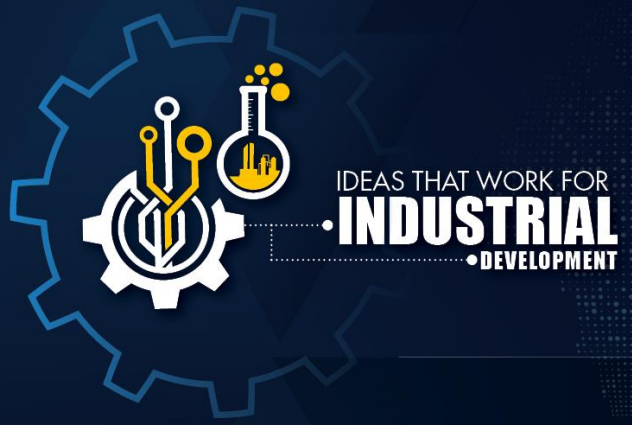

Growing South Africa's Wealth through Digital Innovations

Digital Innovation as a Disruptor

Dr Quentin Williams

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Content

- The problem we face
- The effective production model as a solution
- Digital innovation as a wealth-creation tool

The problem

The problem we face: Unemployment

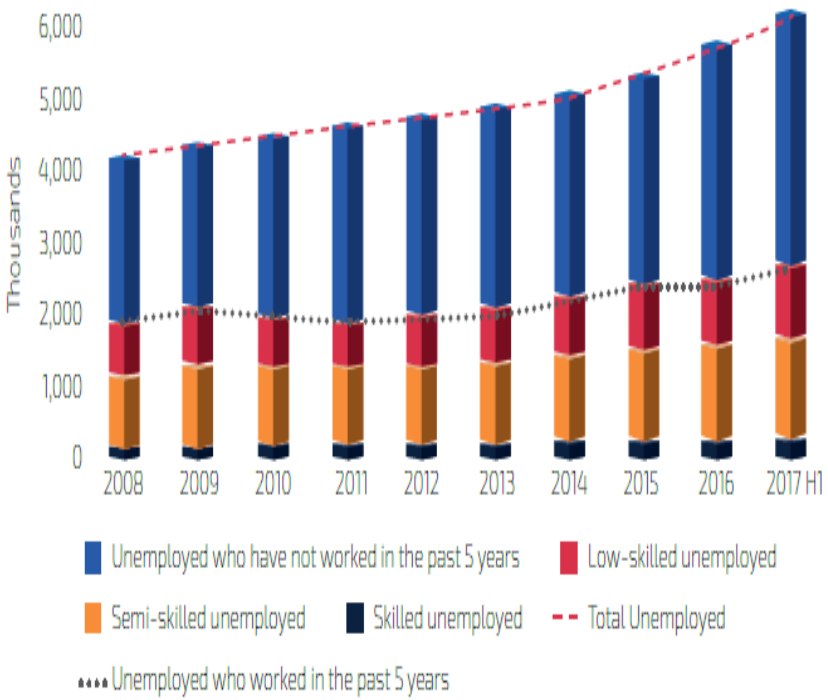
Unemployment by Skill level 2008-17

"Since 2008, **3.5 million** people have entered the labour force, but only **1.6 million** additional jobs have been created. Nearly 6.2 million people are unemployed, or 9.3 million if those who have stopped looking for work are included. Of those looking for employment, 3.5 million (57.1 %) have not worked in the past five years"

Source: The World Bank, South Africa Economic Update, 2017

The problem we face: Skills

Unemployment by Skill level 2008-17



High unemployment

vs

Skills in highest demand on LinkedIn, 2016

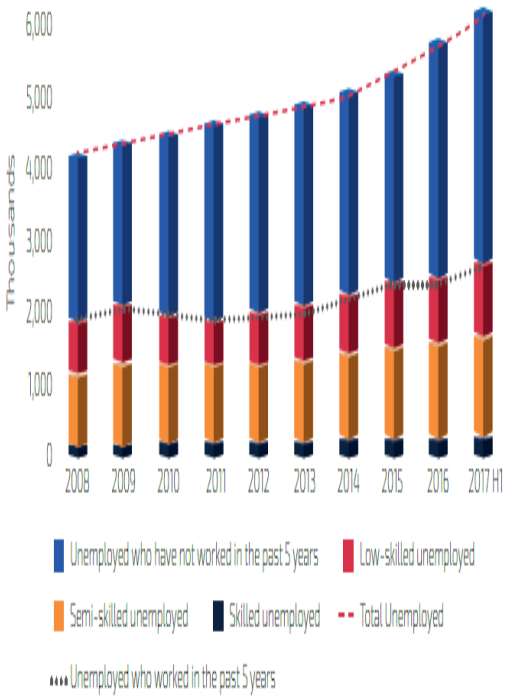
1.	Statistical analysis and data mining
2.	Java development
3.	Network and information security
4.	Mobile development
5.	Perl/Python/Ruby
6.	User interface design
7.	Middleware and integration software
8.	Web architecture and development framework
9.	Mac, Linux and Unix Systems
10.	Public policy and international relations

