Scientia Militaria
2024, VOL. 52, NO. 1, 59-86
DOI: 10.5787/52-1-1447

Reflecting on the Rise and Decline of the South African Defence Industry

Kevin Gopaul[263], *Elma van der Lingen*[264] & *Rudolph Oosthuizen*[265]
Graduate School of Technology Management, University of Pretoria, Pretoria, South Africa

Abstract

The South African Defence Industry has undergone several significant changes during the past six decades, with its current state being deemed unfavourable for continued survivability. To develop a robust understanding of the industry, a review of the scientific literature (and government policies) has been undertaken to chart the trends in the industry through the decades. South African political ideologies in the sixties and seventies resulted in a need for self-sufficiency in defence. By the late eighties, increased military spending resulted in a powerful and capable defence industry, but the end of apartheid and regional conflicts saw an expected sharp drop in the defence budget. The Strategic Defence Package offered some respite in terms of exports, but this has declined in the recent past. The defence budget has remained at a steady low value for two decades, with no real possibility of an increase. To maintain relevance and ensure organisational resilience, the remnants of the South African Defence Industry should use the Defence Industry Strategy as a baseline to develop robust local relationships to drive innovation and foster economic growth, while also strengthening international market share by strengthening unique South African technologies.

Keywords: South Africa, South African Defence Industry, Strategic Defence Package, defence budget, innovation, economic growth, organisational resilience, technologies

Introduction

In recent years, scholarly publications and popular sources have observed that the South African Defence Industry (SADI) has declined over the past number of decades, with a handful of defence companies remaining in the country. This downturn is also reported to be present in the state-owned entities (SOEs) that have performed defence-related work (the Denel Group being a prime example). As described below, due to the lack of investment in the SADI and the subsequent loss of skills and expertise, commentary is rife with "doom and gloom" predictions regarding the industry and the impact this downfall will have on South Africa. In 2020, the SA Secretary for Defence, Gladys Sonto Kudjoe, made several declarations regarding the state of the SADI, maintaining that the reduction in the defence budget resulted in the SADI facing challenging times, that more

investment and innovation were required as defence is a sovereign capability[1] that can generate foreign income, and that the SADI is seen as a driver of the development and incubator of advanced technology that spills over to other areas.[266]

While academics and the media have come to seemingly foregone conclusions that the SADI has been extraneously eroded, it was deemed prudent to conduct an academic study of the reasons for the changes in the defence budget through the decades, with an analysis of the funding trends from the past to the present, and the consequences these trends have had for the SADI. The two outcomes of this historical perspective were envisaged to be addressing the fundamental question of *why* the SADI is considered to be in a decline, as well as whether the constant comparison to the past is indeed warranted. The past-to-present correlation was expected to provide a platform from which to forecast the possible future trajectory of the SADI, and informed speculation subsequently intended to address the resilience of the SADI. Organisational resilience is a critical factor that allows organisations to cope with adversity, such as natural disasters, financial crises, and epidemics.[267] At the very least, the aforementioned commentary was to be evaluated from an intellectual perspective, and a fresh outlook had to be gained by reflecting on six decades of history. Figure 1 below depicts this approach, with key events highlighted to chart the journey through the rise and fall of the SADI. The analysis behind the approach was based on an extended literature review of scientific publications (the vast majority being qualitative journal articles), conference proceedings, books, and government policies. With the universal emphasis placed on arms production by many Commonwealth countries during the Second World War, the period after the war was seen as being relevant to a study on the development of SA defence industrial capabilities. In addition, as will be shown below, the political climate from the 1960s onwards played a considerable role in shaping the SADI.

Defence Industrial Origins

The SADI was effectively established with British support shortly before the Second World War. The war resulted in many civilian firms participating in the war effort, with most of them returning to their roots after the war.[268] A few factories were maintained, such as Defence Ordinance (later Lyttelton Engineering Works) and the SA Mint Ammunition Factory.[269] In 1951, talks of domestic production of armaments gained momentum when the Defence Production Board was established, which was tasked to liaise between the Department of Defence (DoD) and the private sector. The mandate of the board was to provide advice to the DoD regarding arms procurement as well as the create a domestic arms production capability. This resulted in the establishment of new defence-capable industries, although expansion was not significant.[270]

[1] "Sovereign capability" is defined by the 2015 Defence Review as the ability to ensure, under full national control and without reliance on any direct foreign assistance, certain capabilities identified as vital to national security.

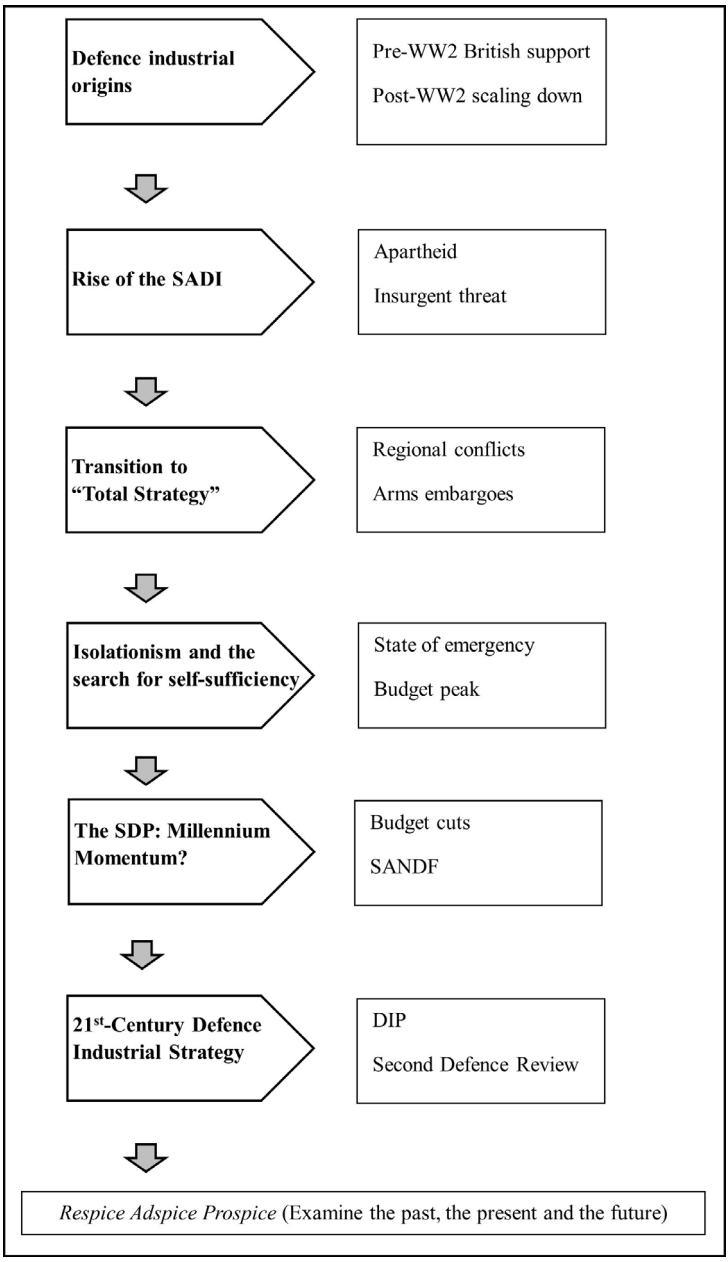

Figure 1: Approach to analysing the rise and eventual decline of the South African Defence Industry.

