The ICT R&D and Innovation (RDI) Implementation Roadmap:
- Need
- Vision
- Concept

Our Achievements
- Attracting Foreign Direct Investment (FDI) into South African ICT R&D
- Delivering on government departments' national priorities
- Impacting on both socio and economic dimensions
ICT RDI Implementation Roadmap remains a crucial cornerstone and key guiding framework for DST’s ICT RDI activities.
ICT is a recognized driver of economic growth

National Development Plan provides this vision for ICT:

“by 2030, ICT underpins a dynamic, inclusive and prosperous information society and knowledge economy, in which a seamless information infrastructure will meet the needs of citizens, business and the public sector, providing access to a wide range of services required for effective economic and social participation at a cost and quality at least equal to South Africa’s competitors.”

In South Africa "the Internet economy is worth R59 billion (2011) and contributes some 2% to GDP"

Sources:
Kenya Economic Update, December 2010
Worldwide Worx Report
### Underinvestment in ICT R&D, in international comparison

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (million)</th>
<th>GDP ($Bn)</th>
<th>GERD % GDP</th>
<th>ICT R&amp;D as % GERD</th>
<th>ICT R&amp;D as % GDP</th>
<th>ICT R&amp;D Expenditure ($Bn)</th>
<th>ICT Sector Size ($Bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>52</td>
<td>350.6</td>
<td>0.78%</td>
<td>8.4%</td>
<td>0.065%</td>
<td>0.22</td>
<td>29</td>
</tr>
<tr>
<td>Brazil</td>
<td>200</td>
<td>2 246</td>
<td>1.3%</td>
<td>19.4%</td>
<td>0.46%</td>
<td>10.3</td>
<td>110</td>
</tr>
<tr>
<td>South Korea</td>
<td>50</td>
<td>1 305</td>
<td>4.2%</td>
<td>44.8%</td>
<td>1.93%</td>
<td>25.1</td>
<td>261</td>
</tr>
<tr>
<td>Australia</td>
<td>23</td>
<td>1 056</td>
<td>2.4%</td>
<td>15.9%</td>
<td>0.38%</td>
<td>4.0</td>
<td>129</td>
</tr>
<tr>
<td>Taiwan</td>
<td>23</td>
<td>475.3</td>
<td>2.3%</td>
<td>19.0%</td>
<td>1.85%</td>
<td>6.4</td>
<td>200</td>
</tr>
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</table>

- South Africa spends close to 10% of GDP on ICT goods and services, of which most are imported
- ICT R&D intensity as a % of GDP has decreased from 0.12% in 2009 to 0.065% in 2013
- OECD Review of the South African NSI - Report: South Africa ranked below bottom five on ICT for Innovation

To harness the socio-economic benefits of ICT and to be a player in ICT, we must **significantly** increase investment in ICT R&D.
Our vision is for a South Africa that has overcome the Digital Divide; by leveraging advances in ICT to address socio-economic challenges it has created **Digital Advantage**

This will be done through **sound investment** and **effective coordination** of ICT R&D and innovation activities.

- Principal focus: satisfaction of National Needs (deliver Impact against 14 Outcomes)
- Focused export activity as technologies arrive on-market (ie AFIS)
- Test technologies with local customers before broader export
Mission: Deliver Impact, in Alignment with National Priorities

Drivers
- Broadband Infrastructure and Services
  - Future Wireless Technologies
    - Broadband Service Infrastructure
- Development
- Sustainability and the Environment
- Grand Science
- Industry Applications
- The Service Economy

Opportunity Areas
- E-inclusion
  - Development
    - Agriculture
- Green and ICT
  - Global Change
    - Geo-spatial Applications
- Astronomy
  - Bio-Medical Sciences
- Smart Infrastructure
  - Mining
  - Manufacture
  - Future Internet Applications
  - Content Creation and Delivery
  - Supply Chain Optimisation
  - Asset Management
  - Mobile Enablement
- M-Health
- E-services
- Education
- Business Model Innovation
- Payment Solutions
- Outsourced SA Capability
- Systems Integration
- Content and Services Localisation
- Trust and Security

