# 4

# Regional Innovation & Growth

**Key findings:**

- Knowledge and innovation are key elements of economic competitiveness in today's globalised world.
- Debate is heightening about the importance of realising a regional innovation system in the Western Cape to enhance regional economic competitiveness.
- The Western Cape knowledge economy manifests not only in advanced manufacturing and service sectors; the primary sector is producing and making use of knowledge.
- The Western Cape economy has key strengths in analytical, science-driven knowledge, underlying the importance of university-industry linkages.
- Both regional and sectoral dynamics appear to be important to growth in the Province.
- In terms of sectoral dynamics, updated trend analysis between 1995 and 2005 shows that the Western Cape is mainly a service economy; over the past years between three-quarters and four fifths of value added was generated here.
- Key activities in 2005 included financial & business services (29,2%), wholesale & retail trade, catering and accommodation (17,7%), and transport & communication (11,1%).
- The fastest growing sectors over the past 11-years were transport & communication (6%), wholesale & retail trade, catering & accommodation (5,4%) and financial & business services (4,7%).

- In 2005 almost three-quarters (72,5%) of the Western Cape's workforce were employed in service activities, led by financial & business services (18,3%), wholesale & retail trade, catering & accommodation (16,3%), government services (15%) and community, social and other personal services (11,8%).

- This year's PER&O briefly reviews evidence from the third phase of the MEDS, which included seven new studies – the informal sector, food processing, boatbuilding, construction, chemicals, printing & publishing and wholesale, retail & franchising.

- The MEDS recommended that the informal sector be accorded priority status within the MEDS strategy, based on its potentially large impact with respect to output and equity.

- The fourth round of the MEDS, undertaken in 2007, extends analyses to the informal sector and the cultural or creative industries.

# 1. Introduction

The PER&O 2006 chapter titled "Sectoral growth and employment prospects" focused on the global context of sectoral activity, comparing conditions for knowledge intensification of economic activities in the Western Cape with those elsewhere in SA and in other parts of the world. The chapter concluded that while the Western Cape is an advanced province in SA, it is at the same time a very marginal player compared to other catch-up regions, especially in Asia.

Furthermore, the chapter argued that it was important to gain a better understanding of the knowledge infrastructure and the dynamics of innovation in the Province, in order to be able to design policies in support of higher and shared growth and job creation.

*Chapter 4: Regional innovation and growth* in this year's PER&O extends the above analysis, reflecting on the reasons why the knowledge economy matters to the Western Cape and how it does so. The chapter thereafter reports recent research that shows linkages between productive and knowledge-based activities in the Western Cape.

An update of trends in sectoral development in the period 2005 to 2006 is matched by insights from the 2006 round of the Department of Economic Development and Tourism's Microeconomic Development Strategy (MEDS).

Finally, the chapter outlines the implications for policy research and for policy formulation.

# 2. The contemporary growth and development conundrum

If knowledge is considered the opposite of ignorance and if innovation is considered the alternative to a business-as-usual approach, it is surprising that there is the level of hype surrounding the knowledge economy. Perhaps those who feel part of it draw comfort from the belief that they have moved into a new era and therefore disdain those that do not appreciate the merits of the knowledge economy.

But precisely such distinction between worlds traditional and modern not only illustrates a fair amount of arrogance vis-à-vis past generations and their achievements, but also a colossal misunderstanding of what the knowledge economy is about and which role innovation plays in it[1].

Much like the terms "globalisation" and "competitiveness" in the last two decades of the past century, "knowledge" and "innovation" are terms that frequently obfuscate more than they explain; often they are used by people who struggle, and fail, to understand the complexities of economic change in today's world.

[1] cf. Mokyr, 2002

To be sure, knowledge and innovation are important for economic growth and development. While "institutions" and "networks" are fashionable terms in their own right, at the same time they are indispensable building blocks of the knowledge economy as well.

Although each of these terms has a widely agreed definition attached to it, there is much less consensus about how they are causally related to growth. It is far from clear how exactly "knowing" (what?) and "learning about" (from whom?) or "making new things" (under which conditions?) help a society grapple with the challenges of late or with underdevelopment.

Sober academic assessments of the state of the art admit as much. In a recent paper, Richard Nelson, a pioneer of evolutionary economic theory, argues that it is early days in the endeavour to unravel the mystery of economic growth and understand the role institutions play in it: "This diversity of meanings, and analytic foci, makes coherent discussion about the nature and role of institutions difficult. Indeed, it can lead to some rather bizarre arguments"[2].

There is, of course, general agreement that innovation is more likely to take place in an economy whose institutions encourage and support entrepreneurship (with its consequential risk-taking), and manage to shift resources from declining to rising activities. But this is so general as to lose the insights that really matter, namely the sector-specific and time-bound details of which specific institutions support or hinder productivity growth[3].

More recent work explores the higher-order complexities of what is termed "network alignment", that is, the extent of fit between the heterogeneity and rising number of networks, in which all actors (notably businesses, governments, science and training institutions) in transition or catch-up economies are simultaneously involved, and that of the developmental goals of productivity increases, growth, and poverty reduction that inform the behaviour of those networks [4].

The analysis argues that it is hard to assess the extent of network (mis)alignment precisely because concepts such as knowledge and innovation largely elude measurement, and that the analytical tools at our disposal are currently rather blunt.

For example, in a regional context such as the Western Cape, businesses invariably seek new markets, try to improve efficiencies, or aim to master new technologies; universities pursue teaching and research in an environment in which external funding is becoming more important; and provincial, metropolitan, and local governments aim to harness resources for higher and shared growth.

[2] Nelson n.d., 2006, 11
[3] ibid, 31
[4] von Tunzelmann, 2007

The heterogeneity of these goals raises the question of how the various (possibly conflicting) underlying aims and objectives can be reconciled for a collective purpose or, in other words, how network alignment becomes the visible expression of a somehow coordinated "network of networks" located in a "system of systems"[5].

Institutions and networks have, of course, always played a role in catch-up and, thus, in innovation. But a generation ago, when Taiwan and Korea surprised the world through their rapid economic advances, much of their progress was based on learning how to master a few key technologies in capital-intensive industries such as electronics.

Today Taiwan, Korea and later-generation catch-up economies need to have a much wider range of competencies, both because development has proceeded and because there is more of it, due to the progress made by large economies such as China and India.

This means that it is no longer sufficient to send academically gifted young learners abroad to obtain a degree in engineering at a reputable institution of higher learning, and then expect them to return home and apply their skills for national development.

The knowledge economy demands much larger numbers of highly skilled people who need to be trained primarily at domestic universities in a wide range of competencies, including frontier activities such as bio- and nanotechnology. Therefore, while the complexity (or science base) of key technologies has increased, so have the challenges in ensuring that a country's or a region's stock of talent contributes meaningfully to mastering the multitude of applications that ensue[6].

The good news about all this is that the role of institutions and networks for innovation, and knowledge for development, appear to be receiving attention from more academic quarters than was the case not so long ago.

Although research such as that referred to above implicitly warns against premature policy conclusions, much of this literature has an activist leaning in that it seeks to inform public interventions in favour of upgrading and learning. Linkages between research communities and policy makers are alive and well; this very publication is a case in point.

The bad news is that because the relationship between knowledge and growth is not well enough understood, there is no simple guide that would provide a provincial government with a list of appropriate interventions.

What the state of the art suggests is that a macro perspective on the role of institutions or network alignment becomes fruitful only to the extent that it is accompanied by micro-level investigations of the determinants of business behaviour, their interactions with knowledge providers, the effectiveness of systemic support, and so on.

[5] ibid
[6] cf. Nelson, 2006

This is but one reason why it is important to discuss the knowledge economy in the Western Cape through an assessment of sectoral dynamics as is done in this edition of the PER&O. Since the Provincial Government is responsible for a particular geographic space that can be distinguished from higher (national) and lower (local) levels of aggregation, it is necessary first to place the above discussion in its proper spatial context.

## 2.1 A regional innovation system in the Western Cape: Why bother?

This is an important question. Businesses can benefit from agglomerations and they might also exploit the proximity of knowledge pools in universities or science institutions. But they need not. In fact, their most important source of knowledge may be other businesses half way round the world, perhaps their mother companies, or the internet. Possibly they buy their key technological assets on the open market.

In brief, if there is nothing intrinsically regional about the determinants of innovation in the Western Cape, the role the Provincial Government plays in helping to build a knowledge economy is obviously different.

For example, rather than concentrating on flows of knowledge between information technology (IT) and biotechnology businesses in and around Cape Town or between food processors in Bellville and ostrich farmers in Oudtshoorn, it may have to facilitate communication between businesses in the same sector, but geographically far apart.

It could be that championing the interaction between academics and entrepreneurs is very effective in some activities and not at all in others. Reasons might include the relative strengths of local knowledge producing institutions in specific fields, the ease of transferability of the knowledge involved, the state of technological upgrading achieved in a particular sector relative to the rest of the world, and so on.

Very likely, the determinants of innovation in businesses differ from sector to sector and the Provincial Government will have to engage in all of the above, though not necessarily simultaneously. Economists have acknowledged the role of proximity since Marshall in 1890 systematically thought about the benefits arising from the co-location of businesses specialised in similar products[7].

The fragmentation of production from the late 1970s implied that emerging parts and components producers needed to agglomerate so as to organise the supply chain[8]. Porter, in 2003, simply transferred his competitive diamond to the local level arguing that it was equally as relevant in a regional context.

