



# The Impact of the 4<sup>th</sup> Industrial Revolution on Economic Development

*Developing A Country Agenda*

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**Telkom**

The Telkom Group is the leading provider of integrated services in the ICT converged market in South Africa, managing a specialised portfolio of companies with R41bn revenues and employing ~19 000 people.



**Wholesale Infrastructure**

Wholesaler provider of communication facilities & infrastructure to ISPs  
DSL, Fibre, ME etc.



**Converged ICT solutions**

End-to-end digital solutions provider of ICT solutions to enterprise customers  
Connectivity, voice, IT, cloud etc.

**Telkom Consumer**

**Connectivity solutions**

Retail communications service provider to consumers  
Broadband, voice, internet & mobile.



**Directory & online services**

Local advertising and marketing organisation providing digital solutions  
Directory, online search, e-commerce.



**Property management**

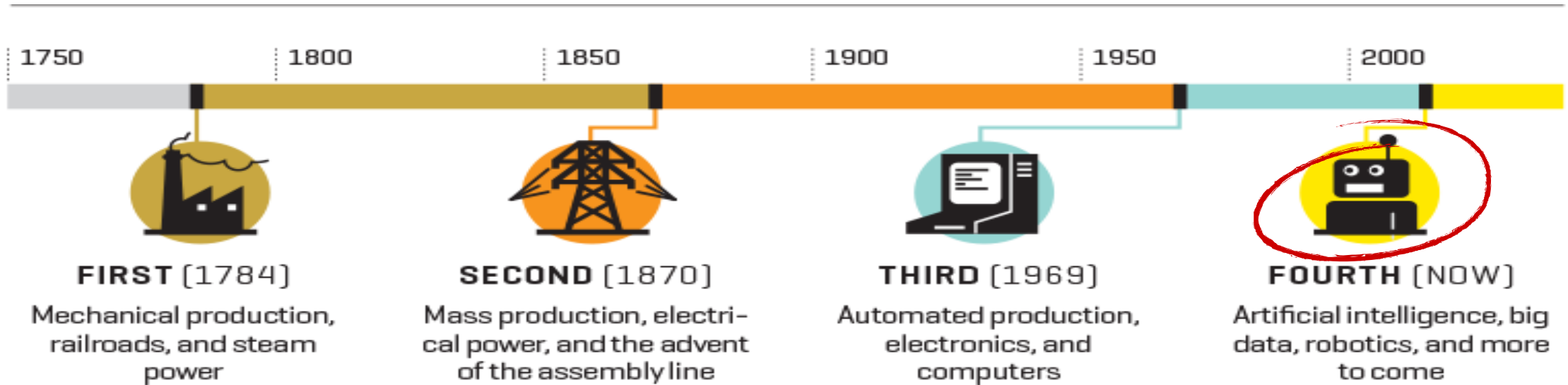
Property business managing masts and towers, property development and property management services.

## Key messages

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- The fourth industrial revolution is a **fundamental shift** in the way that technology, communications, data, and analytics impacts **almost all aspects of society and the economy**
- This era presents South Africa with **significant and interrelated opportunities...**
  - Improved access to better services, provided more efficiently across socio-economic and geographic barriers
  - Increasing transparency, trust and social cohesion through direct communication
- ...but also a **host of risks to effectively manage**
  - Unequal access to benefits – infrastructure access and training required
  - Employment displacement as automation and new business models increase need for education and training
- **The government has a critical role to play** in securing and enhancing the **human capital and technological assets** required to harness the power of the fourth industrial revolution
- **Telkom is uniquely positioned** to drive the foundations of the fourth industrial revolution: investing in the country's largest networks, integrating services and players, forging new business models, developing talent
- In order to realise the full potential of this moment in history we need **multiple stakeholders to work in a coordinated way towards a shared vision** in terms of financial investment and target outcomes

# The fourth industrial revolution is a fundamental shift in the way that technology, communications, data, and analytics impacts society and the economy



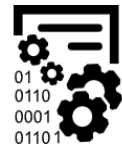
# The proliferation and adoption of these inter-related technologies marks this period as distinct from those that preceded it