High demand for and *loss* of advanced skills

Source: LinkedIn, 2017

The problem we face: Import driven

Unemployment by Skill level 2008-17



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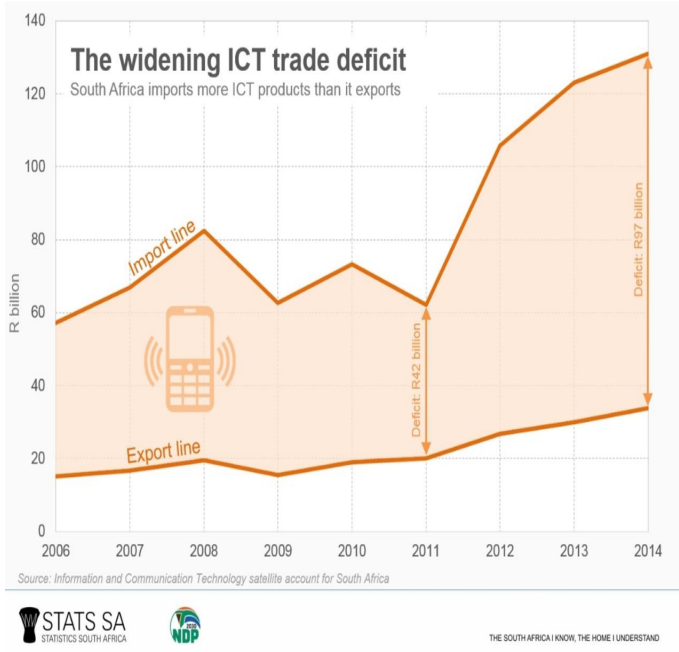
High demand for and loss of advanced skills

vs

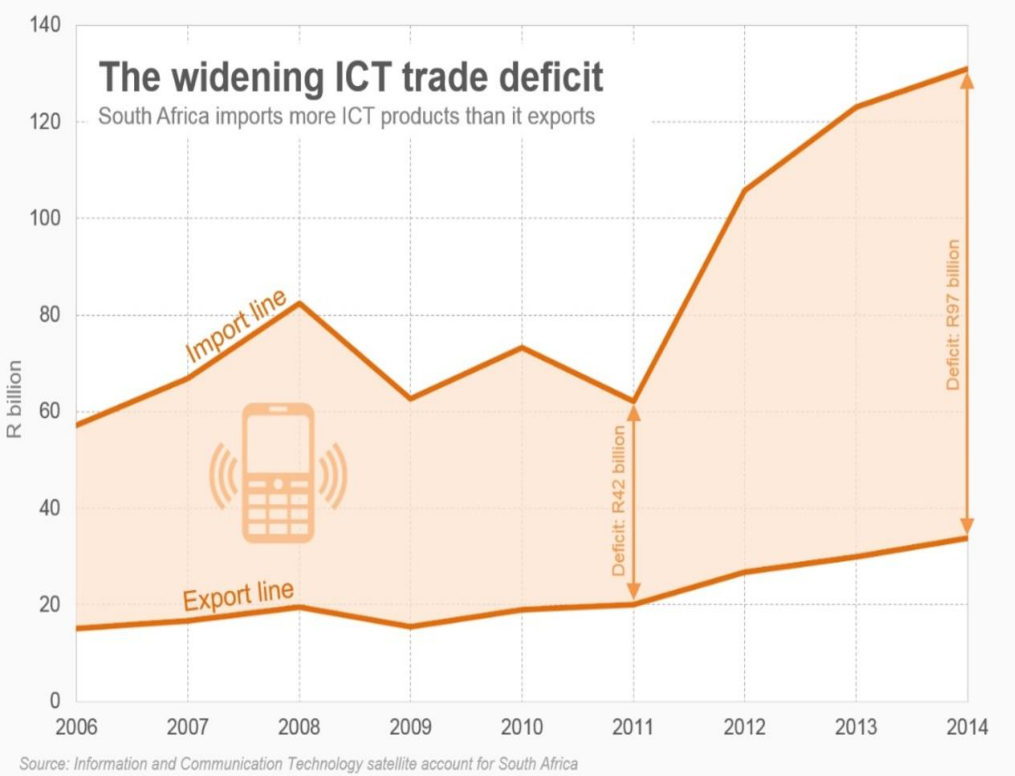
Import and export of ICT goods and services



