IDEAS THAT WORK FOR INDUSTRIAL DEVELOPMENT

Towards a transformed defence industry that contributes to the growth of the South African economy

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Based on research performed by Johan Strydom and several other CSIR colleagues

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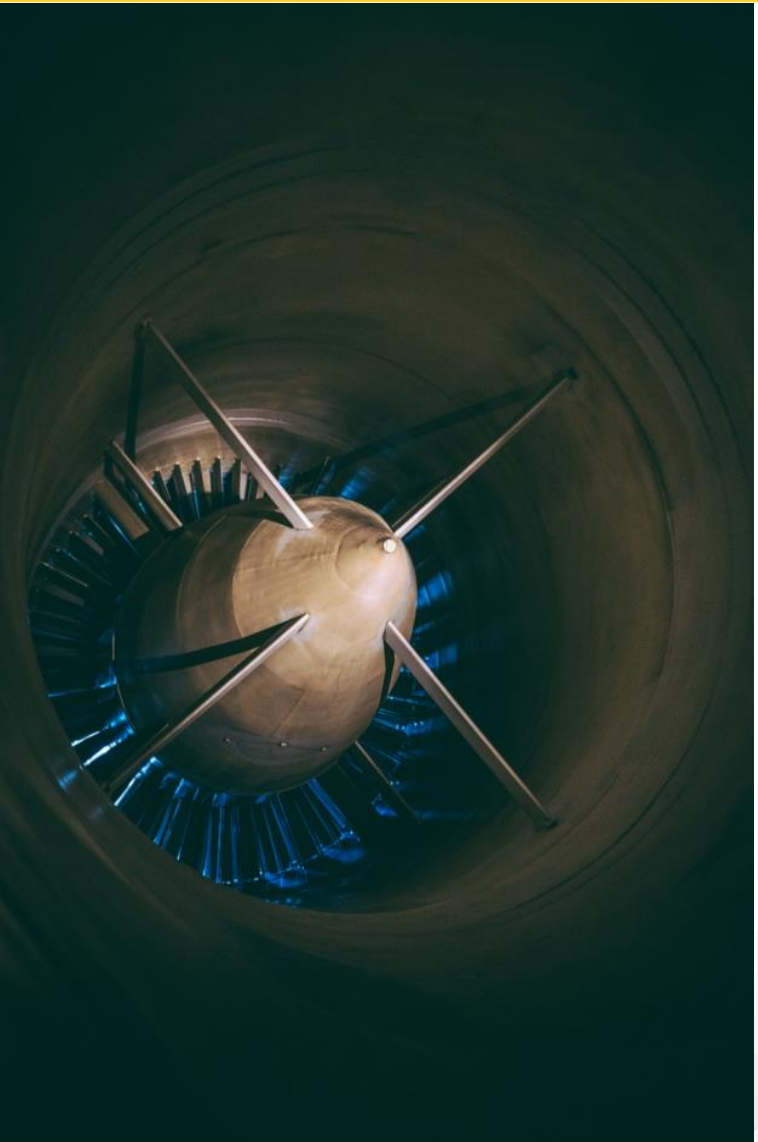
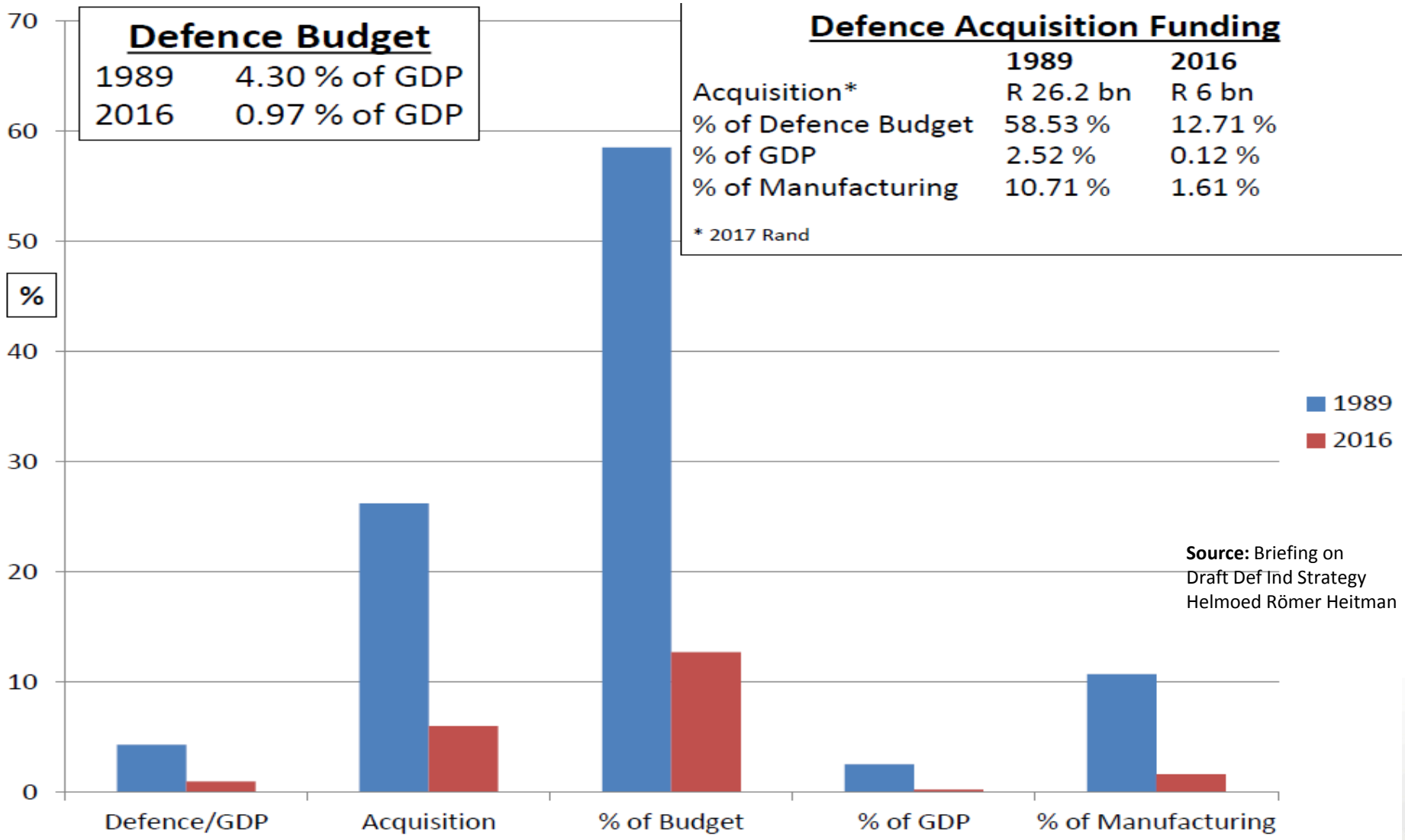
Scope



