

Europe's AI Strategy for a Digital Economy - Lessons for Japan?

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2021.01.20

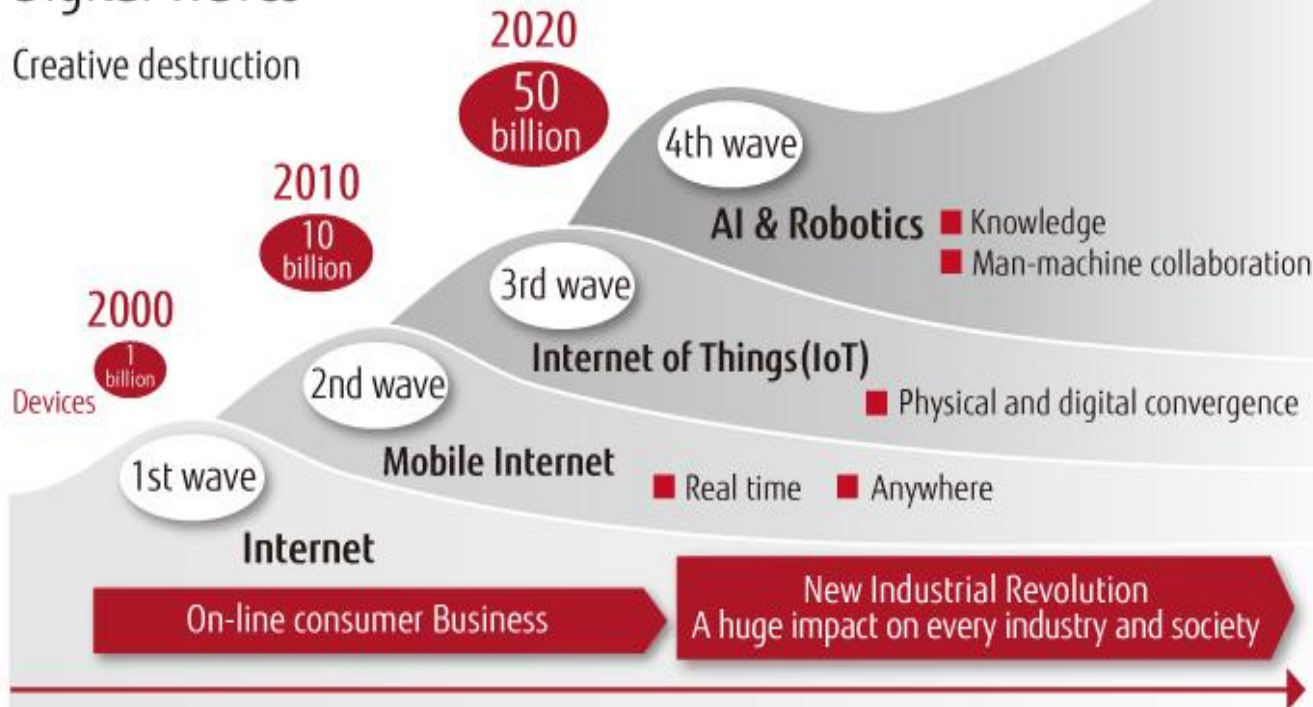
- AI in a digital economy – Social value added
- EU AI strategy – Data integration and ecosystems
- Focus on Industrial AI – How much potential?

- AI in a digital economy – Social value added

Technology - From Networks to AI

Digital Waves

Creative destruction



■ Learning Economy

■ Industry 4.0

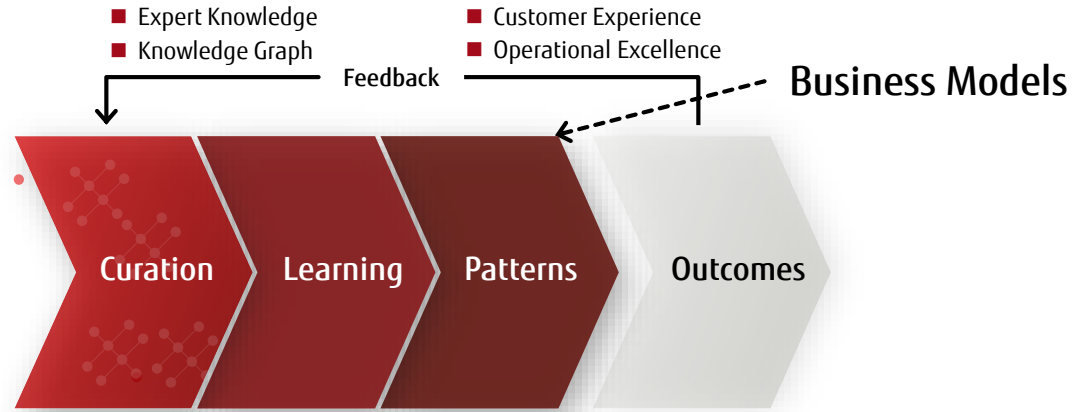
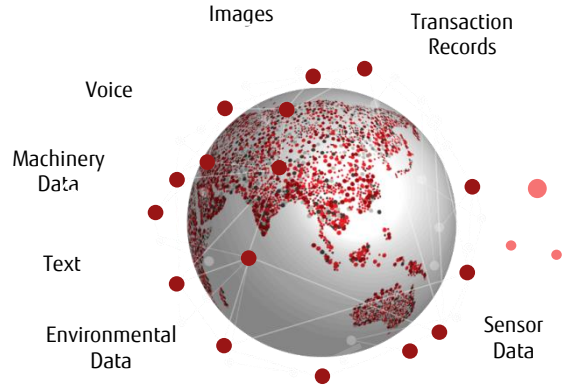
■ Platform Economy

■ Network Economy

AI – The New Oil? Transforming Data into Value



The Data universe



Manufacturing

Use scan images and engineering expertise to learn how to quality assure key parts



Healthcare

Bring together patient data and medical open data to learn to diagnose risk factors in mental illness



Shipping

Combine weather data and operational data to learn to plot optimal, weather compensated routes



Finance

Learn from securities transaction data to spot anomalies like errors in data entry and fraud



Life Science

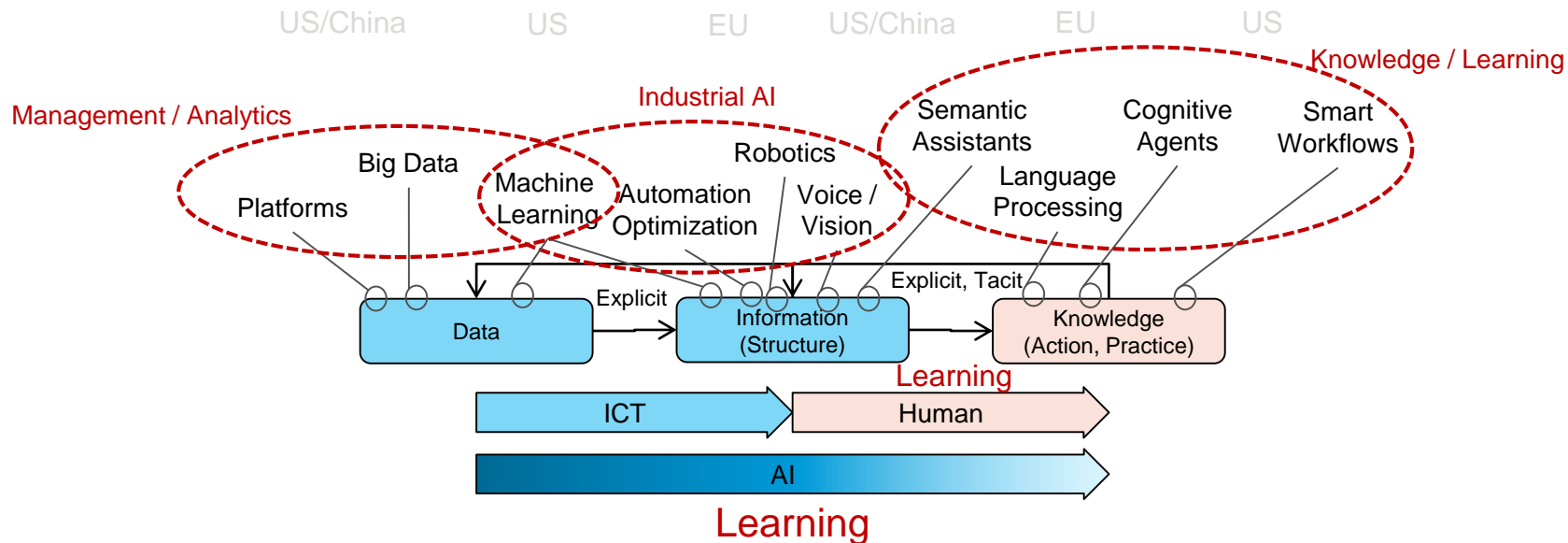
Combine genome data and medical open data to explain the links between genome and disease



