

Industrie 4.0

Von der Effizienz zur Nachhaltigkeit

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Definitions (1)

Efficiency

- **Efficiency** is the (often measurable) ability to avoid wasting materials, energy, efforts, money, and time in doing something or in producing a desired result. In a more general sense, it is the ability to do things well, successfully, and without waste.

$$\text{Efficiency} = \text{Result} / \text{Effort}$$

Definitions (2)

Sustainability

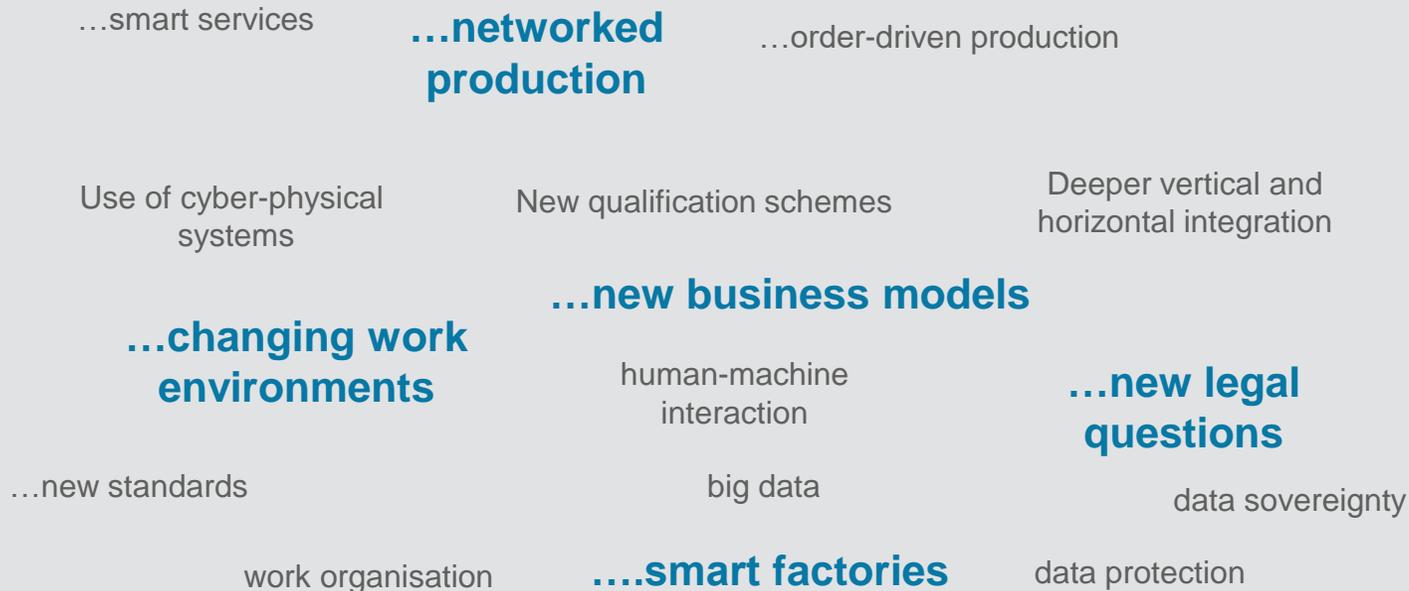
- Sustainability** is the process of maintaining change in a balanced environment, in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.



Definitions (3)

