

# **NACI ROUNDTABLE DISCUSSION** ON PRELIMINARY FINDINGS REGARDING IMPACTS OF IMPORTED TECHNOLOGIES IN SOUTH AFRICA



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**science & innovation**

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**NACi**  
NATIONAL ADVISORY COUNCIL ON INNOVATION



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## BACKGROUND

As part of its 2018/19 advisory work programme, the National Advisory Council on Innovation (NACI) initiated a project on the impacts of imported technology versus the stimulation of local development. As South Africa, like most middle-income countries, is a net importer of technologies, not much attention has been paid to this.

The project sought to understand the impact that importation of technologies has on firms<sup>1</sup>, exports and the fiscus. This would assist NACI to offer policy recommendations or advice. It may have implications for policies such as research and development (R&D) and firm-level incentives for capital investment.

Interesting preliminary findings emerged from the literature review (and local instruments), technology balance of payments and business sector innovation stimulating economic growth and jobs. NACI then hosted a workshop to discuss those findings with stakeholders and solicit inputs. Below is a detailed feedback of the entire workshop.

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<sup>1</sup> A company is called a firm when it is a partnership of two or more persons. So linguistically, there is a clear difference between firm and company. Dictionaries refer to a company that is a partnership as a firm

# 1. WELCOME TO THE WORKSHOP

**Dr Mlungisi Cele (Acting CEO: NACI), Ms Claire Busetti (NACI Councillor)**

Dr Mlungisi Cele, the Acting CEO of NACI, welcomed stakeholders, thanking them for their willingness to participate in and contribute input to the workshop. He emphasised that to make real impact, NACI required stakeholder resources and support. He added that this work would enhance understanding of the relationship between investment in imported technology and productivity.

Ms Busetti indicated that the critical issue was using policy and STI to improve the lives of South Africans, saying that the current perception was that the technology balance of payments (TBoP) was distorted, which contributed to the view that technology and innovation should not be imported. This, she added, might reflect the inward-looking stance of the previous government. Current challenges, she continued, required that South Africa exported more than raw materials and that some countries had moved ahead of South Africa, and benefitted from innovation and technology imports. She concluded that it was important to understand what was being exported and imported, and to compare South Africa to China and South Korea.

## 2. PRESENTATIONS AND DISCUSSIONS

### 2.1 Literature review and local instruments : Dr S Manzini

**(download presentation: <https://www.dst.gov.za/owncloud/index.php/s/artBHj97rYXabpw>)**

The presentation focused on the importation of technology and local instruments created to promote smart importation. All countries were found to import some form of technology, in many cases more than what is exported. Extensive literature supported this argument. The widely divergent views on this matter need to be understood so that strategies suitable for South Africa are formulated. This would allow policymakers and researchers to make sense of a complex issue.

Some oppose foreign technology as not suitable to local conditions or compromising local competitiveness. However, critical questions should be asked, as firms work within a broader global context.

The importance of understanding technology diffusion was emphasised. Technology is not spontaneous or solely driven by market forces, but is also based on human agency. Again, there are wide-ranging arguments regarding the environment in which technology diffusion occurs and reference was made to accumulation versus assimilation theories.

Conditions for successful policy interventions were outlined, with examples from East Asia, where technology importation was correlated to economic growth. The state plays an important role and must provide inputs. International partners are key and original equipment manufacturer arrangements are used to acquire technological capabilities. For Taiwan, it can be illustrated that policy coherence is essential and that skills development processes require linkages with economic development strategies. Reference was made to the need for a non-linear approach to the value chain of the imported technology.

#### Discussion points:

- The disaggregation between firms and state-owned technologies was raised.
- South Africa has rich resources, but it is still unclear what to import and what to export. This needs to be integrated into national development strategies to ensure that there is clarity about what to accept and what to reject. The state is important and insight is needed into what technologies are required.
- Most innovation and investment is going into financial technology (fintech), both locally and globally. The approach taken by this group needs to be understood and possibly adopted, it was noted.
- Whether any restrictions on technology such as geographic limitations were found in the literature was queried. Literature did not highlight constraints, although reference was made to geographical distance. It was suggested that the evidence is clear: Those positioned far from sources of technology are best placed to import and absorb it according to their own requirements and research capacity. China is the most compelling example of this and it is fruitless to focus simply on whether technology is imported or not. Rather the focus should be on local R&D capacity.