- Defence budget and the status of the defence industry
- A 2027 vision for the RSA defence industry
- A proposed strategy for realising the vision
- Exciting opportunites and initiatives
- The way forward

Defence budget

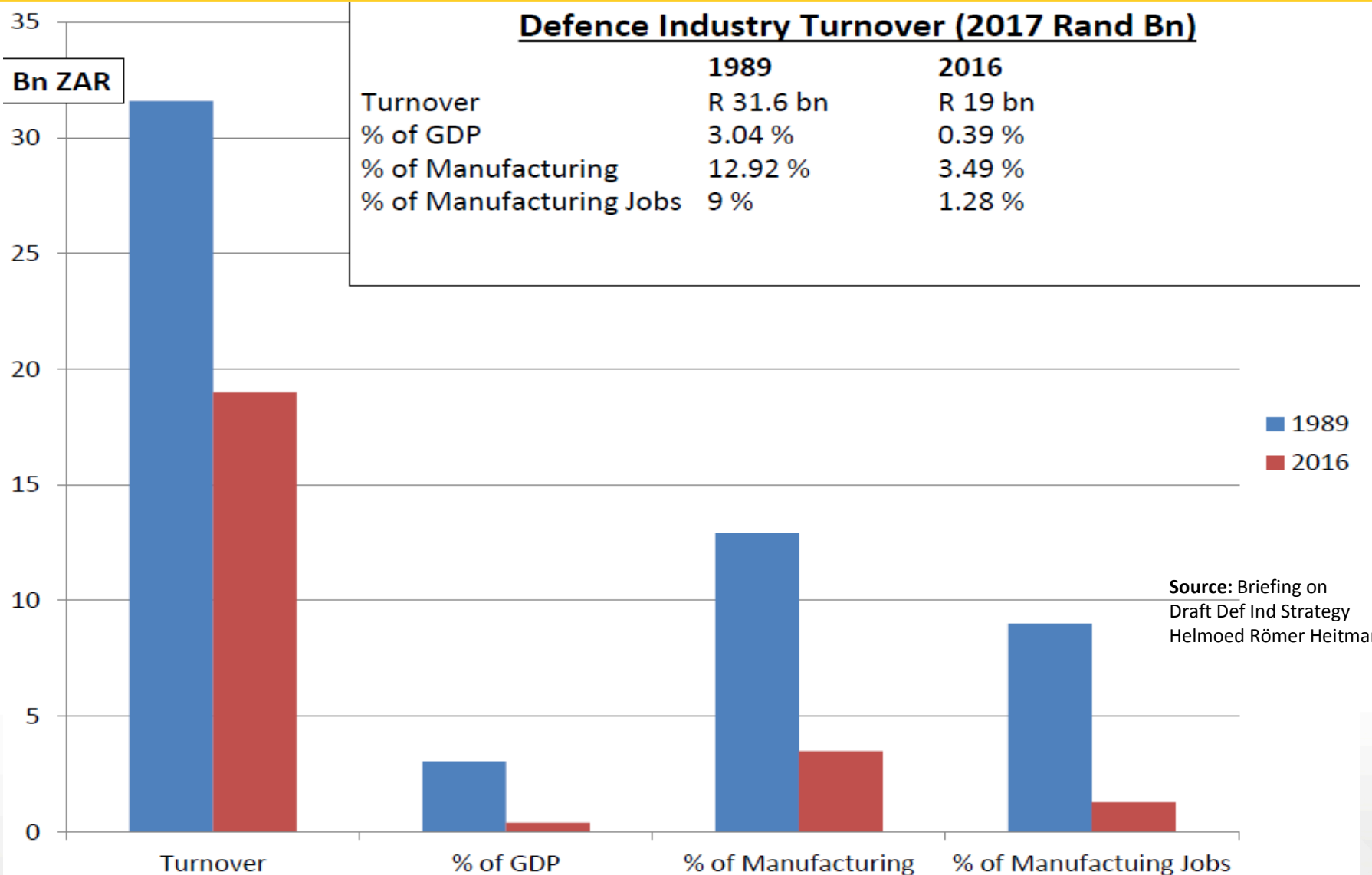


Source: Briefing on Draft Def Ind Strategy Helmoed Römer Heitman

The status of the defence industry

Defence Industry Turnover (2017 Rand Bn)

	1989	2016
Turnover	R 31.6 bn	R 19 bn
% of GDP	3.04 %	0.39 %
% of Manufacturing	12.92 %	3.49 %
% of Manufacturing Jobs	9 %	1.28 %



Source: Briefing on Draft Def Ind Strategy Helmoed Römer Heitman

The RSA defence industry in 2027

- Makes a **significant contribution to the RSA economy**:
  - Adds more than **R200bn** to the GDP (90% export sales)
  - Generates more than **10% of the manufacturing jobs**
  - Contribution to the **reduction in crime** freed up **12% of the GDP:** that is now **invested in economic development**
- **Gave birth to the para-military industry** supporting the **Border Management Authority (BMA)**
- Has become the single biggest contributor to the **reduction in wildlife crime** and the **protection of the booming tourism industry**

The RSA defence industry in 2027

- Establishes **integrated security capabilities** (level 7) to the **Security Cluster** and other government departments and agencies
- Fulfilled the **DoD's strategic aims**:
  - Provides a **sovereign defence technology capability**
  - Provides a real degree of **strategic independence**
  - Provides SANDF with **optimised and locally supported equipment**
  - Provides government with a **valuable diplomatic tool** in the ability to provide friendly states **with equipment, technical support** and the means to stimulate **local industrial development**
- Established an industry and sector that is **representative of South Africa's demographics**

Realising the 2027 defence industry vision

- **Establish** a transformed and internationally competitive **National Defence System of Innovation**
  - **Enhance** all the elements of an **advanced national defence manufacturing system**
  - **Optimise** the role of **research & technology organisations (RTOs)**
  - **Scale up** to capture value from **defence innovations**
- **Utilise industry growth pathways** as a mechanism to reach **the new reality**

