

# **The Restructuring of South Africa's Defence Industry<sup>1</sup>**

**by Peter Batchelor and Paul Dunne**

**August 1998**

**Centre for Conflict Resolution, University of Cape Town, South Africa  
and  
Middlesex University Business School, United Kingdom**

**Preliminary Draft. Comments Welcome. Please do not quote without permission.**

---

<sup>1</sup> This paper is based on research currently being undertaken as part of a project on *Defence Industrial Restructuring, Conversion and Economic Growth in South Africa*, funded by the Leverhulme Trust, whose support is gratefully acknowledged. We are grateful to Thomas Scheetz for helpful comments and discussion.

## Introduction

South Africa's transition to democracy and the ending of apartheid has been accompanied by a parallel process of demilitarisation, which has reversed the militarisation of South African society that occurred during the 1970s and 1980s. This process has had a number of different dimensions, including dramatic cuts in the defence budget, the ending of compulsory conscription for white males, the re-establishment of civilian control over the armed forces, and the implementation of various disarmament measures. These include the termination of the country's nuclear weapons programme and the destruction of the country's stockpile of anti-personnel mines.

These changes have also meant that South Africa's domestic defence industry, which was built up in response to arms embargoes, has been forced into a process of downsizing and restructuring. This has led the industry to pursue a number of adjustment strategies, such as retrenchment of employees, increases in exports and diversification into civilian products, to minimise and survive the impact of the defence cuts.

Many of these changes have been occurring in something of a policy vacuum. There have been some policy initiatives that have altered the structure of the defence industrial base, such as the commercialisation of Armscor and the formation of Denel, and the introduction of more competitive procurement policies, but in general the industry has been left to fend for itself. This makes the South African industry an interesting case study of defence industrial restructuring. It is an industry that was developed and maintained at great cost for strategic reasons during the apartheid era, but since the transition to democracy has lost much of its reason for existence, and has experienced unprecedented cuts in demand. At the same time there has been little in the way of policy to try to convert the resources used to civilian production.

There are clearly many lessons to be learned from this experience and the aim of this paper is to identify these by analysing the restructuring of the defence industry that has taken place since the late 1980s. To this end *Section 1* describes the origins and development of the country's domestic defence industry, with *Section 2* examining its economic significance. *Section 3* then describes the defence cuts and disarmament measures which have been implemented since the late 1980s, and *Section 4* assesses the impact of the defence cuts on the domestic defence industry and the manufacturing sector. *Section 5* examines the downsizing and restructuring of the defence industry which has been occurring since the late 1980s, and highlights the adjustment strategies which defence firms have pursued in order to minimise (and survive) the impact of the defence cuts. It also analyses the outcomes of this process of defence industrial adjustment, particularly the size and structure of the domestic defence market. *Section 6* provides some conclusions and considers the future prospects for South Africa's defence industry.

### 1. The Origins and Development of South Africa's Defence Industry

South Africa's defence industry was initially established, with British aid, just prior to the Second World War. During the war it produced a substantial amount of basic weaponry for

the Union Defence Force and the Allied forces, including armoured cars, bombs and ammunition. After the war, however, most of the wartime arms factories converted back to their pre-war civilian activities (Cawthra, 1986) and during the 1950s and early 1960s South Africa relied heavily on imports of arms, mainly from Britain. In the 1960's there was growing international opposition to apartheid and this led to South Africa's withdrawal from the Commonwealth in 1961 and the imposition of a voluntary United Nations arms embargo in 1963. This severely limited the country's access to international sources of arms and provided the impetus for establishing a domestic defence industry. In 1964 the Armaments Production Board was established to control the manufacture, procurement and supply of all armaments for the South African Defence Force (SADF) (Simpson, 1989). This included co-ordinating arms production in the private sector, where close to 1000 firms were involved in various aspects of arms production

In 1967 the United Nations Security Council passed a resolution calling on all states to stop supplying South Africa with arms. During the same year P.W. Botha, the then Minister of Defence, visited armaments factories in Portugal and France as part of an in-depth investigation into various 'models' for domestic arms production in South Africa (Frankel, 1984). In 1968 the Armaments Production Board was renamed the Armaments Board and made responsible for the procurement of armaments for the SADF, as well as ensuring optimal utilisation of the private sector for arms production (Simpson, 1989). In the same year the government established the Armaments Development and Production Corporation (Arm Scor). During the next few years Arm Scor took over various private sector companies, such as Atlas Aircraft Corporation, and established a number of new production and research and development facilities (Cawthra, 1986).

The next major development came in 1973 with the establishment of the Defence Advisory Council (DAC) to co-ordinate the private sector's involvement in domestic arms production (Philip, 1989). The DAC was chaired by the then Minister of Defence, P.W.Botha, and included the president of the Armaments Board and representatives from many of the country's major private sector companies (e.g. Anglo American, Barlow Rand, Tongaat and SA Breweries). The establishment of the DAC represented the growing institutional links between the state, the military and private industry, and is often regarded as the take-off point for the country's local military-industrial complex. These developments also took place within the context of a marked militarisation of society that occurred during the 'Total Strategy' era of the 1970s and 1980, when the apartheid regime mobilised vast amounts of state resources to defend white minority rule against internal and external threats (Cock & Nathan, 1989). The development of a domestic defence industrial base was an important component of the government's overall strategy.

Increasing international opposition to apartheid, and world-wide demands for a mandatory arms embargo against South Africa, prompted a major reorganisation and expansion of the defence industry during the mid 1970s. In 1976, the same year as the UN imposed mandatory arms embargo against South Africa (Resolution 418) the Armaments Board and the Armaments Development and Production Corporation were merged to form the Armaments Corporation of South Africa (Arm Scor). Arm Scor assumed responsibility for both procurement and production of armaments for the SADF (Cobbett, 1989).

During the 1980s the domestic defence industry expanded considerably in response to South Africa's increasing involvement in a number of regional conflicts (e.g. Namibia, Angola), which required a guaranteed supply of weapons of ever-increasing sophistication, and to the growing militarisation of the state. New state-owned research and development and arms production facilities were established. The private sector became increasingly involved in domestic arms production, with more than 2000 firms involved by 1984 (Armcor, 1984). In addition to investing in arms production capabilities, the government also pursued self-sufficiency in a number of related industries, such as engines, gearboxes and axles that could be used for armoured vehicles.

The early 1980s also brought a number of problems to the defence industry. The arms embargo had forced the industry to adopt a number of uneconomical practices, such as tooling up for short production runs and stockpiling supplies of certain items which were not readily available in South Africa (Landgren, 1989). This led to increasing production costs and, when combined with the excess capacities created by a decline in domestic demand after the initial build up, led to drastic staff cuts at Armcor and the cancellation of a number of defence contracts with private sector firms. Some of Armcor's production activities were rationalised and a government commission was set up in 1984 to investigate Armcor's financial problems (Cawthra, 1986).

By the end of the 1980s South Africa had a relatively sophisticated defence industry, which was able to meet most of the equipment requirements of the SADF. It is important to recognise, however, that the local defence industry did not try to reproduce R&D which had already been carried out in the major Western arms producers but concentrated on acquiring a capacity for upgrading, modifying and modernising existing armaments and weapons systems (Brzoska, 1991). South Africa's ability to continue to obtain foreign inputs (technology, personnel and components) in circumvention of the United Nations arms embargo was vital for its increasing self-sufficiency in arms production (see studies by Vayrynen, 1980; Landgren, 1989 and Brzoska, 1991).

The form and nature of the South African defence industry as it was before the start of the transition to democracy was the result of a number of factors interlinked with the development and maintenance of the apartheid state. The imposition of UN embargoes; South Africa's military involvement in a number of regional conflicts, which required a guaranteed source of supply of military equipment; the ideological imperatives of the apartheid state, and the desire for self-sufficiency in strategic industries, including armaments; government support for import-substitution-industrialisation; and the interests of private capital, particularly the lucrative nature of domestic arms production. All of these factors led to the creation of a relatively sophisticated but resource sapping defence industrial base, which was one of the contributory factors to the economy's poor economic performance during the 1970s and 1980s. To provide an understanding of just how important, and how expensive, the defence industry was, the next section provides a detailed analysis of its economic significance during the apartheid era.