Industrie 4.0 - A changing industrial ecosystem

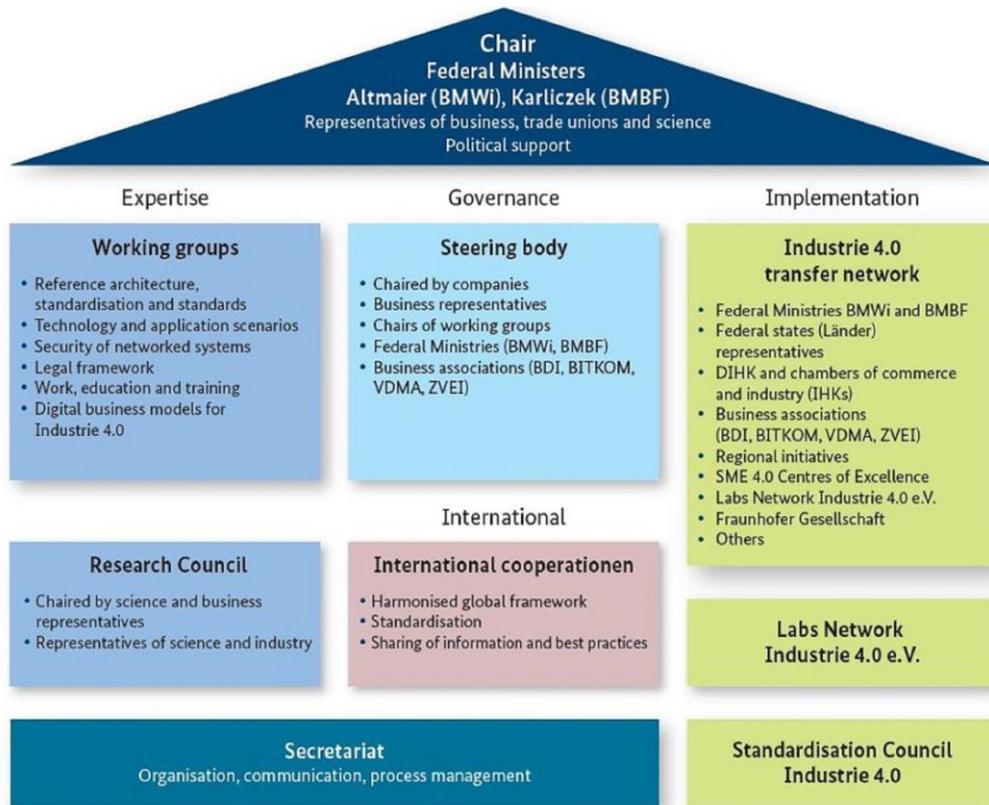
The 4th industrial revolution leads to ...



Grafik © Anna Salari, designed by freepik

Structure of the Plattform Industrie 4.0

Joining forces for Industrie 4.0



Source: BMWi, July 2018

Close alliance of ...

