Smart Factories in Digital Europe Programme

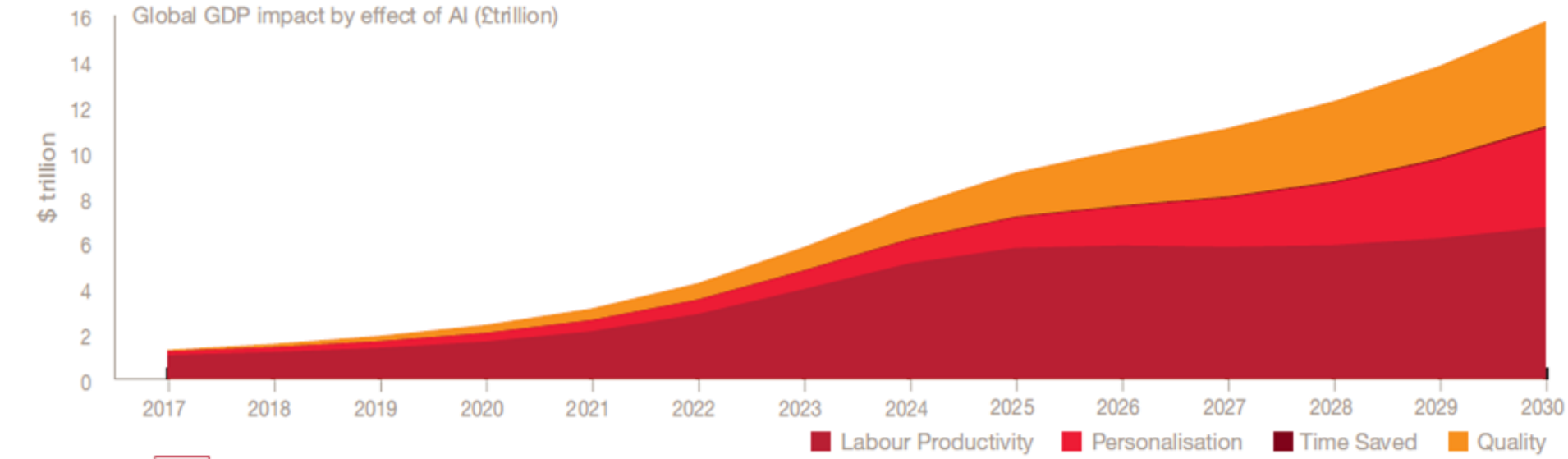
Smart Factories of the Future:
From Industry 4.0 to Industry 5.0

8th July 2020

Matthias Kuom

Smart Factories of the Future = AI in Manufacturing?

AI: productivity, personalisation, time, quality



Labour productivity improvements are expected to account for over 55% of all GDP gains from AI over the period 2017 – 2030.

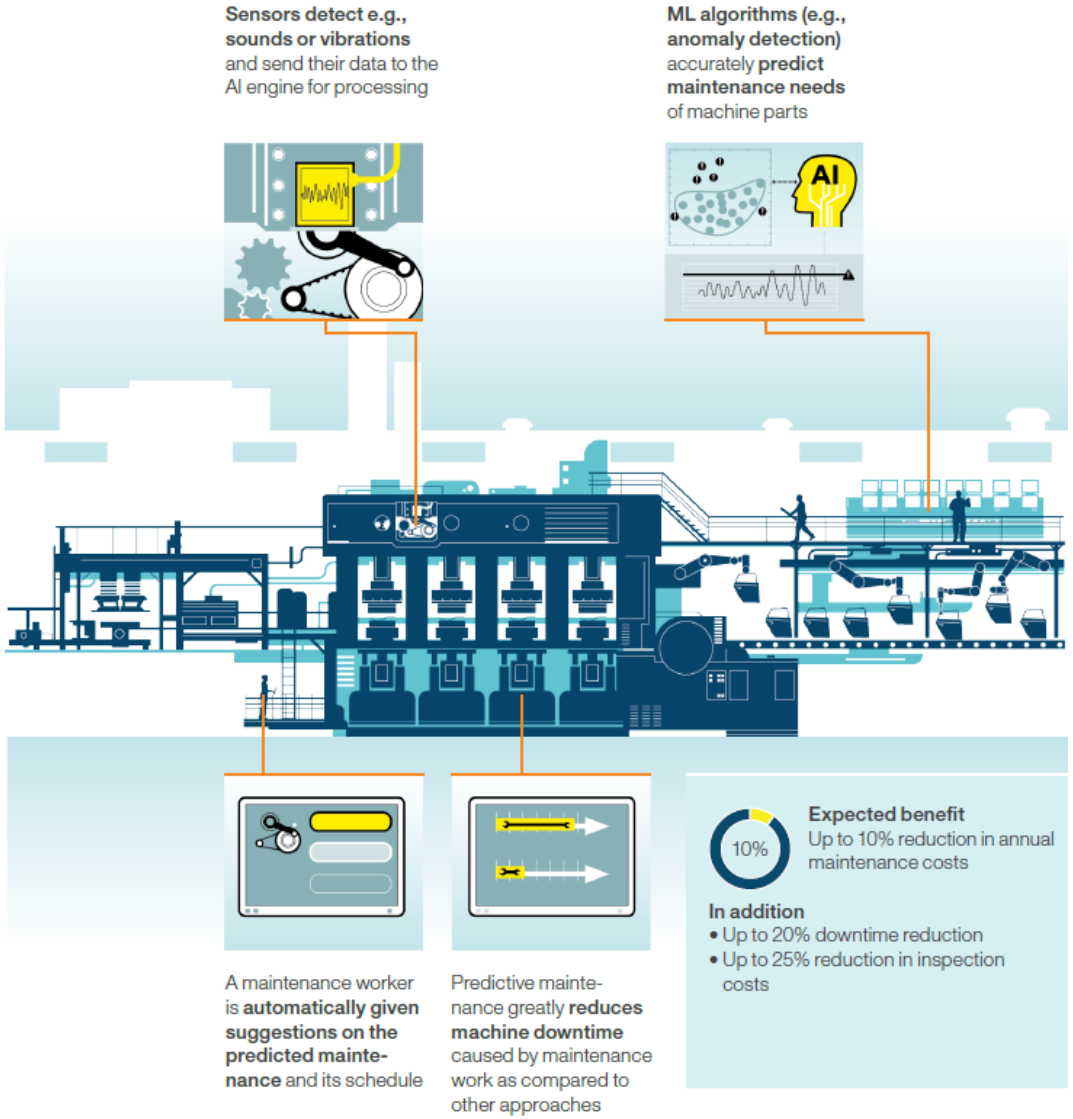
As new technologies are gradually adopted and consumers respond to improved products with increased demand, the share of impact from product innovation increases over time.

