Global Trends, Challenges & Opportunities

National STI Foresight for South Africa

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Global Trends

Growing up: global demand for products and services

Getting scarce: water, food, energy, natural resources

Gaining value: scarce resources become more costly as they are finite and shared

Giving rise to: sustainability and security concerns problems with potential social, economic and political conflicts

Going technological: Advancements in STI and increasing public and private R&D are providing opportunities for addressing global challenges
Demographic change

From 7.4 billion in 2015, the global population will reach 8.5 billion by 2030 and 9.7 billion by 2050

By 2050, over a quarter of the world will live in Africa

Africa’s population will more than double by 2050 and account for more than half the global population increase

Regional % change, 2015-50:
- Africa: +109%
- Oceania: +46%
- Latin America: +23%
- North America: +21%
- Asia: +20%
- Europe: -4%
Use of water-food-land resources

52% of agricultural land is already affected by moderate to severe degradation.

+60% food to feed 9.7 billion people by 2050.

+55% water demand by 2050.

GLOBAL DEMAND

+37% increase in global energy demand by 2040.

Economic growth in non-OECD will drive further increases in global energy consumption. Asia will account for around 60% of the total increase.
Shift of the gravity of world economy

Percentage of world GDP, 2005 USD: 2000, 2015 and 2030

By 2030, emerging economies are expected to contribute 2/3 of global growth and will be the main destinations of world trade.
Progress towards renewables

Energy supply mix (% of electricity generation)

2013
- Nuclear
- Renewables 22%
- FOSSIL

2040
- Nuclear
- Renewables 33.5%
- Hydro 15%
- Wind 9%
- Coal 30%
- Gas 23%
- Solar PV 4%
- Other 1.5%
- FOSSIL
- Oil 1.5%
Social change

More urbanised
% of the world population living in urban areas

- 36% in 1970
- 50% in 2009
- 70% in 2050

More educated
The number of students enrolled in higher education will double globally by 2025 to 260 million.

Obesity on the rise
Adult obesity, 2014
Child obesity, 2014

- Overweight: 39%
- Obese: 13%

41 million children under the age of 5 were overweight or obese in 2014.

Rise in annual supply of industrial robots

- 70 in 2002
- 230 in 2014
- 400 in 2018

An explosion in the number of things connected

- 10 in 2014
- 30 in 2020
- >100 in 2050

OECD STI Outlook 2016
Global Risks (WEF): Unique & common challenges

Risk category:
- Economic
- Environmental
- Geopolitical
- Societal
- Technological
A set of ambitious goals: Need for systems thinking
Linking challenges and technologies

- Wealth & Inequality
- Health & Well-Being
- Access to Knowledge
- Societal Change
- Synthetic Biology
- Internet of Things
- Demographics
- International migration
- Urbanisation
- Micro and Nano Satellites
- Artificial Intelligence
- Blockchain
- Globalisation
- Roles of States
- Localisation
- Global Power Shifts
- Additive Manufacturing
- Advanced Energy Storage Technologies
- Nanomaterials
- Technological Change
- Economy, Productivity
- Jobs
- Financialisation

Big Data Analytics

Water, Energy, Food & Climate
The 4th Industrial Revolution & Human x Technology Convergence

Improved reach
Improved value
- consumer lifestyle
Improved process efficiency
Improved human efficiency

Networked industries
Networked consumer electronics
Networked everything
Networked society

First wave
Second wave
Third wave

https://iotomorrow.wordpress.com/origin-definition/
Second mission of Foresight: Analyzing wider impacts of change

1st Industrial revolution

Revolutions in machinery, manufacturing & transportation → Slum days, many suffered ill health due to starvation in Victorian Britain, such as these London children in 1860...

2nd

Enormous expansion of rail and telegraph lines, unprecedented movement of people and ideas, a new wave of globalization → and destruction...

3rd

Increased access to goods and services → stress on natural resources, demographic change & the emergence of megacities...
The 4th Industrial Revolution: Some consequences – A day in futurama