### 2.2 TBoP<sup>2</sup> - Payments and receipts for intellectual property: Prof D Kaplan

**(download presentation: <https://www.dst.gov.za/owncloud/index.php/s/5bHciO2HUZScqKM>)**

The presentation outlined payments and receipts for gross domestic expenditure on research and development (GERD), intellectual property (IP) and industrial policy, drawing conclusions about the status quo.

Disaggregated data for South Africa should be created to improve understanding about changes. Current limitations and complexities notwithstanding, data allow for countries comparisons and are comparable over time. However, South Africa has fallen behind. As countries grow and develop, payments for technology rise rapidly. A decline in payments is problematic. A direct correlation can be drawn between

2 Technology balance of payments

economic growth and the purchase of IP from outside the country. Economic growth requires investment and South Africa is paying 4% less than it did four years ago. The low growth is due to lack of investment.

South African purchases have plateaued. Brazil, for example, is doing better than South Africa. As countries grow, they produce more technology, but South Africa is in the negative. Its payments in relation to GERD are in line with those of comparator countries. Small, advancing countries are paying for technology, but the outcome is still determined by how the technology is used.

When measuring performance, a review of receipts is a more important indicator, and it is less about how much is being paid to foreign countries. The scenario for South Africa is not positive at present. State support is essential, as can be seen in the automotive industry, which absorbs 70% of government support. It should, however, be noted that this is for capital investment, not innovation.

The presentation concluded by confirming that importation of technology is correlated with economic growth and that South Africa is lagging behind countries of comparable development.

#### Discussion points:

- ▶ Looking at expenditure in relation to economic growth, the possibility of exploring South Africa's comparative advantage was raised. The situation has both positive and negative aspects. If new products are imported it is vital that new sectors be developed. The kind of technology imported must be understood. For example, a dramatic rise in importations related to cellular telephone manufacture has occurred in South Korea.
- ▶ Even though South Africa imports machinery and has agricultural prospects and extraordinary resources, unemployment remains at 40% (broad definition). It appears that South Africa's approach is incorrect. This comment was noted.
- ▶ South Africa remains an extractive economy with a small manufacturing industry. Perhaps there is little progress because a more robust manufacturing industry acts as a catalyst for innovation. South African exports are principally minerals (gold, platinum and coal) but across the board, these markets are not seen as viable in the long term. New exports must be created to earn foreign exchange and there is a need for imports that facilitate new activities. Despite diversification in the South African economy, clarity is needed on what can be produced for the global market.
- ▶ Clarity was sought about the correlation between imported technology and South African R&D. GERD needs to be more relevant to transform the current scenario by creating outputs and employment. Business should spend more on R&D as universities do not create jobs. Business should be at the centre of innovation for employment and outputs. A focus on the different constituencies of GERD is required.

- ▶ In 2008, IP expenditure increased and clarity is sought on which sectors contributed to this. It was suggested that there was general economic growth during this period but the role of IP expenditure remains unclear. Technology imports are important, but their economic benefits need to be understood through analysis of disaggregated data. To this end, NACI requires access to government data.

## 2.3 TBoP - problematique of technology transfers: Prof M Kahn

(download presentation: <https://www.dst.gov.za/owncloud/index.php/s/OHErVParm1oDJfi>)

Should South Africa import anything or develop technology nationally, considering the importance of improving the TBoP? The Organisation for Economic Cooperation and Development (OECD) has no information on South Africa after 2005 as the country has not complied.

Importers of technology may be resented as they are seen to compromise local possibilities. Reference was made to the developmental state attributes of South Africa in the 1920s, which promoted 'import substitution' and 'learning by doing'. Currently there appears to be no crisis that will force the country to do things differently.

The possibility was raised that South Africa may be a technology comprador<sup>3</sup>. South Africa is one of the top 20 automotive manufacturers in the world but of foreign vehicles. Denel was undermined by the arms deal and has a reduced capacity. Transnet has lost its previous capacity where locomotives were built locally in their entirety. South Africa could have been comparable to China, but these opportunities have been lost.

It has a pool of unemployed and unskilled labour in contradiction to the ideals of the National Development Plan (NDP) that emphasise 'decent' work and the construction of a social compact, which do not necessarily consider current realities.

Any references to technology transfer in the draft white paper<sup>4</sup> are vague and little mention is made of it in the R&D strategy. It was suggested that government's role should be to enable innovation and encourage competition. When contemplating an innovation strategy for South Africa, it is clear that research capacity has been boosted in universities and has been successful. The number of PhD and post-doctoral researchers has increased by a third or more.