58% of all GDP gains in 2030 will come from consumption side impacts.

Source: PwC analysis

PwC, Sizing the prize, what's the real value of AI for your business and how can you capitalize?, 2017

Productivity, cost reductions



Predictive Maintenance
→ cost reductions

European Commission

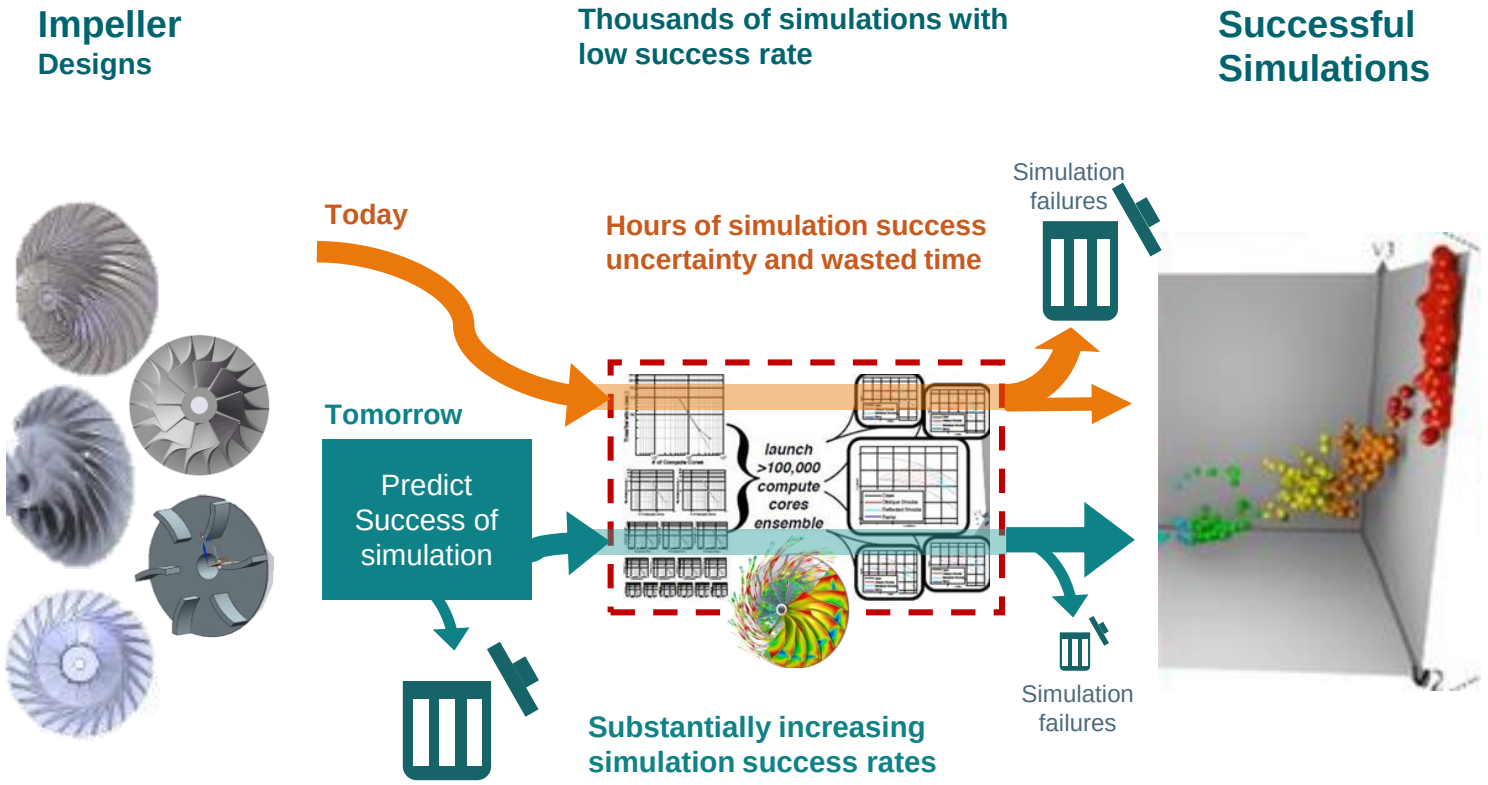
McKinsey, Smartening up with Artificial Intelligence (AI), April 2017

AI enhances product design

Optimizing CFD based product design

- Residual Neural Network: Prediction of simulation success based on design configuration (design variables)
- Increase successful simulations from 20% to 50%