Rise of the SADI

The 1960s saw a drastic change in the defence environment. Violent uprisings suddenly became increasingly common as the black majority fought against everything the apartheid regime represented. These protests were met with force.[271] The gross human rights violations imposed on the majority of the SA population at the time resulted in international condemnation, with the United Nations (UN) Security Council imposing a voluntary arms embargo on South Africa.[272] This severely limited SA access to arms and related equipment and technology. South Africa also began expanding its supply chain by engaging with nations willing to ignore the embargoes, including France, Italy and Israel.[273] At this point, it is reported that close to 1 000 firms were involved in various aspects of arms production, from research and development (R&D) to component production and final assembly of certain weapons systems. Technology development was also vital as many firms engaged in activities to keep abreast and ahead of arms advancements.[274] The early 1960s further saw civil wars take hold in the neighbouring states of Angola and Mozambique, with the Soviet Union supplying arms to insurgents.[275] South Africa, therefore, took a firm anti-communist stance, resulting in technology transfers from Western countries (in particular the United States and Britain), boosting the economy and starting an expansion of the manufacturing sector.[276]

The anti-apartheid protests required force to quell the resistance, and communism was seemingly at the doorstep with the conflicts in other Southern African countries. While sanctions did fuel innovation in specific sectors, especially defence, they hindered capability of government to repel these threats fully. A robust solution was therefore needed.

In the early 1960s, military spending amounted to just over 1 per cent of the SA gross domestic product (GDP).[277] This increased to about 3 per cent by the mid-1960s.[278] The increase in military spending was also related to the growth of the South African Defence Force (SADF), which almost doubled in size between 1960 and 1970.[279] Evolution on government level came in the form of the 1968 amalgamation of the Armaments Board and the Armaments Development Corporation, which resulted in the establishment of the Armaments Development and Production Corporation (Armscor). Armscor was responsible for procuring armaments for the SADF and ensuring optimal utilisation of the private sector for arms production.[280] During the next few years, Armscor took over various private sector companies and established several production and R&D facilities.[281] Examples include Atlas Aircraft Corporation and rifle manufacturer Musgrave being acquired in 1969, with Kentron established to develop missile technology, and the Institute for Maritime Technology (IMT) created to provide naval R&D support.[282]

The military spending, coupled with establishing an effective local defence capability, resulted in the government successfully containing the domestic political opposition to apartheid to a large extent, with the SADF playing a significant role in helping the South African Police (SAP) to quench the violence. The literature points to this success eventually reducing the defence budget to around 2 per cent of the GDP by 1970.[283] With regard to the external threat, the 1969 Defence White Paper however stated that although an unconventional threat already existed in the form of terrorism, the possibility of a

conventional attack was not excluded. This was based on a threat analysis conducted by the SADF, which concluded that insurgencies similar to those that took place in Rhodesia (now Zimbabwe), Angola or Mozambique could occur à la the Korean War;[284] thus began the roots of the Border War.

The primary reason for the increased defence budget in the early to mid-1960s was, therefore, a political one strongly influenced by the perception of a threat, both from a domestic perspective and from an international (anti-communist) perspective. It was however also an economic, social, strategic and geopolitical threat. The sustainment of the apartheid ideology and keeping the insurgent communist threat at bay (in the face of arms embargoes) made self-sufficiency concerning all matters relating to defence paramount. An assumption that can be made is that, even if an arms embargo did not come into play, an increase in defence spending would indeed have taken place to quell the resistance, albeit not to the extent that it did due to the need for self-sufficiency. Nevertheless, history has shown that this template formed the basis for developing the SA security and defence capability that became a formidable force by the late 1980s.

Transition to "Total Strategy"

Military spending began to increase in the early 1970s due to a concomitant increase in internal and external opposition to apartheid. The independence of both Angola and Mozambique contributed to the threat perception, and thus added momentum to increased defence spending. From the early 1970s, the SADF was deployed in South West Africa (now Namibia) in support of the SAP against insurgent infiltrations, and in 1975, South Africa became involved in the Angolan Civil War.[285] A further significant development came in 1973 with the establishment of the Defence Advisory Council (DAC) to co-ordinate involvement by the private sector in domestic arms production. The DAC was chaired by Minister of Defence PW Botha, and included the president of the Armaments Board and representatives from many of the major private sector companies in the country.[286] Establishing the DAC represented the growing institutional links between the state, the military, and private industry, and is often regarded as the point at which the local military–industrial complex in the country actually began.[287]

These events led to key procurement programmes in the mid- to late 1970s that propelled the SA military as well as defence industrial base forward at lightning speed. A large number of weapons systems were procured in 1975, the most noteworthy being the Dassault Mirage F-1 fighter aircraft from France.[288] In 1976, the UN changed its voluntary arms embargo into a mandatory one, thereby making the acquisition of arms seemingly impossible.[289] The same year saw the fierce Soweto uprising occur, a watershed moment in SA history.[290] From a strategic defence perspective, Armscor assumed responsibility for procuring and producing armaments for the SADF. This made Armscor the central player in the SA domestic defence industry. It not only determined the size, structure, profitability, and many other aspects of the local defence market, but it simultaneously functioned as one of the largest domestic arms producers in the country, with private firms acting as subcontractors. As Dunne reports, Armscor was both a player and a referee in the domestic defence market.[291] These events, coupled with communist expansionism,

prompted the SA government to adopt the "Total Strategy" policy.[292] First suggested in the 1977 Defence White Paper, the policy was led by Defence Minister PW Botha.[293] The result was the unprecedented political influence of the military establishment and the actual militarisation of SA society in which the SADF played a central role.[294]

The expansion of military power and influence as a social institution became evident on political, economic, and ideological levels.[295] "Total Strategy" addressed both the domestic and the regional security situation, with the SADF becoming the primary vehicle for the destabilisation of most neighbouring countries. The security situation inside the country continued to deteriorate and, although the SAP remained the leading agency for internal security, the role of the SADF inside South Africa steadily increased.[296] The rise in military spending in 1977–1978 peaked at 5 per cent of the GDP, and totalled over 18 per cent of total government expenditure.[297] The SADF and SAP grew substantially in terms of service members and equipment and, as expected, the arms industry systematically expanded. The late 1970s also saw the start of the SA nuclear weapons programme.[298] It is worth noting that a self-sufficiency parallel to the SADI can be drawn with the SA energy requirements during the 1970s and beyond, both areas deserving additional in-depth exploration.