High internal demand for ICT goods and services

Source: STATS SA, 2017

The nature of the South African ICT sector



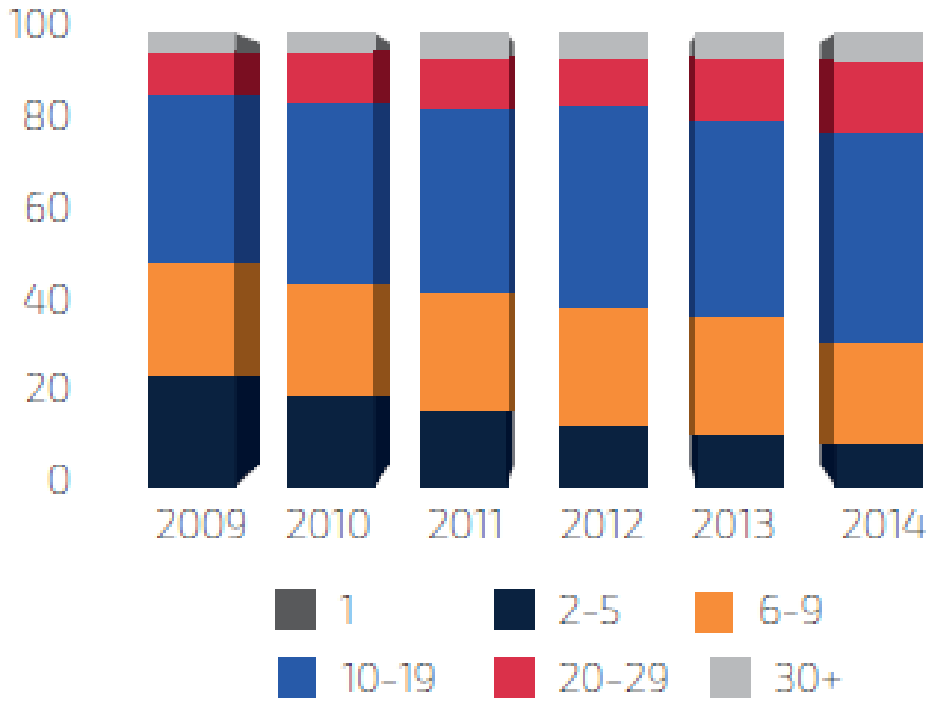
- Now larger than agriculture at 3% GDP contribution
- Growth in mobile technology, internet penetration, smart devices
- Guided by National ICT policy framework, National ICT RDI Roadmap, SA Connect
- Appreciating stock prices of ICT firms such as Adapt IT and Naspers

- South Africa is a net importer of ICT goods and services: from 42 billion in 2011 to 97 billion in 2014 (**100% increase in 3 years**).
- One of highest contributors of South Africa's total imports: **10%** of all SA imports - radio, TV and communications equipment, while **exports** comprise mainly broadcasting, telecommunications and information (knowledge) supply services.
- 133 134 SMMEs. Of these, 42.5% are formal enterprises and 57.5% are informal establishments

Sources: BMI-Techknowledge, 2015; STATSSA, 2017
DTPS, 2016; STATSSA, 2017

Can we disrupt the trend? Where are all the gazelles and unicorns?

