



Demystifying the 4th Industrial Revolution

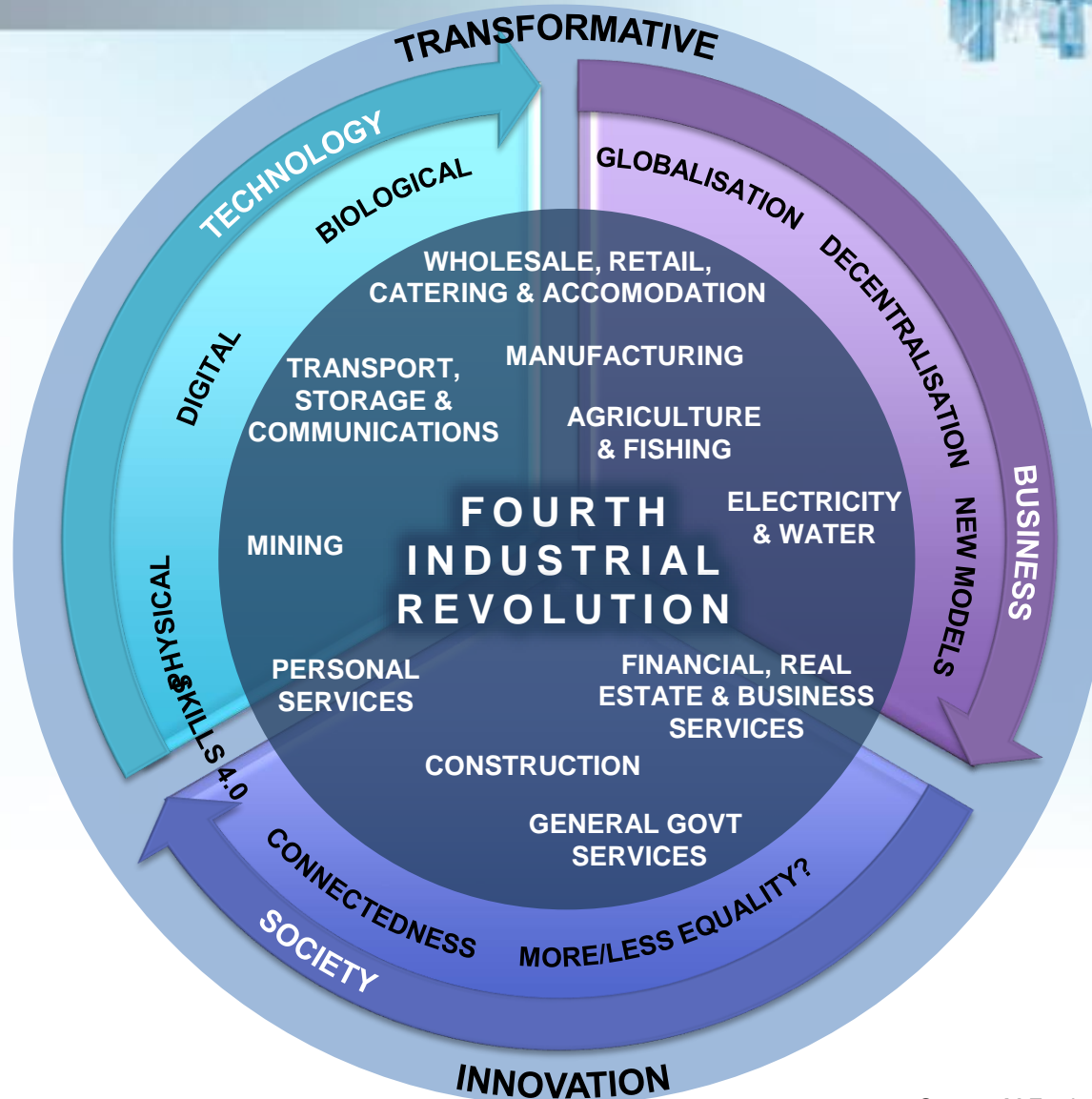
The Fourth?
Industrial??
Revolution???