But although geographic proximity – and the cognitive dimension that often accompanies it – may undoubtedly facilitate learning, businesses can make use of other forms of proximity. Organisational, institutional, or social proximity may link actors that are geographically far apart[9].

[7] See also Simmie, 2005
[8] Piore and Sabel 1984, Storper, 1997; for a critical review, see Markusen, 1999
[9] For example, Caniëls and Romijn, 2003, Niosi and Zhegu, 2005, Simmie, 2004, Wolfe and Gertler, 2004

The emergence of *global* innovation networks in which businesses from both advanced and developing countries engage in multidirectional knowledge flows, belongs to the most fascinating features of contemporary capitalism[10].

It is therefore important to distinguish between the mere existence of clusters, which is widely documented, and localised learning and innovation, about which less is known, especially in developing countries[11]. The existence of studies underlining the importance of geographic proximity both in Europe and in North America merely confirms that the proof lies in empirical analysis[12].

Much depends on the nature of the economic activity undertaken. To the extent that intra-industry spill-overs are more prevalent than inter-industry spill-overs, specialised local production structures favour innovative activity. Particularly in the case of R&D-intensive and small businesses, knowledge spill-overs have limited geographical reach and so proximity does matter[13].

By contrast, in industrially differentiated metropolitan areas, where much innovation is concentrated, higher technological intensity of an industrial activity is typically associated with higher diversity. So a policy for the City of Cape Town will likely have to be different from one aimed at an outlying area specialised in a few sectors with lower technological intensities; and the support provided for such an outlying area will have to change over time as it increases its technological sophistication[14].

### 2.1.1 Innovation in the Western Cape

The literature on the relationship between knowledge and growth is therefore not such that regional authorities with a developmental agenda can easily derive a list of recommendations from it, to help them pursue their growth strategies more convincingly. The current state of the art is better at suggesting some general principles, but ultimately of course specific plans of action are needed.

It doesn't help that SA has not produced much scholarship on the role of spatial agglomeration, various dimensions of proximity, and the nature of inter-firm relationships in innovative activities. In the mid-1990s, the Foundation for Research Development assessed the competitive strengths of the nine provinces[15].

Ten years later a team from the national Department of Science and Technology (DST) calculated provincial Technology Achievement Indices[16]. But these reports did not probe causal links between the various dimensions of the composite indicators they used, or factors within them. Hence they reported an outcome without really understanding the processes that led to it.

[10] UNCTAD, 2005
[11] Helmsing, 2001
[12] For example, Greunz, 2003, Audretsch and Lehmann, 2005, Asheim and Coenen, 2005, Rondé and Hussler, 2005
[13] Van der Panne, 2004
[14] Greunz, 2004, Lim 2004
[15] FRD, 1995
[16] DST, 2005, see also UNDP, 2001

Fortunately our understanding of the knowledge economy in the Western Cape is more advanced than what is known about it in the rest of the country. This is thanks to background work over the past three years commissioned by the PER&O itself, analyses undertaken in the context of the MEDS, the Council for Scientific and Industrial Research's (CSIR) Provincial Advanced Manufacturing Technology Strategy (PAMTS), and an ongoing project at the Human Science Research Council (HSRC) on the provincial knowledge infrastructure and dynamics of learning[17].

Of interest to this chapter is that the relative integration of productive and knowledge-based activities in the Province, as well as the relevance of geographic proximity between businesses and other knowledge users and producers for this relationship, appears to vary between sectors and technologies. This is illustrated in the following analysis.

Table 1 below, shows the economic, R&D, scientific, and technological profile of the Western Cape in 2004. Data sources include value added by sector supplied by Quantec, R&D investments by sector as well as research field, publications in peer-reviewed journals, and patent applications, all supplied by the HSRC. Activities are reported in Table 1 only if the Western Cape compared to the rest of the country is specialised in them and accounts for a sizeable proportion of the national total (at least 20%).

Productive activity is concentrated in agriculture, forestry, & fishing; food & beverages, textiles, as well as in financial & business services.

In 2004, the Province attracted 14 per cent of national R&D investment, including manufacturing, where it has a relatively weak productive base. R&D investments are much more diversified than productive activity, which is a possible indication that the knowledge sector in the Province is more sophisticated than the production sector. At first sight, "knowledge" (proxied by scientific output) also seems to be much more at home in the Western Cape than "technology" (proxied by patent applications).

[17] Lorentzen, 2006

**Table 1: Weighted specialisation indices for productive and knowledge-based activities, 2004**

| Production | R&D investment | Technology (patents) | | Science (publications) |
|---|---|---|---|---|
| | | Produced by | Used by | |
| ***Primary*** | | | | |
| Agriculture, fishing | Vegetables, horticultural specialties, nursery products | Agriculture | Vegetables, horticultural specialties, nursery products | Biology |
| | Fishing, fish hatcheries, and fish farms | Fishing, fish hatcheries and fish farms | Fruits, nuts, beverage and spice crops | Earth sciences |
| | | | Forestry and logging | Industrial biotechnology and food sciences |
| ***Secondary*** | | | | Mechanical and industrial engineering |
| Food, beverages | Food products, beverages | Food, beverages | Food, beverages | Civil engineering |
| Textiles, clothing, leather | Textiles | Textiles | Wearing apparel | Chemical and process engineering |
| | Publishing, printing, media | Wearing apparel | Paper, paper products | Electrical and electronic engineering |
| | Pesticides | Paper, paper products | Rubber and plastics products | Clinical sciences |
| | Rubber and plastics products | Rubber and plastics products | Ships, boats | Medicine |
| | Machinery, equipment | Ships, boats | | Human movement and sport science |
| | Electronic valves, tubes | | | Public health and health science |
| | TV and radio transmitters | | | Medical biochemistry and clinical chemistry |
| | Medical and surgical equipment | | | Medical microbiology |
| | Instruments, appliances | | | Immunology |
| | Aircraft, spacecraft | | | |
| | Transport equipment | | | |
| ***Tertiary*** | | | | |
| Finance, business | Trade and repair of motor vehicles | | Water transport | |
| | Retail trade | | Sewage and refuse disposal | |
| | Land transport | | Private households | |
| | Water transport | | | |
| | Air transport | | | |
| | Financial intermediation | | | |
| | Insurance and pension funding | | | |
| | Other business activities | | | |
| | Advertising | | | |
| | Public administration, defence, social security | | | |
| | Health, social work | | | |

*Source: Lorentzen, 2007*

*Note: Weighted specialisation indices resemble revealed comparative advantages in that they are obtained by calculating the relative share of a particular activity (by SIC code or research field) in the national total which is reported only if the absolute weight in the national total reaches 20 per cent.*

The question then is how, and if, knowledge inputs relate to knowledge outputs. The definitive answer relies on further analysis. But preliminary conjectures may help in answering the following questions:

- In which sectors that are key to the regional economy do successful businesses appear also to invest in R&D and obtain technological innovations that in turn might make them more successful?
- What science and technology output is yielded by R&D input?
- What evidence exists for spill-overs between knowledge production and use?

The establishment of correspondences between the Western Cape's specialisation indices is not equivalent to attributing causality in the sense that, for example, R&D investment in a specific sector or research field leads to a scientific publication or technological innovation in the same fields.

It merely suggests that, where there is co-existence of knowledge inputs and outputs, the underlying production function is possibly knowledge-intensive, which then justifies probing the role of regional dynamics that make this possible. In turn, if such correspondences do not exist, it is safe to conclude that regional innovation dynamics do not play an important role in the provincial industrial profile.

Table 2 shows the results of this exercise. A productive specialisation in agriculture, forestry, & fishing co-exists with an R&D specialisation in crop growing, gardening, and horticulture. Patents emanate from agriculture, hunting, and related service activities while producers in horticultural, fruit, forestry and related activities make use of them.

A very important insight is that these data yield contrasts with the often un-reflected notion that the knowledge economy manifests itself primarily or exclusively in advanced manufacturing or service sectors, and that it occurs only in medium- or high-tech activities.

In reality – and this is good news – a primary sector, agriculture, with typically low R&D-intensive processes and with a very significant employment share in the Western Cape appears to be producing and making use of knowledge.

Fields in which specialisations in business sector R&D investments co-exist with specialisations in scientific output include biological sciences, electrical and electronic engineering, clinical sciences, and medical microbiology.

Hence, the Western Cape has strengths in analytical, science-driven knowledge. This underlines the importance of university-industry linkages, which merits further investigation, especially for the four disciplines mentioned here.

**Table 2: Correspondences between specialisation indices**

| Production | R&D: SIC code | R&D: research field | Patents: producers | Patents: users | Science: publications |
|---|---|---|---|---|---|
| ***Production, R&D, and technology*** | | | | | |
| Agriculture, forestry/fishing | Growing of crops, market gardening, horticulture | ⟺ | Agriculture and related service activities | Growing of vegetables, horticultural specialties, nursery products; growing of fruit, nuts, beverage and spice crops; forestry, logging and related service activities | |
| ***R&D and science*** | | | | | |
| | | Biological sciences | | | Biological sciences |
| | | Electrical and electronic engineering | ⟺ | | Electrical and electronic engineering |
| | | Clinical sciences | | | Clinical sciences |
| | | Medical microbiology | | ⟲ | Medical microbiology |
| ***R&D and technology (production and use)*** | | | | | |
| | Growing of crops, market gardening, horticulture | | Agriculture | | |
| | Growing of vegetables, horticultural specialties, nursery products | | | Growing of vegetables, horticultural specialties, nursery products | |
| | Fishing, fish hatcheries and farms | ⟺ | Fishing, fish hatcheries and farms | Fishing, fish hatcheries and farms | |
| | Food products, beverages | | Food products, beverages | Food products, beverages | |
| | Textiles | | Textiles | | |
| | Rubber and plastic products | | Rubber and plastic products | Rubber and plastic products | |
| | Other transport equipment | | Ships and boats | Ships and boats | |
| | Water transport | | | Water transport | |

*Source: Lorentzen, 2007*

Specialisations in investments in R&D co-exist with technological specialisations – in terms of producing or using patents, or both – in the areas of agriculture & fishing, including related downstream activities, plus textiles, rubber & plastics, ships & boats, and water transport.