Capabilities

Enablers
- Research and innovate in the future means of providing access
- Enable individuals to empower themselves: economically, socially and democratically
- Use ICT to optimise the management of resources, assets and environments
- Leverage the ICT component of Grand Science projects to create new industrial and service capability
- Facilitate growth and performance in existing and emerging sectors

Market Opportunities

Context

Enable improved, lower cost, more convenient access and consumption of physical and digital services, both private and public
The Roadmap frames and guides ICT RDI activity – focus is on Impact

- Improved quality of basic education
- A long and healthy life for all South Africans
- All people in South Africa are and feel safe
- Decent employment through inclusive economic growth
- A skilled and capable workforce to support an inclusive growth path
- An efficient, competitive and responsive economic infrastructure network
- Vibrant, equitable and sustainable rural communities with food security for all
- Sustainable human settlements and improved quality of household life
- A responsive, accountable, effective and efficient local government system
- Environmental assets and natural resources that are well protected and continually enhanced
- Create a better South Africa and contribute to a better and safer Africa and World
- An efficient, effective and development oriented public service and an empowered, fair and inclusive citizenship
- An inclusive and responsive social protection system
- Transforming society and uniting the country
4-Pronged Strategy to drive broadband connectivity

- Policy, legal and regulatory (institutional) framework
- Connected Government
- National Broadband Network
- Skills Development
- R&D and Innovation
- Applications and local content development

ICT RDI Roadmap is pivotal to success

National Broadband Policy recognises the ICT RDI Roadmap as the “guiding document for investment in ICT RDI”

DTPS and the DST are committed to work together with other role players to implement the plan to advance South Africa’s situation in terms of ICT R&D and Innovation required to realise the Digital Opportunity strategy.
The ICT Roadmap supports other government departments' national priorities

- **Department of Basic Education**
  - In advancing the strategic objective to provide evidence to support policy and decision making in the implementation of the 2004 DBE e-Education White Paper, the DST in partnership with the DBE, Eastern Cape DoE and DRDLR initiated the ICT for Rural Education and Development (ICT4RED) in the Nciba Circuit of the Cofimvaba District.
  - **Cofimvaba ICT4RED**: 26 schools and 246 teachers trained in the use of ICT for teaching and learning; Operational model is being transferred to the Eastern Cape Department of Education

- **National Department of Health**
  - **Development of the Health Normative standards Framework** gazetted April 2014 laying the foundation towards addressing the critical issue of fragmentation of eHealth systems
  - **The Health Patient Registration System**: Deployed at 38 facilities, with 328 639 registered patients and 274 554 visits from Sept 2014
  - **Operation Phakisa (phase 2)**: participated in the “Health Information Systems group” to developed a plan for the implementation of an integrated Health Information System to support processes required for the “Ideal Clinic” project
Our Achievements

2013/14 – 2014/15
Successes: Funding and Progress

Sourced R697.7m in co-funding and leverage funding

- **R15 million** over 3 years from the DBSA Green Fund: development of an ICT Smart and Green Platform

- Three year funding of **R61.1 million** (R39.1 million from DST and R22 million from DRDLR): implement the Cofimvaba e-Textbooks initiative

- Three-year ICT Industry Innovation Partnership Fund of **R62 million** from the National Treasury’s Economic Competitiveness Support Package

- **R120 million** from the European Union General Budget Support (EU-GBS) by National Treasury (3 years): Use of ICT to support government service delivery

- A joint investment of **R439.6 million** from the DST partnerships with IBM (7 years) and Cisco for establishment of R&D centres at Wits and Nelson Mandela Metropolitan University
Track record: Funding and R&D Impact

Current Investment from DST already leading to a significant increase in **Co-Funding** from other Government departments and **Leveraged** funding from Industry.

