



# DPRU

WORKING PAPERS

Understanding the high tech sector  
in the Cape Metropolitan Region:  
A contribution to the development  
of a regional strategy for high tech  
industry

A joint DPRU and Wesgro research project

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## 1. INTRODUCTION

This working paper is the result of a study of high technology industry in the Cape Metropolitan Region (CMR) undertaken jointly by the Development Policy Research Unit (DPRU) of the University of Cape Town, and Wesgro, the Western Cape's investment promotion agency. The study was funded by the Council for Scientific and Industrial Research (CSIR), Wesgro, and the DPRU.

Conventional wisdom in the CMR (defined as the Cape Metropolitan Area plus Stellenbosch) holds that the region is well suited to the development of a high tech cluster. This is backed up by recent developments, such as the launch of Capricorn, the establishment of Wesgro's Cape High Tech Forum, and the establishment of the Cape Information Technology Initiative (CITI), which suggest that a lot is happening in the CMR's high tech sector.

Nevertheless, it is important to be aware that by far the largest concentration of high tech firms in the country is currently in Gauteng. According to a study by Rogerson (1998), as recently as 1994 the Pretoria-Witwatersrand region accounted for 71% of total national employment in high technology manufacturing, with metropolitan Cape Town accounting for only 5%.<sup>1</sup>

Why is high tech industry of interest to a regional economy in the first place? First, high tech products are dramatically increasing their share of world demand and thus are an important source of growth. Second, high tech industries have potentially large regional spillovers in terms of knowledge that can drive productivity and quality improvements in other regional industries. Each of these reasons is briefly discussed.

The structure of demand is not static and has continued to shift away from the traditional low and medium tech sectors towards the more technology-based sectors. This dynamism of the high tech sector suggests that regions specialised in these industries should grow faster than regions specialised in more traditional agricultural and industrial products. The shift to producing high tech products not only satisfies the region's own demand for such products, but also supports more sustainable export-led growth for the region.

What is driving the shift to high tech? A number of forces are involved. First, there is significantly more new product innovation occurring in the high technology fields than in the traditional sectors. These new products create new markets, which then compete with established products for the growing income of consumers. A good example is the information technology (IT) sector, in which most of today's products did not exist twenty years ago. These products may even act as substitutes for traditional products, providing a further push to the decline of the traditional products.

Second, high technology products are more income elastic than traditional low and medium technology products. Therefore as consumer incomes grow, a greater proportion will be spent on high tech products.

Third, the competitive upgrading and growing sophistication of all sectors of the economy has been affected by the increasing use of intermediate high technology products. The primary beneficiaries have been the information and telecommunications sectors, but other sectors have not been excluded. For instance, biotechnology is playing an increasingly important role in agriculture.

How significant is the shift to high tech? This is best shown through a number of revealing statistics. The Economic Commission for Latin American Countries (ECLAC) Comparative Analysis of Nations (CAN) determines the dynamism of OECD imports, which comprise around 70% of total world imports. As reported in UNCTAD (1996: 126), the study reveals that many of the products considered dynamic

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<sup>1</sup> Note that these figures refer only to high tech manufacturing, not high tech services, which may show a relatively higher concentration in the CMR.

*... are in high-technology sectors; from 1963 to 1993, high tech imports into OECD countries grew by over 180 per cent, compared to only 40 per cent for medium technology goods and a decline of 12 per cent for low technology goods.*

This difference in import growth rates to the most important markets in world trade is remarkable. This trend is also evident in the most important high technology field, namely information and communication technology (ICT). The World Trade Organisation estimates that trade in computer and telecommunication products plus telecommunication services was worth over \$1 trillion in 1996 and is roughly equivalent to total world trade in agriculture, automobiles and textiles combined (WTO Focus 1997). To further reinforce this point, it is estimated that annual spending by US companies on IT equipment outstrips their spending on all other capital equipment (Talero & Gaudette 1995). South Africa is no different, with growth of many components of the ICT sector as high as 20% per annum this decade (Hodge & Miller 1997).

The second reason that developing a high tech cluster is seen as important has to do with the high knowledge content of high tech industries. This high knowledge content means that there are potentially large spillovers of knowledge that can contribute to upgrading the competitiveness of other industries in the region concerned. The spillovers can occur in a number of ways. First, a high tech cluster can crowd-in a sophisticated specialist supplier base that can serve other industries. It is apparent that high tech sectors like ICT have a large intermediate role in all industries and contribute to improving productivity, quality and product innovation. A further example is biotechnology, which is playing an important role in improving agricultural yields.

Second, high tech industries are human capital intensive and serve to upgrade the skills of the regional labour force and attract more skilled labour to the region. Through labour turnover some of the skilled workers may find their way into other traditional industries.

Why are spillovers of knowledge to non-high tech sectors important? The argument, in simplified form, is as follows. As economic development takes place within a region/country, average wages will increase in response to the growth in output. As average wages increase, the region/country will lose its competitiveness in the low technology, labour intensive, tradable products. This process can be slowed for a period through the application of technology to the production process. This can create a productivity gap that outweighs the wage gap with lower wage countries, or can allow the creation of new products in these sectors that do not have any direct competition. As UNCTAD (1996: 112) cites in relation to the Asian example:

*As income increases and the domestic market begins to grow, rising labour costs and the entry of lower-cost producers progressively erode the export competitiveness of many labour-intensive manufactures. This can be offset, in part, by new investment and export opportunities in higher-level niches in traditional industries, such as textiles and clothing, created through improved design and marketing.*

Getting back to the CMR, two questions arise: To what extent do we already have a high tech cluster in the CMR on which to build? What would need to happen to make the CMR a leading high tech centre, in the national and international contexts?

Internationally, spatially-based clusters of firms in various industries have received attention. This is particularly so in the high tech arena, with Silicon Valley perhaps the most famous example of a spatially-based high tech cluster. Based on theory as well as these sorts of experiences elsewhere in the world, current international literature on regional industrial strategy places emphasis on:

- the benefits of agglomeration;
- the importance of dense formal and informal networks and linkages between firms;
- the need to embed foreign firms in the local economy;
- the institutional environment in which firms operate.

Taking our lead from this literature, we propose as a starting point that a high tech strategy for the CMR should be based on the following three “pillars”:

- developing **existing high tech firms** in the region, whether they are “indigenous” or foreign firms;
- entrepreneurial support for **start-up** firms;
- attracting **new investment** from outside the region.

It is important to understand that none of these pillars makes sense on its own; they need to be seen as three interrelated aspects of a single strategy. For example, the success of existing high tech firms can act as a powerful advertisement in attracting new investment. The attraction of new investment can provide, for example through joint ventures, finance for the further development of existing firms. A strong regional industry provides opportunities for entrepreneurs to start new firms successfully.

However, these three pillars provide just the bare bones of a regional strategy. They constitute simply a framework, or an approach to the task. A crucial starting point for actually developing and implementing such a strategy is to understand the existing high tech base in the region. If the region is providing an environment in which existing firms thrive, it is likely that the task of attracting new investment and supporting start-ups is already half done. With this in mind, the primary goal we set ourselves in this study was to deepen our understanding of high tech firms that already operate in the CMR. In particular, we sought data on the following:

- the number of high tech firms already existing in the CMR;
- a breakdown of industry sub-sectors they are involved in;
- the primary activities of these firms;
- whether they are purely local firms or part of national or international companies;
- their reasons for locating in the CMR;
- their linkages with other local firms and institutions, such as suppliers of inputs and technology;
- the benefits and problems they experience as a result of their location in the CMR;
- their plans for the future.

The results of this investigation are reported here. Section 2 outlines the methodology used to survey existing high tech firms in the region. Section 3 presents the findings of the survey in detail. Section 4 brings us back to the question of a high tech strategy for the CMR, and suggests what the findings mean for such a strategy. Of course, in the end, the development of a strategy of this nature must involve stakeholders in the industry and the region if it is to succeed. This report should be read as a contribution to that process, and not as a prescriptive document.

## 2. METHODOLOGY

Having agreed that the goal was a deeper understanding of the existing high tech base in the CMR, we set about designing a research process to achieve that. This process consisted of three main steps:

- compiling a database of high tech firms in the CMR;
- sending a questionnaire to all these firms;
- following up the questionnaire with interviews with selected firms.

Each of these steps is discussed briefly in turn.

### 2.1 Compilation of a database of high tech firms in the CMR

This task of compiling a database of high tech firms in the CMR was not as straightforward as it may sound. First we had to decide how to define “high tech” for the purposes of this study. Appendix A gives some background on the debate about what is meant by high tech. The following eight sub-sectors were identified for this study:

- application software;
- communications equipment;
- computers and office equipment;
- drugs and medicines;
- electronics;
- engineering and scientific services;
- information system services;
- scientific instruments.

This list reflects a relatively uncontroversial view of which industries are considered to be high tech. However, it is unusual in that it includes services, not just manufactured products. This is important as we suspect that these services are amongst the fastest growing high tech sub-sectors in the CMR.

We decided to exclude retailers and training firms from the survey. We were interested only in manufacturers, distributors, and providers of high tech services.

Four of the sub-sectors identified can be grouped together to form an Information and Communication Technology (ICT) sector. They are:

- application software;
- communication equipment;
- computing and office equipment;
- information system services.

There was no existing up-to-date register or database of firms in the CMR in all of these sub-sectors, so we had to compile one, using a variety of existing sources which covered different parts of this range of sub-sectors. The database was compiled from four sources – the Cape Chamber of Commerce, the Cape Town City Council’s Silicon Pages, the Information Technology Association of South Africa, and a list of information technology firms compiled by Capricorn.

There is no doubt that many firms were missed, and the database was far from perfect. Also, the use of two sources concentrating on purely information technology (IT) firms meant that there may have been a bias towards this sub-sector. However, given the variety of unrelated sources used, we felt it was sufficiently comprehensive to proceed with.

The next step was to check that the addresses and contact details for the firms on the database were valid, and that the firms were still in operation. In the course of this process, retailers and training firms that had made it onto the list were deleted. The final database consisted of around 400 confirmed firms.

Wesgro subsequently developed the list further, and published it in September 1998 as *The Western Cape Business Directory: Technology Sector*. It is available from Wesgro.

## **2.2 Questionnaire survey**

A questionnaire was compiled, and a pilot survey of ten firms was conducted. On the basis of this pilot survey the questionnaire was finalised, and then posted to all firms on the database in August 1998. A total of fifty-one firms responded over the next few weeks. Please see Appendix B for a copy of the questionnaire. The results of the survey analysis are presented in Section 3.

## **2.3 Interviews with selected firms**

Based on some initial analysis of the results, a number of respondents were identified as firms with whom follow-up interviews, to explore issues in greater depth, would be useful. Ideally it would have been useful to interview almost all the firms who responded, but the time consuming nature of the interview process meant that we were ultimately able to conduct only six in-depth interviews. However, as part of CITIs “Listening Lunch” held in January 1999, valuable information was gathered from a further six firms (although not in as much depth as would have been possible in individual firm interviews). Data from the interview process is also included in Section 3.

### 3. SURVEY RESULTS

This section examines the results of the questionnaire survey that was conducted.

#### 3.1 Are the respondents representative of the database?

Questionnaires were sent out to all firms on the high tech database for the CMR and a total of 51 firms replied – a response rate of close to 13%. As explained in Section 2, the database itself does not include every single high tech firm in the CMR, and may have a bias towards IT firms. Nevertheless, bearing in mind these inadequacies, the first step is to compare the characteristics of the respondents with those of the firms in the database, to get an idea of how representative the respondents are of the firms in the database.

There are three dimensions of representivity: sub-sector, location within the CMR, and size. Assessing representivity with respect to sub-sector is complicated by the fact that no common classification scheme was followed across the original data sources. In addition, the ICT sector was bundled together as one classification in the data sources and was split into four distinct groups in our survey (communication equipment, computing and office equipment, information system services and application software). The task of separating the database firms into the four ICT categories was somewhat arbitrary as it relied on industry knowledge and clues from firm names. Assessing representivity with respect to location within the CMR is easier, with the only possible bias coming from the use of post office box addresses in the database rather than physical addresses. There was no information on firm size in the database, so no assessment of representivity with respect to size can be made.

On the basis of industry sub-sector and CMR location there are clear similarities between the respondents and the database. The comparison is detailed in Table 1. In terms of industry classification, the main difference lies in the proportion of ICT firms. These represent two-thirds of firms in the database and only half of the respondents. Given that there is potentially an ICT bias in the database, it is difficult to say which is more representative of the true make up of the CMR's high tech sector. There is greater similarity in terms of CMR location, with a slight over-representation of Stellenbosch and under-representation of Town among the respondents.

**Table 1: Comparison between the database and the respondents**

	<b>Database</b>	<b>Respondents</b>
<b>Industry sub-sector</b>	(% share of total)	(% share of total)
Communication equipment	5	12
Computing & office equipment	22	12
Electronics	17	16
Drugs & medicines	2	4
Other high tech products	4	16
Information system services	29	18
Application software	11	10
Engineering services	10	14
<b>Location within CMR</b>		
Town	36	29
Atlantic	12	14
Northern Suburbs	12	8
Goodwood	10	14
Southern Suburbs	14	12
South Peninsula	12	10
Stellenbosch	4	14

We cannot claim that the respondents give a truly accurate representation of high tech firms in the CMR. However, there are sufficient similarities with the database to ensure that a useful analysis is possible.

The important similarities include:

- a high proportion of ICT firms in the total;
- a secondary strength in electronic and engineering firms;
- a smaller proportion of drugs and medicine and “other” high tech firms;
- a more or less even distribution of firms across the CMR, although with some concentration in the Town area.

## 3.2 Results from the questionnaire

The discussion of survey results begins with a brief description of the respondents from a number of perspectives, including industry sub-sector, firm size, type of firm, and so on. It continues with an analysis of the nature of local high tech activities, the local linkages of the firms, their staffing patterns, their infrastructure requirements and the factors that influenced their location decision.

### 3.2.1 Characteristics of the respondents

#### a) Industry sub-sector

The first important characteristic is the high tech sub-sector into which the respondents fall. No respondents fall into the “scientific instruments” sub-sector. Respondents that do not fall into any of the sub-sectors listed on the questionnaire are grouped under “other high tech products”. The eight sub-sectors can be grouped into two broad categories, products and services:

#### *High technology products:*

- **Communications equipment** – equipment used in all communications technologies e.g. PABX, switching equipment, fibre optic cables, cellular transmission stations.
- **Computing and office equipment** – computers, their accessories and all electronic office equipment such as photocopiers and fax machines.
- **Electronics** - includes all electronic equipment that is for neither computing or communications purposes, e.g. security systems, defence systems, control boards.
- **Drugs and medicines** – pharmaceutical products including biotechnology.
- **Other** – all other high tech products that are not produced in abundance in the CMA, including chemicals, machinery, aircraft and automotive components.

#### *High technology services:*

- **Information system services** – includes all services that surround the information system of an organisation. This would include activities around developing information systems, providing information services and handling information communication. Examples are systems developers, communications service providers, and information providers.
- **Application software** – includes the development, sale and support of application software.
- **Engineering and scientific services** – includes high tech services that require engineering skills such as industrial automation, process control, as well as research services.