In other words, we observe, for example, that some businesses in the Western Cape invest above average in nursery products and that some businesses – possibly the same – and other knowledge producers (such as the ARC in Stellenbosch) reap rewards in terms of technological achievement.

We cannot be sure that knowledge flows link these two groups. But the information certainly suggests that regional linkages between businesses within the same value chain or even across value chains are a distinct possibility.

In addition, the Western Cape has a high number of correspondences where a specialisation in R&D investments is accompanied jointly by specialisations in patent production and use.

This could indicate spill-overs or even intended knowledge sharing at play. Although the bulk of SA's technological knowledge is clearly not produced in the Western Cape, businesses based here may well be its most effective users.

Finally, in the Western Cape, with the exception of textiles, all sectors with a specialisation in technology (that is, patent) output co-exist with specialisations in technology use. This applies to agricultural & fishing activities, paper & paper products, rubber & plastic products, ship & boat repairing and building.

Therefore businesses in the Western Cape are not only important producers or users of technological knowledge in these areas, but mostly both. Again, this suggests the possibility of regional dynamics that merit closer investigation, for example inter-business relationships between lead and laggard businesses.

On the basis of this evidence, the textile sector appears to be rather fragmented. For the time being it remains an open question whether improving interactions between producers and users of knowledge in the sector could allay the competitive challenges with which it has been battling rather unsuccessfully of late.

In summary, in the Western Cape both regional and sectoral dynamics appear to be important. We now need to establish if these dynamics are determined merely by economies of scale and scope, superior infrastructure, a high demand for innovative products, and so on, or if businesses actually enjoy agglomeration advantages and the benefits of joint action (or suffer from their absence) in dealing with technological change.

The difference is important for the role of the Provincial Government. If businesses operate in Cape Town because of, say, the City's international airport and related logistics and nothing else, it would not be appropriate to speak of a regional innovation system.

By contrast, if innovative activities in the Province do hinge on some or all of the relationships hinted at in this section – in other words if what goes on in the Province has a systemic quality to it, articulated in the interactions between businesses, science and training institutions, and governance agencies – then proximity would indeed matter.

In the first instance, the Provincial Government could limit itself to basic service provision. In the second, it would need to understand, and try to overcome, network failures that hold back the advance of the province.

## 2.2 Government policy and university-industry linkages (UILs)

Insights from international empirical studies confirm the potential importance of university-industry linkages (UILs) for the knowledge economy in the Western Cape, gleaned from the data presented here. For example, in the European Union (EU), regional geographical and technological proximities matter for the creation of new knowledge. Knowledge spill-overs become less evident over longer distances. This is especially true for UILs which are largely limited to directly adjacent regions.[18]

In Germany, universities with a greater investment in knowledge that are located in regions that also invest above average in knowledge, create opportunities for entrepreneurship through the associated spill-overs. Especially for small businesses, these externalities are easier to capture from close by, so therefore the rate of creation of technological start-ups has a distinct spatial dimension[19].

In France, a highly skilled labour force and productive universities do not per se make much of a difference to innovative activity unless they are part of a system; just "being there" is not sufficient[20]. In Spain, businesses located in regions with higher R&D investment and more scientific output make greater use of science in patented technology.

What matters here is not so much R&D investment in itself, but rather the back-and-forth movement of people between industry and academia.

In sum, the increase in the use of science by local industry rises concomitantly with larger allocations to local universities, in terms of both money and people, and with the production of more scientific research results plus the human resources capable of generating and applying this knowledge[21]. The situation in the UK is similar[22].

However, what works in Europe or the United States need of course not apply in SA. A recent, very comprehensive review of the last ten years of academic writing on university-industry linkages raised a number of concerns with this literature[23].

[18] Greunz, 2003
[19] Audretsch and Lehmann, 2005
[20] Rondé and Hussler, 2005
[21] Coronado and Acosta, 2005
[22] Faggian and McCann, 2006; see also Kim, Lee, and Marschke, 2005
[23] Klitkou, Gulbrandsen, Patel, von Ledebur, 2007

First, this work is largely a-theoretical. At best, there are "frameworks", none of which enjoy much currency outside their small group of supporters. What is lacking is an approach that conceives of UILs as a particular articulation of economic, institutional, and organisational relationships.

In view of the fact that these relationships differ considerably between advanced and latecomer economies, it would be spurious simply to transfer insights from a highly sophisticated developed economy to the Western Cape.

Second, there is a prevailing disciplinary bias in favour of biotechnology and related fields. Since UILs are likely to differ substantially across sectors and disciplines – especially with respect to their research intensity – the available research has not really captured the expected variance in the nature and mode of these interactions.

In the context of developing countries that rely predominantly on low research-intensive activities, this means that not only is there little appropriate data available to compare like with like, but key research questions have not even been asked yet[24].

In sum, conceptual questions such as those raised by various researchers referred to above[25] must be pursued alongside empirical investigations of regional knowledge flows in order to understand how a regional innovation system works, and where and why it underperforms.

Having briefly reviewed the role of regional innovation in growth and having illustrated preliminary evidence of linkages between productive and knowledge-based activities in the Western Cape, it would be desirable to include innovation indicators or other evidence of firm-based technological learning into the sections that follow.

This combination would ideally allow us to begin to understand how the presence and strength of these linkages affect economic performance. Unfortunately, available data do not yet allow us to do that which is why sections 2.3 do not quite live up to the expectations generated by the material reviewed here.

In the future it might be possible to rely on data such as those generated by the HSRC's *Innovation Survey*, suitably disaggregated to the provincial level, in order to do so. A more realistic strategy, certainly in the short term, would be to mandate the MEDS to incorporate innovative activities explicitly in its sectoral reviews.

To date, the sector research commissioned by the MEDS has employed a standard industry analysis methodology and thus largely neglected innovation. If this were changed, it would contribute to the emerging knowledge base on innovation in the province.

Due to data limitations, a certain disjuncture between the previous and the following sections is therefore inevitable. All one can do at this point is venture some conjectures based on where sectoral trends suggest that linkages between productive and knowledge-based activities may influence economic performance. This is done in the conclusion of this chapter.

[24] cf. Kruss 2005, 2006

[25] Nelson (n.d.) and von Tunzelmann, 2007

## 2.3 Broad overview of sector development

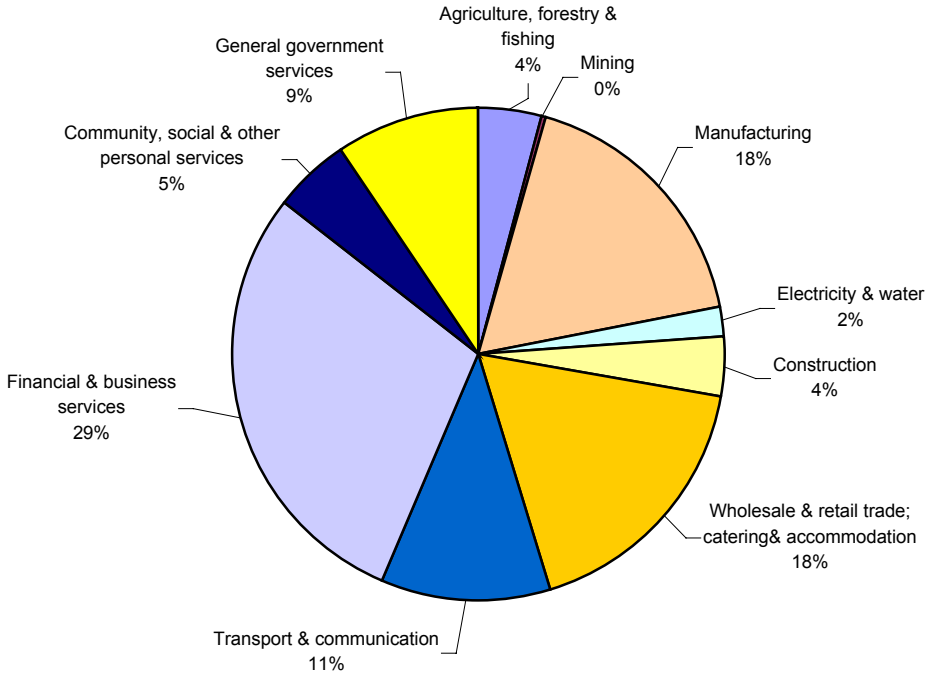
This section builds on and extends the sectoral description in the 2006 PER&O. It covers data for the period from 1995 to 2005 or 1995 to 2006.

### 2.3.1 Output growth

The economy in the Western Cape is rather diversified, with activities in the primary, secondary, and tertiary sectors. In 2005 the primary sector consisted predominantly of agriculture, forestry & fishing, which accounted for 4,3 per cent of provincial output, slightly lower than in 2004. The share of manufacturing was 17,6 per cent, also a little lower than in 2004.

The Western Cape is therefore mainly a service economy; over the past years between three quarters and four fifths of value added was generated here. The most important activities in 2005 included financial & business services (29,2%), wholesale & retail trade, catering & accommodation (17,7%), and transport & communication (11,1%), followed by government services (9,5%).

