worlds of science (in academia) and technology (in industry). In the extreme case, the two may exist in splendid isolation from each other.

¹ This draws on UNIDO (2005) and Lorentzen (2006).

In addition, fledgling interactions may be hampered by a mismatch between educational or research output on the one hand and industry demand on the other, for example, in the case of school curricula that are incongruent with prevailing technological specialisations.

The public sector can play an important complementary role in providing incentives so that national investments in skills, competences, and the adoption of existing and the creation of new knowledge jointly involve training and research institutions and industry. In short, catch-up is unlikely to come about by itself; instead it requires a co-ordination effort.

This is the case even when science-industry interactions are vibrant and productive. Information or co-ordination failures can stand in the way of innovative development, and thus catch-up. What works in one sector need not be successful in another simply because different levels of technological maturity mean that some sectors are primarily in need of generic innovative skills to facilitate external knowledge absorption, while others require clusters of firms that are highly specialised and that rely on both vertical and horizontal linkages with one another to tackle emerging technological opportunities. Thus not only national economic development proceeds in stages, but so do the trajectories of individual sectors. The domestic knowledge infrastructure needs to accommodate this differentially, providing in parallel basic vocational training to some and much more specialised knowledge inputs, including risk capital, to others.

The co-evolution of skills, technological learning and the institutional context to combine them is the key challenge to catching up, including at the regional level.

3. The global context of sectoral activity

Developing countries have become much more important in world industrial activity and trade over the last decades. Presently about a quarter of developed country and one-half of developing country imports originate in developing countries. Compared to the mid-1960s, the value of manufacturing exports from the South has increased 86-fold, accounting for roughly a third of world exports.

By contrast, exports from developed countries have increased some 39 times over the same period. Put differently, in 1965 developed countries exported almost five times more manufactures than developing countries, while by 2003 this ratio had decreased to just over two times, as seen in table 1.

Most of this is due to rapid industrial development and increased integration into the world economy of the East Asian tigers – Hong Kong, Singapore, Korea and Taiwan – and more recently also China. These economies ship the lion's share of exports to both developed and developing countries². Indeed, Brazil and Mexico are the only non-Asian economies in the developing country heavyweight league of the top 10 traders.

Table 1: Share of manufacturing exports, 1996 – 2003, \$-million and per cent

From/To:	Developed countries						Developing countries					
	1965		1985		2003		1965		1985		2003	
	Value	Share	Value	Share	Value	Share	Value	Share	Value	Share	Value	Share
Developed	87	83	851	80	3 555	76	29	82	279	74	1 033	53
Developing	18	17	218	20	1 142	24	6	18	97	26	921	47
<i>of which:</i>												
China and NICs ¹	1,5	1	59,5	6	545	12	1	4	46	12	586	30

Source: UNCTAD (2005b)

Note: ¹ Newly Industrialised Countries

Manufactures are the most important category in trade among developing countries, and their share has risen faster than intra-OECD³ and world trade. By contrast, if it were not for primary commodities, Africa's share in world trade, already marginal, would be much lower still.

The composition of exports from developing countries has shifted since the 1980s. Exports to developed countries registered their most dynamic growth in medium-skill, technology-intensive manufactures such as cars, in electronic goods, in parts and components of electrical and electronic goods, and in high-skill manufactures.

² 'Ship' is a more adequate term than 'produce' because international trade statistics involve some double-counting that reflects intra-regional production sharing and trans-shipment. In turn, this is due to the importance of global sourcing arrangements for the East Asian economies. For more detail on this, see UNCTAD (2005b).

³ Organisation for Economic Co-operation and Development

By comparison, trade amongst developing countries is, not surprisingly, less skill and technology intensive. Labour- and resource-intensive manufactures such as clothing, electric and electronic components, medium-skill manufactures and agricultural products have shown above-average growth rates. Again, the expansion of relatively skill- and technology-intensive manufacturing exports to developed countries is largely concentrated in the East Asian economies.

It is worthwhile examining these trends in more detail at the product level. In world trade, products can be labelled 'dynamic' if they combine a number of features:

- Their export values and shares register high growth rates. Combining the two is important in order not to attribute dynamism to products that grow from a very low base.
- They are not subject to a high degree of volatility. This eliminates primary products.
- They show a high degree of predictability in the sense that past performance is a good guide for future developments. This reduces the risk associated with investments, and so forth.
- They show a relatively more equal distribution of market shares. Thus, market concentration does not stand in the way of developing countries upgrading toward new activities.

Over the last two decades, a limited number of products originating in a limited number of countries accounted for a growing share of export dynamism. As suggested above, these products were mostly electrical and electronic goods, including parts and components; textiles and other labour-intensive manufactures, especially clothing; and finished products from R&D-intensive industries with high technological complexity and/or a high degree of economies of scale, as listed in table 2. Most of these products originate in developed countries, but in a select few the developing country share is rather substantial, or even – as in knitted undergarments – higher.

As the labour force or workers produce goods, it is important for industrial upgrading that the link between export product characteristics (in terms of their different combinations of skills, technology and capital) on the one hand and skill profiles on the other is understood.

For the world as a whole, high-skill and technology-intensive products registered the highest export value growth in the 1980s and 1990s. This is why the notion of the knowledge economy has become a widely used concept. Perhaps surprisingly, trends in developing countries are very similar – products in the aforementioned category, along with those in medium-skill and medium-technology-intensive activities grew much above average; labour- and resource-intensive sectors, along with low-skill and low-technology-intensive products were close to the average, and primary commodities, except fuel, below average.

Table 2: 20 most dynamic products in world non-fuel exports, ranked by composite index on predictability, volatility and growth, 1980 – 1998

Rank	SITC ¹	Product	Rank by index on dynamism based on export values	Rank by index on dynamism based on shares in total exports
1	846	Knitted undergarments	10	11
2	714	Non-electric engines & motors	6	9
3	752	Computers	2	2
4	553	Perfumery & cosmetics	14	18
5	048	Cereal preparations	33	42
6	893	Plastic articles	11	10
7	111	Non-alcoholic beverages	45	65
8	847	Textile clothing accessories	31	52
9	773	Electricity distributing equipment	20	20
10	612	Leather manufactures	29	70
11	728	Specialised machinery & equipment	79	88
12	778	Electrical machinery & apparatus	17	13
13	655	Knitted fabrics	24	23
14	872	Medical instruments & appliances	16	19
15	821	Furniture & parts thereof	19	15
16	759	Parts of computers & office machines	4	4
17	592	Starch, inulin, gluten, albuminoidal substances	44	46
18	062	Non-chocolate sugar preparations	72	86
19	776	Transistors & semiconductors	1	1
20	679	Iron & steel castings	53	54

Source: Mayer, Butkevicius and Kadri (2002, Table 5)

Note: ¹ Standard International Trade Classification

These trends hold a mixed message for resource-intensive regions in Africa and elsewhere. Many enjoy significant windfall benefits from the current commodity boom. Yet it is clearly not wise to succumb to the easy resource gains or windfalls that this generates, although not primarily because the boom may end soon. Barring major crises, the resource boom is only likely to taper off once China graduates from raw-material-intensive industrial production towards a more service-based economic structure, something that is clearly not around the corner.

But the productivity potential and the income elasticity of demand for primary commodities are lower than for manufactures, especially for high-skill-intensive goods. Therefore the key challenge for primary commodity producers is to invest the returns from the China boom into activities associated with economic diversification and knowledge intensification.

In fact, since the mid-1990s, high skill- and technology-intensive manufacturers had the highest share in developing-country non-fuel exports. Similarly, export value growth in the 1980s and 1990s was highest in science-based sectors. Examples from the high- and medium-skill and technology category include computers and office equipment, communication equipment and semiconductors, chemical and pharmaceutical goods, aircraft and scientific instruments. Motor vehicles, chemicals other than pharmaceuticals, electrical and non-electric machinery are among the categories where competitive dynamics are scale intensive and involve specialised suppliers. It is not a contradiction that these activities involve labour-intensive production processes; this merely speaks to the importance of global supply chains.

The increase in the share of low- relative to high-skilled labour embodied in internationally traded products is primarily due to the integration into the world economy of countries like China and India. At the same time, since globalisation militates against poor human capital, the share of unskilled labour fell from about a third in 1975 to a fifth in 2000. By contrast, the share of high-skilled labour increased by 50 per cent in the 1990s alone and reached 10 per cent in 2000. This trend emanates from intra-industry trade between high-income countries and from production sharing between them and select emerging markets.

The implications of these trends for all countries are that they must try to reduce the share of unskilled workers because there are simply not many sectors where their labour is sufficiently productive to enable competitive trade in the global economy.

In addition, middle-income countries such as SA must try to upgrade gradually from low to high skills in order to avoid ruinous competition with more price-competitive countries like China and India. Of course, this is easier said than done. In fact, it is exactly what all other latecomer economies are trying to achieve as well, hence such a strategy effectively shoots at a moving target.

In sum, the dynamics of world exports are primarily driven by skill- and technology-intensive products manufactured in select old and a few newly industrialised countries. This begs the question how and where the rest of the world fits into the picture.

4. SA and the Western Cape in the global context

In general, and not surprisingly, it has been easier for developing countries to enter the world market with relatively simple goods as opposed to doing so with primarily high-valued-added products. Thus, the increase in their share of world exports is higher than their share in world manufacturing value added (MVA).

Table 3 shows how SA compares to the rest of the world in respect of MVA. Since 1998, MVA growth in SA has been higher than the world and developed country average, but it has been much lower than in developing countries. This mainly reflects successful catch-up from much lower levels of development on their part.

In 2002, SA came 53rd in a 90-country ranking of per-capita MVA compiled by UNIDO (2005), down from 48th in 1990, just behind Poland, Brazil, Saudi Arabia and Chile, and before Mexico, Libya and Russia. At the same time, however, it scored much higher in technological advance (measured as the ratio of the share of medium- or high-technology goods in industrial production and manufactured exports, respectively) than in industrial advance (measured as the share of industry in total production and total exports), suggesting that SA's medium- and high-tech production is more competitive than that of industry in general.

In the combined ranking of industrial-cum-technological advance, SA registered as a distant follower of the leading economies, together with Hong Kong, Turkey, India, Indonesia, Argentina and Australia.

Table 3: Average annual real growth rate of MVA and per-capita MVA in constant (1995) US\$

Country group	MVA growth (%)		MVA per capita		
	1993 - 1998	1998 - 2003	1993	1998	2003
World	3,5	2,7			
Developed market economies	3,0	1,7	4 784	5 340	5 710
Transition economies	-2,3	7,1	534	454	659
Developing regions	6,2	5,5			
Sub-Saharan Africa	4,2	3,0	29	30	32
South Africa	2,5	2,9	681	696	749
North Africa	4,1	4,4	153	171	195
Latin America and Caribbean	2,7	0,7	660	689	665
South and East Asia	6,4	7,0	188	227	298
China	9,6	7,9	218	330	463
West Asia and Europe	5,7	3,3	501	571	615

Source: UNIDO online data access

Note: China includes Hong Kong and Taiwan

Over the past two decades, increases in the developing country share of MVA were concentrated in textiles, transport equipment and natural-resource-intensive sectors such as petroleum products, basic metals, tobacco and non-metallic mineral products.

Table 4 shows that the structure of MVA underwent little change in the 1990s, except for large increases in the shares of electrical machinery and transport equipment (industry sector 34), along with a large decline in textiles and wearing apparel.

Table 4: Structure of MVA (%)

ISIC ¹	Branch	Developed market economies		Transition economies		Developing countries		South Africa		World	
		1993	2003	1993	2003	1993	2003	1992	2002	1993	2003
15	Food and beverages	11,0	9,6	17,4	15,4	15,8	13,5	17,3	14,8	12,0	10,5
16	Tobacco products	0,6	0,5	1,1	0,9	2,6	1,7	1,7	1,7	1,0	0,7
17	Textiles	2,4	1,5	2,8	2,3	6,2	4,6	2,6	2,0	3,0	2,1
18	Wearing apparel	2,5	1,1	2,7	2,5	3,6	2,8	3,2	2,5	2,7	1,5
19	Leather, leather products and footwear	0,7	0,4	1,3	0,7	1,8	1,1	1,2	0,8	0,9	0,5
20	Wood products (excl. furniture)	2,4	2,1	2,2	2,4	2,0	1,4	2,1	2,8	2,3	1,9
21	Paper and paper products	3,7	3,2	3,1	3,3	2,4	2,2	4,7	4,5	3,5	3,0
22	Printing and publishing	6,1	5,1	2,1	2,7	2,7	2,0	4,6	3,1	5,4	4,5
23	Coke, refined petroleum products, nuclear fuel	2,8	2,3	5,1	4,0	7,5	6,4	6,6	5,1	3,6	3,1
24	Chemicals	10,0	10,5	9,2	7,8	10,4	10,9	10,0	11,1	10,0	10,5
25	Rubber and plastics products	3,3	3,3	2,5	3,9	3,9	3,7	4,1	3,8	3,4	3,4
26	Non-metallic mineral products	3,9	3,2	6,4	5,8	5,5	4,8	3,3	3,2	4,2	3,6
27	Basic metals	5,6	4,9	12,8	9,9	5,7	5,7	9,4	13,8	5,8	5,2
28	Fabricated metal products	7,1	6,3	4,6	6,2	4,8	4,3	7,1	7,4	6,6	5,9
29	Machinery and equipment n.e.c. ²	8,0	7,4	8,2	7,5	4,9	4,7	6,4	6,3	7,5	6,9
30	Office, accounting and computing machinery	2,6	5,2	0,4	0,4	1,1	2,2	1,6	1,6	2,3	4,5
31	Electrical machinery and apparatus	6,4	7,1	3,4	5,0	2,5	2,8	1,3	1,4	5,7	6,2
32	Radio, television and communication equipment	3,1	9,0	2,1	5,3	5,4	13,6	1,8	1,3	3,5	9,8
33	Medical, precision and optical instruments	2,8	2,8	1,9	1,9	1,1	0,8	0,5	0,4	2,5	2,4
34	Motor vehicles, trailers, semi-trailers	7,6	8,8	4,0	5,4	5,0	5,9	6,5	8,7	7,1	8,1
35	Other transport equipment	2,9	2,4	4,3	3,2	2,1	2,8	1,4	1,4	2,8	2,5
36	Furniture; manufacturing n.e.c.	4,7	3,3	2,5	3,5	3,0	2,3	2,5	2,2	4,3	3,2

Source: UNIDO GlobStat

Notes: ¹ International Standard Industrial Classification

² Not elsewhere classified

Developments in SA are somewhat different. On the one hand, the rise in the importance of transport equipment reflects the successful revitalisation of the motor vehicle industry⁴. At the same time, the loss of MVA share for textiles and apparel mirrors the global trend where extremely price-competitive producers, especially China, massively entered world markets, causing major dislocations. On the other hand, the weight of resource-intensive activities such as wood, basic metals and fabricated metal products increased over the 1990s.

