The key drivers of science-industry collaborations in service for society

Science Business Society Dialogue Conference
5-7 December, 2016

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NEPAD Business Foundation

NEPAD BUSINESS FOUNDATION

Who are we…

A Non Profit Organisation formed to achieve the New Partnership for Africa's Developments' (NEPAD) outcomes

- African based NPO with cross border mandate
- Neutral multi-stakeholder party
- Linkages and access to African governments and key decision makers
- Specialist advisory assignments
- Up-to-date intelligence on business development issues in Africa
- Provide Investment Business Platforms with Government representatives from Africa
- Physical presence in multiple African countries

To support…

Our Vision…

… to provide critical linkages between public and private sector with the intention of accelerating development projects from inception to implementation for the prosperity of Africa.

Our Mission…

… to promote sustainable economic development in Africa through the private sector.

FOUNDING PARTNERS

AngloAmerican Eskom MTN OLD MUTUAL TRANSNET

PLATINUM MEMBERS

RioTinto Mott MacDonald PDNA GRINDROD T-Systems

Role of the NEPAD Business Foundation

The NEPAD Business Foundation (NBF) acts a Project Management Unit to catalyse, coordinate, unlock and accelerate project development in Africa, from concept to bankability, through public-private and development finance partnerships

Project Origin
(Public Sector/Developer/Sponsor)

DFI's
GVT's
Donors

PIDA
PICI
SADC
PPP

Inception
Feasibility

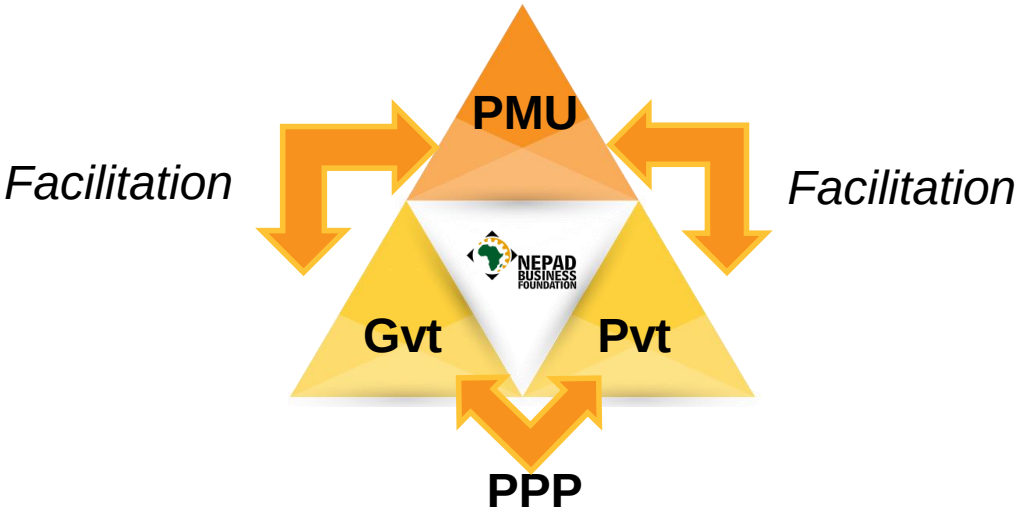
NBF

BRIDGE

Bankability
Implementation

Project Destination
(Private Sector/PPP)

Private sector companies inform the strategy and function of the NBF which is supported by…



The Science-Technology-Innovation Mix

Science-Technology-Innovation

An effective Science-Technology-Innovation (STI) policy relies on the collaboration of key stakeholders including government, research institutions, industry and firms.

This cross-stakeholder cooperation is required in formulating policies and in ensuring their implementation

- **Science policy** entails investments in research and development (R&D), and importantly in the development of human capital through education and training.
- **Technology policy** focuses on the development of technological infrastructure to support the development and utilisation of existing and new technologies.
- **Innovation policy** should focus on actions by public organisations to help develop capabilities and capacity of firms to innovate.