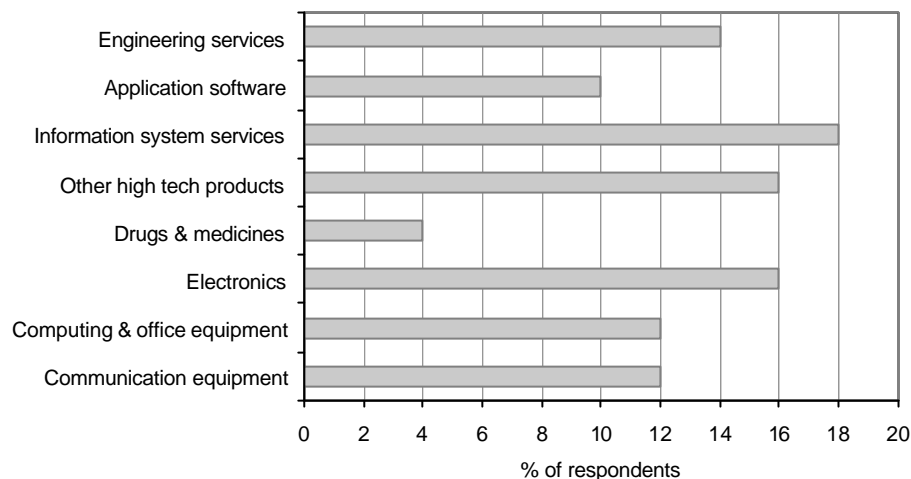
Figure 1 shows the percentage of the 51 respondents in each sub-sector.

A striking feature is the quite even spread across different sub-sectors. The most sizeable group is information systems services, which accounts for 18% of the respondents. This group is made up mostly of firms that develop custom software systems for finance, insurance, telecoms and manufacturing firms. It also includes a few information service providers (network and content).



The next most prominent groups are “other” high tech products, electronics, and engineering services. As “other” is a broad, catch-all group, it is not surprising that it features prominently. It contains an interesting mix of firms from aeroplane and automotive component producers to plastic moulding and food processing machine producers. The electronics firms can be roughly split into those servicing the maritime, security and communications fields. The engineering services firms are made up mainly of firms that assist manufacturers in process automation and control.

**Figure 1: Respondents by industry sub-sector**



The next most important groups – application software, communication equipment, and computing and office equipment – are all ICT-related, and each account for between 10% and 12% of the respondents. The entire set of ICT-related categories (the three above plus information system services) together make up 51% of the sample, suggesting some broader cluster group in ICT. In terms of the activities of these firms, the most notable feature of the computing & office equipment firms is that all but one of the firms is simply a distributor of products with after-sale service capacity, and not a manufacturer of products. This is partially true of the application software group though a number of these firms develop their own products. The communications equipment group is made up almost entirely of manufacturers.

The smallest group of firms is the drugs and medicines group. Both the respondents in this group are very active in the development and production of pharmaceuticals. However, it is not possible to draw conclusions about the sub-sector on the basis of only two respondents.

#### **b) Type of firm**

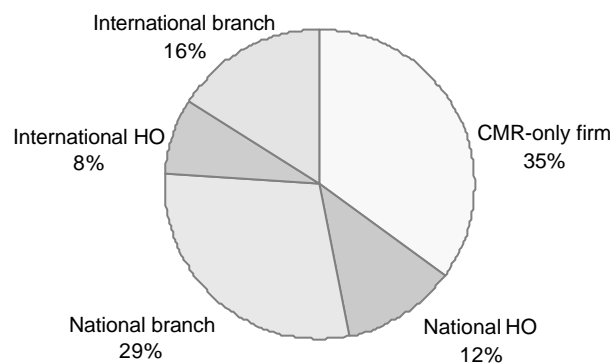
Another crucial variable to understand when preparing a local development strategy for a sector is what types of firms exist in the sector. Strategies to enhance the sector’s development will differ significantly if the sector is dominated by, for example, branches of multinational companies compared to if it consists mainly of small local firms. Figure 2 provides a breakdown of the firms in the sample by type of firm.

Five firm types are identified:

- **CMR-only firm** – a firm whose operations are based entirely within the CMR;

- **National head office** – a firm which has operations in the CMR and elsewhere in South Africa, with its head office in the CMR;
- **National branch** – a firm which is a branch of a national company (with its head office elsewhere – most of the firms in this category reported to a head office in Gauteng);
- **International head office** – a firm which has international as well as South African operations, with its head office in the CMR;
- **International branch** – a firm which is a branch of an international company (with its head office elsewhere – most firms in this category reported to a head office in Europe or the United States).

Figure 2: Respondents by type of firm



A further important distinction can be made between **CMR-based firms** and **branches** of firms based elsewhere. CMR-based firms include:

- CMR-only firms;
- national head offices;
- international head offices.

Branches include:

- national branches;
- international branches.

Fifty-five percent of the respondents fall into the broad CMR-based group. It is an important group because these firms, with their primary base in the CMR, are likely to be strongly “embedded” in the local economy, and are not subject to decisions taken by management in far-off head offices. They may also perceive themselves as owing some form of loyalty to the CMR.

Of the branch firms, a large number are national firms which have an office in the CMR either for production or simply to serve as a distribution point for this important regional market. International companies are also present in substantial numbers, indicating that the CMR is a significant enough market to attract their attention. However, as will be shown later, their interest in the CMR seems to be entirely for its market, and these firms are engaged chiefly in distribution to CMR customers.

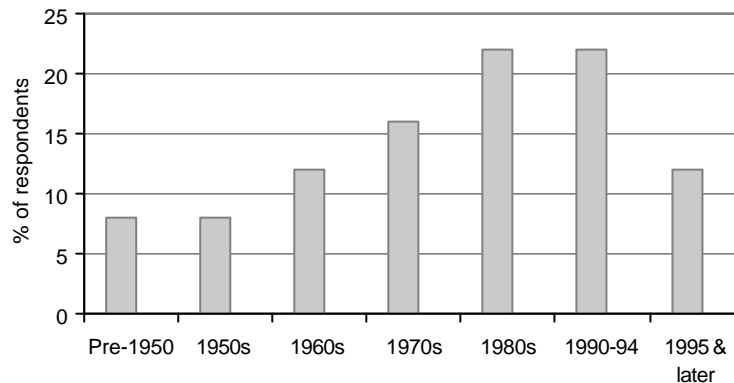
An important indication of whether national and international branches can play a role in the development of the CMR is the level of autonomy that local management has over local operations. Local management may have full autonomy over strategic decisions for the CMR

operation, only some autonomy over strategic decisions, or autonomy may be limited to day-to-day decision-making, with strategic decisions being made by the head office. Respondents reported an even distribution in the levels of autonomy of local management.

### ***c) Year of establishment***

The years in which the respondent firms were established is a useful indicator of the growth and dynamism of the high tech sector (see Figure 3). Interestingly, the CMR seems to have a reasonably long history of high tech activity, with just over a quarter of respondents being established prior to 1970 and 44% prior to 1980. This suggests that there has been some accumulation of knowledge and human capital in the CMR over time, which can provide a firm base for further development. An encouraging indicator of the recent growth of the cluster is that 34% of the respondents were established in the 1990s. Notable is the fact that just over 80% of the start-ups in the 1990s were in the four ICT-related sub-sectors. This reflects the explosive growth of that sector but also a possible comparative advantage for the CMR. These new start-ups make up about 60% of the ICT respondents.

**Figure 3: Year of establishment**



### ***d) Firm size***

The number of employees in each firm, along with annual revenue, is an indicator of firm size. Small firms (up to 20 employees) make up over a third of the respondents (see Figure 4). However, many of these firms are not that small in terms of revenue, with only 14% of the respondents earning annual revenue under R2m (see Figure 5). Three-quarters of these small firms are involved in high tech services or product distribution which may explain the high revenues earned per employee. In fact, it seems that high tech services and product distribution are more amenable to small firm organisation; roughly 50% of firms in each of these categories are small. In contrast, three-quarters of the manufacturing firms are medium to large.

**Figure 4: Number of employees**

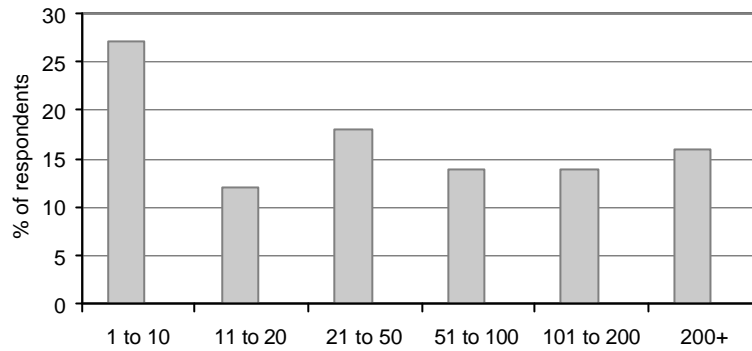
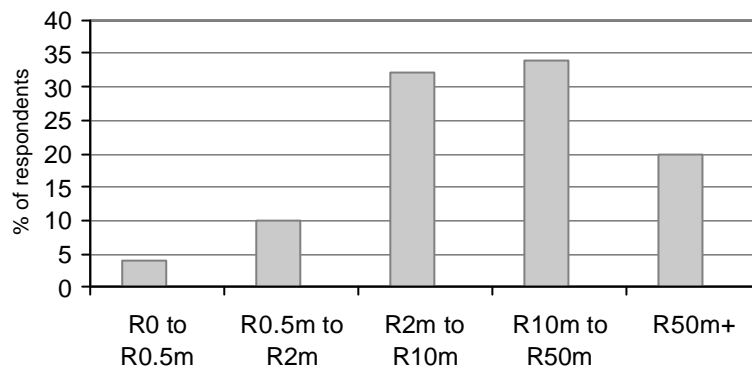


Figure 5: Annual revenue



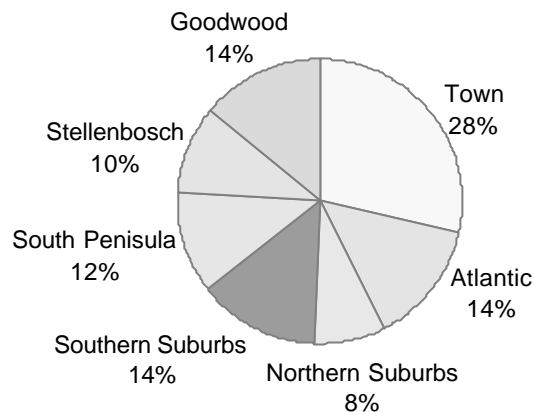
#### e) Location within the CMR

The final interesting characteristic of the respondents is the location of the firms within the CMR. The geographical areas used for this analysis were:

- **Town** – city bowl area including Salt River and Woodstock;
- **Atlantic** – industrial areas on the Atlantic seaboard, including Paarden Eiland, Montague Gardens, Milnerton
- **Goodwood** – industrial area centred around Goodwood including Epping and Pinelands
- **Southern Suburbs** – Mowbray through to Wynberg
- **South Peninsula** – the industrial areas centred around Retreat extending from Plumstead through to Simonstown
- **Northern Suburbs** – the office complex in Parow, Belville, Durbanville
- **Stellenbosch** – the winelands area including Paarl and Somerset West.

The distribution of firms across these areas is shown in Figure 6.

Figure 6: Location of respondents within the CMR



As already discussed, this pattern is reasonably similar to that of the database of high tech firms, suggesting that this distribution is a good representation of the actual distribution of all high tech firms in the CMR. The most striking feature of the distribution is that many office-only locations (Town, Southern Suburbs, parts of Goodwood and Northern Suburbs) are home to a significant proportion of the firms. This is because many of the high tech firms in the CMR are not involved in manufacturing (in particular many of the ICT firms) and so are unlikely to choose to locate in an industrial area. In fact, they are likely to avoid industrial areas actively as these areas do not portray the sophisticated image that high tech service firms seek.

A closer analysis of the ICT firms reveals that they are concentrated mainly in Town (38%) and the Southern Suburbs (19%) with a few communications equipment manufacturers in the Atlantic, Stellenbosch and South Peninsula industrial areas. In contrast, the electronics, engineering services and “other” high tech firms have a more or less even distribution across the CMR showing no notable geographical concentration.

### 3.2.2 Activities of firms

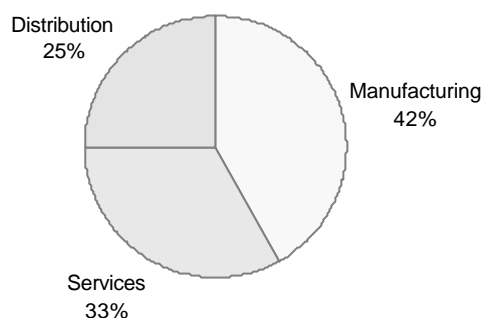
The CMR is one of South Africa’s major economic centres, accounting for approximately 11% of the country’s GDP (Wesgro estimates). However, a defining feature of the CMR economy is its distance from South Africa’s industrial heartland and major market in Gauteng. The CMR’s location on the coast with a sizeable port suggests that it could be a centre for export activity. However, one of the main markets for South African manufactured goods is the Southern African region and Gauteng is arguably better placed than the CMR to serve this market. Further, most high tech goods have a high value to weight ratio, making air transport more important than shipping. This gives Gauteng a further advantage as it is a regional air transport hub, though the CMR is relatively well serviced. (This is supported by respondents’ comments on whether their location in the CMR gives them an advantage with respect to exports, discussed towards the end of Section 3.2.3.)

The combination of these factors means that one might expect that high tech industry in the CMR is focused on the local (CMR) market, and thus includes numerous firms which are simply distributing products manufactured in Gauteng or internationally. If this is the case, then attempts at growing the cluster may face difficulties, because exports from the CMR would be an important source of sustained regional growth in the sector. Figure 7 and Figure 8 portray what the survey revealed of the activities of the respondents.

As expected, there is a significant group of firms which is involved purely in distribution. Almost all of these are branches of national or international companies, which presumably set up

a CMR branch because the CMR represents a significant market.<sup>2</sup> However, at 25% of the respondents, this is not an exceptionally large group. More than half of this 25% is concentrated in computing and office equipment, and application software – both sub-sectors in which South Africa does not have significant production capacity and which are thus dominated by international firms. For the rest, 42% are involved in manufacturing high tech products, while 33% provide customised high tech services.<sup>3</sup>

**Figure 7: Main activities**



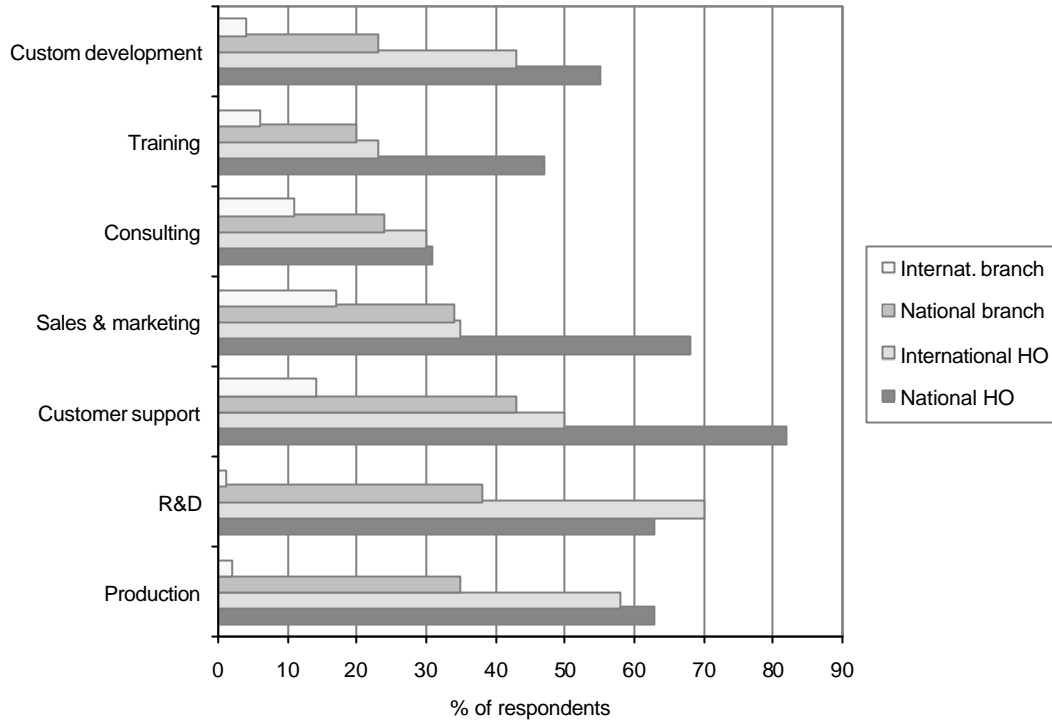
The survey tried to take the analysis one step further by asking firms which lower-level activities they undertake in the CMR, and what proportion of the company's overall South African total of each of these activities takes place in the CMR operation. This may help gauge whether the CMR is an important centre for specific parts of the supply chain, such as R&D, production, or training. Figure 8 summarises the responses to this question by type of firm (i.e. national branch, national head office, international branch, and international head office). CMR firms (i.e. firms with no operations outside the CMR) have been excluded as it is assumed 100% of their activities take place in the CMR.