- Sciences
- Economy
- Politics
- Associations
- Unions

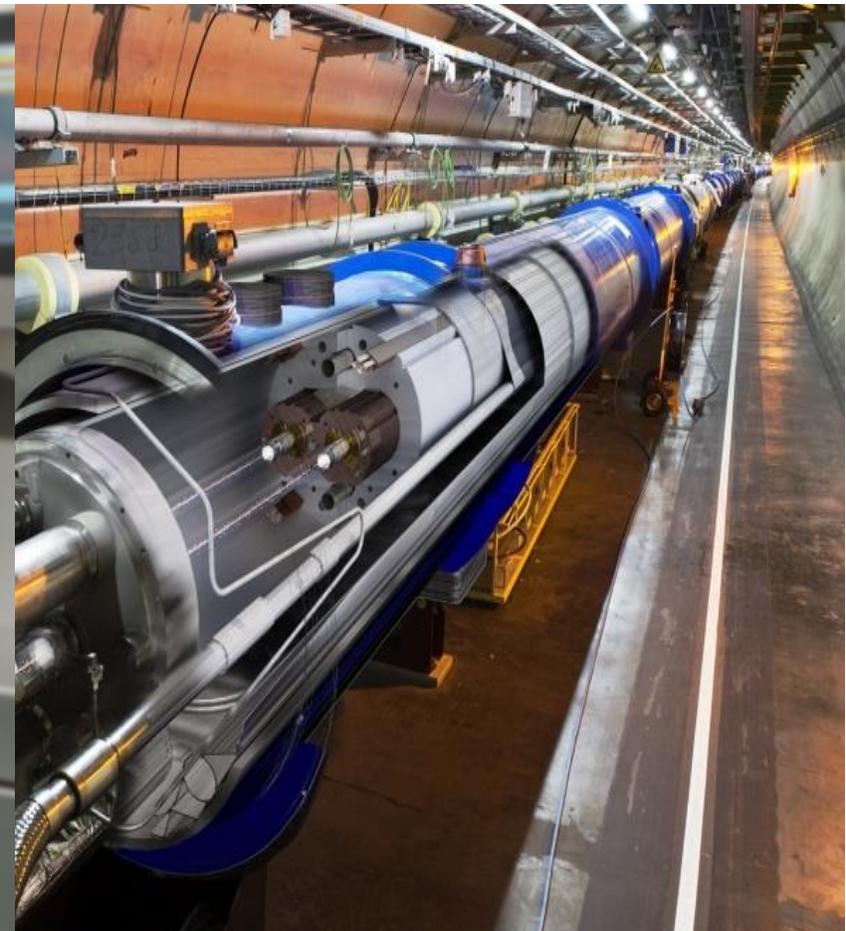
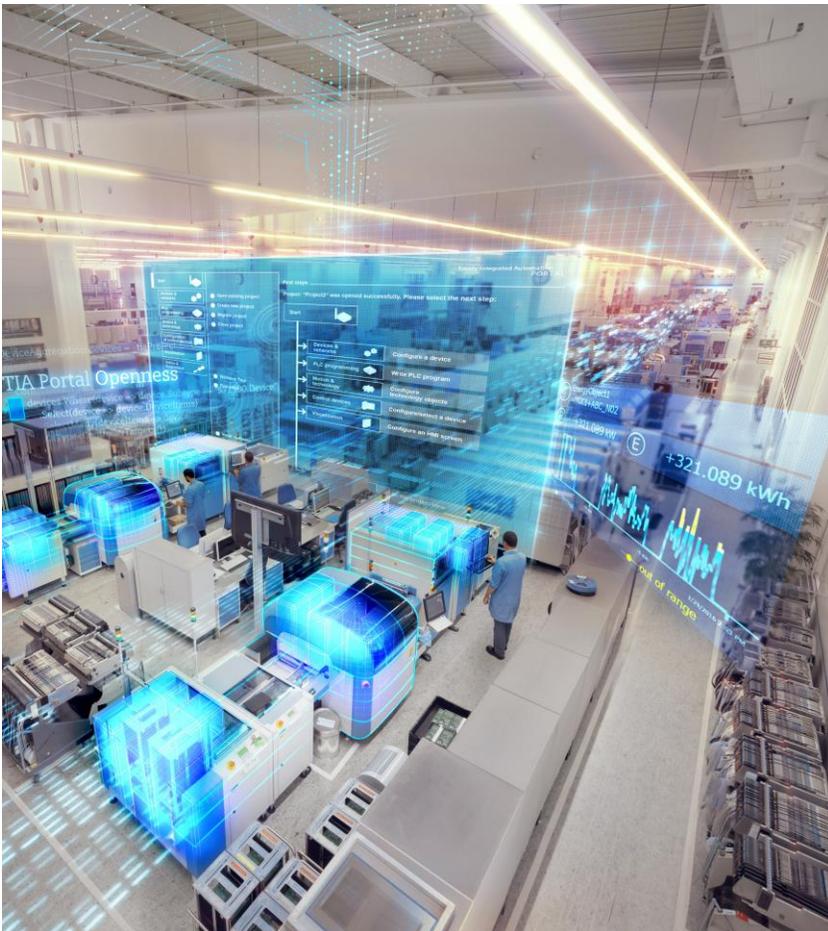
and working together for ...

- Reference architectures, standards, norms
- Technology and Application Scenarios
- Security of networked systems
- Legal Framework
- Work, education and training
- Digital Business Models

