NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

SPEECH

BY

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AT

THE MEMORIAL PUBLIC LECTURE IN HONOUR OF PROFESSOR CALESTOUS JUMA

THEME: "*PUBLIC POLICY OPTIONS FOR SCIENCE AND TECHNOLOGY IN AFRICA*"

ON

19 JULY 2018

AT

18:00

AT

AUDITORIUM 1

Master of Ceremony Dr Alfredo Tjiurimo Hengari, Press Secretary and Presidential Adviser
His Excellency Dr Hage Geingob, President of the Republic of Namibia and First Lady Madame Monica Geingos
His Excellency Dr Sam Nujoma, Founding President and Founding Father of the Namibian Nation
His Excellency Nangolo Mbumba, Vice-President of the Republic of Namibia
Right Honourable Dr Saara Kuugongelwa, Prime Minister of the Republic of Namibia
Honourable Dr Itah Kandjii-Murangi, Minister of Higher Education, Training and Innovation
Honourable Dr Naledi Pandor, Minister of Higher Education, and Training, South Africa
Honourable Ministers and Members of Parliament
Esteemed Members of the Diplomatic Corps
Esteemed Academics, Guests and Students
Members of the Media
Ladies and Gentlemen

Firstly, I wish to extend my deep sense of gratitude to State House for reaching out to the Namibia University of Science and Technology (NUST) to host this prestigious academic gathering, as initiated by His Excellency the President, under the heading: **Professor Juma Memorial Lecture**: **"*Public Policy Options for Science and Technology in Africa.*"**

In addition to NUST being Namibia's **only technological university** with a core mission that embraces **science and technology, research and development, entrepreneurship and innovation**, it is also the natural home for public discourse on any relevant scientific and other development topics.

Similarly, I am deeply honoured to provide a high-level reflection on Professor Calestous Juma's unfinished Paper entitled ***"Science and Technology Advice to African Presidents."*** I'm humbled by this opportunity to comment on the scholarly work of one of Africa's preeminent intellectuals. I shall not critique the Paper; I would rather highlight the critical issues raised and the recommendations postulated.

The Paper consists of **five sections or chapters** as follows:

The **first section** presents the key features of Africa's technological vision as expressed in the various presidential summits convened by the African Union (AU).

Section II examines the key global trends in presidential science and technology advice.

Section III provides an overview of the institutional arrangements and models used to provide presidential science and technology advice.

Section IV uses the case of Namibia to illustrate how structures of government, often arising from national constitutions, can hinder or facilitate the effective provision of presidential advice.

The **final Section, Chapter 5,** outlines various options that could be pursued to strengthen the institution of presidential science and technology advice in Africa.

Background

But first, as we embark on the analysis, I shall provide a synopsis or reflection, which speaks to the background against which the Paper is framed. To be clear the Paper analyses Africa's development scenarios and challenges in **Science and Technology, Research and Development, and Innovation,** and posits various solutions based on best practices. But it does not impose particular solutions for a particular President, Government or Government system.

These five indicators or factors are measures or indications of, or potential for, socio-economic development. For instance, an Index rank of Science and Technology capacity indicates the status of a country as:

i. Scientifically advanced,
ii. Scientifically proficient,
iii. Scientifically developing,
iv. Scientifically lagging.

Thus, **expenditure on these five development factors** is a **key indicator of government and private sector efforts to obtain competitive advantage in Science and Technology.** It is proven that science has helped stimulate economic growth in regions investing in innovative solutions around the world. However, in respect of all five factors, Africa lags behind, thus making **the case for stronger scientific and technological advice, foundations, renewal or revival more urgent.**

In other words, a number of African countries are poised to reap the economic benefits of increased investment in Science and Technology, **expressed as a percentage of national Gross Domestic Product (% of GDP)**. **For example, while the global R&D expenditure for the world stands at 2.27% of GDP, for Namibia it reflects a meagre investment of 0.34%, much lower than the agreed target of 1% of GDP! In contrast, Namibia's military spending stands at about 1.8% of GDP, with little investment in R&D on its part. In other words, Namibia spends six times more on the military than a Research and Development.**