The “Fourth Industrial Revolution”



*The fourth industrial revolution refers to the **fusion of technologies** in the **physical, digital and biological** domains leading to the creation of new technologies that will usher in a new industrial era characterised by **exponential growth, inter – connectedness, increased human productivity and the blurring of the lines between man and machine.***

Not Just Industry!



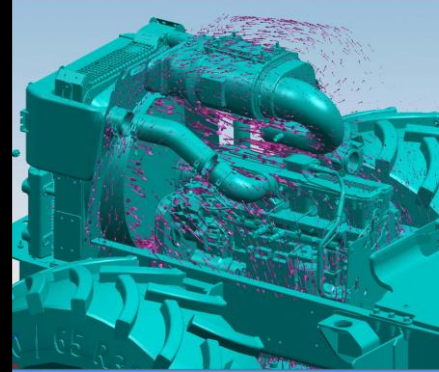
Technology Revolution??



Advanced Robotics



Big Data & Analytics



Simulation



Augmented Reality



Digital Integration



Advanced Manufacturing



Cloud Computing



Internet of Things

Key Institutional and System-wide elements



A conducive and supportive policy environment



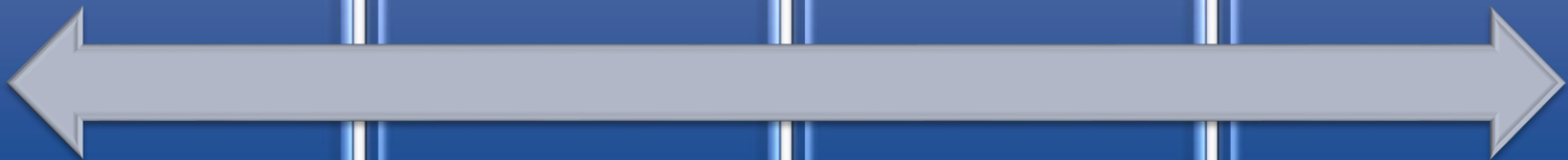
State support instruments and incentives



Research, Development & Innovation Environment



Public-private partnership models and instruments



Smart places



FIRE



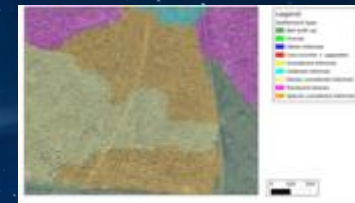
FLOODING



URBAN MAPPING



URBAN CHANGE



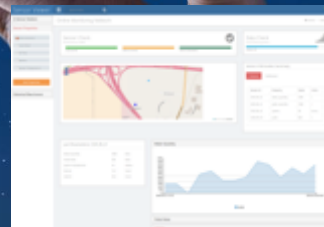
AIR QUALITY & GASES



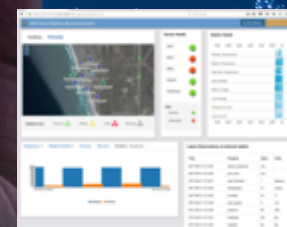
WATER QUALITY



WATER LEAKAGE



RADIATION

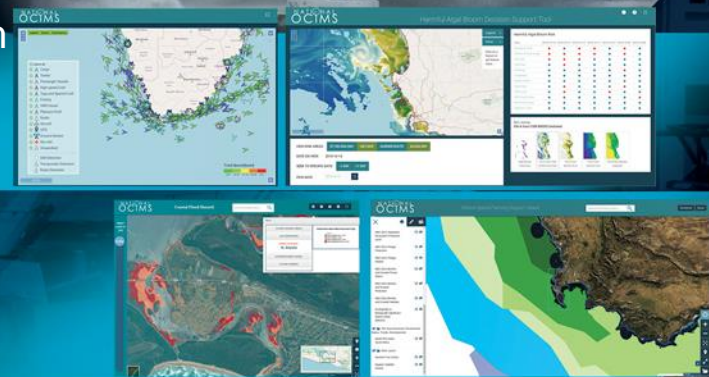


SOLAR ENERGY



National Oceans Information Management System

- CSIR-developed tool that provides decision support for the effective governance of South Africa's oceans and coasts, called OCIMS
- In South Africa, 30% of the population lives within 60 km of our oceans.
- Many coastal communities are dependent on our oceans and coasts for their livelihood, residence or for lifestyle and recreational use.
- OCIMS supports the unlocking of the oceans economy through enhanced oceans and coastal planning and decision support
- Uses eight decision support tools, which include integrated vessel tracking, harmful algal bloom detection, coastal flood hazard monitoring, operations at sea, bilge dump detection, fisheries, water quality monitoring and marine spatial planning.