**Figure 1: Sectoral contribution to Western Cape output, 2005**




*Source: Quantec Research, 2007*

Over the 11-year period under review here, the activities with the highest average annual growth rates were transport & communication (6%), followed by wholesale & retail trade, catering & accommodation (5,4%), and financial & business services (4,7%). Sectors in long-term decline or stagnation included mining & quarrying (-11,0%) and government services (0%). All other activities grew between 1,5 and 3,7 per cent.

From 2004 to 2005, the Western Cape economy grew 5,5 per cent. Above average growth materialised in construction (10,3%), wholesale & retail trade, catering & accommodation (8,2%), financial & business services (7,1%), and marginally in transport & communication (5,7%). The only sector in absolute decline was mining (-12%).

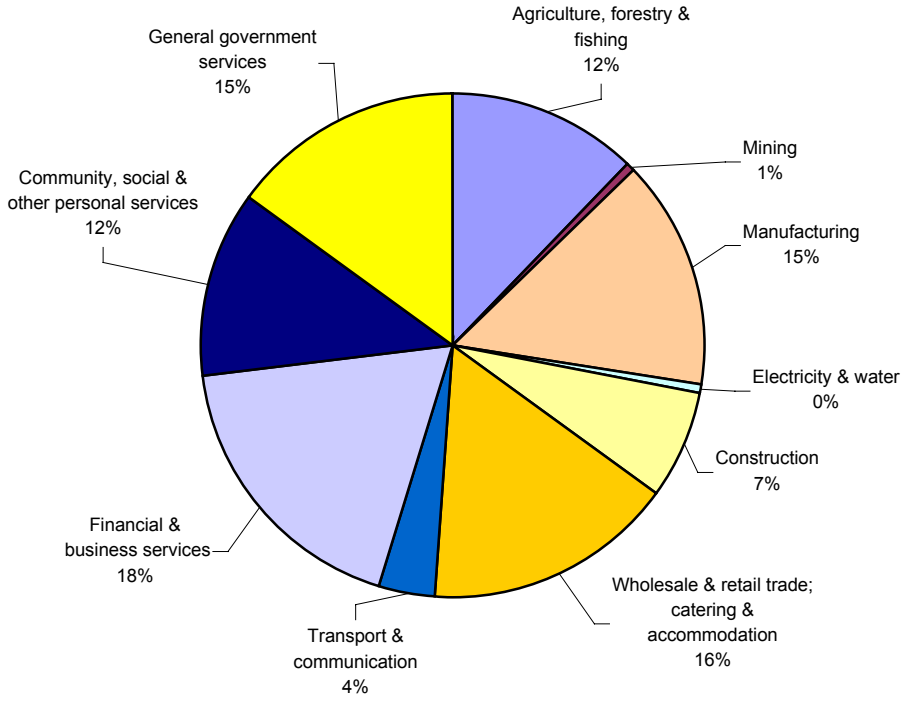
### 2.3.2 Employment growth

In 2005, 12,1 per cent of the Western Cape's work force was employed in agriculture, forestry & fishing. Manufacturing employed close to 15 per cent. Almost three-quarters (72,5%) were employed in service activities, led by financial & business services (18,3%), wholesale & retail trade, catering & accommodation (16,3%), government services (15%), and CSP services (11,8%).

Over the period 1995 to 2005 long-term growth rates were highest in financial & business services (5,3%). Wholesale & retail trade, catering & accommodation as well as community, social & other services grew by between 1,3 and 1,7 per cent. All other sectors declined, except manufacturing, which stagnated.

Overall employment also stagnated which is obviously reason for concern because it means that output growth need not lead to job creation.

**Figure 2: Sectoral contribution to Western Cape employment, 2005**




*Source: Quantec Research, 2007*

Fortunately, the more recent picture looks considerably brighter. While from 2004 to 2005 employment fell in manufacturing (-10,6%), as well as in agriculture, fishing & forestry (-18,6%), and in CSP services (-9,8%), overall job growth picked up by 3,2 per cent, more than a point higher than in the previous year.

Job creation was especially vibrant in transport & communications (52,1%), financial & business services (27,1%), construction (23,7%), electricity & water (17,4%).

In summary, job gains in the service sector more than compensated for job losses in the primary and secondary sectors. This means that at a macro level the economy is realising a shift toward activities in the tertiary sector.

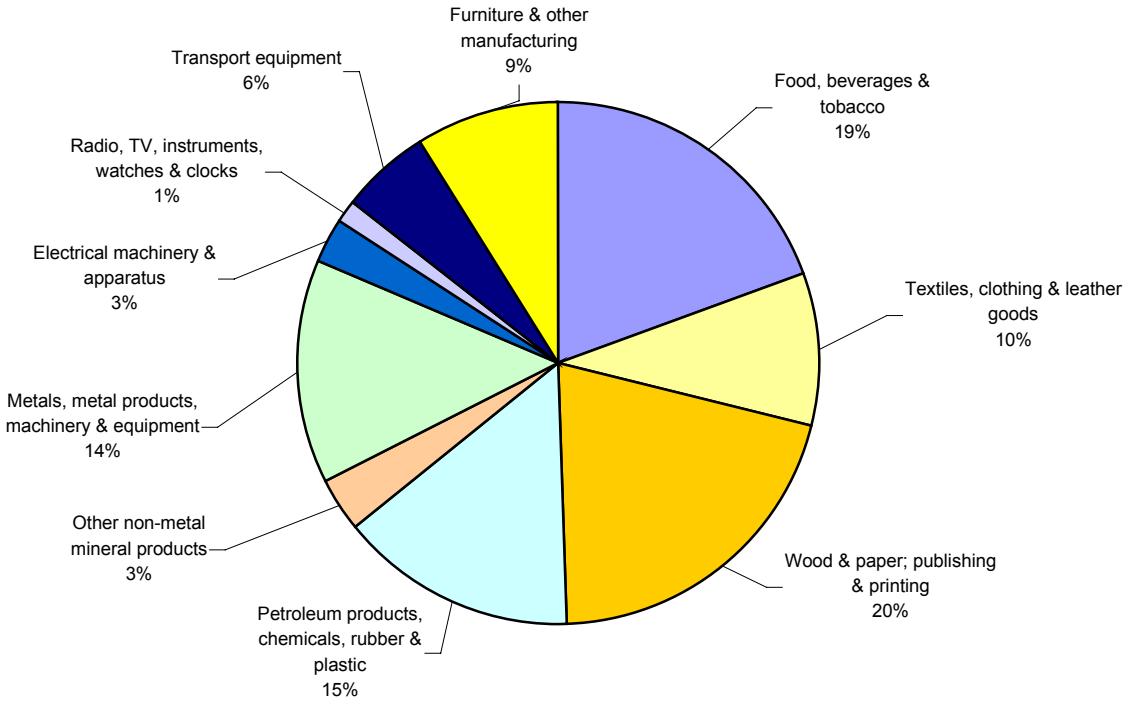
It does not mean, however, that farm workers, fishermen, and textile workers who are being retrenched successfully establish themselves as, say, data entry operators in the financial sector. Some of these workers will need retraining, while others, for reasons of age, may in the longer term be unemployable and will therefore have to rely on forms of social security to avoid hardship.

## 2.4 A detailed look at manufacturing

### 2.4.1 Manufacturing output

Within the manufacturing sector, in 2005 the most important activities were wood & paper, publishing & printing, and food & beverages, each accounting for a fifth of manufacturing value added; followed by petroleum products, chemicals, rubber & plastic, as well as other non-metal mineral products (28,8%). Textiles, clothing & leather goods continue to play a role (9,6%), as does the furniture industry (8,9%).

**Figure 3: Sub-sectoral contribution to manufacturing value added in the Western Cape, 2005**




*Source: Quantec Research, 2007*

Average annual growth from 1995 to 2005 was highest in transport equipment (4,2%) and petroleum products, chemicals, rubber & plastic (3,8%). It was also above average in metals, metal products, machinery & equipment (2,8%) and electrical machinery & apparatus (2,6%). All other sectors were affected by below average growth, while the textile sector actually shrunk slightly.