Infrastructure

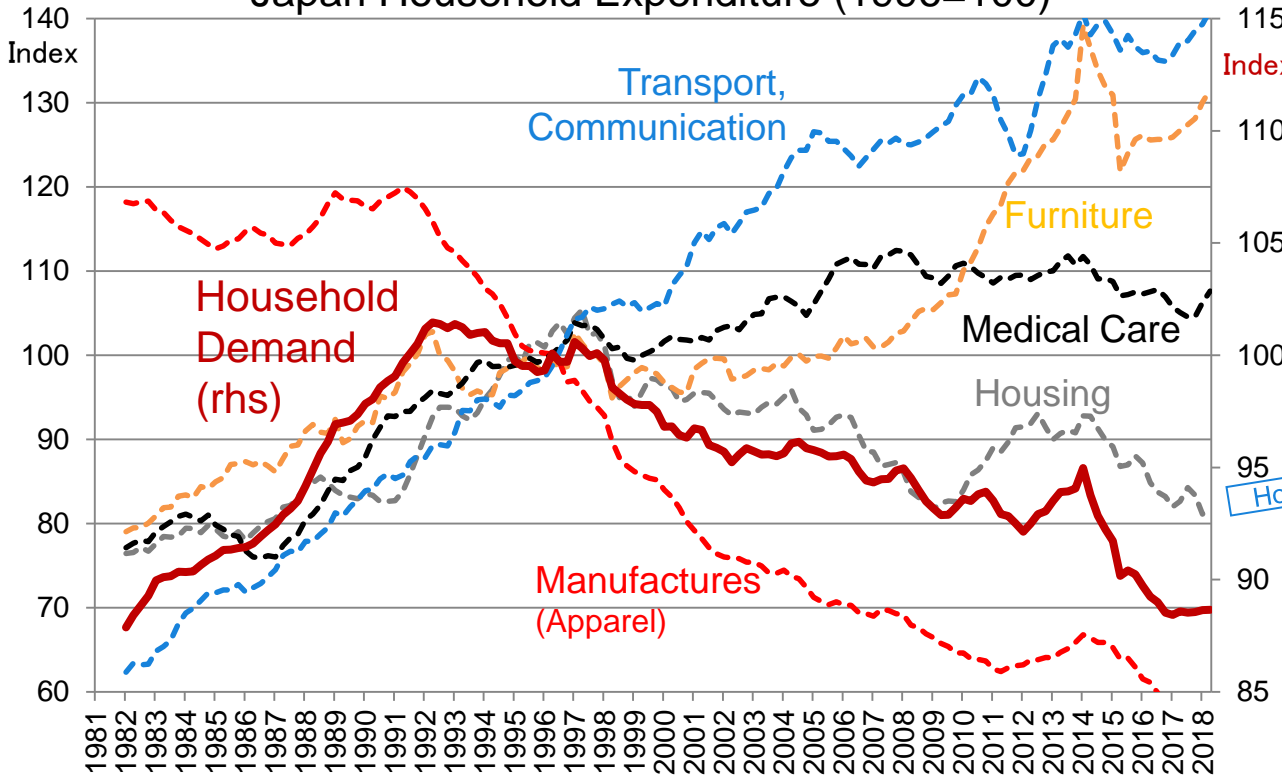
Use sub-surface scan images to learn how to spot cavities and sink holes underneath roads

AI Value Added – From Data to Knowledge & Learning



Digital Economy & AI – ICT Impact on Value Added

Japan Household Expenditure (1996=100)



Note: 5-quarter moving averages. Corrected by changing household size.

↑ **ICT Value Added** increases income & demand

→ Income stagnation depresses demand

↗ Home Office

↓ **ICT Efficiency** lowers prices & relative demand

Opportunities and Challenges of an AI Economy

Digital Economy (Now)

- Networks add value, support growth (*network effects, consumer rents*)
- IoT & Industry 4.0 business models (*digital services, cyberphysical systems*)
- Digital platform integration & globalization (*economies of scale*)

- ➡ Major companies & consumers win (*traditional companies disrupted*)
- ➡ Knowledge economy & war for talent, (*dual economy, income disparities*)
- ➡ 'Winner takes all' business models (*monopoly rents*)

AI Economy (Soon?)

- Broad ICT productivity gains in services (*capital share increases, prices fall*)
- AI (cognitive) business models (*individualization, learning*)
- Digital platforms integrate (*Society 5.0*)

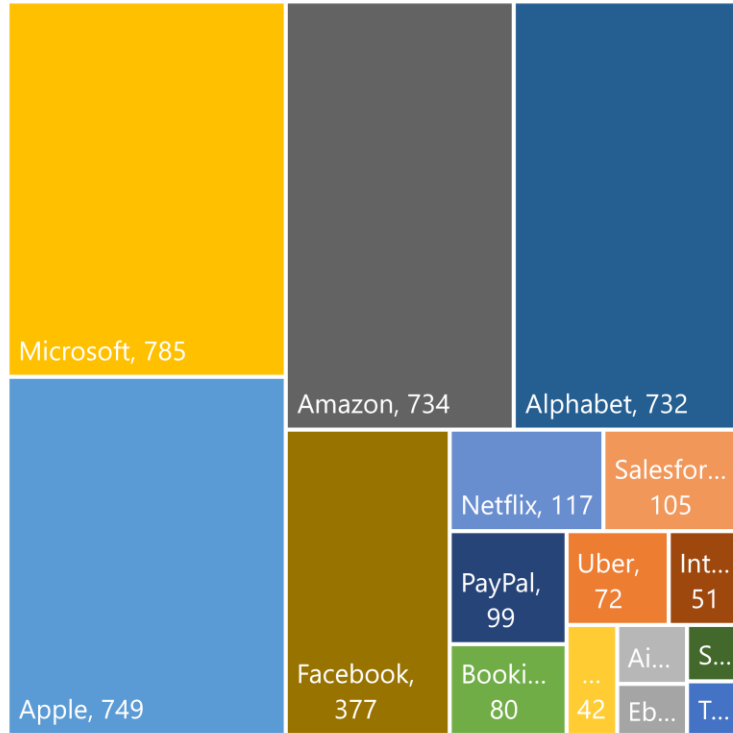
- ➡ Focus on new value added
- ➡ Build "AI on Demand" platform
- ➡ Prepare "digital" government