## **2. The Economic Significance of South Africa's Defence Industry**

As we have seen, the establishment and development of a domestic defence industry in South Africa necessitated massive investment by the state, and the large-scale involvement of the private sector. This meant that by the late 1980s the defence industry could be argued to be one of the most significant 'sectors' of the country's industrial base, in terms of its use of resources. The use of resources to develop a military industrial base had an opportunity cost, however, as there were alternative uses available for the expenditures which could have been more productive. In fact, the expansion of the defence industry during the 1970s and 1980s occurred during a period when the economy, and particularly the manufacturing sector, was performing poorly, and there is evidence to suggest that it imposed a substantial 'burden' on the national economy and was a significant contributing factor to the country's deteriorating economic performance (see Lipton, 1986 and Kaplinsky, 1992).

The defence industry did emerge as a significant creator of jobs during the 1970s and 1980s, and by 1989 over 130,000 people were employed (directly and indirectly) in domestic arms production. Total defence industry employment as a percentage of total manufacturing employment increased from less than 1% in 1961 to over 9% in the late 1980s.

Given the nature of the industry, however, most of the jobs created were highly capital and skill intensive and, given the nature of the apartheid state, were largely reserved for whites. Thus the employment benefits of domestic arms production both perpetuated the racist structure of the labour market and were inappropriate for a country with scarce capital and an abundance of unskilled labour. The defence industry also absorbed a disproportionate share of the country's skilled labour and this is likely to have been at the expense of the civilian economy. The apartheid government sanctioned the movement of scarce skilled human resources away from more productive civilian uses, and by 1989 nearly 2000 scientists and engineers, over 10% of the total number of R&D personnel in the national economy were employed by Armscor (Batchelor, 1996).

The use of scarce national resources for investment in arms production also had negative consequences for investment in the civilian sectors of the economy. Studies by Kaplinsky (1992) and Joffe et al. (1995) have argued that the excessive share of state investment in strategic industries (e.g. Armscor, SASOL) during the 1970s and 1980s represented a form of 'misinvestment', in that large amounts of scarce resources were invested in the wrong (capital intensive) sectors and the wrong types of technology (e.g. synthetic fuels) because of strategic considerations.

The establishment of a domestic defence industry was expected to reduce the cost of arms imports and there is a clear decline in imports as a share of procurement from 1970. However, by the end of the 1980s it was estimated that South Africa was still spending over R2 billion (R1.4 billion in 1985 prices) on arms imports per annum (Table 1). While South Africa became less dependent upon imports of completed weapons systems after the arms embargo in 1977, it remained highly dependent upon imports of machinery, technology and components. Thus, the development of a domestic arms production capability created new forms of dependency on foreign sources of technology and machinery, and ended up

absorbing increasing amounts of scarce foreign exchange resources.

**Table 1. South Africa Arms Imports, 1970-1989**

Figures are in Rand million in constant 1985 prices. Figures in italics are in percentages.

Year	1970	1975	1980	1985	1989
<i>Import Ratio *</i>	<i>81</i>	<i>66</i>	<i>48</i>	<i>42</i>	<i>42</i>
Arms Imports	713	1582	849	800	1407
<i>% of Total Imports</i>	<i>3.0</i>	<i>5.1</i>	<i>2.7</i>	<i>2.8</i>	<i>4.5</i>
<i>% of Manf.Imports</i>	<i>3.5</i>	<i>6.8</i>	<i>4.1</i>	<i>4.1</i>	<i>6.0</i>

\* Imports as a share of total procurement spending.

Sources: South African Reserve Bank, Quarterly Bulletin, various issues; Central Economic Advisory Service (1994); Armscor.

In response to the problems of the industry in the early 1980s, namely rising overhead costs, excess capacities and declining domestic demand, South Africa made a major push for exports and Armscor launched a massive international marketing drive in 1982. As a result of South Africa's willingness to supply arms to fellow 'pariah states' who were similarly excluded from access to the world's major arms producers, the value of South Africa's arms exports increased by nearly 300% between 1982 and 1989 (see Table 2).

Despite this increase, the contribution of arms exports to the national economy was in fact fairly insignificant if the hidden costs of export subsidies are considered. Marketing was paid for by Armscor out of the defence budget and much of the R&D and production costs of export products were subsidised by the domestic procurement budget (Willett & Batchelor, 1994). Also, despite the growth of exports, South Africa's trade balance in armaments remained negative between 1982 and 1989. Thus, the defence sector remained a net user of foreign exchange resources throughout the 1980s.

**Table 2. South Africa Arms Exports, 1982-1989**

Figures are in Rand million in constant 1985 prices. Figures in italics are in percentages.

Year	Arms Exports	<i>Arms Exports/ Manf.Exports</i>	<i>Arms Exports/ Total Exports</i>
1982	31	<i>0.2</i>	<i>0.1</i>
1983	34	<i>0.3</i>	<i>0.1</i>
1984	56	<i>0.4</i>	<i>0.2</i>
1985	282	<i>2.3</i>	<i>0.7</i>
1986	287	<i>2.2</i>	<i>0.7</i>
1987	347	<i>3.1</i>	<i>0.9</i>
1988	178	<i>1.5</i>	<i>0.5</i>
1989	118	<i>0.9</i>	<i>0.3</i>

Sources: Armscor; South African Reserve Bank, Quarterly Bulletin, various issues; Central Economic Advisory Service(1994)

In addition to the considerable domestic resources costs associated with the establishment of the industry, the opportunity costs included trade-offs with other forms of public expenditure, and the crowding out of more productive investment in the civilian economy. This would seem to have contributed to the underdevelopment and declining competitiveness of the country's manufacturing sector. Any apparent short-term economic benefits were not as valuable as might appear at first sight. Employment creation reflected the inequalities of the apartheid system as well as removing access to highly skilled labour from the civil sector, while arms exports were of questionable benefit to the economy when subsidies are taken into account. Overall, it can be argued that the development of the domestic defence industry distorted and inhibited the trajectory of South Africa's industrial development and exacerbated the country's income and expenditure inequalities, which were an integral part of the apartheid political economy.

### **3. Demilitarisation, Defence Cuts and Disarmament**

South Africa's external strategic environment changed dramatically after 1989. The end of the Cold War and the break up of the former Soviet Union, effectively put an end to superpower rivalry in Southern Africa. This contributed to the resolution of most of the region's historical conflicts (e.g. Namibia, Mozambique) and provided opportunities for countries to reduce their levels of military spending and implement disarmament measures (e.g. demobilisation). It also had a positive impact on the South African state's external threat perceptions and led to dramatic changes in foreign policy. South Africa withdrew its armed forces from Namibia and Angola in 1989 and embarked on an ambitious program of diplomatic and economic outreach to African states (Nathan & Phillips, 1992).

At the same time as these positive political developments were taking place, South Africa experienced its worst domestic recession since the 1930s. As a result of severe budgetary constraints and because of changing government spending priorities, the de Klerk government cut South Africa's defence budget quite dramatically after 1989. The ANC-led government continued to cut the country's defence budget, and by 1996 the defence budget

had declined by more than 50%. As a result of the defence cuts, the share of defence spending in Gross Domestic Product (GDP) declined from over 4% to less than 2% between 1989 and 1996, while the share of defence in total government expenditure declined from 13 % to less than 6% during the same period (Table 3).

**Table 3. Defence Budget Trends, 1989-96**

Figures are in Rand million in constant 1990 prices. Figures in italics are in percentages.

Year	1989	1990	1991	1992	1993	1994	1995	1996
Defence Budget	11435	10071	8094	7605	6589	7153	6249	5895
<i>% change</i>	<i>5.5</i>	<i>-11.9</i>	<i>-19.6</i>	<i>-6.0</i>	<i>-13.4</i>	<i>8.6</i>	<i>-12.6</i>	<i>-5.7</i>
<i>Defence/GDP</i>	<i>4.1</i>	<i>3.6</i>	<i>3.0</i>	<i>2.8</i>	<i>2.4</i>	<i>2.6</i>	<i>2.2</i>	<i>1.9</i>
<i>Defence/Govt.Exp</i>	<i>13.0</i>	<i>12.4</i>	<i>9.8</i>	<i>8.4</i>	<i>6.8</i>	<i>8.1</i>	<i>6.8</i>	<i>5.8</i>
*								

\* Defence Spending as a share of total government expenditure.

Source: Budget Review 1998, (Government Printer: Pretoria, 1998).