Science-Technology-Innovation

Research points to **emerging economies and newly industrialising nations** achieving greater economic success where they have the **ability to formulate effective science, innovation and technology policies**.

National policies are geared towards **enhancing the capacity and capabilities of local firms** to innovate and compete internationally and in fact, local firms' ability to take advantage of the policy environment to continually innovate can become a critical competitive advantage for the domestic economy.

Science-Technology-Innovation

A lack of institutionalisation of innovative capacity leads to constrained potential for industrialisation through downstream value-addition.

Other factors inhibiting innovation include:

- Distances from end-user markets;
- Poor infrastructure and logistics networks;
- Poor trade facilitation frameworks; and
- Lack of application of business good practices.

In small developing countries in particular, industrial centres of competence offer a real opportunity to transform marginalised economies.

Science-Technology-Innovation

African governments, supported by the development community, have spent consistently on the development of small businesses in an effort to develop entrepreneurship. Despite this expenditure:

- No overwhelming net positive industrialisation effect;
- Unemployment has continued to rise; and
- African economies have not competed with newly industrialising and emerging economies of Asia and Eastern Europe, while Latin American countries have been experimenting in innovation, and the Middle East has overtaken Africa in terms of innovation metrics.

Global Innovation Index

Global Innovation Index

The Global Innovation Index 2016 (GII) 9th edition co-published by Cornell University, INSEAD, and the UN's World Intellectual Property Organization (WIPO).

The GII gathers data from more than 30 sources, covering a large spectrum of innovation drivers and results; privileging hard data over qualitative assessments (five survey questions were included in the GII 2016). The framework is revised every year in a transparent exercise to improve the way innovation is measured.

https://www.globalinnovationindex.org/analysis-indicator

Global Innovation Index

The GII relies on **Innovation Input** and the **Innovation Output** Sub-index with key pillars.

Five input pillars that **enable innovative activities**:

(1) Institutions,
(2) Human capital and research,
(3) Infrastructure,
(4) Market sophistication, and
(5) Business sophistication.

Two output pillars capture **evidence of innovation outputs**:

(6) Knowledge and technology outputs and
(7) Creative outputs

Global Innovation Index

1	Switzerland	66.3
2	Sweden	63.6
3	UK	61.9
4	USA	61.4
5	Finland	59.9
11	Korea, Rep of	57.1
25	China	50.6
42	Turkey	39
53	Mauritius	35.9
54	South Africa	35.8
84	Mozambique	29.8
90	Botswana	29.0
93	Namibia	28.2
98	Malawi	27.3
105	Tanzania	26.4
106	Senegal	26.1
111	Madagascar	24.8
125	Zambia	19.9
n/a	Angola	-
n/a	DR Congo	-
n/a	Lesotho	-
n/a	Swaziland	-

Case Study in Innovation: Republic of Korea

Case Study: Korea

Economy (1960)

- Korea launched its industrialisation drive in the early 1960s
- A developing country, with poor resource and production base, small domestic market, and dependence on foreign powers for national security.
- GDP in 1961 was $2.3 billion or $82 per capita.
- Mostly agrarian economy, with manufacturing accounting for 15% of GDP. International economic interactions were very limited.
- In 1961, Korea's exports totalled $55 million, and imports $390 million.

- **<u>Recent statistics:</u>** GDP $1.849 trillion in 2015. Exports 28.5% of total output ($526.9 billion in 2015); Unemployment 3.5% in 2014. (IMF World Economic Outlook Database)

Republic of Korea

COUNTRY AT A GLANCE

Population	50.62 million	2015
GDP	$1.378 trillion	2015
GDP growth	2.6%	2015
Inflation	0.7%	2015

Case Study: Korea

Science and technology (S&T) situation

- There were only two public S&T institutions: the National Defence R&D Institute and the Korea Atomic Energy Research Institute.
- Korea invested $5 million on R&D in 1964, resulting in fewer than 5,000 jobs for scientists and engineers.

