

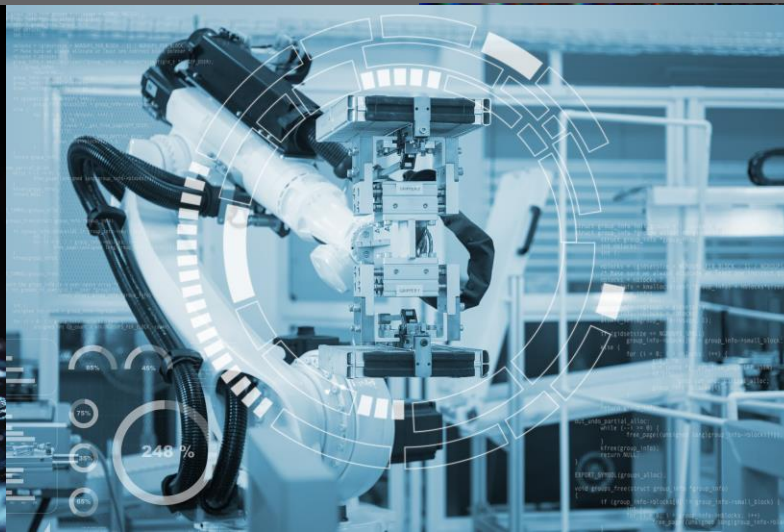
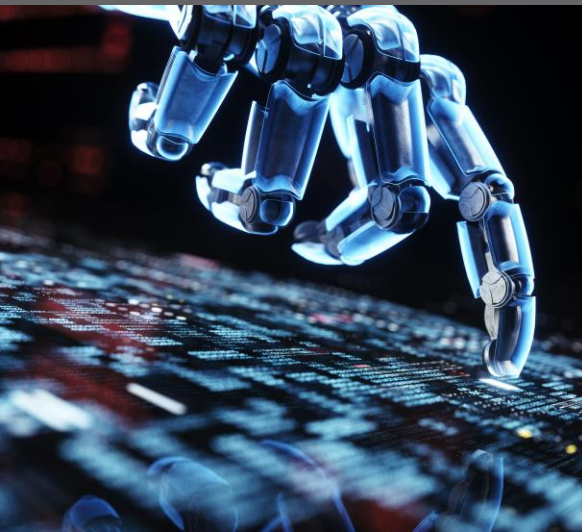
# Cornerstone

