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Industry 5.0 - The Future of Manufacturing

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Where we come from

- **Industrie 4.0**
 - Created by German Acatech 2013, deployed ~2014
 - Dual Strategy – Provide and Apply (Technology & Market Development)
- **World Economic Forum – Future of Jobs**
 - The Future of Jobs Report, October 2020
- **AUS Modern Manufacturing Initiative**
 - 6 National Manufacturing Priorities



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Jack Ma on Smart Machines

"We cannot teach our kids to compete with the machines who are smarter – we have to teach our kids something unique. In this way, 30 years later, kids will have a chance."



Source:
www.weforum.org/agenda/2018/01/jack-ma-davos-top-quotes/



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Major Disruptions in Australia

“Never let a good crisis go to waste.” *

3 Cs - Three major Disruptions for Australia:

- ***China***
- ***COVID-19***
- ***Climate Change***

Strategic Re-Thinking of Manufacturing in Australia

* Winston Churchill



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Industry 5.0 in Europe

- **Human – centric:**
People as Success Factor
- **Sustainable:**
Eco-Eco-Soc and Climate Smart
- **Resilient:**
Robustness vs absolute Efficiency



Sources & picture sources:
ec.europa.eu/info/research-and-innovation/research-area/industrial-research-and-innovation/industry-50_en & festo.com

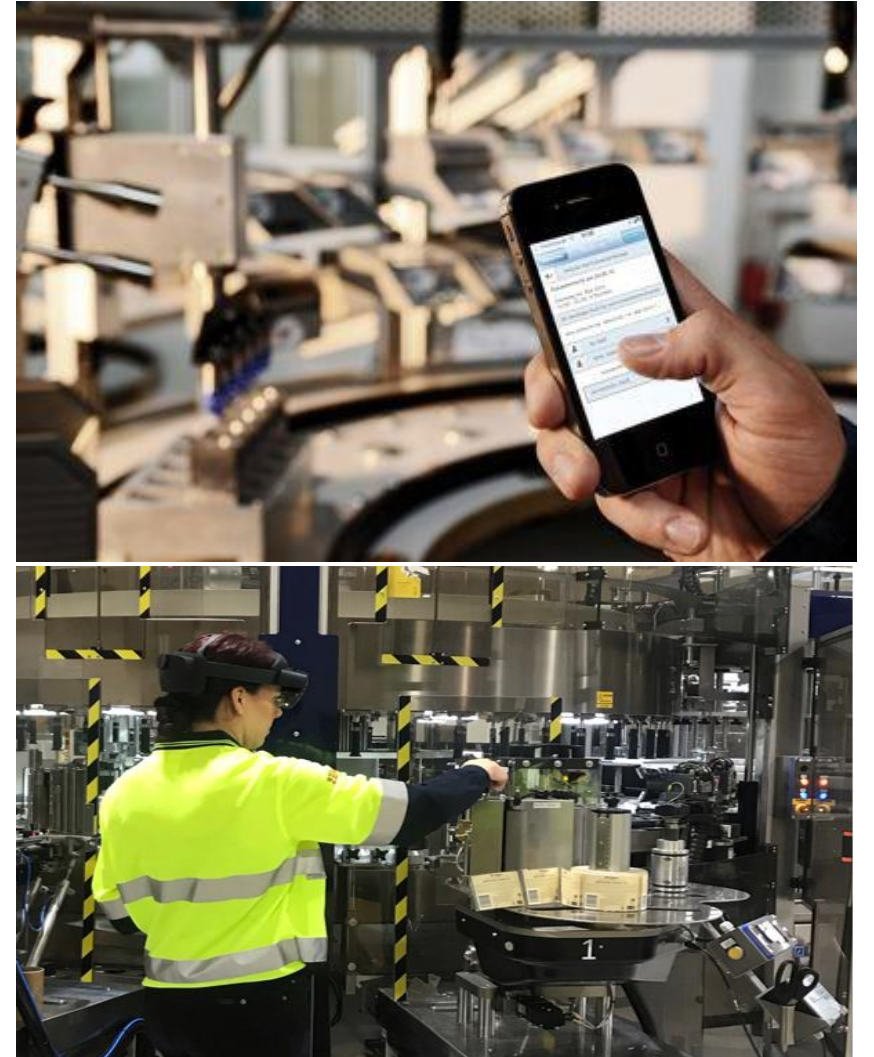


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Human-centric

- People are the Success Factor in Modern Advanced Manufacturing
- Industry 4.0: Smart and Connected Sensors and Actors on the Shop Floor
- Technology is available, Skilled People are the Bottleneck