Design and engineering



CFD: Computational Fluid Dynamics

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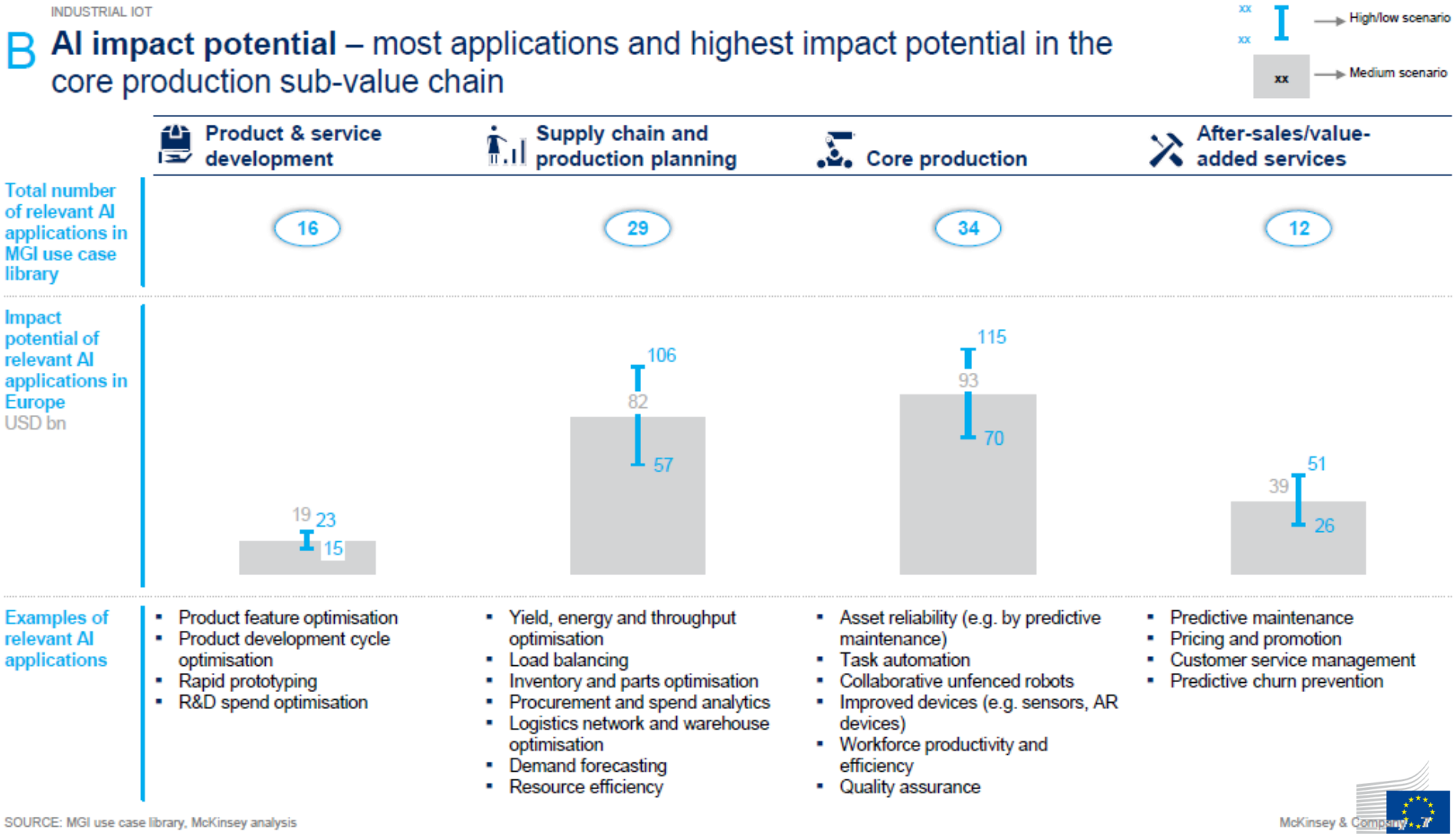
https://ec.europa.eu/digital-single-market/en/news/workshop-artificial-intelligence-manufacturing-presentations-and-report, July 2019