Isolation and the Search for Self-Sufficiency

After a decline in military spending at the end of the 1970s, it began to increase again during the mid-1980s as a result of the increasing involvement by South Africa in Angola, Namibia, and Mozambique, as well as the deteriorating internal security situation, which saw increasingly violent domestic opposition to apartheid.[299] More stringent arms embargoes were implemented in conjunction with other economic sanctions and boycotts.[300] Alsheh states, 'by the late 1980s, South Africa had become the single most ostracised, sanctioned and universally condemned regime in the history of the international community and the paradigmatic pariah state'.[301]

President Botha politically modified the role of the defence force through his "Total Strategy", and created the military-dominated State Security Council (SSC), which effectively replaced Cabinet, and became the centre of national decision-making and official power in the 1980s.[302] The effect was a guaranteed supply of weapons of ever-increasing sophistication. The arms industry became a "strategic" one, with Armscor benefitting from massive state investment and receiving privileged access to various state resources.[303] In the mid-1980s, Armscor had contracts with more than 2 000 private sector companies.[304] At the time, it was estimated that about 400 of these firms were wholly reliant upon Armscor contracts, providing insight into the extent to which such companies were dependent upon the needs of the SADF.[305] By the late 1980s, Armscor had emerged as one of the largest industrial companies in the country, employing over 30 000 people.[306] The SADI employed an estimated 131 750 people, constituting some 8,3 per cent of the total employed in the SA manufacturing sector.[307] This is further demonstrated by the fact that the SADI absorbed a relatively large proportion of the scarce skilled labour in the country, a prime example being that more than 10 per cent of the total number of R&D scientists and engineers were employed by Armscor itself.[308] South Africa had, therefore, established a substantial defence industry, which offered products

and equipment developed for use in the difficult terrain in the region. The country became self-sufficient in terms of systems integration capabilities with more than acceptable product lines at various levels.[309] The industry manufactured most calibres of arms and ammunition, military vehicles, communications and electronic warfare equipment, as well as air-to-air and anti-tank missiles. It was also capable of assembling military aircraft and constructing and arming strike craft and minesweepers.[310] Moreover, in an attempt to push the envelope further into military capabilities, South Africa started a chemical and biological weapons project in 1981.[311]Military spending peaked again in 1989–1990 at 4 per cent of the GDP and 13 per cent of total government expenditure.[312]

Self-Sufficiency "Case Study" – The South African Air Force

During the mid- to late 1980s, the South African Air Force (SAAF) was considered to be at its peak both in terms of size and proficiency. It is therefore prudent to reflect briefly upon the most capable air force in sub-Saharan Africa at the time. This is done to draw a parallel to the immense effort of developing and maintaining a capability that could support the SAAF, as the undertaking of military aircraft support is highly specialised and resource-intensive. A similar analysis could be performed for the SA Navy and Army, with examples being the SAS *Drakensberg* and artillery systems, but the conclusion would be the same; the SAAF is therefore used to illustrate the concept.

The major development that led to this impressive aerospace capability was the establishment of the Atlas Aircraft Corporation at the then Jan Smuts Airport (now OR Thambo) in the late 1960s. A considerable infrastructure had to be created to support and sustain this capability.[313] In 1966, the first Impala Mk 1 was produced (150 followed). The Mirage F-1, Mirage III, and the Alouette III assembly processes were initiated as the years went by. In 1974, the first Kudu light transport and the Impala Mk II were built (99 followed). This continued unabated into the 1980s.[314] It was claimed that Atlas created an aviation industry from a zero base, and that very few companies could support a mixed fleet of jet trainers, helicopters, and fighters without proper backup from the manufacturers.[315]

In 1985, the SAAF Order of Battle consisted of the aircraft as per Table 1, as adapted from Heitman,[316] and Becker,[317] and based on the first author's own experience and research while being a member of the SAAF:

Table 1: South African Air Force Order of Battle (1985)[318]

Squadron	Location	Type	Role
1	Hoedspruit	Mirage F1AZ	Ground attack, fighter
2	Hoedspruit	Mirage IIICZ	Ground attack, fighter
3	Waterkloof	Mirage F1CZ	Fighter-interceptor
4	Lanseria	Impala Mk II	Ground attack
5	Durban	Impala Mk II	Ground attack
6	Port Elizabeth	Impala Mk II	Ground attack
7	Cape Town	Impala Mk II	Ground attack
8	Bloemspruit	Impala Mk II	Ground attack
11	Potchefstroom	Cessna 185	Liaison, battlefield reconnaissance
12	Waterkloof	Canberra	Bomber, reconnaissance
15	Swartkop	Super Frelon	Transport, search and rescue
16	Port Elizabeth	Alouette III	Battlefield support, counterinsurgency
17	Bloemspruit	Alouette III	Battlefield support, counterinsurgency
19	Swartkop	Puma	Transport, search and rescue
21	Waterkloof	Mercurius Viscount	VIP transport
22	Ysterplaat	Alouette III Wasp	Anti-submarine warfare, search and rescue
24	Waterkloof	Buccaneer	Bomber, naval strike, interdiction
25	Ysterplaat	Dakota	Battlefield support
27	Ysterplaat	Albatross	Maritime patrol Search and rescue
28	Waterkloof	C-130 C-160	Transport
30	Ysterplaat	Puma Super Frelon	Battlefield support Counterinsurgency
31	Hoedspruit	Alouette III Puma	Battlefield support Counterinsurgency
35	Cape Town	Shackleton	Maritime patrol
40	Dunottar	Impala Mk II	Ground attack
41	Lanseria	Kudu	Light battlefield support

Squadron	Location	Type	Role
42	Potchefstroom	Bosbok	Battlefield reconnaissance
44	Swartkop	Dakota DC-4	Transport
1 Central Flying School (FS)	Dunottar	Harvard	Training
2 Flying Training School	Langebaanweg	Impala Mk I	Training
84 Advanced FS	Potchefstroom	Bosbok Kudu C-185	Training
85 Combat FS	Pietersburg	Impala Mk I, Mk II Mirage IIIEZ, BZ, DZ, D2Z	Training
86 Advanced FS	Bloemfontein	Dakota	Training
87 Advanced FS	Bloemspruit	Alouette III	Training

The number of aircraft, different aircraft types, as well as the geographical distribution of squadrons that the SAAF operated in the mid-1980s is astonishing, especially when compared to the current inventory. Impalas numbered 251, and the Mirage family, just over 100, with similar numbers for helicopters and transport types. While the number of aircraft indicates the need as perceived by government at the time, it is also a testament to the capability created to support these aircraft and to the productive and innovative capacities of the people of this industry. South Africa did manage to acquire aircraft during the arms embargo years and, during these years of isolation, the SADI took up the gauntlet of adequately supporting the execution of the defence component of the Total Strategy policy.