Picture Source: Fraunhofer IAO, UniSA



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Sustainability

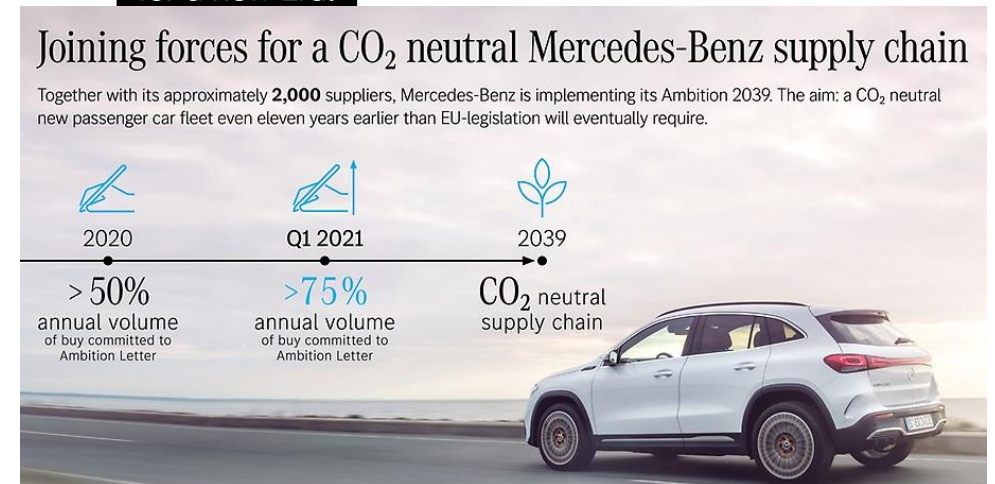


- Ecological – Economical – Social
- Climate Smart
- Transparent & Ethical Business and Supply Chains
- EU Vision of 100% Circular Economy

Sustainable & Climate Smart Manufacturing

Example Daimler's “*SpurWechsel*”:

- **Climate rating by the non-profit organization CDP**
“We use this to create transparency about the carbon footprint of suppliers. Only if we know the environmental impact of our supply chain can we enter into targeted dialog with our suppliers and take measures to reduce greenhouse gases
- **Self-assessment questionnaire of the technology service provider NQC**
“We ask our suppliers to provide us with information about the ecological, social and ethical aspects of their business dealings. To this end, we provide suppliers with self-assessment questionnaires via the NQC platform.”



Resilience

- Robust Business Strategies and Business Models
- Sovereign Manufacturing Capabilities and resilient Supply Chains
- Lean, Efficient and Digital are important – Robustification is necessary
- Critical Skills, Resources and Technologies

Picture Source: DISER, Gartner

Six strategies for supply chain resilience



gartner.com/SmarterWithGartner

Source: Gartner
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Gartner.



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I 5.0 – Enabling Technologies EU

- **Human-centric solutions and human-machine-interaction technologies** that interconnect and combine the strengths of humans and machines.
- **Bio-inspired technologies and smart materials** that allow materials with embedded sensors and enhanced features while being recyclable.
- **Real time based digital twins and simulation** to model entire systems.
- **Cyber safe data transmission, storage, and analysis technologies** that are able to handle data and system interoperability.
- **Artificial Intelligence** e.g. to detect causalities in complex, dynamic systems, leading to actionable intelligence.
- **Technologies for energy efficiency and trustworthy autonomy** as the above-named technologies will require large amounts of energy.



Source and pictures sources:
ec.europa.eu/info/research-and-innovation/research-area/industrial-research-and-innovation/industry-50_en ,
[fraunhofer.de](https://www.fraunhofer.de) ,
[unisa.edu.au](https://www.unisa.edu.au)



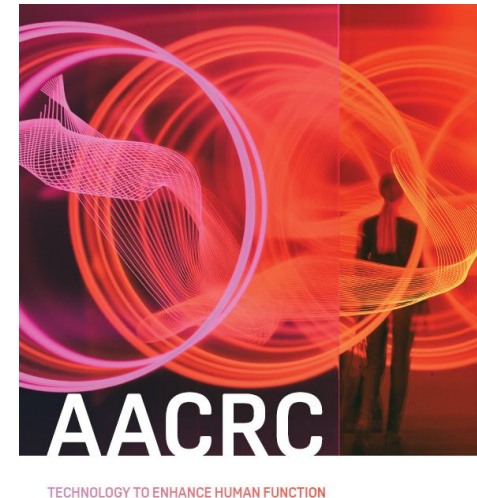
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I 5.0 – Enabling Technologies SA

- SA Hi-Tech Sector Plan 2030
- CRC for Intelligent Manufacturing
- Augmenting Abilities CRC
- Build Global Partnership



Industry Cases and Good Practice

*“The future is already here, it is not equally distributed.”**

- **Bosch** Connected Industries & Nexeed
- **Festo** Bionics & Learning Factories
- **REDARC** Energy & Vehicle Management
- **SAGE** Automation & Smart Manufacturing

- ...



* William Gibson



What's next?

“The best way to predict the future is to create it.”*

- **Implement Industry 4.0 or leap frog to Industry 5.0?**
 - Strategy, Change Plan and the Tools



Future **Work** Lab

- **SA Industry 4.0 Intelligent Manufacturing Initiative**



Government of South Australia
Department for Innovation and Skills



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- **Develop a South Australian Manufacturing Ecosystem**
- **Opportunities in (South) Australia: Industry 5.0 Technologies for Mining, Hydrogen, Agriculture, Defence, Health & Care**



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*Abraham Lincoln a/o
Peter Drucker
Pictures source:
futureworklab.de

Thank You

“When the wind of change blows, some people build walls, others build windmills.”

(Chinese Proverb)



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