Digital Becomes Physical with 3D Printing

- The CSIR and Aerosud Innovation Centre, an aeronautical engineering and manufacturing company, have developed an advanced 3D printer for metal components.
- The printer has the ability to produce geometrically complex parts up to 2 m long, 600 mm wide and 600 mm high.
- During proof-of-concept trials, the machine achieved production speeds 10 times faster than current commercial laser melting machines.
- Three titanium parts have been produced to date, namely a pilot's throttle lever, a condition lever grip for a South African-developed aircraft and a fuel tank pylon bracket for a commercial aircraft.
- The programme, funded by the Department of Science and Technology, began in 2011 after shortcomings with commercially available metal additive manufacturing technology were identified.

Product Lifecycle Management Digital Twin Technology For SMMEs



- Product lifecycle management (PLM) and associated software, which includes simulation and digital twin technology, can help small, medium and micro enterprises (SMMEs) to grow and mature.
- When digital twins are used as part of PLM, traceability is improved and collaboration becomes more efficient during the design cycle.
- By creating a digital twin of the product and/or relevant testing and manufacturing processes, the innovation cycle is shortened, as is the time to market.
- A digital thread intelligently connects digital twins and real-time production information – across lifecycle phases of ideation, realisation and utilisation, and across value chain participants to form a smart innovation environment.
- The Industry 4.0 PLM Centre of Technology was established by the CSIR, together with the Department of Trade and Industry and Siemens.

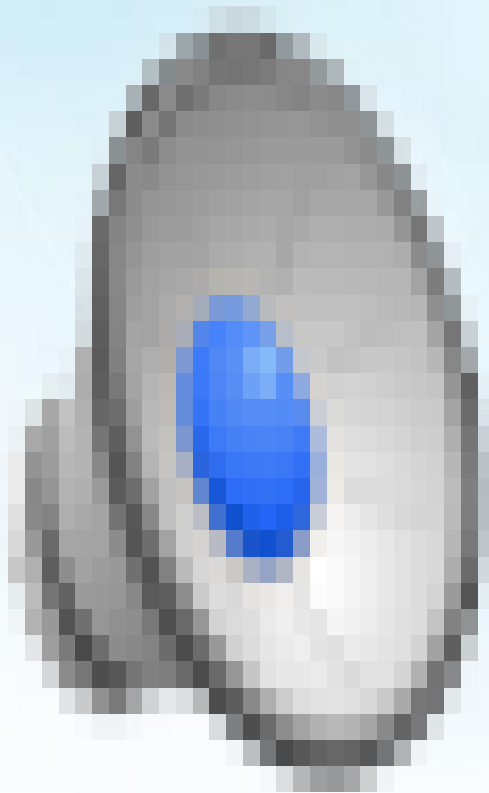
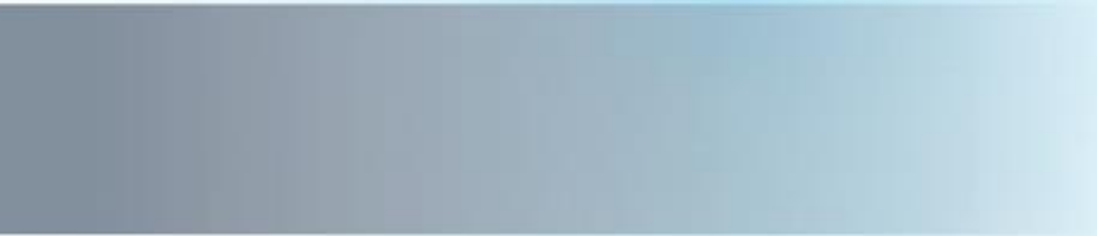


National Collaborative Networks



South Africa and the Centre for the Fourth Industrial Revolution Network

for Global Technology Governance



C4IR Network: A Platform for Global Technology Governance



- **A space for global cooperation**
- The Network is dedicated to co-designing policy frameworks and governance protocols – including laws, regulations, norms and best practices – that accelerate the application of science and technology in the global public interest.
- **A “do-tank”**
- Partner governments and companies will co-design and pilot these frameworks and protocols for rapid iteration and scale. The Centre for the Fourth Industrial Revolution Network is not a think-tank, but rather a “do-tank”.
- **A champion for ethics and values in technology**
- All policy principles, frameworks and regulations developed by the Network will prioritize ethics and values.