- AI turns ICT into a “General Purpose Technology” that affects the entire economy and society at large

- EU AI strategy – Data integration and ecosystems

Europe's AI Strategy – Digital Economy Builds on Platforms

US Platforms (USD, Billion)



EU



Asia



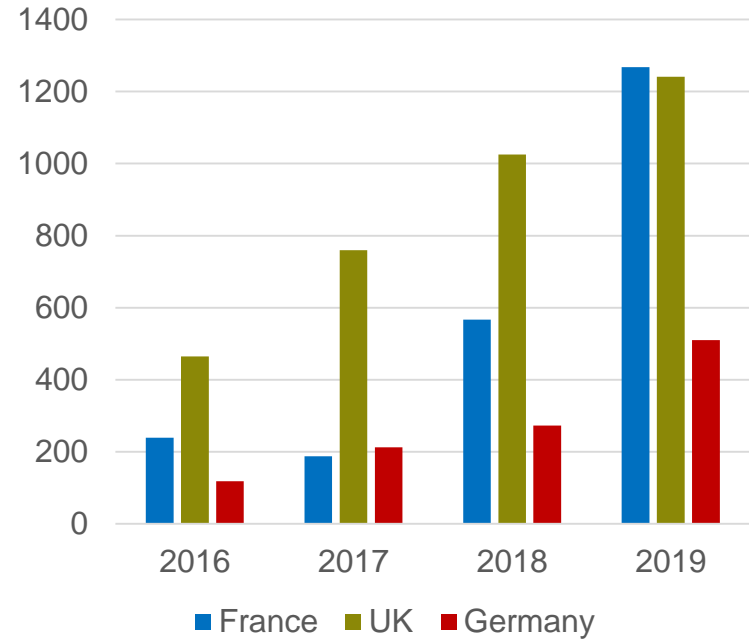
Europe's AI Strategies – Strong Research & Weak Finance

AI Development Indicators

	EU	US	China
Capital (Venture / Private Equity) (2017-18)	\$2.8 billion	\$16.9 billion	\$13.5 billion
Patents (PCT 1960-18)	1,074	1,863	1,085
Researcher	43,064	28,536	18,232
Top Researcher (HC-base)	5,787	5,158	977
Publications (2017)	14,776	10,287	15,199
Publication Quality (FWCI)	1.2	1.5	1

Source: AI Index (2019), Elsevier AI Index (2018), Center for Data Innovation (2019).

Public AI Project Funding (US\$ Mill.)



Source: Roland Berger (2019) – The Road to AI
Note: 2019 numbers are estimates.

■ EU Commission “Ethical AI” (April 2018)

- 1.5 billion euro (Horizon program 2018-2020)
- Public-Private: “AI on Demand Platform” for SMEs, research, cluster support
- Ethical, explainable AI, learning support, data exchange platform

■ French AI strategy (“AI for Humanity” March 2018)

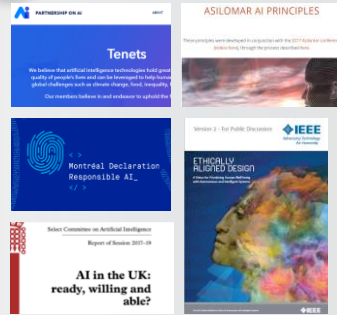
- 1.5 billion euro;
- Public-Private: INRIA and other public research cooperation
- “Medical” (AI data center) and “Transport” (autonomous driving legal support)

■ German AI Strategy (November 2018)

- 3 billion euro (until 2025; 2019:500 million)
- Public-Private: AI Research Center (DFKI) cooperation, SME Centers
- Developing application & competencies on top of fundamental research

EU AI Ethics – Trends in Policy & Technology

2016 AI Ethical Principles



2019 AI Ethics Guidelines



European Commission

OECD

Government of Japan

2020 AI Regulation/Legislation

In my first 100 days in office, I will put forward legislation for a coordinated European approach on the human and ethical implications of Artificial Intelligence.



Ursula von der Leyen

EU Commission President

Policy

FAT

Fairness

Accountability

Transparency

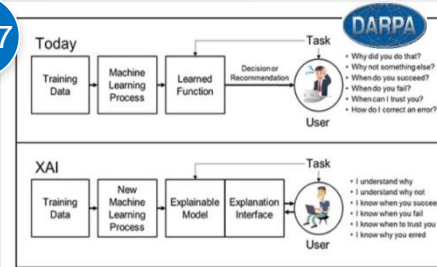
2018 ACM Conference on Fairness, Accountability, and Transparency (ACM FAT*)

A computer science conference with a cross-disciplinary focus that brings together researchers and practitioners interested in fairness, accountability, and transparency in socio-technical systems.