The presentation referred to two reviews, one by OECD and one by MinCom. Both reviews emphasise the importance of receipts interpretation. Why are South Africa's receipts so low? Reference was made to Futures literacy – embracing

3 A person who acts as an agent for foreign organisations engaged in investment, trade, or economic or political exploitation

4 <https://www.csir.co.za/draft-white-paper-on-science-technology-and-innovation> Draft white paper on science technology and innovation, September 2018

complexity and using the future<sup>5</sup>, an online resource that may assist in imaging a new future.

An example of innovation is found in plants, where it is necessary to constantly innovate breeds to manage climate transitions. The numbers are significant and there is a gap in plant cultivars. If this sector were supported, the TBoP receipts would increase by 60% as South Africa is among the world's top ten plant cultivars.

#### Discussion points:

- ▶ Defining low, medium and high technology and its importation is important. It is important to understand correlations of trade, industrial and innovation policies and whether they are complementary. It was suggested that policy coordination across government is difficult and poor. Some global 'successes' have been recorded in authoritarian environments – for example, Malaysia simply became a factory for multinationals and did not promote R&D. Although this would absorb labour, South Africa should approach things differently.
- ▶ Cuba's stratification around global isolation was raised. Cuba performed reverse-engineering and continued manufacturing certain products. It was suggested that participants read the paper by Inglesi-Lotz R and Pouris A, Does South African research output promote innovation<sup>6</sup>, which makes various suggestions on linking research and innovation.
- ▶ The notion of minerals beneficiation has been circulating since the '80s, but it would not be possible today as there are too few metallurgists and miners do not understand the processes. Both skills and a competitive advantage are required. Beneficiation remains in a number of policy documents, which makes it even more important to understand what is required. Platinum currently recycled in destination countries and many new alternatives to platinum catalysts compromise beneficiation opportunities.
- ▶ The examination of patents is important. Intellectual property is valuable only if exploited; mere ownership is not useful.
- ▶ A crisis may change the way decisions are made in South Africa. Japan's and Korea's dramatic economic growth arose from the Second World War. Singapore faced a crisis when the British left the colony and responded by implementing policies geared to development and growth. In contrast, South Africa has not addressed its serious education challenges of the past 25 years.

## 2.4 Firm level evidence: Costs and benefits of the importation of foreign technologies: Prof E Kraemer-Mbula

(download presentation: <https://www.dst.gov.za/owncloud/index.php/s/3FTD9rt7gDXhMh1>)

The presentation outlined instruments being developed to analyse data using a firm as the unit of analysis for costs and benefits of the importation of foreign technologies.

Technology is difficult to acquire because it requires conscious effort by the recipient, who should be aware of associated risks and costs. Routes and costs of importing foreign technologies were outlined, as were processes of determining the effects of foreign technology acquisition. These address areas such as employment, output, exports, R&D and innovation.

Information was provided on a survey being implemented online and on analysis of results. The STI community is expected to support the process.

#### Discussion points:

- ▶ It was suggested that the core question of the survey is incorrect, possibly irrelevant, even parochial and slightly xenophobic. It is more important to establish how firms acquire technology (not whether it is foreign or local), what the constraints are and why stagnation has been reached. Policy recommendations on how to address constraints should be formulated, including the possible establishment of a technology transfer fund.
- ▶ It is important to understand the general limitations for firms to access technology. Technology gaps exist between and within countries, and many knowledge gaps need to be filled. How to address knowledge gaps should be more important, as the current process is about using external knowledge in a deliberate way.
- ▶ There was some discussion about this criticism, and a suggestion that an Econometric study would supplement already identified gaps in research. This study would not aim to address all knowledge gaps and would rely on inputs from other stakeholders.
- ▶ A Stellenbosch University study on innovation argues that an innovation system is not solely necessary, but that the focus should be on social innovation to ensure that social enterprises and social firms are created. South Africa requires a new strategy with Germany's approach used as an example. It was agreed that social impact should be measured.
- ▶ This survey should incorporate different modes of foreign direct investment. Policy on the importation of technology should be understood.

5 [https://www.researchgate.net/publication/272739756\\_Futures\\_Literacy\\_-\\_Embracing\\_Complexity\\_and\\_Using\\_the\\_Future](https://www.researchgate.net/publication/272739756_Futures_Literacy_-_Embracing_Complexity_and_Using_the_Future)

6 Inglesi-Lotz R, Pouris A. Does South African research output promote innovation? *S Afr J Sci* 2018;114(9/10), Art. #a0286, 3 pages. <https://doi.org/10.17159/sajs.2018/a0286>

## 2.5 Enhancing business sector innovation to stimulate growth and job creation: Prof D Kaplan

(download presentation: <https://www.dst.gov.za/owncloud/index.php/s/DuNykNNOSIZxMA6>)

This presentation focused on enhancing innovation in the South African business sector to stimulate economic growth and employment.