The Paper highlights that while the above listed indicators are foundations of development, these are strongly linked to **tertiary foundation enrolment**. Tertiary foundation must fulfil the role as a driver of growth and technological capability, in R&D&I. But Africa's tertiary education enrolment rates are among the lowest in the world: the average for **Africa is 7.1% compared to 25.1% elsewhere in the world**, **and other evidence shows that African countries still lag behind in Science and Technology capability.**

[Where some African countries like South Africa (19.4%), Liberia (17%), Nigeria (10%) and Namibia (9%) show above average enrolment rates in tertiary education, they still lag behind in Science and Technology capability. In other ways, the growth in the tertiary education sector has been insufficient to match the rising demand driven by improved access to primary and secondary education and a growing young population.]

As African countries advance in Science and Technology capability, their changes of orienting economies toward sustained and sustainable growth are greatly enhanced.

It is for these reasons that the Paper on **Science and Technology Advice to African Presidents** will play a critical role in **shaping policy frameworks**. In the Introduction the Paper briefly sketches the history of presence of western technology through colonisation, when technologies were employed to subjugate the African populations and exploit them, resulting from racial and power imbalances. It further sketches contestations between indigenous and western technologies. Following decolonisation, economic integration and transformation of Africa became possible, leading to the replacement of the **Organization of African Union (OAU)** – which was driven by ***political and decolonisation agenda,*** with the **African Union (AU)** – which is driven by a ***development agenda***.

The extent to which the **mental shift** is reflected in the organisation of government, so they can serve as **facilitators of technological innovation**, is one of **Africa's emerging policy challenges**. They require Africa's political commitment to moving the economies from being resource-driven to being innovation-led.

Let's now delve into the details as elaborated in the five chapters.

Chapter 1: Introduction

This section deals with the key features of Africa's technological vision as expressed in the various presidential summits covered by the AU. The **mental shift** alluded to earlier led to the adoption of the **AU's 10-year Science, Technology and Innovation Strategy for Africa (STISA - 2024)**. This is a **policy orientation** meant to accelerate **Africa's 50-year Agenda 2063** aiming for **inclusive growth and sustainable development**.

The Strategy accounts for Africa's contemporary levels of development and their persistence and is about harnessing science, technology and innovation to help solve six key grand challenges:

i. Building infrastructure,
ii. Eliminating hunger,
iii. Improving human development,
iv. Protecting the environment,
v. Enhancing social cohesion, and
vi. Spreading prosperity.

All in all, the importance of harvesting science and leveraging existing technologies and discovery is necessary to drive development by creating new enterprises and expanding development growth options. This approach also includes fostering innovation through **interactions between government, academia, business and civil society associations**.

Therefore, **STISA-2014** has identified **four strategic actions that reflect Africa's state of development** while accommodating differences in states. These are:

a. **investing in infrastructure:** where both **physical projects** and **research facilities** are critical and show symbiosis - **Physical projects** are **inherently high-tech and offer a foundation for building up scientific and technological capabilities**, while **research facilities** can be **directly linked to infrastructure projects and others need to be set up at universities and institutes** with opportunities for common use and collaborative study. It is not possible to do research without the necessary conditions such as funding, researchers, infrastructure, and international collaboration.

b. **building technical capabilities:** speaks to the need to expand the availability of quality postgraduate education, especially leading to doctorates is recognised, but this requires systematic and coordinated approach to HCD. The Paper laments the fact that in Africa, research is carried out in national institutes that do not teach and most universities teach but have little research capacity or funding. In addition, research findings in universities and institutes do not diffuses into the economy. This is the reason for establishing a **new generation of innovation universities that combine research, teaching, commercialisation and community engagement.**

c. **incubating and upscaling enterprises**: is recognised that African countries are investing in enterprise development, noting that these are the primary vehicles for forming knowledge into goods and services. However, technical knowledge and entrepreneurship require forging close connections between business and academia. For sure, as business grows, they demand and produce more technical knowledge, while universities especially the new technological and new generation universities serve or should serve, as incubators of business.