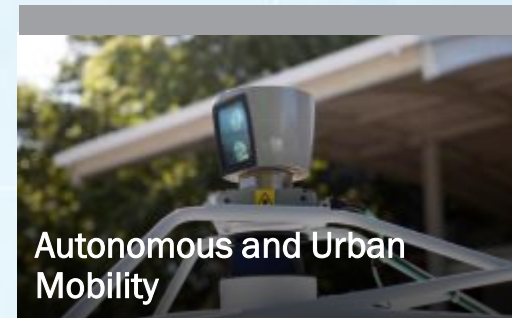
Platforms of Emerging Technologies



Artificial Intelligence and Machine Learning



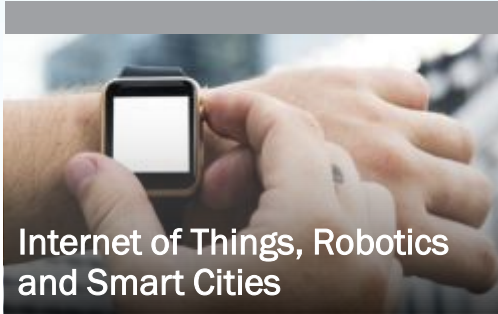
Data Policy



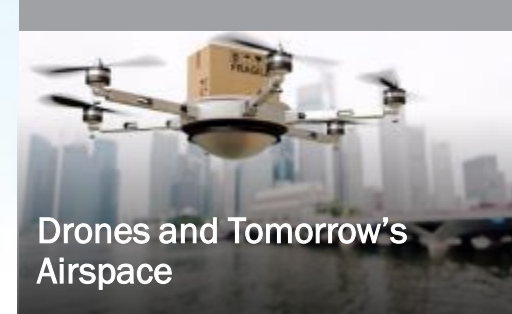
Autonomous and Urban Mobility



Blockchain and Distributed Ledger Technology



Internet of Things, Robotics and Smart Cities



Drones and Tomorrow's Airspace

Emerging Priority Areas



Artificial Intelligence

- Enhancing (government) service delivery

Blockchain

- Reserve Bank Digital Currency
- Digital Identity

4IR for the Earth



Future of Drones and Tomorrow's Airspace

Precision Medicine

- Health data exchange
- African Genome

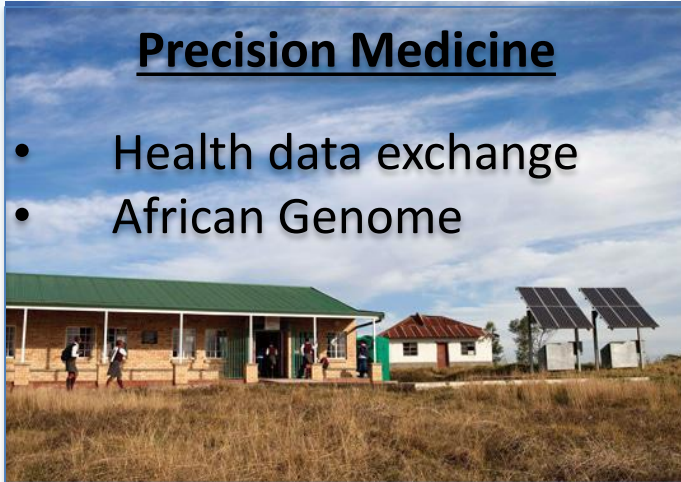
Internet of Things

- Real Time Information Systems in mining
- Smart Cities
- Smart Factories

Future of Autonomous and Urban Mobility



Precision Medicine





THANK YOU!

dvisser@csir.co.za