Initial Investment in Capability and Critical mass (Masters and PhDs) led to **increased impact** in later years, with growth in:

- Technology Demonstrators
- Enterprises Created / supported
- Patents Granted
Addressing National Priorities via structured engagement with Government

**Priority Area**

- Broadband Infrastructure and Services
  - DTPS: Broadband Policy Implementation; Knowledge Economy
  - IDC: Commercialisation of new broadband technologies and business models
  - PICC: SIP 15

- Data Science
  - SKA: Data Science and Analytics
  - NSP: Big Data

- Development
  - DRDLR: Poverty Alleviation

- Service Economy
  - DoH: NHI; E-Health Normative Standards Framework (gazetted May 2014) project

- Industry Applications
  - DEA: Green Fund (DBSA); Green Economy
  - DoE: Energy Efficiency
  - DMR: Sector strategy on Minerals and Processing
  - IDC: Investment in Green Technologies
  - Provinces, Municipalities (COJ): Smart Cities

- Sustainability and the Environment
  - NSP: Disaster Prevention Management; Land Cover Change Detection
  - DEA: Global Change
**Strength of ICT RDI Ecosystem attracting FDI**

**Investment**

- **IBM**
  - Equity Equivalent (R700m total over 7 years, of which R373m for R&D)
  - IBM SDRI launched on 6 Feb 2015: 1st time R&D investment is recognised as a component of EEIP
  - SA collaborators will have access to IBM foreground IP and associated background IP; free license to exploit IP in the South African market; jointly developed and owned foreground IP
  - Roadmap Priority Areas: - Smart Cities, Analytics, Health, Data Science

- **Cisco**
  - RDI Investment: R66m
  - Centre for Broadband Communication at NMMU was launched on 26 March 2015 as a result of a partnership involving DST, CISCO, NMMU, CSIR and the SKA project
  - Roadmap areas:
    - Broadband, Fibre networks and technology

- **SAP**
  - DST R6m pa
  - SAP R12m pa
  - Innovation: Mobile ERP for < SMME’s
  - HCD: 20 x PhD + MSc students

**Outcomes**
ICT RDI is already delivering impact on National need and priority

BB4ALL

TECH4RED
ENHANCING EDUCATION

ICT4RED
ICT for Rural Education Development

AFIS
ADVANCED FIRE INFORMATION SYSTEM

mlab
SOUTHERN AFRICA
# Track Record: TECH4RED

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<tr>
<td><strong>Critical Mass in ICT RDI</strong></td>
<td><strong>Development of ICT RDI Roadmap</strong></td>
<td><strong>Implementation of ICT RDI Roadmap</strong></td>
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<td><strong>ICT RDI Strategy</strong></td>
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**Embed Capability**

- Cofimvaba: R13.8 |

**Achieve Impact**

- TECH4RED: R39.1 (DST) R22m (DRDLR)

### Exploring

- ICT 4 Development Donor

### Build Critical Mass

**ICT for Education:**

- R12.65m (MTEF)

### Train teachers, learners and district officials in the use of ICT for teaching and learning at 26 Nciba Circuit schools

- 6,500 learners, 246 teachers, 16 district officials
**Track Record: BB4ALL**

**Phase 1: 2004 - 2007**
- Critical Mass in ICT RDI
- ICT RDI Strategy

**Phase 2: 2007- 2009**
- ICT RDI Strategy
- Development and Implementation of ICT RDI Roadmap
  - **Build Critical Mass**
    - Wireless (MTEF)
    - COFISA: Nokia Village Connection
    - R8.2
  - **Achieve Impact**
    - BB4ALL EU SBS (6 years)
    - Google TVWS
    - Kumba
    - R86m
    - R1m
    - R6m

**Phase 3: 2009 – 2015**

**Exploring**
- Wireless technologies

**19 Village Operators (Entrepreneurs)**

Wireless Mesh broadband connectivity to more than 50 schools in the John Taolo Gaetsewe District of the Northern Cape

200 Schools and government facilities connected in Limpopo and Mpumalanga; 1 Black SMME to take forward Mpumalanga implementation

PARSEC granted licence for Wireless Mesh Node Manufacturing
# Track Record: AFIS

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## Build Critical Mass
- Geomatics and Spatial R7.9m
  - AFIS (Eskom)
- EU Projects
- SensorWeb standards
- GEOSS/IEEE

## Commercialise
- AFIS Global growth
- Eskom
- ABSA
- SAMSA
- Economic Savings: ~R379m

### Exploring
- Geomatics Roadmap
- Advance Fire Information System concept to ESKOM

First Space technology export:
AFIS partner in Kenya, RCMRD has completed installation of their satellite data reception station.