It was not only the level of the defence budget which saw significant change, but also the structure. As Table 5 shows, the share of personnel costs and operating costs increased at the expense of procurement and R&D spending. The increasing share of personnel costs during the pre-election period was related to the SADF's internal deployment in support of the police, particularly as a result of the increasing political violence which accompanied the final stages of the process of constitutional negotiations before the elections in April 1994 (Atkinson & Friedman, 1994).

The share of personnel and operating costs continued to increase after 1994 as a result of the integration process and the formation of the South African National Defence Force (SANDF) which started immediately after the elections in April 1994. The dramatic decline in the share of procurement spending to less than 20% by 1996 reflected the cancellation and postponement of a number of armaments projects. The share of procurement costs was, however, extremely high by international standards (Scheetz, 1985).<sup>2</sup>

Despite these cuts South Africa still remained the largest military spender on the continent in absolute terms, and in 1996 accounted for nearly 65% of total military spending in Southern Africa, and 27% of total military spending in Africa (SIPRI, 1997).

<sup>2</sup> Thomas Scheetz suggests that a general international rule is that personnel costs are usually around one third of total defence expenditure. Procurement is also around one third, although this can depend on the lumpiness of procurement spending. (p326).



**Table 4. Structure of Defence Budget, 1989-96**

Figures are in percentages.

Year	1989	1990	1991	1992	1993	1994	1995	1996
Personnel	18.9	21.2	27.6	27.9	31.6	38.6	33.8	41.9
Operating	22.6	21.7	26.9	26.9	28.3	33.5	32.8	40.0
Procurement	58.5	57.1	45.5	45.2	40.1	27.9	33.4	18.1
TOTAL	100	100	100	100	100	100	100	100

Sources: Estimates of Expenditure, State Revenue Account; Budget Review 1998 (Government Printer: Pretoria, 1998).

Accompanying the cuts were a number of related disarmament measures. The SADF was rationalised and restructured, with the disbanding of various units and the closure and scaling-down of bases and installations. In 1993 compulsory conscription for white males was ended. Major weapons projects were cancelled or postponed. Redundant, obsolete and surplus military equipment was sold or destroyed and the country's nuclear weapons programme was terminated (Nathan & Phillips(1992) and Batchelor (1996) provide details). There was also a restructuring of the public sector defence industry. As part of a policy of 'commercialising' public enterprises, Armscor was split into two separate organisations in April 1992. A new state-owned industrial company called Denel was formed under the Ministry of Public Enterprises, and it inherited most of Armscor's research and development and production facilities. Armscor remained part of the Ministry of Defence and retained responsibility for the procurement of armaments for the SADF (Batchelor, 1996; Cilliers, 1994). After the ANC-led government came to power in April 1994, a new civilian Ministry and Defence Secretariat was established. In addition, parliamentary control over the armed forces was re-established through the creation of a parliamentary defence committee with statutory powers of oversight over the armed forces.

#### **4. The Impact of the Defence Cuts: Defence Industry Downsizing and Restructuring**

While there is evidence that the development of the defence industry had clear economic costs, this does not mean that the severe cuts in military spending would have an immediate positive impact. Indeed, cuts of such severity in the midst of a recession exacerbate economic problems, especially if there is no attempt to replace the loss of demand in the economy. Such effects are short-term adjustment costs and are normally felt in terms of job losses and the impact on towns and regions that are dependent on defence spending. Without government action these costs can be severe and can lead to a wastage of valuable resources. The alternative is to develop some form of 'conversion' policy which can aid adjustment. This will be discussed later, but first we examine the impact of the cuts in military spending after 1989.

As Table 3 shows, between 1989 and 1996, South Africa's defence budget declined by 50% in real terms, while the procurement budget declined by nearly 70%. While the overall defence market declined by nearly 70% between 1989 and 1996 (average of 15% per annum), the domestic market only declined by 53% (average of 10% per annum) during the same period (see table 5). The value and share of imports in the overall defence market has

declined in line with the cuts in overall procurement spending. Surprisingly, there appears to have been little effect on imports as a result of the lifting of the UN arms embargoes in May 1994, and the share of imports in the overall market averaged just over 20% between 1989 and 1996.<sup>3</sup>

**Table 5. South African Defence Market, 1989-1996**

Figures are in Rand million in constant 1990 prices. Figures in italics are in percentages.

<b>Year</b>	<b>Total Market*</b>	<b>% change</b>	<b>Imports/ Total (%)</b>	<b>Domestic Market +</b>	<b>% change</b>	<b>Domestic/ Total (%)</b>
1989	6236		42	3618		58
1990	5126	-17.8	42	2973	-17.8	58
1991	3931	-23.3	21	3123	5.1	79
1992	3242	-17.5	17	2696	-13.7	83
1993	3162	-2.5	17	2625	-2.6	83
1994	2427	-23.2	14	2093	-20.3	86
1995	2167	-10.7	17	1808	-13.6	83
1996	1984	-8.4	14	1707	-5.6	86
Average 89-96		-14.8	23		-9.8	77

Notes

\* Based on total value of Armscor Acquisition Spending for Departments of Defence, Safety and Security (Police) and Correctional Services (Prisons).

+ Value of Domestic Acquisition Spending

Source: Armscor; Armscor Annual Report (various years)

The decline in the size of the overall defence market has been reflected in the value of domestic arms production (including exports), which fell by nearly 50% between 1989 and 1996 (see table 6). This was lower than the fall in the overall market because the declines in domestic demand were offset to some extent by increases in the value of exports. The volume of domestic arms production declined by just over 40% during the same period. The contribution of the defence industry to the national economy has also declined since 1989, with the value of domestic arms production in total manufacturing output declining from nearly 7 % in 1989 to around 3 % in 1996, and as a share of GDP from 1.5 % in 1989 to less than 1% in 1996.

<sup>3</sup> It should be noted, however, that the planned purchases of corvettes and other major weapons systems will in all likelihood be funded from outside the defence budget.

**Table 6. Value of Domestic Arms Production, 1989-1996**

Figures are in Rand million in 1990 prices. Figures in italics are in percentages.

Year	1989	1990	1991	1992	1993	1994	1995	1996
Value: Arms Production *	3854	3136	3823	3078	3250	2643	2421	2008
<i>% change</i>		<i>-18.6</i>	<i>21.9</i>	<i>-19.5</i>	<i>5.6</i>	<i>-18.7</i>	<i>-8.4</i>	<i>-17.1</i>
Volume: Arms Production +	111.5	100	90.5	70.1	63.1	62.8	64.4	64.4
<i>Arms Production/Manf. Output (%)</i>	<i>6.6</i>	<i>5.8</i>	<i>6.7</i>	<i>5.3</i>	<i>5.5</i>	<i>4.4</i>	<i>3.7</i>	<i>3.1</i>
<i>Arms Production/GDP (%)</i>	<i>1.5</i>	<i>1.3</i>	<i>1.5</i>	<i>1.2</i>	<i>1.2</i>	<i>0.9</i>	<i>0.8</i>	<i>0.6</i>

\* Value of Domestic Arms Production based on value of domestic acquisition spending and earnings from arms exports.

+ Volume of Domestic Arms Production (1990=100)

Sources: Armscor, South African Reserve Bank, Quarterly Bulletin, various issues

The defence cuts and disarmament measures have also had a dramatic impact on the size and structure of the domestic defence industry. Many defence firms went out of business or exited the defence market, and the industry as a whole has undergone a process of downsizing and restructuring (SADIA, 1996). As Table 7 shows, total employment in the defence industry declined by over 55,000 between 1989 and 1996, including over 10,000 in the public sector defence industry. Employment fell more quickly in the defence sector during the recession than in the overall economy as reflected by the decline in its share of manufacturing and total employment.

**Table 7. Defence industry Employment, 1989-96**

Figures in italics are in percentages.

Year	1989	1990	1991	1992	1993	1994	1995	1996
Armscor/Denel	26348	23630	21387	16580	14914	14847	15209	15218
Total Defence industry	131750	118150	106935	82900	74570	74235	76045	76090
<i>Defence industry/Manf. Employment</i>	<i>8.6</i>	<i>7.7</i>	<i>7.2</i>	<i>5.8</i>	<i>5.3</i>	<i>5.3</i>	<i>5.4</i>	<i>5.3</i>
<i>Arms Industry/Total Employment</i>	<i>2.3</i>	<i>2.1</i>	<i>1.9</i>	<i>1.5</i>	<i>1.4</i>	<i>1.4</i>	<i>1.4</i>	<i>1.3</i>

Sources: Armscor; South African Reserve Bank, Quarterly Bulletin, various issues.