R&D – Trying to be a Step Ahead

The advances made by the SADI regarding aerospace technology during the apartheid era were not just the assembly and maintenance of aircraft and related systems, but also the R&D required to ensure that South Africa was at the forefront of technology and maintaining a strategic advantage. It is also theorised that the level of economic sanctions and the arms embargo resulted in the systems in service by the SAAF being deemed irreplaceable; thus, perpetuating the drive to be self-sufficient.[319] From the 1970s, the South African R&D effort, spearheaded by the SAAF, Armscor, industry as well as academia (as stated by Campbell, the 'ideas and research agenda of the SADF drew heavily from the institutions of higher learning'),[320] resulted in various aerospace technology projects that were internationally competitive – with the impact still felt in South Africa today. The upgrade of the Mirage III to the advanced Cheetah fighter saw South Africa work closely with Israel, with the type first revealed to the public in 1986.[321] Similarly, the Atlas Aircraft

Corporation upgraded the Puma helicopter to the Oryx during the 1980s.[322] Closely related to the Oryx was the development of the Rooivalk combat support helicopter, a project that began in 1984, and had its first flight in 1990. Budget cuts saw the aircraft eventually entering service at the end of the decade.[323] "Smart Bomb" development, such as the TV-guided H2 glide bomb, was used in combat when a bridge was destroyed in Southern Angola after the bomb had been launched from a Buccaneer bomber in January 1988.[324] Electronic Warfare (EW) expertise, which is still being used today, came into operation during the Border War to counter the surface-to-air missile threats faced during operations in the theatre.[325] A final example is the SA air-to-air missile design and development capability, which started in 1969. Initially based on the US Sidewinder missile, this experience soon blossomed into a world-class capability.[326]

The End of the Decade – The Cost of Self-Sufficiency

The SADI emerged as a significant creator of employment during the 1970s and 1980s.[327] There was massive investment by the state, and large-scale involvement of the private sector. Total industry employment as a percentage of total manufacturing employment increased from less than 1 per cent in 1961 to over 9 per cent in the late 1980s. Military spending peaked at 4 per cent of the GDP in 1989, and comprised 13 per cent of total government expenditure.[328] There have however been observations that the SA self-sufficiency drive came at the expense of the greater economy, and that the end of the decade saw an increasing number of modern Soviet weapons entering the theatre of operations in Angola and further afield. The competitive pressure to respond to the perceived threat was slowly becoming overwhelming. SA leadership was lulled into a false sense of security, believing they had achieved self-sufficiency and could henceforth design new weaponry at the forefront of technology.[329]

As early as the mid-1970s, Schieber reported, 'apartheid is economically and politically unpracticable'.[330] A by-product of the apartheid dogma was the construction of an autarkic[2] defence industrial complex, which further drained the SA economic revenue streams that could have been used for social development projects. Saba quantitatively examined defence spending and economic growth in South Africa over the period 1960–2018 and concludes, 'in the long- and short-run, defence spending retard[s] economic growth'.[331] In another article based on a quantitative study, Dunne and Vougas categorically state, 'the military burden of the apartheid regime did have a bad effect on the economy'.[332] In a later article, Dunne states that the strategy of attaining self-sufficiency in armaments left South Africa with an advanced and comprehensive defence industrial complex but at great economic and fiscal cost.[333] The government allowed the employment of scarce skilled human resources in defence, when they could have been used more effectively in other areas, thereby contributing to the national economy. Further, new forms of dependency on foreign technology sources absorbed increasing amounts of scarce foreign exchange resources.[334] Arms exports increased during the 1980s, but export subsidies resulted in the SA trade balance in armaments remaining negative. The defence sector thus remained a net user of foreign exchange resources throughout the decade.[335] By the mid- to late

[2] **Autarkic**; specifically national economic self-sufficiency and independence

1980s, scholars were analysing the long-term prospects of apartheid, and whether the SADF and the SADI could successfully support the ideals of government (in other words, the cost of self-sufficiency).

The SDP: Millennium Momentum?

The end of apartheid in the early 1990s marked the end of the need for self-sufficiency. Military spending was at an all-time high when this occurred, and the SADI performed at its full capacity. At the time, scholars, such as Campbell, postulated that a new society needed to be created in South Africa, one that was inextricably linked to the demilitarisation of society 'from top to bottom'.[336] The process of "conversion" needed to be investigated and implemented, 'dismantling of the SADF and the laying of the basis for the conversion of the factories producing weapons … to build bridges, transportation systems, houses, new communities'.[337]

During the early 1990s, the international community also experienced considerable changes from several perspectives. The end of the Cold War in 1991 resulted in defence cuts in many countries, with hundreds of thousands of defence industry personnel being retrenched.[338] Several historical conflicts in sub-Saharan Africa ended, changing the SA external threat perception, and armed forces were withdrawn from Namibia and Angola in 1989.[339] There was no longer a clear need for maintaining a strong military, resulting in an SA defence budget that "suffered" the most. SA defence funding decreased by 40 per cent between 1989 and 1994, while procurement expenditure declined by 60 per cent[340]. The share of defence spending in GDP declined from over 4 per cent to less than 2 per cent between 1989 and 1996, while the share of defence in total government expenditure declined from 13 per cent to less than 6 per cent over the same period.[341] The SA socio-political transformation in the early 1990s occurred during the most severe economic recession in the country since the 1930s.[342] Dunne and Vougas report that employment and investment declined over this period, and exports showed little growth, mainly because of the continued presence of trade and financial sanctions. Inflation remained high, averaging 13,6 per cent per annum.[343] Accompanying the budget cuts were several related disarmament measures – conceptually, the "demilitarisation of South Africa". Jordaan states that a call was made to restructure the military along non-offensive defence lines.[344] The SADF was rationalised and restructured (the Interim Constitution approving the creation of the South African National Defence Force [SANDF] on 26 April 1994),[345] with various bases and units scaled down and/or shut down. Major weapons projects were cancelled or postponed. Obsolete and surplus military equipment was sold or destroyed, and the SA nuclear weapons programme was terminated.[346] It is thought-provoking that the literature contains no counter-arguments to the scaling-down process; political will might have been too strong to consider other options, but given the benefit of hindsight, a revisionist approach could be considered as a matter of interest.

The dramatic defence cuts affected the SADF, which, in turn, significantly affected the size and – more importantly – the innovative and industrial capabilities of the SADI. Arms production declined by just over 40 per cent between 1989 and 1996. The contribution of the SADI to the national economy also declined, with the value of domestic arms

production in total manufacturing output declining from nearly 7 per cent in 1989 to around 3 per cent in 1996.[347] Many firms exited the defence market. It became increasingly concentrated, with a few large firms occupying monopoly positions. In 1991, a study was undertaken to determine how the Armscor assets and technological abilities could be retained. The solution was to separate the production roles and the procurement roles of Armscor, and to form a new company capable of managing the production assets. Cabinet approved the formation of a new public sector industrial group, Denel Pty (Ltd) in 1992, to be placed under the jurisdiction of the Ministry of Public Enterprises. Armscor remained part of the Ministry of Defence, and was responsible for procuring SADF armaments.[348] (Recent history has not been kind to Denel, and a comprehensive examination of the Denel Group is warranted to understand the current state of this organisation fully).