Enhancing the advanced national defence manufacturing system

Different sources of competitiveness

Manufacturing perspective	New(-ish) opportunities for competitive edge
Product Innovation	Speed of new technology development
Process Innovation	Product mix flexibility and factory productivity
Supply chain capability	Reconfigurable supply capabilities
Product/service delivery	Superior understanding & response to customer needs

Functions of national innovation systems

Overall function of an innovation system:

- To develop, diffuse and use innovations

Innovation system activities

- **Research** (basic, applied, development, engineering)
- **Implementation** (manufacturing)
- **End-use** (customers of the product or process output)
- **Linkage** (bringing together complementary knowledge)
- **Education**

Source: Introduction to Technology & Innovation Management Strategy and Policy
University of Cambridge, Department of Engineering
IfM Education and Consultancy Services

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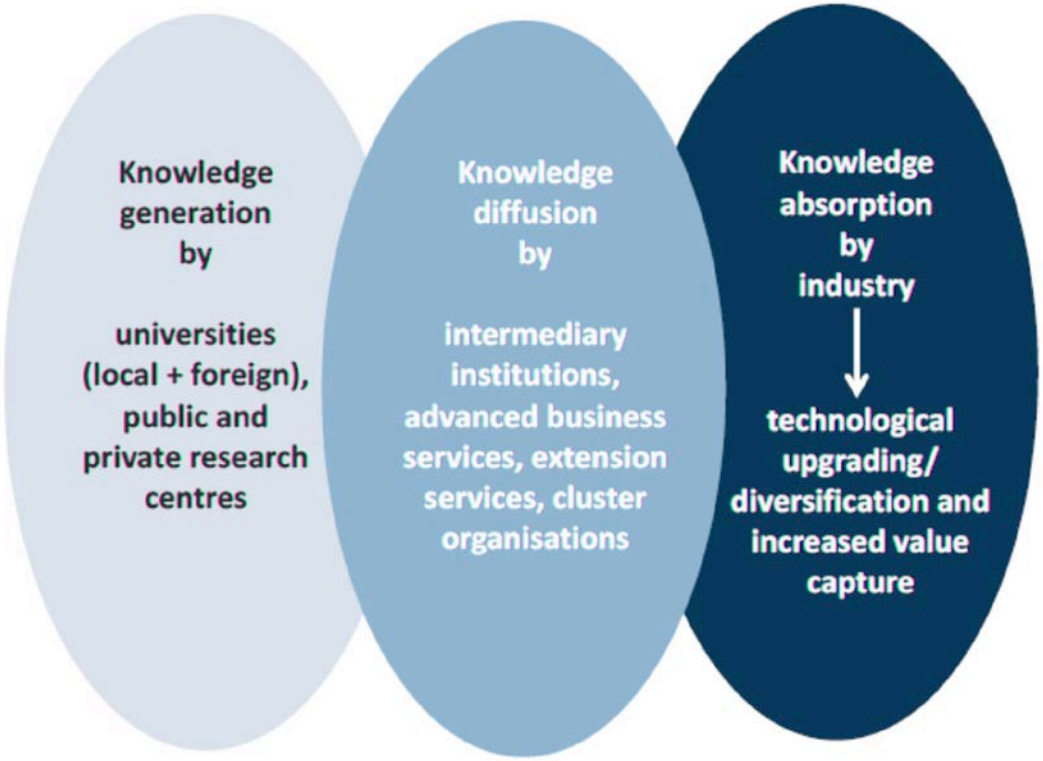