Distribution of firms by age
The share of young firms (<5) years is declining

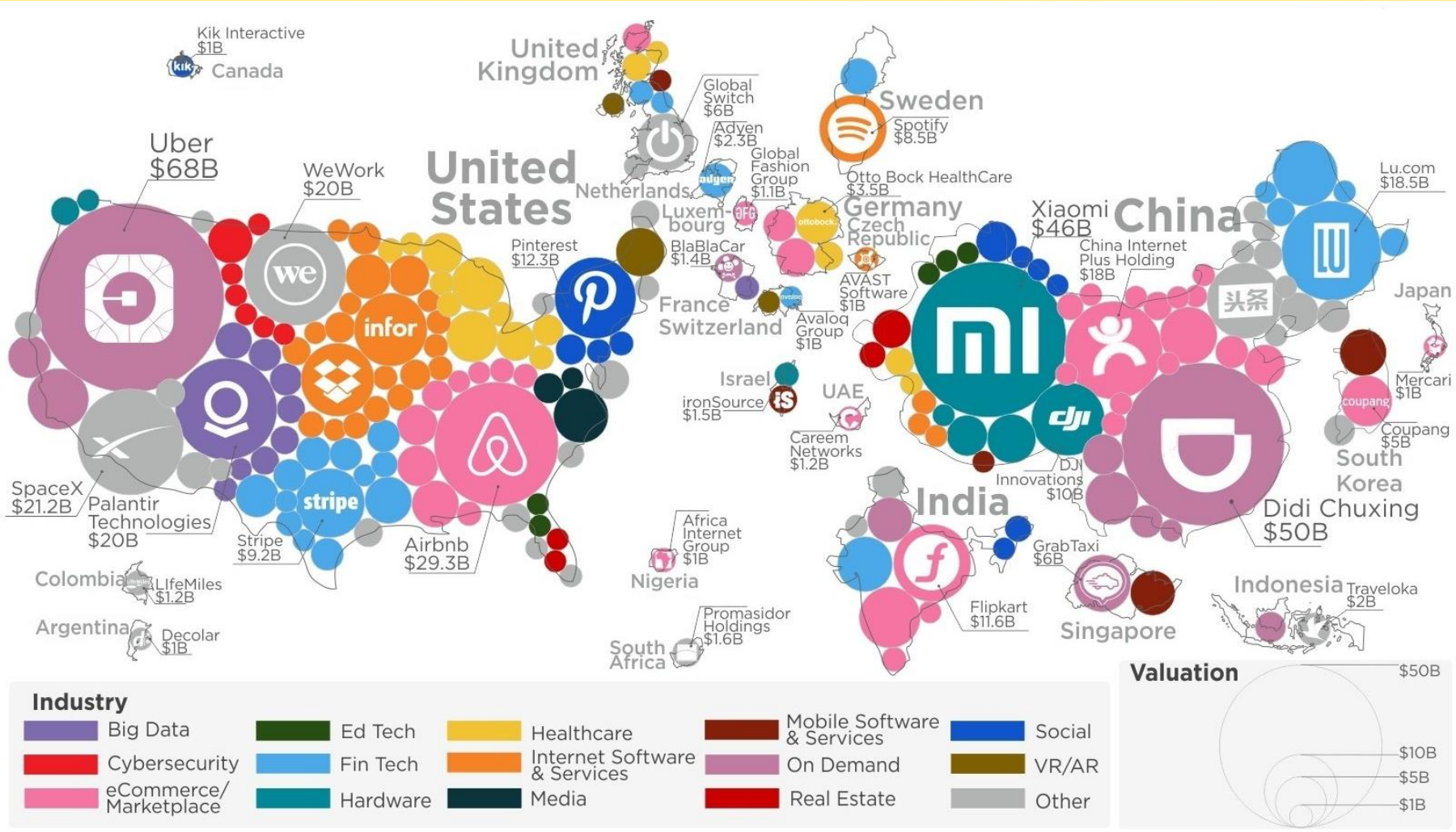


- "Globally, young high-growth firms, known as 'gazelles', are playing a **leading role** in innovation. Young firms tend to be responsible for a higher share of patents and to hold patents for more radical inventions. South Africa has the **lowest share** of young firms among emerging economies.
- **Exit rates** are also low, suggesting that less productive firms stay in business, limiting the reallocation of resources, such as skilled labour.
- Most South African start-ups operate at a **small scale**; few have international customers or ambitions contributing to the low number of 'unicorns' in South Africa."

Source: The World Bank, South Africa Economic Update, 2017

The World's Unicorn Companies 2017

All private companies valued at $1B+



https://howmuch.net/articles/the-worldss-unicorn-companies-2017
https://www.cbsinsights.com/research-unicorn-companies

Most are in the ICT space

Why do start-ups struggle in SA?

Environment

Environment is less conducive to entrepreneurial risk-taking

- (Graduates) need to secure income for household and extended family
- Family and friends unlikely to be in a position to help boot-strap
- Mindset and propensity

Programmes

Incubator mind-set

Many incubation and accelerator programmes available but depend on entrepreneurs to bring ideas (not necessarily technology or products) that then get vetted and supported. When entrepreneurs don't come forward or ideas aren't viable, the incubator stalls

Solutions get built but not businesses

Programmes exist where companies work with universities or other providers to develop solutions. Though the company's problem is solved, no further steps are taken to develop a fully-fledged business or a supplier ecosystem around the solution

People

Entrepreneurs struggle to build business acumen

- Understanding the market and the marketing of products and services
- Understanding how to manage a business
- Enlisting the support of an experienced business mentor

Going it alone or one-sided team: Hard to win

Very often the entrepreneur or group of entrepreneurs comes from a technical background and lacks business understanding; or comes from a business background and lacks technical understanding

IDEAS THAT WORK FOR INDUSTRIAL DEVELOPMENT

The effective production model

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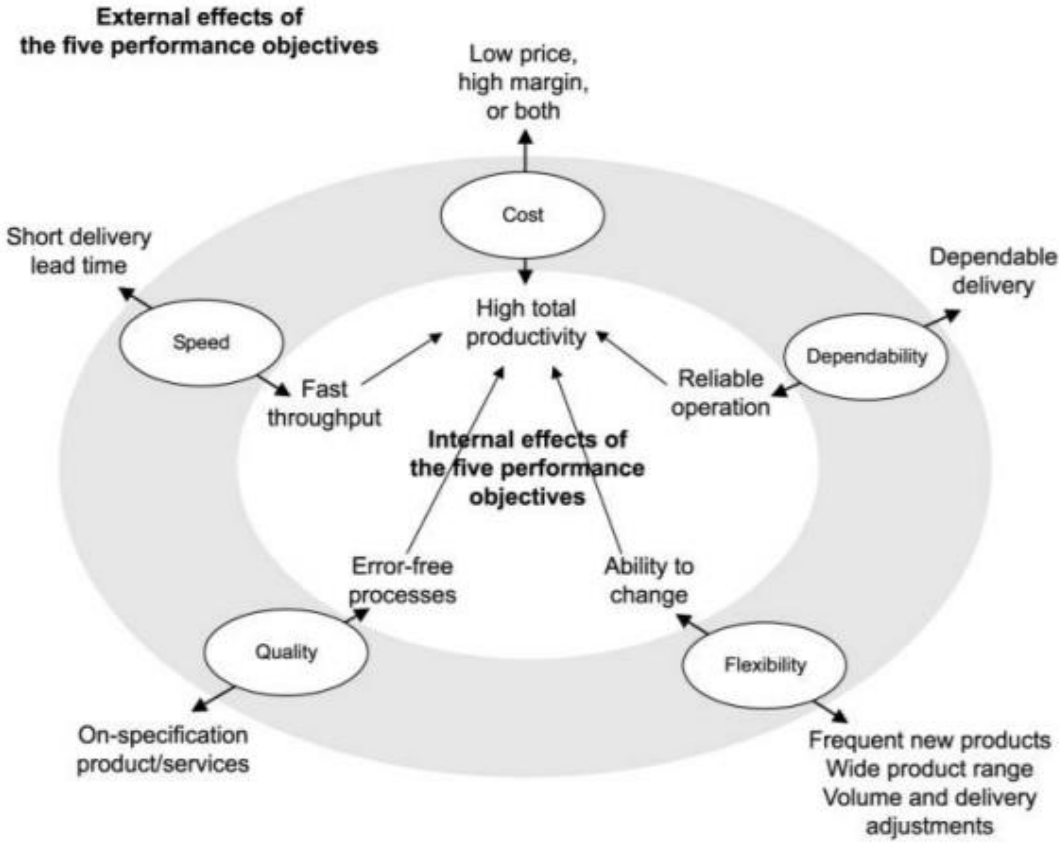
Effective production is key…



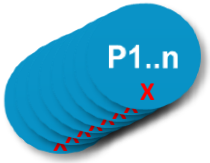
A nation's economy is a concert of many individuals involved in diverse labour in the production of various goods and services. The more jobs in an economy, the wealthier that economy. Furthermore, the more productive these jobs are in producing goods and services that can be expanded to bigger markets; the wealthier that nation will be.