This meant that skilled workers in occupation categories, such as engineers and scientists, bore the brunt of the retrenchments in the defence industry and there is evidence to suggest that many of these retrenched defence workers have found it difficult to find work in the civilian sectors of the economy (Batchelor, 1996). There was no attempt by government to use the savings in the defence budget to create employment for the skilled workers in the civil sector. Instead the impact of the recession was exacerbated.

Defence R&D spending from the national defence budget declined by nearly 70% between 1989 and 1996 (an average of nearly 14% per annum), while the share of R&D spending

within the defence budget declined from nearly 9% to 5% (Table 8). The share of defence R&D in total R&D spending also declined quite dramatically from nearly 50% to less than 20% in 1993 and, while more recent figures are not available, it is likely that it has declined even further in the last few years.

**Table 8. Defence R&D Expenditure, 1989-96**

Figures are in Rand million in 1990 prices. Figures in italics are in percentages.

<b>Year</b>	<b>Defence R&amp;D</b>	<b>% change</b>	<b>% of Defence Budget</b>	<b>Total SA R&amp;D Spending</b>	<b>Defence/Total (%)</b>
1989	985		8.6	2043	48.2
1990	793	-19.5	7.9		
1991	580	-26.9	7.2	2455	23.6
1992	467	-19.5	6.1		
1993	342	-26.8	5.2	1831	18.7
1994	342	0	4.8		
1995	342	0	5.5		
1996	329	-3.8	5.5		
Avg. (89-96)	523	-13.8	6.4		

Source: Armscor; Estimates of Expenditure; SA Science and Technology Indicators (Foundation for Research Development, various years).

In the context of these budgetary constraints, local defence firms have been forced to fund an increasing amount of defence R&D from their own sources. Between 1992 and 1995 Denel's R&D funding from external sources (e.g. defence budget) declined by 25% in real terms. During the same period the company's funding of defence R&D from internal sources increased by 15% in real terms.

The cuts in defence R&D spending since 1989 have not been accompanied by significant increases in total R&D spending in the South African economy. However, there has been some improvement in South Africa's innovative activity (as measured by patenting activity). This might suggest that a crowding out of civilian innovative activity during the 1980s when defence R&D was at very high levels, is no longer occurring.

With such large cuts in demand in the defence sector the performance of the manufacturing industry was bound to have been effected, through the impact on defence contractors, sub contractors and intermediate product suppliers. These effects clearly exacerbated the impact of the general recession. As Table 9 shows, the value and volume of manufacturing production declined quite significantly between 1989 and 1993, capacity utilisation in the manufacturing sector as a whole, and in the defence-related sectors of the manufacturing base, also declined after 1989 and only started to recover in 1995. However, the level of capacity utilisation in 1996 was at the same level as in 1990.

**Table 9. Defence Industry and Manufacturing Performance, 1989-96**

Figures are indices (1990=100). Figures in italics are in percentages.

Year	Value: Defence Industry	Volume: Defence Industry	Value: Manf. Sector	Volume: Manf. Sector	Capacity Utilisation: Manf.Sector	Defence Industry Employment (‘000)	Manf.Sector Employment (‘000)
1989	122.9	111.5	100.5	100.4	<i>84.1</i>	131	1583
1990	100.0	100	100	100	<i>81.9</i>	118	1581
1991	121.9	90.5	96.5	96.4	<i>81.0</i>	106	1546
1992	98.2	70.2	92.6	93.5	<i>78.5</i>	82	1504
1993	103.6	63.1	91.9	93.3	<i>77.9</i>	74	1477
1994	84.3	62.8	94.1	95.8	<i>80.0</i>	74	1480
1995	77.2	64.4	100.8	103.0	<i>83.3</i>	76	1493
1996	64.0	64.4	101.9	103.3	<i>81.5</i>	76	1437

Source: Armscor; South African Reserve Bank, Quarterly Bulletin (various issues); Central Statistical Services, Bulletin of Statistics (various issues).

The negative impact of the defence cuts and disarmament measures was also felt most acutely in those cities, towns (e.g. Simon’s Town ) or regions which are heavily dependent on defence spending as a result of the location of military bases or arms production facilities. The bulk of Armscor’s retrenchments (nearly 80%) between 1989 and 1992 was concentrated in the Pretoria-Witwatersrand-Vereeniging (PWV) region, as opposed to 20% in the Western Cape and less than 1% in the Orange Free State (OFS) (Batchelor, 1996 and Rogerson, 1990). Despite the fact that the impact of the defence cuts was concentrated in the PWV region, the size and diversity of the PWV economy meant that it was more able to absorb the impact of the defence cuts than some of the country’s other regional economies (e.g. Western Cape).

## 5. Defence Industrial Adjustment

In the face of declining demand for their products there are a number of ways companies can respond to try to survive. They can take an *offensive* adjustment strategy, whereby the firm attempts to maintain or increase its defence business. The most common offensive strategies have included increasing arms exports, mergers and acquisitions, and joint ventures with local and/or foreign defence firms. Alternatively, they can take a *defensive* strategy, whereby the firm attempts to reduce its dependency on its defence business. This normally involves some form of conversion and or diversification. Conversion is a general term for the reorientation of production from military to civil. The common usage of the term concerns plant or establishment based conversion, which involves the alternative (civilian) use of a specific defence plant’s existing skills, equipment and technology to produce civilian products - i.e. the classic ‘swords into ploughshares’.

Given the differences that have emerged between defence and civil production methods, plant conversion is no longer seen as a feasible policy (Dunne & Willett, 1992). Instead the focus is now on company conversion, which may involve the transfer of resources and the reorientation of productive capacities from military use to civil purposes. It may also involve

the conversion of all or certain company facilities to civilian production, the development of new or alternative civilian products using existing defence resources (spin-off/dual use), the scaling down of various plants and facilities and the opening up of new facilities (Renner, 1992).

Similarly, diversification within a company is a means of reducing its dependence on military business by moving into, or broadening, its civil production. This can be achieved by investing in new capital or acquiring new civil companies. In addition to outright purchase, mergers, joint ventures and co-production agreements with civilian companies are possible. Diversification may be a permanent alternative to defence business, or just a (temporary) complement to defence business during periods of limited or declining demand for armaments. Firms may, of course, also diversify into the production of other weapons systems.

Conversion can also be seen in a wider policy context. The government creates the military industrial base and is its main customer, as a monopsonist, so it can also force or assist firms to convert. It can, of course, simply cut military expenditure and take a 'hands off' approach, but it can also have some form of proactive policy, using the savings from defence expenditure to aid the adjustment to civil production. This can be done by creating new demands and/or some form of industrial and regional planning (Dunne and Willett, 1992). In South Africa the government has taken a 'hands off' approach to conversion, apart from the creation of Denel in 1992. The result has been a variety of responses by individual companies, to which we now turn.

### ***Vertical Integration, Mergers and Acquisitions***

With the decline in domestic demand for armaments, South Africa's defence and defence related companies have had to reconsider their corporate strategies and the result has been large changes in the structure of the industry. Denel and the major private sector defence contractors, such as Reunert, Grintek and Altech have all attempted to vertically integrate, by outsourcing far less of their defence business than in the past. This has reduced the demand for the output of hundreds of smaller defence firms, particularly those that act as suppliers and sub-contractors for the larger firms. Many small and medium-sized private defence firms have merged with, or been acquired by, larger defence firms in the last few years (e.g. Reunert acquired the armoured car division of TFM in early 1997), while others have exited the market. This has meant that the domestic defence market (excluding imports) has become increasingly concentrated, and by 1996 Denel and the three largest private sector defence firms accounting for over 90% of total domestic acquisition spending (see Table 10).

**Table 10. Structure of South African Defence Market, 1992-96**

Figures are percentages.

Year	1992	1993	1994	1995	1996	Average 1992-96
Imports	17	17	14	17	14	16
Denel	43	34	38	42	44	40
Private Sector	40	49	48	42	42	44
Total	100	100	100	100	100	100

Sources: Armscor Annual Report (various years); Denel Annual Report (various years).