Source: **Introduction to Technology & Innovation Management Strategy and Policy**
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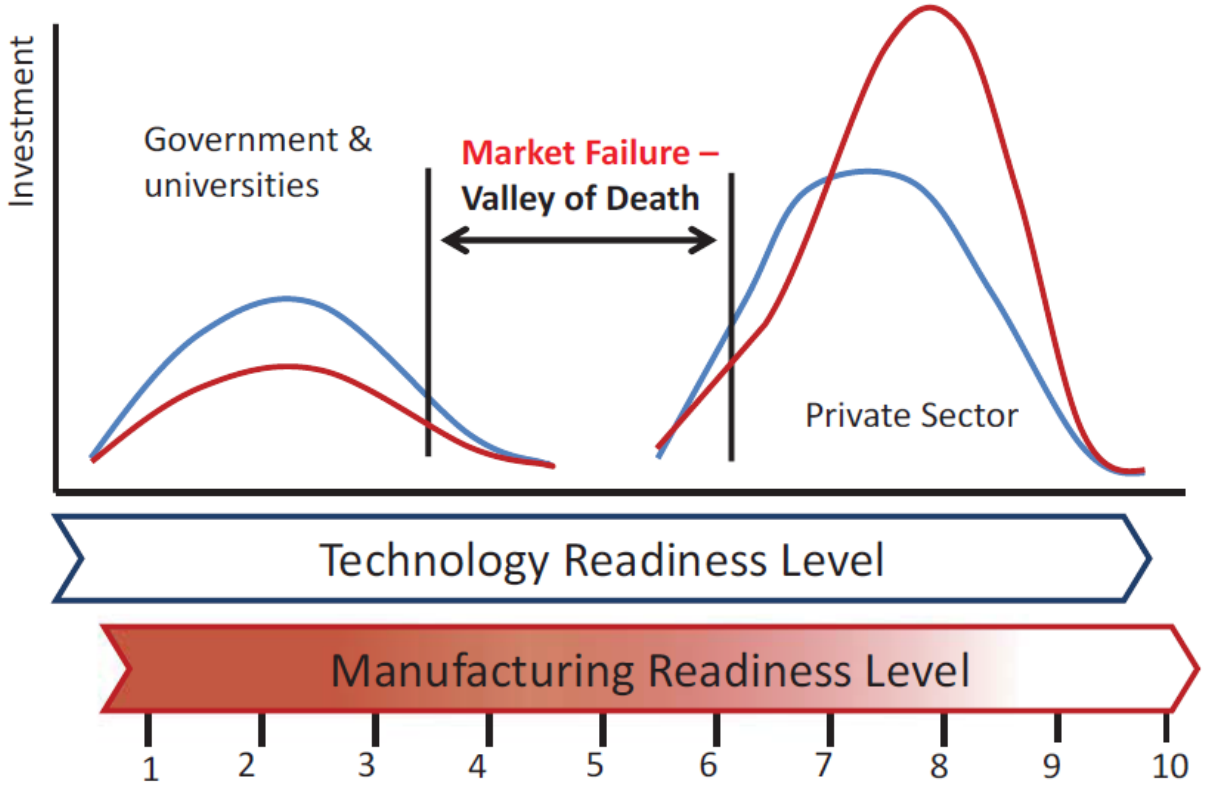
Manufacturing readiness levels and the valley of death



Source: Introduction to Technology & Innovation Management Strategy and Policy
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National Systems of Innovation

Why this matters...

A key determinant of competitiveness of a knowledge economy is quality of connections between the different system elements

- There is national competitive advantage from proactively fostering an infrastructure of linkages between actors
- Different innovation actors making different contributions to technologies/production systems/infrastructure; engaging with different elements of manufacturing value chain systems

Source: Introduction to Technology & Innovation Management Strategy and Policy
University of Cambridge, Department of Engineering
IfM Education and Consultancy Services

Why public investment in RTOs is justified

MARKET FAILURES ADDRESSED BY RTOs

Rooted in the **economics of research** and the idea that **'market failures'** makes it difficult for companies to invest in general forms of knowledge[1]

Therefore:

- Public funding for RTOs represents a **social investment**[1] and its rationale stems from the barriers to strategic and co-ordinated capability development, which may apply to infrastructure, equipment and skills which would not otherwise be in place[2]
- RTOs exist to **help firms innovate**, and to solve innovation problems that are beyond the capabilities of individual firms[2]
- Spillover effect: RTO technological **capabilities are passed on** to its customers whose performance improves, who become more competitive, employ more people, pay more taxes, increase the quality of life, and so on[1]

Sources:
(1) Arnold, E., Clark, J. & Jávorka, Z. "Impacts of European RTOs: A study of Social and Economic Impacts of Research and Technology Organisations
(2) Hauser, H. "The Current and Future Role of Technology and Innovation Centres in the UK"