In 1962, Korea launched its first five-year economic development plan, aimed at developing an industrial base that could support both import substitution and export promotion.

Two objectives of the Economic Development Plan

- Promoting the inward transfer of foreign technologies
- Developing the domestic absorptive capacity to digest, assimilate, and improve on the transferred technologies.

Case Study: Korea

Korea chose to skip FDI to keep local ownership and control of the economy focusing instead on:

Reverse engineering

- The reproduction of another manufacturer's product following detailed examination of its construction or composition.

Original equipment manufacturing (OEM)

- An original equipment manufacturer (OEM) is a company whose products are used as components in the products of another company, the value-added reseller (VAR) working closely with the VAR customising designs based on that company's needs.

Foreign licensing

- Foreign licensing agreements helping Korean companies expand their product lines in the international marketplace while lowering the financial risk of the expansion.

Case Study: Korea

In the 1970s

- Korea invested in machinery and chemicals.
- In heavy machinery, foreign licensing was an important channel for technology acquisition.
- In chemicals, Korea relied largely on turnkey plants, which included technical training programs as part of the packages.
- Government created government R&D institutes, which worked with private industries to build the technological foundation for industrial development.

Case Study: Korea

- Government recognised it needed to build indigenous R&D capability, so National R&D Program was launched in 1982 aimed at:
  - Promoting and facilitating **private R&D** activities,
  - Providing **tax credits for R&D investments** and worker development.
  - Implementing the overall government strategy of **exposing firms to international competition.**
  - Providing companies with **financial and other incentives** based on export performance.
  - Companies with **better performance given better business opportunities** as well as better access to financial resources.
  - Korean firms recognised that to **keep pace** with technological change and survive in an export-driven world, they would have to **invest heavily in R&D**.

Case Study: Korea

Both positive and negative effects:

- The policy enabled Korea to acquire technologies at lower costs and precluded the constraints often imposed by MNCs on local firms' efforts to develop their own capabilities.
- However, Korea had to forego access to technologies that might have been available through direct equity links with foreign firms. Without FDI, Korea failed to meet global standards in domestic business operations and the reliance on large-scale foreign loans contributed to a major financial crisis in 1997.
- Korea was able to succeed largely because the informal modes of technology transfer that emphasised a well-educated workforce.