As a result of these developments the structure of the domestic defence market has changed quite considerably since the late 1980s. Denel has continued to dominate the domestic market, averaging 48% market share in the period 1992-1996, while the private sector's share has averaged 52% during the same period. Denel's current share of the domestic market is significantly lower than in the 1980s, when the former Armscor subsidiary companies (now part of Denel) accounted for nearly 70% of the domestic market (Batchelor, 1996).

Denel also continues to dominate most of the 7 major sectors of the domestic defence market, particularly *aerospace*, *ammunition* (small, medium and large calibre), *weapons systems* (including infantry weapons, cannons, artillery systems and missiles) and *military vehicles* and many sub-sectors, such as information technology, and testing. The other major sectors of the domestic defence market, namely *electronics*, *maritime* and *support equipment* remain dominated by the three largest private sector defence firms, namely Reunert, Altech and Grintek. These three companies accounted for over 80% of the private sector's share of the domestic defence market in 1996.

### ***The Push for Exports***

One of the most significant responses to the declining domestic defence market has been the significant increase in South Africa's arms exports. Almost all defence firms, without exception, have pursued export markets quite aggressively since 1989, and particularly since the lifting of the UN arms embargoes in May 1994. Armscor's international marketing efforts, the presence of South African defence firms at international defence exhibitions, together with the support of the ANC-led government have contributed to the increasing value of the country's arms exports shown in Table 11.

**Table 11. South Africa Arms Exports, 1990-1996**

Figures are in Rand million in constant 1990 prices. Figures in italics are in percentages.

<b>Year</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Arms Exports	163	758	438	739	641	721	345
<i>% change</i>		<i>365.2</i>	<i>-42.3</i>	<i>68.8</i>	<i>-13.3</i>	<i>12.5</i>	<i>-52.1</i>
<i>Arms Exports/ Manufactured Exports (%)</i>	<i>0.7</i>	<i>3.0</i>	<i>1.9</i>	<i>3.2</i>	<i>2.5</i>	<i>2.2</i>	<i>N/a</i>
<i>Arms Exports/ Total Exports (%)</i>	<i>0.2</i>	<i>1.1</i>	<i>0.7</i>	<i>1.1</i>	<i>0.9</i>	<i>1.0</i>	<i>N/a</i>

Sources: Armscor; South African Reserve Bank, Quarterly Bulletin, various issues.

The value of South Africa's total arms exports are dominated by Denel who accounted for nearly 80% of the total in 1996 and have averaged nearly 80% per annum since 1992. As a result of the success of its export sales, Denel has also benefited significantly from the General Export Incentive Scheme (GEIS), which was introduced in 1990 to promote manufactured exports and which provides subsidies up to 19.5% of the value of each export contract. Since 1992 Denel has been one of the largest recipients of GEIS payments, and in 1992 was the second largest recipient of GEIS payments after Iscor.<sup>4</sup>

### ***International Joint Ventures***

In addition to finding new export markets, most defence firms have also actively pursued international joint ventures with foreign defence firms, to strengthen their chances of bidding for, and winning, new defence contracts in South Africa and in foreign markets. According to the South African Defence Industry Association (SADIA), by early 1996 there were more than 90 joint ventures between South African and foreign defence firms. Most of these are with European defence firms, and are concentrated in a number of key niche markets (e.g. armoured vehicles, remotely-piloted vehicles, demining technology) in which South Africa has a 'proven' international competitive advantage. The value of these international joint ventures, both in monetary terms and in terms of the technology transfers involved, is difficult to quantify; and will only become apparent if and when a local defence firm and its joint venture partner win a domestic or foreign contract.

### ***Diversification and Conversion***

Denel has actively pursued strategies of diversification and conversion since its inception in April 1992. These strategies have included joint ventures, acquisitions and/or mergers with civilian firms, the purchase of existing non-military product lines or licensing agreements, and the development of civilian products using existing defence technology and production facilities (i.e. spin-off) (Batchelor, 1996). These diversification strategies have been accompanied by significant investments in R&D and new product development as well as by a major marketing strategy to identify new (local and foreign) civilian markets. Only one of

---

<sup>4</sup> GEIS was phased out in 1997. A number of supply-side measures have been introduced by the Department of Trade and Industry (DTI) to encourage exports.



Denel's divisions has pursued an explicit strategy of conversion. Houwteq, which was formerly involved in military satellites, converted all its facilities to civilian purposes in 1992, and became involved in the development and marketing of low-earth orbit (LEO) satellites. However, the initiative was not commercially viable and was terminated in October 1994.

The outcome of Denel's diversification efforts since 1992 is reflected in the trends in the company's turnover and profitability and in the changing composition of the company's business. Denel's turnover declined in real terms between 1992 and 1996 largely as a result of the dramatic declines in the value of domestic defence business. In addition, the composition of Denel's business changed quite dramatically, with domestic defence business declining from 63% in 1992 to 50% in 1996. The company's poor level of profitability over the period was related to the commercially unviable nature of many of the company's assets and facilities that it inherited from Armscor.

The declining contribution of domestic defence business was offset to some extent by increases in exports (mainly arms exports) and civilian sales. The increasing value and share of the latter being directly related to the company's diversification efforts in some of the groups, such as Denel Informatics (Appendix 1 provides more detail on Denel).

**Table 12. Denel Composition of Turnover, 1992-96**

Figures are in Rand million in constant 1996 prices. Figures in italics are in percentages.

Year	1992	1993	1994	1995	1996	Average (92-96)
Turnover	3839	3507	3376	3507	3013	
% change		<i>-9</i>	<i>-4</i>	<i>4</i>	<i>-14</i>	<i>-6</i>
Domestic Defence	<i>63</i>	<i>53</i>	<i>48</i>	<i>45</i>	<i>50</i>	<i>52</i>
Defence Exports	<i>16</i>	<i>20</i>	<i>23</i>	<i>24</i>	<i>14</i>	<i>19</i>
Domestic Commercial	<i>20</i>	<i>24</i>	<i>25</i>	<i>25</i>	<i>30</i>	<i>25</i>
Commercial Exports	<i>1</i>	<i>2</i>	<i>4</i>	<i>5</i>	<i>7</i>	<i>4</i>
Total Defence/Turnover	<i>79</i>	<i>73</i>	<i>71</i>	<i>69</i>	<i>64</i>	<i>71</i>

Source: Denel, Annual Report, various years

Most private sector defence firms have pursued diversification strategies since the late 1980s in order to minimise the impact of the defence cuts. Some firms (e.g. Grinaker Avitronics) have been relatively successful in developing civilian products (e.g. microwave products, voice technology products) from their existing military technologies. However, most small and medium-sized firms have found it more difficult to develop spin-offs because of the resources needed to fund R&D to develop new civilian products. Most of the large defence firms (e.g. Reunert) have been successful in acquiring civilian firms, or civilian product lines through licensing agreements with civilian firms. Conversion has not been popular amongst private sector firms, as it is perceived as expensive and difficult.

The results of these private sector diversification efforts have been mixed. According to information supplied by the South African Defence Industry Association, the private sector defence industry as a whole witnessed real declines in the value of its total sales between

1992 and 1996, largely as a result of the cuts in defence spending. However, the share of civilian sales (both domestic and exports) in total sales increased quite substantially from around 20% in 1992 to nearly 50% in 1996 (SADIA, 1996).

The diversification experiences of the three largest private sector defence firms also provide some indication of general trends in the private sector. All three companies witnessed significant declines in the share of total defence sales in turnover between 1992 and 1996. The value of Grintek's defence sales declined by 20%, while Altech's declined by over 30% during the same period. Both experienced positive average real increases in turnover between 1992 and 1996, despite negative average real declines in defence sales. Thus their growth in non-defence sales, as a result of diversification efforts, exceeded the growth in defence sales. In contrast, Reunert's defence sales increased by 15% during the same period, reflecting the company's relative success in the defence market. However, its growth in non defence production was also relatively high over the period and higher than defence, suggesting some successful diversification efforts.

**Table 13. Private Sector Defence Industry Diversification Efforts, 1992-96**

Figures are in Rand million in constant 1996 prices.

