THE FUTURE IN NUMBERS

**Built Environment**

By 2022, 50% of people involved in Industry 4.0 collaborations will use virtual assistants or intelligent agents.¹

**Manufacturing**

By 2022,

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of people involved in Industry 4.0 collaborations will use virtual assistants or intelligent agents.¹

**Essential Domestic Services**

**Personalised healthcare**

is becoming a reality with advances in diagnostics, microbiomics, wearables and IoT.⁴

**Professional Services**

By 2022,

40%

of customer-facing employees will consult an AI-powered virtual agent daily to make decisions or seek support.⁵

**Trade and Connectivity**

**Autonomous Vehicles**

will be as transformative as the smartphone, reshaping cities and the way people live, work and play.³

**Lifestyle**

**56% more food** needs to be produced by 2050.

Reducing food loss and waste by 25% globally can reduce this gap by 12%.⁶

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Sources:

ALIGNMENT TO INDUSTRY TRANSFORMATION

At the College of Engineering (CoE), Nanyang Technological University (NTU Singapore), we focus strongly on translating knowledge into real-world innovations and future-ready solutions. The table below classifies the capabilities of some of our key centres/programmes according to the six clusters and 23 industries that the Future Economy Council (FEC) of Singapore has identified as poised for industry transformation. We believe we can be your strategic partner in capability building, innovation and talent development, to enable you to ride on the waves of industry transformation and emerge a winner!

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We gratefully acknowledge the funding support of all our industry partners and funding agencies.
1. Alibaba-NTU Singapore Joint Research Institute
Alibaba-NTU Singapore Joint Research Institute pursues cutting-edge research in Humanised AI to address areas of significant opportunities in today’s rapidly changing societal and technological landscape, such as smart health, new lifestyles and liveable city.

2. Rolls-Royce@NTU Corporate Laboratory
Rolls-Royce@NTU Corporate Laboratory focuses on fundamental technology research projects driven by Rolls-Royce’s industrial and technology strategy across:
- Electrical Capability
- Computational Engineering (Data Analytics and AI)
- Manufacturing Technology
- Materials and Repair Technology
- Internet-of-Things

3. Delta-NTU Corporate Laboratory for Cyber-Physical Systems
Delta-NTU Corporate Laboratory for Cyber-Physical Systems works on developing cyber-physical systems, ranging from industrial internet-of-things, sensing and connectivity, and intelligence and robotics for:
- Smart Manufacturing
- Smart Learning
- Smart Living
- Smart Commercialisation

4. Singtel Cognitive and Artificial Intelligence Lab for Enterprises (SCALE@NTU)
Established to support Singapore’s transformation into a Smart Nation and enable its digital economy, SCALE@NTU focuses on the R&D of AI, data analytics, robotics and smart computing, with the goal of developing applications in:
- Public Safety
- Smart Urban Solutions
- Transportation
- Healthcare
- Manufacturing

5. HP-NTU Digital Manufacturing Corporate Lab
HP-NTU Digital Manufacturing Corporate Lab focuses on digital manufacturing technologies for the 4th Industrial Revolution, specifically in the areas of advancing 3D printing, AI, machine learning, new materials and applications, cybersecurity and customisation.

6. Singapore Centre for 3D Printing (SC3DP)
SC3DP drives research in 3D printing with a focus on six key research areas:
- Future of Manufacturing
- Aerospace and Defence
- Building and Construction
- Marine and Offshore
- Biomedical and Food
- Electronics
7. **Robotics Research Centre (RRC)**
RRC develops cutting-edge solutions for:
- Industrial and infrastructure robots that can work alongside human workers, rather than in ring-fenced environments, for the automation of low-volume, high-mix tasks and
- Human-centric robots that can be utilised in close proximity to humans or even within a human body.

8. **Nanyang Environment and Water Research Institute (NEWRI)**
Ranked as the world's ninth top-ranking water research organisation, NEWRI was set up to address Singapore's national water and environment priorities. It comprises five centres of excellence:
- Environmental Process Modelling Centre (EPMC)
- Singapore Membrane Technology Centre (SMTC)
- Residues and Resource Reclamation Centre (R3C)
- Advanced Environmental Biotechnology Centre (AEBC)
- Environmental Chemistry and Materials Centre (ECMC)

9. **The Photonics Institute (TPI)**
TPI harnesses the strengths of NTU and the Optoelectronics Research Centre of the University of Southampton to spearhead the development of cutting-edge light-enabled technologies and translate them into wide-ranging applications in communications, healthcare, manufacturing and more.