The only country group sharing these characteristics for wood and fabricated metal products is the transition economies. In contrast, the weight of the industries underpinning the information economy, namely electronic machinery and communication equipment (industry sector 32), along with electrical machinery, remained stable or fell while it went up in the rest of the world. At least at this high level of aggregation, this is a troublesome picture. It suggests that, relatively and absolutely, SA is overspecialised in traditional, declining industries and under-specialised in new, growing industries.

Not surprisingly, this assessment is borne out by the export performance of the country and the Western Cape in the dynamic products referred to above, as seen in table 5. Although growth rates in the Western Cape are higher for the majority of the products on the UNCTAD list, this is primarily because they come off a very low base. In fact, only in perfumes does the share in Western Cape exports exceed the world average.

In all other dynamic products, the country and the Province are hardly present. The Western Cape has actually lost market share in the combined product list. Growth rates in electronic and electrical-related production are particularly sobering; for the latter they are actually negative. If one made a comparison not with the developing country average but with that for the most important East and South East Asian exporters, the contrast would be starker still.

⁴ However, although the SA Motor Industry Development Programme (MIDP) has contributed greatly to this revitalisation and SA auto exports are rising, so are imports, while local content is still low and has recently even declined. For further information on the MIDP, see this chapter's glossary of terms.

Table 5: Export growth and share in total manufactured exports of the 20 most market-dynamic manufactures (%)

Product group	Average annual export value growth				Share in total exports						
	World		South Africa	Western Cape	World		Developing countries	South Africa	Western Cape		
	1980-2001	1993-2003	1995-2004	1980	2001	1980	2001	1995	2004		
Thermionic, cold and photo-cathode valves, tubes and parts	16,7	8,9	35,6	1,5	5,1	3,9	9,1	0,004	0,0024	0	0
Optical instruments and apparatus	15,9	11,8	31,5	0,1	0,4	0,0	0,4	0,35	0,025	0,0004	0,015
Parts and accessories suitable for electronic machinery	14,6	15,8	0,9	0,9	3,1	0,6	5,4	2,0	0,21	0,021	0,053
Automatic data processing machines and units thereof	14,6	18,9	22,3	1,3	4,1	0,3	6,7	1,1	0,14	0,004	0,07
Electric power machinery and parts thereof	12,8	20,0	15,9	0,4	0,7	0,4	1,1	2,0	0,29	0,008	0,08
Perfumery, cosmetics and toilet preparations	12,8	20,0	40,5	0,3	0,6	0,2	0,3	0,16	0,26	0,06	0,36
Undergarments, knitted or crocheted	12,6	32,9	25,7	0,4	0,7	1,5	1,6	0,003	0,01	0,02	0,05
Telecommunications equipment and parts	12,6	21,9	25,8	2,0	4,5	3,5	5,6	5,4	0,05	1,1	0,47
Articles of materials described in division 58	12,5	-	-	0,9	1,5	1,2	1,4	-	-	-	-
Medicinal and pharmaceutical products	12,1	17,6	26,8	1,5	3,1	0,7	0,8	0,2	0,26	0,16	0,37
Medical instruments and appliances	12,0	10,6	4,6	0,3	0,6	0,1	0,4	0,14	0,10	0,22	0,07
Equipment for distributing electricity	11,8	19,1	5,6	0,6	0,8	0,4	1,2	0,56	0,07	0,004	0,02
Knitted or crocheted fabrics	11,2	7,4	5,6	0,3	0,3	0,3	0,7	0,04	0,20	0,35	0,12
Electrical machinery and apparatus, n.e.s.	11,1	0,8	-17,1	1,5	2,0	1,4	2,1	1,4	0,04	0,05	0,02
Manufactures of leather or composition leather, n.e.s.	11,1	15,8	15,5	0,1	0,2	0,3	0,3	0,1	0,01	0,005	0,005
Electrical apparatus such as switches, relays, fuses and plugs	11,0	4,5	-19,4	1,4	1,9	1,3	2,1	0,34	0,14	2,2	0,05
Furniture and parts thereof	10,7	7,2	9,2	1,1	1,5	0,8	1,5	0,42	0,2	0,59	0,29
Undergarments of textiles fabrics	10,6	10,0	13,0	0,3	0,3	1,5	0,8	0,008	0,006	0,056	0,04
Nitrogen-function compounds	10,5	34,2	-11,5	0,6	0,8	0,3	0,3	0,007	0,04	0,005	,0003
Road motor vehicles, n.e.s.	10,4	11,8	22,3	0,4	0,3	0,2	0,2	0,02	0,02	0,0007	0,001
All 20	12,4	15,4	9,8	15,6	32,7	19,0	41,8	2,6	2,8	5,2	2,7

Source: UNCTAD GlobStat (for world and developing countries); Trade & Industrial Policy Strategies (TIPS) (for SA and Western Cape)

Note: Product groups for world and developing countries based on SITC code; for SA and Western Cape on the Harmonised Commodity Description and Coding System, at HS4-digit level. The use of two different codes is dictated by data availability and obviously not ideal for purposes of comparison. The analysis was conducted using the 1 000 product, 170 country HS national and provincial data as calculated by Quantec. The full HS range, however, includes 7 500 products nationally. Since the full HS range is only available nationally, the researchers had no choice but to use the 1 000 product HS data set since the analysis was regional focused.

Why do we export what we export?

Exports of manufactures from SA have increased over the last decade, in part due to a more favourable trade regime introduced after 1994. Yet the country has not witnessed an export boom. Why not?

On the one hand, manufacturing exports have diversified during the 1990s. Relatively skill-intensive sectors such as coke and refined petroleum products, other chemicals, and especially motor vehicles, parts & accessories and other transport equipment registered high growth.

In contrast, less skill-intensive activities such as textiles, wearing apparel and leather & footwear registered relatively poor growth.

However, the magnitude of these trends pales in comparison to the achievements of the developing world as a whole. This dire assessment applies across all technology categories, and especially so in high-technology products.

In fact, during the 1990s, most of SA's top 20 exports were in stagnating markets. In 2002, only some 13 per cent of exports were in products for which world market demand was rising and that exhibited an above-average growth rate. This was passenger cars, pumps & compressors, furniture and precious metals.

In essence, therefore, SA lags other developing economies – including those with similarly resource-intensive endowments – in the restructuring of its economy towards high-growth export products. This is then the first key response – SA did not witness an export boom because it was not producing the products that are increasingly in demand on the world market. Why not?

Recent research estimated export supply and demand functions to analyse the constraints to SA not shifting export production to high-growth products. Its findings suggest that external factors are not to blame. That is, foreign export demand is not a constraint to export growth. In other words there is an infinite demand for SA's products in the world.

The constraint rather lies on the supply side. This refers to manufacturers (free) riding on the back of a very competitive exchange rate until 2002 instead of pushing diversification in view of a more competitive environment, given the likelihood of exchange rate appreciation in the future. The strong rand environment has arrived and is likely to remain for some time, reducing rand competitiveness. This means that a more aggressive approach to diversification is now required.

Other important reasons are bottlenecks in transport infrastructure and skills. The latter in particular affects the high-technology metal products sector.

The major recommendations are straightforward:

- Improve rail, road and port infrastructure;
- Sustain high-quality education in support of the growth of high-technology sectors; and
- Think hard about how investments in R&D and technological innovation can help to develop new products, technologies and markets.

Source: Edwards and Alves (2005)

In sum, this and the previous section showed that SA and the Western Cape are under-represented in those skill- and technology-intensive economic activities that have accounted for much of the medium- to long-term dynamism in world output and trade.

Due to the concentration of these activities in a handful of countries, it shares this predicament with a large part of the world. This is reason for concern insofar as a relative specialisation in these activities would on average mean an easier opportunity to benefit from globalisation.

However, it is important to remember that this is a high-level, strategic review. It suggests that there are important trend differences between SA and other latecomer economies, especially in Asia. It certainly does not imply that economic activities in the Western Cape's more prominent sectors necessarily fail to contribute to growth and to create jobs. The extent to which they do, and what stands in the way of their perhaps doing more of both, require a closer look at what is happening in individual sectors, and why.

Detailed sector analysis is the subject of much of what follows in this chapter. But first it is worthwhile to draw out the implications of the above – from insights in the dynamics of catch-up and prevalent trends in world industrial activity to how the Western Cape fits in with either – for Provincial policy-making.

5. A role for provincial government

To keep things simple, this section identifies two areas where provincial government could make a difference.

The first concerns knowledge, skills and capabilities in catch-up. The brief summary of historical insights from successful experiences of catch-up suggested that the relationships between technological innovation and scientific enquiry are complex and fraught with difficulties.

Except in science-driven sectors, entrepreneurs are not apt to consult scholarly journals in their search for inspiration that leads them to technological improvements. Even if they were prone to do so, the language in which the articles are written would often be too technical for them, or the research focus would be too removed from the practical applications they are primarily after. Scientists, on the other hand, especially those in academia, rarely consult the technological agendas of firms when designing their research programmes in the first place. They might not even consent to sharing laboratories or other equipment with their industry counterparts.

Furthermore, individual instances of fruitful science-industry interaction might not disseminate within or across sectors if the collective mastery of tacit knowledge is not up to the task. Thus relevant technological knowledge might be under-utilised, simply because there are not enough skilled individuals to realise the value of new information, let alone to internalise and exploit it efficiently.

In addition, knowledge assimilation might require complementary competences so that the absorptive capacities of one firm build on and benefit those of another. By the same token, if these capacities are few and far between, even highly motivated firms might get stuck in technological cul-de-sacs, simply because they are not in a position to draw on specific external resources to master particular aspects of a technological solution, and not because their capabilities are insufficient in the first place.

It is unlikely that policies in support of the *national* system of innovation (NSI) can avoid these problems single-handedly, much less so in a context such as SA's, where efforts to develop and operationalise a suitable NSI are in their infancy.

For example, national programmes in support of science-industry interaction such as the Technology and Human Resources for Industry Programme (THRIP) or the Innovation Fund provide incentives for science and industry to work together⁵. But they do not privilege provincial interactions. This is an area where provincial government can make a difference.

⁵ For more information on the THRIP, see this chapter's glossary of terms.

Although the Province has no jurisdiction over the higher education institutions, it can help them to grow into a more important role for provincial economic development – and let them reap the attendant benefits – by providing incentives and support over and above nationally funded mandates that bring the relevant role-players together.

What form this would take is likely to differ from sector to sector and thus needs further thought. It clearly necessitates a much more profound understanding of the limitations, needs and interests of both the higher education sector and industry than we currently have.

The co-evolution of the local knowledge infrastructure – from schools to universities – with the technological endeavours of firms, and the incentives and rules that regulate the interaction are not going to fall from heaven. That is why a provincial government committed to catch-up could make a big difference.

The second area concerns salient trends in the world economy, among which increasing knowledge intensity is particularly relevant. The discussion above showed that the Western Cape is not capitalising on the opportunities that globalisation presents in a similar way to those countries – like Korea – that are a model for SA's technological aspirations. This raises the question of positioning.

Provincial government has a role here, too. More specifically, it should initiate dialogue with all concerned stakeholders that ultimately grapples with the following questions:

- Do stakeholders need/want to capitalise on opportunities presented by globalisation?
- If yes, how realistic is such an endeavour, and what process should be followed?
- If not, how do stakeholders ensure that the existing specialisation of the Province is sustainable in the long term and does not lead, wholly or in parts, to situations of technological lock-in?

Part of the answers lies in the sectoral profile of economic activities in the Province to which the chapter turns next.

6. Broad overview of sector development

This section builds on and extends the sectoral description in *PER&O 2005*. It covers data for the 10-year period 1995 to 2004.⁶

6.1 Output growth

The Western Cape economy has traditionally been broad based. It supports sizeable and important activities in all sectors of the economy – primary, secondary and tertiary.

In the primary sector, agriculture, forestry & fishing accounted for 4,5 per cent of Provincial output in 2004. The share of manufacturing was 18,3 per cent. Service sector activity had the lion's share – financial & business services and retail & wholesale trade alone made up 44,4 per cent of Provincial GDP.

Average annual growth rates were highest in transport, storage & communication (6%), followed by wholesale & retail trade, catering & accommodation (5,1%), the financial sector (4,5%) and electricity, gas, & water (3,8%). All other sectors grew at a rate below the Provincial average of 3,2 per cent. Thus, manufacturing as a whole grew only by 1,4 per cent.

Chapter 2 referred to the effects of the recent strong currency environment on the non-tradeable goods sector and on the industrial base more generally. Within manufacturing, the only sectors with significant growth were petroleum products, chemicals, rubber & plastic (4,4%), transport equipment (3,2%) and metals, metal products, machinery & equipment (3%).

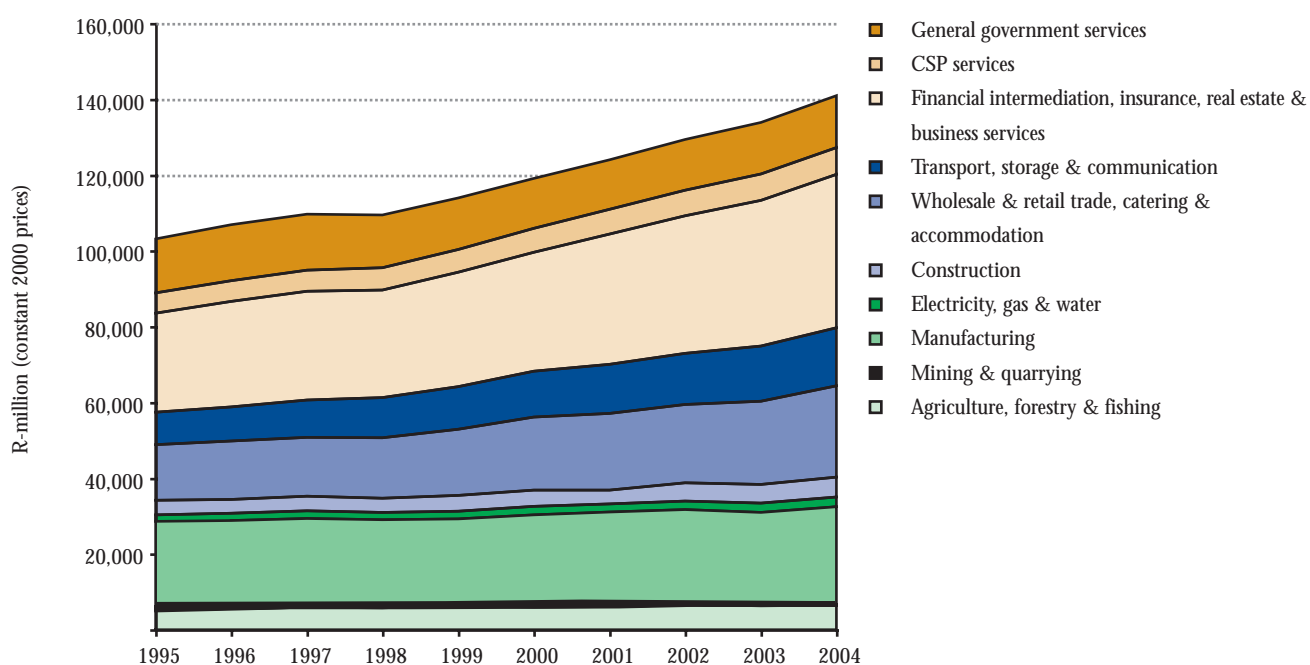
Market-dynamic products referred to earlier in the discussion registered relatively low growth; in textiles, clothing and leather goods it was slightly negative over the period under consideration. It remained below 1 per cent in radio, television, instruments, watches & clocks, as well as in furniture, and reached only just over 2 per cent in electrical machinery & apparatus.