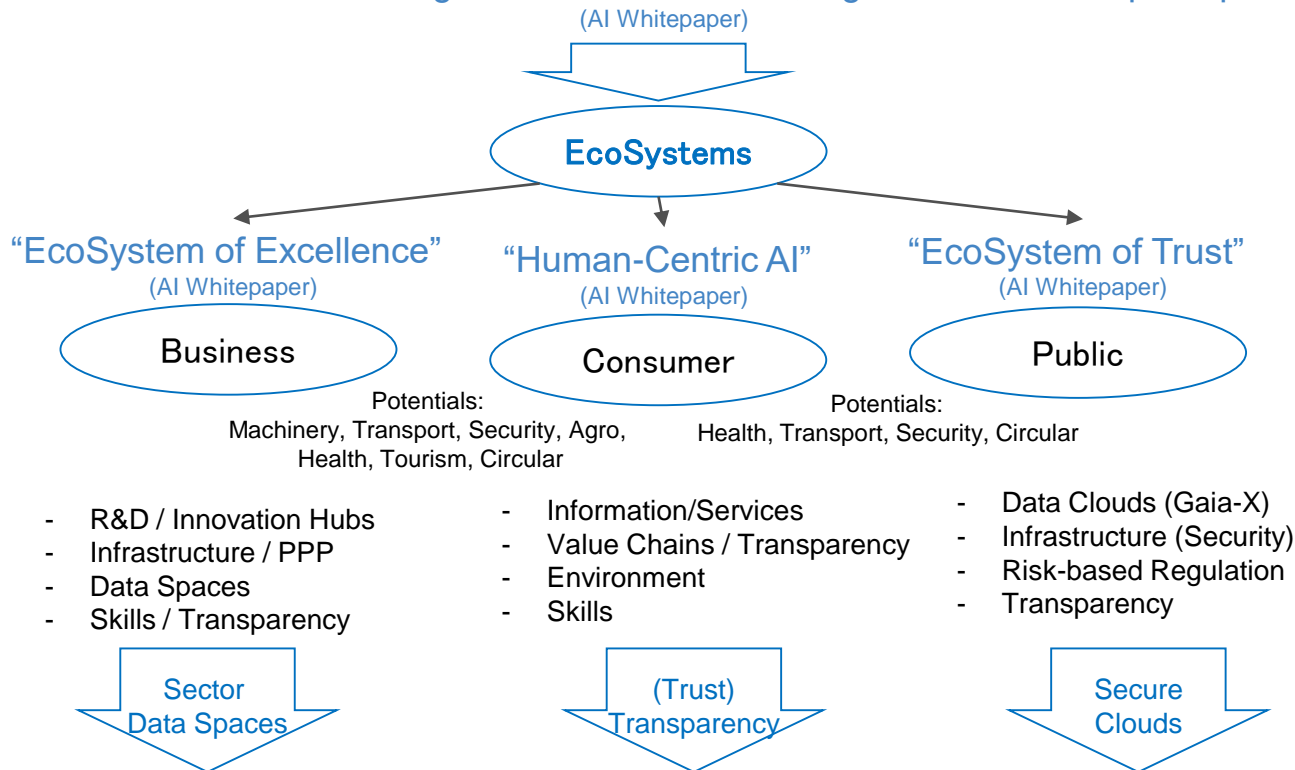
Technology

XAI – Explainable AI

2017

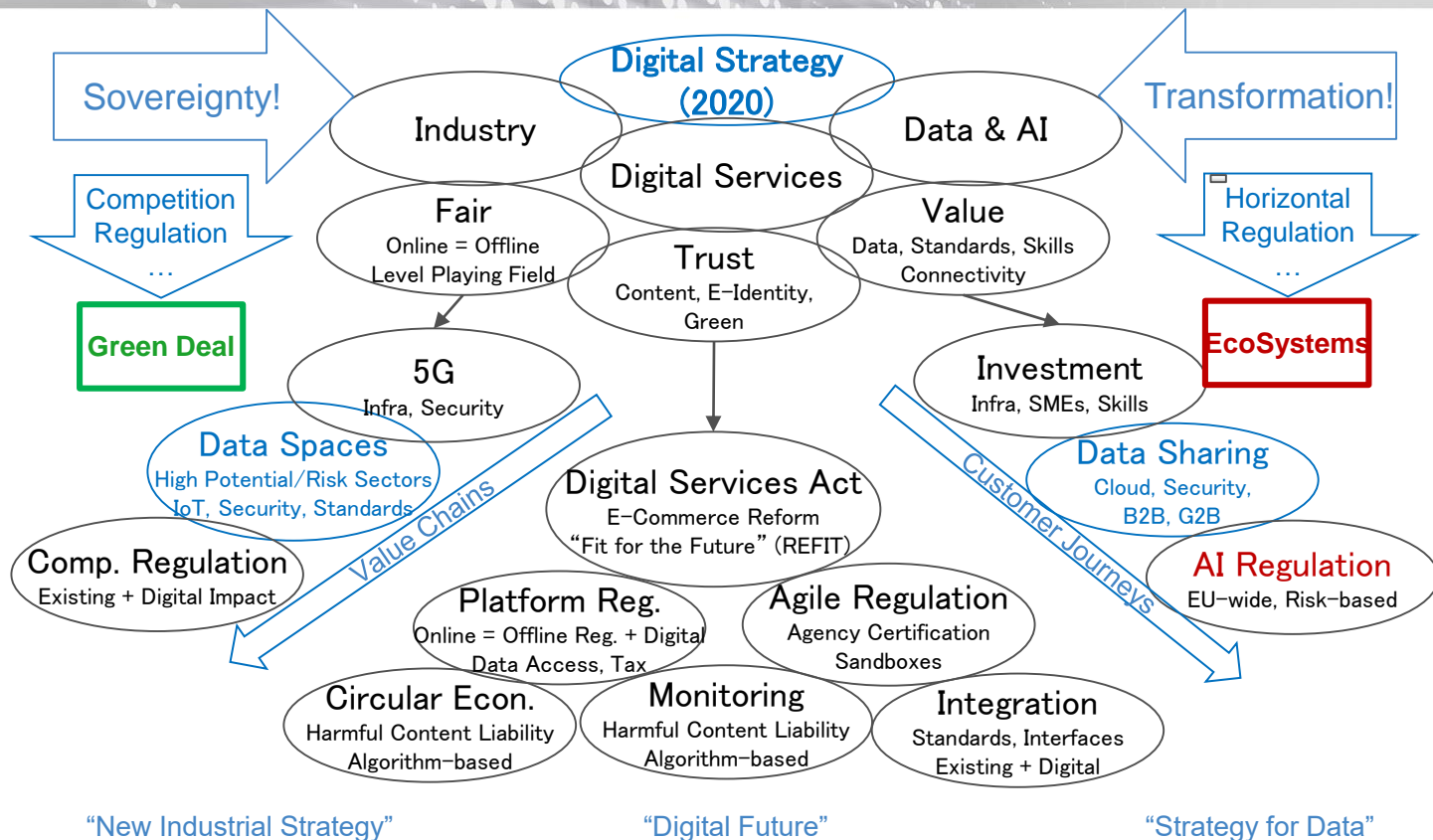


“AI is a collection of technologies that combine data, algorithms and computer power”



- From Digital Single Market (DSM) to “Shaping Europe’s Digital Future” (DSM 2.0)
 - Offensive deregulation -> Defensive transformation
 - Fast-track vertical regulation -> Digital horizontal regulation
 - Productivity -> Digital value added, fairness (online=offline), trust (transparency)
- Focus on Data Economy and AI
 - Integrated EU-wide (sector) data spaces, access to government data
 - Infrastructure development/security (5G)
 - Support of AI ecosystems, AI skill development, AI business models
- Digital Economy
 - Digital capacity building (infrastructure, market integration, ecosystems)
 - Green growth, value chains (mobility, health, ...), sharing, data & AI value added
 - Agile regulation, ecosystems, international standards
- Platform Regulation (Digital Services Act)
 - Digital monopoly control, ex-ante regulation of platforms and (illegal) content
 - International cooperation on EU-standards (values) such as GDPR
 - Introducing universal electronic ID