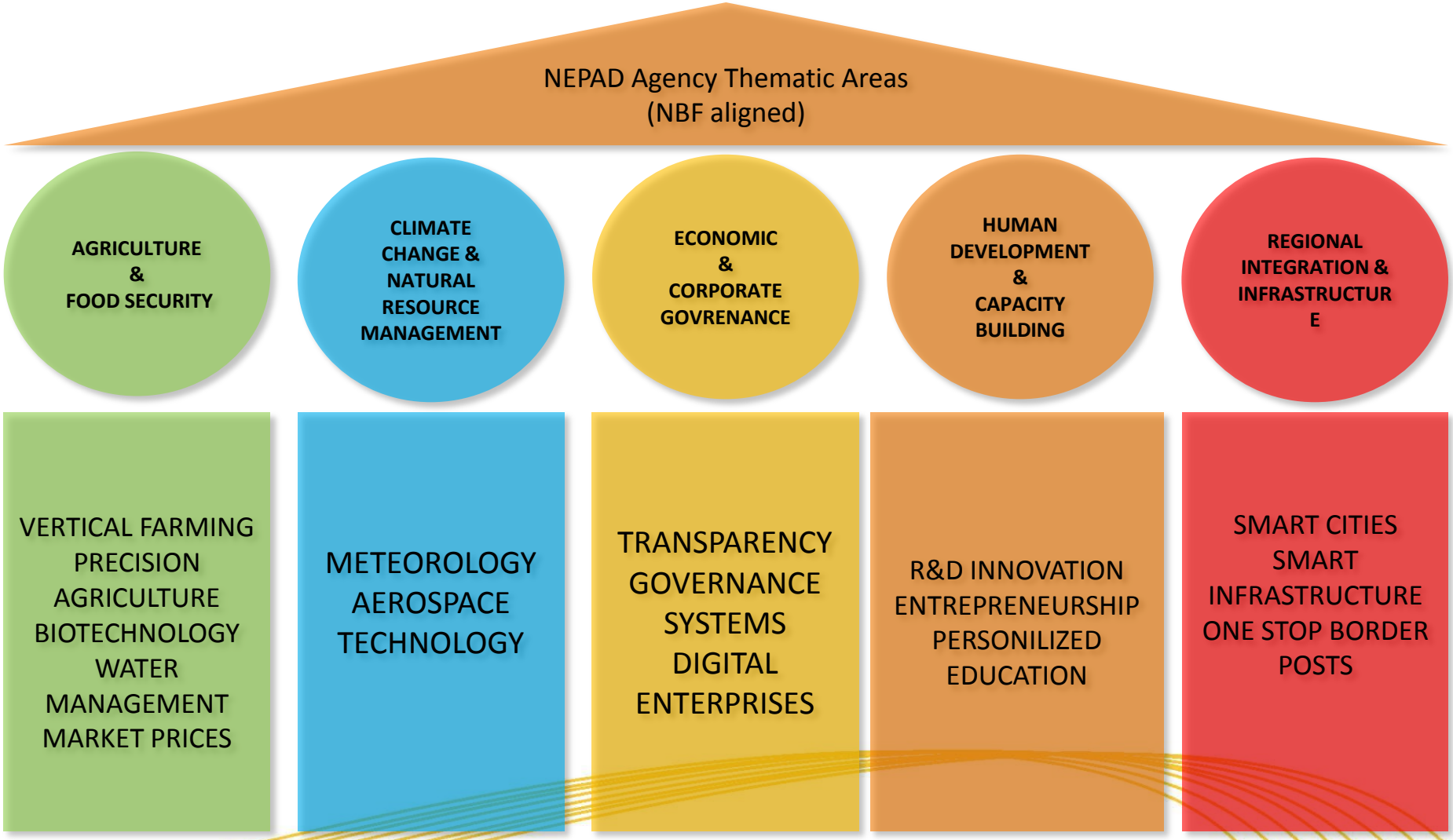
Case Study: Korea

	1965	1970	1975	1980	1985	1990	1995	2000	2003	2005
R&D expenditure (million dollars)	8.0	33.0	88.0	428.0	1,390.0	4,676.0	12,244.0	12,249.0	16,002.0	23,582.0
Govt.	7.2	28.9	62.4	272.7	344.7	908.7	2,309.9	3,054.7	3,913.4	5,730.7
Private sector	0.8	4.1	25.6	155.3	1,045.3	3,767.3	9,934.1	9,192.3	12,088.6	17,793.5
Govt. vs. private	61:39	97:03	71:29	64:36	25:75	19:81	19:81	25:75	25:75	24:76
No. of corp. R&D centres	0	1	12	54	183	966	2,270	7,110	9,810	11,810

What about Africa?

Supporting Technology Development and Innovation through Public-Private Collaboration

NEPAD Business Foundation – Approach to Innovation



Africa's connectivity

4.1B unconnected Worldwide, 800M in Africa…

" Beyond communication, for every ten people who get online, about one person gets lifted out of poverty because they get access to tools for education and finding jobs "

Working on Connectivity from all possible Angles

Availability

- Drones, Satellites, Lasers, Terrestrial Solutions, Telco Infrastructure

Accessibility & Affordability

- Use less Data for Applications
- Make Data Cheaper

Awareness & Relevance

- Local health, education and other Content in all Languages

NBF Ethiopia – Beyond Connectivity

- Building Africa's Technological R&D Capacity Through Regional Clusters
  - NEPAD Business Foundation currently advocating for an East African Technology and Open Innovation Campus Gathering East African Science and Technology Ministries, Research Centers, Academia and Centers of Excellence in one place.