The results are extremely interesting, and reveal Cape Town's position as an important yet secondary centre in the South African economy. International companies not head-officed in the CMR obviously concentrate their activities in Gauteng (or perhaps in other major centres), as revealed by the fact that the CMR attracts less than 5% of all the production-related activities (production, R&D, training and custom development) that these companies undertake in South Africa. The size of the CMR market means that the CMR accounts for between 10% and 20% of the sales-related activities (customer support, sales and marketing, and consulting) that these companies undertake in South Africa.

**Figure 8: Respondent's share of company's total SA activities**

<sup>2</sup> Note that all retailers were excluded from the database of high tech firms so distributors include manufacturing companies whose manufacturing activities are located elsewhere but who have an after-sales service branch in the CMR.

<sup>3</sup> These services often entail producing a custom product such as an information system.



In contrast, national companies not head-officed in the CMR make far greater use of the CMR as a production and R&D centre, with 35% of their production and 38% of their R&D taking place in the CMR – substantially larger than the CMR’s share of economic activity in South Africa. This is an encouraging sign. The CMR is less important but still significant for the training and custom development activities of these companies. The CMR is clearly an important market for these companies, with 43% of customer support and 34% of sales occurring in the CMR.

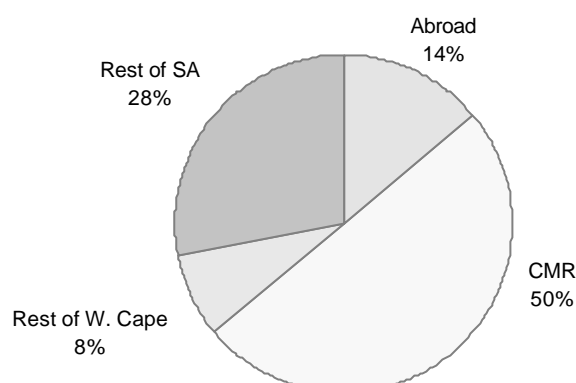
As might be expected, it is the national and international companies with their head offices in the CMR, which make greatest use of the CMR as a centre for their various activities. For these companies, the CMR accounts for 58% to 63% of their South African production and, importantly, for 63% to 70% of their South African R&D. The CMR market is still important to these firms as shown by the high share of their South African customer support and sales activities which take place in the CMR. However, this is less the case for the international head offices in the CMR, which rely less on the local market.

Overall, these results are quite sobering. They show that the CMR is still considered a secondary production location by high tech firms operating nationally, and is not the centre of South Africa’s high tech sector. It is the CMR-based firms that make greater use of the CMR for production-related activities. However, this needs to be read in conjunction with data on the location of customers to see whether these firms are using the CMR as a base to export to the rest of South Africa and beyond.

### 3.2.3 Customer location and exports

Figure 9 shows the breakdown of customer location for all the respondents.

As would be expected based on the preceding analysis, the CMR and surrounding Western Cape province is the primary market, accounting for 58% of sales. However, exports from the region are significant, with 28% of sales going to customers in the rest of South Africa (outside the Western Cape province) and 14% going to international customers. Exports from the region thus make up 42% of sales, suggesting that the high tech cluster in the CMR is not inwardly focused, has built up considerable capacity, and has established markets outside the region on which to base future growth.

**Figure 9: Customer location**

If we remove from the analysis the firms whose main activity is distribution of products produced elsewhere (these are mainly branch offices of national and international firms) and recalculate the figures, exports to the rest of South Africa rise to 35%, and exports abroad rise to 18%.

These percentages are simple averages of the percentages reported by respondents; they are not weighted to reflect firm size. It may be that the firms who are exporting most are the large firms, in which case Figure 9 will under-represent exports in revenue terms. Based on the annual revenue categories reported by respondents (as shown in Figure 5 in Section 3.2.1(d)), we estimated export revenues for all the service and manufacturing firms (again leaving out the distribution firms). This was an inexact process<sup>4</sup>, but nevertheless the results are interesting. We estimate that of the revenue earned by service and manufacturing respondents, 36% comes from sales to the rest of South Africa, 32% from sales abroad, and only 32% from sales in the Western Cape. This suggests that it is indeed the larger respondents who are more heavily engaged in exporting. (The unweighted percentage of sales in the Western Cape is 58%, much higher than the weighted percentage of 32%).

The picture is further developed when one analyses customer location broken down by type of firm, as shown in Figure 10 (which returns to using simple averages of percentages reported by all respondents). It shows that the international branches are the ones that are focused almost exclusively on the CMR market, with only 5% of their sales exported from the region. An encouraging signal is that national companies not head-officed in the CMR are exporting from their CMR branches at a high rate of 38% of total CMR production. This suggests that the CMR have some advantages in high tech production not available in other parts of the country.

The overall export performance of the CMR-based firms<sup>5</sup> is good. CMR-only firms export 55% of their product or service from the region, including 18% to customers outside South Africa. National head offices export 45% of their production from the region. International head offices export almost 30% of output abroad and a further 40% to the rest of South Africa. What is most encouraging is the persuasiveness of export activity: all of the CMR-based respondents

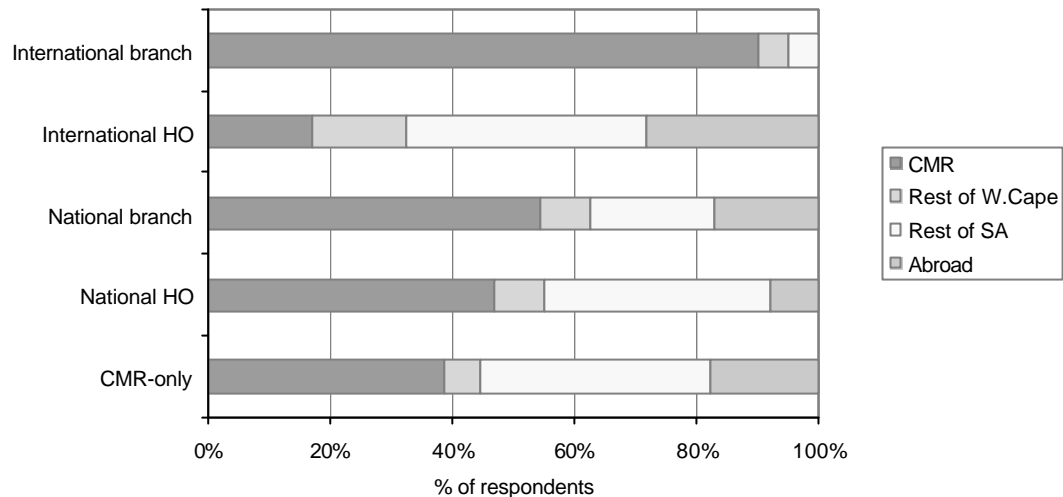
<sup>4</sup> It involved choosing an arbitrary point within each revenue category to work with. For example, if a respondent reported annual revenue of "R10m to R50m", we chose R25m on which to base the calculation. So if that respondent reported that 20% of its output is sold to customers abroad, we would estimate the annual value of its exports abroad to be R5m. The total annual revenue of all the service and manufacturing respondents combined, worked out to be R740m using this method. Revenue from exports abroad was R235m.

<sup>5</sup> Recall that these include CMR-only firms, national head offices and international head offices.



export at least 20% of their output from the region. Even though this is unlikely to be the case for every CMR-based high tech firm outside the respondents, it does indicate a high incidence of exporting. This high incidence of exporting activity by CMR-based firms suggests that the CMR may have a comparative advantage for high tech production relative to other South African cities. What is also encouraging is that export markets have already been developed, laying the basis for future growth.

**Figure 10: Sales by customer location by type of firm**



In spite of this encouraging overall export performance, only eight respondents said that their location in the CMR gives advantages with respect to export markets. These are their comments (in some cases “advantages” seems too strong a word):

- Export logistics OK.
- Living & labour costs are low, so products are more competitive. Also exchange rate helps.
- Close to a port.
- Labour costs of professional engineers are lower. Labour enjoys the Cape Town area in terms of living conditions.
- In the leisure industry, people enjoy Cape Town as a venue. We also have some marketable sport, publishing infrastructure.
- Our export market is foreign vessels. Cape Town is major port.
- Good deep sea port (when it is functioning smoothly). [This firm also said that the port functioning has hindered its operations.]
- Very close to harbour, especially container deliveries.

Although export performance is important for the future health of the industry, the significance of local market linkages should not be overlooked. Probably all of the CMR-based firms “grew up” serving local customers, enabling them to accumulate expertise and become competitive. Once this sort of expertise is established, firms are then in a position to grow further

<sup>6</sup> Recall that these include CMR-only firms, national head offices and international head offices.

through exporting from the region. The continued linkages to the local market and local suppliers may also keep them based in the region as their external markets grow. As noted in Figure 10, the local market is still important for the high exporting CMR firms though less so for the ones that have gone international.

What interviewees had to say about exports ...

The US is our biggest potential market. But for a product to be really acceptable and trusted there, it must say "Made in the USA". So to really expand our market there, the rights to products may have to move to the US. We might have a situation where the bulk of production occurs here, and then final assembly in the US.

"We've tried to get into the US, but it's extremely difficult to do it from here."

A major issue in exporting to the EU and the US are the safety standards and ratings. It's very costly in terms of additional paperwork and testing to meet all the requirements, especially if you have a large product range. Australia has also developed its own ratings. The SABS has some agreements with other countries, but these are not really of much assistance.

We're finding stiff competition from Asian exporters, particularly with currency collapses. Also, Asian markets have largely dried up.

You have to be close to your market. So for overseas markets, you need to identify a strategic partner. Either they come to you because they've seen your product and they like it – this is the best option – or you seek them out.

Niche markets are difficult to find, but once you're in you can make good margins.

South Africa is really lacking in managers and directors who have export capability and ability to explore and open new markets.

DTI support for exports, for example through exhibitions, has improved – one can see the difference from the previous government.

The DTI export support conference last year was extremely useful, particularly around overseas safety standards and ratings.

### **3.2.4 Local linkages**

An important indicator of the strength of a local cluster is the extent of its links with the local economy. Strong links locally may indicate a depth to the comparative advantage of the region. Firms that have grown up supplying high tech firms in the CMR will have accumulated knowledge and capacity in that field that enables them to supply a better product. This in turn may offer a competitive advantage to high tech firms in the CMR relative to high tech firms in other regions that do not have specialised suppliers. In the questionnaire, we attempted to explore firms' technology, specialist services and manufactured input linkages. In each case we seek to uncover the specific inputs used, where firms source these inputs from, and any problems they have with the local supplier base.

#### **a) Technology**

Firms were asked to list the technologies they use in their production process or in the provision of their service. Table 2 lists the common technologies cited by the respondents, by industry sub-sector.

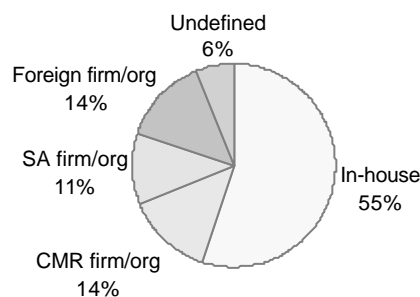
The list shows that there are common technological requirements across different sub-sectors. One obvious grouping is ICT services – application software and information system services. Both make use of programming tools, search engines, networking and the Internet. Engineering services overlap with ICT services to some extent through their use of CAD/CAM, Internet and engineering-specific software. A second obvious group is the communications equipment and electronics sub-sectors. Both require circuit board design and development, microprocessor development and software for specific electronic systems. The drugs and medicines sub-sector seems to stand alone with its biotechnology and chemical synthesis and analysis technology needs. The “other” high tech products category is, unsurprisingly, a bit of mixture, but with some similarities to other sub-sectors (e.g. CAD/CAM and electronic design). Finally, computing and office equipment firms seem to be users of IT applications, reflecting their position as distributors rather than manufacturers.

**Table 2: Technology requirements by sub-sector**

Sub-sector	Technologies
Communications equipment	Electronic design; mechanical design; microprocessor development; new materials components; software systems; circuit board testers
Computing & office equipment	IT applications (databases, operating systems, etc); laser technologies; fibre optic splicing
Electronics	Printed circuit board (PCB) manufacture and design; microprocessor development; microwave; image processing; artificial intelligence; GIS; software development
Drugs & medicines	Biotechnology; chemical synthesis and analysis
Other high tech products	CAD/CAM; new materials; metallurgy; electronic design
Information system services	GIS; artificial intelligence; electronic messaging; Internet; search engines; programming tools; high speed communications; CAD/CAM; networking
Application software	Search engines; LANs; Internet; microprocessors; compilers
Engineering services	CAD; GIS; engineering software; human machine interface (HMI); Internet

An analysis of where firms source their technology requirements (see Figure 11) shows that in-house development is the dominant source, accounting for 55% of requirements. Only 14% of the technology needs of respondents are provided by other CMR firms of institutions, with roughly the same proportion of needs being satisfied by firms or institutions in the rest of South Africa and abroad.

**Figure 11: Suppliers of technology requirements**



Interpretation of this result is not easy because of the various ways in which firms may have interpreted the question. For instance, it is highly possible that when branches of national and international branches said their technology requirements are fulfilled in-house, they meant by the head office, and not by the CMR branch itself. Service firms will most likely interpret the

question as in-house supply of technical expertise in the process of customising off-the-shelf technology for a client – can we consider this in-house technology development? Even if manufacturing firms are supplying some of their own technology needs, it is not clear what level of technological development is involved. Adapting existing technologies is quite different from doing cutting-edge research into new technologies.

Considering these problems with interpretation, it is difficult to reach firm conclusions about the supply of technology to CMR high tech firms. Based on the interviews conducted, it is clear that there is some depth of technological capacity in the region, with a number of firms engaged in cutting edge development of products and services. However, our impression is that this is the exception rather than the norm, with the majority of firms relying on technologies developed elsewhere. Of course, it is certainly not a bad thing for CMR firms to source technologies from outside the region, enabling them to keep up with developments in more advanced regions nationally and internationally.

Another indicator of the extent of local technology linkages is the incidence of joint initiatives with primary technology developers such as universities, technikons and science councils. Such initiatives may have longer-term technology development goals with less focus on direct short-term application. They may also indicate a sharing of costly scientific equipment or an attempt to direct the development of specialised skills to satisfy future labour needs (e.g. through the provision of bursaries for PhD students in specific technologies).

