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

CSIR international Convention Centre (ICC), Pretoria
15 October 2018

Programme director: Ms Claire Busetti (NACI Councilor)

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. The main concern was the debate about the relative impact of importing technology versus the stimulation of local development. While South Africa, like most middle-income countries, is a net importer of technologies, not much attention has been paid to the impact thereof.

In order to address the abovementioned concern, the project sought to understand the broad impact that the importation of technologies has at firm[1] level, exports and the contribution to the fiscus. Understanding of the impact of technology importation would assist NACI in its capacity of offering policy recommendations or advice. This may have implications for diverse areas of policy such as research and development (R&D) and firm level incentives for capital investment.

Following the commencement of the project, some interesting preliminary findings resulted based on literature review (and local instruments), technology balance of payments and business sector innovation stimulating economic growth and jobs. NACI then decided to host a workshop in order to share and discuss those preliminary findings with and solicit inputs from participating stakeholders. Below is a detailed feedback of the entire workshop.

1. WELCOME TO THE WORKSHOP
Dr Mlungisi Cele (Acting CEO: NACI), Ms Claire Busetti (NACI Councilor)

Dr Mlungisi Cele, the Acting CEO of NACI, started by welcoming stakeholders and thanking them for their willingness to participate in the NACI roundtable workshop and to discuss and make input to the preliminary findings of the study. He emphasised that in order to make real impact in that regard, NACI required both resources and support from various stakeholders. He added that the work of this nature would contribute to a better understanding of the relationship between investment in imported technology and productivity. Finally, he invited colleagues and stakeholders to reflect on the preliminary findings and provide the needed inputs.

[1] A company is called a firm when it is a partnership of two or more persons. So from the linguistic perspective, there is a clear difference between firm and company. Dictionaries make a difference when a company is a partnership. And then they call it a firm

In conclusion, Ms Busetti indicated that the critical issue was making use of policy and STI to improve the lives of South Africans. She went on to say that current perceptions included that the technology balance of payments (TBoP) was distorted which contributed to the view that technology and innovation should not be imported. Furthermore, she said that such might reflect the inward-looking stance of the previous government. She indicated that current challenges required that South Africa exported more than raw materials. According to her, some countries had moved ahead of South Africa in that regard, and benefited from innovation and technology imports. She closed by saying 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 the local instruments created to promote the smart importation of technology. All countries were found to import some form of technology, in many cases more than what is exported. Extensive literature was applied to support that argument. The widely divergent views on this matter need to be understood so that strategies suitable for the South African context can be formulated. This would allow policymakers and researchers to make sense of a complex issue.

Some oppose foreign technology on the basis that it is not suitable to local conditions or may compromise local competitiveness. However, critical questions should be asked, within the understanding that 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. Lessons learned were such that the state plays an important role and must provide inputs. International partners are key and original equipment manufacturer (OEM) arrangements are used to acquire technological capabilities. In the case of 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:

a) The disaggregation between firms and state owned technologies was raised.

b) 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 there is a need for insight into what technologies are required.

c) 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. That point was noted.

d) Whether any restrictions on technology such as geographic limitations were found in the literature was queried. Literature on this topic 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 simply focus on whether technology is imported or not. Rather the focus should be on local R&D capacity.

2.2 TBoP[2] - Payments and receipts for Intellectual Property (IP): Prof D *Kaplan*
(Download presentation: https://www.dst.gov.za/owncloud/index.php/s/5bHciO2HUZScqKM)

The presentation outlined payments and receipts in relation to 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 facilitate improved understanding about what changes have taken place. Current limitations and complexities related to the data exist but data do allow for countries to be compared and the data are comparable over time. However, South Africa has fallen behind other countries in this sphere. As countries grow and develop there, is a rapid rise in payments made. Payment is made for technology and the fact that less is being paid is problematic. A direct correlation can be drawn between 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. Comparing South Africa to Brazil provides clarity. Brazil is doing better than South Africa. As countries grow they produce more technology, but South Africa is in the negative. South Africa's payments in relation to overall spending on R&D (GERD) is in line with comparator countries. Small, advancing countries are paying for technology, but the final outcome is still determined by how the technology is utilised.

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 emphasising that importation of technology is correlated with economic growth and that South Africa is lagging behind countries at a comparable stage of development.

Discussion points:

- When looking at expenditure in relation to fast 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 being imported it is vital that new sectors be developed. The kind of technology that is being imported must be understood. A dramatic rise in importations related to cellular telephone manufacture has occurred in South Korea.

- Even though South Africa imports machinery and that it also has agricultural prospects and extraordinary resources, unemployment remains at 40% (broad definition). It appears

[2] Technology Balance of Payments

that in South Africa an incorrect approach is being taken. 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 face challenges and are not seen as viable in the long term. New exports must be created in order to earn foreign exchange. Complementary to this is the need to import that which allows for the establishment of new activities. Despite the diversification in the South African economy, what choices exist are not clear. Clarity about what can be produced for the global market is essential.

- Clarity was sought about the correlation between imported technology and South African R&D. GERD needs to be more relevant as it would transform the current scenario dramatically. If spending on GERD is important and relevant, it is likely to create outputs and employment. Business should spend more on GERD 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 about which sectors contributed to the increased expenditure. It was suggested that there was general economic growth during this period but the role of IP expenditure remains unclear. Technology imports are important and evidence around the economic benefits of technology imports needs to be understood through the analysis disaggregated data. To achieve improved understanding of this dynamic 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)

A common question is whether South Africa (SA) should be importing anything at all or focusing on developing technology at a national level, considering the importance of achieving an improved measure of TBoP. OECD data have no information on South Africa after 2005 as the country has fallen short of the compliance standards.