NBF Ethiopia Activities

- Creating a dedicated ICT Desk and Injecting a Technology Perspective in AU-NEPAD Development Framework
- Identifying and supporting Promising African Grown Startups - entrepreneurship

What about SADC?

Science and Technology as a cross-cutting theme in the region can be used to **develop and strengthen national systems of innovation** in order to drive sustained socio-economic development and the rapid achievement of the goals of the SADC common agenda including poverty reduction and eradication.

The **Protocol on Science, Technology and Innovation** was signed by SADC Heads of State and Government in Johannesburg, South Africa, in August 2008.

It is a blueprint document outlining the framework of cooperation between Member States within the SADC region. It came about through extensive deliberations between Member States and covers scientific and technological matters of interest within the region.

SADC Protocol on Science, Technology and Innovation

The objectives of the Protocol in the region are to:

- Strengthen regional cooperation and coordination;
- Promote the development and harmonisation of policies;
- Share experiences and pool resources;
- Promote public understanding, awareness and participation;
- Promote the value of Indigenous Knowledge Systems and technologies;
- Attract, motivate and retain scientists;
- Strengthen institutional capacity and facilitate institutional cooperation and networks;
- Enhance and strengthen the protection of intellectual property rights;
- Increase access to the teaching and learning of basic science and mathematics; and
- Promote gender equity and equality in the teaching and learning at all levels of education.

What about SADC?

- These policies and strategies should be focused on attracting sustainable, high quality FDI with the associated positive spillovers in local supplier development, skills development, technology development, with a balance between increased domestic demand and balancing imports and exports.
- A proportion of these benefits should be consistently ploughed back into research and development to support greater innovation.
- Importance of public-private collaboration with expert engagements with academic, research institutions

Barriers to doing business in SADC

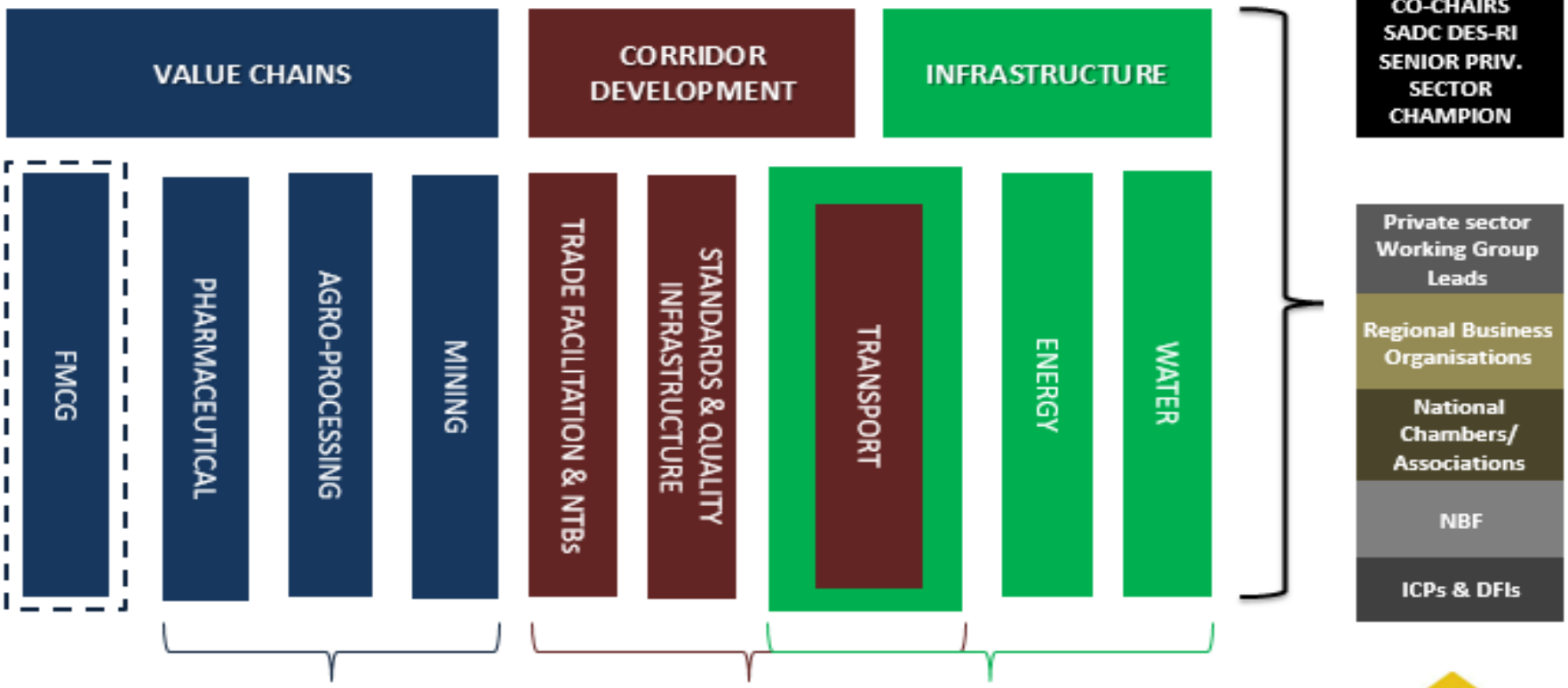
- **Access to and cost of finance**
- Tax rates and/or administration
- **Access to skilled labour**
- Economic and regulatory policy uncertainty
- Exchange rate/foreign currency fluctuations
- **Customs regulations, procedures and bureaucracy**
- Inefficient bureaucracy
- **Non-tariff and other trade barriers**
- **Supply of reliable and efficient infrastructure**
- Corruption