Thirty-eight percent of respondents have engaged in some collaboration with such research organisations, and most of these firms have collaborated with more than one institution. The institutions cited most frequently by respondents are the University of Cape Town (mentioned by 50% of the respondents engaged in collaborative initiatives), University of Stellenbosch (50%) and Cape Technikon (40%). Peninsula Technikon and the CSIR were mentioned by between 10% and 15% of those respondents that are involved in collaborative work, while the University of the Western Cape did not feature at all.

The questionnaire asked firms whether they experience problems with technology suppliers. However, this question was badly answered with most respondents focusing on the suppliers of technology components rather than R&D services. The answers were still interesting, with 35% of the respondents reporting problems with the supplier base. The most frequently cited problem was low stock holdings causing untimely deliveries. Cost did not seem to be a major issue though the quality and competency of the suppliers did seem to be problematic in many instances.

The limited use by respondents of CMR firms or institutions for technology needs, combined with the perception of numerous problems with suppliers, gives the impression that local technology suppliers do not necessarily constitute an advantage for high tech firms located in the CMR. This impression is supported by the responses to a question on whether proximity to local technology suppliers was an important positive factor in the decision to locate in the CMR – only 13% of respondents said yes. However, the fact that over a third of respondents have engaged in collaborative initiatives with local institutions such as universities suggests that there is potential to build these linkages further and to improve the local supply base of new technologies.

### ***b) Specialist service inputs***

In a metropolitan area as large as the CMR there will almost certainly be a rich supply of standard business services (e.g. accounting, marketing, legal services) of adequate quality. However, high tech firms often make use of very specialised services (e.g. venture capitalists, video conferencing, and broadband communications) that may not be required by other firms and so may not be present in sufficient quantity and quality in the CMR. The questionnaire attempted to ascertain what these needs are and whether they are being supplied adequately in the CMR.

The needs respondents were fairly consistent, with seven main specialist services being cited often. These were, in order of importance:

- highly specialised consultants and personnel (most frequently cited were web developers, systems integrators and outsourcers);
- Internet;
- high-speed broadband communications;
- venture capitalists;
- professional trainers;
- international marketing (including regulatory issues in foreign markets);
- video conferencing.

Of these specialist services, respondents report that those that are limited or missing in the CMR are highly specialised consultants and personnel, venture capitalists, professional trainers and international marketing firms. Greater bandwidth was also a common request in order to enhance online development.

About a third of respondents reported problems with the local specialist service suppliers that do exist. The quality and reliability of service was cited as a frequent problem along with cost and a lack of experience. One respondent noted that excessive movement of staff and the rapid creation and destruction of service firms mean that there is considerable uncertainty in supply.

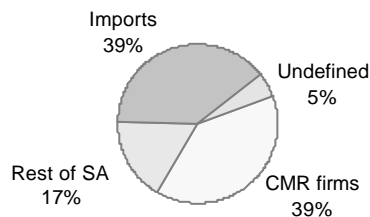
Overall, it seems that specialist service provision in the CMR is limited, and is not a significant factor encouraging high tech firms to locate in the CMR. It may be that specialist services become more important for firms as they attempt new activities, such as substantial exporting. In this case, the lack of these services may act as a real hindrance to the growth of firms.

### c) *Manufactured inputs*

Thirty-nine percent of the manufactured inputs used by respondents are purchased from suppliers (see Figure 12). This may be an over-representation of the proportion of manufactured inputs *produced* in the CMR, as some of the CMR suppliers may simply be distributors of products manufactured elsewhere.

The other major source of inputs is imports from abroad. This is unsurprising as South Africa as a whole has a significant trade deficit in high tech products suggesting a comparative disadvantage in their production. Purchases of manufactured inputs from the rest of SA are limited, at 17%.

**Figure 12: Suppliers of manufactured inputs**



It is not clear whether respondents are happy with the situation in which a large proportion of their manufactured inputs are sourced from outside the CMR, or whether they would much rather source the inputs locally, except that they are not available from CMR suppliers. What is clear is that almost half of the respondents are unimpressed with local suppliers of manufactured inputs, with 43% reporting problems with these suppliers. This was much higher than for technology or specialised service suppliers. The most frequently cited problem was lack of on-

time delivery, with poor quality and high cost also getting many votes. Many respondents did say that this is not specific to the CMR but is a general problem in South Africa.

What interviewees had to say about manufactured inputs ...

We've tried where possible to use local suppliers. They usually do fine until the bigger volume jobs come through – then quality goes right down. This is a major factor affecting our competitiveness. We need to improve logistics in the supply chains.

It's not easy to outsource production because of quality standards. In general there are poor attitudes to standards among South African producers, and quality consciousness is low. This is the biggest hassle with subcontracting.

We'll probably look at using more imported components, as they're more cost effective.

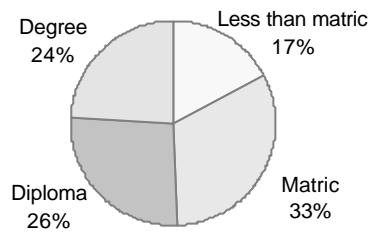
Overall, it appears that although the local supplier base is used, it offers no particular advantages to the high tech firms in the region and may in fact hinder operations somewhat. This is reflected in the answer to the question about whether the local manufacturer supplier base positively influenced the firm's decision to locate in the CMR – only 6% of respondents said "yes".

### 3.2.5 Personnel

High tech industries are noted for their use of large numbers of highly skilled workers. In an international study of high tech clusters, the availability of skilled workers was considered the number one locational decision variable for firms locating in mature high tech clusters (Zieminski & Warda 1997).

The questionnaire attempted to get an idea of the skill levels being used by high tech firms in the CMR. Figure 13 shows that 50% of the employees of the respondents have some tertiary training – 24% have a university degree and 26% have a diploma from a technikon or private institution. Matriculants make up a third of employees, while employees with less than a matric accounted for the remaining 17%. Such extensive use of skilled people means that if the high tech cluster in the CMR is to grow there needs to be a steady stream of skilled entrants into the regional labour market.

**Figure 13: Education levels of employees**



The questionnaire also asked firms what types of skills they currently use most, and what skills they would need if they were to expand. The replies were not very specific which makes the results somewhat predictable. The results by industry sub-sector are shown in Table 3.

The most common skills required by high tech firms are electronics/electrical engineering and IT skills (programmers, application specialists, designers and technicians). Unsurprisingly these same skills are required for expansion, along with sales and management skills. The latter are just as important for developing expansion opportunities as the technical skills are to provide increased capacity. Other skills requirements that emerge from the list are a various types of engineers for “other” high tech products and engineering services firms, and chemical-related professions for the drugs and medicines firms.

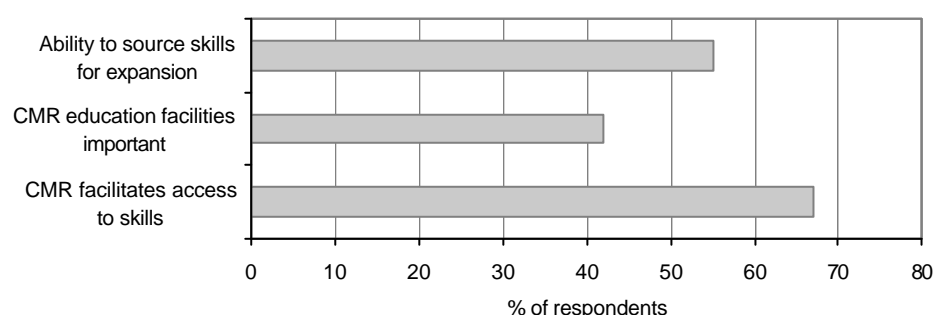
Firms were asked whether their location in the CMR facilitates access to skilled personnel, and whether the existence of good education and training institutions was important in the decision to locate in the CMR. With an eye to the immediate future, the questionnaire also asked whether firms were confident that they could source the skills necessary for expansion locally.

**Table 3: Skills needs by sub-sector**

Sub-sector	Skills most used	Required for expansion
Communications equipment	Electrical engineers, computer scientists	Engineering (software, production, process, electronic), sales, technical support
Computing & office equipment	Sales, IT technicians	Sales, technicians
Electronics	Electrical engineers, electronic design	Electronic engineers, IT programmers, application software support consultants, sales
Drugs & medicines	Biochemical, chemists and chemical engineers	IT skills plus chemists etc
Other high tech products	Electrical, mechanical engineering, artisans, marketing, technicians	Engineers, technicians, machine setters, sales, management
Information system services	IT skills, design skills, marketing, programming, project managers	Management, programmers, marketing
Application software	Programmers, software engineers, computer scientists	Quality programmers, software application consultants, sales
Engineering services	Engineers – mechanical, electrical, civil	Engineers, service technicians and managers

The answers to this set of questions were more positive than those to the questions on suppliers of technology, manufactured inputs and specialist services, suggesting that skilled labour access is where one of the CMR's comparative advantages lies. Figure 14 shows that 67% of respondents feel that their location in the CMR facilitates access to skilled labour. Forty-two percent said that the CMR's education facilities were a factor in their location decision (although in some cases this was a long time ago), and 55% of respondents said they would be able to source locally the skills they require for expansion (although in some cases with difficulty, or with additional in-house training needed – only 43% of respondents gave an unqualified “yes”).

Six percent of respondents mentioned that although access to skilled labour was not a reason for moving to the CMR, it has become a reason for staying as they are able to source skills locally.

**Figure 14: Education facilities and access to skills**

The picture is not all positive. Although 55% of respondents feel they can source skills required for expansion, they caution of growing shortages. Also, the basis for optimism amongst a few firms is their belief that they can attract people from elsewhere in South Africa or from overseas. The particular skills that firms feel are becoming increasingly scarce are engineers and quality IT people with specialised skills (e.g. web developers).

This not-so-positive picture was confirmed by every firm that we interviewed. According to these firms, there are growing skill shortages in the CMR, particularly of computer scientists and engineers. This means that when firms advertise for staff, they get far fewer applicants than they would have, say, four years ago, and often end up having to employ someone who is a less than



ideal candidate. The problem, according to interviewees, is not that the CMR is not producing good graduates in these fields, it is that new entrants tend to leave the CMR to go and work elsewhere, either overseas or in Gauteng. One interviewee cited anecdotal evidence that of a recent class of 40 UCT computer science graduates, only three remained in the CMR. The attraction of working overseas is the extremely high salaries compared to those that are available in South Africa, and presumably the attraction of Gauteng is that there are more opportunities available (given that there is a much larger number of high tech firms) as well as somewhat higher salaries. We return to this issue in the discussion of quality of life in Section 3.2.7.

Overall, although access to skilled employees has traditionally been an advantage associated with locating in the CMR, especially for high tech firms, it seems that this advantage is in danger of being eroded. This is certainly cause for concern given the extent to which high tech firms rely on highly skilled employees. It is addressed further in Section 4.

What interviewees had to say about skills ...

“It’s becoming more and more difficult to find the right guys.”

The universities here *are* producing the right people. Rather employ someone with a degree from Stellenbosch than someone with a degree from a US university. A South African education provides better fundamentals – a good basic education. The US guys can market, but they aren’t good on the fundamentals.

Graduates in South Africa are good – on average better in the fundamentals than a similar group from the US or the UK.

In previous years we could pick the best guys; now it’s more difficult. We’re having to employ people now who wouldn’t have stood a chance three years ago.

For web development, you need a combination of technical skills, business skills, and design skills. It’s this combination that’s extremely difficult to find.

South Africa lacks marketing and finance expertise, and internationalism. But we’ve got good guys, and we’re starting to learn some of what’s needed.

*One interviewee gave the following historical perspective, which suggests that in one unexpected way the skills shortage may actually have benefited South African IT companies:*

The South African computer industry was a closed shop till the elections – it developed behind sanction walls. When South Africa opened up, a lot of computer companies started coming in from overseas and vying for big projects. But they hit a skills shortage very soon. They thought they could just come in and buy the skills they needed and set up, but they hit the skills shortage. So the first wave of new foreign companies was blocked, in terms of the inroads they could make into the market, by practicalities. This gave South African companies the space to respond – they acted quickly and globalised. All the big players are expanding overseas, for example by developing links with overseas companies.

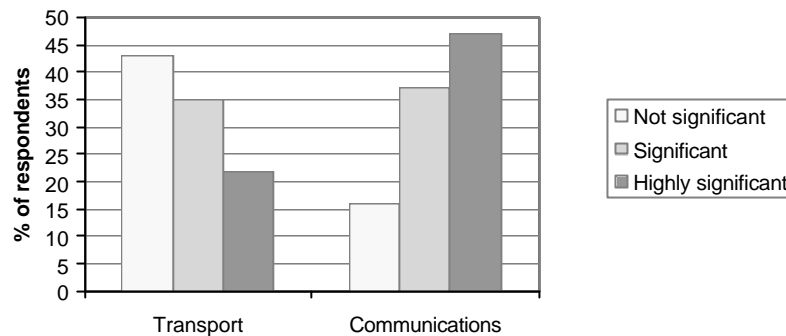
### **3.2.6 Transport and communication**

The literature on high tech clusters tends to make a strong argument around the role of infrastructure in the development of a cluster. The focus is generally on communications infrastructure, with the argument made that far more sophisticated communications infrastructure is required by high tech firms. In terms of transport infrastructure, it is often argued that air transport (passenger and freight) is the most important form of transport for high tech firms as it facilitates the rapid movement of people and high value goods (high tech products are often low weight/high value so are usually air freighted rather than transported by sea, road or rail).

The questionnaire asked firms how significant their transport and electronic communications costs are, and then whether their location in the CMR results in significantly higher or lower costs than those facing competitors in the rest of South Africa or abroad. Firms were also asked whether the existing telecommunications infrastructure in the CMR is adequate for their needs.

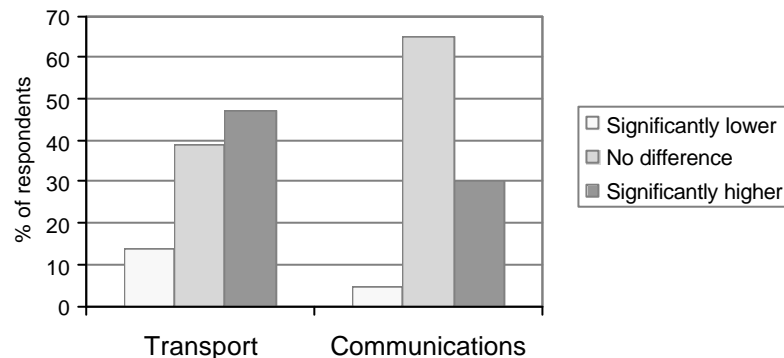
Figure 15 shows that while less than a quarter of respondents rated transport costs as a highly significant cost item, almost half the respondents rated electronic communication costs as highly significant.

**Figure 15: Significance of transport and communication costs**



A comparison of the perceptions of respondents of their transport and communication costs relative to those faced by competitors in the rest of South Africa and abroad (Figure 16) shows some predictable results. Few respondents feel they face lower costs than competitors from elsewhere, and those that do are all focused on the local CMR market. A large proportion feel that they face higher transport or communication costs, or both.

**Figure 16: Transport and communication costs in the CMR compared to elsewhere**



For transport, the impression is not that the services themselves are overpriced, but that higher costs are incurred as a result of distance from the main markets, thus disadvantaging these firms relative to firms located nearer those markets. For communications, this is also the case to some extent, with several firms mentioning the high cost of national phone calls, but it also seems that firms are disadvantaged relative to foreign firms because South African communication services are more expensive. The uniformity of communication service pricing throughout South Africa means that many firms saw no difference in costs to their competitors in the rest of the country.

