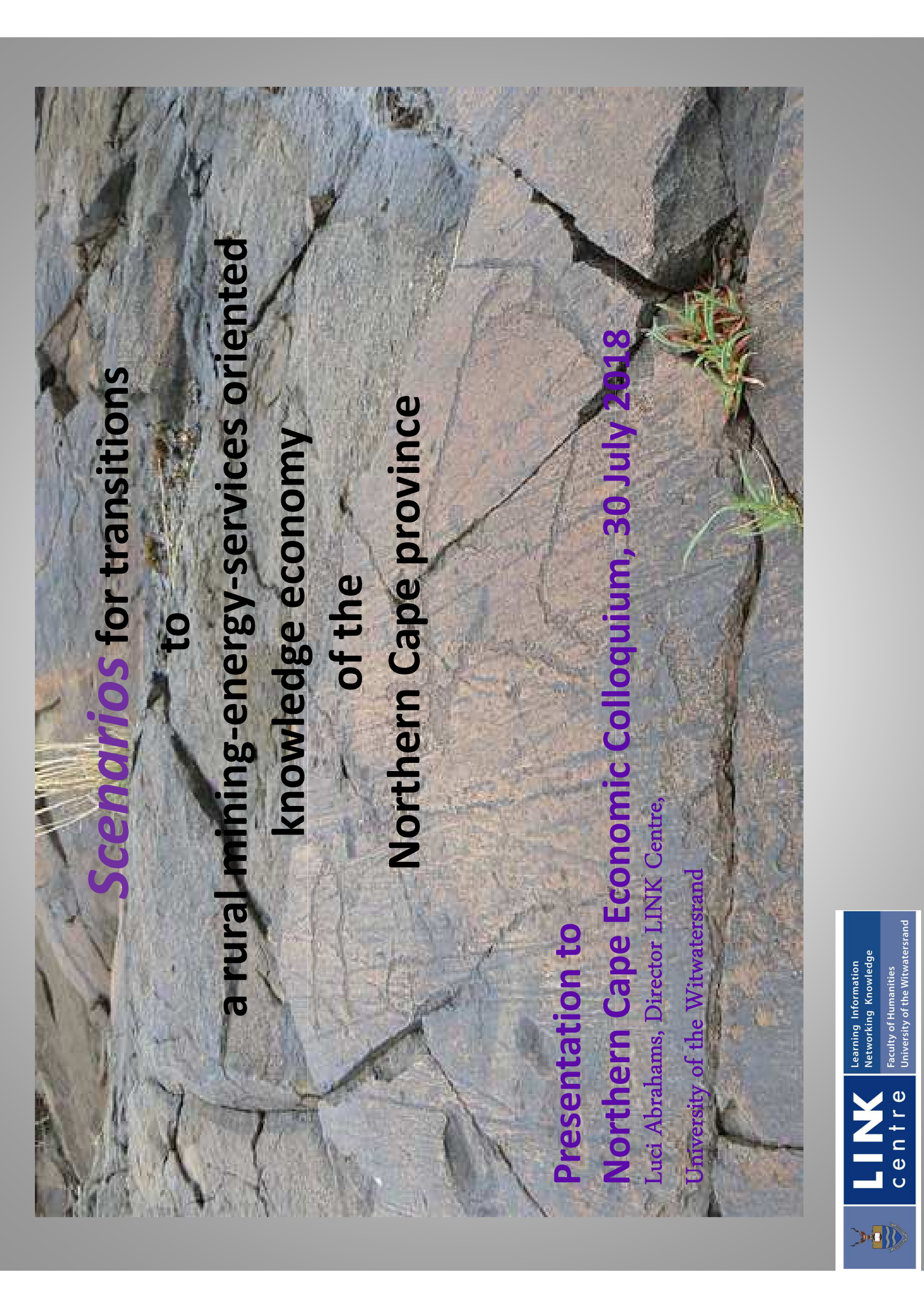




Scenarios for transitions to a rural mining-energy-services oriented knowledge economy of the Northern Cape province