Structural change over the last 10 years has diminished the weight of primary and secondary activities in favour of growth in the tertiary sector. Although this secular trend has not been dramatic, it does suggest that the Western Cape economy is increasingly service-dominated.

⁶ The reader should note that the detailed sectoral analysis in chapter 2: *Economic Outlook 2006/07 – 2007/08* uses the five-year period 1999 to 2004, while this chapter uses the 10-year period 1995 to 2004. Sector contributions to output and export growth, investment and employment should therefore not be compared directly. Both analyses are, however, based on data as calculated by Quantec Research. Also note that the sparseness of the original survey and census data from Stats SA – on which the Quantec data are based – makes provincial sectoral analyses problematic. The unavailability of up-to-date enterprise-based industry censuses and surveys at the regional level also inhibit the quality of the data results.

At the same time, its broad base is likely to give way to more specialisation. This is a typical feature of economic development – diversification from initially relatively simple activities is superseded by more specialisation as an economy generates particular competencies with which it competes in world markets. Although this is therefore a positive development, it entails adjustment costs for those (sub-) sectors that contract – in particular, agriculture and manufacturing. The realities are stark and must be faced squarely by all. Given the trends above, it is clear that some industries will need to downsize or close, and employees in these sectors may be affected.

Figure 1: Sector contribution to regional GDP, 1995 – 2004



Source: Quantec Research and own calculations

It is important not to confuse trends in the sectoral distribution of economic activity with their relative knowledge intensity. Economic activities in the primary sector are on average often less skill- and technology-intensive than those in manufacturing and services. But they need not be. What happens on average is less important for dynamic upgrading than what happens in distinct instances of technological learning and its subsequent dissemination.

Judging the developmental potential of the Western Cape's sectoral profile requires a thorough understanding of the distribution of skill and technology intensity associated with the various activities in each sector. For example, the wine industry combines relatively low-skilled activities with the employment of very advanced technology.

Over the last half-decade or so, select estates have used infrared imagery obtained from satellite or aerial photography to obtain the best possible match between a specific cultivar and distinct soil characteristics. This is the high-tech end of the search for 'terroir'. The same technology allows the examination of grape stress levels across and even within vineyards so as to allow for differential harvesting.

These new processes – which are in a major way responsible for the internationally acknowledged increase in the quality of SA wines – inform the low-skill activities on the ground, such as pruning techniques, canopy management and so on, making them more knowledge-intensive. Hence the sector cannot be characterised as either low- or high-skill-intensive, or as either low- or high-technology-intensive. It is both, and what matters most for the Province's development is whether given factor endowments lend themselves to increasing knowledge intensification.

Similar dynamics are at play in manufacturing and services. For example, boat builders in the Western Cape manufacture world-class leisure crafts that also combine very advanced technology with low-skilled labour. Similarly, in call centres, operators can be limited to very simple procedures or may alternatively offer extremely complex business or customer services.

Across all spheres of economic activity, therefore, entrepreneurs and their workforces can rise to the challenge of sustained competitiveness through growing their knowledge and technological assets. This implies that the sectoral profile is an important part of the Province's identikit, but not more than that.

Compared to SA as a whole, the Western Cape economy is significantly more service-oriented and only marginally involved in the exploitation of natural resources. This means that the Provincial economy does not benefit directly from the commodity boom fuelled by demand in China and elsewhere for minerals and other non-renewables.

It does benefit indirectly through the use of its port infrastructure, of course. Commodity booms generate windfall booms, often at little domestic effort. That is why they are attractive. But it is also the reason why they are a blessing in disguise. It is no coincidence that over the past 50 years or so, the most persuasive examples of economic catch-up took place in countries that did not have mineral riches, primarily in Asia.

In contrast, many resource-rich economies in Africa and Latin America followed boom-and-bust cycles that severely hampered their economic catch-up. It would be simplistic to charge resource intensity *per se* for failed development. Knowledge intensification can be harnessed in and around resource-intensive sectors. But at least in boom cycles, incentives are often not such as to favour investments in human capital and so forth. Therefore, the fact that the Western Cape's factor proportions are significantly different from the rest of the country need not be reason for concern, least of all in a longer term perspective.

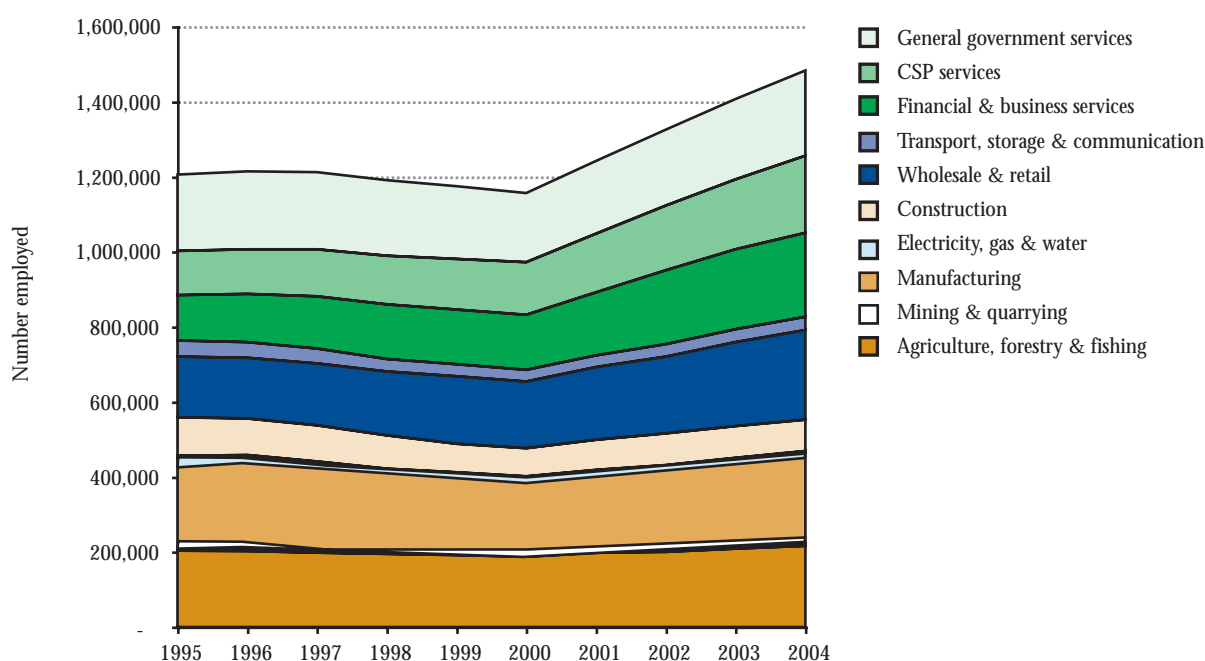
It is certain that the current commodity boom will come to an end at some point. It is also certain that success in the world economy will continue to be linked to technological capabilities in particular and to knowledge intensity more generally. The data presented here must be interpreted in this light.

6.2 Employment growth

Average annual growth in employment trailed output growth by roughly one point, at 2,1 per cent. Six sectors – manufacturing (16,3%), wholesale & retail trade, catering & accommodation (16,1%), government (15,3%), financial & business services (15,1%), agriculture, forestry & fishing (14,6%) and community & other services (13,9%) – account for more than 90 per cent of Provincial employment in the formal sector. Meanwhile, roughly one in 10 persons is employed in the informal economy.

Of these sectors, the only ones with above-average employment growth rates for the period 1995 – 2004 were community and financial services (5,7% and 6,3%, respectively) and trade (3,9%). Within manufacturing, only transport equipment (3,9%) and furniture (3,5%) grew at above-average growth rates.

Figure 2: Western Cape sector employment, 1995 – 2004



Source: Quantec Research and own calculations

In sum, only in a few sectors did above-average output growth coincide with above-average employment growth. In financial services and transport equipment, employment growth outstripped output growth. In wholesale & retail trade, a 5 per cent output growth happened alongside a 4 per cent employment growth. In furniture, above-average employment growth coincided with below-average output growth.

Output growth therefore seems to have a positive impact on employment. This was also in the case in the 1970s and 1980s, although apparently with higher output elasticities, as seen in the textbox below. This underlines the importance of accelerated growth for sizeable job creation, and hence shared growth and integrated development in the Western Cape.

Growth and decline of manufacturing in the Western Cape

Manufacturing matters, and the contraction of the sector in the 1990s is therefore viewed with concern. One reason is that the manufacturing sector is traditionally an important employer in the Western Cape. Manufacturing growth historically relied on increases in both capital and labour.

Detailed research into manufacturing sector performance in the Western Cape from the 1970s to 1996 highlights that over the period, the contribution of labour to growth was at first static and then fell, especially in the 1990s. Consequently, labour shedding occurred in many magisterial districts hosting important manufacturing activities, especially in food processing in the Cape Town metropolitan area.

So why did labour not contribute more to output growth? In theory, this question allows for two possible answers. The first is that SA's manufacturing sector is a mature industry that is about to migrate to less-developed parts of the world in search of more competitive production costs and new markets. If SA were a high-income country and the activities in question were, for example, textiles and steel, this might well be the case. But SA is a middle-income country, and another reason must therefore exist for the declining labour absorption rate.

The second is that there are factors within the labour market itself. Detailed econometric analysis suggests two culprits: real wages and sluggish growth. The real wage was found to have a statistically significant negative impact on employment. On average, a 1 per cent rise in the real wage led to a 0,74 per cent fall in employment. Growth, by contrast, does have a positive effect on job creation. However, while in the past output growth was directly proportional to employment growth, from the 1990s the output elasticity fell to about one half, meaning that a 1 per cent increase in output led only to a 0,48 per cent increase in employment.

Labour shedding did not just affect the Western Cape. The trend mirrors what happened in the country at large. But while manufacturing in SA registered strong positive contributions of technological progress in the 1970s and 1980s, this is not evident for the Province. Why not, and if this unwelcome difference persists, is a question that warrants further research.

Source: Fedderke and Fitschen (2005a, b)

Compared to the country as a whole, the Western Cape has been doing rather well. In sectors with generally declining employment, it registered lower negative growth rates, and in sectors with generally expanding employment it registered higher growth rates than the rest of the country.

Relative to the 2005 PER&O, the overall assessment is thus guardedly more positive. But caution is warranted.

First, the comparison with the rest of the country obviously chooses a very low benchmark that lies below the aspirations of both the country and the Province.

Second, the change in average annual performance is due to an improvement in year-on-year changes from 2003 to 2004. It remains to be seen if this is sustainable.

Third, this assessment is only as good as the data on which it is based. Provincial-level data are not easily available and therefore also much less scrutinised for possible inconsistencies by the research community.

In addition, as chapter 4: Employment Dynamics points out, the expected rapid increase in the working-age population may alleviate labour supply constraints. However, it could also lead to yet more people looking for jobs for which they do not have the right kind of skills.

Chapter 4 also reports that the share of relatively educated individuals accounts for the most rapid rise in the labour force, and that there was rapid employment growth among matriculants. This is undoubtedly positive – yet without a concomitant and comprehensive development of labour demand for the very skills these school leavers possess (or are believed to be able to develop) it may not make much difference to the unemployment statistics.

This means that, concerns with the quality of education aside, if demand for secondary-level graduates and young people in general is depressed, arguments could be made for steering larger cohorts towards the tertiary system, particularly vocational education and training, such as Further Education and Training (FET). This would make the graduates employable at a higher skill level for which industry in the Province may generate more demand, especially in the long run, than for low-skilled activities.

To be sure, at about a quarter of the workforce in high-skill occupations, the Western Cape avails itself of a more elevated occupational structure than the national average. But rather than looking at the Province's relative position, it would be more relevant to ask whether one knowledge worker per four members of the workforce suffices to reach the threshold where advanced but isolated economic activities combine to graduate toward a real knowledge economy.

The general outlook for employment is thus co-determined by the evolution of skill profiles and industrial dynamics. This means some caution is warranted when interpreting these data.

Skills versus education

The development of skills is one of Government's key objectives. Before technological advancement, high school education was regarded as sufficient qualification to secure a job. However, in an economy that has undergone structural changes, the required educational level of a century ago is no longer adequate for preparing the modern workforce. The thinking follows the economy's ability to create jobs constrained by the quality of workforce the education system produces. This then fuels the level of unemployment and feeds through the vicious cycle of poverty. Because SA's labour market is characterised by skills mismatch, the agenda for education at all levels needs to ensure competitiveness among the workforce. Different forms of skills and definitions are provided below:

Basic skills: *Generic, transferable skills that are essential to every individual's personal development in his/her education, work and everyday life.*

- Intellectual (includes critical, analytical and creative thinking, and problem solving);
- Communication;
- Information and communication technology (ICT) and managing information;
- Numeracy (application of numbers);
- Improving own learning and performance;
- Working with others.

Subject-specific/ vocational skills: *Skills that are essential to the understanding and practical application of knowledge within an academic discipline and/or a vocation/profession.*

Vocational skills are quality assured and accredited in line with certain subject specifications, combining benchmarking criteria followed by competence statements. On satisfaction of the particular field's requirements, the qualification is conferred to an individual.