Source: Introduction to Technology & Innovation Management Strategy and Policy
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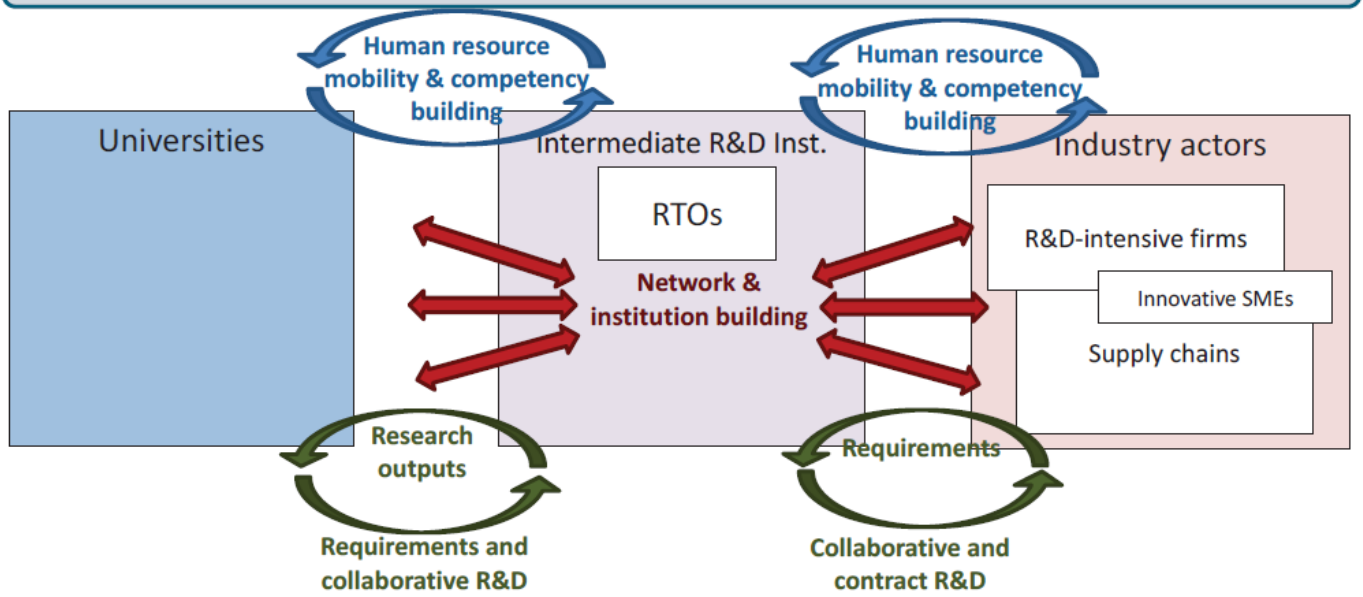
The role of RTOs in national innovation systems

RTOs can:

- (a) Assume a **coordination role to de-risk innovation projects**, acting as a **bridge between businesses and the research and academic communities** to enable projects that no single actor would be able to perform by itself **(Technology R&D function)**.



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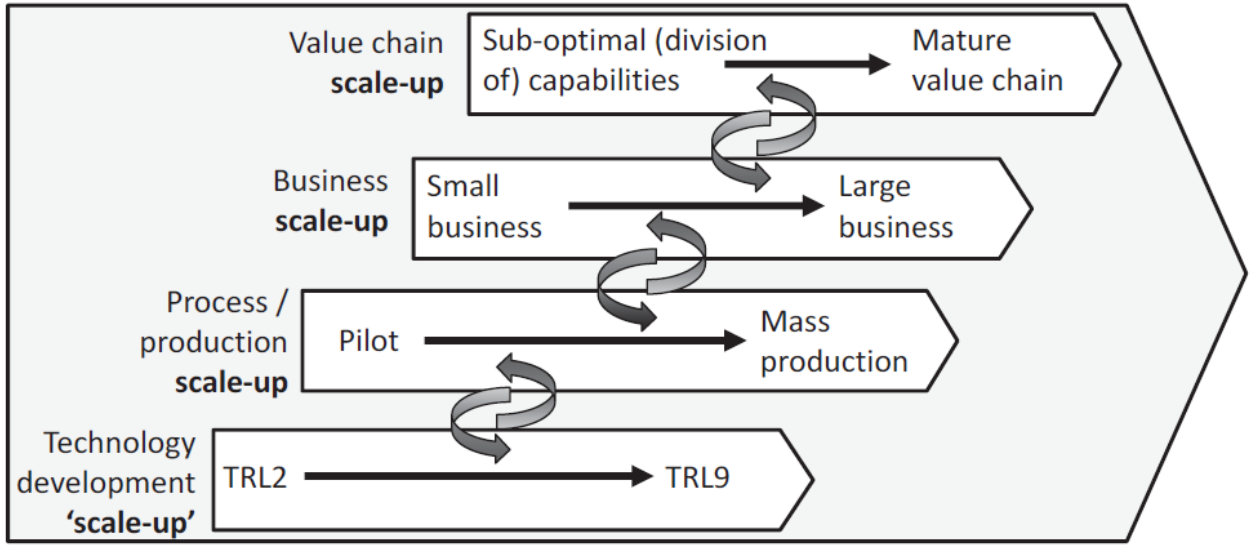
SCALING UP to capture value from defence innovations