Presentation to

Northern Cape Economic Colloquium, 30 July 2018

Luci Abrahams, Director LINK Centre,

University of the Witwatersrand

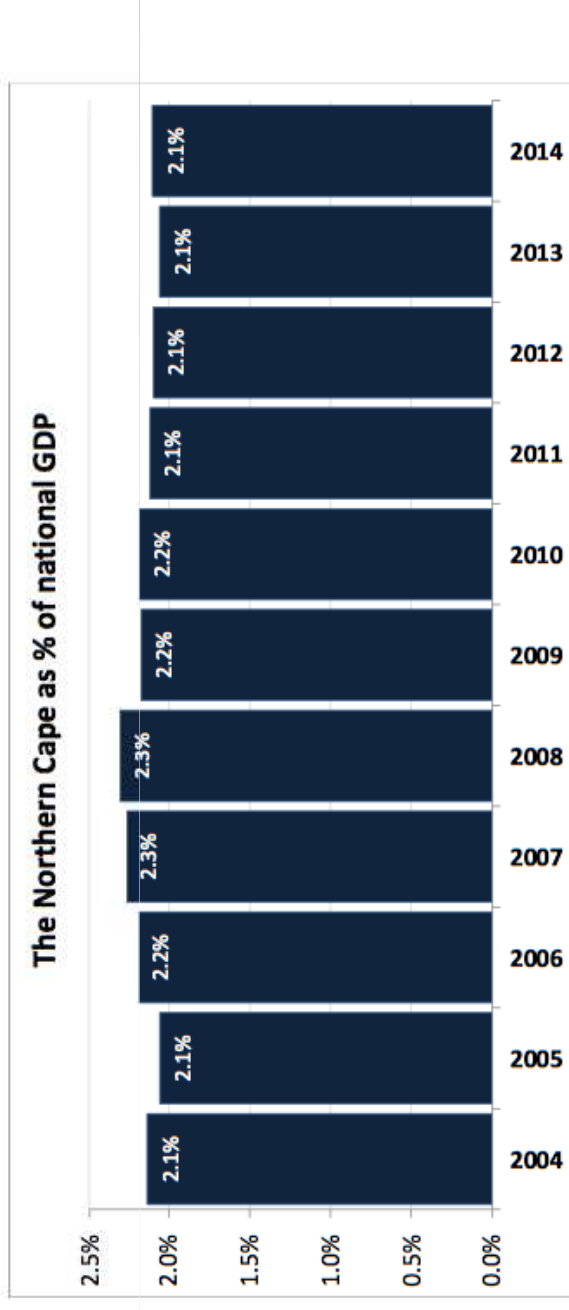


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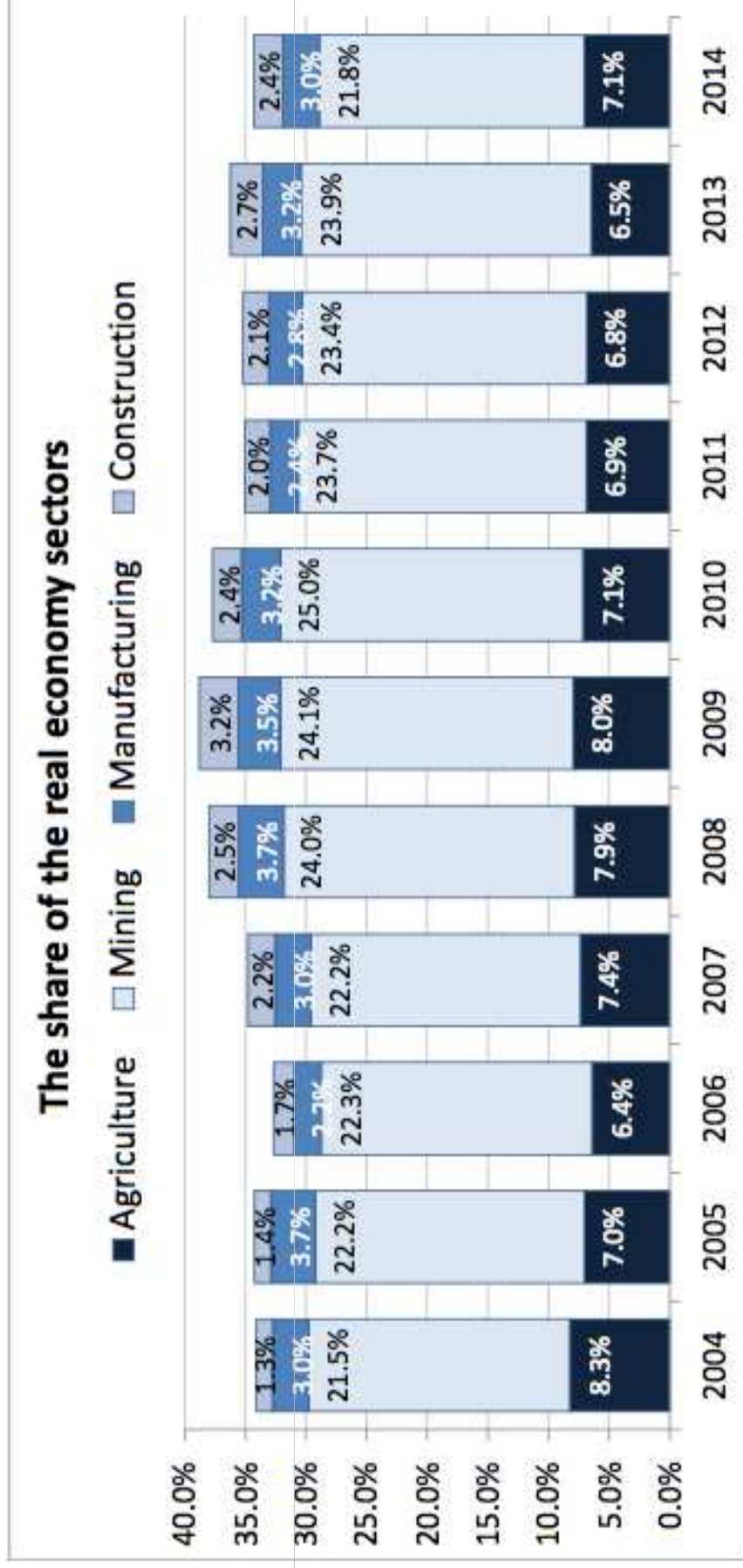
PROVINCIAL POSITIONING IN SOUTH AFRICA AND SADC REGION

- Population – 1.2 million (shrinking) – smallest by population – approx. 2% of RSA, but geographically – almost 30% of South African land area (how is geography a competitive advantage), half the population of Botswana/Namibia
- Economically – contribution to GDP is 2%: mining 22%, agriculture 7%, manufacturing 3%, construction 2% (how to break the 2% barrier, over 30 years or more)
- A detailed comparative analysis of the N Cape in relation to other small “less favoured” regions would be useful in thinking about knowledge economy formation



Source: StatsSA, GDP Annual and Regional Tables 2016. Excel spreadsheet downloaded in June 2016.

ECONOMIC STATISTICS 2004 – 2014 (TIPS, 2016)



Source: StatsSA, GDP Annual and Regional Tables 2016. Excel spreadsheet downloaded in June 2016.

Other (trade and services)

Government = 15,36%

FIRE = 13,13%

Trade = 11,9%

Transport + communication = 9.59%

Personal = 4,67%

Electricity/water = 3.05%

Questions:

1. Limits to growth?
2. Current economic nodes vs.

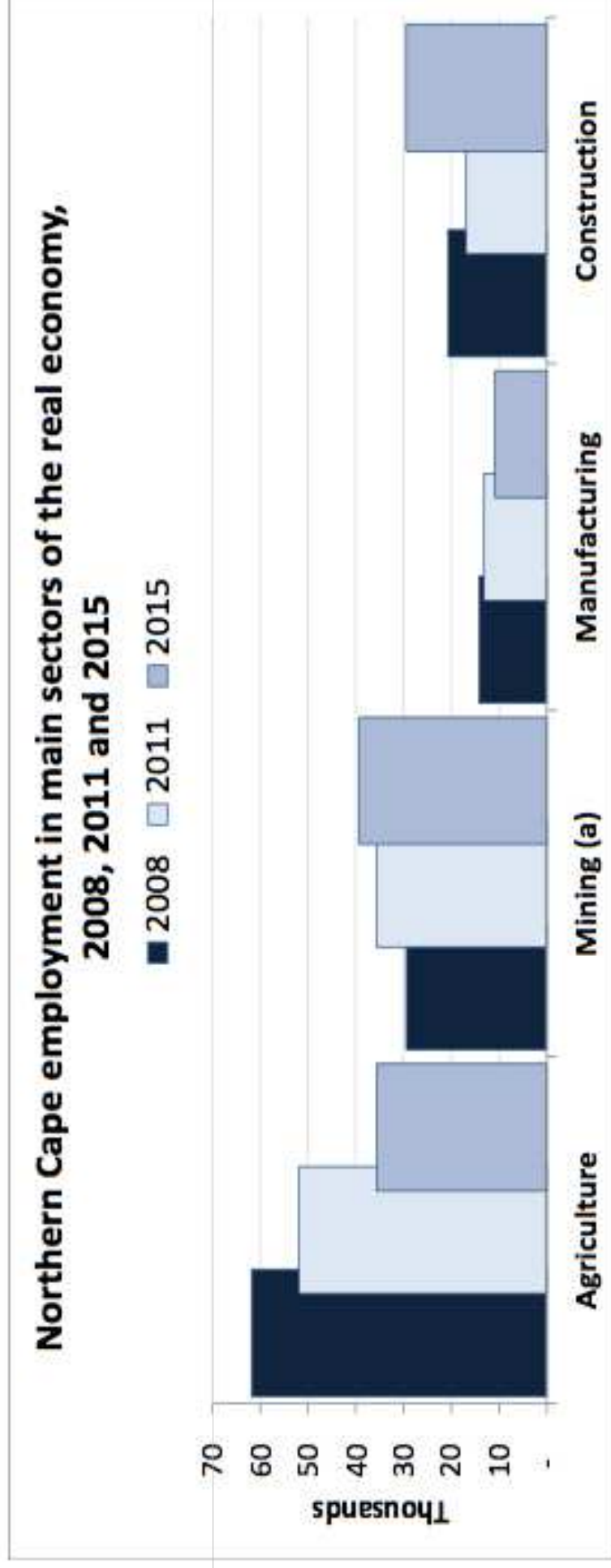
future economic nodes?



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EMPLOYMENT/KNOWLEDGE PERSPECTIVE (TIPS, 2016)



Notes: (a) 2014. Source: Except for mining, Statistics South Africa, QLFS Trends 2008-2016. Excel spreadsheet. Average of four quarters for the year. For mining, Department of Mineral Resources. B1 Statistical Tables. Excel spreadsheet.