Employability skills: *These skills enhance achievements in learning and facilitate transition and integration into effective performance in the workplace.*

- Self management and people management (for example, effective relationships, time management, change management and effective leadership);
- Negotiation;
- Networking;
- Presentation;
- Career management (for example, self-awareness, business/organisational awareness, action planning, job search and entrepreneurship).

It is evident that educational attainment alone does not equip the workforce with the tools needed to survive in the emerging high-skill economy. Some skills are job-specific; others influenced by cultural background and personality, meaning that no learning institution can provide all skills. As organisational structure and environment are dynamic, lifelong learning becomes central for career development. Individuals must obtain a set of skills that enable them to integrate their knowledge, experience and transferable skills in order to make effective progress in their careers

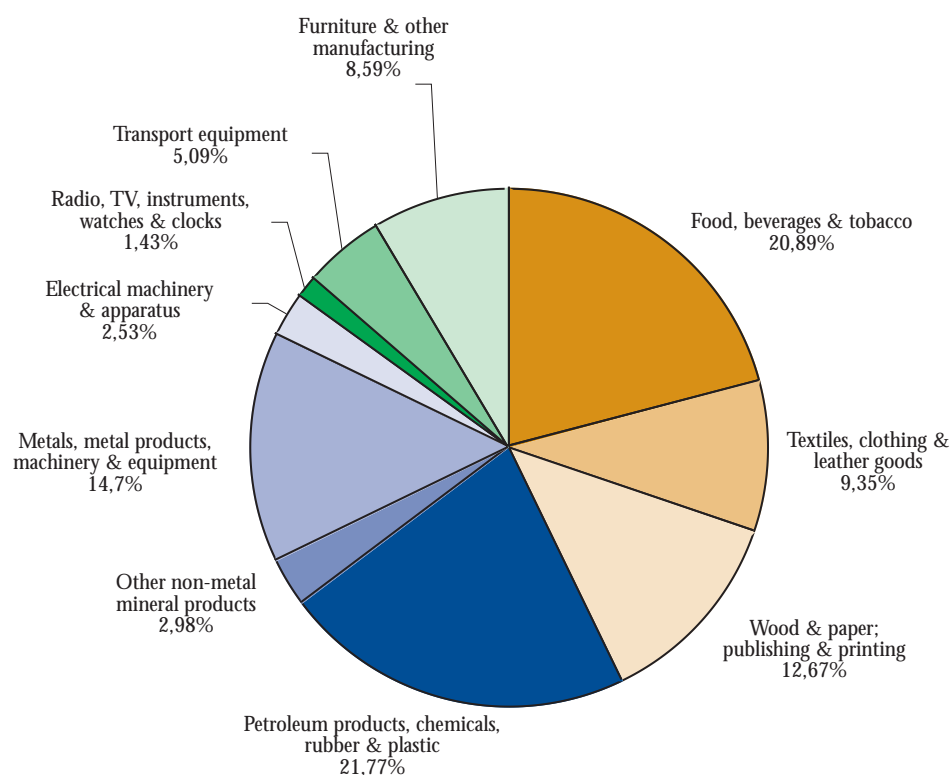
Source: Dimon, 2003

6.3 A detailed look at manufacturing

6.3.1 Manufacturing output

Compared to 2003, the sectoral shares in manufacturing value added did not see much change in 2004. The shares of a few sectors increased by a percentage point or less (textiles, clothing & leather goods; wood & paper, publishing & printing; furniture & other manufacturing; and electrical machinery & apparatus) at the expense of a few others (petroleum products, chemicals, rubber & plastic; metals, metal products, machinery & equipment; and transport equipment).

Figure 3: Shares of sectors in MVA, 2004



Source: Quantec Research and own calculations

More importantly, although it may be too early to say, the secular contraction of the manufacturing sector in the 1990s may have come to an end. It is noteworthy that the increase in MVA to 2004 took place in parallel with a strengthening rand.

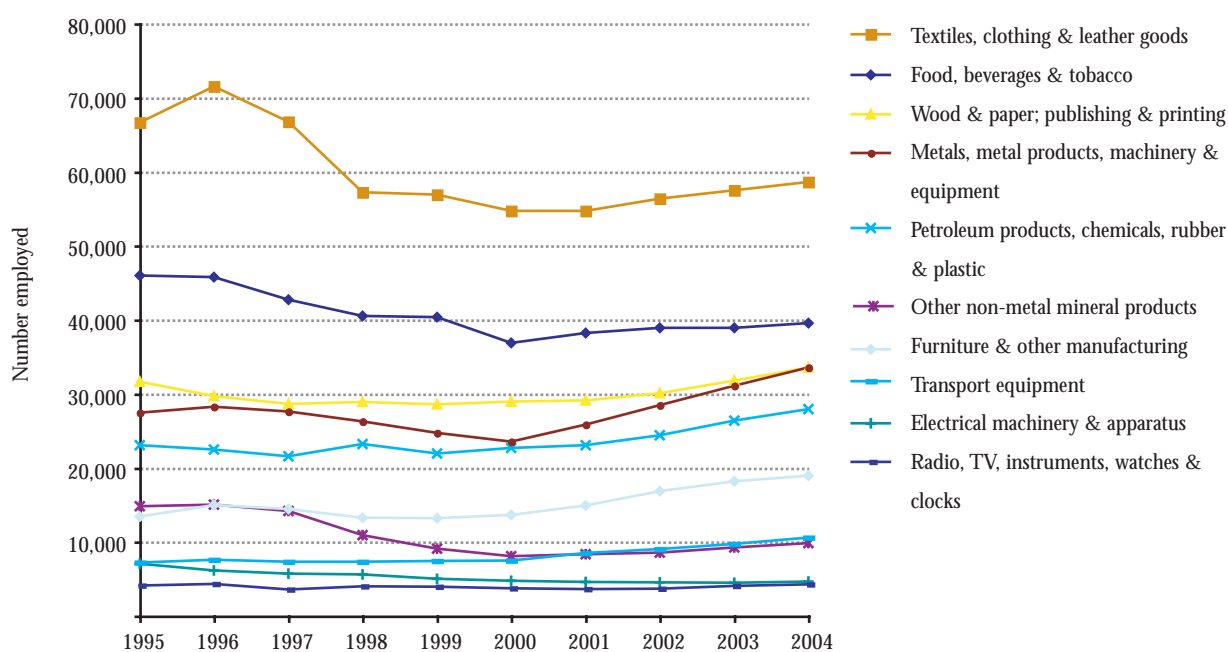
6.3.2 Manufacturing employment

Over the 10-year period 1995 – 2004, average annual declines in manufacturing employment were most marked in electrical machinery & apparatus (-4,1%), other non-metal mineral products (-4,0%), food, beverages & tobacco (-1,5%), and textiles, clothing & leather goods (-1,3%).

The strongest gains were made in transport equipment (3,9%), furniture & other manufacturing (3,5%), metal, metal products, machinery & equipment (2,0%) and petroleum products, chemicals, rubber & plastic (1,9%).

Provided the data accurately reflect reality on the ground, the good news is that manufacturing employment was higher in 2004 than in 2003. This is in contrast to manufacturing employment in the country as a whole, which has been slowly declining. It is also in contrast with the labour shedding that characterised manufacturing from the 1970s to the 1990s.

Figure 4: Manufacturing employment, 1995 – 2004



Source: Quantec Research and own calculations

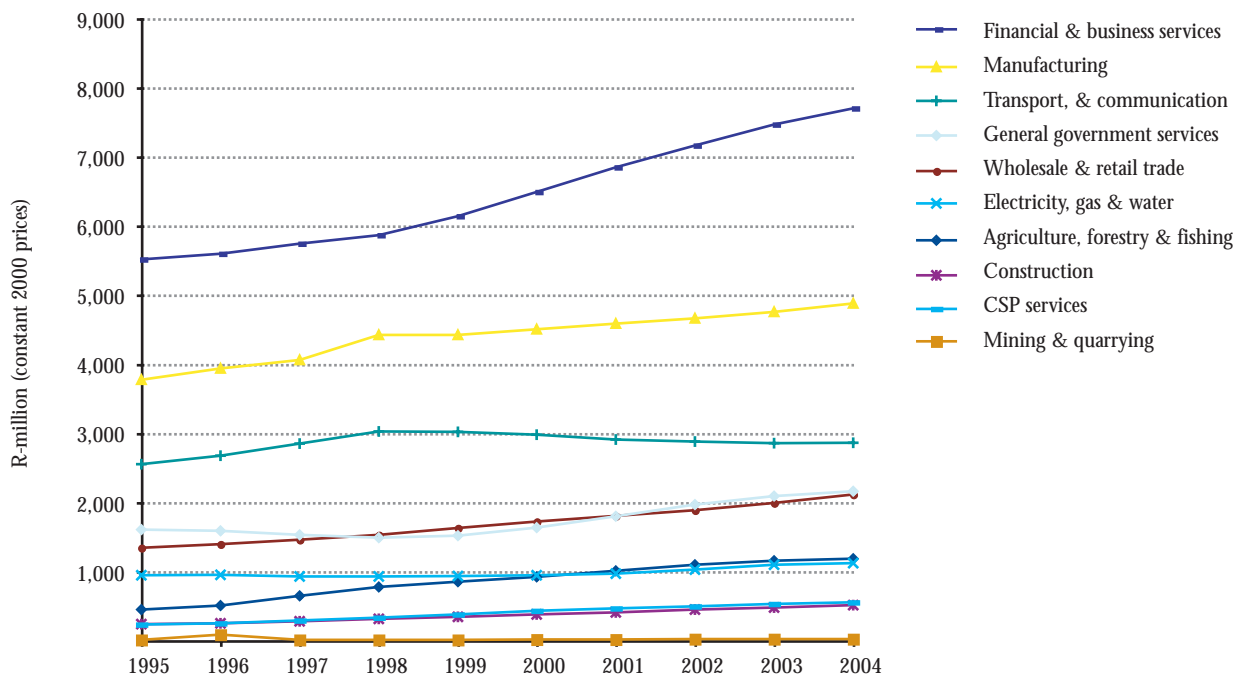
6.3.3 Manufacturing investment

Investment in manufacturing grew 2,6 per cent a year in real terms over the 10 years to 2004. This growth was particularly strong in transport equipment (10,4%), radio, television, instruments, watches & clocks (7,2%), furniture & other manufacturing (5,9%) and petroleum products, chemicals, rubber & plastic (5,5%).

The only sectors with slightly negative growth rates were textiles, clothing & leather goods (-1,0%) and metals, metal products, machinery & equipment (-0,7%).

In 2004, manufacturing accounted for just over a fifth of total investment in the Province, commensurate with its share in value added. Almost four-fifths of this was contributed by the petroleum & chemical sector; the food industry; wood & paper, publishing & printing; and metal-related manufacturing.

Figure 5: Gross provincial fixed investment, 1995 – 2004



Source: Quantec Research and own calculations

In an ideal hypothetical world not subject to change, the sector contributing most value added to the regional economy would also be the largest employer and would invest accordingly in order to sustain this position. But things are obviously never that simple.

In terms of absolute value added, the three most important manufacturing activities in 2004 were petroleum products & chemicals, food-related and metal-related activities. In contrast, the biggest employers were clothing & textiles; followed by the food sector; and wood & paper, print & publishing.

The largest investments originated in petroleum products & chemicals, followed by food-related; wood & paper, print & publishing; and metal-related activities. Of all of these, only petroleum products & chemicals grew at a higher average annual rate than the Provincial economy as a whole.⁷ This is why attention must be given, despite their small absolute size, to sectors whose investment and employment behaviour sets them apart from the rest – such as transport equipment, instruments and furniture.

Between 1994 and 2003, the cumulative share of inward direct investment into the Western Cape was 17 per cent of all foreign direct investment (FDI) flows into the country. According to information supplied by the BusinessMap Foundation, foreigners viewed business opportunities primarily in services and new industries. Between 1997 and 2003, cumulative flows of inward direct investment accrued mostly to IT (33,2%), cyclical services (19,2%) and financials (18,9%), followed by consumer goods (18,9%) resources (4,7%) basic industries (2,9%) and general industry (2,1%). This means that for the time being, manufacturing industries have not received much capital or technology from foreign interests.

6.3.4 Manufacturing trade

Manufacturing exports grew at an average annual rate of 4,4 per cent from 1995 to 2004. Export growth was thus higher than output growth. Increases in world trade have been higher than increases in world output for the last two decades. This is a hallmark of globalisation, which in turn obviously affects developments in the Western Cape.

The highest export growth rates were achieved by instruments⁸ (11,5%), transport equipment (11,3%), furniture (9,1%) and metal-related activities (9,0%). By contrast, exports of electrical machinery & apparatus fell by an average of 14,1 per cent. This is reason for concern and warrants further analysis.

In its *Industrial Development Report 2002/2003*, UNIDO (2002) commented that SA in the 1990s, along with Brazil, China, India and Saudi Arabia, had successfully upgraded its export structure but less so its industrial structure. This was based on the observation that there had been more of an increase in the share of medium- and high-technology products in manufactured exports than in MVA.

⁷ In the 1970s, 1980s and 1990s, the strongest growth in value added was always associated with those sectors that also contributed the largest proportion of MVA to the regional economy. Perhaps this is no longer so evident.

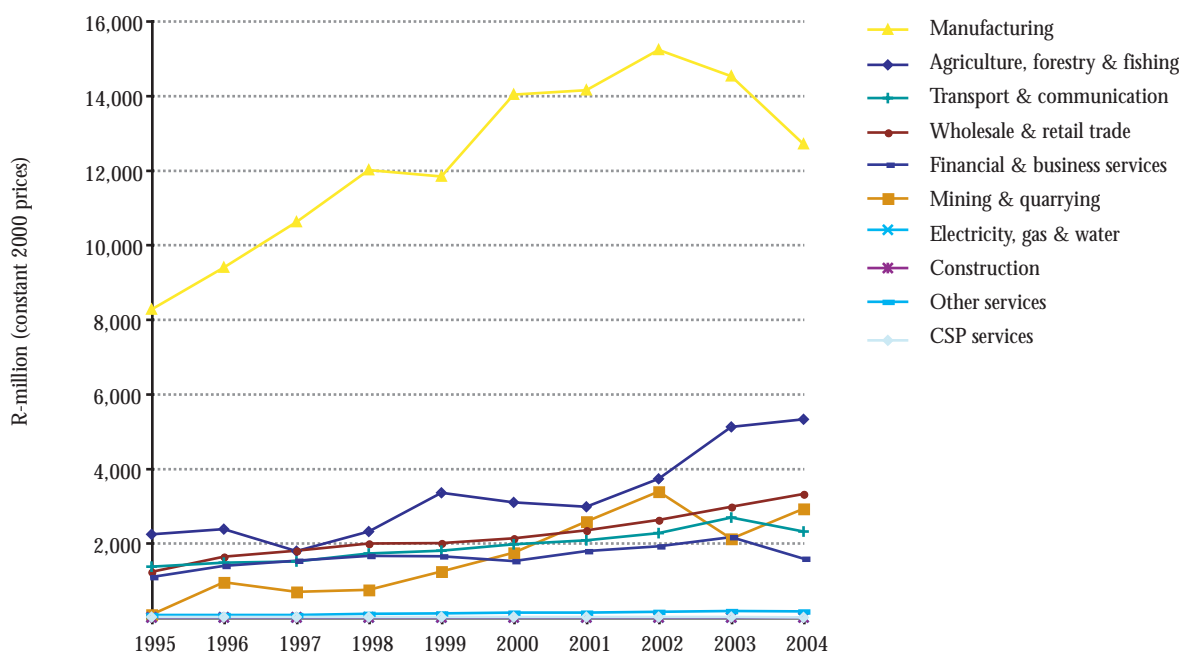
⁸ 'Instruments', a standard category in the SITC, includes anything from measuring devices to scientific apparatuses. At the level of disaggregation used in this analysis, we cannot state the exact commodities this category includes; to do that, one would need data at the HS6-digit level.