AI impact potential in manufacturing

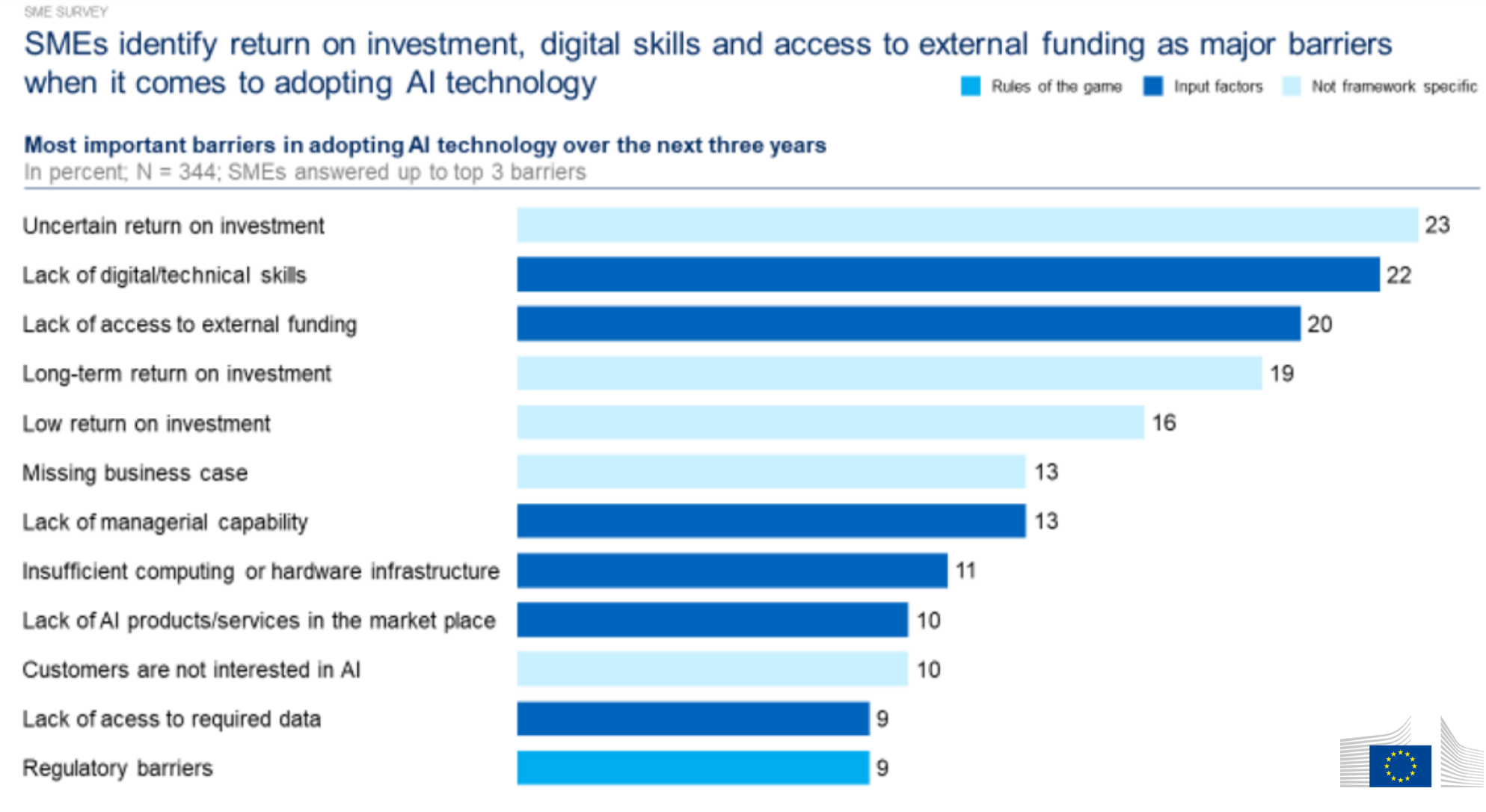


McKinsey & Company

European Commission

McKinsey, Industrial Internet of Things Strategic Value Chain, July 2019
https://op.europa.eu/en/publication-detail/-/publication/09a1b19f-93fa-11ea-aac4-01aa75ed71a1/language-en

Barriers to AI adoption for SMEs



https://op.europa.eu/en/publication-detail/-/publication/09a1b19f-93fa-11ea-aac4-01aa75ed71a1/language-en

European Commission

Commission Priorities

Esp. Digital Europe Programme

“I want European businesses and our many SMEs to access high quality data and create value for Europeans – including by developing Artificial Intelligence applications.”

Thierry Breton,
Commissioner for the Internal Market

European Commission

European Strategy for Data

The Commission presented strategies for AI and data 19.2.2020

White Paper on AI:
a European approach to excellence and trust

A European strategy for data

AI Ecosystem of Excellence

6 key actions

1. **Join forces between Member States and the EU** - Coordinated Plan on AI
2. **Strengthen research and innovation** – Funding opportunities in HE and DEP, Testing and experimentation sites, data spaces, networks of excellence
3. **Improve skills** – Talent
4. **Help SMEs** - Digital Innovation Hubs, equity funding
5. **Work together with the Private Sector** - New PPP on AI, data and robotics
6. **Promote AI in the public sector** – Sector dialogues

Strong business-to-business domain
Strong industrial and services sectors

In 2018, machinery and vehicles was the EU's most exported product group (EUR 809 billion) and made up 41 % of total exports

Top 5 manufacturing activities in EU

1. Motor vehicles, trailers and semi-trailers
2. Machinery and equipment
3. Fabricated metal products
4. Food products
5. Chemicals and chemicals products

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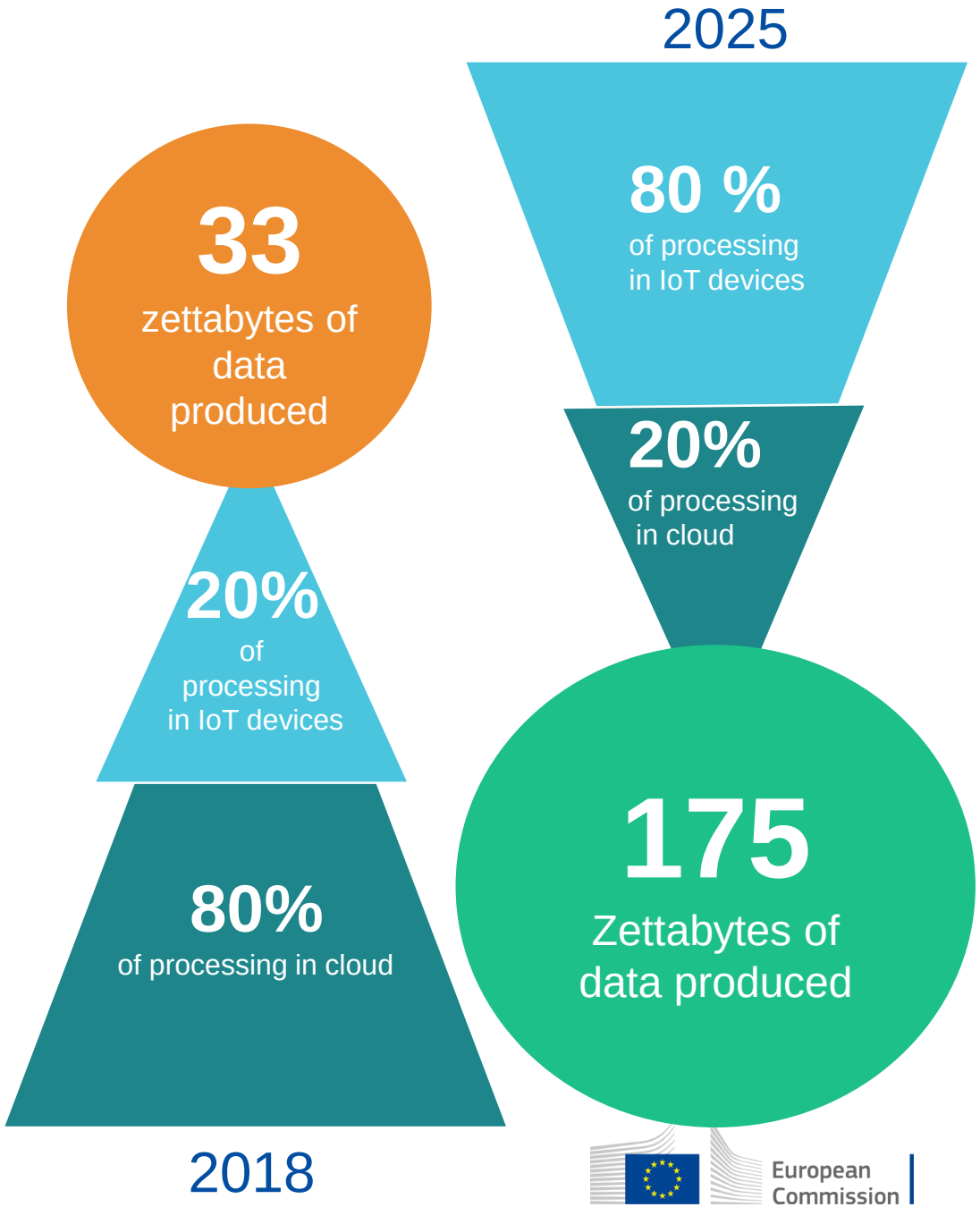
Source: https://ec.europa.eu/eurostat