Co-evolving innovation journeys: technology, process, firm, value chains…



The multi-dimensional nature of 'scale-up'

Source: Emerging trends in global advanced manufacturing:
Challenges, Opportunities and Policy Responses
United Nations Industrial Development Organization

Industry growth pathways

- **Pathways involving local and foreign OEMs**
  - **Local manufacturers doing joint R&D and manufacturing with a foreign OEM** on a risk share/work share agreement
  - **Attracting major foreign OEMs to establish new assembly plants locally**, as well as establishing the required upstream suppliers (multi-tier industries) locally, for local and export markets
  - **Local exporting OEMs expanding their export product lines**;
  - **Local manufactures entering export markets** by supplying a foreign OEM.

Industry growth pathways

- **Import substitution**

Import substitution has potential for growth of the local industry, especially when it is used as an interim step towards exports.

- **In-licensing** (new manufacturer/SMME or established manufacturer)
  - Initially for the local market but with an intention of entering export markets
- Import substitution of **imported components** that are **integrated into existing export products;**
- Import substitution **based on locally developed technology alternatives;**
- **Putting local procurement requirements on foreign OEMs** supplying to Government Department, with the intent to have the OEMs integrate SA products into their systems;
- Development of local manufacturing capability on the back of major **capital acquisition programs** (e.g the NIP and DIP approaches used recently as part of the Strategic Defence Packages);

Industry growth pathways

- **Local manufacturers entering export markets**
  - Existing product lines
  - New product lines
  - New high-technology manufacturers with locally developed IP and products

Industry growth pathways

- **SMMEs and transformative enterprise & supplier development**
  - **Preferential procurement driven enterprise development** support
  - **Local OEMs spinning out companies** around technologies with wider application beyond their primary markets
  - Utilise the **DoD's Transformative Enterprise Development (TED)** programme
  - Utilise and expand **dti's Aerospace Industry Support Initiative (AISI)**
  - Identifying localisation opportunities through the **DST's Technology Localisation Implementation Unit (TLIU)**
  - Form **SMME/RTO/OEM partnerships** to address **DoD acquisition programme requirements**
  - Involve **SMME** in the development of **advanced technology demonstrators**
  - Support **SOEs** with **transformative supplier development**

Exciting initiatives and opportunities

- Launch of the Product Lifecycle Management Technology Centre
- Africa Truck
- Small African Regional Aircraft (SARA)
- AHRLAC
- Cmore
- Hostile Fire Indicator (HOSFIN)
- Synthetic Aperture Radar (SAR) technology development
- Persistent Wide Area Surveillance technology development
- Inundu fast jet test, evaluation and training pod

Launch of the CSIR Product Lifecycle Management Technology Centre

the dti
Department:
Trade and Industry
REPUBLIC OF SOUTH AFRICA

IDEAS THAT WORK FOR INDUSTRIAL DEVELOPMENT

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Africa Truck

Small African Regional Aircraft (SARA)