Few knowledge economy type inputs, few knowledge workers

INFRASTRUCTURE INVESTMENT (TIPS, 2016)

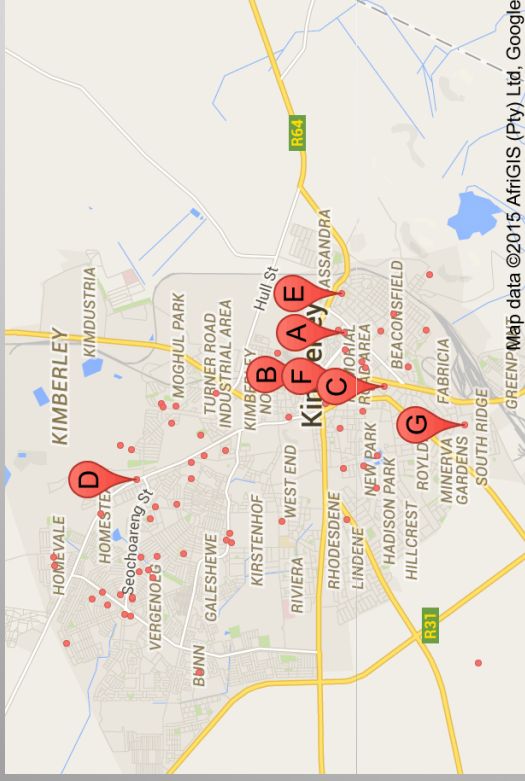
Major infrastructure projects in the Northern Cape as of 2016/2017

Project name	Agent	R billion	Project description
Square Kilometre Array	National Research Foundation	16	The most powerful radio telescope in the world
Sishen-Saldanha corridor expansion	Transnet	9.4	Expand Sishen-Saldanha iron ore line export capacity
Solar park and other renewable energy projects	Various	200	Establish 1GW solar park near Upington region and further 4GW elsewhere in Northern Cape, among others

Questions:

- 1.Impact of investments on economy?
- 2.Impact of investments on employment?

BASIC AND HIGHER EDUCATION



- 553 public schools – school to university programmes?

- Sol Plaatjie University – foundation + niche diploma and degree programmes + attract students and academics + research partnerships

- Public Lecture: Fracking, Energy and Groundwater
https://www.youtube.com/watch?feature=player_embedded&v=hqKqFydILXY

- Rural research – agriculture (innovation award for Olives South Africa), botanicals research for pharma and cosmetics industries, mining, water, poverty and unemployment, social integration in small towns
 - SKA research programme



CHANGING THE ECONOMIC, EMPLOYMENT, KNOWLEDGE MIX

Thought Experiment 1:

Focus on regional and global markets

- *Mining*
- *Financial services*
- *Government Services*
- *Wholesale*
- *Transport*
- *Personal Services*
- *Agriculture*
- *Manufacturing*
- *Electricity/Energy*

Knowledge and skills mix?

Thought Experiment 2: Possible

contribution to GDP and

*inclusive growth from innovation
in mining, agriculture, energy,
other?*

- *Digitally-enabled mining*
- *Precision agriculture*
- *Renewable energy*
- *Digital government*
- *Transport sharing models and
connectivity for tourism*

Knowledge and skills mix?



MINING, MINING TECHNOLOGIES, DIGITAL TECHNOLOGIES AND DEVELOPMENT



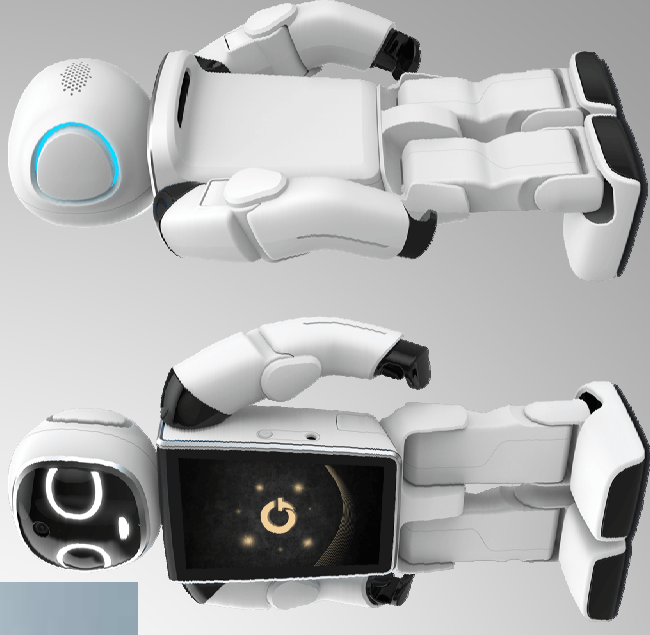
*Mining, geological and earth sciences research and
a local knowledge
base for mining and minerals beneficiation
– Finsch, Sishen-Saldanha corridor expansion,
other mines*



3E ROBOTICS



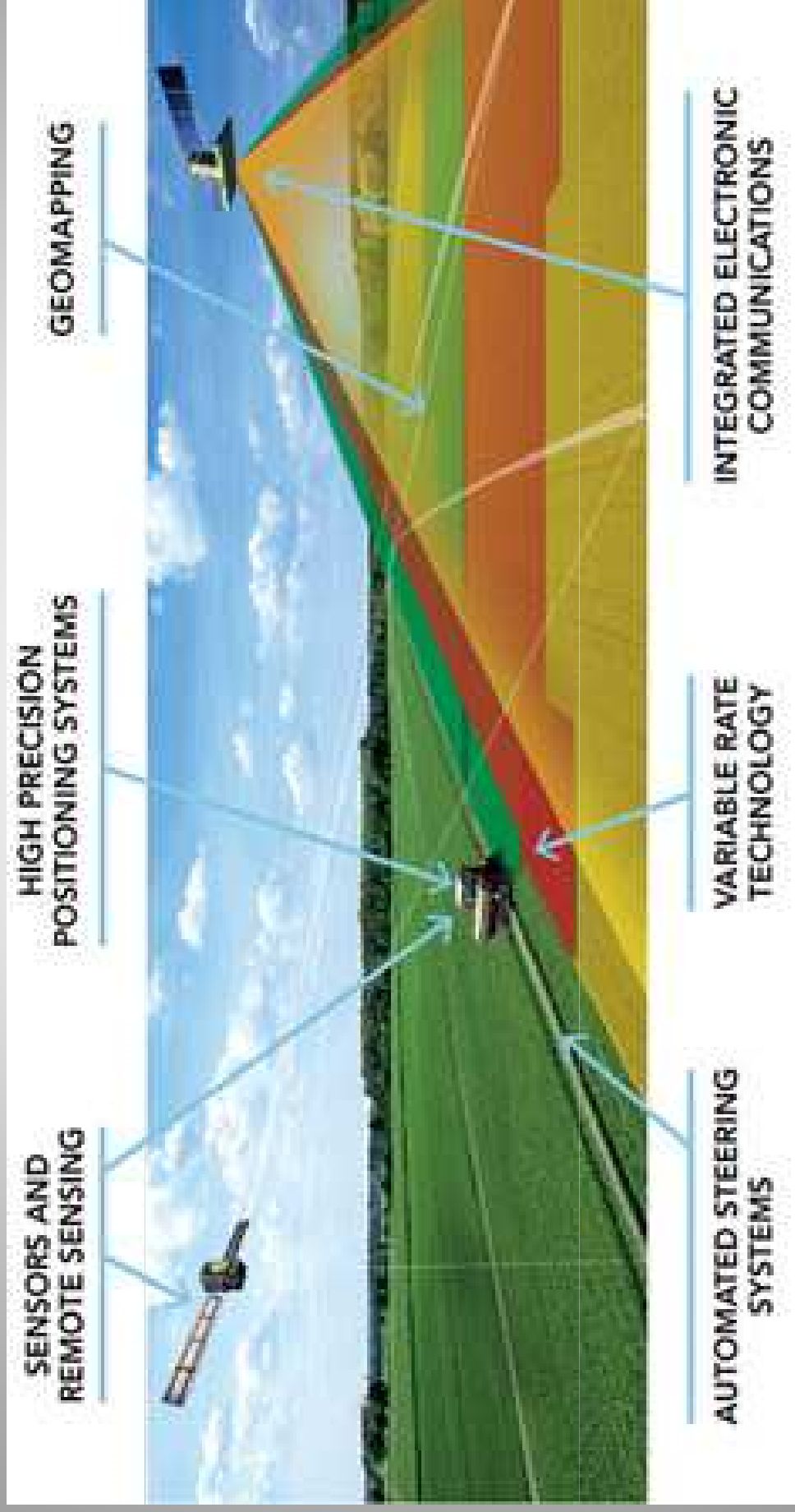
“Empower, experience, empathy” [Honda]
Hardware, software, movement, information
processing, sensory engagement