Year	1992	1993	1994	1995	1996	Avg.92-96
<b>1) Reunert</b>						
Turnover	3103	2905	3933	4889	4915	
% change		-6	35	24	1	13
Total Defence Sales	854	744	764	859	981	
% change		-13	3	12	14	4
% of Turnover	28	26	19	18	20	22
<b>2) Grintek</b>						
Turnover	1683	1687	1887	2106	2230	
% change		0.3	12	12	6	7
Total Defence Sales	293	256	236	231	235	
% change		-12	-8	-2	2	-5
% of Turnover	17	15	13	11	11	13
<b>3) Altech</b>						
Turnover	1213	1147	1206	1379	1592	
% change		-5	5	14	15	7
Total Defence Sales	218	188	148	156	150	
% change		-14	-21	5	-4	-8
% of Turnover	18	16	12	11	9	13

Sources: Company Annual Reports, various years.

Overall, the private sector's diversification efforts have not been particularly successful, given the presence of a number of barriers to exit from the defence market. These barriers have included: expensive plant and equipment; highly-paid and highly-skilled defence workers, the presence of a severe domestic recession; a highly competitive and overtraded civilian markets; and a lack of direction from government with respect to the future of the defence industry. The defence firms who were most successful in their diversification efforts tended to be small or medium sized firms with a moderate dependency on defence sales. Large defence firms, such as Reunert, were relatively successful in their diversification efforts because they were financially strong enough to be able to use their resources to develop new civilian products and markets. Small and medium sized defence firms, which did not have the resources to invest in new civilian products and markets, found it extremely difficult and costly to diversify, and many of these firms went bankrupt or exited the defence market completely.

Clearly, there have been major changes in the South African defence industry, with defence companies having a variety of responses to the cuts in military procurement expenditure. The restructuring and commercialisation of South Africa's public sector defence industry since April 1992 has had a dramatic effect on the private sector defence industry. The changes in Armscor's procurement policies, which have entailed more competitive procurement, acquisition from abroad, and the formation of Denel as a contractor and competitor, have fundamentally altered the 'cosy' relationship that was evident between the public sector defence industry and the private sector from the early 1960s. The outcomes of these adjustment strategies have included a changed local defence market in terms of size and structure; the increasing concentration and monopolisation of the domestic defence market; a dramatic increase in defence export sales; the increasing internationalisation of the domestic defence industry through international joint ventures; a significant increase in diversification and conversion initiatives; and a continued restructuring of the public sector defence industry.

## **6. Conclusion**

Analysing the experience of the South African military industrial base over the period of intense cuts in defence spending provides a valuable and instructive case study. It lends support to the argument that if a policy of conversion is to achieve a 'peace dividend', it will need to comprise some form of interventionist policy.

In South Africa the lack of government policy with respect to defence industry conversion has left the onus on individual firms. This has led to offensive corporate responses whereby defence firms attempted to capture as much of the remaining domestic arms market as possible; and to defensive responses whereby firms attempted to find alternatives to the defence market. The offensive activities of both public sector and private sector defence contractors has led to increased concentration in the market. In addition to the reduced orders, vertical integration by the main defence contractors has reduced the value of work that they out-source to sub-contractors and suppliers. Firms have been taken over, merged or have simply left the market. There has been an increase in the number of international

joint ventures formed, to help the exploitation of domestic and international markets, but it is not yet clear how successful this strategy will prove. The only area in which the government has provided some support is for arms exports through Armscor's marketing efforts, and the GEIS. However, GEIS was phased out at the end of 1997.

As regards defensive strategies, diversification efforts varied, including mergers and acquisitions of civilian firms, acquisitions of civilian products, and the development of new civilian products based on existing defence technologies. This has led to higher levels of civilian sales amongst defence firms, but has been of limited success. The absence of any government support for the conversion of the country's defence resources (labour, capital and technology) has left firms to their own devices. This has meant that in many cases they have attempted to produce civilian prototypes of existing defence products without any real knowledge or understanding of how commercial markets work. The limited number of successful conversion efforts in South Africa's defence industry is not unique. The international evidence suggests that, without government support and the political will to support conversion, only those companies with relative strengths in dual-use technology markets, or those companies at the lower levels of the product hierarchy will find conversion relatively easy (Dunne, 1995).

This has meant a marked decline in the defence industry which exacerbated the general economic recession that occurred in the early 1990's. It has also meant that defence firms have continued to pursue strategies aimed at increasing their share of both local and foreign defence markets and that a real opportunity to reduce the power of the military industrial complex and to improve economic performance has been lost.

There will be further cuts in defence spending and the overcapacities in the international defence market make the potential for expansion of trade rather limited. This means that there is still a need for a conversion policy and, given the failure of a purely market driven conversion policy it is evident that the government will need to become proactive. Top down approaches, adopted in government orchestrated conversion strategies has not been particularly successful in Eastern Europe and the former Soviet Union, however, so an alternative approach to defence industrial restructuring needs to be identified for South Africa. A national conversion strategy which is concerned with demilitarising the economy and restructuring a country's industrial and technological priorities, rather than with the micro-level, technical aspects of conversion, seems to be the most appropriate<sup>5</sup>. As part of such a conversion strategy, the government should provide a conducive macro-economic environment which encourages the conversion of resources from military to civilian purposes. This could be achieved through mechanisms and incentives, such as tax breaks, subsidies to spin-off companies, retraining programmes for defence workers, and economic regeneration programmes for towns or regions affected by the recent defence cuts. In addition the government, in conjunction with industry, labour, local and regional authorities and other interested parties should formulate a national defence conversion strategy. This

---

<sup>5</sup> Support for a government-sponsored conversion strategy has come from a number of quarters, including the trade unions, church groups and elements within the ANC. However, beyond a rhetorical call of 'swords into ploughshares' little work has been done on the formulation of a conversion policy that seeks to optimise the gains from the demilitarisation process.

conversion strategy should be integrated with existing defence, industrial and science and technology policies. It should aim to redirect the country's industrial, technological and scientific resources capabilities towards meeting the country's pressing socio-economic needs

The government's support for a strategy of conversion for the domestic defence industrial base is extremely significant for two compelling reasons. Firstly, conversion is an important strategy for demilitarising those components of the South African industrial base that were part of the apartheid military-industrial complex and which have 'survived' into the post-apartheid era. Secondly, it is also the most appropriate mechanism for developing and regenerating the county's industrial base and for eradicating the destructive legacy of militarism, which is still so pervasive in South and Southern Africa.<sup>6</sup>

---

<sup>6</sup> In early 1997 the government initiated a process to produce a White Paper on the Defence Industry. The White Paper, which will be presented to parliament for approval later this year, sets out government's policy towards the defence industry. It suggests the formulation and implementation of a national defence conversion strategy, which includes government support for conversion of the domestic defence industry. What form this support will take still has to be decided and approved by Parliament. However, it is likely that the Department of Trade and Industry, in conjunction with the Department of Defence, will be involved in providing some support to the defence industry's diversification and conversion efforts through its existing supply-side incentive measures.

### *Appendix 1: The Restructuring of Denel*

One of the key features of the changing shape of the South African defence market over the last few years has been the restructuring of the public sector defence industry. With the split up of Armscor in April 1992, Armscor still retained responsibility for acquisition for the SADF/SANDF, while Denel concentrated on research and development and the manufacture of armaments.

From the time of its inception Denel immediately began to pursue a number of adjustment strategies in order to 'commercialise' the former Armscor subsidiaries and to reduce its dependence upon the domestic defence market (Cilliers, 1994, Rogerson, 1995 and Batchelor, 1996). Some of these adjustment strategies were aimed at reducing the company's dependency on its defence business and included retrenching staff, internal cost cutting, the closure of certain production facilities, spin-offs, diversification, and conversion. Some adjustment strategies were aimed at maintaining or increasing the company's defence business (both local and foreign) and included mergers, acquisitions and joint ventures with local and foreign defence firms, and increasing arms exports.

Denel's organisational structure has been subject to a continuous process of restructuring and rationalisation since the company's formation in April 1992. At the time of its formation Denel's business activities were divided into 5 groups - Systems, Manufacturing, Aerospace, Informatics, and Properties & Engineering Services - which in turn consisted of a number of divisions and business units. Most of Armscor's former arms production subsidiaries were consolidated in the Systems, Manufacturing and Aerospace groups. Since 1992 Denel has continued to rationalise and restructure its operations, and in many cases divisions have been closed because of unprofitable operations. In some cases new divisions have been established in order to pursue or consolidate new and expanding non-defence markets.

The different adjustment strategies that Denel has pursued since 1992 have not been mutually exclusive in that the company has made no attempt to get out of the defence market altogether. Instead it has pursued a dual-track approach which involves adapting to the declining domestic defence market by rationalising and consolidating its defence operations, while at the same time reducing its dependence upon the local defence market through diversifying into civilian markets and products, and through increasing arms exports (Batchelor, 1996).