In some cases, 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 the notions of “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[3]. South Africa is one of the top 20 automotive manufacturers in the world but these are foreign vehicles. Denel was undermined by the arms deal and has a reduced capacity. Transnet has lost its previous capacity where locomotives use to be built locally and in their entirety. South Africa could have been comparable to China, but these opportunities have been lost.

SA has a pool of unemployed and unskilled labour and this stands in contradiction to the idealistic 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[4] are vague and little mention is

[3] A person who acts as an agent for foreign organizations 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

made of it in the R&D strategy. Referring to the draft white paper 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 that it is important how receipts are interpreted. Questions must be asked about why South Africa's receipts are so low. Reference was made to *Futures literacy – embracing complexity and using the future*[5] an online resource, which may assist in the imaging of a new future.

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

Discussion points:

- Clarifying the distinction between low, medium and high technology and its importation is important. When looking at innovation policy, it is important to understand the correlations between trade, industrial and innovation policies and whether they are complementary. It was suggested that policy coordination across government is difficult and poor. Some recorded global 'successes' have occurred in authoritarian environments. Malaysia simply became a factory for multinationals and did not promote R&D. Although such a factory system would absorb labour, South Africa should approach things differently.

- The case of Cuba was presented and how it had strategized around global isolation. It was confirmed that Cuba did 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*[6] 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 to embark on this type of project today as the required number of metallurgists is not available, and miners themselves do not understand these processes. Both skills and a competitive advantage are required. This concept of beneficiation continues to be present 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 have emerged. This somewhat compromises any beneficiation opportunities.

- It would be important to look at the examination of patents. Intellectual property is only valuable if exploited; mere ownership is not useful.

- A crisis may change the way decisions are made in South Africa. Japan and Korea's dramatic economic growth arose out of the Second World War. Singapore faced a crisis when the British left the colony and responded by implementing policies geared to

[5] 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

development and growth. In contrast to these responses, South Africa has not addressed challenges in education over the past 25 years despite the fact that the sector continues to face serious challenges.

2.4 Firm level evidence: costs of 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 that are being developed to analyse data using a firm as the unit of analysis concerning 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 the processes involved in determining the effects of the acquisition of foreign technologies. These address areas such as employment, output, exports, R&D and innovation.

Currently the research project implementing the survey online and taking decisions about the analysis of survey results. Further information was provided, about the implementation of the survey and how the analysis of survey results is envisaged. It was expected that the STI community would 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 a point of 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 that an Econometric study would supplement gaps in research that has already been identified. The survey in question does not aim to address all knowledge gaps and will rely on inputs from other stakeholders.

- The University of Stellenbosch has published a study on innovation, which 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 while the approach taken by Germany should be used as an example. It was agreed that social impact should also be measured.

- It is important to incorporate into this survey different modes of foreign direct investment (FDI). Policy around the importation of technology should also be understood.

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 how to enhance innovation in the business sector in South Africa in order 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 in the commercialisation of knowledge that there is growth and employment.

Innovation policies should contribute to output and employment and the focus should be on areas of weakness. The reason 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 White Paper should be business-centred, with new policies, mandates and performance indicators. Various approaches to enhancing innovation in the business sector should be used and it should be taken into account that different types of business require different responses.

The white paper focuses on governance and the proposed role of NACI and the DST. The business community has thus far been under-represented. This could be remedied by DST taking into account business experience and education in recruitment processes 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 a common phenomenon globally, SA national 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, with the aim of strengthening city metropoles. It may be that the innovation system is over-centralised and that insufficient attention is paid to small technology start-ups and the use of crowd funding.

It is possible that incentive structures for funding start-ups will be better aligned to private rather than public domains. In this case government should support venture capital enterprises and revise government policy accordingly.

What constitutes an innovative country can be tested but it is important to recognise the depth of a problem and respond appropriately. The DST plays a limited role in stimulating business sector innovation and the effectiveness of some 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 and Industry (DTI) should coordinate their respective 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 a sense of realism about the size and composition of the National System of Innovation (NSI).

Discussion points:

- Policy instruments supporting innovation should include rural areas where investment would be required to ensure that rural areas are not left behind. This is a fair comment but currently the frontier investment areas are over-emphasised and they do not have firms to take-up the opportunities.

- It was acknowledged and confirmed that businesses should be the locus of innovation, but they would need to be categorised in order to identify those with an 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 and the collection of data regarding M&E should be investigated as it would provide useful data. It is possible that data already exists to set up these evaluations, including industrial statistics.

- It is necessary to understand whether there is a distinction between exports as an indicator or as economic growth. Export data must be interrogated to identify whether any is reflected in export activity.

- Social innovation, which resides in communities and cities, is also an important area that should be captured in the white paper.

- Skills development would include exposure to concepts of 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 would need to earn a living by becoming more entrepreneurial.

- A collaborative framework between DTI and DST exists but in reality, little shared planning takes place. Ideally, less competition and more complementary activities is necessary. 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 Busetti (NACI Councilor leading the project) pointed out that the feedback from the workshop would be embedded in the research going forward. She also said that it was recognised that more research into policy implementation was needed as policy advice from NACI is evidence-based. Her emphasis was also on having crosscutting research around the importance of importing technology to enhance business innovation. She assured participants that the recommendation that the National Treasury be represented on the NACI board was well received, as it would allow for improved access to information.

Finally, she indicated that the focus on government at the expense of business was also acknowledged. She added that the focus on business innovation was crucial and acknowledged. In closing, she mentioned that the National Innovation System's (NSI) aim was to create knowledge, which could lead to new products, services and markets, contributing to job creation and economic growth.

The workshop ended at 13.15