Sixty-four percent of respondents said that the existing communications infrastructure in the CMR is adequate for their needs, with the remaining 36% complaining about the available bandwidth (affecting speed of Internet access and data transfer), the quality and reliability of service, and the range of services available. A number of these unsatisfied respondents concede that they can do business with what is currently available, but say that their performance would be enhanced if better communications infrastructure and services were in place.

Firms were not asked about the adequacy of the transport infrastructure and services. However, a number of general concerns were expressed about the infrastructure in the CMR. A number of firms that deal with the port feel that it is a good deep sea port but does not function well at all times. Thirteen percent of respondents have concerns about the road infrastructure in the CMR, citing congestion as a growing problem. From interviews, firms felt the airport and airfreight services were efficient though relatively costly.

Overall, it seems that the infrastructure in the CMR has been adequate thus far. However, as firms and the local economy grow, this infrastructure is becoming less adequate. As it stands, there appears not much in the local infrastructure that actively attracts firms to the region or gives local firms a significant advantage, with the possible exception of the seaport, although this is used by only a small percentage of high tech firms. On the other hand, it seems that there is not a sufficient lack of infrastructure to *discourage* firms from locating in the CMR or to prevent CMR firms from competing successfully. Of particular importance is the fact that the CMR has a well functioning airport, which has numerous direct flights to the rest of South Africa, the Southern African region, Europe and the United States. The lack of such an air transport hub would be a severe disadvantage to the CMR.

### **3.2.7 Other locational factors**

A number of factors which impact on the location decision of high tech firms have been discussed in some detail in the preceding sections: local linkages (with suppliers of technology, specialist services, and manufactured inputs), availability of skilled labour, and the quality and price of transport and communications services.

In an attempt to capture other potential reasons that high tech firms might have for locating in the CMR, the questionnaire also contained a checklist of “other locational factors” and a space for firms to add any further factors that they felt to be important in their location decision. The suggested “other” factors were:

- government incentive schemes;
- presence in the CMR of companies in the same industry;
- diverse industrial base in the CMR;
- overall quality of life in the CMR.

Respondents could choose more than one factor. The results of this question are as follows. (Bear in mind that some respondents may have interpreted this question as “what keeps them in the CMR” rather than strictly “what made them establish in the CMR in the first place”.)

No respondents said that government incentive schemes were a factor in their location decision. This is not surprising, since the CMR has seldom been targeted in spatially differentiated incentive schemes. However, under the 1991-1995 Regional Industrial Development Programme, limited financial incentives were available to new or expanding manufacturing firms in the CMR – these were evidently not taken advantage of by those respondents who are manufacturers.

Fourteen percent of respondents cited “presence of companies in the same industry” as a factor in their location decision, while 10% cited “diverse industrial base”. The inclusion of these factors in the list was an attempt to identify whether agglomeration economies are at work in the CMR. Agglomeration economies within the high tech sector do not seem to play a large role at this stage. Also, most of the respondents who did cite “companies in the same industry” are firms focused primarily on the CMR market, so they could be seen as firms fighting for market share and therefore setting up in a location where competitors have also established. Although agglomeration economies of a more general type were not seen as important by most respondents, it seems likely that the CMR’s diverse industrial base would have played an indirect role in the firms’ location decision, since a diverse industrial base helps to ensure relatively high levels of business services, transport and communications infrastructure and so on.

“Overall quality of life in the CMR” was chosen by 51% of firms. This is worth discussing, since quality of life is often identified as an advantage that the CMR has, particularly over other metropolitan areas in South Africa. We would like to make two points about quality of life as a factor in the location decisions of firms. First, **quality of life is an elusive concept** that means different things to different people. For some people quality of life might mean living in a small town in the middle of nowhere; for others it might mean living in a vibrant city centre with plenty of social and entertainment options. But setting that aside, and working from the starting point that the CMR has some broad set of features that confers on its residents “quality of life”, it seems that this has played a role in the location of firms in the CMR. The second point is that, while it may well be the case that quality of life plays a role in the location decisions of a substantial proportion of firms, **it is unlikely to be the primary factor** in such decisions. (Bear in mind that Gauteng is by far the country’s largest high tech centre). *In the first instance*, firms are attracted to a location by factors such as the existence of a market for their product, suppliers of inputs in their production process, or excellent infrastructure that they need in order to function. Quality of life might be a reinforcing factor.

Having said this, there is one important way in which quality of life may have a material impact on the functioning of high tech firms. We have already seen that high tech firms depend strongly on highly skilled personnel. These people are, because of their skills, likely to be mobile (not just nationally but internationally) and are thus able to exercise substantial choice over their living and working environments. If quality of life plays a large role in these choices, and if the CMR offers the sort of quality of life that these people are looking for, then high tech firms in the CMR may have a real advantage when it comes to attracting and retaining skilled staff. Recall that in an international study of high tech clusters, the availability of skilled workers was considered the number one locational decision variable for firms locating in mature high tech clusters (Zieminski & Warda 1997). This study also found that quality of life was also an important variable, but is correlated with access to skilled labour.

This would be a basis for optimism about the CMR’s high tech industries, except that, as discussed in Section 3.2.5, all the firms interviewed complained of growing skill shortages in the CMR. This was put down to the fact that skilled people would rather work overseas or in Gauteng, where there are more work opportunities and higher salaries, than in the CMR. So clearly the CMR’s quality of life is proving an insufficient basis on which to maintain the region’s advantage in the supply of skilled labour.

A few interviewees said that although their firm could be doing much better, or they could be earning 50% more, if they moved to Gauteng, they chose to stay in the CMR because of personal ties to the region or because of a lifestyle choice. While this is significant, it does not provide a strong positive basis on which to attract firms to the CMR. It means that particular people are prepared to earn less in return for living in the CMR. There is a clear cost involved in their choice; a cost that many other people may not feel to be justified.

So, while quality of life might be a valuable “reinforcing factor” in firms’ location decisions, on its own it is neither a necessary nor a sufficient condition for attracting and retaining high tech firms or the skilled labour they rely on.

The other location factors that respondents added to the four that were suggested in the questionnaire are worth listing. In no particular order, they are:

- Customer driven – large insurance head offices, oil companies, retail industry.
- Took over an existing concern.
- All members were resident in the CMR at the time of formation.
- I live here!
- Western Cape is a significant proportion of the medical industry, as well as being a major training centre of medical personnel.
- The founder member was Prof at US, therefore we settled close to universities.
- Proximity to fishing industry 90% of reason.
- 99% factor: my customer is navy in Simonstown.

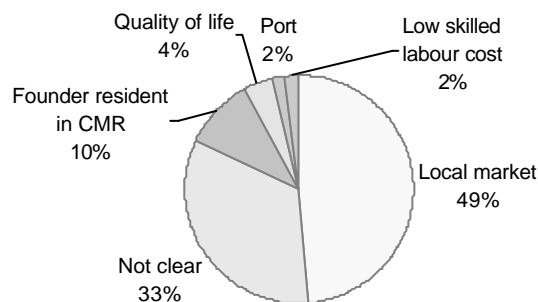
- The potential for Cape Town as an internationally marketable city.
- Availability of skilled resources.
- Firm established in Cape Town and grew from there. Offices established in strategic locations (Gauteng, Port Elizabeth, Bloemfontein, Pietermaritzburg).
- Client location (SA Navy).
- Location so long ago – difficult to tell.
- We needed to have a presence in Cape Town – it represents 15-20% of our national market.
- 1971 was too long ago to have been influenced by any of these factors.
- Long time ago. 1963. Textile industry skills and attractive location and port.
- UCT.
- We opened a branch purely to better serve and support the local market. All our manufacturing facilities are in Gauteng.
- Cape is a better place to live, even in 1973.
- Our location here was simply a case of being in the right place at the right time. There were no other options to consider.
- Important to cover main metropolitan areas in SA.
- Support customers on national basis.

### 3.2.8 Primary reason for CMR location

We felt it would be useful to try to identify for each respondent the primary reason for the firm's location in the CMR. Based on a thorough examination of each respondent's questionnaire as a whole, an attempt was made to identify a reason that stood out as the single most important reason for that firm's location in the CMR. In some cases this was an easy task, with an explicit primary reason given by the respondent (such as in some of the comments above). In other cases a primary reason had to be inferred. In some cases no particular reason stood out. Figure 17 shows the result of this analysis.

For almost half the respondents, the primary reason for the firm's location in the CMR is the local (i.e. CMR) market. In a few cases, the local market in question is a highly specialised one, for example the fishing industry or the navy. In another few cases the local market was the initial reason for the firm's location in the CMR, but the firm has subsequently expanded beyond the local market. In several cases the local market consists of other CMR firms, for example large corporate head offices. This is an important point, to which we will return in Section 4.

**Figure 17: An assessment of respondents' primary reason for locating in the CMR**



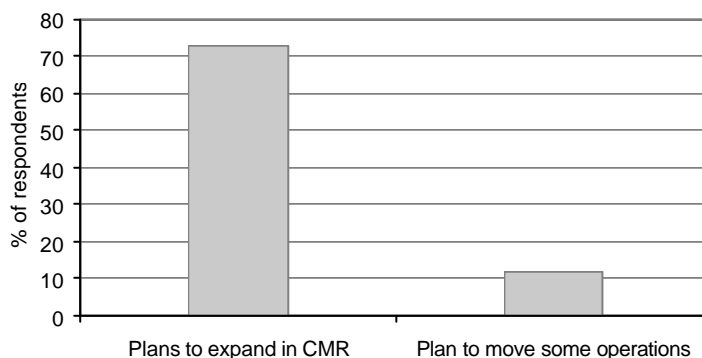
The third of respondents for whom no clear reason stood out included those for whom the reason has been obscured through time. Interestingly, 26% out of the 33% are CMR-based firms (including 14% national or international firms head-officed in the CMR, and 12% with operations in the CMR only). It is likely that in many of these cases a strong reason for the firm's location was that the entrepreneur who founded the firm happened to live in the CMR. So although only 10% of respondents actually said that their main reason for locating in the CMR was that the entrepreneur who founded the firm lives here, this is likely to be an under-representation of the significance of this reason.

### 3.2.9 Future plans

The bulk of the questionnaire was aimed at finding out which high tech firms are in the CMR, why they chose to locate in the CMR, what linkages they have with the local economy, and how they perceive various characteristics of the local economic environment. This tells us a lot about where the firms are at but not really about where they are going. We felt it was important to understand whether firms have plans to expand operations in the CMR, whether they see no basis for growth, or whether they are even considering moving away from the CMR.

A positive indication for the state of the high tech sector in the CMR is that 73% of respondents have plans to expand operations in the region, involving employing additional staff and/or increasing production capacity (see Figure 18). Twelve percent of firms are considering moving some operations from the CMR. The most common reason given was to have operations closer to the Gauteng market. However, none of these firms is considering abandoning its CMR base, and in fact all but one is planning to expand its CMR base in addition to setting up an operation in Gauteng.

Figure 18: Future plans



It is encouraging that firms do not see any immediate constraints to continued growth in the CMR. However, as discussed in other sections of this report, respondents did raise various concerns in other parts of the questionnaire, and so constraints may emerge in the longer term if these concerns are not clearly identified and acted on.

What interviewees had to say about current trends and future plans ...

Do you foresee growth? Absolutely. This is an industry that's growing at a fast rate, so just maintaining our share in the industry involves growth. But that doesn't happen by itself. There's more competition—mostly international, but also from local people representing overseas suppliers.

There's a decline in a lot of the smaller manufacturing firms who just can't compete with imported products. Recently there've been a number of mergers, which seem to be significant – moving towards a linked supply chain philosophy.

The Internet and web development industry is extremely young, and very fast changing – it's in flux. Particularly in the last twelve months there's been a lot of rationalisation, which has generally involved the more established web companies being bought out by an advertising company or a technology company. The boundaries of the industry are blurred.

In the IT industry there are lots of small operators, consultants, highly networked CCs, who fit into the cracks – a lot of alliances happen between these people.

You're trying to do a study of an industry that's changing very fast. Right now it's not easy to get a handle on exactly what is happening – things are in flux.

Cape Town is a “creative centre” – this might be, or become, a reason for people to come here.

We have resisted pressure to move to Joburg, but could be doing much better there. If you can find a niche market you're fine in Cape Town. But if you're starting up as an entrepreneur, Cape Town is still small.

There're many people investing in South Africa, but you don't hear about it – one only hears about the bad things.

All the big players are expanding overseas. How? By buying overseas companies. South African companies are responding well to the challenge of globalisation.

The trend in big corporates is towards keeping their core IT services in-house and outsourcing the rest.

### **3.2.10 Ways to encourage growth**

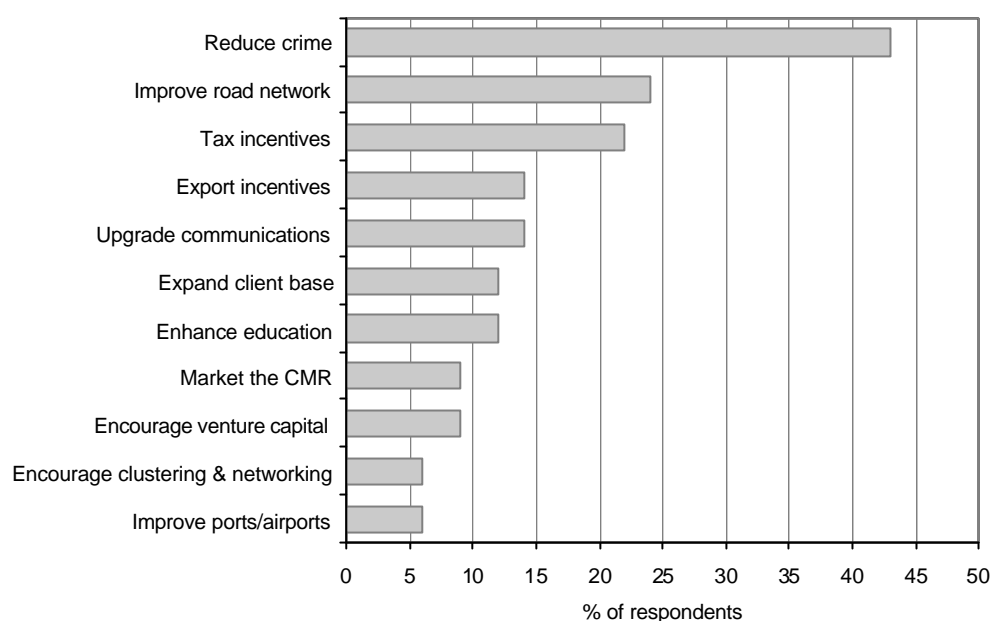
The final part of the questionnaire asked firms to identify factors which would encourage them to stay and expand in the CMR, and to suggest ways in which local and/or metropolitan and/or provincial government might contribute to the expansion of existing high tech firms and the establishment of new high tech firms in the CMR. The responses to these two questions have been combined, since they overlapped substantially, and then grouped into common themes. These are presented in Figure 19. It is evident from the responses that many respondents do not distinguish clearly between the powers and functions of different tiers of government, which is somewhat disappointing.

The most common theme was the need to **reduce crime levels**. Although this should certainly not be taken lightly, similar responses would probably be received from almost all firms (high tech and other) in any of the country's major centres. A high crime level does of course impact on quality of life, so to the extent that quality of life is more important for high tech firms, reducing crime might also be more important.

The next most important themes, mentioned by 24% and 22% of respondents respectively, were improvements to the transport network in the CMR (in most cases referring to road transport by privately-owned car although with three mentions of public transport), and the introduction of tax incentives.