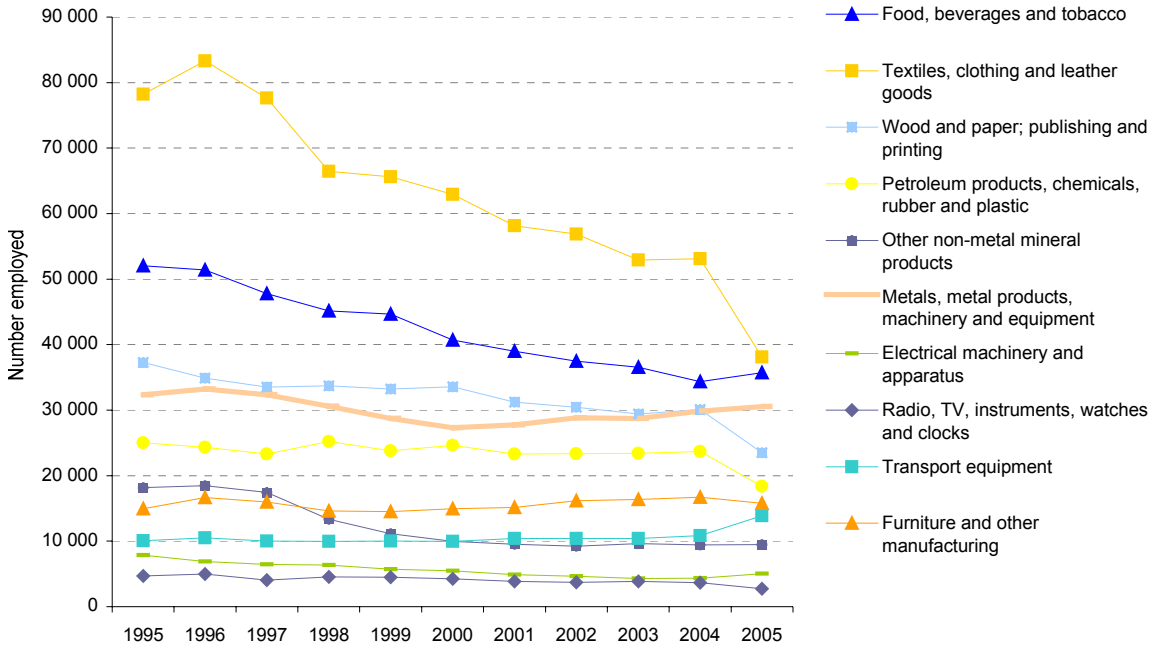
From 2004 to 2005, manufacturing output growth was generally higher (2,4%). transport equipment (14,3%), other non-metal mineral products (12,8%), radio, TV, instruments, and watches & clocks (10,7%) were the most dynamic activities. The only sector in absolute decline was wood & paper, publishing & printing (-4,8%).

Although small, developments in transport equipment and the instrument sector merit closer attention since they possibly constitute promising forays by Western Cape businesses into activities that are among the most dynamic areas of global trade.

### 2.4.2 Manufacturing employment

In 2005 about one in five workers in manufacturing was still employed in textiles, clothing & leather goods. Employment in the food processing sub-sector followed at 18,5 per cent, then in metals, metal products, machinery & equipment (15,8%), and wood & paper, publishing & printing (12,18%). Taken together, petroleum products, chemicals, rubber & plastics (9,52%), furniture (8,16%), and transport equipment (7,19%) employed another quarter of the manufacturing work force.

**Figure 4: Manufacturing employment in the Western Cape, 1995 – 2005**




*Source: Quantec Research, 2007*

The long-term decline in manufacturing employment was reflected in all sectors except transport equipment, which grew at an average rate of 3 per cent in the period 1995 to 2005, thus combining a successful output growth with a promising job creation performance.

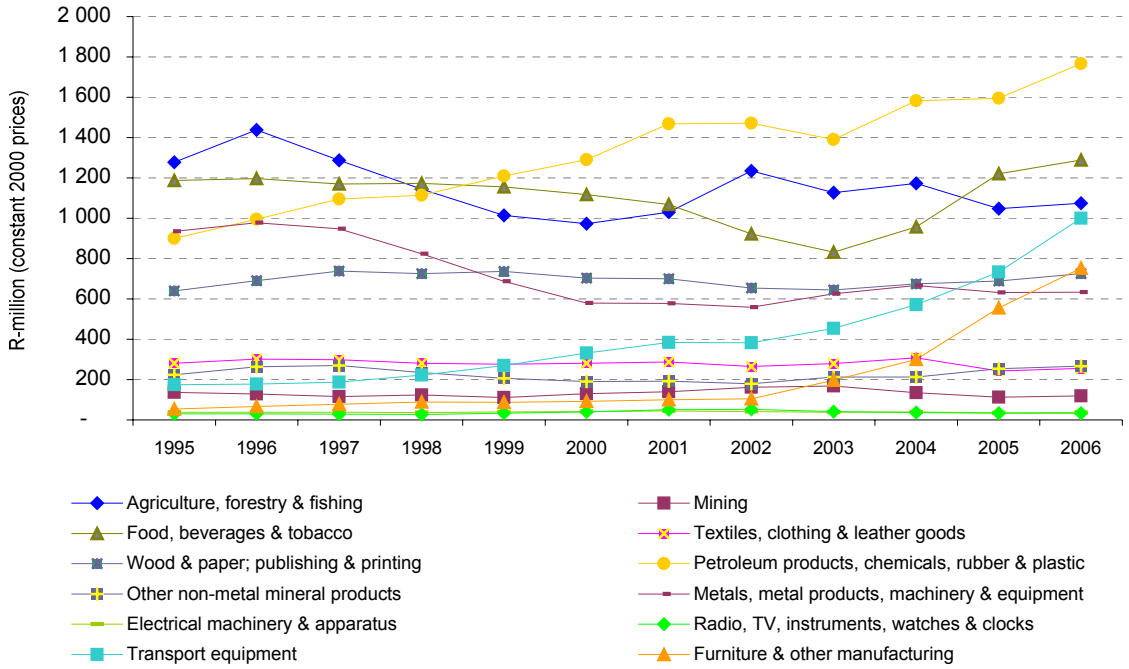
Jobs in the furniture and metals industries stagnated, while job losses in both old sectors (textiles) and new sectors (electronic devices) amounted on average to as much as 5 to 6 per cent per year.

Unlike in the previous year, manufacturing employment also dropped in 2005, by 10,6 per cent. Sectors that moved against the trend include transport equipment (28,1%), electrical machinery & apparatus (15,5%), and food processing (4,0%).

### 2.4.3 Manufacturing investment

In 2006, the share of the manufacturing sector in provincial investment exceeded its weight in the regional economy, while the picture was reversed for the service and primary sectors. Manufacturing contributed 21,4 per cent to total outlays. The most important activities were petroleum products, chemicals, rubber & plastics (5,6%), transport equipment (3,2%), furniture (2,4%), and wood & paper, publishing & printing (2,3%).

**Figure 5: Gross Provincial Fixed Investment in the Western Cape, 1995 – 2006**




*Source: Quantec Research, 2007*

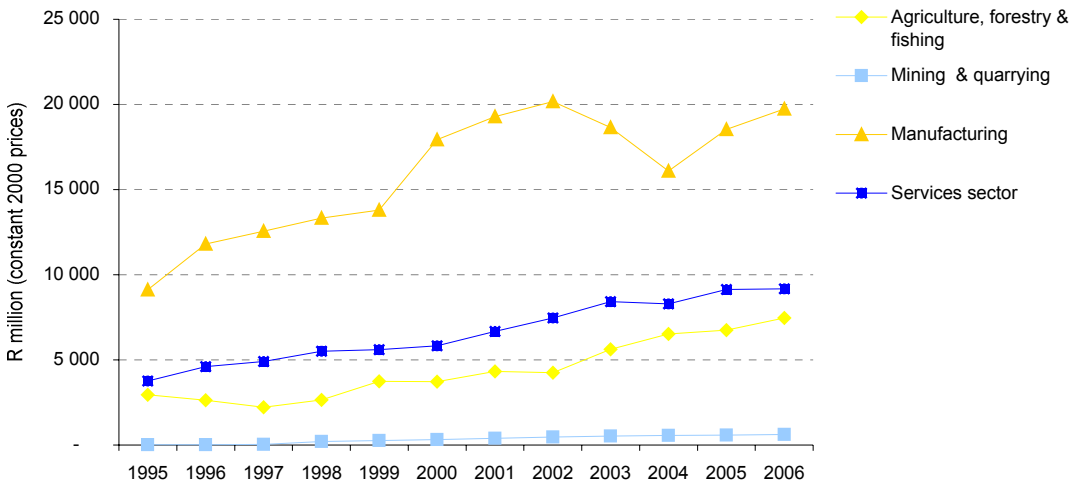
Gross fixed investment in the provincial economy grew 10,7 per cent from 2005 to 2006. Within manufacturing, furniture (35,5%) realised the highest growth rate. Over the 12-year period from 1995, average annual growth for all sectors was 4,8 per cent.

Over the long term, the service sector had the leading growth rates on average — CSP services (14,6%), construction (13,3%), communication (12,8%) – although the two top investing sectors were furniture (24,5%) and transport equipment (15,7%).

### 2.4.4 Manufacturing trade relative to total trade

The primary sector contributed 21,9 per cent to Western Cape exports in 2006. Agriculture, forestry & fishing are thus roughly five to six times as important for Provincial exports as for output. More than half (53,4%) of the Western Cape's exports originated in manufacturing, about three times as much as its contribution to output. Services contributed a quarter of exports, about three times less than their share in output.

**Figure 6: Western Cape exports by sector, 1995 – 2006**




*Source: Quantec Research, 2007*

According to Quantec data used in this report, average annual growth of manufacturing exports totaled 16,6 per cent from 1995 to 2006. If true, this would not only be world-class performance but nearly four times as much as that reported in the 2006 PER&O for the period 1995 to 2004, thus raising questions about the reliability of data at the provincial level.

In 2006, more than half of Western Cape manufacturing exports was in coke and refined petroleum products (16,1%), food (14,2%), beverages (12,9%), and basic chemicals (8,7%).

Another quarter came from basic iron & steel (6,9%), machinery & equipment (6,5%), other chemicals & man-made fibres (4,8%), TV, radio & communication equipment (3,3%), and non-automotive transport equipment (3,3%).

The sectors registering average annual growth rates over the 12-year period of 20 per cent or higher included tobacco (53,6%), TV, radio & communication equipment (42,5%), basic chemicals (30,7%), non-automotive transport equipment (30,1%), glass (28,5%), basic iron & steel (23,8%), beverages (22,8%), professional & scientific equipment (19,9%), and machinery & equipment (19,7%).