Digital Regulation & AI – Comprehensive Transformation **FUJITSU**



Digital Integration for AI - Gaia-X Government Cloud

■ AI: EU Commission

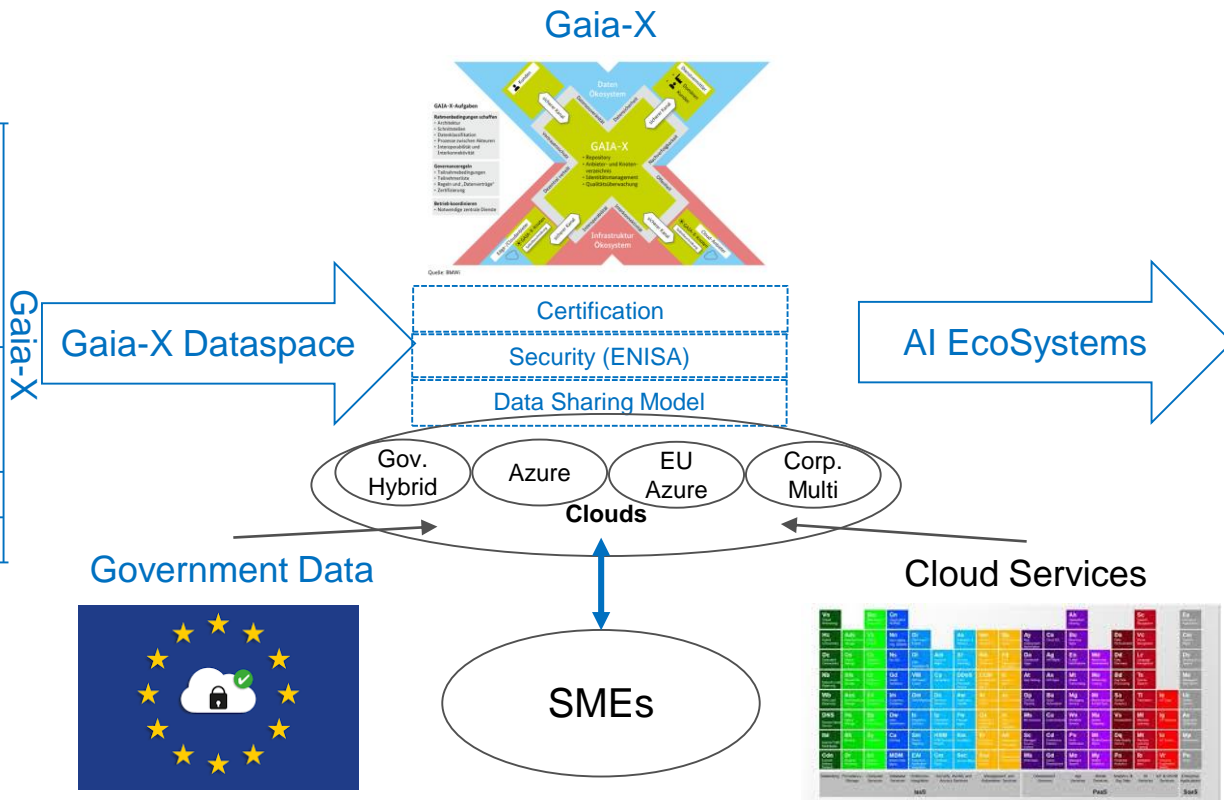
- Ethics
- Research
- Data Standards

■ AI: French Approach

- University Research
- Centers of Excellence
- Public Projects

■ AI: German Approach

- Industry (4.0) AI
- SME Support
- AI Clouds

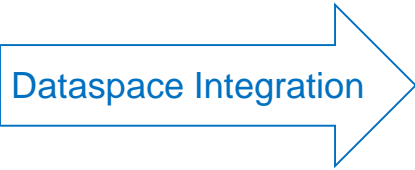


Digital Integration for AI - Gaia-X Government Cloud

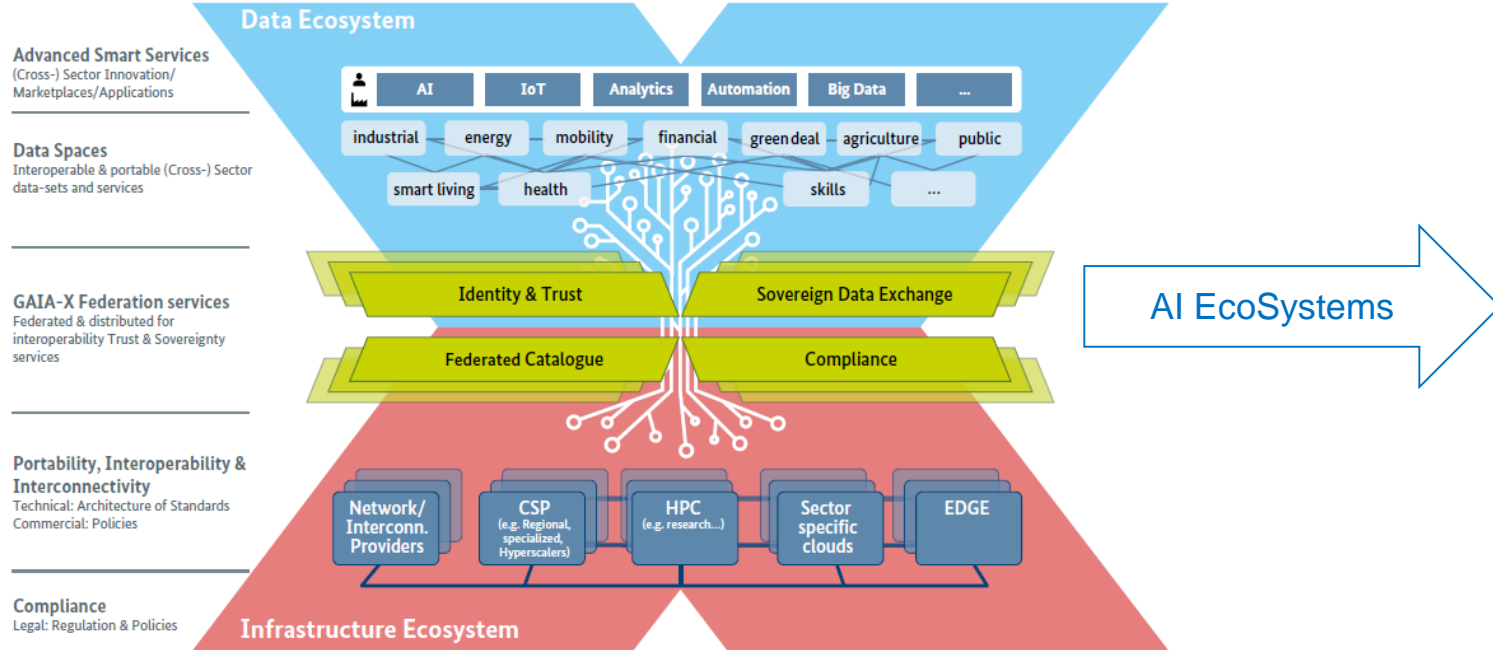
Government Data



Figure 1: Architectural concept with GAIA-X federated services

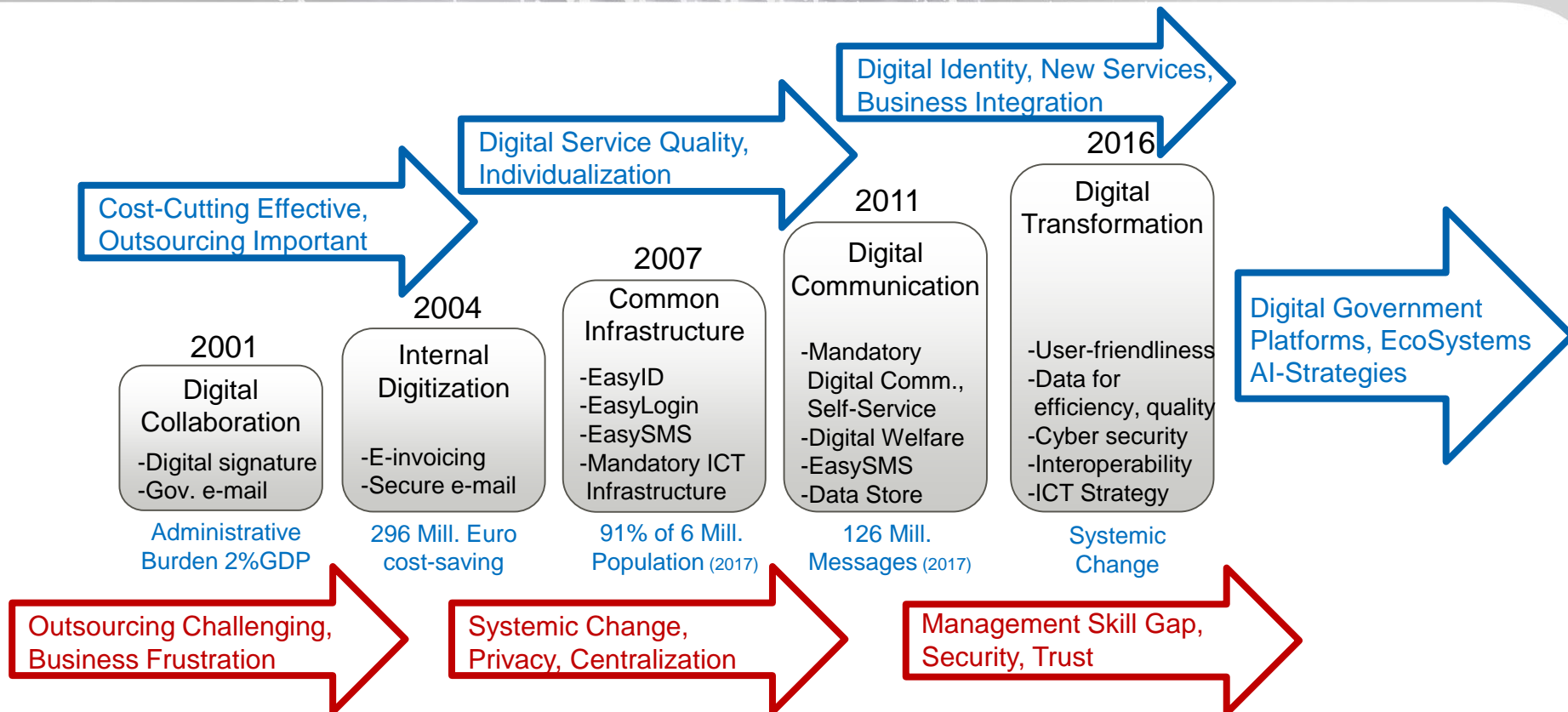


Cloud Services



Source: BMWi

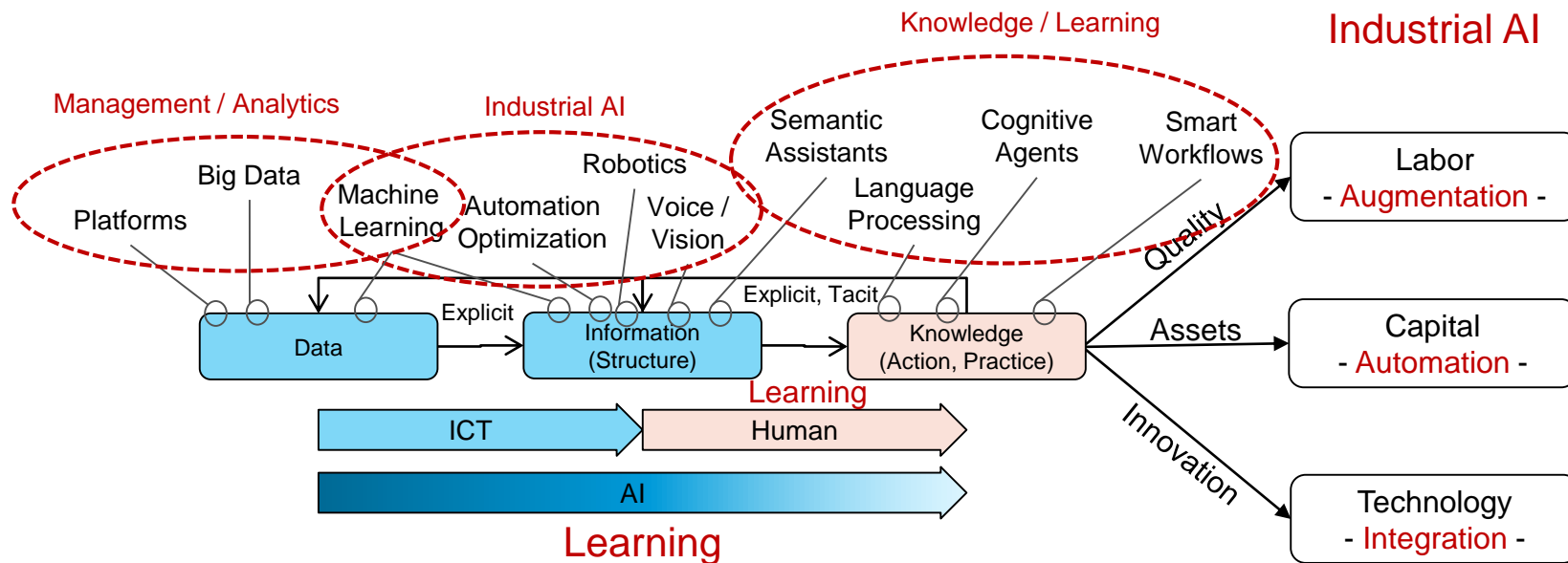