**Congestion on CMR roads** seems to be impacting negatively on the ease with which respondents and their employees are able to travel to and from work and conduct business. While respondents might feel that the solution is to upgrade and expand the road network, there are complex metropolitan transport planning issues at stake here, not least of which is how to improve public transport options in a metropolitan region characterised by low density urban sprawl. There is no easy answer to this problem.

**Figure 19: Respondents' suggestions of ways to encourage growth**



The request for **tax incentives** was frequent and predictable. It is also something that falls outside the ambit of local and provincial government. The national Department of Trade and Industry does have a Tax Holiday Scheme under which limited tax incentives are available to new firms in certain sectors; however, the scheme is due to come to an end in October 1999.

The next most important themes, cited by between 12% and 14% of respondents, were upgrading of communications infrastructure and services, enhancement of education and skill levels, expanding the client base, and government incentives for export activity.

The importance of **telecommunications infrastructure and services** for high tech firms has already been discussed at some length, as has the importance of **education** and availability of **skilled labour**. Respondents who called for **expanding the client base** mentioned in particular the need to attract corporate head offices, which are currently a driving force in much of the ICT work in the CMR. All three of these issues are picked up in Section 4.

A number of the respondents who called for export incentives specifically mentioned the development of an **export processing zone (EPZ)**. There has been an extensive debate about the desirability or otherwise of EPZs in South Africa over the course of the last decade, and the notion has been largely rejected. The national Department of Trade and Industry is currently investigating the establishment of so-called Industrial Development Zones (IDZs), adjacent to particular ports and airports throughout the country. IDZs would provide some of the incentives traditionally associated with EPZs, such as a duty-free environment for exporting firms, but would not incorporate other common features of EPZs, such as exemption from labour legislation and exceptionally generous tax holidays. As far as the authors know, Saldanha Bay is the only location in the Western Cape that has been earmarked for an IDZ. IDZs as currently conceptualised would be aimed at greenfield investments, and existing firms would not have the option of relocating to an IDZ.

Other suggestions worth noting were calls for the improvement in the **port and airport** to facilitate access to and from the CMR for both goods and people; the need for **venture capitalists** in the CMR and greater access to finance more generally; calls for local/metropolitan government to **support cluster initiatives** such as the Cape IT Initiative and to facilitate person to person **networking opportunities**, and finally to **market the CMR**. Respondents were not explicit about the purpose of marketing the CMR, but it could be to attract other firms to the



region to boost the client base or to create a positive image for the region that high tech firms can use to enhance their own image.

### **3.3 Results broken down by firm characteristics**

Section 3.2 focused on the overall results from the questionnaire, without breaking them down by different firm characteristics. This section takes the analysis further, by looking at how firms' responses differed according to:

- the high tech sub-sector in which they operate;
- their size;
- the type of firm (CMR-based, national branch or international branch);
- the location of their customers.

#### ***3.3.1 The influence of industry sub-sector***

Table 4 shows the results broken down by industry sub-sector. The large number of sub-sectors used means that each sub-sector is represented by relatively few respondents. This in turn means that the results may not be a true representation of the characteristics of the different sub-sectors. Caution should be used in interpreting these results, and industry knowledge will no doubt help to make sense of them.

An analysis of firm size by sub-sector reveals that small firms (up to 20 employees) dominate in electronics, information system services and application software. These sub-sectors do not require large set-up costs and trade on the knowledge of skilled workers. In contrast, the computing and office equipment, and drugs and medicines sub-sectors are dominated by large firms as they involve huge set-up costs and are subject to large economies of scale.

Table 4: Results by industry sub-sector

	Communications equipment	Computing & office equipment	Electronics	Drugs & medicines	Other high tech products	Information system services	Application software	Engineering services
Number of respondents	6	6	8	2	8	9	5	7
<b>Characteristics</b>								
% small firms	33%	17%	50%	0%	25%	67%	80%	28%
% CMR-based firms	67%	33%	88%	0%	75%	33%	40%	57%
% formed in 1990s	33%	33%	13%	0%	0%	88%	60%	29%
<b>Local Linkages</b>								
CMR provision of technology	9%	0%	18%	5%	21%	31%	0%	4%
Involvement in joint initiatives	40%	33%	50%	100%	14%	38%	25%	28%
CMR provision of manuf. inputs	43%	26%	53%	37%	21%	47%	35%	34%
<b>Customers</b>								
Exports from W. Cape	71%	12%	56%	95%	47%	35%	28%	26%
<b>Personnel</b>								
Employees with tertiary education	56%	41%	47%	31%	29%	72%	63%	54%
<b>Infrastructure</b>								
Significance of transport costs	2	1.8	2	1	2.1	1.8	1	1.7
Significance of communication cost	2	2.4	2.1	2.5	2.4	2.6	2.6	1.9
<b>Locational Factors</b>								
Technology suppliers	17%	17%	13%	50%	13%	0%	0%	0%
Manuf. input suppliers	0%	17%	13%	0%	13%	0%	0%	0%
Educational facilities	67%	17%	38%	50%	38%	11%	0%	43%
Firms in same industry	17%	33%	13%	0%	13%	0%	20%	14%
Diverse industrial base	0%	0%	25%	0%	0%	11%	0%	29%
Quality of life	67%	17%	63%	100%	63%	44%	20%	57%
Local mkt assessed as primary location reason	17%	100%	25%	0%	50%	44%	60%	71%

The extent to which a sub-sector is dominated by CMR-based firms tells us something about the depth of local capacity in that field. A high proportion of CMR-based firms suggests a depth of capacity, since local firms are emerging to compete with firms from outside the region and find opportunities in their sub-sector. The sub-sectors that perform best by this measure are communications, electronics and “other” high tech products industries. Other sub-sectors in which a third or more of respondents are CMR-based, are the three service sub-sectors.

The analysis of local linkages tells us much about which sub-sectors are firmly embedded in the local economy. Three sub-sectors stand out as having strong local linkages – electronics, communications equipment, and information system services. Respondents in each of these sub-sectors use local technology providers to a significant degree, are involved in joint initiatives with local institutions (such as universities), and source a high proportion of their manufactured inputs locally. (The drugs and medicines sub-sector also shows strong local linkages but it is hard to say much on the basis of responses from only two firms).

Export levels are an indicator of competitiveness, and, in the case of national or international firms, of the extent to which the CMR is used as a production base. The major exporters of high tech products, with more than half their customers located outside the Western Cape, are the drugs and medicines, communications and electronics sub-sectors. “Other” high tech products are also performing well with 47% being exported out of the Western Cape.

Of the service sub-sectors, information systems services reveal the greatest strength with just over a third of its services being sold nationally. In general, services are less easily traded over distance and often require physical presence in the location of the customer or client. So a lower average export level should be expected for service firms compared to manufacturing firms. Also, the information system services and application software sub-sectors have a much higher proportion of young firms than the other sub-sectors. As discussed elsewhere, firms tend to “grow into” exporting.

We have seen that there is increasing concern about skills shortages in the CMR, in fields which have traditionally been well supplied in the region. If particular sub-sectors rely more heavily than others do on skilled personnel, a skills bottleneck could render attempts to promote their growth useless. The sub-sectors, which display the most intense use of personnel with tertiary training, are information system services and application software development. The relatively small proportion of administration and the absence of manufacturing-type production in these sub-sectors mean they provide less scope for less skilled workers. Other high users of tertiary skills are the communications equipment, engineering services and electronics sub-sectors.

The significance for firms of transport and communications costs (rated on a scale of 1 to 3, with 3 highly significant) is predictable, with transport costs being less important than communications costs for all sub-sectors. The sub-sectors for which communications costs are most significant are the ICT sub-sectors along with drugs and medicines and “other” high tech products.

The analysis of locational factors influencing each sector tells us something about the needs of each sector as well as its stage of development locally. Computing & office equipment and application software are both in the CMR predominantly for the local market. Many of these firms said that ‘firms in the same industry’ was a factor in their location decision. This most likely reflects competition for market share rather than seeking any positive spin-offs from an agglomeration of firms.

The local market is also important for the other service firms, which makes sense given the generally low tradability of services mentioned earlier. Quality of life and educational facilities, both related to access to skilled labour, are also rated highly by these firms. This suggests that the CMR is important as a source of skilled labour and not just as a market. Access to labour comes out as a strong factor for the remaining sub-sectors that are not in the CMR simply for the local market. A few of the firms said that the existence in the CMR of suppliers of technology or

manufactured inputs was a factor in their location decision, suggesting some depth to the cluster in the CMR.

### 3.3.2 The influence of firm size

An important reason for doing an analysis by firm size is that many regional development strategies focus on SMEs. There is often perceived to be some form of market failure among this category of firms, and it is also commonly acknowledged that a high “birth rate” of start-up firms in a sector is a good sign. The problems faced by SMEs in general are likely to overlap with those of start-ups.

The results from the questionnaire broken down by firm size appear in Table 5. Firms with 20 or fewer employees were classified as small, those with 21 to 100 employees as medium, and those with more than 100 employees as large. The firm size categories contain larger numbers of respondents than the industry sub-sector categories, so the analysis is probably more reliable. However, it could still be subject to slight distortion by other characteristics, which may be more concentrated in one firm size category than another.

As might be expected, firms with operations in the CMR only (i.e. not national or international firms) make up a greater proportion of the small firms than the medium or large. However, a number of small and medium CMR firms have a presence nationally, and even internationally in the case of one of the medium firms. Eighty percent of the large high tech firms in the CMR are branches of national or international companies.

**Table 5: Results by firm size**

	Small	Medium	Large
Number of respondents	20	16	15
<b>Characteristics</b>			
% of CMR-only firms	45%	38%	20%
% of CMR-based firms	60%	56%	47%
% formed in 1990s	55%	33%	7%
<b>Local Linkages</b>			
CMR provision of technology	23%	14%	4%
Involvement in joint initiatives	29%	31%	100%
CMR provision of manuf. inputs	51%	31%	28%
<b>Customers</b>			
Exports from W.Cape	37%	37%	56%
<b>Personnel</b>			
Employees with tertiary education	68%	44%	29%
<b>Locational Factors</b>			
Technology suppliers	15%	13%	0%
Manuf. input suppliers	10%	6%	0%
Educational facilities	20%	44%	25%
Firms in same industry	30%	6%	0%
Diverse industrial base	5%	19%	0%
Quality of life	50%	50%	53%
Local mkt assessed as primary location reason	55%	50%	40%

The breakdown of local linkages by firm size reflects what is generally understood about small and medium firms. SMEs that lack international or even national networks are more likely to source their inputs locally and so the strength of local suppliers is important for their ability to compete. However, they are probably less likely to be involved in joint technology initiatives with universities and science councils as they may lack the internal capacity to be an active partner. The results seem to support both of these expectations.

Nevertheless, the involvement in joint technology initiatives by small and medium respondents is not insubstantial (29% for small firms and 31% for medium firms). This would suggest a significant degree of technological capacity among these firms, which is supported by the fact that they export more than a third of their products/services.

The most glaring difference between respondents of different sizes is their use of skilled workers. A very high proportion of the employees of small firms have tertiary training (68%), compared to those of medium firms (44%) and large firms (29%). This might be explained as follows. Many of the small firms are start-ups, set up by a small group skilled entrepreneurs, with minimal administrative support. They are also more likely to be in the service industries where manufacturing production is not required. As firms get larger the administrative load and customer support functions increase, lowering the average skill level required by employees. This may be combined with standardisation of products and functions. In addition, firms manufacturing high tech products tend to be larger than high tech service firms and are likely to employ numerous production workers in addition to professionals.

The locational factors by firm size make interesting reading. As expected, the local market is more important to smaller firms than larger ones. Larger firms may have outgrown the local market and have significant export markets while small firms are often start-ups by local entrepreneurs who have targeted a niche in the local market.

Educational facilities seem to be more important for medium firms. This may be because these firms are in a growth phase and their need for skills is at its peak.

Finally, factors which reflect the need for local linkages and support – from the importance of local technology and manufacturing suppliers to the positive agglomeration effects of other firms in the same industry – are often raised as important amongst small firms, followed by medium firms (although still by relatively few respondents). Respondents from the large firm category showed no concern for these issues in their location decision.

### 3.3.3 The influence of type of firm

Table 6 shows the questionnaire results broken down by type of firm (CMR-based, national branch, or international branch). In designing a strategy to promote growth in the high tech sector, it is important to understand not only what the different types of firms in the CMR are, but also whether there are differences in the factors that govern their location decisions, and whether they have different needs and requirements. Attracting branches of international corporations might involve a different set of actions from encouraging new CMR-based start-ups, for example.

**Table 6: Results by type of firm**

	CMR-based	National branch	International branch
Number of respondents	28	15	8
<b>Characteristics</b>			
% small firms	43%	40%	25%
% formed in 1990s	36%	40%	25%
<b>Local Linkages</b>			
CMR provision of technology	24%	6%	0%
Involvement in joint initiatives	36%	27%	37%

CMR provision of manuf. inputs	53%	27%	17%
<b>Customers</b>			
Exports from W. Cape	55%	38%	6%
<b>Personnel</b>			
Employees with tertiary education	44%	53%	60%
<b>Locational Factors</b>			
Technology suppliers	14%	7%	0%
Manuf. input suppliers	11%	0%	0%
Educational facilities	32%	33%	50%
Firms in same industry	7%	13%	38%
Diverse industrial base	7%	7%	13%
Quality of life	68%	47%	0%
Local mkt assessed as primary location reason	29%	60%	100%

It seems clear that the international branches are in the CMR almost exclusively for the local market. The primary overall reason for their location in the CMR is the market in each case, they have minimal local linkages, and they export only 6% of their product/service outside the Western Cape. The high level of joint initiatives reflects social responsibility or training programmes in some cases and is not necessarily research based. They do, however, make extensive use of skilled labour (60% of employees), probably in order to provide technical support for clients, and so half the firms have listed the CMR's educational facilities as important in the decision to locate.

At the other end of the scale are the CMR-based firms. They have considerable links with the local economy, with 24% of technology needs being satisfied locally, 53% of manufactured inputs being supplied locally and 36% of firms involved in a joint initiative with a local university, technikon or research institution. The reason for location in the CMR seems more to do with the quality of life and educational facilities (skilled worker access reasons) than local markets. This is supported by the fact that 55% of sales are outside the Western Cape. Note, however, that many of these firms may have started out servicing the local market before moving on to exporting. Some of these respondents said that local technology and manufacturing suppliers were factors in their location decision.

Somewhere in-between these two points lie the national branches. They make use of local firms and organisations for a smaller portion of their technology needs and manufactured inputs than do the CMR-based firms, but more than the international branches. The fact that they export 38% of output from the Western Cape is important because it shows that, even though many of them are in the CMR primarily for the local market, they are using the CMR as a base to service other markets as well. Hopefully this reflects that the CMR holds some advantages as a high tech location.

### 3.3.4 The influence of customer location

Finally, Table 7 breaks down the answers to the questionnaire based on the location of respondents' customers. Firms were included in the "Exports nationally" category if they sell any of their products or services outside the Western Cape in the rest of South Africa, but none of their products or services internationally. Firms were included in the "Exports abroad" category if they sell any of their products or services internationally. (In most cases these firms also export nationally).