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VALUE CREATION PERSPECTIVE: PRECISION AGRICULTURE



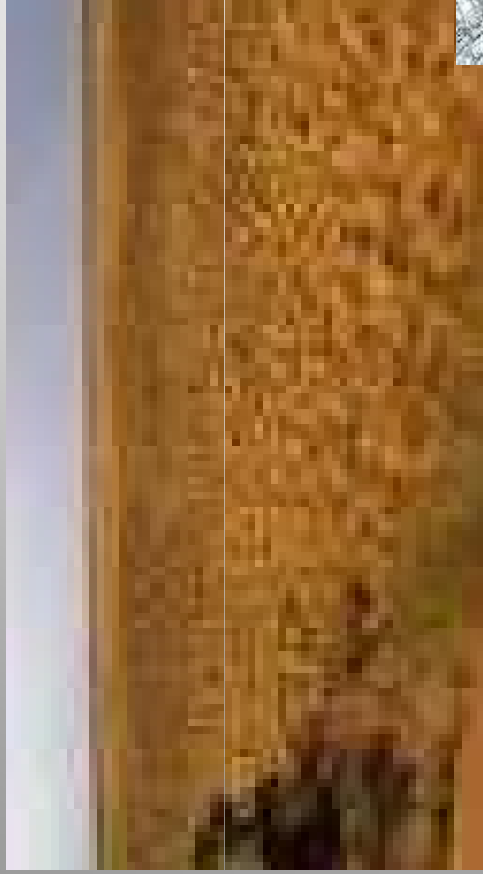
VALUE CREATION PERSPECTIVE: SMART FARMING



AGRICULTURE

- What research and innovation in agriculture?
- *What research and innovation in agro-processing?*
- What research and innovation in fishing and aqua-culture?
- *What research and innovation in packaging and transport?*
- What research and innovation in branding and marketing – South Africa, SADC, Africa, global positioning?
- *What human capital development, digital communication services?*

TOURISM



*Kgalagadi, Mokala,
other game parks
and geological
features –
priority
environmental
and tourism
sustainability research*



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INNOVATION IN SOLAR ENERGY AND WIND POWER



- What does the Northern Cape have in abundance – SUN and SPACE (land)
- Department of Energy – renewable energy from independent power producers
- Solar park corridor – six solar parks planned – including ZAR10 billion investment US – Saudi Arabian joint venture – Redstone Concentrating Solar Power Plant at Postmasburg – first in Africa – set to commence generation in 2018 – power for 24/7 distribution – can power 200,000 homes, business? industry?
- Research institute for solar and renewable energy?
- Potential employment and manufacturing opportunities – heliostats at 500MW of solar generation capacity



FUTURE OF HEALTHCARE

03 HOW TECHNOLOGY CAN TREAT NATIONAL HEALTH SERVICE ILLS

Innovative technologies could offer a cure for ailing health services

06 MEET OLIVIA, VIRTUAL NURSE

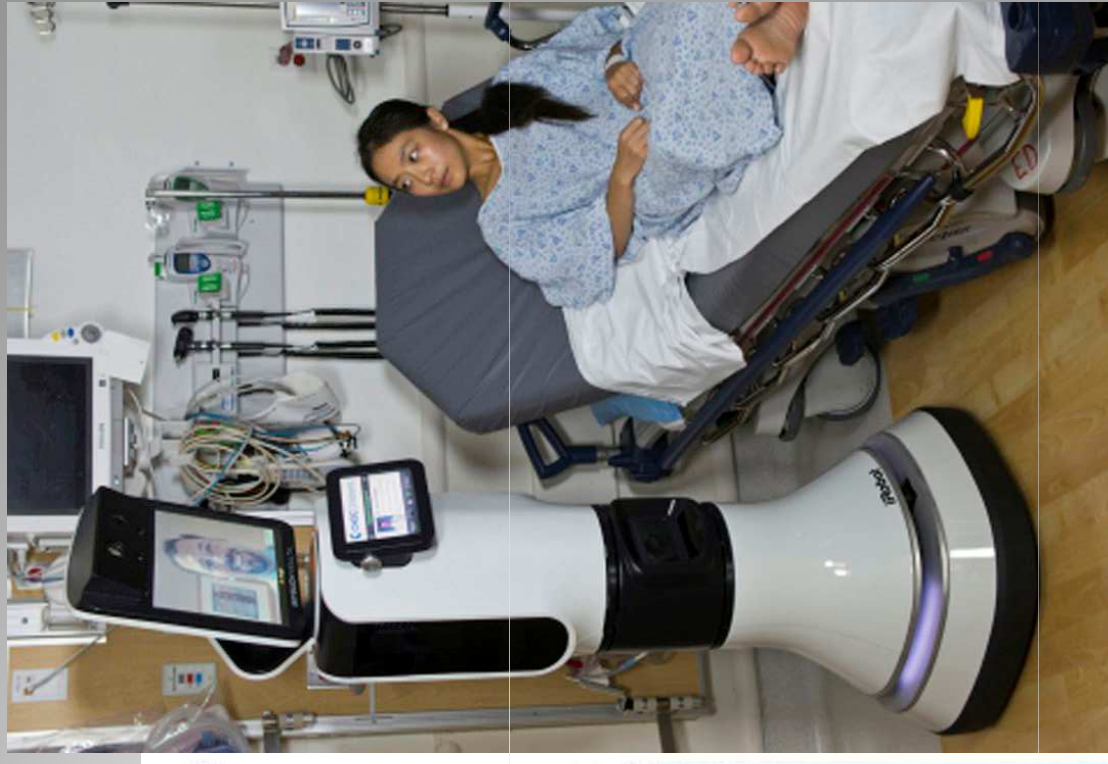
Virtual avatars and chatbots look set to supplement healthcare