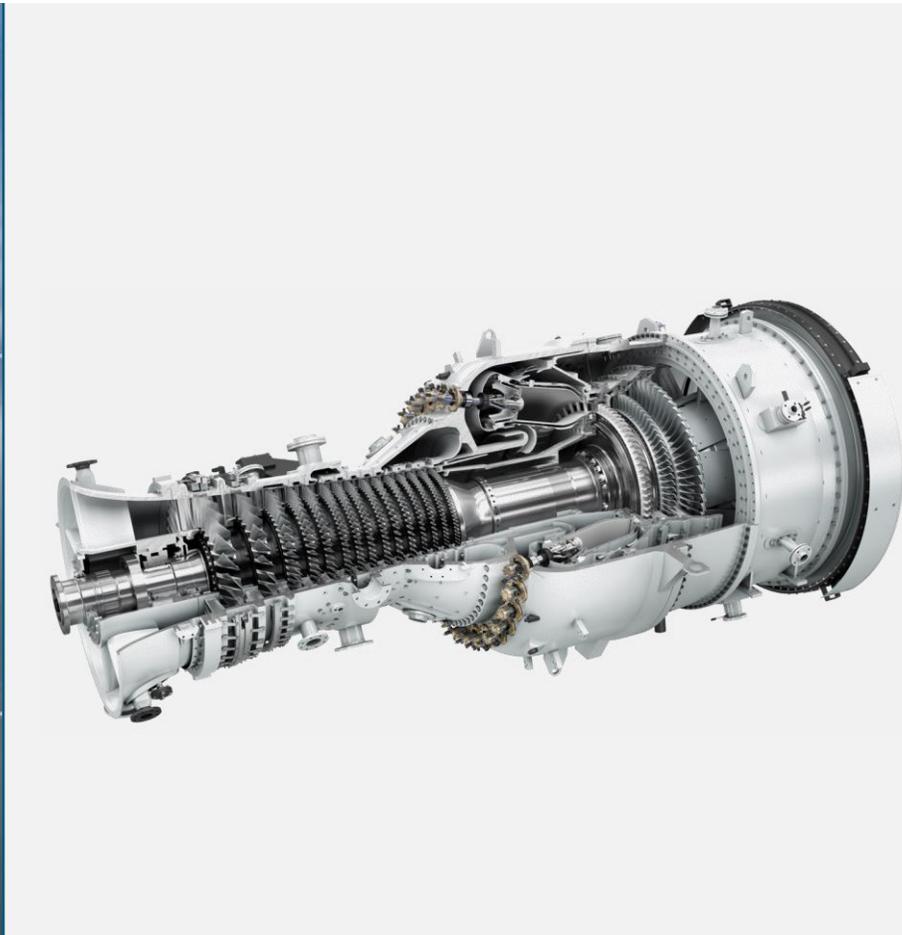


The **Plattform Industrie 4.0** – central hub of a digital ecosystem for the „digitalisation of industry“

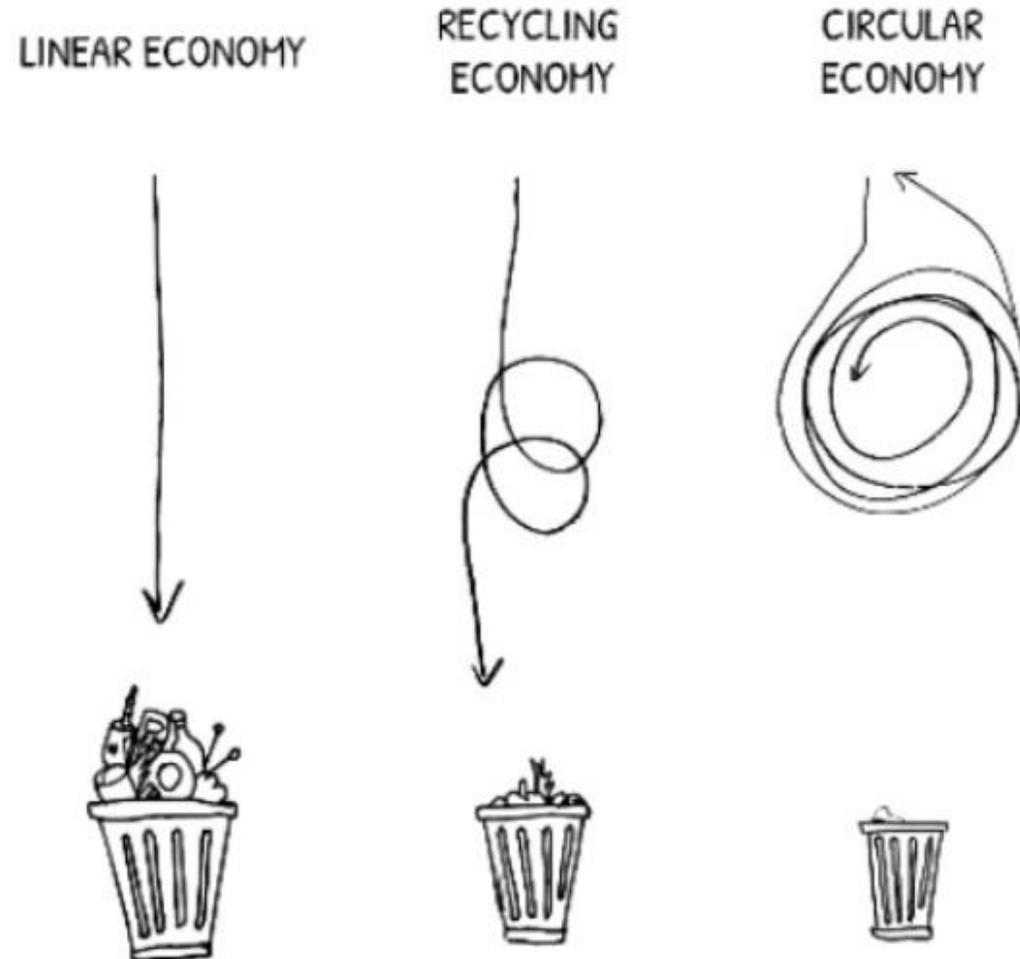
Our customers in manufacturing have essential requirements