Source: Stefan Tangen, (2005) "Demystifying productivity and performance", International Journal of Productivity and Performance Management, Vol. 54 Iss: 1, pp.34 - 46

Combined with Efficient Entrepreneurship…

IDEAS THAT WORK FOR INDUSTRIAL DEVELOPMENT

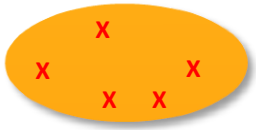
Prototypes



Many digital prototypes are required, that minimises risks through use of appropriate platforms and tools

x = 1 **"business level" thinking** (route to market, sales, etc.) **required** even during technology development

Swarms



Business graduates swarm around attractive prototypes, as a self-forming group.

In a parallel stream to the technical and prototype development, they are immersed in key business concepts – market analysis, business model development

Business Concepts

Start-up formed, which combines technical recruits with business recruits.

Stage Gate 1
Business concept, model and plan is presented to prospective investors and vetted

Start-Ups

Ecosystem support
Vetted start-up is supported over 1+ years - with infrastructure, technical expertise and business mentorship - to build a new sustainable business

Stage Gates every 2 months to monitor progress

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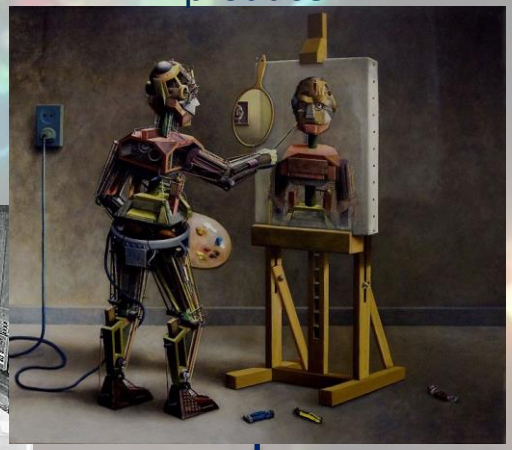
Combined with innovative processes

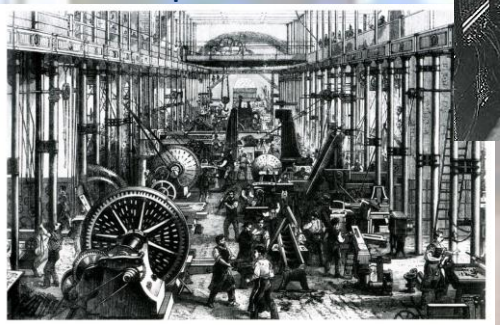
Effective production
=
Machine/AI's consistency and speed +
Human insights and creativity +
Innovative business processes