08 UK PLAYS CATCH-UP IN CONNECTED CARE

The NHS is lagging behind global leaders in connected health services

12 PRESCRIPTION FOR 3D-PRINTED PILLS

3D printing promises to transform medicine and health provision



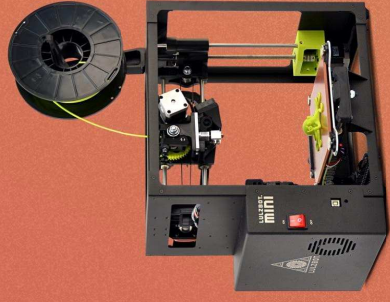


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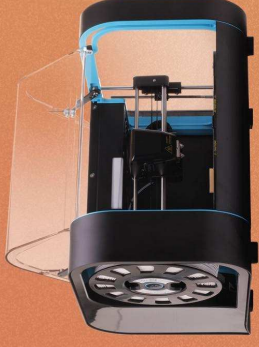
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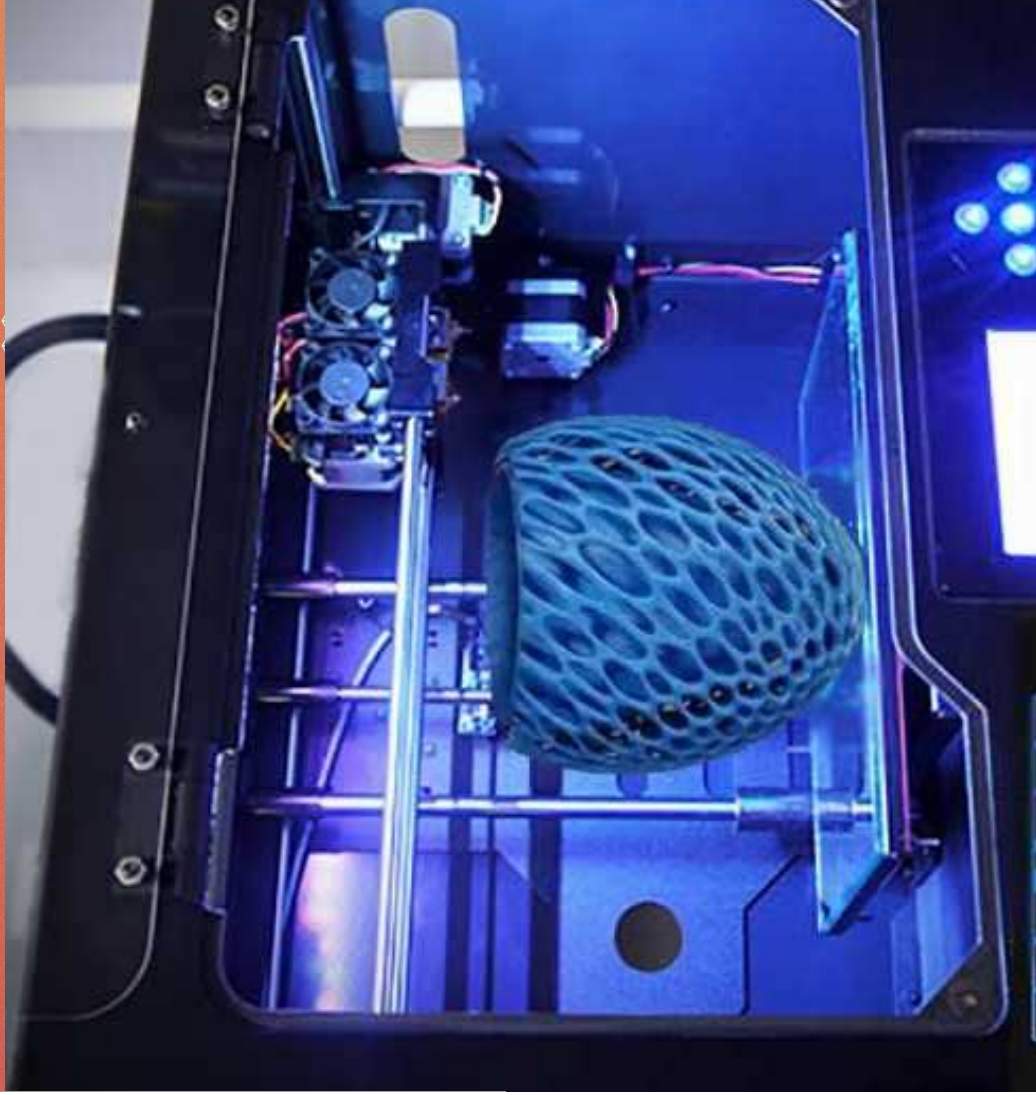
Craftbot PLUS



LulzBot Mini

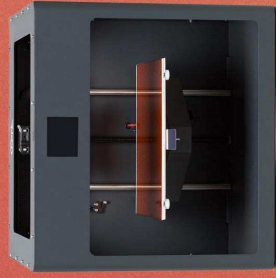


CEL Robox

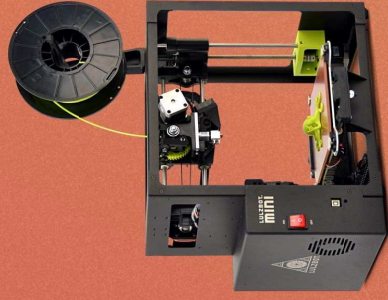


SHIFT IN INNOVATION PRODUCTION:
3D-PRINTING CENTRES
AND MAKER SPACES

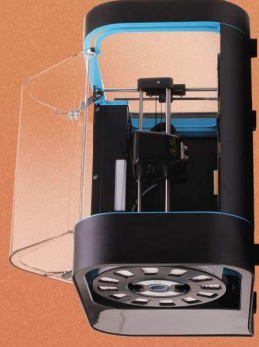




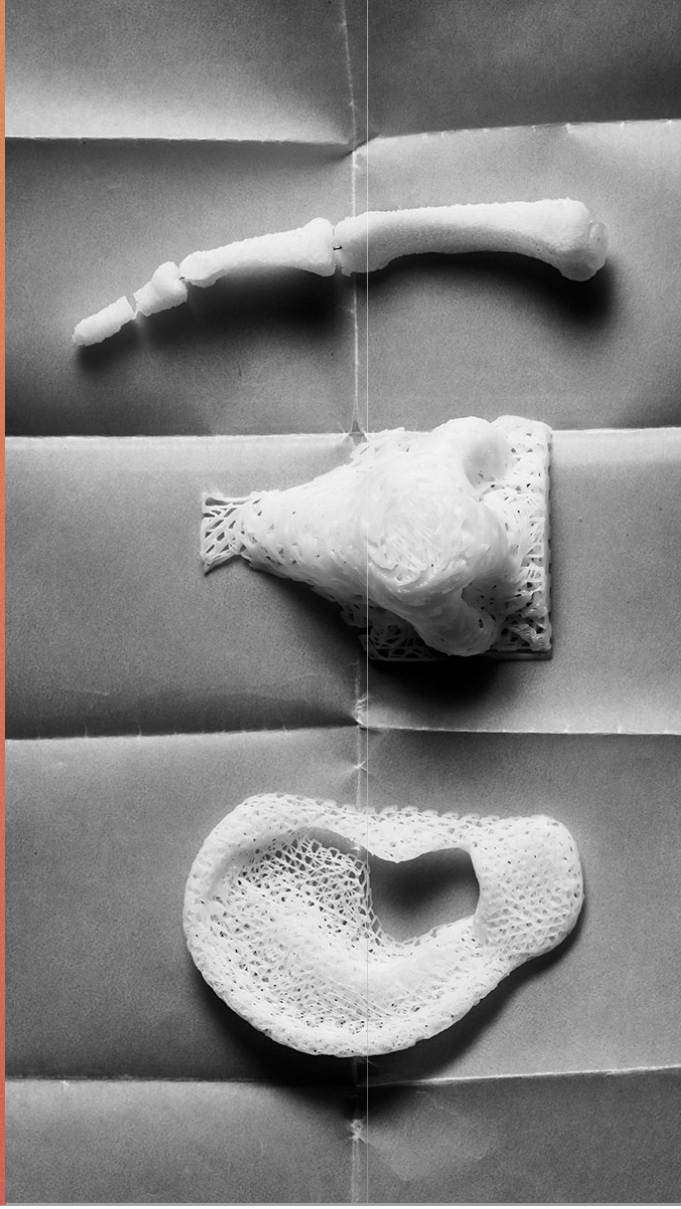
Craftbot PLUS



LulzBot Mini

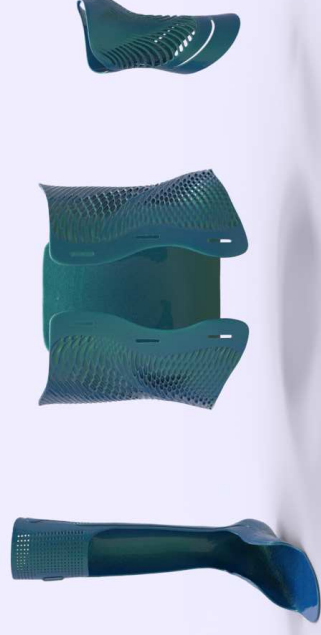


CEL Robox



SHIFT TO INNOVATION PRODUCTION:
EARLY STAGE 3D-PRINTING IN HEALTH CARE

3D PRINT EXCHANGE



WEARABLE TECHNOLOGY: SHAPING THE FUTURE OF YOUR HEALTH CARE

Do you own one of the 19 million wearable fitness trackers shipped in the U.S. in 2014? Discover 8 reasons why more than 60% of doctors recommended their patients use a wearable.