On coming to power in April 1994 the ANC-led government rejected the idea of privatising Denel. However, in late 1995 the government announced that it intended to restructure all state enterprises, including Denel, and that privatisation was one of the restructuring options being considered for all state enterprises.

The restructuring of Denel could include a number of different options: 1) complete privatisation (100% of share capital) of Denel as a single corporate entity like Sun Air; 2) complete privatisation of Denel as separate corporate entities; 3) partial privatisation of Denel as a single corporate entity (with a strategic equity partner) like Telkom or the

Airports Company; 4) partial privatisation of Denel as separate corporate entities. Each of these options would have different implications. For example, if the aim of restructuring is to maximise revenue, then the best option would be complete privatisation of Denel as separate corporate entities. However, if the aim of privatisation is to obtain the maximum benefit to the economy, by increasing Denel's efficiency and competitiveness, then ownership (i.e. privatisation) is not really the issue. Rather the government should concentrate on designing and implementing a clear regulatory framework through legislation, and a competitive procurement policy to ensure that Denel (and the local defence industry) becomes more efficient and competitive.

By mid-1998 the government had still not publicly stated its 'preferred' restructuring option for Denel. However, in late 1997 Denel announced that its information technology division, Denel Informatics, would be renamed Ariel Technologies and that the company would be partially privatised, and eventually listed on the Johannesburg Stock Exchange. The process of privatising Denel Informatics will include a black empowerment option and a management incentive scheme, and it is likely that the state will retain a majority share in the company in the short term. From the above, it seems as if government has chosen the route of partial privatisation of Denel as separate corporate entities.

Another interesting development was the announcement in early May 1998 that the government was planning to set up a state-owned information technology agency (SITA) to enhance information delivery in the public service. It is expected that the agency will be created out of existing state-owned companies, including Telkom and Denel. A bill will be tabled in parliament in September 1998 to establish the proposed agency. This proposed development could be an interesting complement to the strategy of partial privatisation being pursued in relation to Denel Informatics. Batchelor and Dunne (1998) provides more detail.

## **Bibliography**

- Archer S, 1989. Defence Expenditure and Arms Procurement in South Africa. In Cock J and Nathan L (eds), *War and Society: The Militarisation of South Africa*. Cape Town: David Philip.
- Armcor, 1984. *The Armaments Industry in South Africa*. Pretoria: Armcor.
- Armcor, various years. *Annual Report*. Pretoria: Armcor.
- Armcor, various years. *South African Defence Industries Directory*. Pretoria: Armcor.
- Batchelor and Dunne (1998) "The Restructuring of Public Sector Military Industry: A Case Study of Denel". Mimeo, Middlesex University Business School. August.
- Batchelor P. & Willett S. 1998. *Disarmament and Defence Industrial Adjustment in South Africa*. Oxford: SIPRI and Oxford University Press.
- Batchelor P. 1996. *Militarisation, Disarmament and Defence Industrial Adjustment: The Case of South Africa*. Unpublished PhD Dissertation. University of Cambridge.
- Brzoska M. 1986. *South Africa: Evading the Embargo*. In Brzoska M and Ohlson T (eds), *Arms Production in the Third World*. London: Taylor and Francis.
- Brzoska M, 1991. *Arming South Africa in the Shadow of the UN Arms Embargo*. *Defence Analysis*, 7(1),

pp.21-38.

Brzoska M and Lock P, (eds) 1992. *Restructuring of Arms Production in Western Europe*. Oxford: Oxford University Press.

Buys A, 1992. *The Future of the South African Armaments Industry*. *South African Defence Review*, 7, pp. 5-9.

Campbell H, 1993. *The Dismantling of the apartheid Military and the Problems of Conversion of the Military Industrial Complex*, Paper presented at CODESRIA Conference, Accra, Ghana, 21-23 April 1993.

Cawthra G, 1986. *Brutal Force: The apartheid War Machine*. London: IDAF.

Cawthra G, 1988. *South Africa at War*. In Lonsdale J (ed), *South Africa in Question*. London: James Currey.

Cilliers J, 1994. *The Future of the South African Defence industry*. In Garba J (ed), *Towards Sustainable Peace and Stability in Southern Africa*. The Southern African Peacekeeping and Peacemaking Project, Volume 1. New York: Institute of International Education.

Cilliers J, 1995. *Towards a South African Conventional Arms Trade Policy*. *African Security Review*, 4(4), pp.3-20.

Cobbett W, 1989. *Apartheid's Army and Arms Embargo*. In Cock J and Nathan L (eds), *War and Society: The Militarisation of South Africa*. Cape Town: David Philip.

Cock J, 1993. *South Africa's Defence industry: Strategic Asset or Moral Cesspool?* Paper presented at workshop on Arms Trade and Arms Conversion in a Democratic South Africa, Military Research Group, Pretoria, 28-30 June 1993.

Cock J and Nathan L (eds), 1989. *War and Society: The Militarisation of South Africa*. Cape Town: David Philip.

Coker C, 1987. *South Africa's Security Dilemmas*. New York: Praeger.

Department of Defence, 1995. *The National Defence Force in Transition, SANDF Annual Report 1994/95*. Pretoria: Department of Defence.

De Waal T, 1993. *Commercialisation of the Defence Industry: Issues Faced in the Procurement of Arms*. *South African Defence Review*, 11, pp. 7-10.

De Wet G, Jonkergouw E, Koekemoer R, Schoeman N, Steyn F and Truu M, 1996. *The Peace Dividend in South Africa*. In Gleditsch N, Bjerkholt O, Cappelen A, Smith R and Dunne.P, (eds) 1996. *The Peace Dividend*. Amsterdam: Elsevier Science B.V.

Department of Defence, 1967. *White Paper on Defence and Armaments Production 1965-1967*. Pretoria: Government Printer.

Department of Defence, 1969. *White Paper on Defence and Armaments Production 1969*. Pretoria: Government Printer.

Department of Defence, 1977. *White Paper on Defence 1977*. Pretoria: Government Printer.

Department of Defence, 1982. *White Paper on Defence and Armaments Supply 1982*. Pretoria: Government Printer.

Department of Defence, 1984. *White Paper on Defence and Armaments Supply 1984*. Pretoria: Government Printer.



- Department of Defence, 1986. White Paper on Defence and Armaments Supply 1986. Pretoria: Government Printer.
- Department of Defence, 1987. Briefing on the Organisation and Functions of the South African Defence Force and the Armaments Corporation of South Africa Ltd. Pretoria: Government Printer.
- Department of Defence, 1996. Defence in a Democracy: White Paper on National Defence for the Republic of South Africa. Pretoria: Government Printer.
- Denel, various years. Annual Report. Pretoria: Denel.
- Dunne, J Paul (1995) "The Defense Industrial Base", Chapter 14 in Keith Hartley and Todd Sandler (eds) *Handbook of Defence Economics*, Elsevier.
- Dunne Paul and Sue Willett (1992) "National Case Studies in Conversion: The United Kingdom" Chapter 9 in A Brun, L Baehr, H-J Karpe (eds) (1992) "*Conversion - Opportunities for Development and Environment*", pp 209-230, Springer-Verlag.
- Fanaroff B, 1992. A Trade Unionist Perspective on the Future of the Armaments Industry in South Africa. *South African Defence Review*, 7, pp. 10-14.
- Fanaroff B, 1993. The Defence industry: Industrial Relations and Industrial Policy. *South African Defence Review*, 11, pp. 11-15.
- Fine B, 1990. Defence Expenditure and the Post-apartheid Economy. Unpublished paper.
- Fontanel J, 1994. The Economics of Disarmament: A Survey. *Defence and Peace Economics*, 5, pp. 87-120.
- Frankel P, 1984. Pretoria's Praetorians: Civil-Military Relations in South Africa. Cambridge: Cambridge University Press.
- Friedman S, (ed) 1993. The Long Journey: South Africa's Quest for a Negotiated Settlement. Johannesburg: Ravan Press.
- Friedman S and Atkinson D, (eds) 1994. *South African Review 7: The Small Miracle -South Africa's Negotiated Settlement*. Johannesburg: Ravan Press.
- Geldenhuis D, 1990. *Isolated States: A Comparative Analysis*. Cambridge: Cambridge University Press.
- Grundy K, 1986. *The Militarisation of South African Politics*. London: I.B.Taurus.
- Heitman H, 1985. *South African War Machine*. Johannesburg: Central News Agency.
- Heitman H. 1992. South Africa's Defence Industry: Challenges and Prospects. *South African Defence Review*, 2, pp. 26-34.
- Heitman H, 1992. The South African Defence Industry: Present and Future Prospects. *South African Defence Review*, 7, pp. 15-25.
- Hough M, 1993. Disarmament and Arms Control with Specific Reference to the RSA. *South African Defence Review*, 9, pp. 17-23.
- Hough M, 1988. The UN Arms Embargo Against South Africa: An Assessment. *Strategic Review for Southern Africa*, 10(2), pp. 22-38
- Howlett D and Simpson J, 1993. Nuclearisation and Denuclearisation in South Africa. *Survival*, 35(3), pp.