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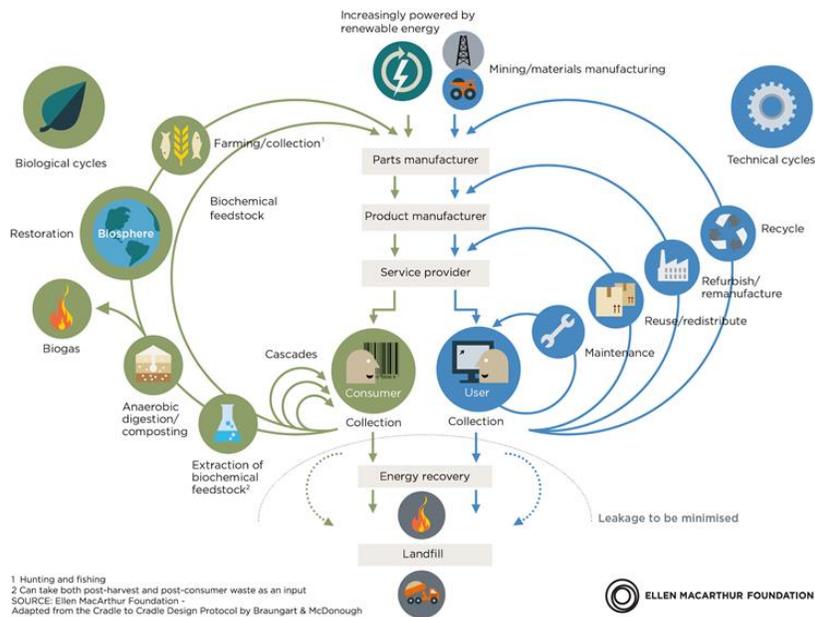
Linear Economy, recycling Economy to Circular Economy