SELF-AWARENESS

With a wearable, patients are more aware than ever of their habits, their exercise efforts, and their progress.



HEALTH MANAGEMENT

Wearables allow users to set goals, reminders, and incentives to stay on the path of healthy living.



TREND IDENTIFICATION

Your activity trends directly correlate to your diet. Wearables help the user to track their activity and plan meals around their activity level.



ADHERENCE

By setting goals and timelines, wearable users are more likely to stick to a regime.



OBJECTIVE DATA

Any general information is useful to your doctor, wearables are able to provide a clear, objective picture of your activity level.



WEIGHT LOSS

Obesity continues to be a growing problem in the U.S. Wearables show you the steps you take, the types of food you eat and track your weight-loss every week.



ACCOUNTABILITY

Wearables help you remain accountable and honest with yourself about your progress will keep you on the right track.

MOTIVATION

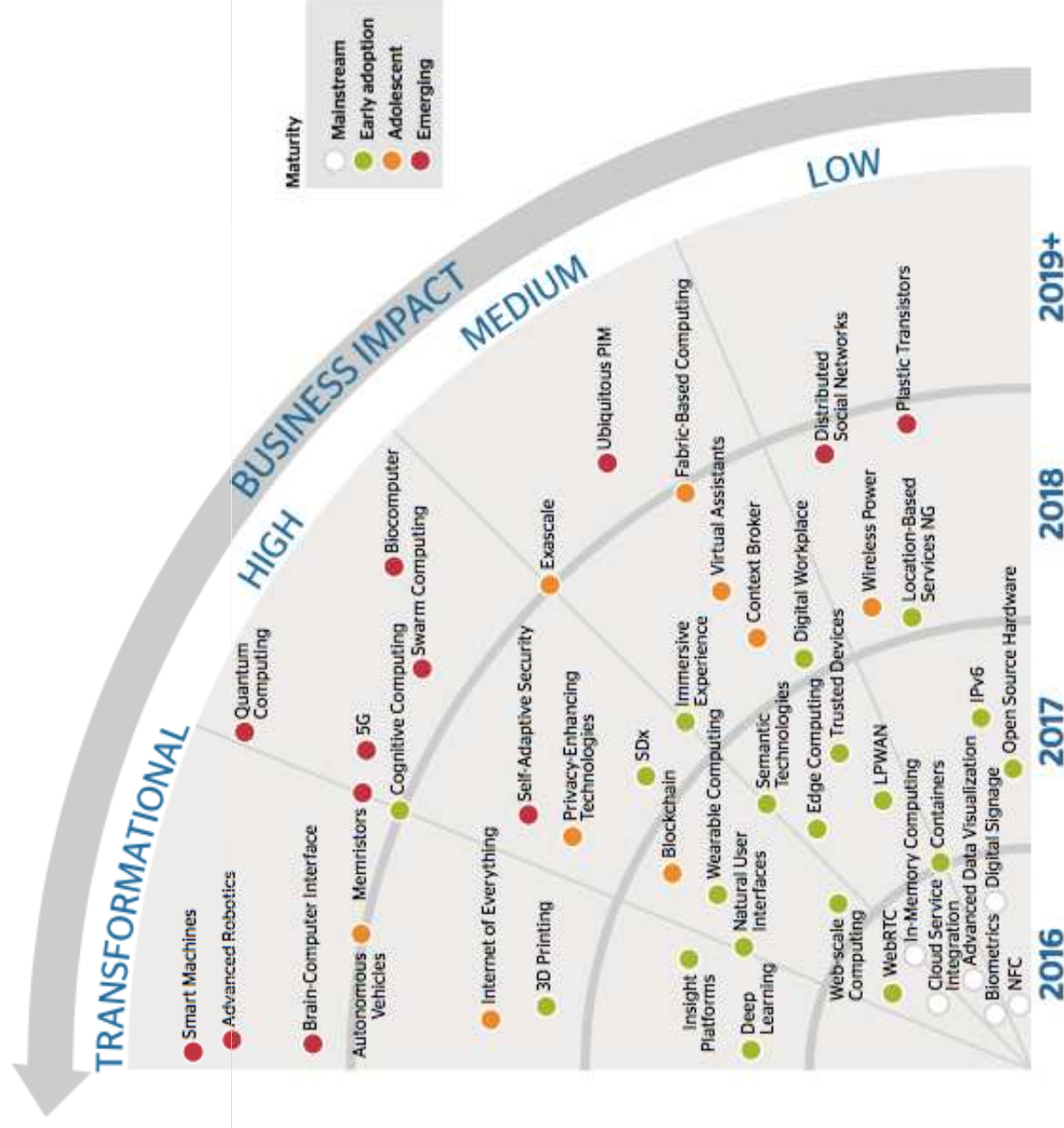
Today, wearables are the new motivators. Users are able to set reminders and are alerted if they sit too long.



UnityPoint Clinic

UnityPoint.org/Clinics/WearableTechnology

Technologies that will Impact your Business





DIGITAL TECH HUBS

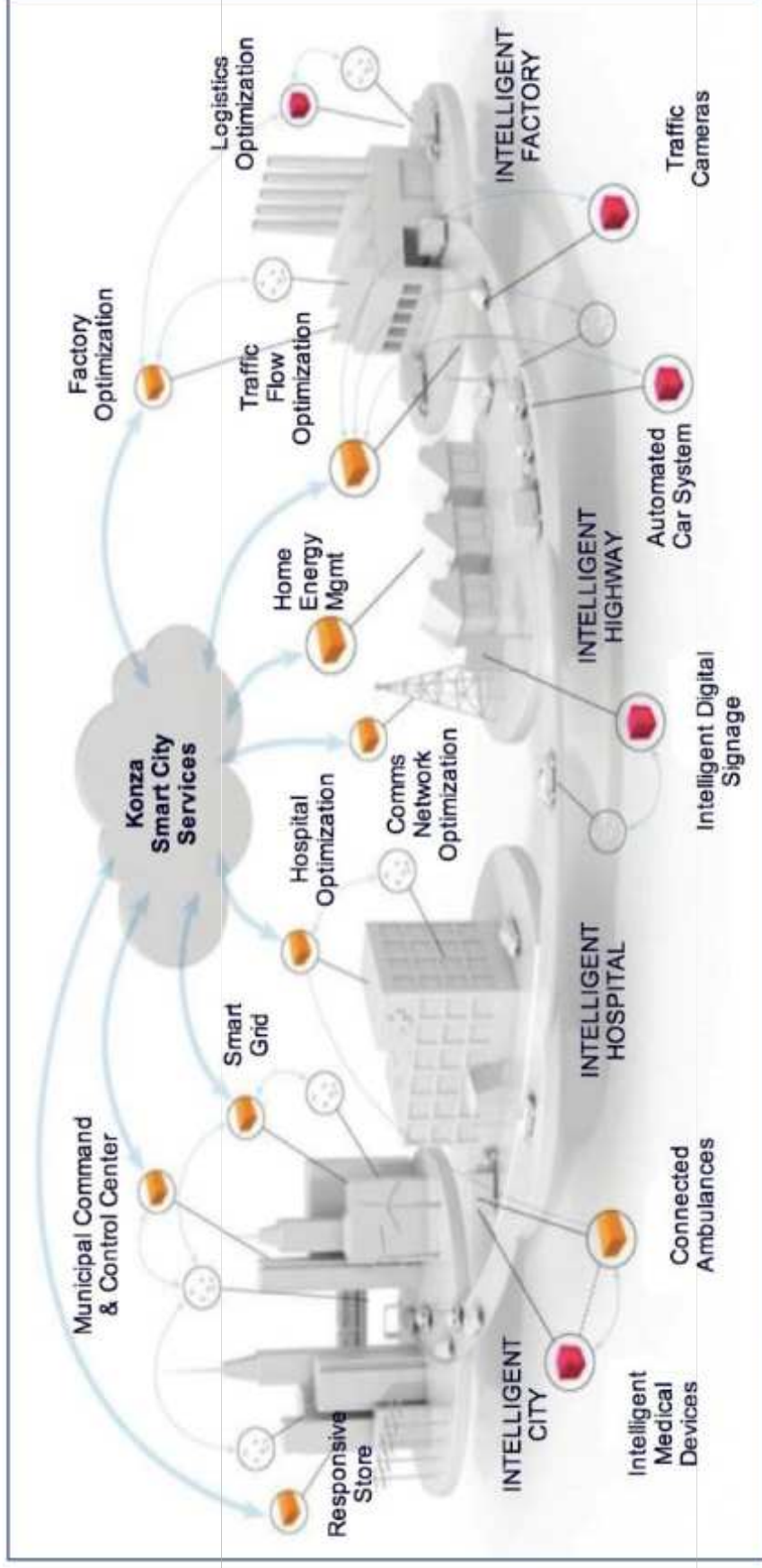
Fak'ugesi Digital Africa Innovation Festival 2016