Digitally driven
Our own creations produce



Computing driven
Human ingenuity produces

Factory driven
Tools and machines produce



Manually driven
Nature produces

IDEAS THAT WORK FOR INDUSTRIAL DEVELOPMENT

The CSIR's solution

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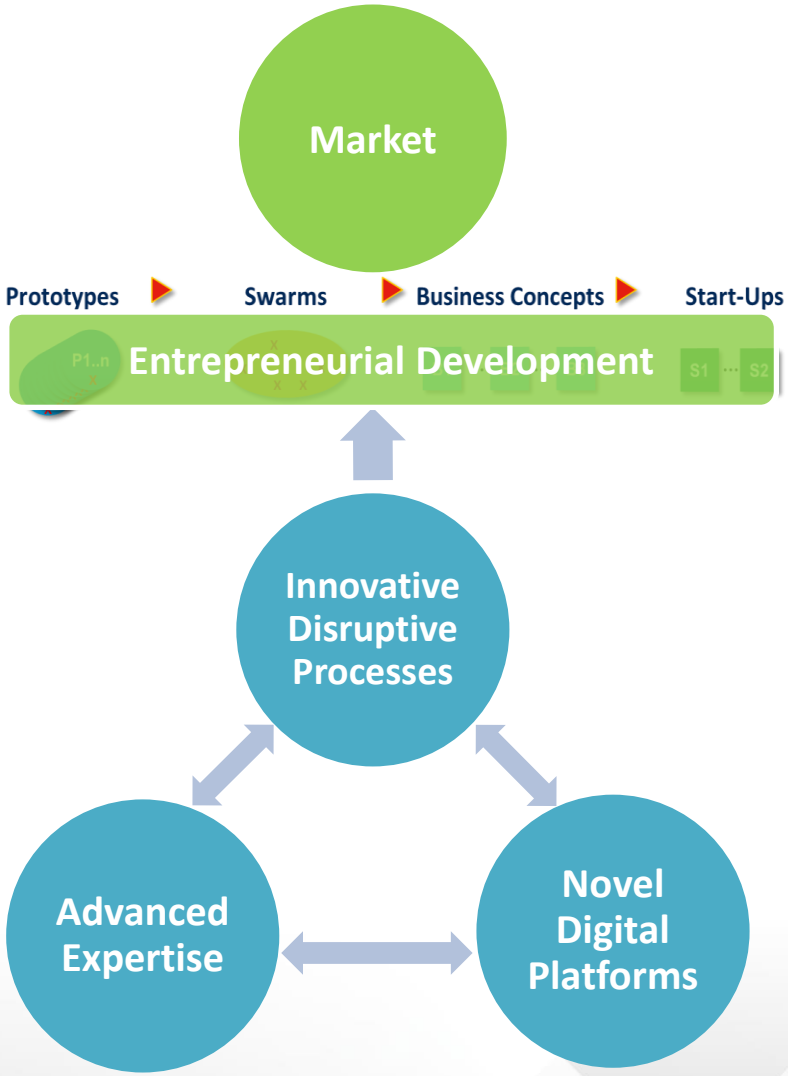
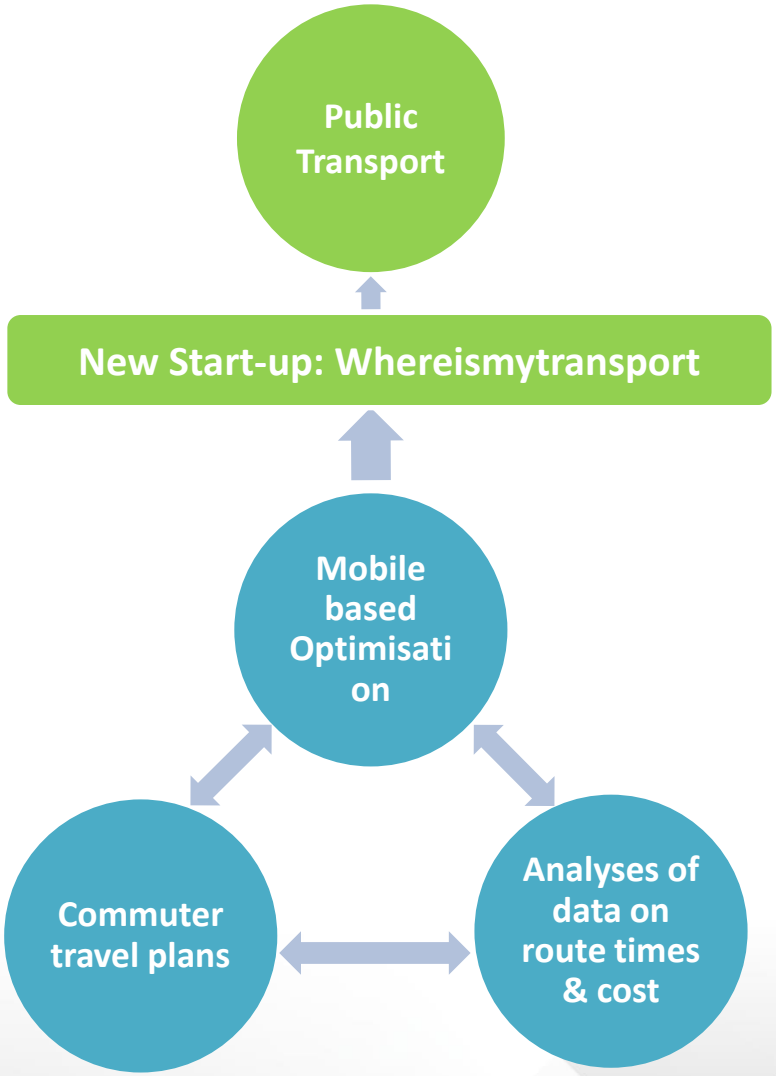
CSIR's digital value proposition

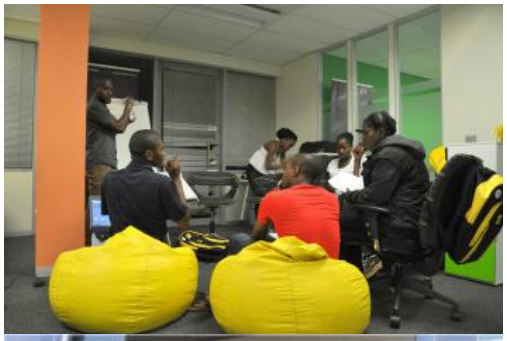


- Technologies that **enable** the South African industry to develop applications and content that are relevant to South Africa and can be exported to other emerging economies,
- Technologies that can be **transferred** to local industry to improve efficiencies in the delivery of services, in the ICT sector, as well as in other sectors, and
- Technologies that **disrupt** entire industries and as a result create new markets and industries.