AHRLAC

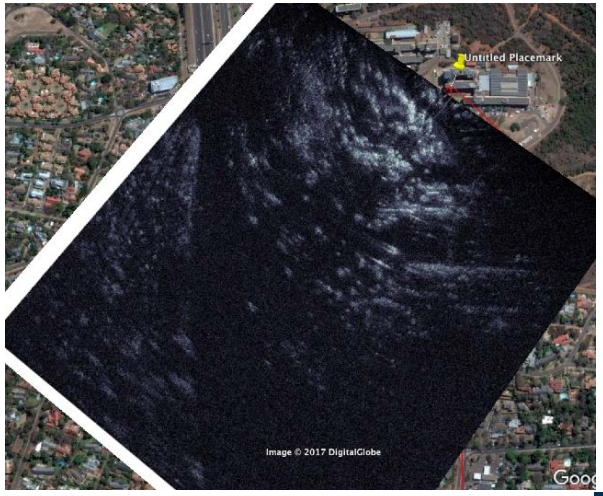
Cmore - Command & Control Collaborator

Persistent Wide Area Surveillance

Recent Synthetic Aperture Radar (SAR) highlights

IDEAS THAT WORK FOR INDUSTRIAL DEVELOPMENT

First Bistatic SAR Image



TCCBI SAR C-Band 60cm Resolution image

The SAR Team

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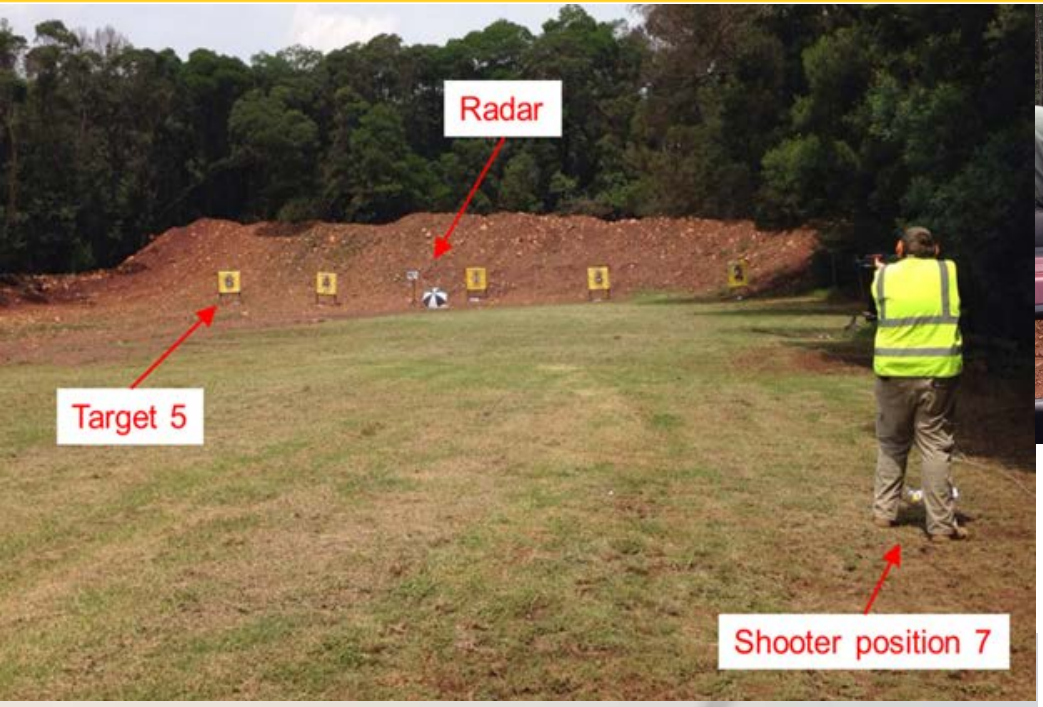
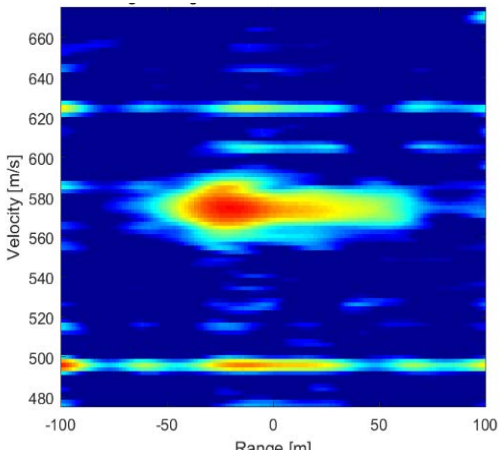
Hostile Fire Indicator (HOSFIIN)





SAAB GRINTEK DEFENCE

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The way forward

- Finalise the NDIC Defence Industry Strategy
- Finalise CSIR Industrial Development Strategy
- Implement industrial development strategies in collaboration with all role players of the South African National Systems of Innovation

Joining forces for growth and development

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