With the drastic cuts, total employment in the SADI declined by more than 55 000 (from 130 000) between 1989 and 1996. During the recession, employment fell faster in the defence industry than in the overall economy. Batchelor and Willet conclude that government made no attempt during the 1989 to 1994 period to channel the funds saved by reducing the defence budget to create means to employ those affected by the cuts or to implement a national conversion and industrial strategy (conversion was already identified by authors, such as Campbell).[349] The absence of government initiatives for defence industrial adjustment resulted in skills and technologies being lost or wasted as firms attempted to downsize and adjust to the shrinking domestic defence market.[350] There was a lack of national policy, and the SADI was left to fend for itself. Interestingly, despite the funding cuts, South Africa remained one of the most significant military spenders on the continent, and in 1996, accounted for nearly 65 per cent of total military spending in Southern Africa, and 27 per cent of total military spending in Africa.[351] This is probably in part because of the robust autarkic nature of the industry and the resistance to changing this approach to an open market approach, or at least a hybrid approach, that allows for more joint ventures and collaborations. Another reason for these statistics could be attributed to the SA peacekeeping operations on the continent.[352]

The White Paper on South African Defence Related Industries (1999)

The DoD eventually promulgated the White Paper on Defence in 1996 (i.e. the 1996 White Paper), which was built upon to develop the White Paper on South African Defence Related Industries in 1999 (i.e. the 1999 White Paper).[353] This latter White Paper aimed to "review the role, nature and current status of defence industries…to provide government's vision for the future of these industries and to prepare policy options for the governance of the industries".[354] The document states that the SA defence industrial capability is not viewed as a distinct sector of the economy; hence adopting the term "defence-related industries". The White Paper on Defence (1996) acknowledged, "the greatest threats to the South African people were socio-economic problems like poverty, unemployment, poor education, the lack of housing and the absence of adequate social services, as well as the high level of crime and violence'.[355] Sylvester and Seegers explain that the DoD had to keep costs to a minimum, given the SA socio-economic problems.[356]

The White Paper on South African Defence Related Industries (1999) recognised that the reductions in the defence budget since 1989 and the likelihood that the budget would remain restricted for the foreseeable future created a situation where the maintenance of extensive military capabilities was neither necessary nor affordable. To this end, the SADI was encouraged to "convert production capability to civilian manufacture without losing the key technology capability needed for military production" – hence the term "dual-use technologies". In addition, it was explicitly stated that the SADI had to have access to international markets to facilitate cost-effective performance and that the government had to support export initiatives.[357] The control Armscor previously had over the functioning and structure of the SADI therefore had to be diminished.[358] The 1999 White Paper made the ultimate recommendations that the SADI had to be restructured to become internationally competitive and that government would support export and international joint ventures.[359] This was the first indication of movement towards a hybrid approach to development of the defence industrial base of South Africa.

Notwithstanding the depleting defence budget, in the 1990s, South Africa had already recognised the need to allow the SADI to compete on international level in the face of globalisation. In addition, several recommendations were made to government to allow this transition, and certain products and industries had been identified as niches in world markets.[360] It is, therefore, unfortunate that the recommended "conversion" process suffered from a lack of government support, which further exacerbated the negative growth of the SADI: companies were "in it for themselves", leading to a loss in the economic performance of the nation.[361] In summary, government did not execute the recommendations made by the White Paper on Defence Related Industries.

Even though the White Paper on South African Defence Related Industries (1999) is hailed as a positive step in the right direction, it has been observed that it might have come too late for the SADI. Batchelor and Willet state in their seminal Stockholm International Peace Research Institute (SIPRI) publication that the failure by government to introduce a national conversion strategy, taking into account industrial, science and technology policy, resulted in the possible gains of disarmament and demilitarisation being inextricably wasted.[362]" The White Paper on Defence (1996) was used as the basis for the 1998 Defence Review, which was developed to establish a force design for the SANDF, ensuring that the core-force capability was maintained and affordable.[363] Many authors, such as Le Roux, assert that this first Defence Review was an essential phase in the overall transformation of the SA defence function, and that the Defence Review process was hailed as the 'most consultative and transparent in modern history'.[364] Mills even goes as far as to say that the Defence Review should have left South Africa technology-rich;[365] however, it takes political will to exploit the benefits of sound analysis and recommendations.

The Strategic Defence Package (SDP)

Commencing in the late 1990s (and continuing into the late 2000s), the SDP had a value of R30 billion, the most significant defence transaction that the country had experienced in its history.[366] In summary:

Table 2: The Strategic Defence Package[367]

System		Number	Supplier country	Supplier organisation	Value (R billion)
Submarine	4	Germany	German Submarine Consortium	4,3	
Corvette	4	Germany	German Frigate Consortium-Thomson (GFCT)	5,5	
A109 utility helicopter	30	Italy	Agusta	1,5	
Hawk fighter/ trainer	24	United Kingdom	BAE Systems	3,7	
Gripen fighter	28	Sweden	Saab	10	

Otherwise known as "the Arms Deal", the SDP has not been without controversy. For example, Sylvester and Seegers label it the largest public controversy of the post-apartheid era. These researchers analysed the necessity and affordability of the acquisitions critically and assessed how the decisions were made concerning the platforms and companies involved. They state that the 1996 Defence White Paper called on the DoD to keep costs to a minimum given the socio-economic problems in the country and that, ultimately, the DoD failed in this regard.[368] It failed to the extent that the contracting did not make the through-life costs of these capabilities visible. What the public thus perceived as a R30 billion transaction, was only 30% of the through-life costs associated with the capabilities (e.g. upgrades, maintenance and repair, disposal – a 30-year life cycle) that were acquired. What seemed to be a new beginning, was therefore the commencement of a long road of fiscal commitment to defence capabilities that South Africa could ill afford.