This points to a certain disjuncture in technological upgrading between export-oriented firms and those focused on the domestic market. To the extent that more advanced firms rely on local suppliers because of, for example, agglomeration externalities, the relative backwardness of the latter may act as a break on the development of the sector as a whole.

Alternatively, imports, or the integration into global production networks, may compensate for the lack of local capability. This may be the reason for the trend in instrument exports.

However, other explanations are potentially equally valid. Close engagement with the concerned sectors is required to understand properly why this is happening. The MEDS process would appear a suitable vehicle to be tasked with shedding further light on this.

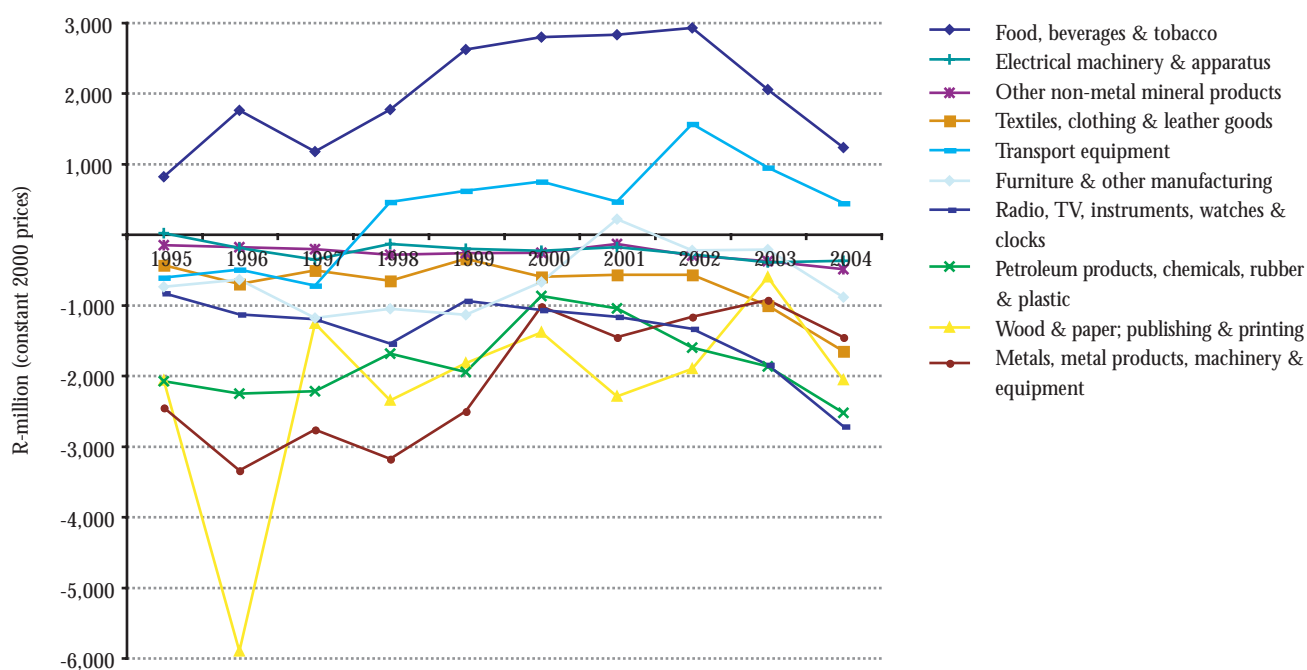
Figure 6: Exports by sector, 1995 – 2004



Source: Quantec Research and own calculations

In 2004, the Western Cape’s manufacturing imports were almost double its exports, and as such contributed disproportionately to the Province’s trade deficit. The only sectors with a positive trade balance were food products and transport equipment. The food sector (29,4%) and metal-related activities (20,1%) accounted for half of all exports by value. A further 37,1 per cent was met by wood & paper, publishing & printing; petroleum & chemicals; textiles and transport equipment.

Figure 7: Trade balances by manufacturing sub-sector, 1995 – 2004



Source: Quantec Research and own calculations

In 2004, 20 products accounted for roughly two-thirds of Western Cape exports. Table 6 lists these products and shows the relative importance of manufactures among them. The top export is oil⁹, but fish, fruit and related products are the largest group, followed by metal products, and finally much smaller items such as machinery, textiles, electronic components, minerals and transport equipment.

The most interesting question concerning the export composition of the Western Cape is the market dynamism of its leading products. As noted above, this involves not just the share in world exports and its growth, but also the predictability, volatility and market concentration.

Although the UNCTAD study could not be replicated here¹⁰, such an analysis should be done. Given the strong share of primary products in the top 20 list, it is likely that Western Cape exports are much more subject to price volatility than the countries behind the products on the list compiled by UNCTAD, as detailed in table 5.

Due to the protectionist nature of large parts of the world agricultural and food markets, it is furthermore likely that the high share of agricultural products, whether processed or not, affects the predictability of export growth in these product categories.

⁹ Of course, since the import content of oil and petroleum products is very high (in fact, the ratio of exports to imports is 1:3), oil becomes a less important net export than other product categories on the Western Cape's list of top exports.

¹⁰ The UNCTAD study is not replicated here in full due to time constraints and data and software concerns. However, it is foreseen that such an analysis will be conducted in future.

Table 6: The largest exports from the Western Cape by value, 2004

Rank	Product	Value (R-million)	Share in total exports, %
1	Oils, petroleum, bituminous, distillates	4 283,43	13,6
2	Grape wines	3 343,78	10,6
3	Citrus fruits, fresh or dried	2 263,16	7,2
4	Grapes, fresh or dried	1 781,58	5,7
5	Apples, pears, quinces, fresh	1 485,78	4,7
6	Fruit, nuts, edible plants, n.e.s.	987,61	3,1
7	Flat-rolled iron/steel, >600mm, not clad, plated	885,91	2,8
8	Diamonds	810,52	2,6
9	Flat-rolled iron/steel, >600mm, clad, plated, coated	643,61	2,0
10	Fish fillets, fish meat, mince	511,20	1,6
11	Liquid, gas centrifuges, filtering, purifying machines	479,90	1,5
12	Fish, frozen, whole	461,74	1,5
13	Crustaceans	420,70	1,3
14	Fruit and vegetable juices	411,54	1,3
15	Synthetic filament yarn	372,35	1,2
16	Diodes, transistors, semiconductors	368,90	1,2
17	Molluscs	348,21	1,1
18	Titanium ores and concentrates	332,18	1,0
19	Fish, fresh or chilled, whole	331,57	1,0
20	Parts and accessories for motor vehicles	313,94	1,0
	Sum 20 top exports	20 837,61	66,2
	Total exports	31 473,03	100,0

Source: Customs and Excise, Wesgro

6.4 A detailed look at services

6.4.1 Service sector output

Services make up more than three-quarters of value added in the Western Cape. The most important activities are wholesale & retail trade, business services, financial services and government. These four sub-sectors account for 70 per cent of all service activity. At 72 per cent, this was remarkably similar in 1996.

Average annual growth was highest in communication (10,3%), followed by finance and insurance (6,2%), trade (5,3%) and electricity (4,1%).

6.4.2 Service sector employment

The service sector employs close to 70 per cent of people in the formal sector, led by government, community & social services, trade and business services.

The highest average annual employment growth rates were attained by business services (8,5%), community & social services (5,7%) and trade (5,4%). The strong value-added growth in communications went hand in hand with negative employment growth.

6.4.3 Service sector investment

In 2004, investment in the sector was lead by business services (27,9%), followed by finance & insurance (19,5%), government services (13,3%) and wholesale & retail trade (11,7%), accounting for close to three-quarters of total investment. Average annual growth from 1995 to 2004 was highest in water (14,2%), communication (9,2%), CSP services (9,1%), construction (8,0%) and trade (4,7%).

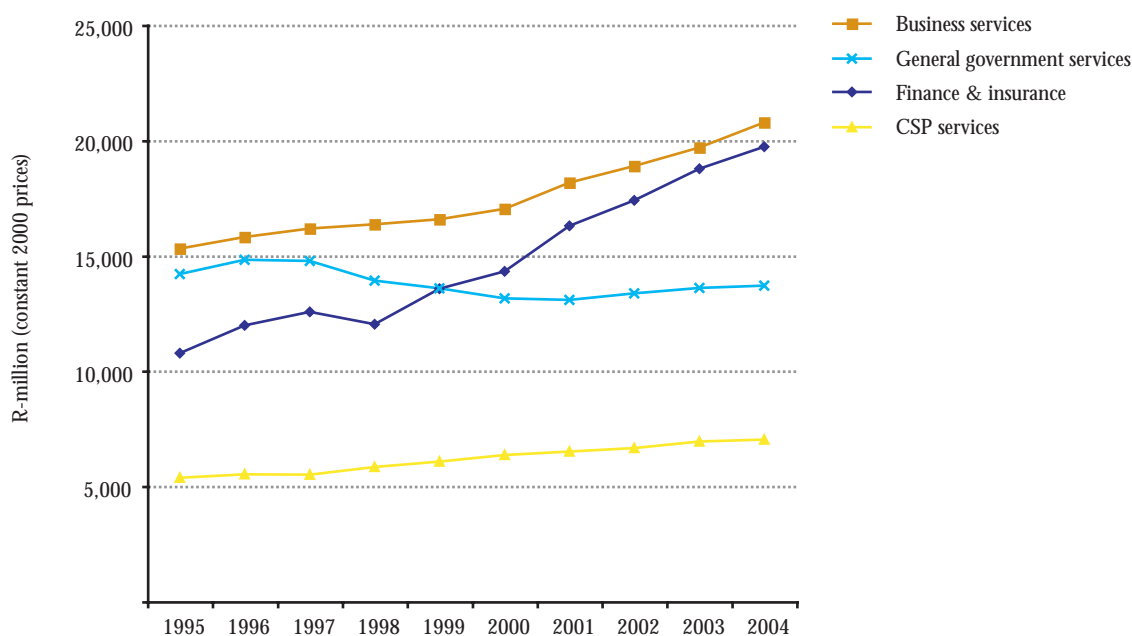
6.4.4 Service sector exports

The service sector accounted for just over a quarter of exports. Seventy per cent of this originated in trade and transport (43,7 and 25,9%, respectively), while business services (10,9%), finance & insurance (10,5%) and communication (5,4%) basically made up the remainder. Average annual growth was highest in trade (13,5%), communication (10,1%), business services (10,0%), community & other services (9,5%), and transport (4,7%) Due to a large decline from 2003 to 2004, average annual growth was negative in catering & accommodation (-11,1%) and stagnant in financial & business services (0.0%).

The juggernaut of the service sector in the Western Cape that combines a large weight in value added, employment, investment and exports with above-average growth rates is therefore wholesale & retail trade. The most dynamic newcomer is communications.

Because of its current and future importance for employment and exports, business services is also a sector to watch. CSP services is important for employment, and its relatively high investment ratio will hopefully sustain that. In contrast, the financial sector may become more important both in the region and abroad, albeit without creating many jobs¹¹.

Figure 8: Value added in services, 1995 – 2004



Source: Quantec Research and own calculations

6.5 Regional differences in industrial activity

So far the discussion has abstracted from the fact that the Western Cape as an economic unit is made up of spatially differentiated economic activities. This means that growth in output or employment in any one sector affects some municipal districts in the Province more and others less, creating spatial dynamics.

This is not just a statistical aside. How well a region or municipal district copes with economic change largely depends on the ability of its residents either to move from declining to growing sectors inside their region – primarily a question of their skill sets – or to leave the district/region in search of better fortunes elsewhere – primarily a question of the resources required for mobility.

¹¹ Jobs created in this sector are mainly skilled, rather than semi- or unskilled. As noted in this Review, as in the PER&O 2005, the unemployment problem in the Western Cape, as in the rest of the country, is – with some exceptions – largely confined to those who do not have skills. Employment amongst skilled individuals is generally high.

Everything else being equal, districts/regions with a relatively flexibly skilled workforce and/or with a more diversified industrial structure can employ coping mechanisms more easily than those that rely on a range of relatively narrow activities and/or people with skills that cannot easily be transferred to other applications.

For example, on the West Coast most people in employment earn their living by producing goods or items, younger even more so than older people. By contrast, in Cape Town most people earn their living by retailing products. These products may very well be the same; fish caught off the West Coast and served by a Cape Town restaurant. But they might also be totally disconnected.

Chapter 4: Employment Dynamics shows that agriculture, forestry, & fishing is both the largest employer in the West Coast and has the highest employment growth rate. So livelihoods on the West Coast rely largely on activities that for the Province as a whole are in long-term decline. Given the structure of economic activity along the West Coast, a retrenched fisherwoman or a metal worker has fewer opportunities to find alternative employment than their counterparts who work as waiters or in IT services in Cape Town. This reality needs to inform sectoral support policies.

Chapter 5: Socio-Economic Profiling at the Local Level provides an excellent spatial overview of the socioeconomic characteristics and sectoral make-up of municipalities and districts. This information provides a critical baseline analysis for sectoral support policies emanating from the MEDS research and recommendations, to which the chapter now turns.

7. Key sector performance: evidence from the MEDS¹²

So far, the chapter has provided a high-level, cross-sectoral analysis of the various economic activities in the Western Cape. More specifically, it points to which sectors are growing in terms of output, and which are in decline. It also highlights how sector output growth relates to jobs created and to those lost. But it has not as yet discussed the reasons behind these trends.