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Konza Smart City Vision - Kenya



INFRASTRUCTURE SERVICES
(Transportation, Utilities, Public Safety, Environment)

CITIZEN SERVICES
(Access, Participation)

CITY SERVICES
(City Information, Planning)

BUSINESS SERVICES
(Local Commerce)

KONZA ICT NETWORK

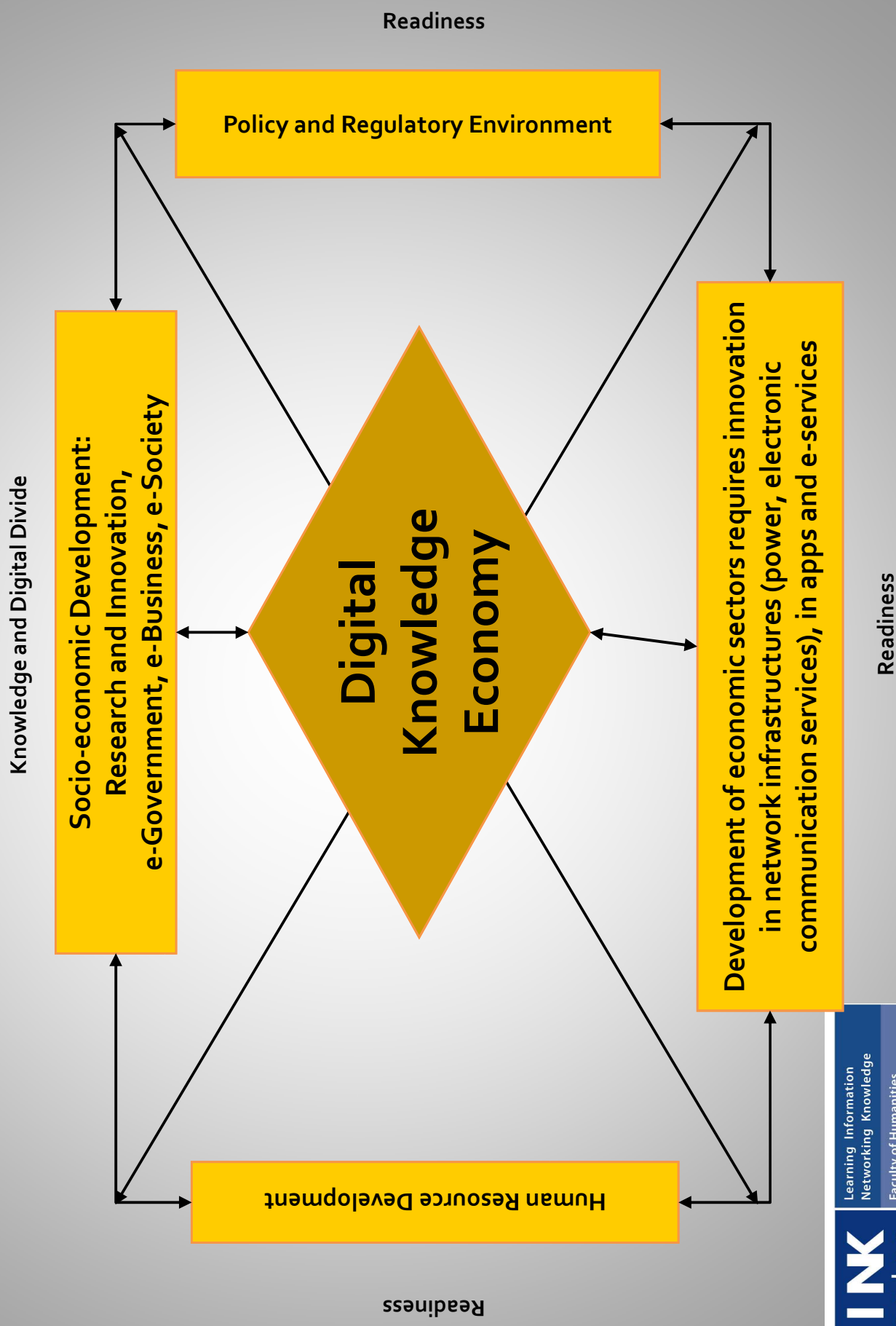
Source: Konza City, Kenya



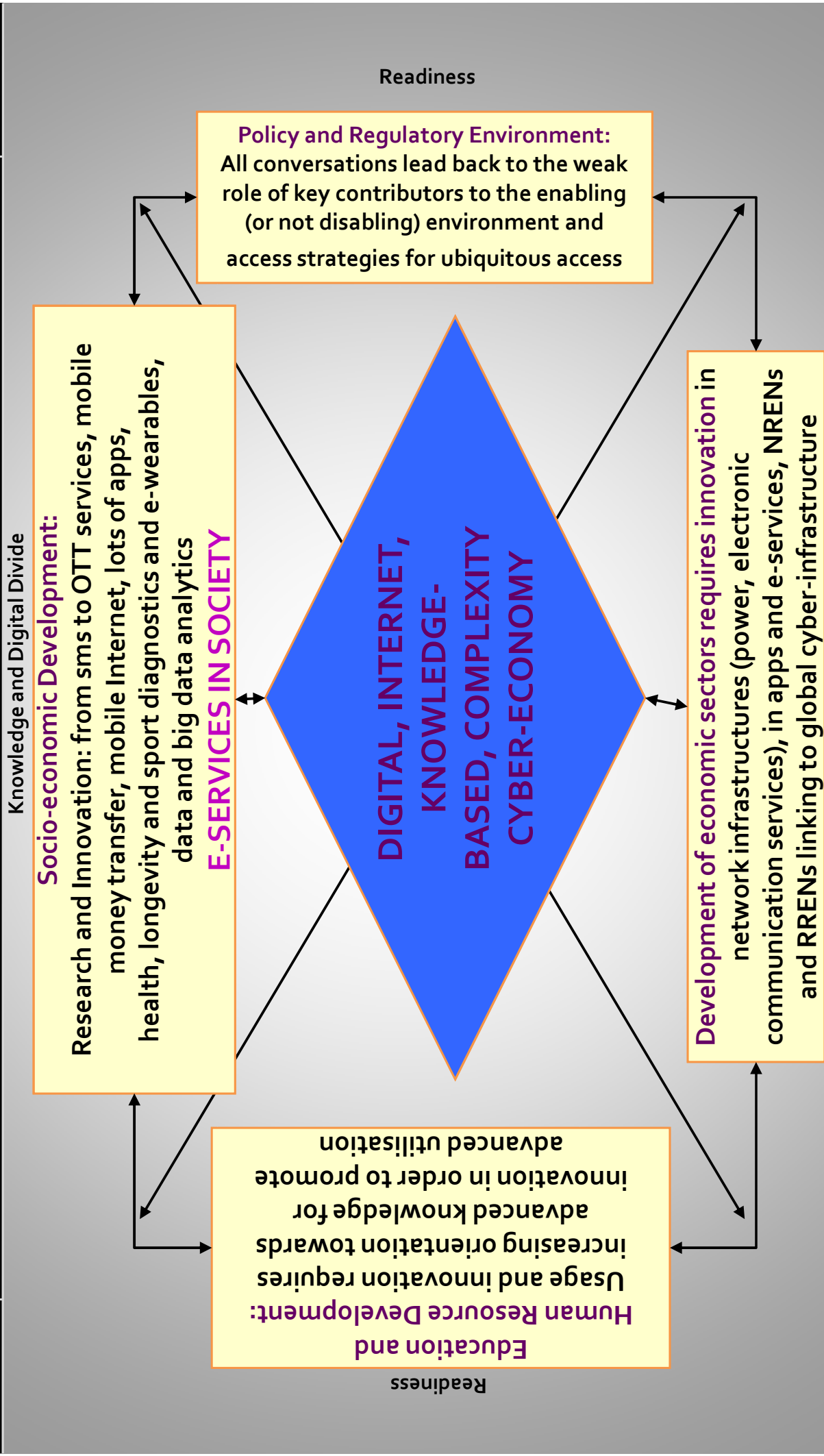
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MULTIPLE PERSPECTIVES ON EVOLUTION OF THE DIGITAL, KNOWLEDGE ECONOMY – NEW FORMS OF VALUE