Digital Government Integration – Forerunner Denmark



- Only “Digital Governments” can drive the digital & social transformation beyond private platforms

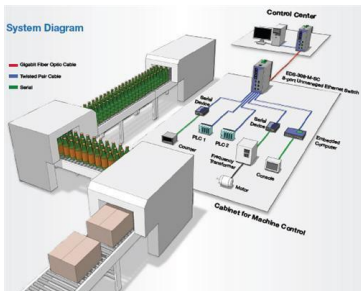
- Focus on Industrial AI – How much potential?

Digital Transformation – Industrial AI

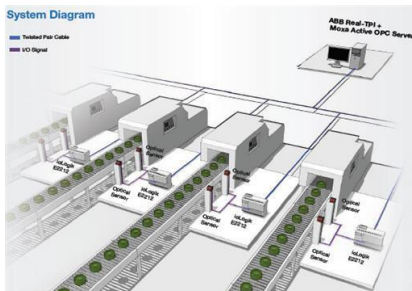


Digital Transformation - Industry IoT & AI

From Factory Automation to Cyber Physical Systems (CPS)



Moxa Ethernet Switches (2009)



L'Oreal - ABB Real TPI (2001), Moxa



Virtual Machine - Pajic (2012)

System:	Controlled	Automated	Intelligent
Technology:	"Inside-Out"	Integration	"Outside-In"
Standards:	Networks	Interfaces	Semantics
Solution:	ERP, Humans		Service Platforms