**Table 7: Results by customer location**

	No exports	Export nationally	Export abroad
Number of respondents	11	21	19
<b>Characteristics</b>			
% CMR-based firms	0%	71%	69%
% small firms	45%	52%	21%

% formed in 1990s	27%	48%	16%
<b>Local Linkages</b>			
CMR provision of technology	3%	20%	15%
Involvement in joint initiatives	18%	29%	53%
CMR provision of manuf. inputs	12%	57%	34%
<b>Personnel</b>			
Employees with tertiary education	61%	50%	41%
<b>Locational Factors</b>			
Technology suppliers	0%	10%	16%
Manuf. input suppliers	0%	5%	10%
Educational facilities	27%	19%	47%
Firms in same industry	45%	5%	5%
Diverse industrial base	9%	10%	5%
Quality of life	9%	48%	79%
Local mkt assessed as primary location reason	91%	57%	11%

The analysis here tends to overlap with the analysis by type of firm. The international branches and a handful of national branches are the ones that are not exporting and so the same characteristics come to the fore for these respondents as in Section 3.3.3, i.e. they have few local linkages, use a high proportion of skilled workers, and are in the CMR primarily to serve the local market.

Those firms that export nationally and internationally are mostly CMR-based firms, and some national branches using the CMR as a base to export to the rest of South Africa and beyond. It seems that firms exporting abroad as well as nationally are more established firms (only 16% formed in 1990s) suggesting that there is a significant learning curve involved in order to start exporting abroad. They tend to be larger firms, with small firms making up only 21% of their numbers. Interpreting this is difficult. Is it that small firms struggle to export abroad because of the numerous market failures that economists put forward, or is it simply that firms grow while servicing the national market first and only then venture abroad? The latter is possibly a stronger interpretation as small firms are well represented in the group exporting to the national market (52%).

Interestingly, the respondents who export abroad use a smaller proportion of locally manufactured inputs than those who export nationally, but more or less the same proportion of local technology inputs. In fact, if one looks at joint technology initiatives as well, then the linkages with local technology suppliers are quite substantial for this group of respondents. This may indicate that local manufactured input suppliers are less competitive than international suppliers and so are replaced as firms enter more demanding markets. The numerous problems with manufactured input suppliers that respondents mentioned seem to support this perspective. The stronger technology links are encouraging.

For those firms exporting internationally, important location factors are quality of life and educational facilities, which are key to attracting and keeping skilled workers.

The next section attempts to develop an overall picture of the high tech sector in the CMR based on all of the detailed analysis in this section.

## 4. TOWARDS A HIGH TECH STRATEGY FOR THE CMR

This section draws together the analysis presented in Section 3 to give an overall picture of the CMR's high tech sector, and then identifies sub-sectors that show the greatest potential for growth. Finally it puts forward suggestions about how growth in these sub-sectors might be encouraged and supported.

### 4.1 A picture of the CMR's high tech sector

Based on analysis of the questionnaire results, and supplemented with knowledge gained through interviews, the following broad picture of the CMR's high tech sector is presented.

The predominant reason for the location of most high tech firms in the CMR is the **local market**. In other words, the development of the sector has been demand-driven – related to the existence of markets for high tech products and services. (This is of course a generalisation, and does not apply to every firm). The local market has been important for two reasons:

- As a **large metropolitan area**, home to thousands of firms and millions of people, the CMR naturally provides a large market for a wide range of products and services, including high tech products and services. As we have seen, a number of national and international high tech firms have established branches in the CMR to service this large local market. The same could be said of any number of metropolitan areas the world over, and this is certainly not a unique feature of the CMR.
- A feature that is more particular to the CMR is the concentration of **corporate head offices** in key service industries such as financial services, insurance and retail. These head offices are intense users of information and communication technology (ICT). As one interviewee explained, since the 1970s the ICT industry in the CMR has hinged around the big corporates, which provide “the bread and butter” of the industry. The latest example is Vodacom, whose arrival in the CMR has resulted in a “feeding frenzy” according to the same interviewee. Another ICT-using sector that is strong in the CMR is tourism. Emerging industries in the CMR such as film, other media, and advertising are also increasingly intense users of ICT. Since much of the knowledge that flows between producers and users of high tech products and services has been shown to be tacit knowledge, it is important that producers inhabit the same locale as the users.

So the CMR has provided, and continues to provide, a strong **demand-driven impetus** for high tech industry partly because it is a large metropolitan area, and more importantly because it is home to the head offices of large corporates in ICT-intense sectors. These large corporations are likely to be exacting clients, demanding high quality ICT products and services.

On the supply side, the CMR's various tertiary education institutions have traditionally provided a reliable stream of skilled graduates in fields required by high tech firms. This has played an important role in the location and expansion of high tech industry, which relies heavily on **highly skilled labour**, in the CMR. However, a worrying number of firms report increasing difficulty over the last few years in finding skilled staff. It seems that the CMR is no longer retaining a sufficient proportion of its skilled graduates and workers, who are enticed by the opportunities and salaries available elsewhere. The erosion of this advantage in the CMR is cause for concern.

**Quality of life** has been a factor in the location of high tech firms in the CMR, partly because it influences their ability to attract and retain skilled staff. However, quality of life is a secondary factor in most cases, and on its own is an insufficient basis on which to attract and retain firms or the skilled staff on which they rely.

In general, high tech firms have *not* chosen the CMR as a location because of the region's **transport and communications infrastructure, suppliers of manufactured inputs, or specialist**



**business services.** While these supply-side factors have not actively hindered the high tech sector's development, they have not actively facilitated it either. They provide no special advantage in the CMR compared to other metropolitan regions in the country.

Interaction between high tech firms and universities or research institutions in the CMR does occur, and has clearly been important for some firms. It is not the norm though, and **local suppliers of technology** do not stand out as a key advantage to high tech firms of locating in the CMR. A similar picture emerges for R&D activities; while some firms carry out substantial amounts, the CMR does not appear to be a strong R&D centre.

Overall, it seems that while the CMR is home to a large number of high tech firms, it cannot claim at this stage to be an international high tech centre. Nevertheless, a number of the CMR's high tech firms are internationally competitive firms that have grown beyond the local market or were never dependent on it in the first place. This suggests that there is no in-principle reason why the CMR cannot *become* a high tech centre of international repute.

## 4.2 High tech sub-sectors with the greatest potential for growth

This overall description of the high tech sector is important, but it hides a great deal of diversity within the sector. A more detailed look at the different high tech sub-sectors tells us more about which ones show the greatest potential for growth in the CMR.

### **Communications equipment**

This sub-sector is focused on markets outside the region, with respondents exporting over 70% of output. There is a group of big corporates at the core, such as Tellumat and Vodacom, which drive industry development and create spin-off opportunities for smaller firms. Firms in the sub-sector seem to have close links with related firms and organisations, such as in the electronics and information systems sub-sectors.

### **Information system services**

This is a particularly strong sub-sector in the CMR. It is a key input to many of the current leading industries in the CMR – financial services, retailing, tourism – and also to other growing CMR industries such as film, media and advertising. It has strong links with the communications sub-sector. Respondents export a third of output demonstrating that strong capabilities have been established based on servicing CMR clients. This sub-sector includes fast-growing new firms in the Internet and web development industries.

### **Electronics**

Respondents in this sub-sector export over half their products, generally producing specialist products for niche markets. There is a depth to their input linkages in the CMR, suggesting that they are firmly embedded in the region. These firms often have their origins in the defence industry but are mostly now producing non-military-related products.

### **Drugs and medicines**

This sub-sector seems to be focused on markets outside the region, with respondents exporting 95% of their products. There are links with local universities and teaching hospitals. As with the communications sub-sector, there is a group of big corporates at the core (Warner-Lambert and Seravac) that drive industry development and create spin-off opportunities for smaller firms. However, it is a small sub-sector in the CMR, and has limited links with other high tech sub-sectors. Also, because there were only two respondents from this sub-sector it is not possible to draw firm conclusions.

### **Computing and office equipment**

This sub-sector consists mostly of branches of national and international companies that want a presence in the CMR market. The main activity in the sub-sector is distribution. Firms in this sub-sector provide important specialist services and can be considered important

suppliers to the CMR high tech sector as a whole. However, they are unlikely to expand beyond their current role of distributing products to local clients. (Manufacturing of computing and office equipment has not taken off in other parts of South Africa either.)

### **Application software**

There seem to be two categories within this sub-sector. On the one hand there are firms which are mainly engaged in distribution of an international package software product. They have similar characteristics to the computing and office equipment sub-sector. On the other hand, there are firms engaged in custom development, either in the context of big software development projects, usually for large corporate clients, or in some cases for another software company (rather than an end-user client), which may be an overseas company.

### **Engineering services**

This sub-sector revolves mainly around industrial automation and process control. Some of these firms can be considered part of the electronics-based cluster but most are servicing the diverse manufacturing base of the CMR. They seem to have no particular clients in leading industries that offer a sufficient market to develop a critical mass in the sub-sector. The three sub-sectors that are most dynamic and deserve most attention at this stage are:

- information system services;
- communications equipment;
- specialist electronics.

It is recommended that the leading firms within each of these sub-sectors be identified, and that the links between the sub-sectors be more fully explored. This would best be done in conjunction with firms in the sub-sectors.

Drugs and medicines seems to be a promising sub-sector, but as discussed there were too few respondents to draw conclusions, and it is a small sector in the CMR. Perhaps a separate study just on this sub-sector would be justified.

## **4.3 The structure of the ICT sector**

In addition to the overall analysis of respondents presented in Section 3, further valuable analysis was done of just the respondents falling into the Information and Communication Technology (ICT) sector.<sup>7</sup> In particular, it is useful to divide the ICT sector into three segments, each of which supports a range of related firms:

### **1. ICT solution providers**

- ICT subcontractors
- ICT suppliers
- ICT consultants
- other suppliers

### **2. ICT manufacturers**

- component suppliers
- software subcontractors
- manufacturing subcontractors
- other suppliers

### **3. ICT specialist services**

- ICT training
- ICT recruitment

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<sup>7</sup> This analysis was done by Wynand Coetzer, an independent high tech business consultant. It is also presented in a document titled "Growth opportunities for the communication and information technology industry in the Western Cape", written for Wesgro's High Tech Forum.

- other specialists

**ICT solution providers** supply ICT products (most of them imported) and services to local organisations. The presence of ICT solution providers means that local industry can outsource its ICT needs and concentrate on core functions. Because ICT solution providers are service companies, a close relationship between the solution provider and the customer is essential. In general, this means that both organisations must be in the same geographical area. In practice, this means that a CMR solution provider cannot provide a satisfactory level of service to organisations outside the CMR, and the growth opportunities for ICT solution providers in the CMR is thus limited by the size of ICT-using local industry (such as corporate head offices). Companies in this segment spawn a range of other companies, such as ICT sub-contractors, ICT equipment suppliers and ICT consultants. Growth opportunities for the spawned industry are limited by the size of the ICT solution providers, which is in turn limited by the size of industry overall in the CMR.

**ICT manufacturers** can be divided into equipment and software manufacturers. Firms in this group can theoretically manufacture for local consumption or for export, but in practice the local market is usually not big enough to sustain continuous development. Exporting is essential for these firms if they are to remain competitive in the long run. If they export successfully, they have the potential for very high levels of growth. ICT manufacturers also spawn related firms such as electronic component suppliers, software and hardware sub-contractors and manufacturing sub-contractors. The size of this spawned industry is limited by the size of the ICT manufacturing sector in the CMR, which could be virtually unrestricted.

Growth of **ICT specialist services**, such as training and recruiting, is in theory not limited by the size of the CMR ICT sector, but in practice local services may be preferred, thus limiting the size of this ICT segment.

This analysis reinforces the importance of ICT manufacturers as a “strategic” high tech sector, as well as the importance of the CMR’s ICT-using client base.

#### 4.4 Elements of a high tech strategy

The next question is how to encourage and support growth in the “strategic” sub-sectors identified. This section is based on a discussion session between the various people who have been involved in this project, and is not the work of the authors alone. We present these as initial ideas to stimulate further discussion and debate, and not as any sort of comprehensive or final plan.

Following the suggestion in Section 1 of a three-pillar approach, a regional high tech strategy for the CMR should include:

- developing existing firms through collaborative initiatives;
- supporting start-ups, especially university spin-offs;
- attracting new investment in leading ICT-using industries.

In addition there are two major crosscutting issues, important for existing firms, start-ups and new investors:

- defending and expanding the CMR’s skills base;
- improving telecommunications infrastructure and services.

Initial ideas about how each of these might be addressed follow.

##### 4.4.1 Developing existing firms

A striking feature of most of the high tech sub-sectors that emerged indirectly from the questionnaire and directly from the interviews was that, with few exceptions, firms seldom collaborate with one another, or even talk to one another. Yet dense formal and informal

networks between firms are known to be a major feature of successful high tech (and other industry) clusters the world over.

Collaborative initiatives should be narrowly defined and focused, both in terms of the firms involved and in terms of the issues addressed. They need to address practical issues that have a material impact on firms. Examples of issues around which CMR firms in the sub-sectors identified might collaborate are:

- getting into exports;
- improving the quality of manufactured inputs, together with the suppliers of these inputs (this is an issue which came up strongly in the survey, with nearly half the respondents reporting problems with suppliers of manufactured inputs);
- attracting skills to the region;
- using the research facilities and capabilities available in the region, and expanding contact between tertiary institutions and firms in the region.

Collaborative initiatives can benefit firms through the collective learning that they allow, as well as through the added weight that comes from acting collectively to solve a specific problem. The role of the public sector in such initiatives would be facilitative.

#### ***4.4.2 Supporting start-ups***

We suggest that the focus here should be on university spin-offs, in other words on start-ups which originate from cutting edge research and innovation occurring in universities and other tertiary institutions. The thresholds or obstacles facing researchers and post-graduates who may be potential entrepreneurs need to be reduced. This might partly be achieved through various on-campus policies, such as those dealing with intellectual property.

In many cases what may be required is to link appropriate people together. For example, a technologist or researcher may need a link with a businessperson or entrepreneur and a finance provider. An initiative such as CITI may be able to act as a facilitator or catalyst in this task of putting the pieces of the puzzle together.

Of course, although high tech start-ups will have particular specialist needs, they are likely to share many of the generic needs of new small businesses in any sector. It is important to be able to point them in the direction of the services that are already available in the CMR for small firms, rather than to try to duplicate these.

#### ***4.4.3 Attracting new investment in leading industries***

We have seen that demand from leading industries in the CMR, such as the finance, insurance and retail sectors, has played a crucial role in the development of ICT firms in the region. Attracting more of these intense ICT-users to the CMR would greatly benefit existing high tech ICT firms by providing a larger local market for their products and services. It would also encourage local start-ups. The “feeding frenzy” around Vodacom, mentioned earlier, bears this out.

It is important to build on existing initiatives in this arena. Wesgro has a Headquarters Initiative, which aims to push the Cape as the premier location in Southern Africa – hence its slogan “Africa starts here”. A hundred and thirty-four companies have been assisted through this initiative. An approach which was successful in the case of Midrand in Gauteng was the use of a business intelligence network to find firms that were thinking of relocating and approaching them directly (Hodge 1998).

The marketing of the region to large corporates is likely to be assisted by the existence of excellent suppliers of ICT products and services in the CMR.

What interviewees had to say about big corporates and attracting new investment

Big corporations make decisions in their head offices, so around the head office you get more business. That's why head offices are important.

For clients like the big insurance companies, the banks, you have to *be* where the head office is. In Cape Town, computer work that depends on the corporates will grow as the corporates grow.

The Internet and web development industry is being driven largely by the financial services sector – they have a service, which is easily provided electronically via the Internet. The industry will always be driven by the big corporates. Why? Because if you want to do anything worthwhile on the Internet you need a high level of functionality, and it starts to get really expensive to buy the skills you need to implement that.