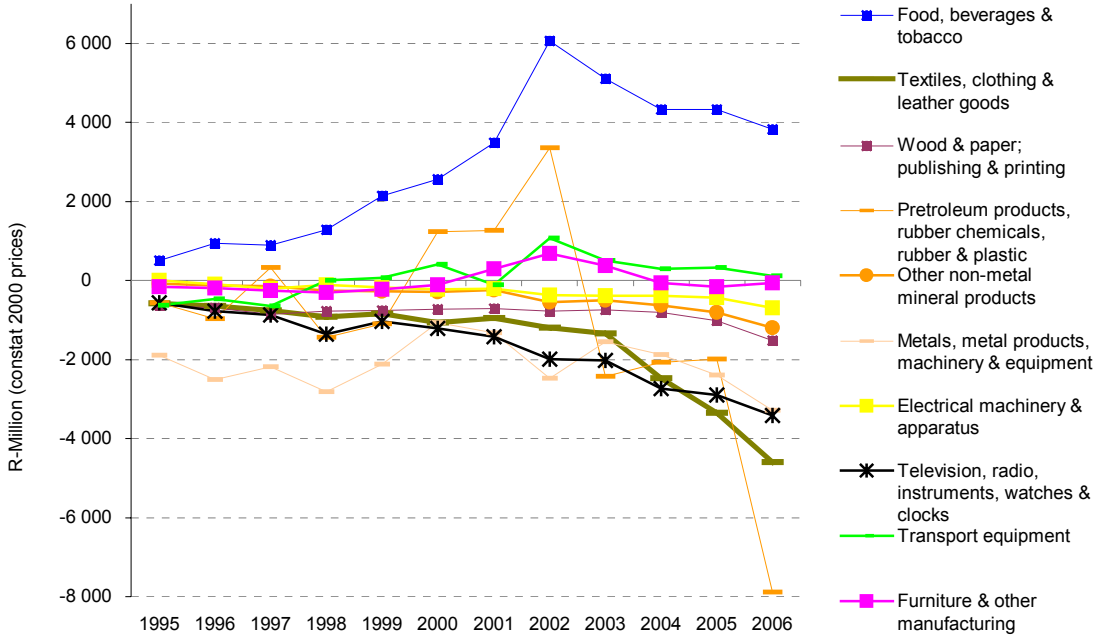
From 2005 to 2006, growth was most dynamic in tobacco (262,5%), basic chemicals (244,8%), rubber products (61,5%), basic non-ferrous metals (37,0%), metal products (32,9%), machinery & equipment (24,8%), and non-automotive transport equipment (22,7%).

From 1995 to 2006, the Western Cape's manufacturing trade balance registered a surplus only twice, in 2001 and 2002. In the other years, the value of imports exceeded exports by a factor of up to two; in 2006 export values represented 62 per cent of import values.

Activities with consistent surpluses included food; beverages; tobacco, leather & leather products; coke & refined petroleum products; basic iron & steel; and motor vehicle parts & accessories.

Trade deficits accrued in textiles; wearing apparel; footwear; wood & wood products; paper & paper products; printing, publishing & recorded media; chemicals, rubber, plastic & glass products; non-metallic minerals; basic non-ferrous metals; metal products; machinery & equipment; electrical machinery; television, radio & communication equipment; professional & scientific equipment; and, more recently, furniture.

**Figure 7: Western Cape trade balances by manufacturing sub-sector, 1995 – 2006**




*Source: Quantec Research, 2007*

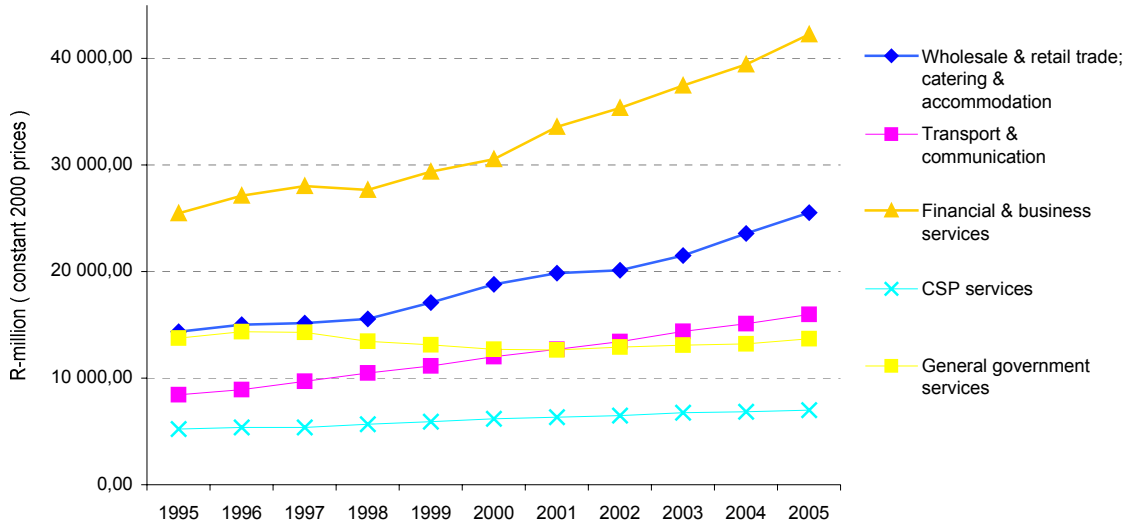
## 2.5 A detailed look at services

### 2.5.1 Service sector output

In 2005, service activities contributed 78 per cent to provincial output. The most important activities were financial & business services (29,2%), trade, catering & accommodation (17,7%), transport & communication (11,1%), and government services (9,5%).

From 1995 to 2005, average annual growth was highest in transport & communication (6,0%), trade, catering & accommodation (5,4%), and financial & business services (4,7%). From 2004 to 2005, growth was most dynamic in construction (10,3%), trade, catering & accommodation (8,2%), and financial & business services (71%).

**Figure 8: Western Cape value added in services, 1995 – 2005**



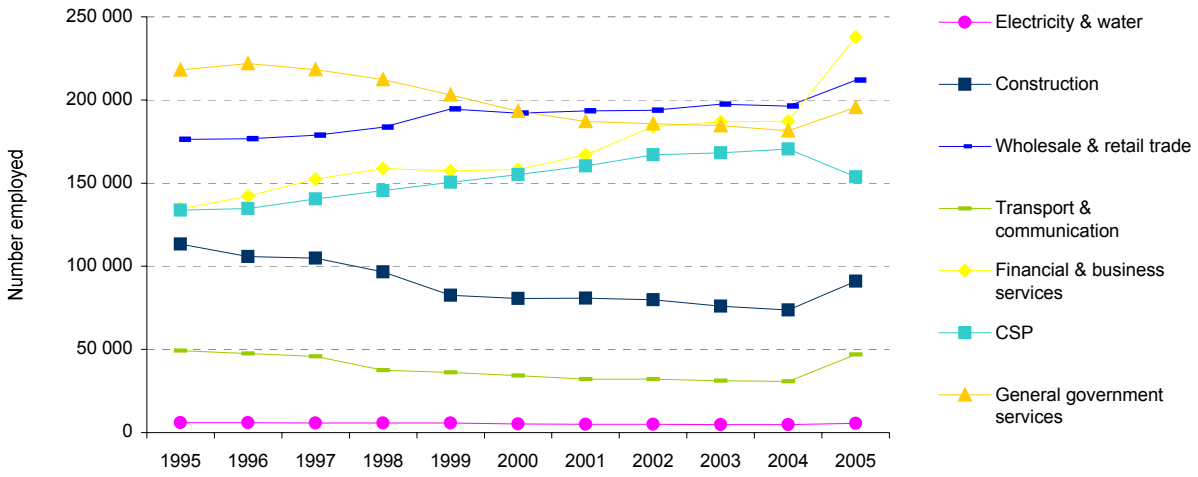

*Source: Quantec Research, 2007*

### 2.5.2 Service sector employment

In 2005, the service sector employed some 943 000 people, or 72 per cent of the work force. Employment was highest in financial & banking (18,3%), wholesale & retail trade, catering & accommodation (16,3%), government services (15%), and CSP services (11,8%).

The sector with the highest employment growth rate from 1995 to 2005 was financial & business services (5,3%), followed by wholesale & retail trade (1,7%) and community services (1,3%). All other activities shed jobs. However, from 2004 to 2005, there was dynamic growth in transport & communication (52,1%), financial & business services (27,1%), and construction (23,7%).