Firefight Trust in Zimbabwe to provide an AFIS service in Zimbabwe. Kishugu International to provide AFIS to its clients in Argentina, Uruguay and Chile.
### Track Record: mLab Southern Africa

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<tbody>
<tr>
<td><strong>Establishment</strong></td>
<td><strong>Expand Programmes</strong></td>
<td><strong>Expand Footprint and Impact</strong></td>
</tr>
<tr>
<td><strong>Partner with Industry Partners</strong></td>
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<tr>
<td>Technology Incubator</td>
<td>Partnered with a wide range of industry partners to help skill and support software developers within the mobile sector: MTN, Vodacom, Intel, Microsoft, Nokia, Google, Qualcomm, Ericsson and Blackberry</td>
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<td><strong>Create Enterprises and Entrepreneurs</strong></td>
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<tr>
<td></td>
<td>&gt;12 new enterprises established</td>
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<td></td>
<td>&gt;100 Entrepreneurs, Developers &amp; Designers supported</td>
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### Some successes:

- **Tour2.0** (Community tourism), **GoMetro** (Adopted by PRASA for Metrorail & Gauteng Roads & Transport), **Afroes** (Rockefeller grant to develop Social Impact games in South Africa, Kenya and Nigeria), **AftaRobot** (Adopted by the AMSTA taxi association and supported by a multinational Telco)
Other Key Initiatives

- **EU-General Budget Support (GBS)** support of R120 million (3 years): 4 projects in support of Government outcomes 4 (decent employment) and 12 (efficient, effective and development-oriented public service): Media Youth Employment, M-Health, Disaster Prevention for local municipalities, HLT activated service delivery.

- **Operation Phakisa (Phase 1) - DEA collaboration:**
  - R50 million over 5 years for Oceans and Coasts information system.

- **CHPC Student Cluster Team** won the International Student Cluster competition (2nd year in a row).

- **National Cybersecurity RDI Agenda:**
  - R&D supporting key National Projects HANIS, EnaTIS and e-Government (smartlDs, e-Passports, e-Drivers License).
  - Biometrics: licensed a Fingerprint processing library to iPulse; South African Social Security Agency’s biometric based payment systems.

- **Data Science Skills Initiative:**
  - Intensive internship programme training students in advance Data Science, resulting in multiple conference papers, technology demonstrators and data analytic tools for government.
In the next 3 years

- **New Pan African mobile IPTV industry** created with multiple microenterprises and microjobs (EU-GBS Mobile IPTV Project) - specifically focussed on Youth employment

- **Spinout companies** from commercialisation of Advance Fire Information System (AFIS) and Geo-location Spectrum Database (GSLD)

- **Possible New Enterprises (SMME's)** created from m-Lab, Data Science activities, Belgium campus innovation villages, Smart Manufacturing opportunities, miPTV media microenterprises, AFIS

- **FDI Investment in R&D over the next 3 years from IBM and CISCO**

- **Decision support provided** that strengthens or improves delivery for NDoH, DEA, DRLR, Local Cities and distressed Municipalities

- **R&D that will Enhance Industrial Competiveness** for entities such as Transnet (Integrated Smart Logistics), ESKOM (Smart Grid), Parsec and Sentech (Future Wireless Technologies)

- **eAgriculture Extension services** impacting rural farmers

- **Performance of SMEs improved** through technology interventions (e.g. Big Fish School of Digital Filmmaking, Jembi, Mezzanine, Wellnicity)
Thank You!