The MEDS process is an attempt to gain a better understanding of the determinants of provincial economic growth. It does so through engaging with sub-sectoral activities and through direct interaction with important stakeholders. It thus sheds light on how firms perceive growth prospects and why they do or do not undertake capital investment, expand or reduce the workforce, and so on. Hence research commissioned by the MEDS complements the sectoral and employment review.

7.1 Agriculture

Agriculture continues to be a mainstay of the Western Cape economy. Its relatively low share of value added belies its role as an important supplier of inputs, especially fruit, to the food processing industry. Also, agriculture plays a very important role in the Province's rural hinterland.

Agricultural activity in the Province is highly diversified and entails everything from conventional wheat farming to organic honeybush cultivation. Agriculture is also linked to another important sector – tourism – both directly and indirectly. Internally, the sector is grappling with land reform, transformation more generally and the effects of the stronger rand.

The biggest challenge to the sector is perhaps the high and rising water stress that affects the Western Cape. Although the current drought cycle will likely come to an end, long-term climate change means that the competition for water – including with industrial and residential users – will become more pressing, with obvious upward pressures on prices. This makes agriculture very vulnerable in the medium to long term.

Externally, the sector is up against an international trade regime that, despite assurances by the world's major trading powers in the context of the current Doha Round world trade negotiations, continues to discriminate against efficient producers from developing countries. At this point it is not clear if, and with what effects, the Doha Round will eventually lead to a reduction in export subsidies and more market access in developed countries. This uncertainty is inimical to making far-reaching investment decisions.

¹² *The Western Cape Microeconomic Strategy, or MEDS, favours support for dynamic growing sectors that have the potential to make a major contribution to output and employment gain, over support for declining sectors. The Strategy's aim is particularly to encourage new ventures where overall gain is likely to be more significant than in existing areas, where resources would probably be used mainly to 'preserve' activities. For the full report, please visit: www.capegateway.gov.za/eng/pubs/public_info/M/115232/1#03.*

Climate change and agriculture

The Millennium Ecosystem Assessment (www.millenniumassessment.org), an international effort to assess the capacity of ecosystems to support human wellbeing and life on earth, funded by the World Bank, the Global Environmental Facility, donor countries and private foundations, undertook what it called a sub-global study of Southern Africa. Ecosystem services are the benefits people obtain from ecosystems, ranging from physical products such as wood to less tangible services such as soil fertility or climate regulation.

The research started in 2001 and findings were made available in 2004. The assessment covered three core ecosystem services – food, water and services linked to biodiversity. Geographically, it involved the Gariep (Orange) River Basin and thus included parts of SA.

With respect to freshwater, the assessment engaged with wide-spread water scarcity afflicting the area going south from Namibia, Botswana and Zimbabwe. Due to the absence of large surface water supplies, this area is highly dependent on groundwater. Most groundwater supplies date back to thousands of years ago. Only 1 per cent or so of the mean annual rainfall returns to these aquifers, while the rate of extraction for human use is much higher.

The biggest user of water is irrigated agriculture. In 2000, it accounted for 73 per cent of all water use, followed by domestic users (17%) and industry (10%). In the same year, SA had exploited a whopping 85 per cent of its irrigation potential, suggesting that something had to be done soon about prevailing consumption patterns. In fact, water demand (including supplies from Lesotho) is expected to outstrip available supply by 2030.

Increases in population, growing per-capita consumption and the anticipated effects of climate change lead to water shortages which in turn constrain development and increase vulnerability. An additional problem is deteriorating water quality due to pollution. This includes everything from mine and industrial effluents to sewage return flows, soil runoff, and nutrients and pesticides from farming activities. More water extraction, in turn, means that the volume in the rivers is insufficient to flush away the resulting salts, sediments, nutrients, pathogens and pollutants.

When annual per-capita water supplies drop below 1 700 m³, disruptive water shortages can frequently occur. When it drops to below 1 000 m³, it poses challenges to human health, food production and economic development. In 2001, the figure for SA was 1 156 m³, clearly a reason for concern.

At the same time, compared to its neighbours, SA can avail itself of a wider range of adaptation strategies, both because it is relatively more affluent and because it is technologically more advanced. Apart from changes in the regime of water pricing and regulatory incentives in support of conservation, it could make an effort to use 'virtual water' by importing rather than producing goods that are water-intensive. In addition, it could switch from low- to high-value crops.

Source: Scholes and Biggs (2004)

7.2 Fishing & aquaculture

Fish is among the Western Cape's most important export items. The Province accounts for some three-quarters of national fish exports.

The biggest external challenge of the industry is the sustainable harvesting of the oceans' resources, many of which are being rapidly depleted, with attendant consequences for the intensity of global competition.

Its biggest internal challenge is how to balance considerations of equity and efficiency in the allocation of quotas. This requires particular attention to the consequences of changes in industry structure and fishing rights to traditional fishermen – and emerging fisherwomen – and the sustainability of the villages in which they live.

As the example of agriculture shows, fishing could benefit from closer linkages with the tourism industry. In addition, there is scope for growth in mari- and aquaculture.

7.3 Clothing & textiles

Although the clothing & textiles sector has contracted over the last decades, it has proved more resilient in the Western Cape than in the rest of the country. Nonetheless, absent radical changes in the way the sector operates, it is likely to continue to lose out to competition from cheaper production locations in Asia and elsewhere.

In the interest of preserving jobs, this puts a premium on intra- and inter-firm efficiencies. Unless this involves smaller firms next to the larger players, further labour shedding is likely to occur. In addition, marketing and organisational innovations should help to reposition the sector toward a more viable technological trajectory. In short, a concerted drive toward knowledge intensification is of utmost importance.

Repositioning the clothing and textiles industry using knowledge intensity

It is well known that the domestic textile industry finds it difficult to compete with China and other low-cost producing textile exporters. However, China does not compete just on price. For some clothing items, China is not the lowest-cost producer; however, other factors, such as its industry's quick response, reliability, business-like attitude and keen understanding of customer demand are key advantages. It is therefore prudent for SA as a middle-income country producer with relatively high levels of knowledge-intensive management capacity to focus on upgrading operational performance in the textile sector as a means to enhance competitiveness.

Already, European and US producers are focusing on measures to upgrade their clothing and textiles manufacturers, including but not limited to:

- Improving supply-chain management and tightening links between suppliers and customers;
- Focusing on fashion-sensitive clothing, where fast product turnaround and short delivery times are important; and
- Switching as much production as possible away from low-value bulk goods such as socks and T-shirts into high-end products such as high-tech industrial and medical textiles, luxury products and high-quality garments with high design content.

Based on the above, it is clear that the textiles industry cannot compete on price alone in low-value-added, price-based clothing segments. It has been suggested that the industry "...consider whether it is possible to focus on raising the knowledge-intensive aspects of the clothing and textiles sectors' operations, whether these be in respect of production operations, high technology inputs and outputs, supply chain relationships, logistics, design, customer focus, buyer relationships, etc."

Subsequently, it is important that skills are continuously upgraded. Provincial and metro government could facilitate here, by "...creating specialised centres of research and technical excellence, building managerial degree programmes, etc."

However, if firms are not willing to internalise the principles of world-class manufacturing and recognise the importance of upgrading, it is unlikely that any intervention will succeed.

Source: MEDS Synthesis Report, 2005

7.4 Metals & engineering

Metals and engineering comprise a wide range of activities. They centre around basic metals and structural steel in Saldanha Bay, a dozen or so foundries, and boat-building and ship repair. In some sense, the downstream processing of steel and engineering is an activity that 'has not yet happened', which is to say that it has substantial potential, given the Western Cape's coastal location, existence of an ore-export harbour and significant local human capital.

Growing this potential would entail a reduction of the domestic price of steel, an area currently investigated by national government. It would then be possible to conceive of a Saldanha steel beneficiation cluster, with forward linkages to the foundries and re-emerging tooling competences. This would tie in well with national programmes in support of advanced supply sectors such as the National Tooling and Advanced Metals Initiatives.

Import parity pricing investigated

In April 2005, the (SA) Department of Trade and Industry (the dti) announced that it would investigate IPP, as it has been identified as a major constraint to growth and expansion of the downstream sectors such as metals and chemicals. According to Trade and Industry Minister Mandisi Mphahlele, research by the dti has indicated that domestic prices to downstream producers are in some cases 30 per cent to 50 per cent above international prices. The aim of the investigation was to "...seek to unlock the potential of our more labour-intensive downstream sectors and improve the levels of beneficiation in our economy." (South Africa Info, 2005).

the dti also commissioned the Competition Commission to investigate IPP to conclude whether it contravened sections of the Competition Act relating to:

- Colluding to fix a price;
- The charging of an excessive price; and
- Engaging in prohibited price discrimination.

However, the Commission found that "...although IPP might be the basis for setting prices that are found to be anti-competitive... there is no predictable connection between IPP and any of the contraventions mentioned above..."

The Commission found the variable exchange rate to be one of the reasons why there is no predictable relation between IPP and anti-competitive pricing practices. IPP is calculated by converting the global price for a product into rand – multiplying the foreign price by the relevant exchange rate (expressed as rand per foreign currency unit). In addition, the Commission noted that prices should be evaluated for their anti-competitive effects according to established, predictable criteria. However, since IPP is as volatile as the underlying exchange rate movements, it is not sensible to formulate a rigid rule about the practice of setting prices according to import parity.

Despite this finding, national government still believes that IPP needs to be addressed. However, changing pricing policy may lead to a negative impact on investments, as companies' profits are reduced, thus reducing the incentive for further investment.

Source: South Africa Info, 2005; Competition Commission, 2006

7.5 Oil & gas

Upstream oil and gas is another initiative where the provincial government, jointly with private sector stakeholders, is investigating the feasibility to grow local capabilities and a critical mass to supply services, including the repair and maintenance of offshore installations and vessels and the fabrication of pre-assembled units, to the offshore oil industry in West Africa.

Like any new initiative, this endeavour faces an uphill battle in overcoming constraints in IPP, transport logistics and skilled labour. Of course, understanding the true nature of these constraints is the first step toward dealing with them. Research into the potential role of the Western Cape as a service provider to the international oil and gas industry is therefore being undertaken in the third round of the MEDS.

7.6 Electronics

Some 70 firms make up the electronic sector in the Western Cape. Most are small or medium-sized enterprises and manufacture components. The few larger firms are active in systems design and engineering. The portfolio of activities stretches from defence via telecommunications to security management. About a quarter of all electronics production in SA takes place in the Western Cape.

The industry in the Western Cape is not competitive in mass-produced parts or components. Building on deep engineering know-how, the sector focuses on niche applications. Many projects attest to the technical savvy of the involved firms and institutions. For example, researchers at the University of Stellenbosch developed and manufactured SA's first satellite. At the same time, however, many firms appear to fail when it comes to bringing their new ideas to market.

Electronics is among the few sectors without a functioning sector association. The absence of such an information and co-ordination mechanism is curious. Experience from other sectors illustrates that this can have beneficial effects in terms of inter-firm cooperation, strategic planning and entering challenging markets abroad.

New solar power technology developed

SA scientists have developed a revolutionary new, highly efficient and more affordable solar power technology that will enable homes to obtain all their electricity from the sun, potentially eliminating high electricity bills and frequent power failures. It is foreseen that the unique SA-developed solar panels will make it possible for houses to become completely self-sufficient for energy supplies, providing enough energy for stoves, geysers, lights, TVs, fridges, computers and other appliances.

It took 10 years of research for the SA scientists (led by University of Johannesburg Professor Vivian Alberts) to develop this new technology, with international experts already admitting that nothing comes close to the effectiveness of the SA invention. Some believe that the new technology will be available in SA within a year. Through a special converter, energy can be fed directly into the wiring of existing houses. In addition, new, powerful and super-efficient storage units (developed by other companies) will allow energy to be stored to meet demands in winter.

Solar companies, both foreign and domestic, are scrambling to get involved, with domestic firms looking to build local factories to produce the solar panels. One of the world leaders in solar energy, German company IFE Solar Systems, has already invested more than R500m in the SA invention. The firm is planning to manufacture 500 000 of the panels before the end of 2006 at a new plant in Germany.

Eskom noted that any new power supply that lessened the load on Eskom was welcome. The SA electricity supply company also indicated that it was carrying out its own research on solar energy and "...are currently investigating building what will probably be the largest solar power plant in the Northern Cape - a 100-megawatt facility."

Source: Saturday Argus, SA Solar Research Eclipses Rest of the World, 11 February, 2006

7.7 Biotechnology

Biotechnology is among the key platform technologies promoted by the SA government. The Western Cape hosts one of three biotechnology regional innovations centres (BRICS), plus the Bioinformatics Network at the University of the Western Cape.

Despite a very sizeable number of research groups in the Province, less than two dozen firms have core activities in biotechnology. It would appear, therefore, that incubation of start-ups and the commercialisation of technologies are not a strong feature of the sector. In addition, firms are active in a broad range of activities; given their small number this may make for a low degree of knowledge transfer.

Although the tertiary education sector turns out qualified graduates, they often end up working in other areas due to the relatively poor remuneration. Students strongly lack commercial skills. This must be addressed to help to accelerate bringing products out of the development pipeline to market. Perhaps the biggest problem for biotechnology activities in the Province is the relatively low degree of interaction between science and industry, a key prerequisite for such a knowledge-intensive activity.

7.8 Crafts

The crafts sector is closely related to the Provincial ambition of shared growth and integrated development: it is labour-intensive, mostly undertaken by SMMEs and an important contributor to revenue generation. Some 2 000 establishments employing more than 7 000 people account for about a quarter of the industry in the country. The sector has close links with the tourism industry and benefits from its expansion. Tourists appreciate craft in that the sector facilitates a unique cultural and retail experience.

Activities in the sector span a very broad portfolio of materials, techniques, products, quality, scale and market positioning. They encompass relatively simple gifts and souvenirs as well as fashion-led items, collectables and art. Through intermediaries, many products are linked into local or international value chains.

Socially, one of the most important functions of craft production is the entry it offers relatively low-skilled people, especially women, into the economy. Over time, it may act as a stepping-stone to other, more remunerative activities. Expansion of the sector is thus directly linked to securing sustainable livelihoods. Institutional support to the sector is available through the Cape Craft and Design Institute hosted by the Cape Peninsula University of Technology.

7.9 Cultural industries

Cultural industries largely elude accurate statistical measurement because they include activities as diverse as architecture, dance and language schools that are either subsumed under other activities or not separately classified at all. Descriptions of the sector must therefore operate with estimates.