**CYBER-PHYSICAL TECHNOLOGIES** – broad adoption of 3D printing, robotics



**PERVASIVE CONNECTIVITY** – always connected, everywhere, to everything with increased sensing and actuating



**BIG DATA** – collecting more information, about more things, more than we ever have before

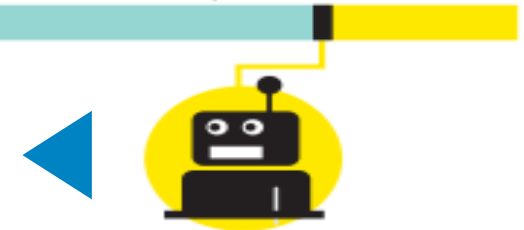


**COMPUTING POWER** – exponential acceleration in our ability to extract insights from data in real time



**AI** – machines ability to do human activities at half the speed with continuous self improvement embed in the technology

2000



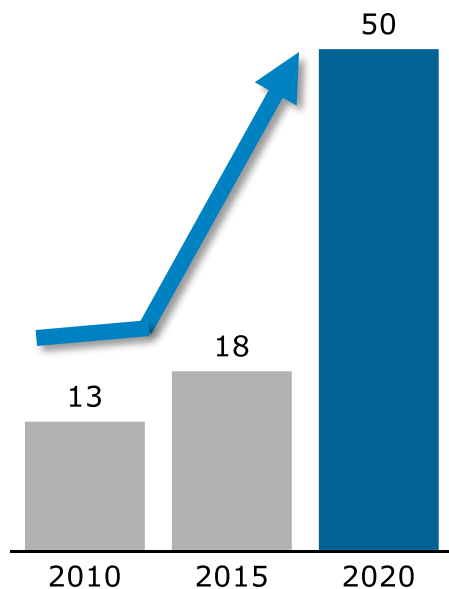
**FOURTH [NOW]**

Artificial intelligence, big data, robotics, and more to come

# We are in the midst of an inflection point, driven by an unprecedented and accelerating wave of change

# 1

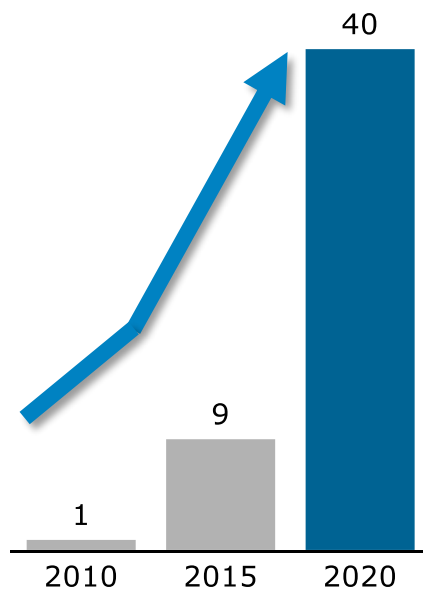
## PROLIFERATION OF DEVICES



**CONNECTIVITY:  
~4X INCREASE IN DEVICES**  
NUMBER OF CONNECTED DEVICES (B)

# 2

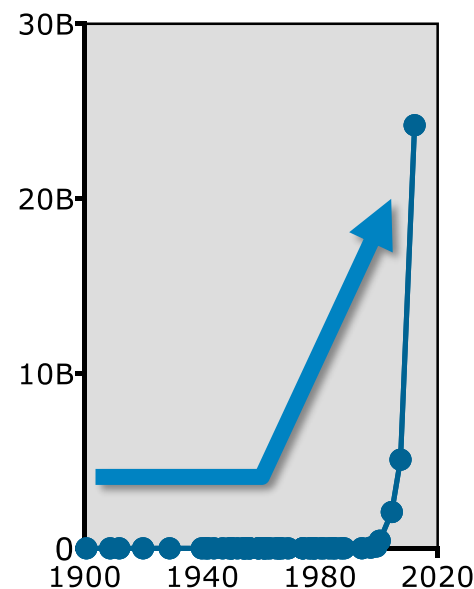
## EXPLOSION OF DATA



**DATA PROLIFERATION:  
A ~40X INCREASE**  
(DATA GENERATED IN ZETTABYTES –  
1ZB = ~250B DVDs)

# 3

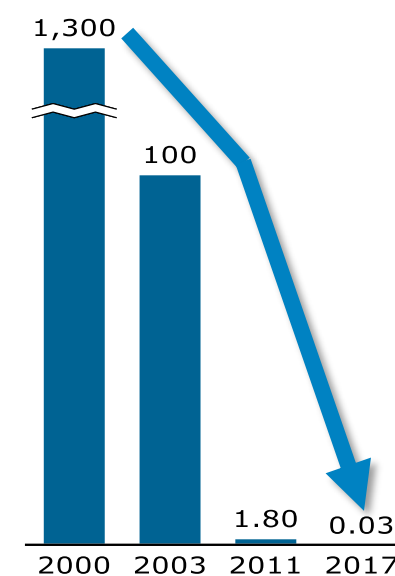
## UPSURGE IN COMPUTING POWER



**COMPUTING POWER:  
EXPONENTIAL  
ACCELERATION**  
(CALCULATIONS PER SECOND PER \$1K)

# 4

## DECLINE IN COSTS



**HARDWARE COST DECLINES:  
EXPONENTIAL DECREASE**  
(COST PER GFLOP – MEASURE OF COMPUTING  
POWER)

# How do we deal with the 4th Industrial Revolution?



- The 4<sup>th</sup> industrial revolution is not a sector problem and must be seen as **part of national discourse**
- We must understand the economic impact of the 4<sup>th</sup> industrial revolution on **individual sectors** as it has the **potential to improve sustainable and inclusive growth or worsen our economic prosperity**
- We must then **actively mitigate adverse impact and leverage opportunities** in short and long-term through a **coordinated and agreed national framework** to deal with the 4<sup>th</sup> industrial revolution

# For governments, the 4<sup>th</sup> industrial revolution presents significant and interrelated opportunities but also a host of risks, which must be effectively managed

## ROLE OF GOVERNMENT

### **PROVIDER**

of critical services to citizens