Understanding new forms of value in the cyber-economy



VISION

- Diversification, empowerment, employment, business creation and sustainable development – each of these aims requires research and innovation to identify and push forward the particular forms of diversification, empowerment, employment, business creation and sustainable development that is possible in the N Cape – agriculture, mining, tourism, solar energy, digitally-connected small towns



Scenario A – From Big Hole to Khi and KaXu Solar One



Tourism increasingly affected by recession and global competition amongst travel destinations

High demand for energy for economic and population growth – 50MW Khi (Sheperd's Tree) Solar One Upington + 100MW KaXu (expanse of sky) Pofadder
<http://www.sastela.org/services.html>



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Scenario B: Local and global positioning of Kimberley City and 81 towns

- City of Kimberley – *from 50,000 diamond diggers to “50,000” knowledge workers*
- Large towns – *Upington – solar hub?*
- Small towns – *tourism and retirement destinations? alternative lifestyle?*
- Rural hubs – *eg. Sutherland and SKA research, sun farms*
- Comparative advantage – low population and unspoiled environment
- Comparative disadvantage – lack of critical mass for appropriate innovation



Scenario C: Triple helix public-private-community inputs for digital government



Other Scenarios

- Main economic activity = mining + quarrying, government services, FIRE services
- 21st century economic activity = solar energy, SKA science and technology, ubiquitous technology
- Focus research in a few selected knowledge disciplines
 - eg data science for SKA
- Science and humanities partnerships – universities, ARC, CSIR, Geosciences Council, other
- Digital towns and services – advantage of small population size, challenge of distance
- Research for a productive local craft industry
- Radical change to knowledge and skills levels of agricultural and non-agricultural labour force



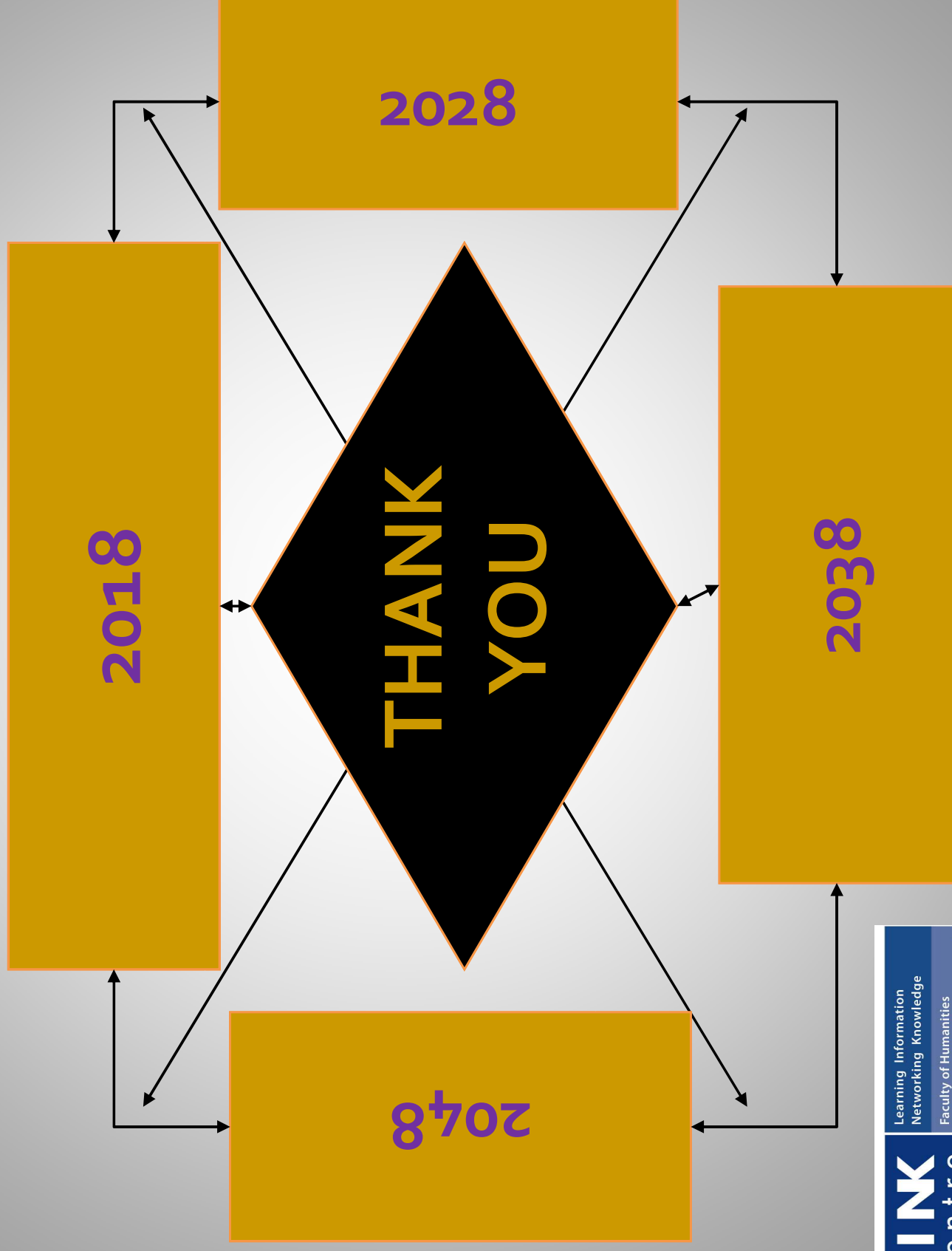
NORTHERN CAPE PROVINCE –

DEPARTMENT OF ECONOMIC DEVELOPMENT AND TOURISM

- **Steering** – research facilitation orientation and services (higher education, cross-governmental engagement, stakeholder management, financing)
- **Innovation Forum** – analytics, scenario building, advice
- **Modeling** – short, medium and long-term financial and non-financial investments and benefits
- **Periodic evaluation** – success and failure



Prospects for innovation and knowledge economy?



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