Cultural industries probably employ a minimum of 50 000 people who earn their primary income in the sector. Much like in crafts, there is a preponderance of SMMEs engaging in labour-intensive activities. Jobs are split about evenly between full- and part-time, and many people work relatively *ad hoc* on short-term contracts.

Unlike in crafts, culture workers tend on average to be relatively highly skilled. The sector offers good opportunities for women. It has close linkages to tourism, retail and services more generally, and includes high-profile events such as the Cape Town International Jazz Festival, along with lower key activities in rural communities, such as the Klein Karoo National Arts Festival held annually in Oudtshoorn.

Lower-income activities such as community arts, craft, dance, music, musicals and opera, theatre and visual arts generate average monthly incomes of below R4 500, while design, fashion, festivals, heritage, language schools and publishing yield incomes between R4 500 and R10 000.

If tourism continues to grow, cultural industries are set to benefit. The Province's educational institutions offer high-quality training for almost all activities in the sector, thus poising it for sustainable growth. What is missing to enhance local capabilities in this area are managerial and other business skills.

7.10 Film

The film industry in the Western Cape can avail itself of world-class locations and very good production skills. Comprehensive data on employment in the sector are not available. Turnover is estimated at R1bn, with another R2,5bn in supporting activities. This accounts for almost half of national production. Altogether, the film industry contributes some 4 per cent to Provincial GDP.

It has become a significant player in the world market, although the Cape is definitely no longer a cheap location and is thus experiencing more competition from emerging countries in Latin America, Asia and Eastern Europe. The film industry has important linkages to the supply and hospitality industries.

Cape Town's film industry is booming

'Tsotsi' has won critical claim abroad, but the domestic film industry is not a one-hit wonder. According to reports, Cape Town's film industry is currently having a favourable season, despite fears that providers had priced themselves out the market.

Higher prices are mainly due to the strong rand; however, some of the costs faced by the film industry have been reduced with the City Council bringing down location fees around the city. Additionally, the city also gives film set discounts on stand-by emergency services. One insider noted that, even though costs have increased steeply, the fact that the city still attracts significant production reflects well on the quality and value delivery.

At present, five major movies are being filmed in and around Cape Town, all making use of the local industry. Each of these movies has budgets of more than \$100m, and two movies have budgets of double this amount. Since September 2005, there have been more than 2 000 shoots in the city. Additionally, there are about 1 260 companies, many small, in the film industry in Cape Town.

There are five sectors in the film industry – feature films, television, still photography, commercials and digital animation – and all are blooming. In addition, international productions now tend to remain in the city for post-production work, whereas they previously only used the city to shoot scenes. In addition, a significant value of production budgets are often spent on hotels and car rentals, reflecting indirect benefits to Cape Town's economy.

Source: Cape Times, Cape Town's 'Fantastic' Film Season, 8 March 2006

Relatively high costs are perhaps the single most important competitive disadvantage of the sector at the moment. This is due to the rand appreciation and a rise in support industry prices. Internationally, the Western Cape's competitors often benefit from very generous support facilities, as well as more favourable access to distribution and facilitation schemes, with resulting inexpensive film and television products.

The sustainability of the sector hinges on viable training of industry entrants at early stages of their career, especially for people from disadvantaged backgrounds. The challenge for both the education sector and the industry itself is to ensure the possibility of upward transition of newcomers to the industry toward the typically more medium- and high-skill professions that dominate the sector. The future of the sector also depends on a relaxation of administrative and regulatory burdens in the area of tax, employment and overtime conditions, as well as the rules governing immigration and work permits.

7.11 Financial services

This sector, especially asset management and insurance, is among the single most important contributors to regional output. In addition, finance, insurance & real estate provide up to a third of Provincial investment.

Unfortunately, the output elasticity of the sector is relatively low in that the above-average growth rate of the sector has not translated into equally high increases in employment. Why exactly this is the case merits further analysis.

Recent important FDI deals included Resources Corporation Berhad from Malaysia (R1,3bn), Zurich Financial Services from Switzerland (R376m) and the US government (R180m).

The financial sector can contribute to job creation in indirect ways. For example, business process outsourcing could grow on the back of organisational innovations in insurance and asset management. Extending financial services to the under- or unbanked majority of the population would provide further opportunities for job growth.

Call centres and business process outsourcing (BPO)

This sector comprises roughly 100 firms employing some 11 000 people. Growth in 2004 was 25 per cent. Because the sector is labour intensive, sustaining high growth rates will contribute to job creation in a major way.

It is important to realise that SA and the Western Cape do not have low labour costs relative to locations competing for a slice of the BPO pie around the world. Hence, the sector must position itself so that it aims for building capabilities in offering more comprehensive and complex services. An opportunity for complex voice-based services exists particularly in connection with the Cape's financial services industry.

Rising to this challenge of technological upgrading requires that people working in the industry who are for the most part relatively low-skilled are given the opportunity and the incentive to graduate to successively higher levels of service competence. If this is successful, 20 000 direct new jobs might be created in the short term, with more potential for the medium and longer term, plus indirect employment effects for the various supplier industries that service the sector.

More than other sectors, call centres and BPO thus harbour the opportunity to advance the low- to high-skill upgrading, in the context of a medium- to high-technology environment, upon which the sustainable development of the Western Cape and the country at large depends.

Information and communication technologies (ICTs)

ICTs benefit from strong growth prospects, both globally and locally. The opportunities for growth of the ICT sector in SA have been considerably improved by the recent liberalisation of the sector, including the establishment of a second national operator, the granting of rights to municipalities to create their own communication networks that they can lease to private operators for cheap voice-over-internet protocol (VoIP) and broadband internet access. Since ICTs are a platform technology, growth in the sector is expected to yield benefits across the economy.

The ICT sector in the Western Cape has attracted some of the Province's largest foreign direct investments, including by US-based VeriSign (R3,5bn) and Zeconi Optic Fibre (R250m).

The sector enjoys the support of active sector associations that appear to succeed in lowering entry barriers to new firms, including from disadvantaged backgrounds.

Knysna municipality provides wireless services to all

In an attempt to avoid high telecommunication costs, Knysna municipality and UniNet, a private wireless services and infrastructure provider, launched a commercial voice service in Knysna in 2006, making it one of the cheapest places to make a telephone call in SA. UniNet won a contract with the Knysna municipality and now supplies the region with a full wireless network, which makes low-cost calls and Internet provisioning possible. Residents receive 100 free local minutes using portable Wi-Fi phones. In addition, there are plans to launch a fixed wireless Internet service, which will drastically cut the Internet access costs of businesses and residents in the vicinity.

It is expected that Knysna's charges will undercut Telkom's by around 50 per cent. However, the Mail & Guardian reports that Knysna's plans will be challenged by Telkom, which claims the proposed Knysna wireless service is illegal. This is despite claims that Knysna's plans were sanctioned by the Telecommunications minister. Telkom is also threatening to sue for loss of earnings.

Although some much larger municipalities - Durban, Tshwane, Cape Town and Johannesburg - are looking at the Knysna option, it can be expected that Telkom's reaction will stifle the expansion of this idea.

Source: Moneyweb, Municipalities Doing It, March 2005; Mail & Guardian, Knysna Leads the Way, 25 November 2005

7.12 Tourism

Tourism is one of the biggest industries in the world. SA leads the continent in international tourism, and the Western Cape has a major share in national tourism turnover. The sector contributes approximately 10 per cent of the Provincial economy and some 7 per cent of employment. It is highly diversified and offers a very comprehensive product range, spanning traditional sight-seeing as well as more specialised services such as eco or health and medical tourism.

Despite the impressive growth of the sector, it does face a number of serious challenges. Foremost among these include:

- Creating a better information base, especially relating to trends in the various sub-sectors.
- Expanding transformation so as to operationalise existing legislation and offer one of the most lucrative provincial economic activities to disadvantaged people.
- Improving the transport infrastructure at both the high and the low end, with innovative solutions for shifting towards safe public transport.
- Strengthening the reach of education and training.

- Support for local authorities for whom tourism holds the promise of job creation only if they manage to match local competences with what is a very demanding and quality-conscious industry.
- Marketing the Western Cape in conjunction with Cape Town as a multifaceted, world-class tourist destination, expanding tourism into townships and rural areas and with the aim to support BEE and specific communities, such as fledgling fishing villages on the West Coast.

In addition, the long-term environmental challenges facing the Western Cape, especially water stress, have potentially very serious implications for the sustainability of tourism. This asks for collaboration between the sector and other stakeholders to elaborate appropriate solutions.

7.13 Energy

The Western Cape's share in national energy demand is around 7 per cent. The biggest users of energy are, in descending order of importance, transport (59%), industry (17%), residential (10%), agriculture (8%), commerce (4%) and mining & quarrying (2%).

The power outages that have been affecting the Western Cape from late 2005 and the costs they impose on the private sector underline the importance of reliable energy supply for economic growth and job creation.

Eskom's plans for the Western Cape

Recent power failures have had a big impact on the Western Cape. Eskom estimates that the Province requires between 3 500 megawatt (MW) and 3 900 MW of power in summer and up to 4 200 MW in winter. The Koeberg nuclear power station can generate 1 800 MW (representing 46 per cent to 51 per cent of the Province's electricity requirements), with the balance of the Province's electricity requirements being transmitted from Mpumalanga via transmission lines.

With increased demand due to higher than expected growth rates, maintenance requirements and other problems at Koeberg, as well as a lack of maintenance on transmission lines from Mpumalanga, Eskom has recently been unable to satisfy the Western Cape's electricity needs.

However, Eskom has several contingency plans in place to address the electricity shortage in the medium term. First, in 2007 Eskom will commission two open-cycle gas turbine power stations (in Atlantis and Mossel Bay) with a total capacity of 1 000 MW, valued at R1,86bn, to meet peaking demand. An added bonus of these power stations is that a significant number of jobs will be created in the building phase, as well as to operate and maintain these stations.

The 40 MW Athlone gas power station's turbines are currently in the UK for refurbishment and should be back in commercial operation by end-June 2006. The Athlone thermal power station, although not decommissioned since its last commercial operation in 2002, is not commercially available and will not be refurbished by the Cape Town Unicity in the short term. It does, however, present an opportunity for privatisation or refurbishment with a partner, but this has not been developed to any great extent.

Given the controversy surrounding the pebble bed nuclear power plant plans, it is unlikely that such a plant will be established in the near future.

Eskom predicts that independent power producers will generate an additional 1 000 MW nationally by 2009. Thus, most of the Western Cape's electricity needs should be met from within the Province by 2009.

Eskom has also indicated that it is addressing the strain on transmission capacity, with the Western Cape being at a distance from generation plants. Strengthening of transmission corridors is expected to be completed by 2010.

Work on Koeberg is estimated to be completed by mid-May 2006. Whether these developments will be sufficient to address the Western Cape's short-term electricity requirements remains unclear, and it is expected that the Western Cape will have to diversify its portfolio of electricity sources.

*Source: Eskom, 2005 and 2006;
Mail & Guardian, 'Loose bolt' at Koeberg Means Months of Repairs, 19 January 2006*

Energy supply problems are largely a national issue. But the Western Cape does have the potential to experiment with alternative energy supplies, especially in the area of renewables drawn from sun, wind and perhaps even waves.

What militates against the development of environmentally friendly energy sources is the relatively low price of conventional energy. Hence, incentives for the exploration of alternatives on a large scale do not really exist unless the regulatory framework changes and support schemes are designed to overcome market failures.

A more rational discussion of the advantages and disadvantages of various possible scenarios is hindered by poor data on energy supply and demand at provincial level. This makes it difficult to estimate needs over time.

7.14 Transport

Much like insufficient energy supply, SA's inadequate transport infrastructure is a constraint on economic growth. Bottlenecks exist in the form of an inefficient rail service, increasing congestion on roads and supply-constrained port facilities. Not only will the spectre of logistical nightmares depress FDI, it obviously also depresses the ability of local firms to increase their internal efficiencies and reduce lead times. In addition, it directly impacts on the Province's ability to honour delivery schedules in fast-moving goods categories where time is of the essence. This is why transport issues must be considered a priority issue in support of both accelerating growth and creating job opportunities.

Improving efficiency and safety of public transport is therefore a key objective for the Province, occupying priority in the Strategic Infrastructure Plan (SIP) currently under development.

Current public transport infrastructure initiatives

Provincial government has already identified that the current level of transport infrastructure impedes social and economic development in the Western Cape. Subsequently, several priority projects have been identified, including:

- Public transport: Establishing an integrated public transport system.
 - This would include extending and improving the rail network, the use of dedicated bus lines and providing interchange facilities to enable linkages between different modes of travel (for example, car to rail).
- Roads:
 - N1 corridor redevelopment and upgrading
 - Regional road rehabilitation and addressing district bottlenecks
 - Addressing rural gravel roads
- Rail: Extending rail services and infrastructure.
 - Several possibilities are being mooted at this stage, with the extension of the Khayelitsha rail line and an Atlantis line reconfiguration highly likely.
- Ports
 - Port access reconfiguration and upgrade.
 - Ports cargo handling and storage facilities reconfiguration and upgrade.
- Airports
 - Airport upgrades, including runway and domestic terminal upgrade at Cape Town International.
 - Airport access and transport linkages, potentially creating a link between the City and the airport.

Although much still needs to be done, processes are in place to address public infrastructure needs in the Western Cape that will help to alleviate transport backlogs in the Province. This, in turn, will provide further impetus to the regional economy.

Source: Forthcoming Strategic Infrastructure Plan (SIP)

8. Sector prioritisation for provincial policy support

The description of the various sectors is a mixed bag. What emerged in the course of the second phase of the MEDS was qualified support for a few activities that best seemed to reconcile the triple demands of accelerated growth, job creation and equity.

In order to arrive at this prioritisation, the MEDS Oversight Committee designed a decision rule that categorised priority sectors in terms of the largest likely effect of policy support on employment, revenue and empowerment in the context of given resources, namely a budget envelope of an estimated R100m a year.

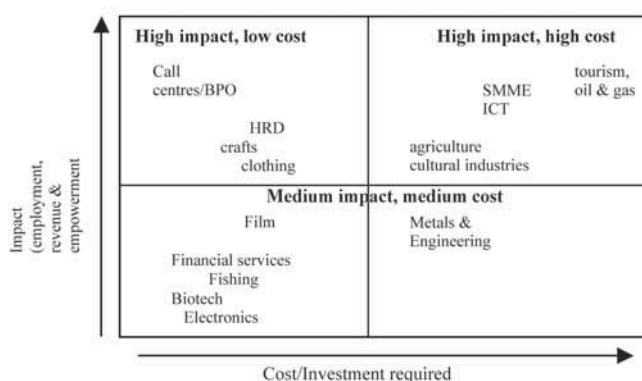
It concluded that this would be realistic only for sectors with a sophisticated and credible sector association to act as a counterpart to government. Further it demanded that Government make sufficient, dedicated human resources available to see support policies through, and that it set up a monitoring and evaluation facility so as to learn about what works and what does not, and to be in a position to make informed decisions in favour of phasing out or strengthening support measures.