### **STEWARD**

of SA's global competitiveness and information economy

### **LARGEST EMPLOYER**

in the country

### **BUYER/USER**

of digital enabling technologies

### **REGULATOR**

of technology and privacy

## OPPORTUNITIES

- Improved access to better services
- Increasing transparency, trust and social cohesion
- Focus on intimacy at scale
- Reduced cost of service delivery

## RISKS

- Civil liberties infringement
- Regulatory burden
- Unequal access
- Accelerating employment displacement



# The scale of investment in the 4<sup>th</sup> Industrial Revolution should have a significant return in the form of economic development



**GDP = Government Spending + Investment + Consumption + Net exports**



**Increase in investment spend** for 4<sup>th</sup> Industrial Revolution **infrastructure**



**Cost savings** through the provision of more **efficient services**



**Increased investment** in high growth **technologies/ companies**



**Decline in investment** in low growth, **less digitised sectors** e.g. mining



**Increased expenditure** in **technologies** e.g. tablets, smart watches



**Decline in cost of goods** due to more **efficient manufacturing practices**



**Increase in exports** of **technological services and products** to other African countries



**Increase in imports** of **parts required to build** the necessary technology

# The strategy should take a “layered” approach to the systems of actors and technologies

## EXAMPLE SOLUTION

### ***National level...***

- ...creating broad “horizontal” applications
- ...de-duplicating information
- ...simplifying governmental processes
- ...increasing coordination

### ***Municipal level...***

- ...tailoring solutions for local conditions
- ...sharing data to refine national models
- ...increasing citizen engagement (two-ways)

### ***Industry level...***

- ...creating ecosystems of actors with different interests / incentives
- ...sharing non-proprietary information across supply chains
- ...creating new business models