154-173.

International Defence and Aid Fund, 1980. *The Apartheid War Machine. Fact Paper on Southern Africa*, 8. London: International Defence and Aid Fund.

James W, (ed) 1987. *The State of Apartheid*. Boulder: Lynne Rienner.

Jaster R, 1989. *The Defence of White Power: South African Foreign Policy Under Pressure*. New York: St.Martins Press.

Joffe A, Kaplan D, Kaplinsky R and Lewis D, 1995. *Improving Manufacturing Performance in South Africa: Report of the Industrial Strategy Project*. Cape Town: University of Cape Town Press.

Kaplan D, 1995. *Ensuring Technological Advance in the South African Manufacturing Industry: Some Policy Proposals*. In Joffe et al (eds) *Improving Manufacturing Performance in South Africa: Report of the Industrial Strategy Project*. Cape Town: University of Cape Town Press.

Kaplinsky R, 1992. *South African Industrial Performance and Structure in a Comparative Context*. Paper Prepared for Industrial Strategy Meeting, Johannesburg, 6-10 July 1992.

Keller E and Picard L, (eds) 1989. *South Africa in Southern Africa: Domestic Change and International Conflict*. Boulder: Lynne Rienner.

Khan C, 1992. *Thoughts on the Future of the South African Armaments Industry*. *South African Defence Review*, 7, pp. 26-28.

Landgren S, 1989. *Embargo Disimplemented: South Africa's Military Industry*. Oxford: Oxford University Press.

Leonard R, 1983. *South Africa at War*. Westport: Laurence Hill.

Lipton M, 1986. *Capitalism and apartheid: South Africa, 1910-1986*. Cape Town: David Philip.

Lonsdale J, (ed) 1988. *South Africa in Question*. London: James Currey.

Matthews R, 1988. *The Development of the South African Military Industrial Complex*. *Defence Analysis*, 4(1), pp. 7-24.

McMillan S, 1992. *Economic Growth and Military Spending in South Africa*. *International Interactions*, 18(1), pp. 35-50.

McWilliams J, 1989. *Armscor: South Africa's Arms Merchant*. London: Brasseys.

Moll T, 1991. *Did the apartheid Economy Fail?* *Journal of Southern African Studies*, 17(2), pp. 271-291.

Nathan L and Phillips M, 1992. *Cross Currents: Security Developments under F.W. de Klerk*. In Moss G and Obery I, (eds). *South African Review 6: From Red Friday to Codesa*. Johannesburg: Ravan Press.

Nathan L, 1993. *Towards a Post-apartheid Threat Analysis*. *Strategic Review for Southern Africa*, 15(1), pp. 43-71.

Natras N and Ardington E, (eds) 1990. *The Political Economy of South Africa*. Cape Town: Oxford University Press.

Navias M, 1993. *Towards a New South African Arms Trade Policy*. *South African Defence Review*, 13, pp.38-49.

Philip K, 1989. *The Private Sector and the Security Establishment*. In Cock J and Nathan L (eds), *War*

- and Society: The Militarisation of South Africa. Cape Town: David Philip.
- Pretorius R, 1983. The South African Defence Industry: Defending apartheid. Unpublished Honours Thesis, University of the Witwatersrand, Johannesburg.
- Ratcliffe S, 1983. Forced Relations: The State, Crisis and the Rise of Militarism in South Africa. Unpublished Honours Thesis, University of the Witwatersrand, Johannesburg.
- Ratcliffe S, 1984. The Shifting Dominance: The Foundations of the Armaments Industry during the 1960s. *Africa Perspective*, 25, pp. 24-39.
- Renner M, 1992. *Economic Adjustment After the Cold War: Strategies for Conversion*. Aldershot: Dartmouth.
- Rogerson C, 1990. Defending apartheid: Armscor and the Geography of Military Production in South Africa. *GeoJournal*, 22(3), pp. 241-250.
- Rogerson C, 1995. The Question of Defence Conversion in South Africa: Issues from the International Experience. *Africa Insight*, 25(3), pp.154-162.
- Roux A, 1994. Defence, Human Capital and Economic Development in South Africa. *South African Defence Review*, 19, pp. 14-22.
- Scheetz, Thomas (1985) "Gastos Militares en Chile, Peru y la Argentina", *Desarrollo Economico: Revista de Ciencias Sociales*, Vol. 25, no. 99, pp 315-327.
- Schrire R, (ed) 1990. *Critical Choices for South Africa: An Agenda for the 1990s*. Cape Town: Oxford University Press.
- Schrire R, (ed) 1992. *Wealth or Poverty? Critical Choices for South Africa*. Cape Town: Oxford University Press.
- Seegers A, 1992. Current Trends in South Africa's Security Establishment. *Armed Forces and Society*, 18(2), pp.159-174.
- Seegers A, 1996. *The Military in the Making of Modern South Africa*. London: Tauris Academic Studies.
- Shaw T and Leppan E, 1985. South Africa: White Power and the Regional Military-Industrial Complex. In Aluko O and Shaw T, (eds). *Southern Africa in the 1980s*. London: George Allen and Unwin.
- Shearer J, 1993. Denuclearisation of Africa: The South African Dimension. *Disarmament*, 16(2), pp. 171-85.
- Simkins C, 1994. The South African Economy: Problems and Prospects. In Spence J, (ed). *Change in South Africa*. London: Pinter.
- Simpson G, 1989. The Politics and Economics of the Armaments Industry in South Africa. In Cock J and Nathan L (eds), *War and Society: The Militarisation of South Africa*. Cape Town: David Philip.
- Singh R and Wezeman P, 1995. South Africa's Arms Production and Exports. In *SIPRI Yearbook 1995: Armaments, Disarmament and International Security*. Oxford: Oxford University Press.
- Southwood P, 1991. *Disarming Military Industries: Turning an Outbreak of Peace into an Enduring Legacy*. London: MacMillan.
- South African Defence Industry Association, 1996. *Some Statistics of the SADIA members of the Defence Industry*. Johannesburg: SADIA.

- South African Institute of Race Relations, various years. Race Relations Survey. Johannesburg: South African Institute of Race Relations.
- South African Reserve Bank, various years. Quarterly Bulletin. Pretoria: South African Reserve Bank.
- Sparks D, 1993. The Peace Dividend: Southern Africa after apartheid. *Indicator South Africa*, 10(2), pp.27-32.
- Steyn P, 1993. Challenges and Prospects for the SA Defence Industry: Equipping the Armed Forces for the Future. *South African Defence Review*, 11, pp. 1-6.
- Steyn P, 1995. Aligning the South African Defence Industry with Regional Integration and Security. *African Security Review*, 4(2), pp.15-23.
- Financial Mail, various years. Top Companies. Johannesburg: Financial Mail.
- Transitional Executive Council, Subcouncil on Defence, 1994. National Policy for the Defence Industry. Pretoria: Transitional Executive Council.
- Vayrynen R, 1980. The Role of Transnational Corporations in the Military Sector of South Africa. *Journal of Southern African Affairs*, 5(2), pp. 199-255.
- Willett S and Batchelor P, 1994. To Trade or Not to Trade: The Costs and Benefits of South Africa's Arms Trade. Working Paper No. 9, Johannesburg: Military Research Group.
- Willett S, 1990. Conversion Policy in the UK. *Cambridge Journal of Economics*, 14(4), pp. 469-482.
- Williams R, 1993. The Changing Parameters of South African Civil-Military Relations: Past, Present and Future Scenarios. Working Paper No.6, Johannesburg: Military Research Group.