Learn to change the world

## Towards Industry 6.0 and related Critical capabilities

24 October 2024

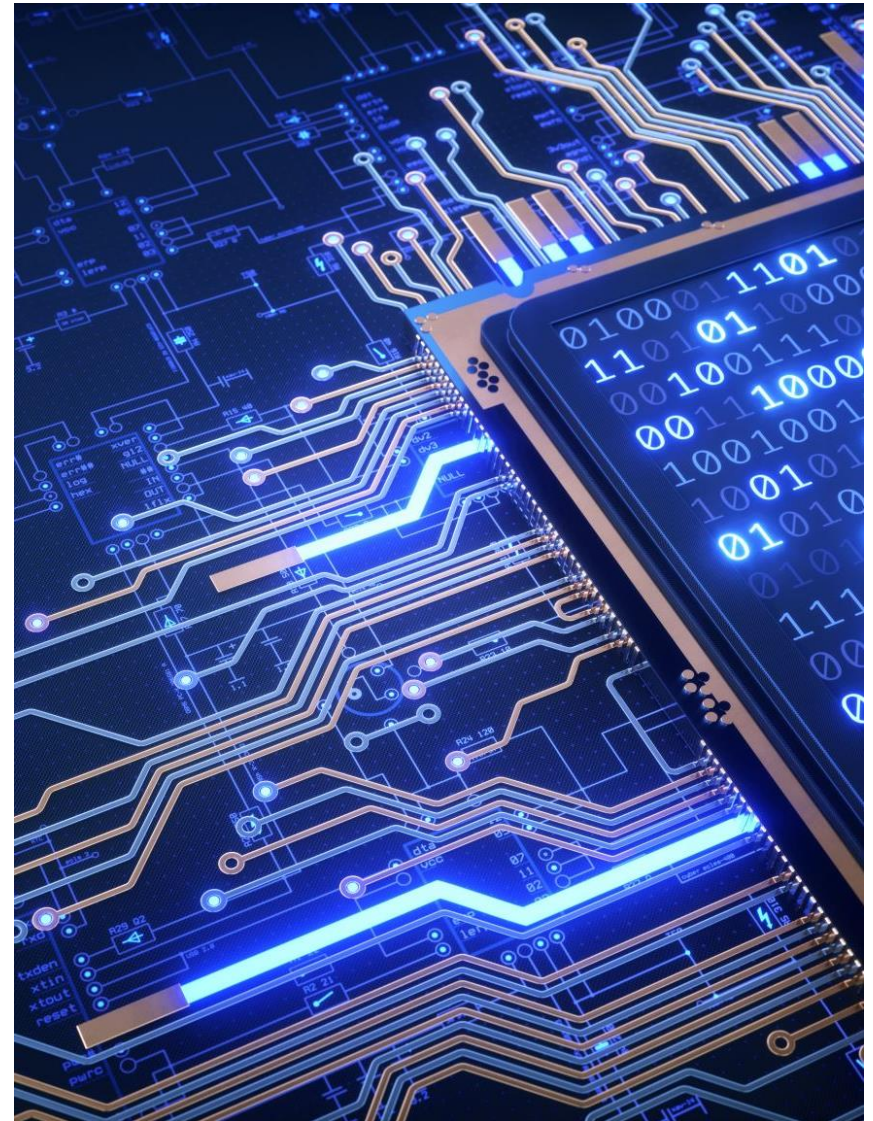
By Sharon Brand and Geoff Schreiner



# Towards Industry 6.0 and related Critical capabilities

## Agenda

- Journey to Industry 6.0
- Technologies
- Skills and capabilities



# Journey to Industrial Revolution 4.0



## Ind 4.0: Automation and Digitisation

- IoT, Big data, electric vehicles, 3D printing, cloud computing, AI, cyber-physical systems



## Ind 3.0: Rise of Automation

- Information, analogue to digital, integral to modular



## Ind 2.0: Era of Mass Production

- Electricity, electronics, mechanical devices, cars



## Ind 1.0: Birth of Industrial Revolution

- Mechanised production, coal and steam power (steam engines)