Twenty-First-Century Defence Industrial Strategy

Defence Industrial Participation (DIP)

DIP is a form of countertrade used by governments for the domestic industry in a country in return for weapons or high-value civil purchases. While general controversy surrounds such offset programmes, they may play a positive developmental role, especially in the defence industry.[369] South African leaders took this positive view regarding the SDP, where the belief that foreign arms procurement could be a vehicle for economic growth was rife. The SDP incurred R15 billion worth of DIP obligations.[370] Managed by Armscor, the DIP programme expected the potential supplier to propose a combination of DIP activities, such as workshare, technology transfer, training, investments, and exports.[371] Armscor, on its own, even considered new ways of working, as illustrated by Potgieter and Steyn in their article on new product development (NPD), where it is stated that Armscor had to be flexible in its policies and practices to accommodate the new South Africa. NPD was therefore proposed to embrace this change and to establish superiority in a competitive and dynamic environment.[372]

While there has been condemnation regarding the DIP programme, Van Dyk et al. argue that the objectives had been met. Some of these include retaining direct and indirect jobs, promoting exports for the SADI, and 'like-for-like technology transfer'. Armscor awarded DIP credits to the value of R4 billion, which was seen as a reason for the growth in exports. SA defence companies, therefore, became 'entrenched into global supply chains', and there were also a substantial number of mergers with European defence companies, which contributed to the sustainability of the SADI. The authors however note that the policy was criticised for not having a much wider impact on the broader industrial base.[373] DeVore asserts that cultivating foreign direct investment (FDI) into SA defence companies diminished the ability of the state to influence decisions or to control the use of intellectual property generated by domestic R&D investments.[374] He also comments on the viability of small and medium states achieving self-sufficiency in defence, a direct reflection of the failed attempt to achieve this by South Africa during the apartheid years, asserting that the defence industries of such nations need government support to function in the global arms market.[375]

It has however been reported that the downsizing of the SADI nevertheless saw many institutional manifestations of militarism from the apartheid era, such as that the centrality and influence of the military–industrial complex within the SA economy remain intact.[376] Dunne did a comprehensive study on how Armscor and Denel had been restructured, and believed that (in 2006), the "continuing legacy of apartheid" was reflected in the current form of the public-sector defence industry. The downsizing of the SADI looked set to continue; yet, Dunne found it surprising that such a high level of militarisation was maintained despite the pressing social needs and economic problems in the country.[377] This is echoed by Abrahams, who states that 'the climate for defence conversion was ideal during the immediate post-1994 period', and that human development should have been more of a priority.[378] Goldstein reported in 2002 that South Africa still had a fully domestic-owned defence industrial complex consisting of about 700 companies employing 50 000 people, contributing 1,1 per cent of the GDP, and ranked second among the largest exporters of complex manufactured goods.[379] Harris questions the rationality of the defence expenditure, and suggests several alternatives.[380]

The number of scientific publications regarding the SADI reached its second peak in the early 2000s. There was much to analyse and report on – the SDP and the drastic change in the military. There was an almost rush from academics to understand how the changes would be adopted and managed within this new paradigm. Most articles published are very positive and congratulatory to the SA government for how this change was implemented. As Le Roux stated in 2003, '[t]oday the SANDF stands as a totally legitimate and generally accepted defence force of the South African nation'.[381] This unique case also provided food for thought for other nations that would perhaps follow similar changes concerning their defence industries.[382] In 2003, Cilliers stated, 'the present status of the industry is undoubtedly the most cost-effective way to preserve and maintain a core capacity, as well as the associated jobs'.[383] The early 2000s however also saw scholars raising questions regarding the long-term viability of the DIP. Dunne and Haines state that the present and future impact at national and local levels could be more problematic than initially recognised.[384] Similarly, Dunne and Lamb assert that off-the-shelf procurement

would have been more economical, and that funds could have been channelled to areas of the economy with a high potential for economic growth and job creation.[385] Haines demonstrates that offsets do not advance the long-term economic or military goals of countries, and have substantial hidden costs.[386] The utility of the DIP programme within the context of developing the defence sector sustainably is thus debatable.

The 2015 Defence Review and the Defence Industry Strategy

As early as 2010, calls for a new defence review were heard.[387] One of the reasons for this was that the level of funding allocated to defence did not seem to align with the needs of the SANDF, especially when considering deployment requirements in the prevailing African security environment.[388] In an interesting take on the change in the defence sector, Vreÿ states that the SANDF had undergone a paradigm shift – from Total Strategy to Defence in Democracy.[389] Seegers declares, '[the] security-is-development concept as embraced in South Africa' makes for a "cautionary tale", as those with minimal policymaking experience were promoting new security policies.[390] Louw describes the variance between defence policy and military capabilities, and concludes that the defence force has been largely unsuccessful in complying with the demands of defence policy.[391] In anticipation of the second defence review, Mills notes that the review should have been conducted by "putting people, not technology, first".[392] He reflects on the significant changes worldwide since the original Defence Review (1998), and maintains that the new review should be adapted for the twenty-first century in an SA and African context.[393] These opinions reinforced the call for a new defence review.

Transformation has also been reported as harming the SANDF. This goes as far back as the late 1990s. Winkates states that the process followed up to that point had been successful,[394] while Cilliers (circa 2018) declared that the SANDF has been suffering from what he terms 'transformation fatigue'.[395] In his article, Wessels criticises the SANDF for focusing on racial quotas instead of achieving professional, military and strategic goals.[396] In another article, Le Roux calls for defence sector transformation to be initiated for the right reasons and by adopting a holistic approach to defence and security.[397]

The 2015 Defence Review (the second such policy review in the democratic South Africa) was developed to assess the then-current state of the SANDF and map out the direction defence would take for the next few decades. The then Minister of Defence and Military Veterans, Ms Nosiviwe Noluthando Mapisa-Nqakula, argued that the significant challenges faced by the SADI were limited economic growth, limited markets, and a reduced defence budget. The National Defence Industry Council (NDIC) was established to address some of these challenges, and was tasked to draft a defence industry strategy, which was approved in December 2020. A comprehensive document, it acknowledged the SADI as a significant factor in expanding and deepening the national skills base while generating foreign currency earnings and creating employment (the defence industry strategy also makes significant reference to the SA Industrial Participation Action Plan). Four "Looking Forward" options were therefore considered: "Uncontrolled Shut-Down", "Planned Shut-Down", "Secure, Stabilise and Sustain", and "Secure, Stabilise, Develop and Sustain". The last option involves deciding 'to use the present industry as the foundation for an

expanded and better-balanced industry and create an environment where the industry can better support economic development and targeted industrialisation R&D, as well as exports'.[398] It is appreciated that the first two very dire options were included, showing that the government was acutely aware of the precarious position in which the SADI was. Ultimately, Option Four was seen as the desired end state, which would use the elements of Option Three as a foundation.[399]

A key factor for the success of defence exports when it comes to complex equipment or systems will often be for the equipment or system to be in actual operational service with the local military. This assures potential clients that:

- the equipment or system in question functions;
- it will be supported over its service life; and
- it can be upgraded by the original equipment manufacturer when required.

The broader government and the defence force were therefore crucial to support the local defence industry in achieving the "Secure, Stabilise, Develop and Sustain" option.[400] This saw the introduction of the "SA Inc." concept.