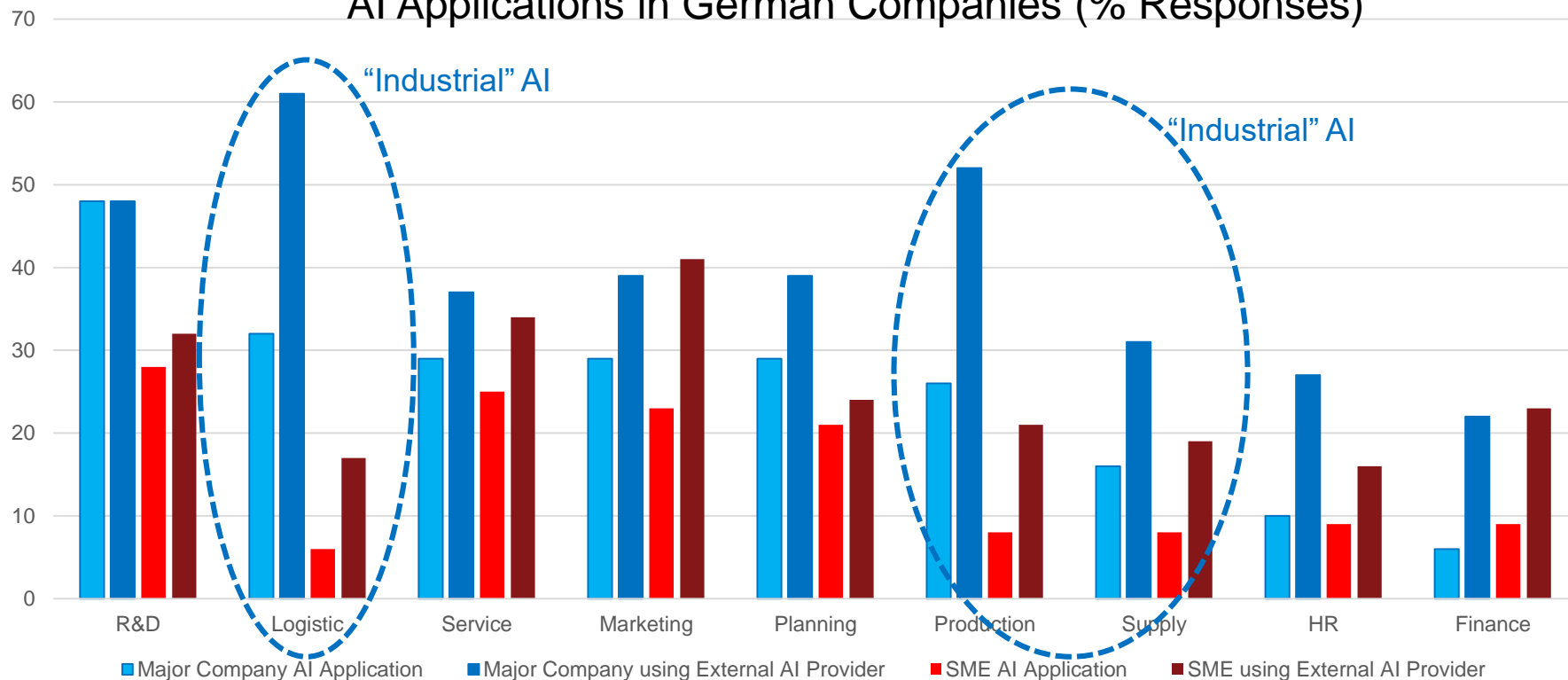
Legacy Systems



IoT / AI Technologies

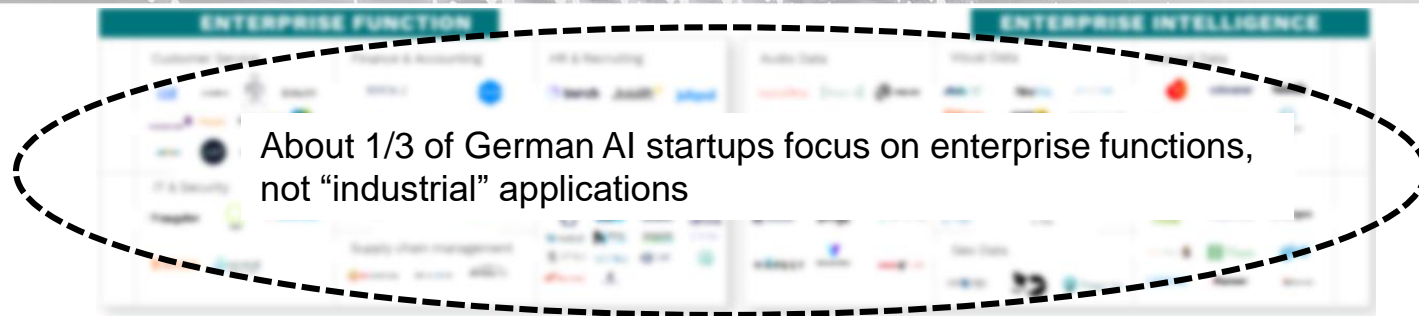
Industrial AI – Large Companies & EcoSystems

AI Applications in German Companies (% Responses)



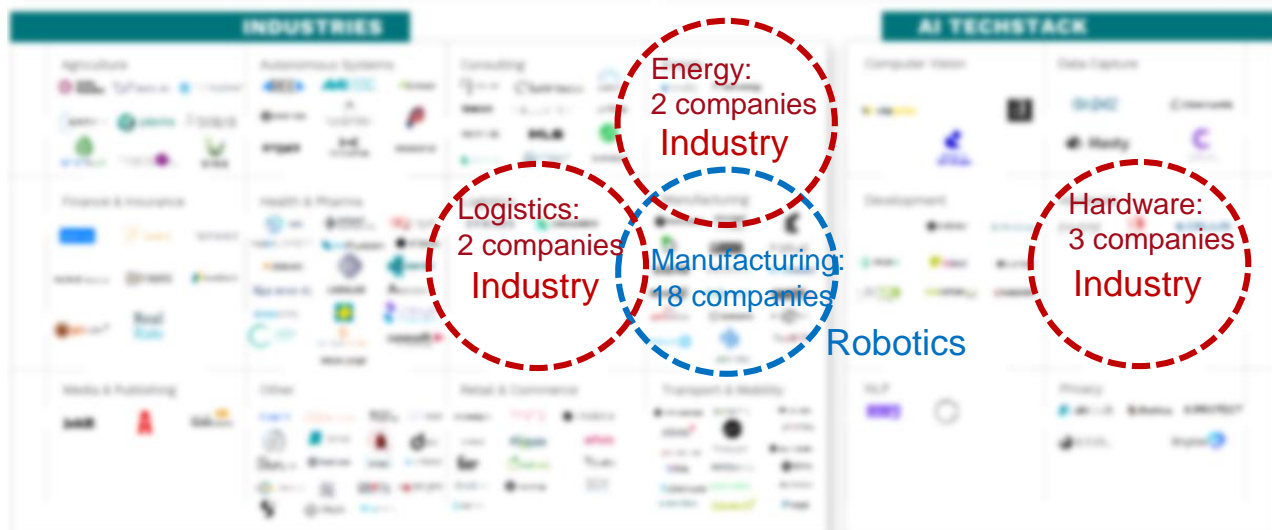
出典: IIT (2019).