Late 1700 to mid-1800s

End 1800s to 1980

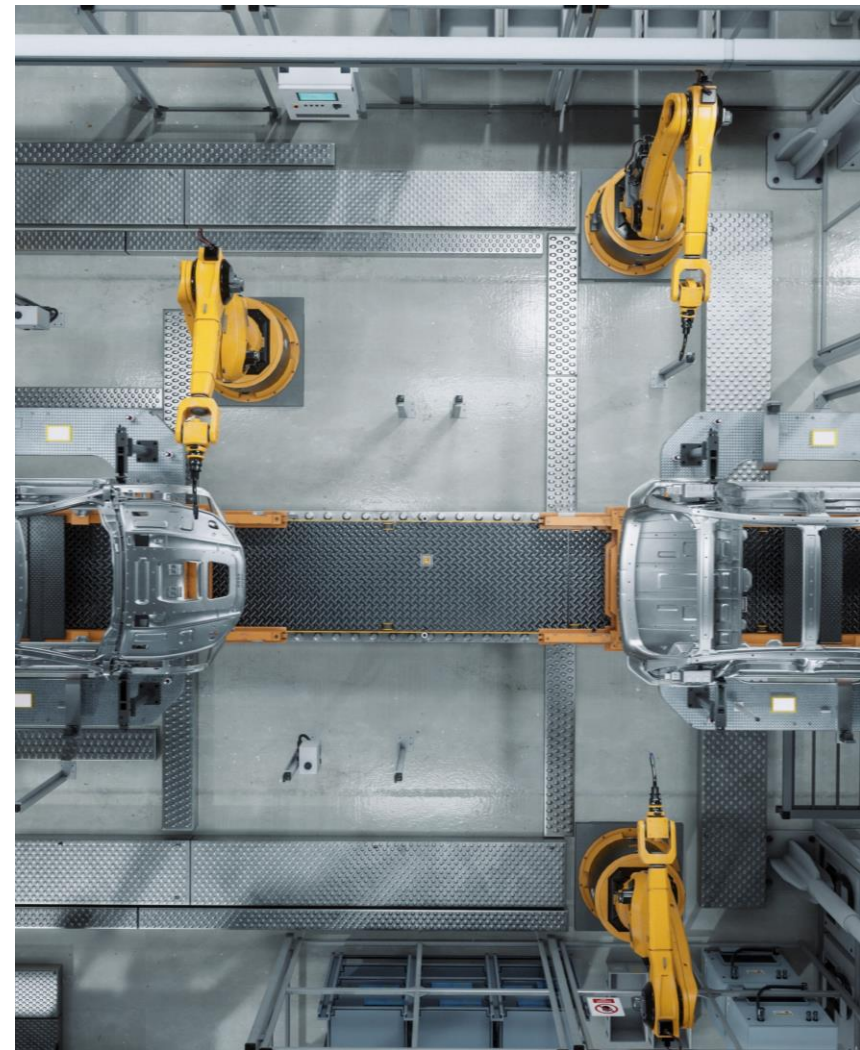
1980s to 1990s

1990s to 2020s

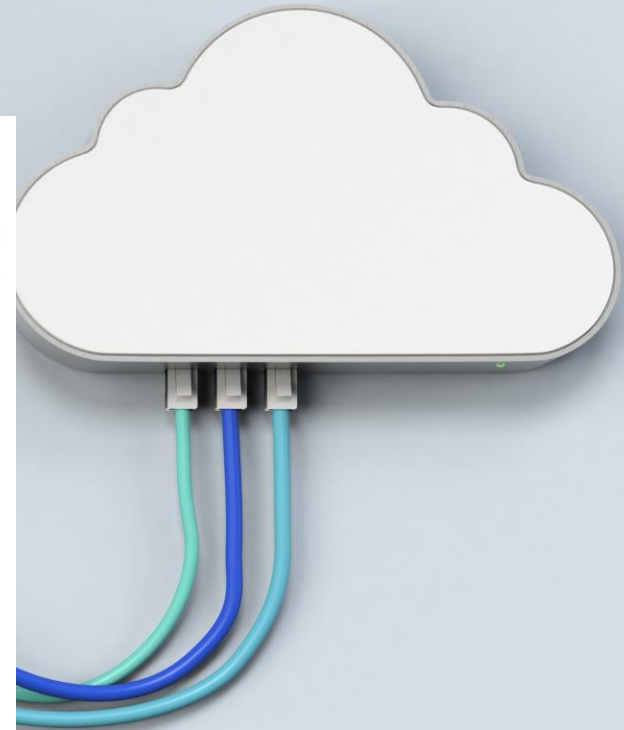
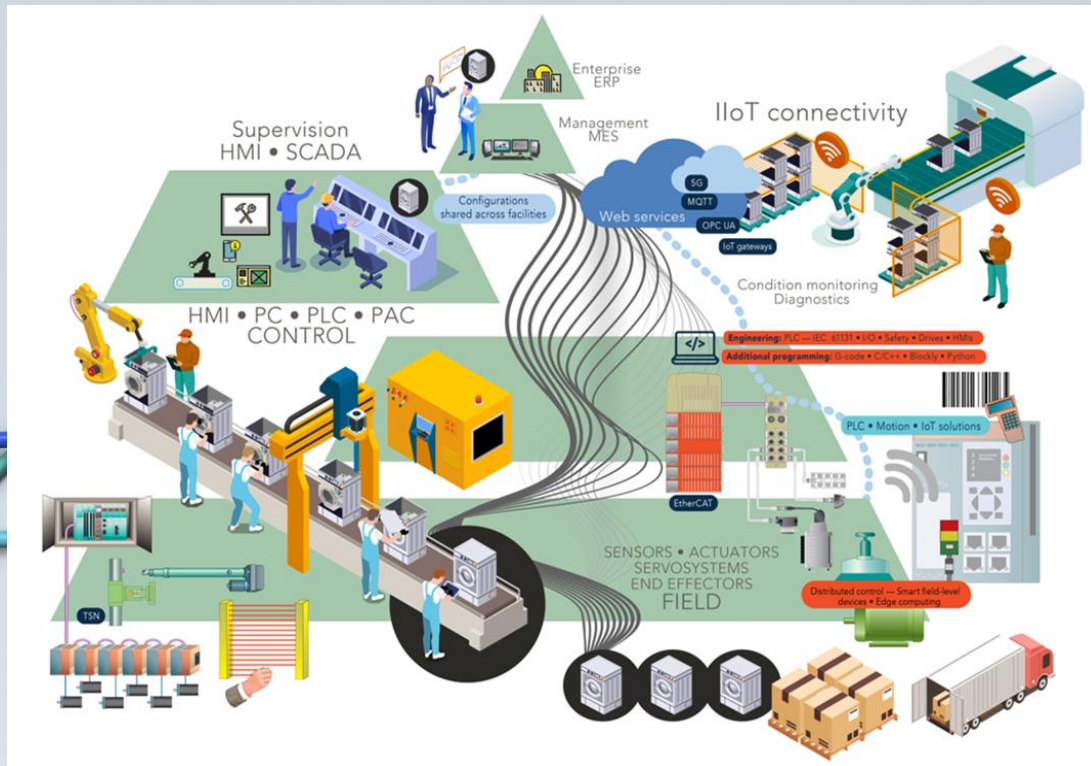
# Industry 4.0 – Automation and Digitisation