**Figure 9: Western Cape service sector employment, 1995 – 2005**

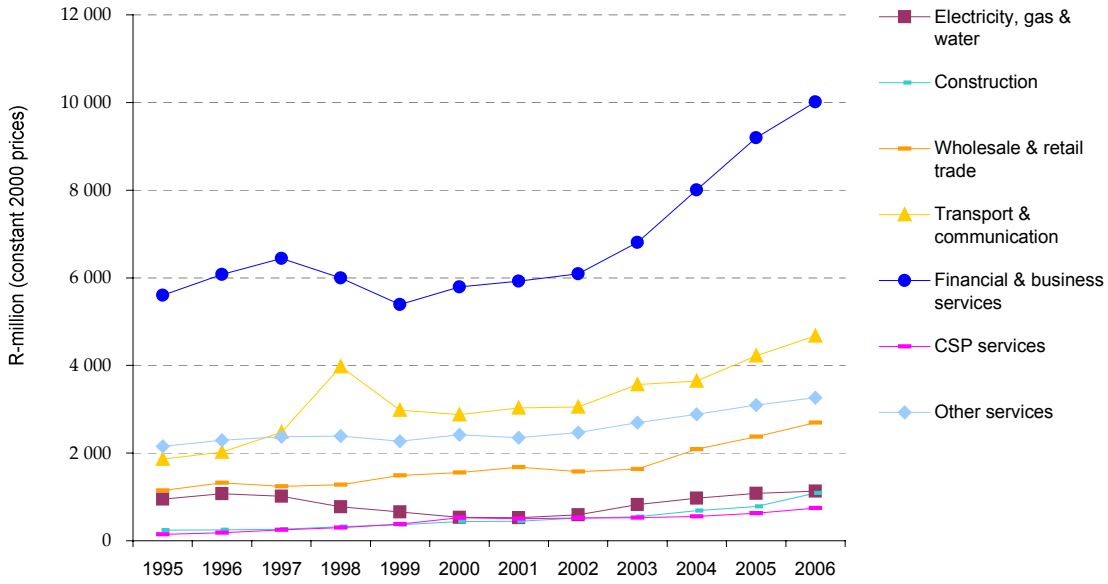



*Source: Quantec Research, 2007*

### 2.5.3 Service sector investment

In 2006, business services represented 16,3 per cent of investment in the Western Cape economy, closely followed by financial & insurance services (15,4%), and government services (10,3%). Transport, trade, and communication each accounted for 7 to 8 per cent. In total, three quarters of investment in the Province originated in the service sector.

**Figure 10: Western Cape gross provincial fixed investment in services, 1995 – 2006**




*Source: Quantec Research, 2007*

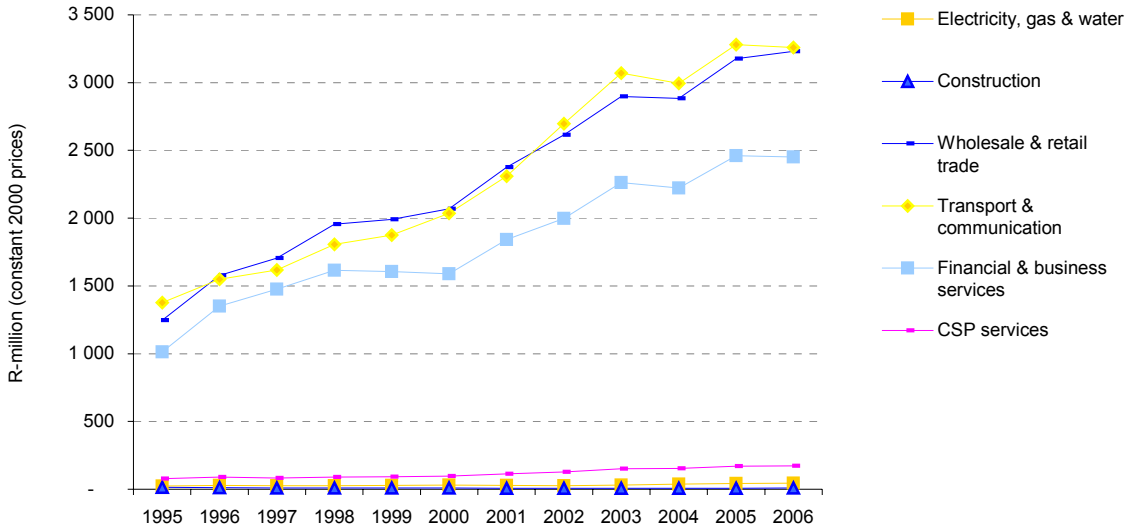
From 1995 to 2006, average annual growth was highest in community services (14,6%), construction (13,3%), communication (12,8%), catering & accommodation (8,1%), and trade (7,3%). From 2005 to 2006, investment growth was highest in construction (39,7%), community services (18,8%), communication (14,4%), and trade (14,1%).

### 2.5.4 Service sector exports

The service sector in 2006 contributed roughly a quarter to exports from the Western Cape, led by transport (6,3%) and trade (5,8%), followed by financial & insurance services (3,6%), business services (3,1%), and catering & accommodation (3,0%).

From 1995 to 2006, service sector activities with above-average annual growth included communication (17,1%), business services (11,0%), and catering & accommodation (9,2%). From 2005 to 2006, service sector investment growth trailed that in manufacturing and remained below the provincial average of 5,6 per cent in all activities.

**Figure 11: Western Cape service sector exports, 1995 – 2006**




*Source: Quantec Research, 2007*

## 2.6 Key sector performance: evidence from the MEDS

The Western Cape Microeconomic Development Strategy (MEDS) is one of a set of interactive strategies developed on behalf of the Provincial Government to stimulate economic development and transformation in the Western Cape. It is based on a multi-annual review of sectoral developments in the provincial economy, currently in its fourth phase.

The 2006 PER&O reported on the results of the first two phases of the MEDS, amounting to 14 sectors and four cross-cutting activities. This edition summarises the deliberations of the MEDS's third phase, which was concluded in July 2006.

The third phase included seven new studies, namely that of the informal sector, food processing, boatbuilding, construction, chemicals, printing & publishing, and retail, wholesale & franchising.

### 2.6.1 Boatbuilding

Boatbuilding is a relatively new, dynamic industry in the Western Cape. The Province has managed to establish itself as the principal national location for boatbuilding. More than half of South Africa's boatbuilding businesses are based in the Western Cape, where they produce more than four fifths of the national boatbuilding output. More than two thirds of the value chain is domestic and under control of PDI-owned businesses.

The most successful products of the sector are catamarans and monohulls, predominantly for sailing, where businesses based in the Western Cape successfully compete internationally. Strong global demand, especially for sailing catamarans, suggests that the sector could grow up to four times its current size.

Constraints to growth relate to production efficiency and quality on the one hand, and to the absence of intra-sectoral cooperation in the interest of joint technological learning and upgrading, and the lack of reduction in logistics costs on the other hand.

These challenges are not primarily steeped in market failures but are the result of the highly individualistic nature of the industry, particularly its manager-owners.

The absence of sector-wide quality assurance mechanisms has had an adverse effect when specific products of individual yards performed badly and were noticed as such by the world yachting community.

Collective problems such as quality might best be addressed through collective measures, but the small size of the industry militates against this in that no yard managers could afford to devote a lot of time to issues that affect the sector at large.

This is why government needs to keep a watching brief over the sector. Unfortunately, even if the sector were to grow, due to its traditionally high labour intensity, the job creation elasticity to demand growth is low because yard owners will likely invest in new technology.

#### The Boatbuilding Academy

The Boatbuilding Academy was established in early 2006 as a joint initiative between the Cape Town Boatbuilding and Technology Initiative (CBTI), the education and training authority for the Manufacturing sector (Merseta), and False Bay College. It opened its door to the first 12 students in January 2006.

The main objective of the Academy is to train young people for employment within the industry by providing a recognised quality qualification. The programme targets existing employees within the industry as well as unemployed and school leavers.

The entrance requirement is a NQF 1 or equivalent qualification (grade 9). The qualification will be offered at NQF levels 2 to 4. The objective is to give students first a broad knowledge of boatbuilding up to NQF Level 2. Specialisation is then possible in the various categories at NQF Levels 3 and 4. The total course lasts 3 years, one year for each of the three NQF Levels.

The training consists of a mix of training at the College and on-the-job training in companies. The response from the boatbuilding companies has been positive; some of the larger companies have each offered to accommodate all of the trainees.

The training at False Bay Colleague will not immediately alleviate the skills bottlenecks within the industry, but is a very important initiative in this direction, reflecting a recognition of formal training in relation to the needs of this niche industry.

### 2.6.2 Food processing

Food processing is internationally a large, complex industry with high degrees of vertical integration. This poses challenges for smaller producers in developing countries. At the same time, growth in demand for healthy products and renewed interest in niche foods, including lifestyle foods, offer opportunities to small-scale producers, especially if they can exploit location-specific advantages and differentiate themselves through *Made in the Cape*.

The food processing sector contributes in important ways to the Western Cape economy. Provincial demand for food is higher than in the rest of the country. It accounts for a fifth of manufacturing value added, is the second largest employer in manufacturing, and the biggest exporter. It is linked to a strong local agricultural sector and to catering and accommodation activities. Intra-sectoral links are important as well.

On the whole, however, the food processing sector has not been a strong growth performer over the last decade. This is the result of relatively stagnant but large, established activities and smaller but high-growth activities such as indigenous teas, speciality meats, and spices & condiments.

Problems faced by smaller businesses which are often associated with the high-growth activities include expensive inputs (such as packaging), barriers to entry to domestic retail, and entry into international markets. In addition, the whole industry faces more import competition.

In a series of activities combining large and fast growing international demand and low concentration levels (that is, with lower barriers to entry for SMMEs), major obstacles faced by Western Cape producers include certification, access to distribution networks, and skills.

#### The Cape Herb & Spice Company

The Cape Herb & Spice Company, started in Cape Town in 1994, has grown into an internationally recognised company with a global reach.

The Cape Herb & Spice Company produces mainly innovative spice mixtures and blends packaged in grinders. Rubs, salts, and sugars also form part of the product range, in packaging such as tins and shakers. The company produces few primarily chilli products and chillies are present only in small amounts in some items of their product range.

The Cape Herb & Spice Company buys inputs locally where possible, due in part to cost considerations. Products not available in SA are imported in bulk purchases where there are significant cost savings. Sourcing from local suppliers has distinct advantages in that the logistics are more manageable and no up-front payment is required, whereas that is the case with international spice purchases.