(Various Business Guides 2011-2013)

Private Sector's Role in Industrialisation

- Private sector generates an estimated 70% of Africa's output, approximately two-thirds of its investment and 90% of employment on the continent. (Source: African Union)
- Private Sector perspectives must be considered in the generation of the regional industrialisation plan because it may influence:
  - Target industries and supporting value chains
  - Infrastructure requirements for energy, water, transport, etc
  - Policy/legal amendments required to enable investment
  - Practical incentives required to enable investment
- Private Sector can provide useful information and successful examples with regard to value chain management and the involvement of SMMEs in those chains, including the description of on-the-ground-challenges and solutions on value chain management of different commodities.
- Local content requirements : supplier development and inclusive business models encouraged

Southern Africa Business Forum



Pharmaceuticals Working Group

- Skills development :
  - National Regulatory Authorities
  - Implement recommendations of Centres of Speciality (COS) and Centres of Excellence (COE) (*approved 2015*)

- ZAZIBONA :
  - Easier registration of medicines at a regional level
  - If tested and approved by national NRA in RSA, Zimbabwe, Botswana or Namibia, then automatic registration of medicines across SADC member states
  - Ensure alignment amongst MS to ensure standardised processes and common understanding (technical level) of processes are implemented in the region

- MDS – Medicines Database :
  - Centralised database of medicines / suppliers / government tenders
    - *Increased competiveness*
    - *Market access – visibility of regional demand and transparency of information on medicines*

- Stronger co-ordination between public and private sector needed

SWPN - Agricultural Supply Chain Water

- Support of **Water Administration System** to manage water release and order placement for irrigation schemes
- ICT system implemented to manage timely release of water into canals, placement of water orders by farmers done online
- WAS release module piloted 4 schemes in Phase 1 (2015)
- Phase 2 (2016) implemented in 5 large schemes
- Phase 3 (2017) expansion to 13 schemes
- Indicative savings of **927 891m³/week = ±48 million m³/annum**

Example of a single shipment dispatched from RSA to Angola

	Nr of Documents	Nr of pages
Vendor	6	29
Export	24	506
Import	21	66
Total	51	601

10 – 15 days lead time

Example of Export documentation per shipment

consumer goods council of south africa

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