Europe has everything to play for

- Data can transform all sectors of the economy and is crucial for AI
- Personal and non-personal data can be a source of innovation for new products and services
- Data can contribute to tackle societal challenges such as climate change, health, mobility, etc.
- Data can make our lives and work easier and better



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Industrial data

The potential value of use of non-personal data in manufacturing is EUR 1.5 trillion by 2027

Source: Deloitte, 2018

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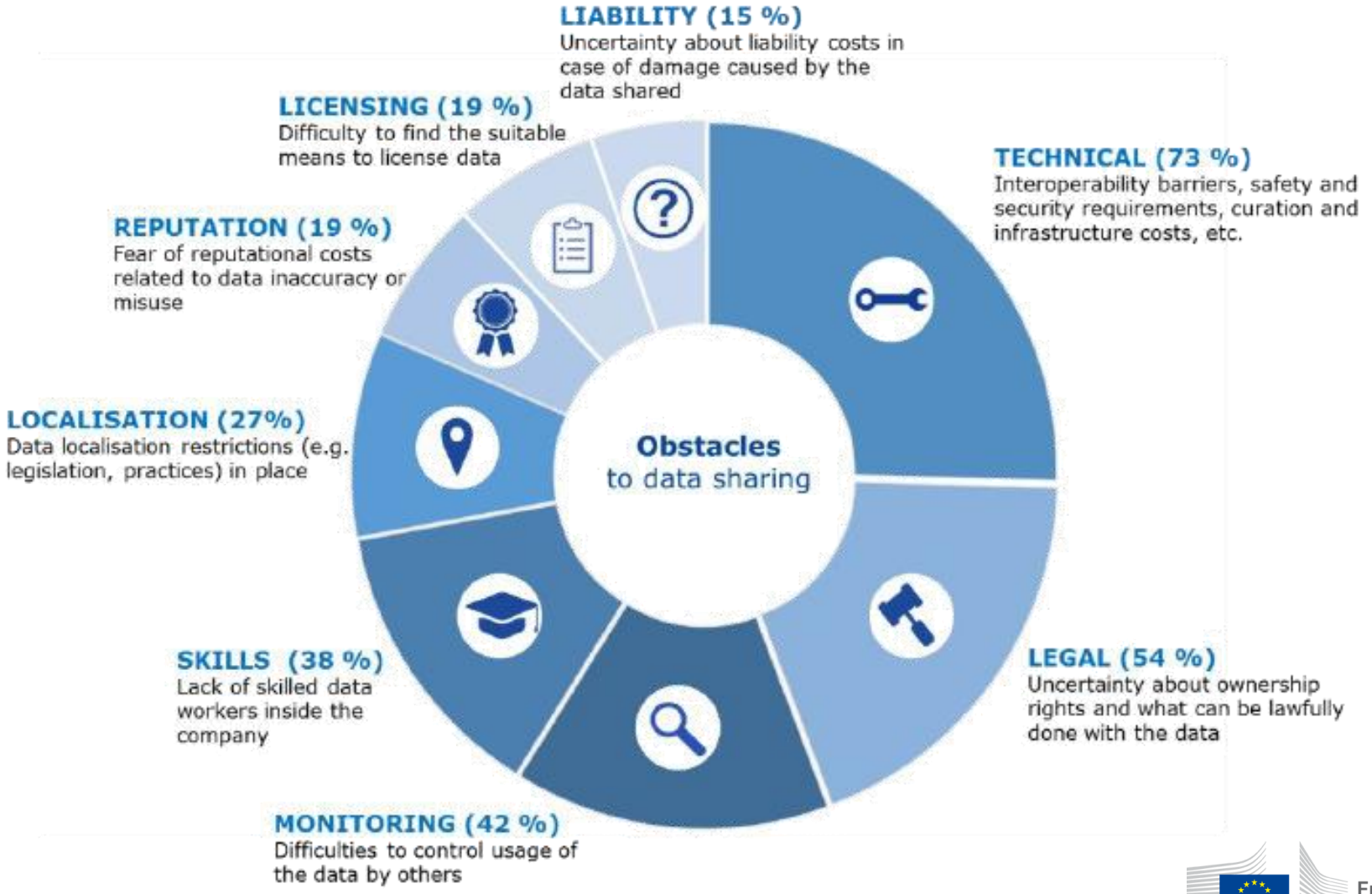
Data Sharing and Reuse

Data Sharing obstacles



Everis 2018
https://publications.europa.eu/en/publication-detail/-/publication/8b8776ff-4834-11e8-be1d-01aa75ed71a1/language-en