Linear Economy of today needs to shift to Circular Economy

Shifts step by step and dependent on industry/market

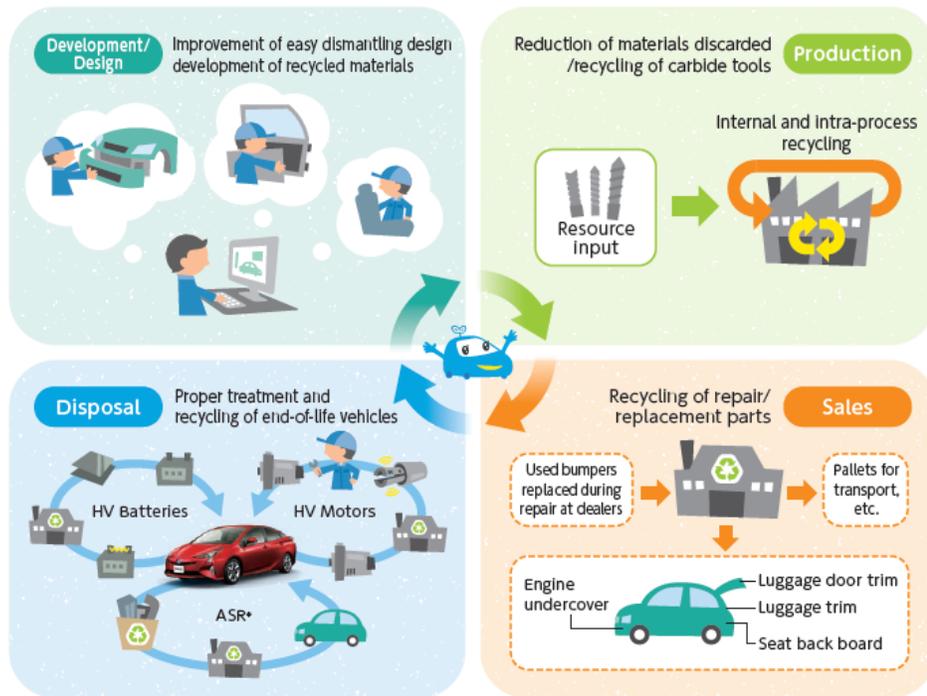
CIRCULAR ECONOMY - an industrial system that is restorative by design



“A Circular Economy is an economic system where products and services are traded in closed loops or “cycles”. It is characterized as an economy which is regenerative by design, with the aim to retain as much value as possible of products, parts and materials. The aim should be to create a system that allows for the long life, optimal reuse, refurbishment, remanufacturing and recycling of products and materials.”

Example automotive: high recycling rates today

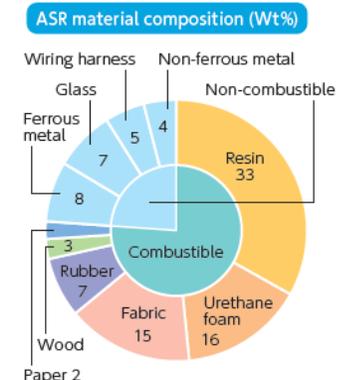
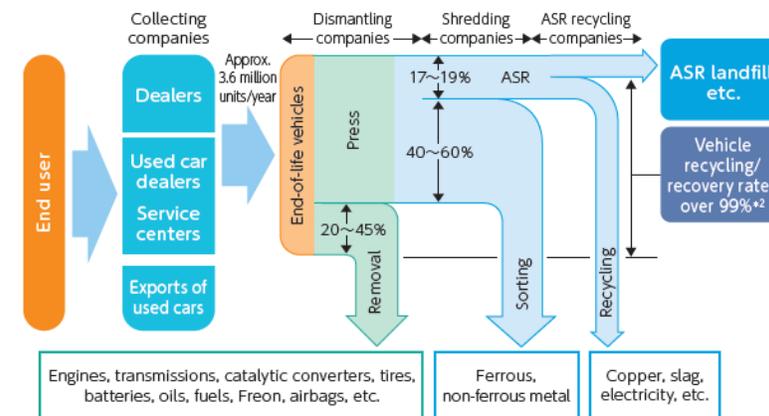
Reuse becoming more important, challenges are HV batteries and fuel cells



Vehicle lifecycle

- Circular – from design for easy dismantling to reuse of parts and further reduction of automobile shredder residue
- New recycling routes for HV batteries/motors

Recycling/recovery route for end-of-life vehicles (Japan)