10. **Innovative Centre for Flexible Devices (iFLEX)**
Formed in partnership with Stanford University, iFLEX develops next-generation flexible electronic devices for applications in soft robotics and biomedical devices that meet today's lifestyle needs.

11. **Advanced Manufacturing and Engineering Centre (AMEC)**
AMEC seeks to engage the manufacturing industry for collaborations in next-generation manufacturing capabilities through the matching of funds and preparatory grants.

12. **Air Traffic Management Research Institute (ATMRI)**
Jointly established with the Civil Aviation Authority of Singapore, ATMRI is the first institute dedicated to research and development in air transportation. The institute seeks to transform air traffic management through digital technologies.

13. **Maritime Energy and Sustainable Development Centre of Excellence (MESD)**
NTU and the Singapore Maritime Institute unite their expertise in MESD, which works to strengthen Singapore as a global maritime knowledge and innovation hub through its focus on future port and shipping applications.
14. Centre of Excellence for Testing and Research of AVs (CETRAN)
CETRAN works with the Land Transport Authority and the Singapore Traffic Police to develop technical standards and test procedures for future deployment of autonomous vehicles on public roads. Its research work encompasses both virtual and physical testing and covers behaviour, safety, vehicle communications and cybersecurity.

15. Transport Research Centre (TRC)
Supported by the Land Transport Authority of Singapore, TRC conducts mobility research to advance Singapore’s land transport system in areas such as:

- Active Mobility
- Electromobility
- Geotechnical and Tunnelling Engineering
- Condition-based Maintenance

16. Data Science and Artificial Intelligence Research Centre @ NTU (DSAIR)
DSAIR combines NTU’s deep expertise in AI and machine learning with big data analytics to pioneer new technologies with commercial or societal impact. The centre also supports Singapore’s Smart Nation efforts.

17. Joint NTU-UBC Research Centre of Excellence in Active Living for the Elderly (LILY)
Jointly founded by NTU and the University of British Columbia (UBC), LILY is Singapore’s first research centre to focus on empowering successful aging through technology. By leveraging on AI, IoT and big data analytics, LILY has developed a series of platform technologies that extend high-quality healthcare service from hospitals to homes. These technologies encourage inter-generational communication and empower seniors to lead active, independent and dignified lives.

18. Cyber Security Research Centre @ NTU (CYSREN)
CYSREN was established to spearhead NTU’s multi-disciplinary research work in cybersecurity. It also serves to represent NTU’s cybersecurity and delves into the following research areas:

- Security and Trustworthiness of Embedded Systems
- Cyber-threat Detection and Attack Attribution
- Cyber and Cyber-enabled Crime and Forensics
- Holistic Approach to Cybersecurity

19. F&N-NTU F&B Innovation Lab
A collaboration between F&N and the NTU Food Science and Technology Programme, the F&N-NTU F&B Innovation Lab translates NTU’s food technology innovations into industry applications for fast-moving consumer goods. The centre conducts research on:

- Developing Healthier F&B Products
- Biodegradable Packaging Solutions
- Conversion of Food Processing By-products into Valuable Resources
20. **Strategic Research Programme of Virtual Reality and Soft Computing**

The Strategic Research Programme of Virtual Reality and Soft Computing carries out research on how virtual reality and augmented reality can be applied in manufacturing, construction, healthcare and education. It conducts research on:

- Fidelity Modelling and Simulations
- Immersive and Realistic Visualisation
- Real-time Interactions
- Natural User Interface
- Serious Games

21. **Nanomaterials for Energy and Water Management (NEW) Programme**

Jointly set up with the Hebrew University of Jerusalem, the NEW Programme seeks to develop novel materials and devices for:

- Printable Energy Materials, Processes and Devices
- Energy Modulation and Storage Systems for Buildings
- Advanced Materials and Processes for Water-efficient Energy Systems or Energy-efficient Water Systems

22. **Construction Industry 4.0**

The Construction Industry 4.0 Initiative seeks to improve the productivity of Singapore’s logistics processes and precast construction works by carrying out research on:

- Integrated Digital Delivery
- Design for Manufacture and Assembly
- AI
- Automation

23. **NTU-NXP Smart Mobility Consortium**

The NTU-NXP Smart Mobility Consortium was set up to serve as a common facility for the development and testing of next-generation transportation innovations that would enhance commuter safety and transportation services.

24. **Blockchain Initiative**

The Blockchain Initiative is an inter-collegiate initiative that integrates cross-domain blockchain expertise within NTU. In addition to addressing the pressing issues of blockchain today such as scalability, security and privacy, the initiative actively engages with industry to research and test-bed projects for real-world use cases.