There would be benefit in expanding the base of firms in the electronics and telecoms sectors. We should be focusing on our design capabilities – attracting research arms of large companies.

#### **4.4.4 Defending and expanding the skills base**

One of the problems that emerged strongly from the questionnaire and especially from the interviews was a growing shortage of skills in the CMR. IT specialists and engineers, especially experienced ones, are in increasingly short supply. The problem seems to be not so much that the CMR is failing to produce good graduates, but rather that people with these skills leave the region, enticed by better opportunities and higher salaries elsewhere. According to a recent article (*Financial Mail* 1999), it is estimated that 25% of all people leaving the country are IT professionals.

There is something of a chicken-and-egg situation here. If the high tech sector in the CMR was thriving and growing, more skilled people would stay here and others might be attracted to the region. Successful university spin-offs, for example, would be an excellent way of retaining skills in the CMR. On the other hand, without a sufficient skills base in the CMR, high tech firms are less likely to start up or locate here.

The specialist training base of the CMR does not seem to have served the ICT sector well. For instance, a number of firms bemoaned the lack of true web developers in the region, and one interviewee went as far as saying that most of the web development training courses currently offered in the CMR “verge on fraud”. For these and other skills, the CMR needs excellent specialist training programmes to produce technology specialists. Other cities have done this successfully. Seattle, for instance, established a specialist education programme in video game development to reinforce the local cluster.

The move in this direction has begun with Telkom's centres of excellence and their telecommunications training programme. These efforts need to be reinforced. There are a number of ways to approach this. First, one could try to attract state research in this field to the CMR. The biggest player outside the parastatals is the CSIR, which has its ICT divisions in Gauteng. A second target is the universities and technikons, which have the advantage of being able to feed the latest research into training programmes. There has been some collaboration with industry already, as seen in the survey results. The initiative for further specialist training

and research can either come from the institutions themselves in response to perceived local demand or can be sponsored by a consortium of key players in the local industry. A joint approach whereby industry defines its needs and provides support for establishment and research funds while the educational institutions commit to a programme is maybe a useful approach. Another possibility is for the specialist training to be undertaken by private education institutions. This is less ideal as it would be unlikely to be accompanied by research.

In the short term, one way to alleviate the skills shortage would be to employ people from outside the country. At a Cape High Tech Forum meeting in May 1999, industry representatives complained of complex and highly restrictive immigration regulations and procedures in South Africa, which prevent them from employing skilled foreigners. South African salaries, while lower than those in much of the developed world, are attractive compared with those in, for example, Eastern Europe or Asia. Yet it is difficult to employ skilled, experienced people from these places, for whom the CMR may well be an attractive place to live, because of immigration regulations and procedures. Even if it possible to employ such people, it is extremely difficult to keep them for more than a couple of years, again because of immigration regulations.

It seems that there may be role for an initiative such as CITI, perhaps together with the metropolitan or provincial public sector, to lobby national government on this issue. Without pressure, whether it comes from individual firms, other parts of government or joint public-private sector initiatives, the current state of affairs is unlikely to change.

#### ***4.4.5 Improving telecommunications infrastructure and services***

As we have seen, telecommunications infrastructure and services are not a strong point of the CMR, and yet are vital for the long term health and development of industry in general, and high tech industry particularly. Current infrastructure is inadequate to support the growing move towards Internet-based business, and it hinders provision of high tech services over a distance. At least three issues need to be addressed: bandwidth, reliability, and tariff structures.

Addressing these problems is not straightforward. It lies in the hands of private investors (such as Internet service providers), Telkom and the national telecommunications regulatory authority, rather than in the hands of metropolitan or provincial government. Although the current public monopoly does penalise local firms in terms of higher costs and more limited service, there is nothing that can be done to change the regulatory regime for now. Industry can lobby for better infrastructure locally, as Capricorn has succeeded in doing for its own development, but action may be limited to this. Private developers putting in good infrastructure, again such as Capricorn, do offer a private sector solution to poor public infrastructure in general office areas. Such developments should be encouraged.

In addition to the five elements we have talked about here, the widely acknowledged role of local, metropolitan and provincial authorities in securing an efficient, business-friendly environment, and in being responsive to the needs of investors, should not be forgotten. Obviously this applies not just to the high tech sector but to manufacturing and services in general in the CMR.

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## APPENDIX A: WHAT INDUSTRIES ARE CONSIDERED “HIGH TECH”?

The common approach to defining high technology products is to utilise industry-level data and employ some form of technology input measure to determine the technology embodied in an industry. Some common measures include the ratio of research and development expenditures to sales, the ratio of scientific and engineering personnel to total employees, the quantity of modern capital (capital equipment less than six years old) or a combination of all of these (Doms & McGuckin 1992). Once the scores for all industrial sectors are available, the high technology sectors are those that represent the top scores on the technology index measure. The point on the technology index at which a product ceases to be a high technology product and becomes a low or medium technology product is still open to debate. For instance, the European Union (EU) will consider motor-vehicles and chemicals as high technology while the Foundation for Research Development (FRD) will consider these two sectors medium technology. Sectors that are commonly defined as high tech include electric machinery, instruments, drugs, electronics and components, office machines, and aerospace.

However, as Abbott et al. (1989) point out, there are two problems with this standard approach – one conceptual and the other related to data issues. The conceptual objection is that there is no differentiation between process and product technological input. If technology is applied to the processing of a low technology product for whatever reason, then this product could end up being falsely classified as a high technology product. An example they use is the petroleum industry where complex refining techniques can now be used to reduce environmental damage and wastage. This has led to the sector being included in some definitions of high tech even though the product itself is not high tech. An example in South Africa may be mining, where considerable R&D has been performed to determine optimal extraction techniques. As R&D has not been highly significant in other sectors of the economy, it may be that mining is defined as high tech through this methodology.

Because technology input measures are available only at a high level of aggregation, analysis of data on the output of a particular industry must assume that all products within the aggregated industry sector are either high or low tech (Doms & McGuckin 1992). This can lead to very misleading results, as most high technology industries contain numerous low technology products. For instance, “office machines” is often included as a high technology industry, yet this classification contains items such as calculators and cash registers, which are not necessarily high tech. The significance of this point is demonstrated firmly in the South African motor vehicle industry (a medium technology sector) which has experienced a recent explosion in exports. It turns out that a highly significant proportion of these exports is in leather seats for BMWs worldwide – products which can hardly be considered high technology.

The US Bureau of the Census tried to overcome these problems by developing a different approach (see Abbott et al. 1989). They removed the problem of including high technology processes under the high technology product categories by developing a list of technological fields that were commonly defined as producing high technology products. The fields that they came up with were biotechnology, life sciences, opto-electronics, computers and telecommunications, electronics, computer integrated manufacturing, materials design, aerospace, weapons and nuclear technology. The problem of including low tech products in high tech industries was then tackled through an assessment of the detailed products that fall within these listings to decide if they were high technology or not. However, the obvious problem with this approach is that it is difficult to implement, given that production and trade data are rarely available at such a detailed level, particularly for sub-national regions.

This study took note of the problems concerning the standard approach as well as the alternative approaches being used. We defined high tech industries as those firms producing high tech products and services, and attempted to exclude from our list any industries or firms that merely make use of advanced processing technology (a number of agri-processing and



motor vehicle plants fell into this latter group). However, we could not entirely eliminate the possibility of including firms that were in fact producing low tech products.

Where we differed with the standard approaches considerably was in the inclusion of services rather than just manufactured products. Although this is unusual, it was particularly important for the CMR study as we suspect that these services are amongst the fastest growing high tech sub-sectors in the CMR. Finally, we were able to remove a few categories from the list because they were either not present in the CMR, or were of a sufficiently small size that they could be aggregated under other categories. For instance, 'biotechnology' was placed under 'drugs and medicines' and many defence-related firms were included under 'electronics', which was their core function. The categories we ended up using were:

- application software;
- communications equipment;
- computers and office equipment;
- drugs and medicines;
- electronics;
- engineering and scientific services;
- information system services;
- scientific instruments.

## APPENDIX B: THE QUESTIONNAIRE

### Cape Metropolitan Region High Tech Study Survey of Firms

The Cape Metropolitan Region, or CMR, includes:

- areas falling within the boundaries of the Cape Metropolitan Council
- AND Stellenbosch and the Winelands.

References in the questionnaire to "local" mean "within the CMR".

All requests for percentages and proportions are for ROUGH figures or estimates. Please do not feel that you need to give exact percentages or proportions.

All information will be treated strictly confidentially, and results will be reported in aggregate.

Please attach an extra sheet of paper if you need more space to respond at greater length.

**PLEASE RETURN BY FAX TO THE DPRU. FAX NUMBER: 021-423 2501**

#### Section A: Identification

1. Name of firm

.....

2. Physical address of firm (including suburb)

.....

.....

3. Contact person .....

4. Which classification below best describes the industry/sector in which your firm operates predominantly? Please choose one.

- |   |  |
|---|--|
| <input type="checkbox"/> Electronics                  | <input type="checkbox"/> Drugs and medicines                 |
| <input type="checkbox"/> Communications equipment     | <input type="checkbox"/> Information services                |
| <input type="checkbox"/> Computers & office equipment | <input type="checkbox"/> Software                            |
| <input type="checkbox"/> Scientific instruments       | <input type="checkbox"/> Engineering and scientific services |
| <input type="checkbox"/> Other (please specify) ..... |  |

5. Please give a brief description of your firm's main product lines or services

.....

.....

#### Section B: Cape Metropolitan Region Operation

6. What year did your company establish operations in the CMR? .....

**7. What is the size of your CMR operation?**

Number of employees:  1 - 10  11 - 20  21 - 50  51 - 100  101 - 200  >200

Annual sales revenue:  R0 - R500 000  R10 million - R50 million  
 R500 000 - R2 million  >R50 million  
 R2 million - R10 million

**8. Is your CMR operation:**  Purely a CMR firm?  
 Part of a national (South African) company?  
 Part of a multinational company?

If your firm is part of a national/multinational company:

Where is the South African head office? .....

Where is the international head office (if applicable)? .....

If your firm is a branch of a national/multinational company, how much autonomy does management in the CMR branch have?

- Autonomy over day-to-day operations only
- Autonomy over all strategic decisions for the CMR
- Autonomy over some strategic decisions for the CMR (please specify which)

.....

**9. What activities does your firm perform in the CMR? (Choose all that apply.) For those firms which are branches of national/multinational companies, roughly what proportion of the company's South African total does this represent?**

- |  |                        |   |
|--|------------------------|---|
| <input type="checkbox"/> Production            | Proportion of SA ..... | % |
| <input type="checkbox"/> R&D                   | Proportion of SA ..... | % |
| <input type="checkbox"/> Customer support      | Proportion of SA ..... | % |
| <input type="checkbox"/> Sales and marketing   | Proportion of SA ..... | % |
| <input type="checkbox"/> Consulting            | Proportion of SA ..... | % |
| <input type="checkbox"/> Training              | Proportion of SA ..... | % |
| <input type="checkbox"/> Custom development    | Proportion of SA ..... | % |
| <input type="checkbox"/> Other (specify) ..... | Proportion of SA ..... | % |

**Section C: Local Linkages**

**10. Technology inputs**

**a.** What specific technologies do you use in your production process or service provision (not in administration)? (e.g. biotechnology, artificial intelligence, GIS, search engines, high speed communications)

.....

.....

**b.** Roughly what proportion of these technology requirements are fulfilled by:

- In-house department .....%
- CMR firms or research institutions .....%
- Firms or institutions in the rest of SA .....%
- Firms or institutions abroad .....%

- c.** Was the existence of local suppliers of technology an important factor in your decision to locate in the CMR? Why?

.....  
.....

- d.** Can you identify any problems with the capabilities of local suppliers of technology that hinder your firm's operations?

.....  
.....

- e.** Are you involved in any joint initiatives with universities, technikons, or research institutions? If so, which ones (in the CMR or elsewhere)?

.....

**11. Service inputs**

- a.** What are your specialist service needs? (e.g. venture capital provision, professional trainers, system integrators, video conferencing, Internet services, outsourcers)

.....  
.....

- b.** Which critical ones are missing in the CMR or in short supply?

.....

- c.** Can you identify any problems with the cost, quality or reliability of business service provision in the CMR that hinder your firm's operations?

.....  
.....

**12. Manufactured inputs**

- a.** What proportion (by value) of your manufactured inputs are provided by:

- CMR firms ..... %
- Firms in the rest of SA ..... %
- Firms abroad ..... %

- b.** Was the existence of local suppliers of manufactured inputs an important factor in your decision to locate in the CMR? Why?

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.....

- c.** Can you identify problems with the cost, quality or reliability of suppliers in the CMR that hinder your firm's operations?

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.....  
**13. Customer linkages**

**a.** What proportion (by value) of your output is sold to customers in the following locations:

- CMR ..... %                       Rest of SA ..... %  
 Rest of Western Cape Province ..... %                       Abroad ..... %

**b.** Does location in the CMR give your firm advantages with respect to access to export markets? If so, what are these advantages?

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**Section D: Personnel**

**14.** What proportion of your firm's employees have as their highest qualification:

- Less than matric .....%                       Post-matric training (e.g. at a technikon) ..... %  
 Matric .....%                       A university degree ..... %

**15.** Which professional occupations/skills are most used by your firm?

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**16.** Does your firm's location in the CMR facilitate access to skilled personnel? If so, in what way?

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**17.** If your firm were to expand, what professional skills would be required? Would you be able to source these skills in the CMR?

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**18.** Was the existence of good education and training institutions in the CMR important in your firm's decision to establish itself here?

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**Section E: Transport**

**19.** Please rate the significance of transport costs in your firm's operations, on a scale of 1 (not significant) to 3 (highly significant):     1     2     3

**20.** Does your firm's location in the CMR result in significantly higher or lower transport costs than those facing your competitors in the rest of South Africa or abroad? Please elaborate.

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**Section F: Electronic Communications**

**21.** Please rate the significance of communications costs in your firm's operations, on a scale of 1 (not significant) to 3 (highly significant):     1     2     3

**22.** Is the existing telecommunications infrastructure in the CMR adequate for your firm's needs? If not, what needs to be improved?

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**19.** Does your firm's location in the CMR result in significantly higher or lower communication costs than those facing your competitors in the rest of South Africa or abroad? Please elaborate.

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**Section F: Other Locational Factors**

**24.** Did any of the following play a role in your firm's decision to locate in the CMR?

- Government incentive schemes (e.g. the Regional Industrial Development Programme, the Tax Holiday Scheme)
- Presence in the CMR of companies in the same industry
- Diverse industrial base in the CMR
- Overall quality of life in the CMR

Please elaborate, or describe other factors not covered that were important in your firm's location decision.

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**Section G: Future Plans**

**25.** Does your firm have definite plans for expansion in the CMR in the next 2 years? If so, please say briefly what these plans involve (e.g. investment in new capacity, employment of new staff).

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**26.** Is your company currently considering moving any part of its CMR operation to another part of the country?  Yes  No If yes, please specify the reasons.

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**27.** Can you identify factors or changes that would enhance the attractiveness of the CMR to your firm, and encourage it to stay and expand here?

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**Section H: General**

**28.** Do you think there are opportunities for production in the CMR of intermediate products or provision of specialist services which your firm or other firms currently buy from elsewhere? If so, please specify.

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**29.** What contributions do you think that local and/or metropolitan and/or provincial government could make to promote:

- the expansion of existing high tech firms in the CMR;
- and the establishment of new high tech firms in the CMR?

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Please feel free to comment on this questionnaire, particularly if you feel that there are factors in your firm's locational decision, or problems with your current location, which have not been covered at all.

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Thank you for your time and help.