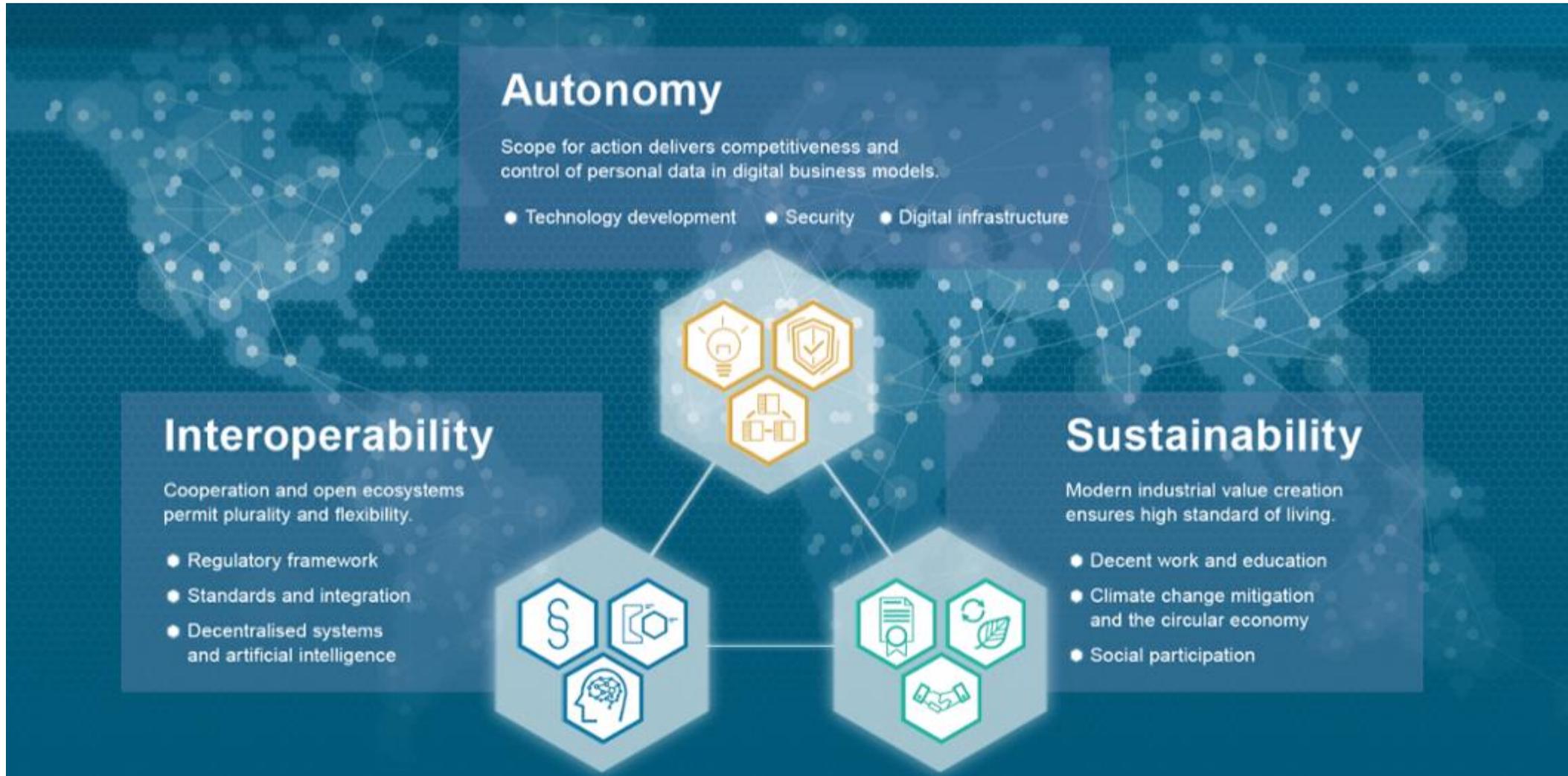


Recycling/recovery route for end-of-life vehicles

- Reuse (full vehicle) by export (usually lost for recycling route)
- Recycling rate already >99%

Vision 2030 for Industrie 4.0

Shaping digital ecosystems globally



Key takeaways from Plattform Industrie 4.0 Retreat January 2019

- 
- Develop Industrie 4.0 as an enabler for sustainability/circular economy e.g. with technologies such as connectivity, lifecycle product/production, data, AI,
 - Use sustainability in Industrie 4.0 as a competitive opportunity for [new] business models
Germany is very strong in sustainability AND in Industrie 4.0
 - Work on an holistic view – ecologically, economically and social dimension