CSIR-enabled digital innovation WhereismyTransport



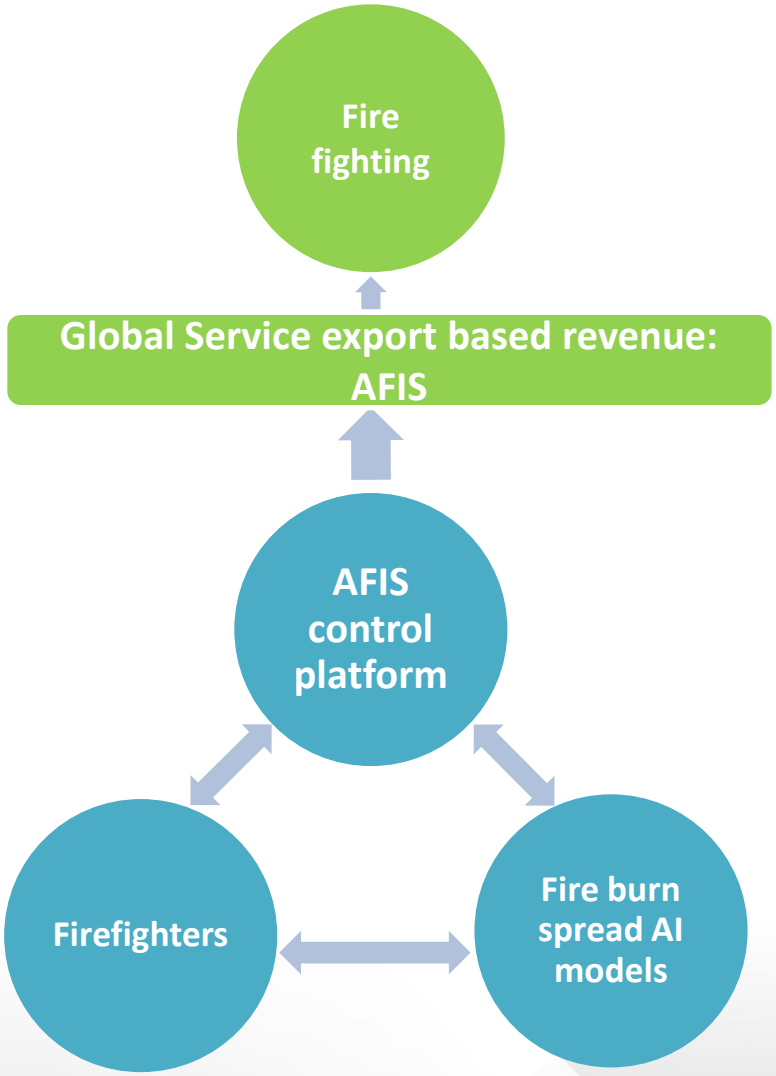
Capacity development and initial support via mLab (CSIR & DST)



Get real-time updates anytime for Metrorail in Gauteng, Western Cape, KZN and Eastern Cape

Cape Town start-up part of Google's Dreamteam

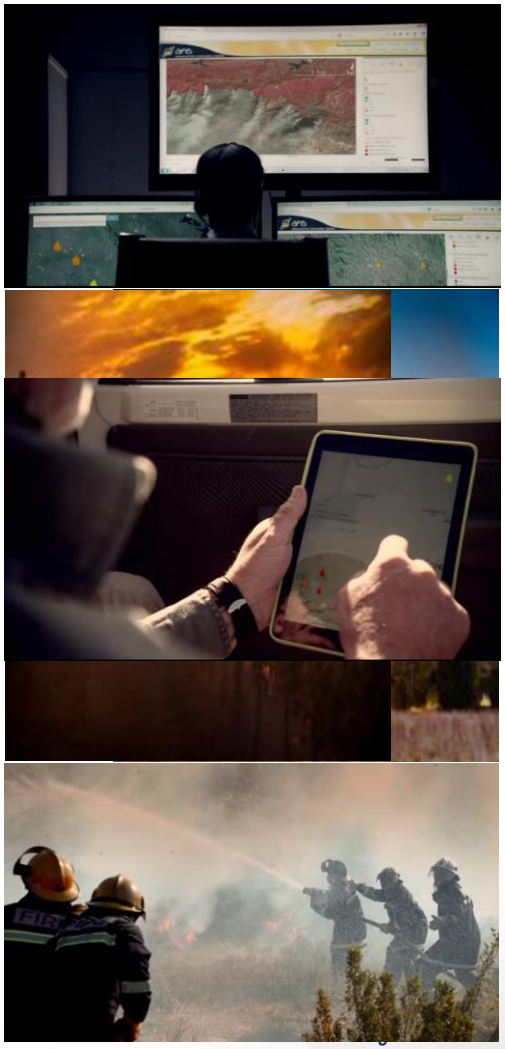
CSIR-created digital innovation Advance Fire Information System