d. **building the Innovation State:** This requires creativity and flexibility from African policy makers and for them to act as agents and champions of the innovation state, thereby providing coordinated policies that fit specific purposes. In short, African countries need to **create governance structures and policy environments that nurture innovation, and thus continuous policy adjustment**. This is best achieved with the support of effective **Offices of Science, Technology and Innovation Advice for heads of state and government. The Paper points out that no African country has such a statutory Office, whose function would be to advise on how to incrementally adjust governance structures to support innovation**, and that such an approach will leverage the countries' regular investments in infrastructure, education and entrepreneurship to support innovation. The Paper also highlights that making innovation a routine aspect of existing activities involves less additional financial investment than other routes.

Chapter 2: Trends in Presidential Science and Technology Advice

This section provides a **synthesis of lessons learned worldwide**, speaking of codification of practices in various countries mostly from industrialized world, such as Canada, New Zealand, United Kingdom and the United States.

Thus the Principles of Science and Technology Advice stress the importance of the **quality of advice and selection of the appropriate principles that fit national realities**, underlining the **use of democratic principles such as openness, effectiveness of policy advice and continuous institutional self-review of advisory mechanisms**.

The paper puts forward the notion that Africa's take to Science, Technology and Innovation advice has been **based on political appointments of presidential advisors, designating existing ministers to serve as advisors, and creating advisory councils**. These approaches reflect the **nature of national constitutions structure, limited financial and human resources, and lack of legal capacity to sustain science and technology advice**. The problem is accentuated by the nascent nature of **national scientific academies**, or lack thereof.

On the other hand, the Quality of Science and Technology Advice depends on maintaining quality expect advice which depends on a variety of conditions that include **early and appropriate identification of issues, recognition and appropriate treatment of scientific uncertainty and risk, and diversity of opinion and cross-disciplinary approaches**.

However, the main problem is African countries' institutional arrangements that foster advice while maintaining independence. This is influenced by domestic conditions such as funding and robustness of scientific, engineering and technological community. Therefore, the advice is that **early and appropriate identification** is a key aspect of the quality of presidential advice on science and technology. There is a need for building science academies, the public, politicians and the wider scientific community.

In summary, the **quality of S&T advice** depends on various preconditions for such as:

i. qualified and quality advisors;
ii. diversity of views and cross-disciplinary approaches to scientific questions;
iii. accuracy of scientific advice, based on scientific evidence, analysis and conclusions;
iv. financial, intellectual and political independence and disinterestedness in outcomes;
v. public trust in information and policy based on appropriate and sound advice mechanisms;
vi. inclusiveness and openness to all institutions and sectors of society; and
vii. review and feedback.

Chapter 3. Institutions of Science and Technology Advice

This Chapter explores four models derived from an analysis of existing review and feedback systems.

Models of Science and Technology Advice

1. **Agency outreach model:** which seeks input from the scientific establishment to assist in the priority setting process. This is based on workshops that bring together all stakeholders (such as in the ***quadruple helix*** model). This is best suited for countries that have an already established science and technology advisory system where advice recipients are accustomed to inclusivity and openness in their decision-making process. **This may require resources (human / financial) that developing countries do not have or cannot afford.**

2. **Independent advisory model for priority setting:** which is more suitable for developing economies, and involves the science agency as a leader that seeks advice or input from an objective group.

3. **Convened science advisory board model for priority setting:** This is an advisory committee that can have members with several year terms and can be convened to advise on scientific and engineering advice. This board provides **"external advice."**

4. **The Network Model of Science:** draws advice from sectoral advisory mechanisms to inform national decisions. For example, the **Chief Scientist in the President's Office** coordinates input on specific issues from across the different departments. This requires extensive financial and institutional resources.