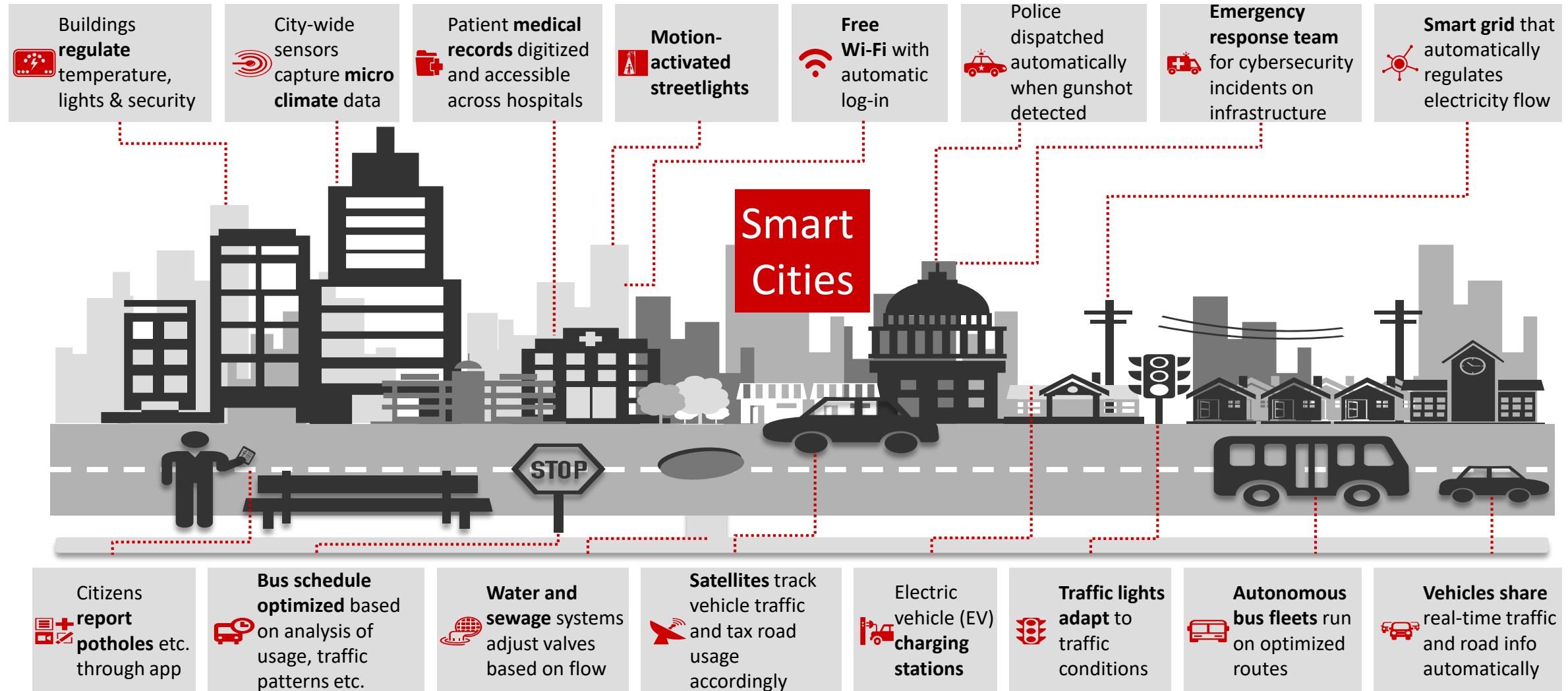
*Biometric  
Cloud*

*Smart Cities*

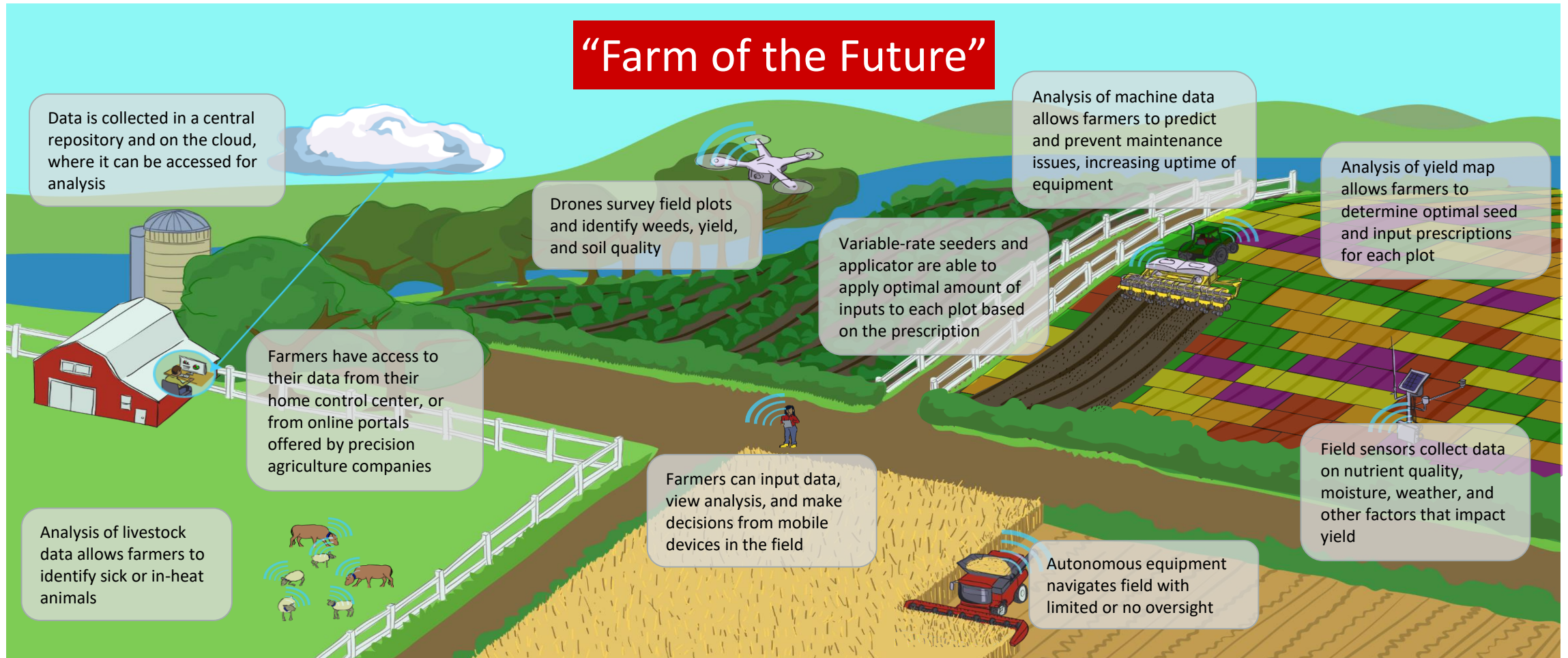
*“Farm of the  
Future”*



# Municipalities are using a range of interconnected technologies and solutions to provide better, more efficient services across cities



# Within agriculture, various organisations across the ecosystem are driving towards the “Farm of the Future” to sustainably increase yields and enhance food security



# 4<sup>th</sup> Industrial Revolution Technologies can deliver and support National Development Plan's enabling milestones

Affordable broadband access is the only core digital milestone listed in the NDP - but many others' delivery will be significantly enhanced by 4<sup>th</sup> IR technologies



**CYBER-PHYSICAL TECH**   **PERVASIVE CONNECTIVITY**   **BIG DATA**   **COMPUTE POWER**   **ADVANCED AI**

## EXAMPLES

NDP ENABLING MILESTONE		CYBER-PHYSICAL TECH	PERVASIVE CONNECTIVITY	BIG DATA	COMPUTE POWER	ADVANCED AI	EXAMPLES
Delivery enhancement	Deliver affordable broadband access		✓	✓			Internet balloons, other new channels to free spectrum
	Increase quality education		✓	✓	✓	✓	Responsive e-learning for customized curricula/testing
	Promote health / wellbeing	✓	✓	✓	✓	✓	Remote health e-monitoring and medication dosing
	Establish effective transport	✓	✓	✓	✓	✓	GPS enabled minibuses with monthly subscriptions
	Produce sufficient clean energy		✓	✓	✓	✓	Integrated home/national power with buy-back to grid
	Broaden asset ownership		✓	✓			Land access claim evaluation, incl. monitoring / tracking
	Ensure access to clean water		✓	✓			Live water cycle quality monitoring and intervention
	Ensure household food security	✓	✓	✓	✓		Precision farming with live data to reduce wastage
	Promote continental development		✓	✓	✓	✓	Powerful new insights from combination of citizen data
	Increase employment to 24M		✓	✓	✓		New efficiencies to improve export competitiveness

# To successfully harness the power of the 4<sup>th</sup> Industrial Revolution, we must have the right approach to building the required human capital and technological foundations