AI EcoSystems: Focus on Natural Language Processing **FUJITSU**



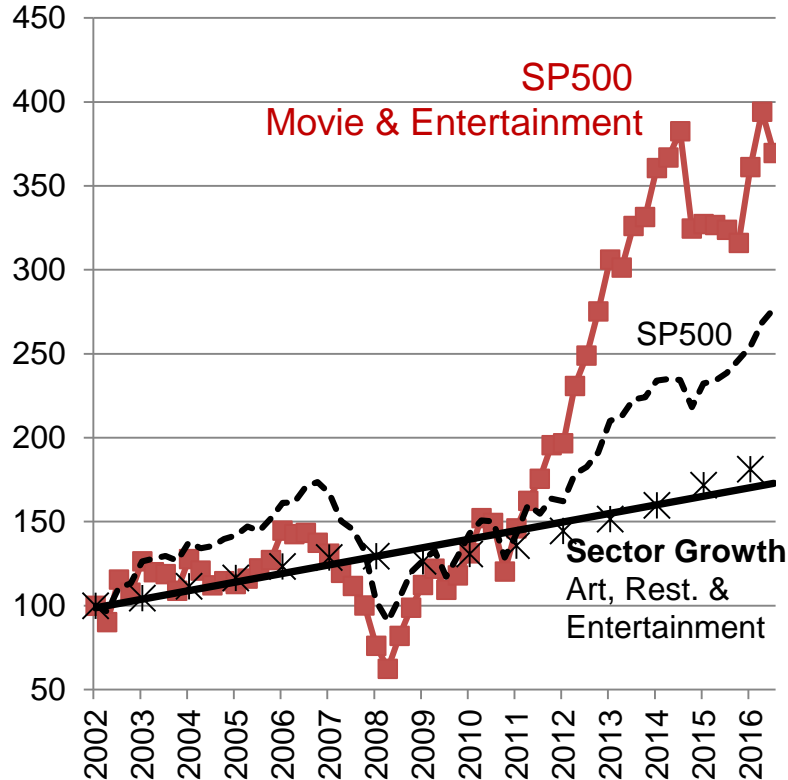
Natural
Language
Processing

German AI
Startup
Landscape



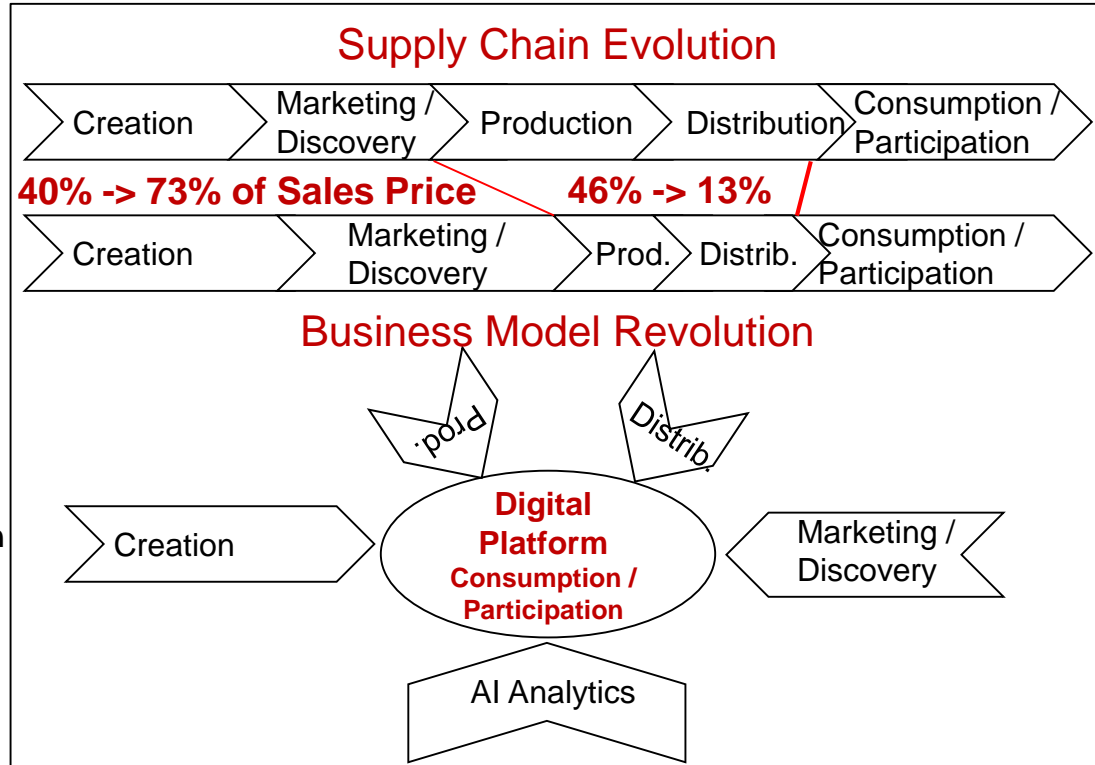
Digital Innovation & AI - Media Business Model

US Media Stock Indices



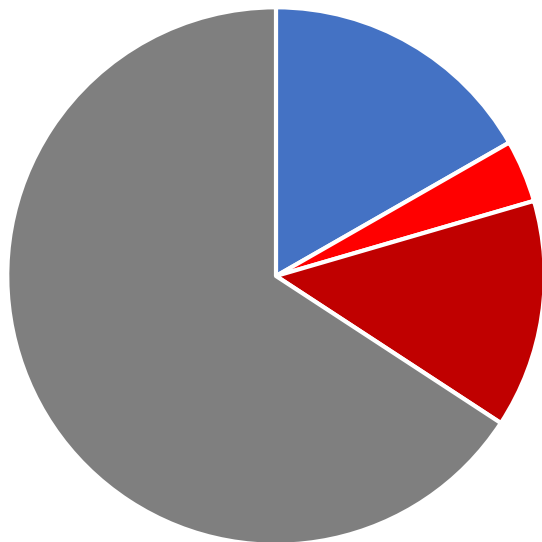
Source: Bloomberg (2017); PWC (2013); Oliver (2017)

Digital Revolution in Music Production



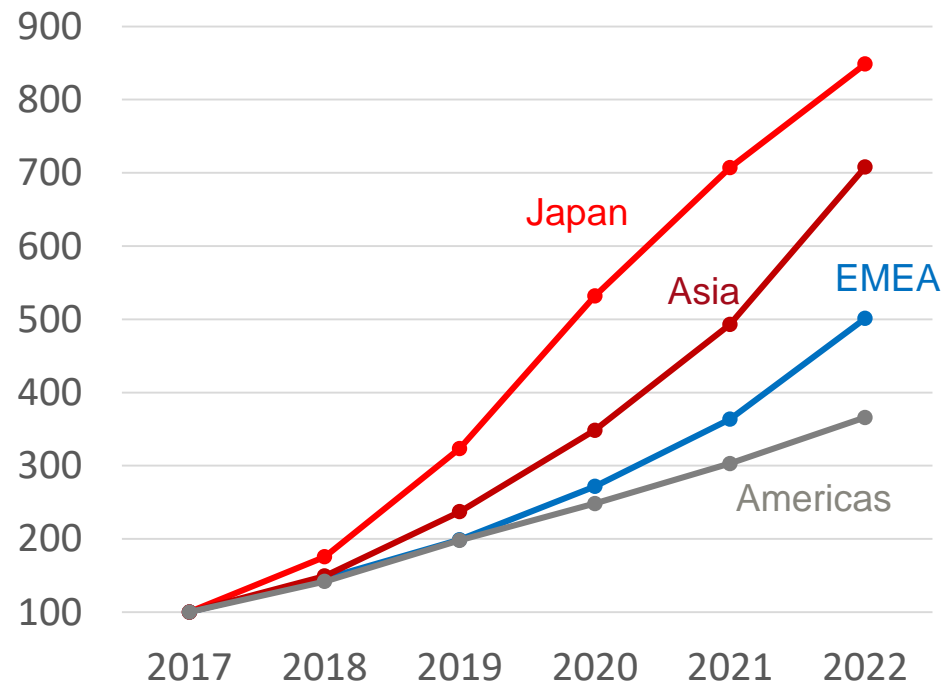
Industrial AI – Potential for Japan?

AI Applications in Manufacturing
(Share of 2024 World Market Forecast)



■ EMEA ■ Japan ■ Asia (ex JP) ■ Americas

Industrial AI Applications in Manufacturing
(2017=100; USD Spending Base)



Source: IDC (2018) -Worldwide Semiannual Cognitive Artificial Intelligence Systems Spending Guide - 2017H2.

Focus on Industrial AI – How much potential?

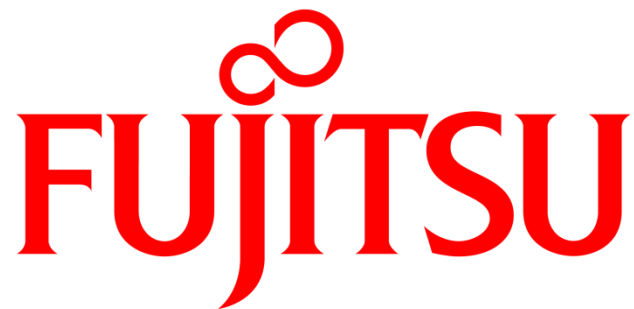


- Industrial AI remains too limited for broad-based digital transformation and business models of SMEs

- AI in a digital economy – Social value added
 - Digital transformation is key

- EU AI strategy – Data integration and ecosystems
 - Complex re-regulation results in slow progress

- Focus on Industrial AI – How much potential?
 - Potential for SMEs too limited



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