Given the various models, the Paper continues to probe the question of **Institutions of Presidential Advice**. It recognizes that advising presidents happens at all government levels, as advice can be sought in various ways. The primary differences between advice mechanisms exist as follows:

i. At which level is scientific input received?
ii. How formal or flexible is the advisory process?
iii. What is the relative use of science advice in different branches of government (executive and legislative)?
iv. To what degree are advisors involved in the decision-making involvement?

The establishment of institutions to advise presidents should be structured to consider the **organization, financial and political characteristics of the country**.

[This may mean (a) the nature of the institution, (organization), (b) kinds of capabilities needed to run the institution (organizational), (c) procedures needed to run the institution (organizational), (d) resources to run the institution (financial), and (e) the sources of outside legitimacy and credibility (political).]

There is also scope for **Scientific and Engineering Academies and Science and Technology Advisors,** which should be established and maintained as one way of realizing professional advice. Academies can **grow from the scientific and engineering community, independently, but they can also grow through concerted efforts by the government**. In either case, funding and its sources shape both the conscious innovation and natural evolution of academics.

The Paper recognizes **Institutional Obstacles** that hinder the establishment, evolution or success of Science and Technology advice. Some of these are:

a) Lack of political will, often attributed to the President;
b) Financial capability and sustainability; and
c) Constitutional, legal and institutional parameters.

Chapter 4. Presidential Advice in Africa: The Case for Namibia

In this Chapter, the Paper studies Namibia's constitutional, legislative, governance and executive provisions in order to frame a case study for the Africa. Unfortunately, the work wasn't completed and there are no firm recommendations for S&T advice for Namibia as a model. But it is evident that a model or a hybrid of the models proposed in the Paper are workable solutions for Namibia. The torch has been passed onto the current and future generations.

Chapter 5. Strengthening Presidential Science and Technology Advice

The foregoing leads to **Chapter 5** which deals with advice on **Strengthening Presidential Science and Technology Advice**, and is essentially a capstone project crystallizing presidential advice in respect of Science and Technology. It proposed fine solutions.

1. **Adopt a high-level strategic vision for innovation and development:** This model must show how Science and technology advancements are relevant to national inclusive and sustainable development strategies. A vision for science and technology must be established.

2. **Reform the various branches of government:** Innovations in government science advice must be shaped by legislation and / or formal orders, not personal appointment. This is to a great extent ensures the institutional independence of science advisors from background political interests.

3. **Building capacity to manage advisory processes:** This requires investments from government to outsource learning to existing institutions (schools, universities, etc), and / or government must improve access to funding for Science and Technology advice. Capacity building can also happen through learnings of successful and failed models and mechanisms.

4. **Improve funding and legal capacity for advisory activities:** Such could mean funding innovative council, universities and agencies, and linking foundations to academics in African countries. Heads of national academics can serve on an *ad hoc* basis as presidential advisors.

These could be the building blocks for establishing a **dedicated Office of the Chief Scientist in the President's Office**. In order to enhance public accountability, legal arrangements or instruments should be put in place. But, all in all, it should be understood that advisory offices do not have implementation functions in the same way as presidential economic advisors do.

Conclusion

I would like to conclude with a summary as follows:

This paper has outlined the increasing imporatance of recognising the importance of science, technology, and innovation as major sources of economic transformation and has presented the key concepts, procedures, and institutional arrangements needed to strengthen scientific advice.

An indicative roadmap includes adopting a high-level strategic vision for innovation and development; reforming the various branches of government to reflect a coordinate approach to science and technology advice; diversifying advisory mechanisms and procedures to reduce uncertainty; building capacity to manage advisory processes; and improving the funding and legal capacity for science and technology advice.

There is no viable alternative to adopting an evidence-based approach to decision-making and codifying the activities in law and institutions."

Once again, I thank you for the occasion to present the synopsis on this commemorative Paper and for your amiable attention.

- Ends.