Thus, the MEDS recommended support for one low-cost, high-impact sector – call centres and BPO activities – along with four high-cost, high-impact sectors – tourism, oil & gas, ICT and SMMEs.

Certain other sectors – crafts, clothing, human resource development, agriculture, cultural industries, film and metals & engineering – were identified as falling in the mid-range of output and equity impact, therefore warranting government attention.

Finally, the high- and mid-impact sectors were assessed in terms of the resource and investment requirements, generating the impact:investment matrix shown in figure 9 for further prioritisation.

Figure 9: Impact:investment matrix for sector prioritisation



Source: MEDS, 2005

9. Conclusion and outlook

This chapter has shown that industrial development in the Western Cape faces many challenges. The list of problems discussed here is not exhaustive. The 2007 PER&O may focus on a different set of concerns. But this year's issues are likely to continue beyond 2006, given their key to unlocking improved sectoral competitiveness and hence their contribution to shared growth and integrated development in the Province.

In short, three key challenges confront the Province in its endeavour to achieve higher growth, create more job opportunities, improve the equitable share of economic progress, and guarantee the sustainability of its development trajectory.

The comparison with industrial dynamics in the rest of the world has shown that the Western Cape faces the heat of globalisation but is struggling to find its place in the sun. Its industrial structure and export composition are not such that it will be easy for the Province to emulate the success of the catch-up economies in East Asia.

The Western Cape is a relatively resource-poor region in a relatively resource-intensive country. This means that it somewhat misses out on the windfall benefits from the current resource boom but suffers the consequences of a real exchange rate appreciation.

The Western Cape is very much exposed to challenges that are either partly or totally beyond its control. Global warming is a direct threat to its biodiversity. Water stress affects the prospects for agriculture, industry and livelihoods more generally.

The beginning of the chapter posed two questions: whether the Western Cape could emulate the export success experienced by those countries that have managed to specialise in market-dynamic goods, and – if the answer is no – what else could be done to promote sustainable growth.

Based on the sectoral overview, it would appear that the answer to the first question is, in fact, negative. The industrial structure and the export composition of the Province are simply too different to attempt to buy into UNCTAD's top 20 shopping list of market-dynamic products. This is especially true for the electronics and electrical industries. That leaves the hard task of finding an answer to the second question.

The answer lies in knowledge intensification of both low- and high-skill activities. Of course, the application of the 'knowledge economy' concept in developing-country contexts is highly problematic.

The importance of knowledge as a driver of growth may seem no more than the latest trend in countries that have yet to solve basic concerns of nutrition, sanitation, health care,

education and infrastructure. In fact, the concept only becomes relevant if adapted to the needs of developing countries and the constraints under which they operate.

Given the industrial and export specialisation of the Western Cape, knowledge intensification must aim at reducing the vulnerability of economic activities in the Province to first-world protectionism, price volatility and elasticity, as well as other factors that negatively affect exporters of primary products or relatively simply processed manufactures. This means that it must be sector specific.

At the same time it must also reflect the existing skill profile of the Western Cape and the need to increase labour absorption rates. Knowledge intensification cannot mean an exclusive focus on very high-end competences in platform technologies such as IT or biotechnology. Instead, the process must include people and firms in low- and medium-skill- and low- and medium-technology-intensive activities.

Skill-intensive patterns of economic development militate against mass employment in countries that, like SA, have large numbers of unemployed people. It is also likely to lead to lower growth.

A recent IMF working paper suggests that the major culprit of India's much lower growth rate compared to China is due to its bias in favour of skill intensity. On the one hand, it created outstanding successes such as the IT cluster in Bangalore that, however, only employs about a million people. On the other hand, there is thus a discrepancy between the high output share and the low employment share of these sectors. This translates into foregone profitable opportunities.

The difference between knowledge intensification and skill upgrading is that the latter process often requires structural change from an activity that is low skill to *another* that is high skill. This is never easy. By contrast, knowledge intensification can be undertaken in low-skill activities. If farm workers in the Overberg apply new mulching techniques that reduce the water intensity of wine growing and save on artificial fertilisers, a low-skill activity becomes more knowledge intensive. If the Cape Boatbuilding Initiative sets up a course for artisans where trained welders are taught how to apply their skills to boatbuilding, knowledge intensification of a low-skill activity will relax a key human resource constraint on one of the Province's most impressive niche sectors.

With respect to the second challenge, the national government is aware of the fickle character of resource booms. The Minister of Finance emphasised as much in his 2006 budget speech. The Department of Science and Technology has a programme through which it studies practical ways to reduce the economy's dependency of resource-based industries while exploiting technological competences built around mining and other activities for applications in various fields.

Because of competencies in certain areas of R&D, firms and tertiary education institutions in the Western Cape are in a good position to help the rest of the country wean itself off the possible short-term windfall benefits of a resource boom that in time may bring about detrimental effects, termed 'resource-curse', as the economy deindustrialises following prolonged exchange rate appreciation and other factors. In practical terms, the Province should be happy to host events like the Mining Indaba as it did in 2005, but it must also be engaged in exploring a future beyond mining.

Lastly, the Province might look for a visionary, iconic industrial policy platform on which to position enhanced sectoral competitiveness. For instance, in the beginning of 2006, the Swedish government announced that it would try to do away with fossil fuels within 15 years, and the United Arab Emirates declared its intention to build up a local aircraft industry – leasing, engine manufacture and aircraft assembly – in the next decade. Both ideas are bold. They are also risky and may not realise the hoped-for benefits. But they will mobilise resources that help these two countries to progress along what they perceive as desirable development paths.


What is the Western Cape's 'Big Idea'?

Given the need to enhance knowledge intensity in a way that promotes employment across the skill spectrum, and the notable impact that climatic change will have on the Province's agricultural potential and biodiversity, the Western Cape could decide to become Africa's most water-wise region on the African continent within the next two decades or so.

Much like the rest of Sub-Saharan Africa south of the Zambezi and Cunene Rivers, the Western Cape is a highly water-stressed area. But it is also a relatively wealthy and technologically advanced region, thus availing itself of a wider range of potential adaptation strategies.

In the beginning, this might include importing instead of growing food items that require large amounts of water for their production. Over time it would involve, for instance, a comparison of water stress on wine quality, or choosing between different fruit cultivars depending on water efficiency. The Western Cape could set itself the goal of becoming SA's first province with a 100 per cent reticulation cover to minimise untreated residential effluents.

This is just one of many possible iconic ideas. The attractiveness lies in the strategic positioning of industrial competitiveness with ecological sustainability, a key pillar underlying the Province's Spatial Development Framework and its upcoming Provincial Growth and Development Strategy.



As noted, given the Western Cape's vulnerability to climate change, shared growth and integrated development has to be economically, socially and environmentally sustainable. A development agenda that positions itself by matching industrial policy competitiveness to ecological integrity holds considerable merit.

Strictly speaking, sectors are less important in developing an iconic idea. But the vision behind such would help constructive thinking about how best the Western Cape could position itself in the global economy while addressing growth and job creation at home. This is a discussion that is yet to happen.

Glossary of terms

- **Aquaculture**

Aquaculture is the cultivation of the natural produce of water (such as fish or shellfish, algae and other aquatic plants). Mariculture, a subset of aquaculture, is specifically marine aquaculture. Examples of aquaculture include raising catfish and tilapia in freshwater ponds, growing cultured pearls, and farming salmon in net-pens set out in a bay. Fish farming is a common type.

- **Catch-up effect**

The catch-up effect, also called the theory of convergence, states that poorer economies tend to grow faster than richer economies. Therefore, all economies will eventually converge in terms of per capita income. This means that a poorer country's income will eventually catch up to a richer country's. In theory, new technologies may allow the economies of emerging countries to even surpass industrialised nations, but the possibility of this happening has become increasingly debatable as developed nations become increasingly modernised at fast paces.

One of the reasons for this phenomenon is that poor countries often have little in the way of technology and maybe have very low efficiency rates. Since they have no access to capital to invest, they cannot improve their processes and are trapped in this low-efficiency pattern. If, however, they manage to attain some capital for investment, the returns on this investment might be huge. This could be explained by the law of diminishing returns. A developed nation is so technologically advanced that the return on investment (ROI) of every unit of currency spent is dramatically lower than the ROI in an undeveloped nation because the poor nation is further behind in this diminishing returns path. This extra return allows poor countries to rapidly increase investment capital and raise efficiency until the law of diminishing returns kicks in and they are growing at the same pace as more advanced nations.

An example of this effect is the rapid growth in the Asian markets of Singapore, Hong Kong, Taiwan, and Korea in the 1960s and 1970s that led to them being called the 'Four Tigers'. These countries started off very poor with little economic power, a lack of capital, no huge skyscrapers or rich banks, and quickly transformed their economies into major world players.

Some economists criticise the theory, stating that endogenous factors, such as government policy, are much more influential in economic growth than exogenous factors.

- **East Asian Tigers**

Singapore, Hong Kong, Taiwan, Korea and also recently China.

- **Harmonised Commodity Description and Coding System (HS)**

The HS of tariff nomenclature is an internationally standardised system of names and numbers for classifying traded products, developed and maintained by the independent intergovernmental World Customs Organisation (WCO). The HS is a six-digit nomenclature. Almost 200 countries, representing about 98 per cent of world trade, use the HS as a basis for, *inter alia*, customs tariffs, the collection of international trade statistics and trade negotiations.

- **Import Parity Pricing**

IPP is a process whereby a domestic producer of a good places the same value on the good as the import price of a foreign competitor.

- **International Standard Industrial Classification (SIC)**

This classification schema is used primarily by the United Nations to classify manufactured goods/processes.

- **Intra-industry trade**

Intra-industry trade refers to the exchange of products belonging to the same industry. The term is usually applied to international trade, where the same kinds of products and services are both imported and exported.

- **Knowledge economy**

For the last 200 years, neo-classical economics has recognised only two factors of production: labour and capital. This is now changing. Information and knowledge are replacing capital and energy as the primary wealth-creating assets, just as the latter two replaced land and labour 200 years ago. In addition, technological developments in the 20th century have transformed the majority of wealth-creating work from physically based to 'knowledge based'. Technology and knowledge are now the key factors of production. With increased mobility of information and the global work force, knowledge and expertise can be transported instantaneously around the world, and any advantage gained by one company can be eliminated by competitive improvements overnight. The only comparative advantage a company will enjoy will be its process of innovation – combining market and technology know-how with the creative talents of knowledge workers to solve a constant stream of competitive problems – and its ability to derive value from information. We are now an information society in a knowledge economy.

- **Latecomer economy**

In relation to many countries that were the initial industrialisers, or 'early developers', latecomer economies represent countries that have copied them much later on to experience growth and development.

- **Manufacturing value added**

The value added is a measure of net output (that is, of gross output less purchased inputs, such as cost of materials and supplies and of fuel and electricity) which has been embodied in the value of the product. In contrast to the measure of total shipments, value added provides some insight into the degree of transformation which occurs within industries. In short, MVA consists of the value of manufacturing shipments plus net change in the inventory of goods in process and finished goods, less the costs of materials and supplies and of the fuel and electricity used.

- **(Western Cape) Microeconomic Development Strategy (MEDS)**

As one of the six iKapa Elihlumayo lead strategies, the overall goal of the MEDS is to guide the Western Cape's actions to enhance, guide and support private sector activity in the Province. It is hoped that the MEDS will accelerate growth, alleviate poverty and promote sustainable development in the Province.

- **Motor Industry Development Programme (MIDP)**

Started in 1995, the MIDP's objectives are to improve the global competitiveness of the motor vehicle and component-manufacturing industry through an import/export complementation arrangement, whereby the local-content value of components or built-up vehicles exported earn credits that can be used to rebate import duties on components and vehicles.

The MIDP was reviewed in 2000 and 2002, when the MIDP's tenure was extended to 2007 to enable the stakeholders within the automotive sector to participate in the review process. The Programme is up for review again in 2006, which will mainly assess whether the MIDP has met its objectives.

These objectives include the development of an internationally more competitive and growing automotive industry that is able to provide high-quality and affordable vehicles and components to the domestic and international markets, provide stable and sustainable employment through increased production and make a greater contribution to the economic growth of the country by increasing production and achieving an improved sectoral trade balance.

The review has caused some tension in the industry, with fears that it could lead to the diminishing of the benefits local manufacturers currently enjoy. However, the MIDP was never designed to be a permanent feature of the automotive industry, but a transitional mechanism to allow a previously protected industry to be reintegrated into the global networks. To this extent, the programme is due to come to an end in 2012, although government has not yet finalised its plans regarding the future of the automotive industry post-MIDP.

- **Secular trend**
In numerical descriptions, such as of a time series of numbers, a secular trend is the long-term upward or downward trend in the numbers, as opposed to a smaller cyclical variation with a periodic and short-term duration.
- **Standard Industrial Classification (SIC)**
The SIC classification system defines economic activity according to 10 divisions. These are further broken down into numeric codes that define major groups, industrial groups, and industries. Descriptive text is used to define the industrial subdivisions.
- **Standard International Trade Classification (SITC)**
The SITC is a statistical classification of the commodities entering external trade designed to provide the commodity aggregates needed for purposes of economic analysis and to facilitate the international comparison of trade-by-commodity data.
- **Technology and Human Resources for Industry Programme (THRIP)**
THRIP, a programme of **the dti**, has three objectives. First, it facilitates and funds the increased participation of higher education and science council researchers and students in industrial innovation, technological adaptation and commercialisation. Secondly, THRIP encourages the formation of stronger linkages between companies in undertaking joint R&D work. Lastly, THRIP promotes technological development in the small, medium and micro enterprise (SMME) sector. THRIP operates by matching funds that are invested in innovation research by private companies. The Innovation Fund is the responsibility of the Department of Science and Technology (DST) and is administered by the National Research Foundation (NRF). It provides incentives for longer-term, large innovation research projects with cross-sectoral collaborative consortia composed of researchers from the higher education sector, government science councils, private sector, or civil society. Its aim is to reallocate research funds to achieve key national policy goals of competitiveness, quality of life, environmental sustainability and harnessing information technology.