## HUMAN CAPITAL



## TECHNOLOGY FOUNDATIONS



**Networks**  
*Connects everything*



**System Integration**  
*Puts it all together*



**Compute and Storage**  
*Holds and handles the data*



**Analytics**  
*Generates the insights*



**Sensors and Hardware**  
*Gathers data and inputs*



**Technical Literacy**  
*Understands how to do it*

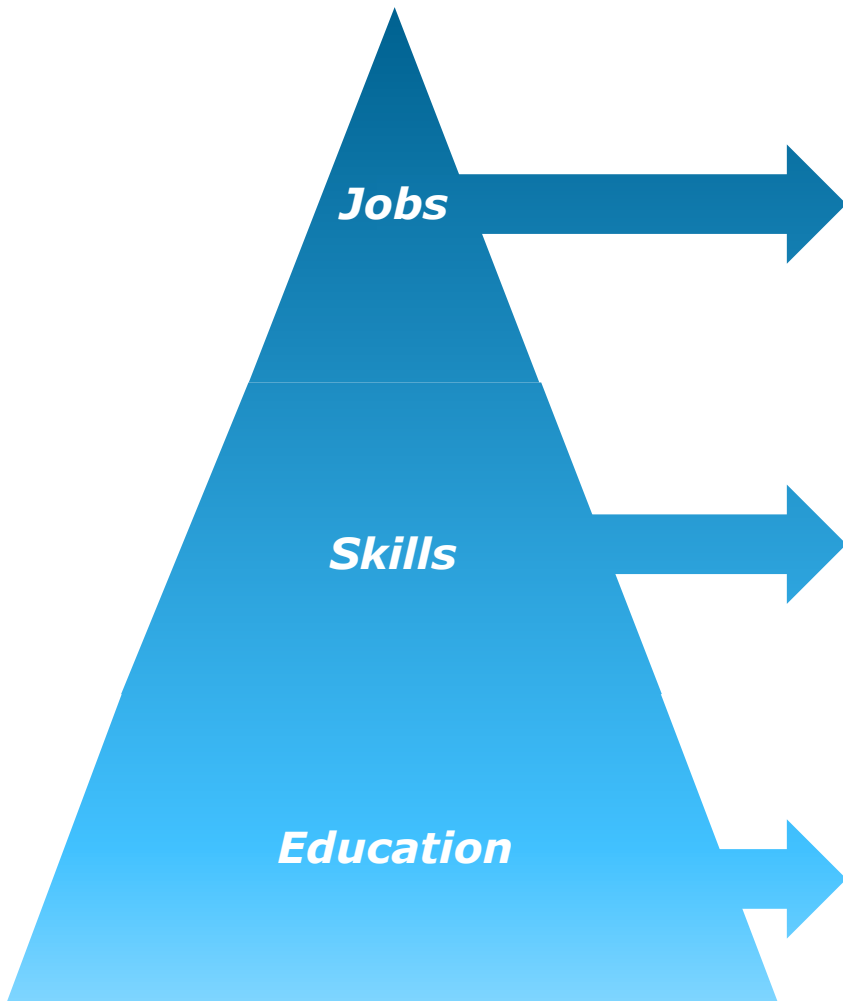


**Applications and Software**  
*Performs the tasks*

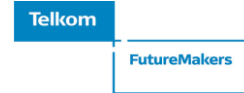


**E-Kiosks**  
*Provides access to it*

# Telkom Group is gearing up to delivery 3 critical, human capital factors that South Africa needs to get right to take advantage of the 4<sup>th</sup> Industrial Revolution



## TELKOM GROUP IS INVESTING HEAVILY IN SOUTH AFRICA'S DIGITAL FUTURE



Telkom Foundation



- **SpliceWorks** is an online platform where tech businesses can **get access to clients** who might need their technology or digital innovation, therefore facilitating growth and employment
- Creating over **1 000 jobs through Future Makers**
- Through the **WeThinkCode** programme, the Telkom Group will fund the training and assist in the work placement of `450 young coders over a period of 3 years
- The **CiTIX initiative**, in partnership with CapaCiTi and the National Jobs Fund, aims to train 2,400 learners in intermediate level digital skills including AI, Geomatics, Operational Technology, CyberSecurity and FinTech
- **BCX Project 200** is a programme designed in partnership with the National Library of South Africa to upskill and provide job placement for 200 young, talented persons with disabilities through a Microsoft Systems Engineering course
- BCX invested in **Explore Data Science Academy** (South Africa's first data science academy) to create 300 new skilled data scientist in the next 3 years, to meet the demand for data analytics in the digital economy
- **Telkom Foundation** is spending ~R85M on education whilst providing supplementary teaching and educating teachers in ICT
- **BCXLearn** provides free e-learning services covering Maths and Science

# Making it happen

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## A COHERENT STRATEGY – SHORT AND LONG TERM

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- Bring together the range of required stakeholders to input on frameworks and policies and to stimulate investment and adoption of 4<sup>th</sup> Industrial Revolution technologies
- Include multiple “layers” of implementation with an emphasis on:
  - Efficient and effective technology roll-out from national scale to individual firms
  - Centralised ways to learn from successes and challenges
  - Rigorous focus on payback periods for parts and the whole
- Sketch out the near term requirements to capture the longer term benefits with specific and measurable milestones

## CO-ORDINATED & ACCOUNTABLE LEADERSHIP

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- Establish singular co-ordination and accountability for authoring and executing the strategy and the measures by which success will be judged
- Provide sufficient financial and human capital to match the scale of ambition
- Ensure sufficient autonomy to drive successful outcomes on a longer time scale
- Conduct regular reviews to:
  - Ensure success and challenges are widely and publicly understood
  - Enhance transparency
  - Identify and scale successful repeatable models