Furthermore, samples from international suppliers are often vastly different from the actual product purchased. Unsatisfactory products are difficult to return and obtaining refunds can be problematic. Raw spices are purchased internationally through spice traders and locally from farmers.

The company is planning to expand its capacity. It currently has two lines at its factory, and a new factory will be built in 2008, which would add one line to their production capacity. The company currently employees approximately 50 people.

The success of the company thus far has been driven by the quality of its products and by innovative marketing. The company distinguishes itself from larger competitors, such as Robertson's, by emphasising certain product qualities (products have no colourants, flavourants, preservatives, etc.) as well as the quality of the actual mixing, blending, and packaging processes. Therefore, the company targets higher-income customers who are more quality conscious.

The Cape Herb & Spice Company is the own label supplier for Woolworths' range of herbs and spices and supplies into the "President's" range of Loblaws in Canada. Through their listing in this range the company gains a near automatic listing with other retailers. An international retailer recently commented that the Cape Herb and Spice Company's products are "known as the best in the world".

The company is extensively certified to export into foreign markets with HACCP and British Retailers Consortium certifications, amongst others. Only two farms in South Africa are sufficiently certified to supply the company with organic products.

Innovative marketing that differentiates their products includes glass grinders and innovative/trendy names such as "Earth's Energy" and "Spirit of Fire". They also hold the worldwide rights for the manufacture (not distribution) of the Jamie Oliver-branded range of rubs, flavoured salts, and sugars.

The majority of their business is derived from the export market. Products are distributed globally, and destinations include the UK and Europe, the US, Canada, South America, Japan, New Zealand and Australia.

The route into the international food market started at trade shows, which plays an important role in accessing the international food market. The Cape Herb & Spice Company still participates in these trade shows in order to open up new opportunities and markets.

### 2.6.3 Chemicals

Excluding petroleum, the chemical industry is not a sizeable sector in the Western Cape. It produces a small range of relatively low- to medium-technology products and imports most of the chemical products required by the Province.

In some sense, the state of the sector in the Western Cape broadly reflects the state of the chemical industry in the country, namely an industry that has hardly grown in the past decade and has lost critical manufacturing capacity and skills.

An interesting new idea is the development of chemicals out of compounds extracted from natural products. The unique patrimony of the Western Cape over its rich biodiversity lends itself to exploring the feasibility of developing pharmaceuticals, body care products, cosmetics, biofuels, and others.

### 2.6.4 Construction

The construction sector contributed some 3 to 4 per cent to regional GDP over the period 1999 to 2003. With annual sector growth to 2008 projected at seven per cent, this is forecast to rise. Planned public infrastructure investments under the AsgiSA play a major role in this.

Over the last decade the output employment elasticity has fallen in this sector, confirming that even in sectors with opportunities for unskilled workers, growth does not necessarily go hand-in-hand with job creation.

The sector is affected by skills shortages. This concerns skilled workers and management. Businesses interviewed in the course of the MEDS sector study complained about the lack of training in the sector. They reported having no financial incentives to offer training themselves, even though retraining their current workforces would allegedly go a long way toward addressing skills shortages.

This suggests that the Construction Education and Training Authority (CETA) is failing in its mandate to facilitate appropriate training.

### 2.6.5 Informal economy

About one in ten people working in the Western Cape are part of the informal economy. This alone shows that the sector is important, albeit not as much as in other Provinces. Compared to the rest of the country, people in the Western Cape's informal economy tend to make more money and be more highly educated.

But this does not mean that all is well. There are barriers to enter the informal sector, blockages to improving incomes, and obstacles to taking advantage of emerging opportunities. Removal of these barriers relates to access to infrastructure and basic services, financial services, training, and local government regulations.

Further analysis on the informal sector is presented in *Chapter 6: Small, Medium and Micro Enterprises and the Informal Sector.*

### 2.6.6 Printing and publishing

Printing & publishing employs some 30 500 people, providing one in seven jobs in manufacturing. The sector appears to be in the throes of a long-term decline.

First, it has not weathered the emerging competition from producers in the Far East well. Lower wages, high levels of efficiency, large scale economies, and significant government support characterise the industry in countries such as the Philippines.

Second, the sector suffers from skill shortages not only in printing and publishing but also in wood and paper. This exerts upward pressures on wages and encourages job-hopping. This has led to gradually more capital-intensive production processes, spelling trouble for job growth in this sector, including for semi-skilled workers.

Managers interviewed for this MEDS study had a poor opinion of the sector SETA and recommended the creation of a provincial training centre along the lines of its existing counterpart in Gauteng. This could be organised in a public-private partnership.

### 2.6.7 Wholesale, retail, and franchising

This sector is the largest employer in the Western Cape. Due to productivity increases of changing labour practices toward more flexible contracts, the considerable growth in the sector has not gone hand in hand with job creation.

Leading businesses in the sector – essentially the large retailers – have played an important role in opening the supply chain both upstream and downstream to emerging businesses. The training authority, the Wholesale & Retail SETA (W&RSETA), has organised successful learnership programmes, allowing unemployed people to gain valuable work experience.

But considerable obstacles continue to stand in the way of informal traders graduating into the formal economy. These obstacles include lack of time and resources to attend training, and lack of access to credit, loans, tenure, infrastructure and bulk buying power to make their businesses more viable.

### 2.6.8 Prioritisation

The MEDS recommended that the informal sector be accorded priority status within the MEDS strategy. This is based on its potentially large impact with respect to output and equity. Resource costs are limited. In addition, the relatively high education levels of a significant portion of the people working in the informal sector suggest that training programmes are likely be effective.

Food processing, boatbuilding, and construction were identified as important within the Western Cape's development strategy, albeit not needing or justifying comprehensive government intervention at this stage.

The recommendation is to keep a watching brief on these sectors in order to monitor whether in future their growth potential is likely to be matched by high impact, which might then change the rationale for support policy.

Finally, chemicals, printing & publishing, and retail, wholesale & franchising each warrant minor support.

### 2.6.9 The 4th round of the MEDS: late 2007

The current round of the MEDS deepens the analysis of two sectors it has taken on in previous rounds, namely the informal sector, and the cultural or creative industries. The focus in the informal sector will be on trade and construction, previously identified as activities with significant growth and job creation potential.

The other study concentrates on music and the performing arts in the Western Cape. Next to a profile of attendant activities, it aims to learn from international experiences of cities or regions that have used culture as a magnet for investment and tourism.

In addition, the MEDS is exploring the opportunities of the 2010 World Cup, especially for small and medium-sized enterprises.

Finally, the work programme includes an ambitious attempt to improve the spatial understanding of economic opportunities in the Province by analysing the economic performance and growth potential of selected municipalities outside of the Cape Metropole.

This will pay special attention to innovation in both urban and rural contexts, thus examining the presence of knowledge-based activities away from the Province's major economic hub.

## 3. Conclusion

This chapter has embedded a detailed summary of sectoral and employment trends up to 2005 or 2006 in a preliminary analysis of the integration of productive and knowledge-based activities in the Western Cape. It attempts to relate trend data about output, employment, investment, and international trade (which are well established and widely used), with data that loosely describe aspects of the Western Cape's knowledge economy (which are much less easily available).

It is critical for policymakers to understand the contribution knowledge-based activities are making to the performance of a particular sector. Such analysis is at least as interesting as the growth in output, employment, or exports itself.

For instance, the agriculture and fishing sectors have traditionally provided livelihoods for many people in the Western Cape. They are prominent surplus items on the provincial trade balance. Yet due to changing weather patterns, scarcer water, pressure on fish stocks, and continuing protectionism in international markets, these two industries are on the whole in decline.

However, this trend is not applicable for every activity in these sectors. In fact, despite the general malaise, some agricultural producers thrive. The analysis in this chapter suggests that this difference may have to do with the degree of integration between what businesses do and what knowledge-producing institutions do[26].

The existence of possible areas of interaction between productive and knowledge-based activities in low research-intensive industries, such as agriculture and fishing, is one of the most interesting findings of this kind of work. It is also a finding that could make the gains from the knowledge economy accessible to a wider group of people.

Given the documented strengths in natural sciences, including biotechnology, it is worth investigating where UILs exist, if they are exploited to the fullest and, in the likely case that they are not, what sort of incentives a provincial government could provide to create networks or overcome network failures.

[26] cf. Lorentzen, 2006 for the Western Cape wine industry.

Another question worth pursuing is whether the dynamic performance of sectors such as transport equipment (including boats) and instruments, with its positive consequences for job creation documented in this chapter, owes anything to the investment into R&D and production or the usage of technology undertaken by some businesses in these sectors.

This requires in-depth case work: Which businesses have invested in R&D, for what reason, and what is the history of learning behind a patent that these businesses apply for or license? And further, are R&D and technology (use or production) the determinants of differential performance within a sector?

This same question can also be asked across sectors. The analysis showed, for example, that as far as technology is concerned, user-producer relationships in textiles seem to be much less developed than in all other sectors in which Western Cape businesses possess technological competences.

To the extent that the sorry state of the textile industry in the Western Cape is due to a lack of appreciation or understanding of key technological changes behind world-class manufacturing in the textile sector, the absence of networks might in the same way doom even those producers that would have a chance at survival if they could benefit from collective strategies to overcome sector-wide shortcomings.

If these suggestions sound like exhortations to fund further research into these matters, that's exactly what they are meant to convey. Yet this is not the usual academic litany. The Western Cape Provincial Government has been remarkably willing to create the space in which questions like these can be pursued. And although we will not learn all answers *subito*, we know today a lot more about what makes the Western Cape economy tick than we did in 2005, the year the first PER&O was published.

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