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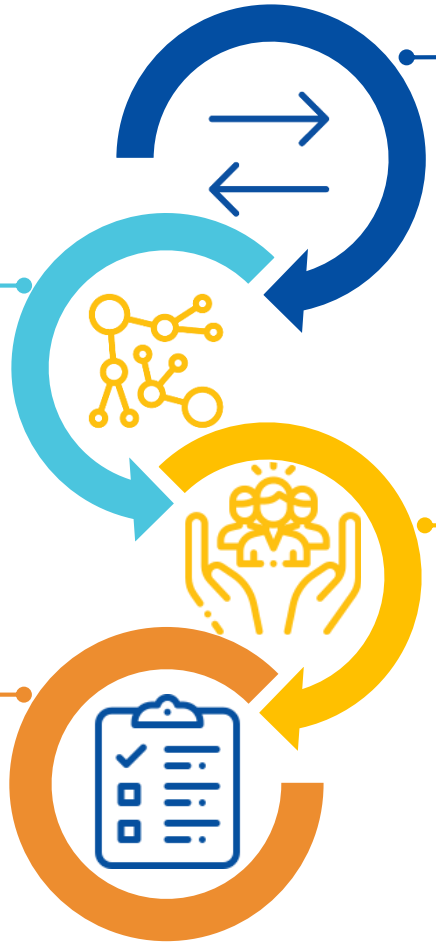
European Strategy for Data

A common European data space, a single market for data



Data can flow within the EU and across sectors

Availability of high quality data to create and innovate

European rules and values are fully respected

Rules for access and use of data are fair, practical and clear & clear data governance mechanisms are in place

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Deploying the strategy through 4 Pillars

A cross-sectoral governance framework for data access and use

including a legislative framework for the governance of European data spaces and other cross- sectoral measures for data access and use

Enablers

Total investments of € 4-6 billion in a High Impact Project on European data spaces and federated cloud infrastructures

Competences

Empowering individuals, investing in digital skills & data literacy and in dedicated capacity building for SMEs.

Rollout of common European data spaces

in crucial economic sectors and domains of public interest, looking at data governance and practical arrangements.

International Aspects

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Common European data spaces

Rich pool of data (varying degree of accessibility)

Free flow of data across sectors and countries

Full respect of GDPR

Horizontal framework for data governance and data access

- Technical tools for data pooling and sharing
- Standards & interoperability (technical, semantic)
- Sectoral Data Governance (contracts, licenses, access rights, usage rights)
- IT capacity, including cloud storage, processing and services

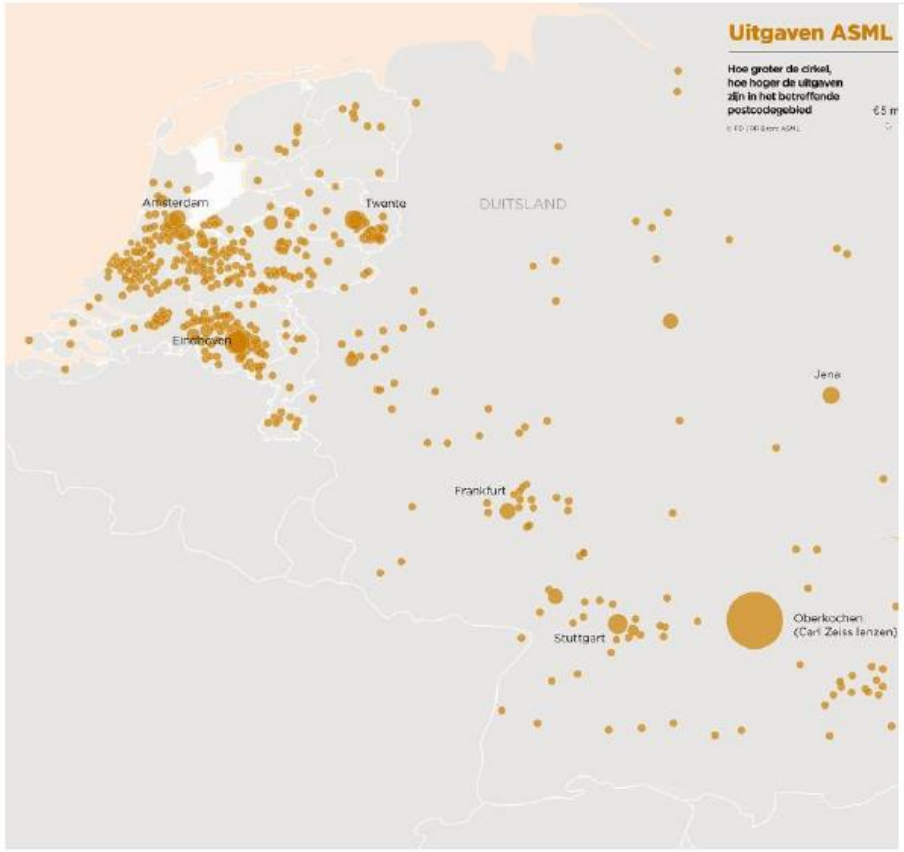
Manufacturing Data Spaces

- Data Strategy: “The Commission will promote the development of common European data spaces in strategic economic sectors and domains of public interest. This should lead to the availability of **large pools of data** in these sectors and domains, combined with the technical **tools and infrastructures** necessary to use and exchange data, as well as appropriate **governance mechanisms**.”

- Here: focus on **sharing, pooling, and reusing data across organisations in the manufacturing sector**

- Objective: to **set up and deploy several operational data spaces for specific value chains in the manufacturing sector**, which enables companies in different user roles (supplier, client, service provider,…) to interact with large amounts of manufacturing data.