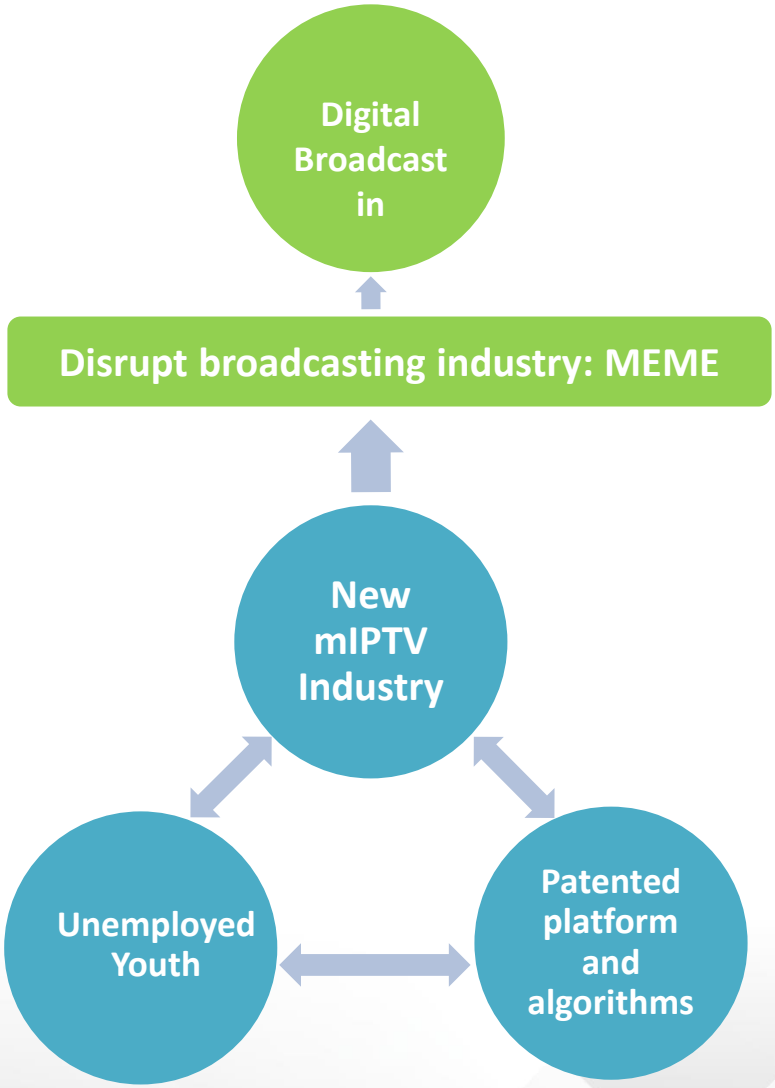
Four-day fire danger forecasts for any location based on AI fire spread model developed by CSIR

Satellite-based fire information tool that provides near real time fire information to users across the globe

AFIS mobile app used by fire crew for real time fire spread management



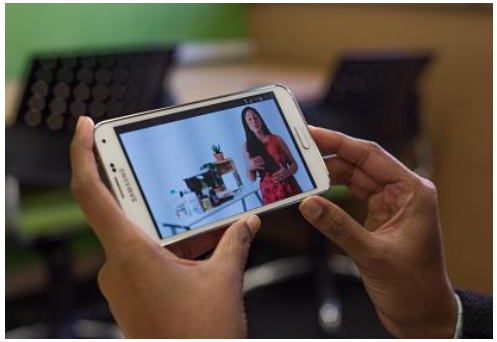
CSIR disrupted digital innovation
Micro enterprise media engine



Patented ultra-low cost scalable mobile Internet Television (mIPTV) platform that enables media production SMMEs to own the means of global (export) distribution while retaining the IP rights to their content.

Distribute live television with integrated social media interaction to even the remotest rural areas of emerging economies on mobile devices without any break-up of the stream (no video buffering)

Create a new Pan African emerging economy to emerging economy industry



Conclusion

- Digital innovation can **create** additional jobs
  - New SMMEs (gazelles), possibly unicorns
  - Employment of Youth
  - Export-based revenue

- **Ecosystem**-based approach required in partnership with NSI to scale and provide:
  - support in the form of infrastructure, policies, product development, implementation, business model innovations and venture capital

- **Scaled** Digital innovation will lead to increase in wealth, economic prosperity and growth

IDEAS THAT WORK FOR INDUSTRIAL DEVELOPMENT

Thank you

Dr Quentin Williams
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The Economic structure of the South African ICT sector

Connectivity	Enabling Tech.	Online Services	Content rights	User Interface
$ 577bn (17%)* R 70bn (60%)**	$ 373bn (11%)* R 9bn (8%)**	$1637bn (47%)* R 17bn (15%)**	$ 64bn (2%)* R 7.6bn (7%)**	$ 813bn (23%)* R 9.7bn (9%)**
Example Products Mobile access Fixed access – retail and VPN services Satellite and other IP services **Local Participation** Almost all active electronic equipment is imported from one of the three OEMS; Huawei, Nokia and Ericson. Local components are cables, material for masts and manholes.	**Example Products** Managed bandwidth and content delivery M2M platforms Web hosting & ISPs Cloud infrastructure **Local Participation** Managed bandwidth and optimization networks are a huge opportunity as these controlled by a few OEMS globally. Local design of web platforms, cloud and data infrastructure	**Example Products** Social networking Gaming, Music, Publishing Search and online ads Video on demand **Local Participation** Completely owned by the US and China. Most digital services in use today by government and large industries are supplied by overseas suppliers, or local distributors of overseas products.	**Example Products** Premium rights – include content acquisition and license costs : Made for digital content **Local Participation** In SA, Multichoice has a large market share with others such as Etv and SABC producing own content. Opportunity to produce local “made for digital” content	**Example Products** Smartphones, Tablets, Consoles, PCs Set-top boxes Digital media receivers Enterprise software **Local Participation** Set-top manufacturing – Multichoice and UEC are the biggest player for both local and African market. All other products are largely imported supplied by multi-nationals

Innovation in ICT sector enables multiple industries

*global market share
**RSA GDP contribution

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Digital disruptive jobs creation in practice
Ecosystem approach: MEME in more detail