- Cloud and IIoT
- Interconnected systems
- Sensors
- Real-time data analytics
- Automation and robotics
- Artificial intelligence
- Human-machine collaboration
- Cybersecurity

*Smart factories utilise cutting-edge technologies and interconnected systems to optimise and automate production processes*



# Cloud & IIoT



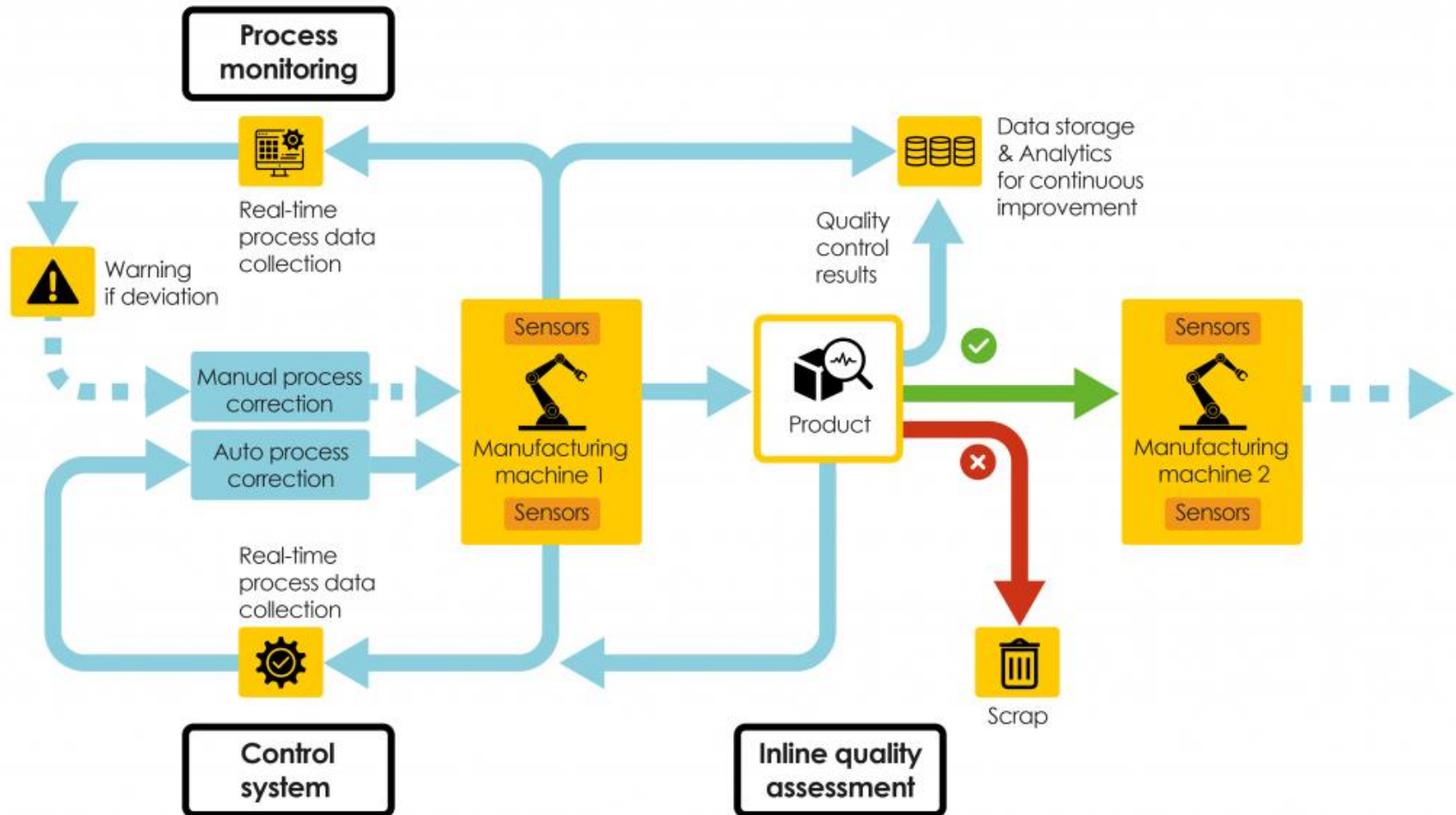
# Integration and Connectivity

Connecting:

- Manufacturing equipment and processes, e.g., sensors, controllers and control displays
- Supply chain functions
- Enterprise-wide systems
- Suppliers and customers



# Sensors for Process Monitoring and Control



# Robotic Process Automation and Additive Manufacturing



# Augmented Reality, Virtual Reality and Digital twins

*Facilitates analysing, testing, training and learning*

AR

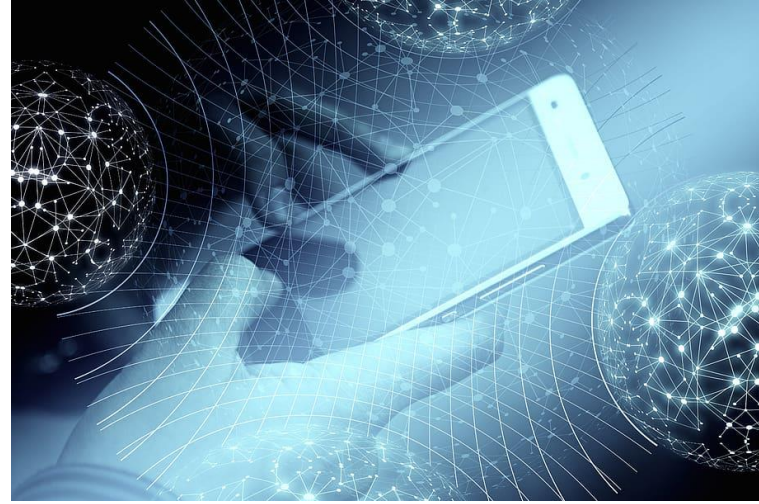
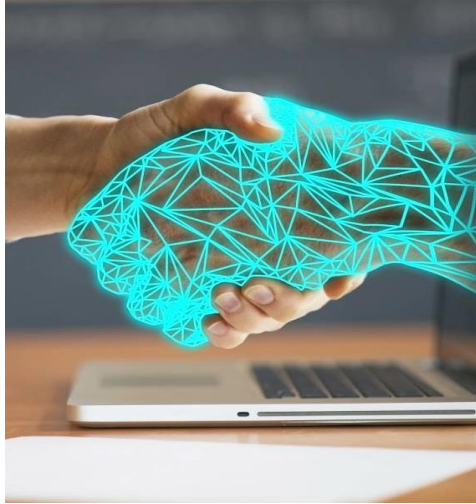


VR



Digital twin

# Data Management, Analytics, Governance and Cybersecurity



# Path to Ind. 6.0



## Ind 4.0: Automation and Digitisation

- IoT, Big data, electric vehicles, 3D printing, cloud computing, AI, cyber-physical systems

## Ind 5.0: Human-centric Revolution

- Collaboration, customer-centricity, customisation, decentralisation

## Ind 6.0: Era of Ecosystems and Sustainability

- Quantum computing, nanotechnology, biotechnology, circular economy

1990s to 2020s

Late 2020s to 2030s

2030s and beyond

# Industry 5.0: The Human-Centric Revolution

Integral to operational strategies

- human-machine collaboration
- personalized production
- customer-centricity
- recognizes irreplaceable role of human intelligence, creativity & intuition
- metaverses, human digital twins, extended machine vision