Example: Smart Connected Supplier Network



- Remaining world Champion in high mix, low volume, high tech machine manufacturing means becoming the most competitive supply chain in the world, i.e. 20% higher productivity of the supplier network, through fast, secure and interoperable exchange of information across company borders

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INTERNATIONAL DATA SPACES ASSOCIATION

smart connected supplier network

OPEN INITIATIVE, OPEN STANDARD

Manufacturing companies, Service Providers, Knowledge Institutes

Approx. 10 Service Providers

RIDDER

= exact

FUJITSU

FUJITSU GLOVIA

SUPPLYDRIVE

mkg

INAD easy2trade

KetenlinK

IJSSEL technologie

tradecloud supply chain platform

ATTRIBUTES

infor

Approx. 200 manufacturing companies, growing to 2000+ the coming years

de cromvoirtse snel metaal op maat

VANRAAKSTAAL

Euro-Techniek

norma

MCB

NEWAYS

VISCON GROUP

trade!nterop

BEMET INTERNATIONAL

FAESGROUP

KMWE

SUPLACON

NTS GROUP

TATA STEEL

Manufacturing Data Spaces
Webinar 6 May 2020

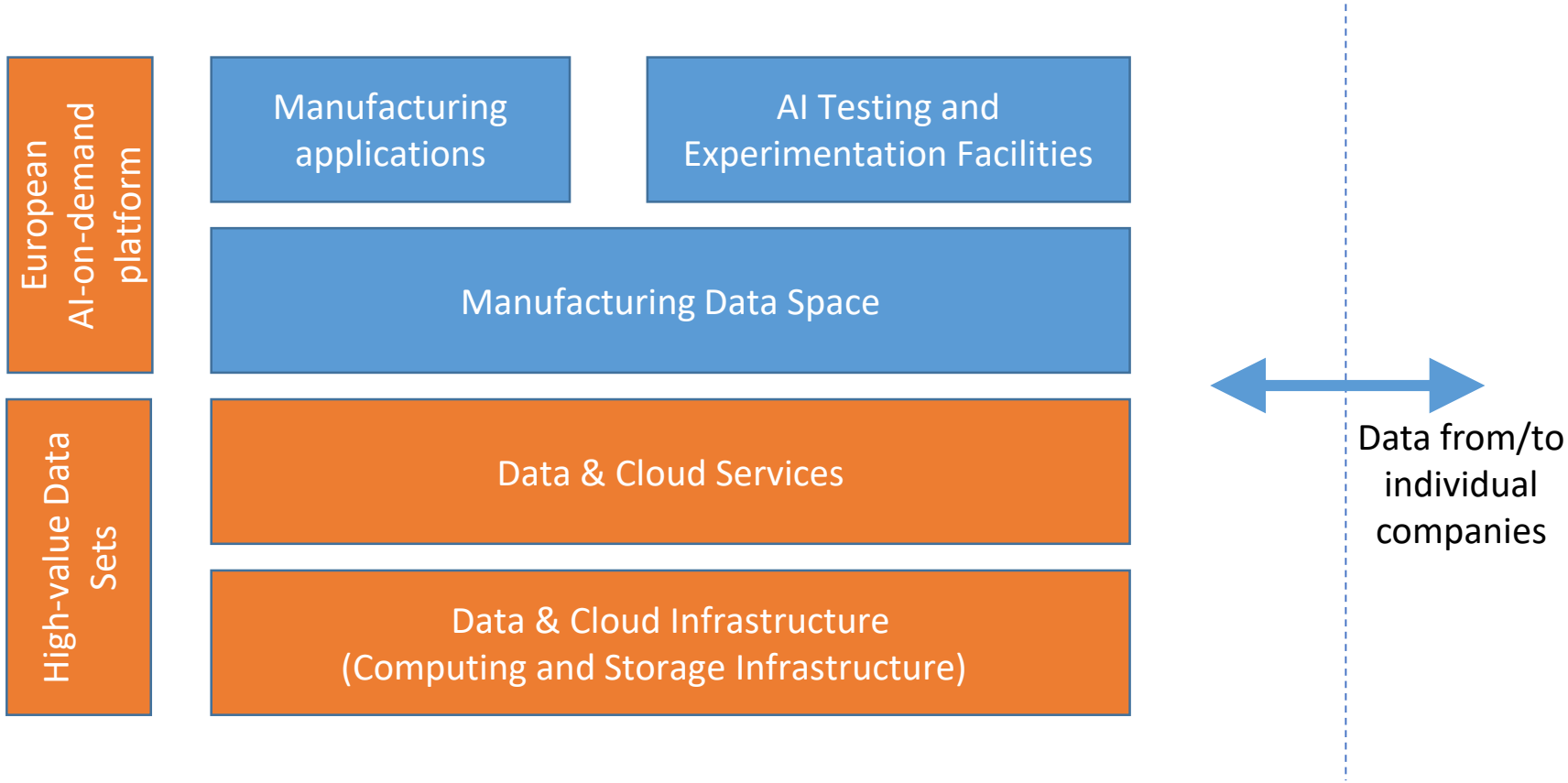
Lessons learned:

- Preference for focus on data sharing rather than data reuse (68% vs 32%)
- Preference for sharing maintenance (34%) and supply chain planning data (24%)
- Preference for distributed (42%) and centralised-in-a-non-profit-actor-established-by-industry (39%) implementation options

https://ec.europa.eu/digital-single-market/en/news/common-european-data-spaces-smart-manufacturing-0