Respice Adspice Prospice[3]

The significant events described in the preceding sections have an integrated history with defence spending and the annually allocated defence vote. Figure 2 shows the defence budget from 1960 to 2020. The defence budget increased steadily through the 1960s as the need for self-sufficiency mounted against the backdrop of a perceived internal and external threat, reaching its peak in the latter part of the 1970s with the "Total Strategy" concept employed by government. After a decline in the early 1980s, the subsequent state of emergency resulted in the eventual second peak in 1989. The early 1990s saw the end of apartheid and the external (regional) threat, resulting in a steady decline in the defence budget during the entire decade to a value of just above 1 per cent of the GDP (similar to the early 1960s). This value has remained virtually constant since around 2000, albeit with a slight yearly decrease. Neither the SDP nor the DIP affected the defence budget.

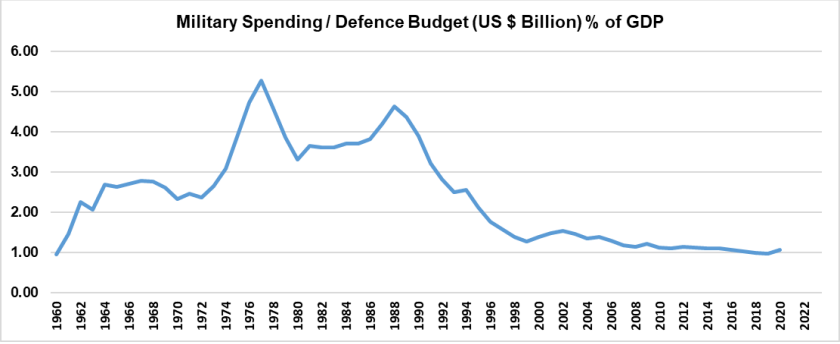

Figure 2: Defence expenditure as a percentage of the GDP (1960 to 2022)[401]

[3] Examine the past, the present and the future [first authors' own translation].

Regarding arms exports, the National Conventional Arms Control Committee (NCACC) was established in the early 2000s to issue arms export permits, previously in the domain of Armscor.[402] NCACC reports are available to the public, and the extent of arms exports can therefore be charted with historical data used for years prior to the establishment of the NCACC. This is reflected in Figure 3 below, with values adjusted to 2022. Note that a small percentage of the exports comprise marketing permits as well. As of 2018, the NCACC sees exports as divided into "Munitions" and "Dual-Use Technologies", with the latter making up less than 10 per cent of the total (this distinction is as per the Wassenaar Arrangement[4]). Export values that could be sourced before the advent of the NCACC were obtained from Batchelor and Dunne.[403] A relatively stable arms export environment can be observed during the 1980s and 1990s, with the rise from 2000 to 2012 attributed to the SDP and DIP, where local companies benefitted from the joint ventures and international partnerships spearheaded by the providers of the systems procured under the SDP in 1999. The peak here is more than three times that of the average for the 1980s and 1990s, after which a sharp decline is observed. The period after 2012 would therefore suggest that the gains the DIP had in the period leading up to 2012, had ended. A slow decrease follows. This was amid the period of state capture, which would have significantly slanted how contracts were awarded and how the government did business.

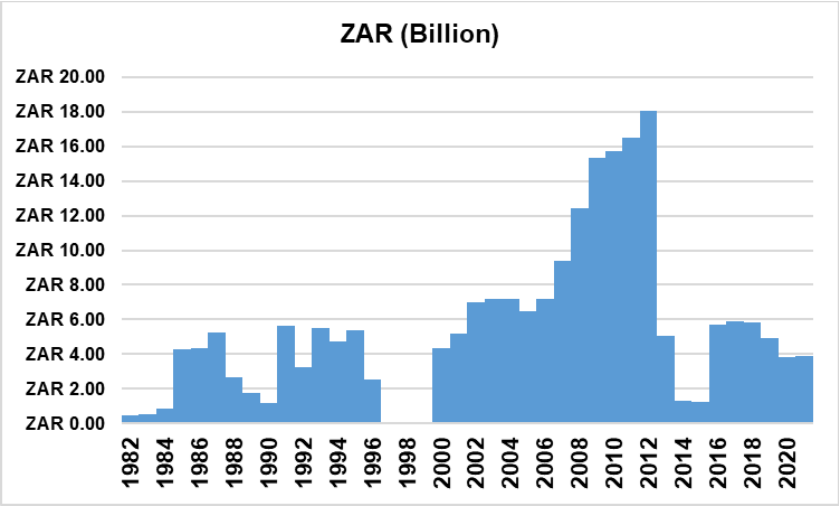

Figure 3: Arms exports (in ZAR billion adjusted for 2022)

[4] The Wassenaar Arrangement is a voluntary multilateral body, of which South Africa is a member, and which promotes transparency, responsibility and accountability among members regarding exports of sensitive conventional weapons and dual-use goods and technologies (see www.wassenaar.org).

During the past five or so years, a multitude of media releases and academic publications, as well as declarations by government officials have emphasised the current grim state of the SADI, with warnings that, 'if the industry is not able to sustain itself, there will be massive job losses, closure of defence-related companies, and highly skilled personnel will be lost'.[404] Matthews and Kohe are critical in their assessment of the declining SADI and conclude that defence industrial stagnation has occurred, exacerbated by corruption, unethical sales,5 and government mismanagement. The ultimate conclusion appears to be that survival of the SADI into the 2020s cannot be assured, and that the question needs to be asked whether the high opportunity cost of defence-related investment in a country experiencing economic and social inequalities is justifiable.[405] With no consideration at all for the involvement of the SANDF (due to declining local defence spending), Moodley suggests that international partnerships may be the key to the survival of the remnants of the SADI.[406]

One of the major considerations not taken into account in these recent comparative remarks by observers is the fact that the "decline" in the SADI occurred because of the end of apartheid, and continuing regional conflicts in Southern Africa. There was no longer a need for a strong military and defence industry in South Africa. As expected, this led to a sharp decline in defence expenditure in the early 1990s. A reduced defence budget was a reality as the significant "threat" to the country was identified as a socio-economic one, not a military, insurgent or terrorist one. Government policy regarding how this smaller SADI should manage this change was however not realised until the end of the 1990s, which is seen as a shortcoming, which possibly contributed to the demise of the SADI and the economic downturn during the early part of the decade. With no immediate threat to the country, it therefore seems surprising that the SDP saw the light of day at the end of the 1990s. It appears that the recently promulgated policy (in 1999 to revitalise the SADI was overshadowed by the SDP. Yet another question that could be posed regarding the SDP is why the expertise and knowledge gained during the pre-1994 years were not used to design and manufacture these platforms. This could surely have led to a boost in the manufacturing sector as well as the greater economy. The fortunes of the SADI are inextricably coupled to other industries, and exploring these links would surely detail a complex and contradictory tale. On a related note, it is indeed significant that, despite a decline in defence spending, socio-economic problems in South Africa have persisted, prompting questions regarding the allocation of this funding.