# Industry 6.0: Era of Ecosystems and Sustainability



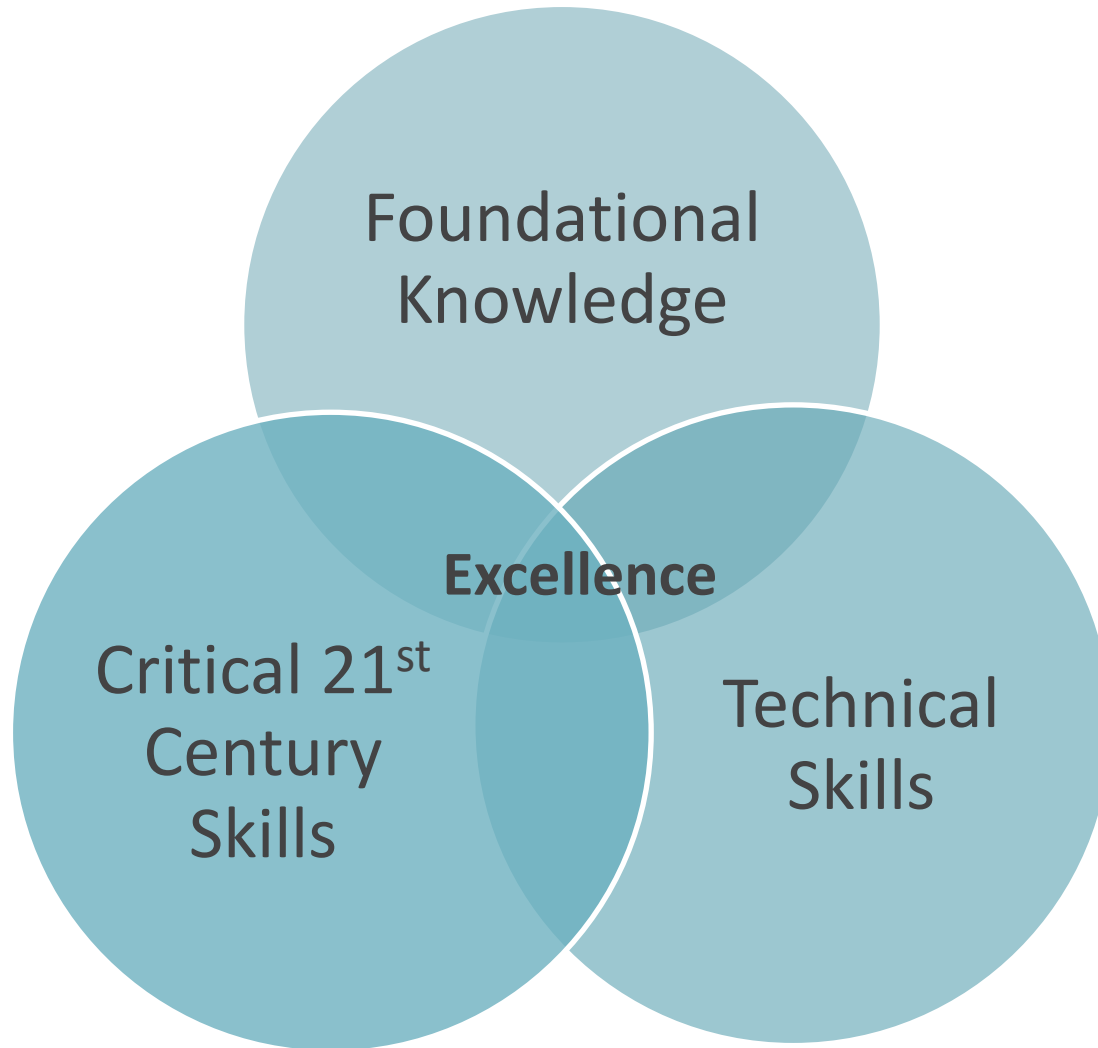
Advanced technologies:

- Quantum computing
- Nanotechnology
- Multidimensional printing
- Biotechnology & Robo-medics
- Assistive home-robotics
- Deep dive electroencephalograms
- Aerial manufacturing platforms & interplanetary resource gathering

# Key actions that humans need to perform in Industry 4.0 and beyond



# Knowledge and Skills Framework



# Critical 21st Century Skills

- Digital literacy
- Data analysis and interpretation
- Programming and coding
- Adaptability and continuous learning
- Collaboration, communication and cultural competence
- Critical thinking and problem-solving
- Creativity and innovation



# Research we carried out at CI

- Research period 2022/3
- 40 companies – public and private
- Interview format



## Key findings:

- Over 50% of respondents were currently not satisfied with graduate recruits
- Key gaps were technical skills especially for manufacturing, digital, business systems, work orientation and problem solving

# Closing the Gap

- Assessments are work focused problems which require resolution
- Group work in all modules
- Use of AI required in some assessments
- Work Integrated Learning projects for final year BCom
- Partnership with Wadhvani Foundation (entrepreneurs)
- Internships
- Course Customisation – Beier Group case study
- Ongoing interactions with employer and industry groups like SAPICs



We would value being in touch with you

You can reach us on LinkedIn or through the Business Studies portal on the Cornerstone Institute website  
[www.cornerstone.ac.za](http://www.cornerstone.ac.za)