Manufacturing Data Spaces

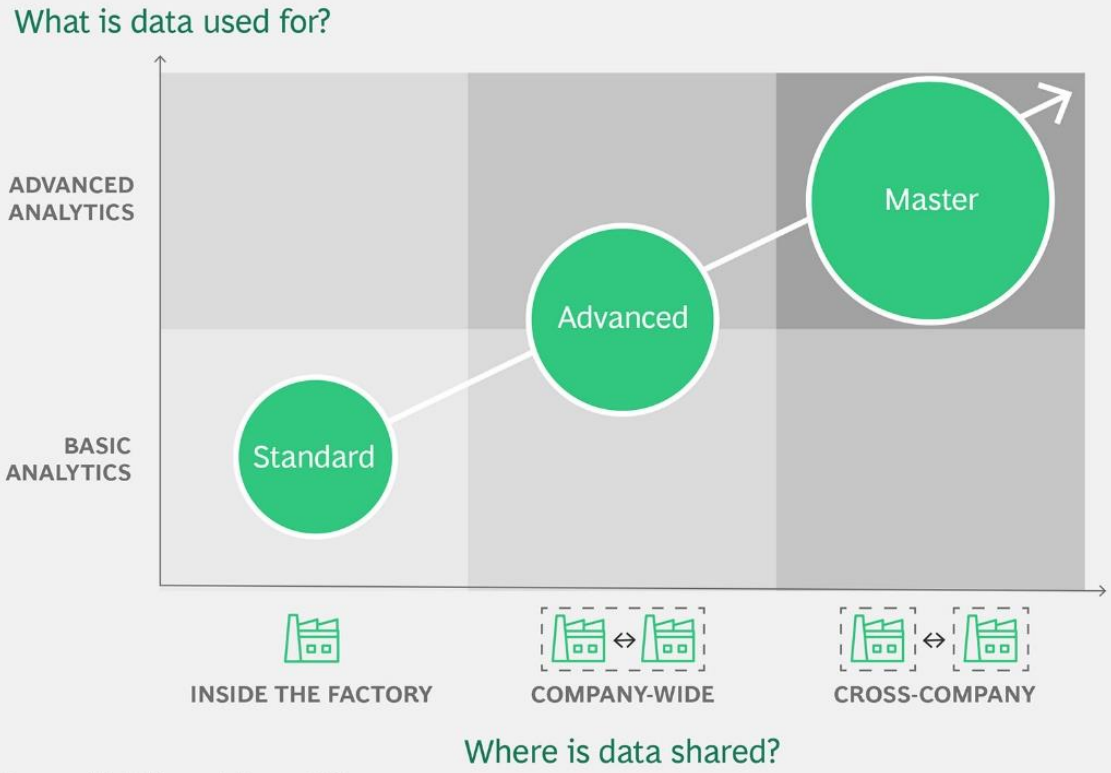
Draft layered model of main building blocks



Building blocks in orange colour are common elements

From Smart Factories to Industry 5.0

Data Sharing Enables Largely Self-Controlled Factories



Sources: World Economic Forum; BCG.
Note: Based on a global BCG survey of 996 manufacturing managers.

5
application domains that clearly demonstrate the value proposition

72%
of managers surveyed say they are considering data sharing to improve operations

$100B+
in value can be unlocked through manufacturing-process optimization alone

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AI Testing and Experimentation Facilities

Coordinated plan on AI	A Reference Testing and Experimentation Facility is a technology infrastructure that has specific expertise and experience of testing mature technology in manufacturing, under real or close to real conditions. From lab to the market, key to foster the deployment of trustworthy AI, encouraging geographical coverage.
Synergies	European data spaces, DIHs, AI on demand platform.
Digital Europe Programme	Commission envisages establishment of world class reference testing and experimentation sites for AI-powered products and services throughout Europe. Common resources available to all European stakeholders to validate new AI-based solutions in real settings.
Member States	Encouraged to match the investments (“co-funding”).
Use of other sources of funding	Complementarities with Cohesion Policy investments. e.g. European Regional Development Fund.

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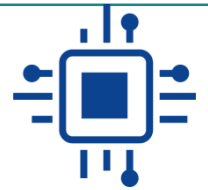
Coverage

World class reference sites for experimentation and testing

Technology-centric

Testing and experimentation facilities for AI components based on neuromorphic and quantum technologies



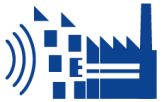
Application-centric

Testing and experimentation in essential sectors:

➔ Agri-Food

➔ Smart hospitals and Healthcare

➔ **Manufacturing**



➔ Smart Mobility & Smart Cities

➔ Energy/circular economy addressed in all sectors

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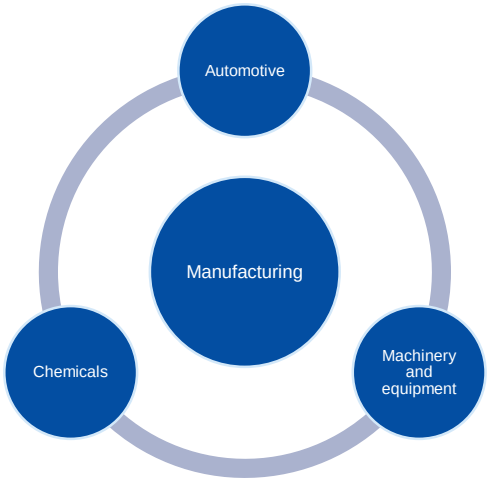
AI TEF on Manufacturing



Major use cases:

Factory level optimization (Flexible production in high-throughput and high variety environment. Rapid prototyping and use case development, assessment, feasibility. Flexibility to adapt to the manufacturing reconfiguration and trend towards shorter series).

Collaborative robotics (Development of mobile, intelligent AI-powered robot models enabling effective and safe human - robot collaboration).

Other use cases:

Supply chain planning.
Circular economy: AI for reverse logistics, remanufacturing, recycling, reuse.

World-class large-scale reference sites for testing and experimentation

Common resource available to all European stakeholders to validate new AI-based solutions in real manufacturing settings.

Validation of all the aspects: technical, socio-economic, legal.

Limited number vs geographical coverage.

Ways to interact with parallel initiatives on data spaces, the European AI-on-demand platform and DIHs.

Full integration, industrial validation and demonstration in real manufacturing environments, prototyping, pilot manufacturing, business development, regulation, standardization, certification and benchmarking, as well as ethics, cybersecurity and data protection, where appropriate.

European Commission

Keep in touch

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Thank you

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