Further reflection reveals that the conditions of DIP may have been a significant reason for the government acquiring these assets, and the fruit of DIP was seen into the early 2010s. SA defence companies forged long-lasting professional relationships with large defence firms, opening up the global defence market. While many SA companies thrived, it must be noted that international companies also obtained the SA knowledge and experience gained during the Border War (this could be seen as a threat to the local industry). Further, the defence budget has remained steady at just above 1 per cent of the GDP since then. The SADI flourished until the decline in defence exports in the mid-2010s, but subsequently

5 Matthews and Koh describe the allegations of bribery and corruption that involved high-level government officials and SDP suppliers, which led to the Seriti Commission of Inquiry.

shows a defence industry not competing on the international market as well as in the past. Did the as-predicted, long-term questionable viability of DIP become a reality? Couple this with the state capture saga, the arms deal corruption allegations, and the much-publicised troubles of the Denel Group, and a tarnishing of the SADI brand is observed. These are all elements that deserve detailed individual analyses.

The second Defence Review and the Defence Industry Strategy, which speak volumes regarding the need for the SADI and the benefits that it can have for the country, have not resulted in any action on the part of the government. Indeed, the Defence Industry Strategy acknowledges that the SADI is currently teetering on the brink of collapse and that international cooperation is essential. The budget remains the same, the SANDF seems to struggle to fulfil its mandate, and what seems to be a reflection of the early nineties, the SADI has been left to fend for itself. This is exacerbated by the fact that the trend of the local customer not supporting the SADI with funding, providing test platforms, and maintaining a solid professional relationship, continues. Not having this support contributes to the lack of foreign income for the SADI.[407]

Considering future projections, an initial question is whether another boost, à la the SDP, could be forthcoming. This is considered highly unlikely, as the purpose of such acquisitions would be questionable; a "saving grace" of this sort is impossible. Similarly, a rise in the defence budget is improbable, given the trend of the defence budget for the past two decades. Local customer investment in the defence industry will therefore not happen. In addition, reflecting the state of sub-Saharan Africa in the early 1990s, there does not seem to be an imminent threat to the sovereignty of South Africa. No threat implies that an increase in the defence budget will not happen. Finally, from a policy perspective, the question of whether the Defence Industry Strategy holds much value for the SADI is raised. In theory, absolutely, but again channelling the past, implementation is critical. Government appears to be committed to recovering the momentum in the industry and using the innovative capability within the national context. As at least one scholar has observed, in some manner, governments of small and medium states need to support their defence industries in becoming involved in the global arms market.[408] This concept began in the early 2000s after the South African failure to sustain self-sufficiency in defence during apartheid. It may, therefore, be prudent to consider the stance other countries have taken in the post-Cold War world, and how the concept of organisational resilience has been addressed. Granted that the South African transition from apartheid is unique, parallels can be drawn to other nation-changing events, with the 1979 revolution in Iran being just one example.

With further consideration of other nations, Putter comprehensively investigated the possibilities of the SADI partnering with BRICS countries, and offers much in terms of the criteria that should be considered in this regard. His listing of certain technologies that could imply a comparative advantage for the SADI is considered an important contribution, and should be a foundation for further work. Putter's conclusions point to possibilities of collaboration with India and/or Brazil, but not with China and Russia.[409] Another worthy option would be to compare the SADI to the defence industries of similar nations and to determine their positions on the three different tiers of defence industrial

capabilities. This would also make for an interesting temporal analysis of the SADI – considering the possible changes in the tier categorisation over the past several decades. As a final recommendation, and almost as an aside to the current research, a study of the pre-history of the production of arms in South Africa, dating back to the nineteenth century, would form an all-encompassing appreciation of the SADI.

Concluding Remarks

Ultimately, the Defence Industry Strategy holds the theoretical key to the continued and sustained existence of the SADI. Such a strategy would, however, need to be analysed critically, and subsequently transformed into a set of measurable objectives, which it actually expects from the industry itself.[410] The SADI itself would therefore need to lead the charge, using the Defence Industry Strategy as a foundation while establishing local links to create synergistic, innovative solutions for all, ensuring a positive economic outcome. The government and academia would be vital in this regard, pointing to the triple helix model of innovation and/or a defence innovation framework as possible guiding principles. Coupled with the incorporation of primary archival material, an examination of policy wider than only in terms of defence, as well as considering the insights of strategic actors, a path forward could be forged. Considering market share, individual companies should develop their technological niche areas and seek out partnerships on a global scale. If the SA government does indeed decide to invest locally and use this expertise for the SANDF, that would be considered a bonus.

In the final analysis, the SADI is facing a relevance problem. The existence of a defence industry is clearly needed to address the perceived need that the apartheid government created. What relevance does such a capability have in the current SA context? While recognised as a driver of innovation and a contribution to economic growth, the current SADI would nevertheless need to prove tangibly that it is a vital cog in the South African trajectory into the future, while also establishing international market links, all necessary to ensure organisational resilience. Using the Defence Industry Strategy as a foundation, this two-pronged approach is ultimately recommended, with the additional perception that any action from government in terms of a fiscal boost is deemed highly unlikely.

Endnotes

[263] Kevin Gopaul joined the South African Air Force in 1996, obtaining a Mechanical Engineering degree and a Masters in Engineering Management from the University of Pretoria. After being involved in combat aircraft system management, he left the Air Force in 2012 as a Lieutenant Colonel. Tenures at the CSIR and Saab Grintek Defence saw Kevin involved in local and international Electronic Warfare projects. Currently a Senior Systems Engineer at GHD, he supports major infrastructure projects across Australia. Kevin is a Chartered Professional Engineer (Engineers Australia), a member of the Royal Aeronautical Society and is currently pursuing a PhD in Engineering Management.

[264] Elma van der Lingen, PhD in Metallurgical Engineering and Material Science from the University of Pretoria, managed Mintek's Advanced Materials Division before joining the University of Pretoria's Graduate School of Technology Management in 2013. At Mintek, she investigated the beneficiation of precious metals and led Project AuTEK, collaborating with RSA's largest gold producers on gold's industrial applications in Catalysis, Nanotechnology, and Biomedical fields. Elma has headed the Department of Engineering and Technology Management at the University of Pretoria since 2016 and chairs the Graduate School of Technology Management. Her research focuses on innovation, entrepreneurship, and technology commercialization.

[265] Rudolph Oosthuizen joined South African Air Force in 1990, where he performed systems engineering roles in electronic warfare and Command and Control (C2). At the University of Pretoria, he obtained a B.Eng (Elec 1994), B.Eng (Hons) (Indus 1998), MEM (2002) and PhD in Engineering Management in 2015. In 2008 Rudolph joined the CSIR as a Systems Engineer on multiple C2 projects. Currently he is an Associate Professor at the Graduate School of Technology Management at the University of Pretoria, where he teaches Systems Engineering and Systems Thinking. Lately, his focus has been on Data Science and Artificial Intelligence for decision support and situation awareness. Rudolph is registered as a Professional Engineer with ECSA and is also a Certified Systems Engineering Professional (CSEP) with INCOSE.

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