The draft white paper fails to recognise poor innovation performance widely across various indicators. Indicators revealing poor performance all relate to the business sector and the commercialisation of knowledge. In contrast, there is a sound performance in knowledge itself, but this does not lead to solutions, as it is commercialisation of knowledge that promotes growth and employment.

Innovation policies should contribute to output and employment, while focusing on weaknesses. Why 1.5% of gross domestic product (GDP) is allocated to innovation is not clear, nor is it clear whether this is justified. Furthermore, the white paper fails to target the business sector. The next draft should be business-centred, with new policies, mandates and performance indicators. Various approaches to enhancing innovation are needed, as different types of business require different responses.

The white paper focuses on governance and the proposed role of NACI and DST, with the business community under-represented. DST should take into account business experience and education in recruitment to ensure a business orientation.

Reference was made to the small technology based start-up sector. South Africa is diverse and has widespread innovation, particularly in urban areas. Although this is common globally, the South African government has not recognised it and much of the support takes place at city level. Technology sectors in urban areas must be strengthened in the next white paper, to strengthen city metropolises. The innovation system may be over-centralised, with insufficient attention being paid to small technology start-ups and the use of crowd funding.

Incentive structures for funding start-ups may be better aligned to private than public domains. In this case government should support venture capital enterprises and revise its policy.

What constitutes an innovative country can be tested, but it is important to recognise the depth of a problem and respond appropriately. DST's role in stimulating business sector innovation is limited and the effectiveness of policy instruments such as the R&D tax subsidy should be reviewed. It is important to build on identified strengths and look at new applications for existing technology.

Industrial policy should reflect innovation, and DST and the Department of Trade, Industry and Competition (the dtic) should coordinate policies more effectively. Monitoring and evaluation should be applied to output growth, employment growth, export growth, receipt from sales of technology abroad and patents.

The new white paper requires a fresh approach. Innovation in the business sector is a priority, as is realism about the size and composition of the National System of Innovation (NSI).

### Discussion points:

- ▶ Policy instruments supporting innovation should include rural areas that need investment to avoid being left behind. This is a fair comment, but the frontier investment areas are over-emphasised and do not have firms to take up opportunities.
- ▶ It was acknowledged that businesses should be the locus of innovation, but they would need to be categorised according to appetite for innovation. Issues are complex and exports cannot be directly subsidised. It is possible to focus on R&D and incentives for firms going into new markets and spaces.
- ▶ Current procurement regulations may need to be adapted to new innovations and pilots could be run. Procurement regulations would need to be adjusted to create an innovative society, which is particularly important in a slow growth environment.
- ▶ Stats SA's method of collecting data on monitoring and evaluation should be investigated to ensure resultant data are useful to most stakeholders. Data, including industrial statistics, may already exist to set up these evaluations.
- ▶ It is necessary to understand whether there is a distinction between imports and exports as an indicator or promoter of economic growth. To do this, both export and import data must be interrogated.
- ▶ Social innovation in communities and cities should be captured in the white paper.
- ▶ Skills development would include exposure to entrepreneurship and innovation, changing the culture and creating awareness. The presentation did not focus on education but this is important. It must become easier to start companies in South Africa. Graduates need to earn a living by becoming more entrepreneurial.
- ▶ A collaborative framework exists between the dtic and DST, but little shared planning takes place. Ideally, there should be less competition and more complementary activities. It would be useful to draw the business sector and other departments into NACI to expand its influence.



### 3. WAY FORWARD AND CLOSING REMARKS: MS CLAIRE BUSETTI

Ms Claire Buseti (NACI Councillor leading the project) pointed out that the feedback from the workshop would be embedded in future research. She acknowledged that more research into policy implementation was needed as policy advice from NACI is evidence-based. She emphasised cross-cutting research on the importance of importing technology to enhance business innovation. The recommendation that National Treasury be represented on the NACI board was well received, she said, as it would improve access to information.

Finally, she indicated that the focus on government at the expense of business was acknowledged and that focus on business innovation was recognised as crucial. In closing, she reiterated that the NSI's aim is to create knowledge that could lead to new products, services and markets, contributing to job creation and economic growth.

The workshop ended at 13:15





