

Implementing the Sensing Enterprise: IoT-driven Enterprise Systems in next generation EU Industries

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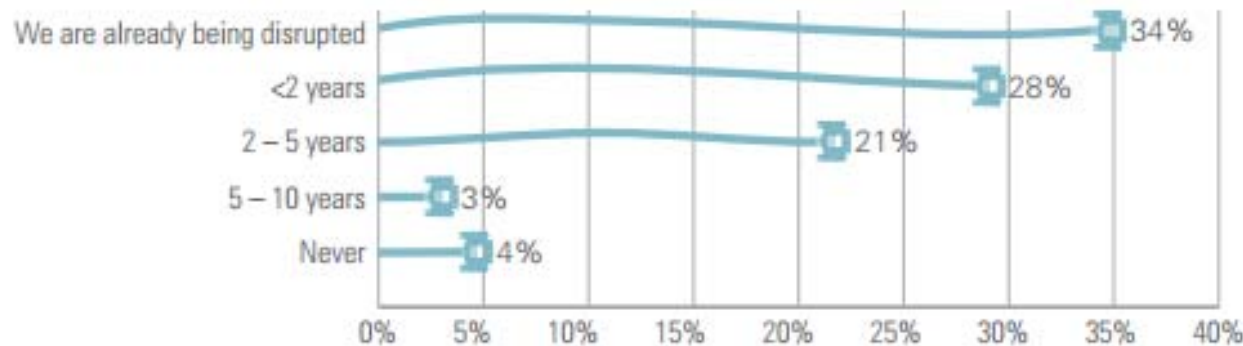
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The “Digital” Hype

When do you think your business will feel properly impacted by digital disruption?

Majority of companies will experience disruption within two years



Source: <https://assets.kpmg.com/content/dam/kpmg/pdf/2015/10/digital-business-its-time-for-cios-to-lead.pdf>

Digital Economy

- €3.2 trillion in the G-20 economies
- Contributing up to 8% of GDP, powering growth and creating jobs
- Over 75% of the value added created by the Internet in traditional industries, due to higher productivity gains

Source:
http://ec.europa.eu/growth/sectors/digital-economy/importance/index_en.htm



Günther H. Oettinger
Commissioner, Digital
Economy & Society

*“...To be absolutely clear: **business as usual will not work!***

*Our overall objective is to **maximise the benefits from digital technologies** in every industry in Europe while ensuring that our workforce is adapting to the digital era.*

*In order to reach this goal and to make industry 4.0 a reality in Europe I propose to take action in four key areas: **digital innovation hubs; leadership in platforms for digital industry; closing the digital skills gap; and smart regulation for smart industry.** ...”*

Speech at Hannover Messe

Digitising Industry: the Digital Crusade?



IoT

Cloud

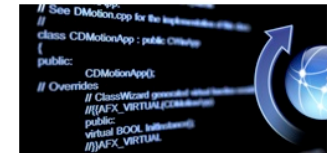
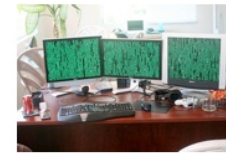
OSS

BigData

CPS

Why Software Is Eating The World

By MARC ANDREESSEN



THE WALL STREET JOURNAL

CLICK HERE TO ACCESS!

UBER



amazon

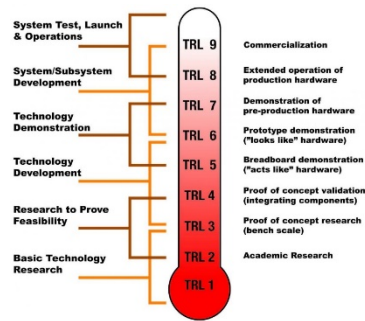


My own theory is that we are in the middle of a dramatic and broad technological and economic shift in which software companies are poised to take over large swathes of the economy

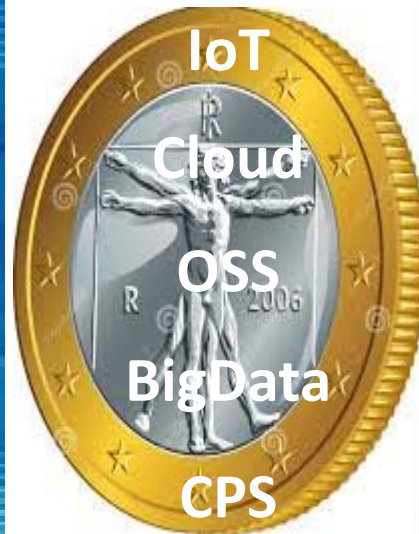
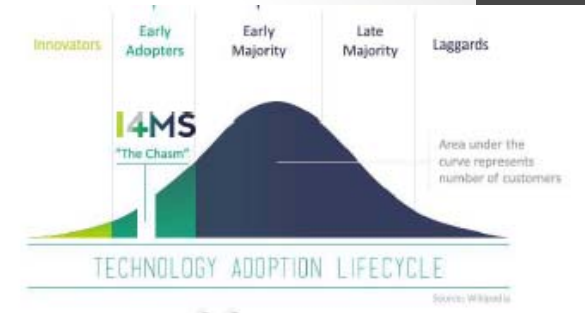
— Marc Andreessen —

AZ QUOTES

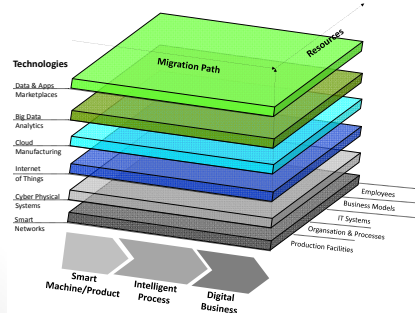
A bi-directional transformation IT→OT and OT→IT



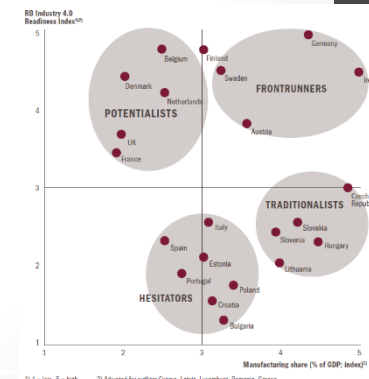
Digitising Industry



MIGRATION FRAMEWORK



Industry 4.0



2

A 6Ps Digital Innovation Vortex in Digital Innovation Hubs

P1 Products:

- Smart (IoT-enabled) Products
- Product-Service Systems
- Individualised Products

P2 Production Systems:

- Green & Sustainable
- Near-shoring, zero KM SC
- Attractive Workplaces

P3 Performance:

- Real Time IoT Architectures
- Edge and Fog Computing
- Real Time Data Analytics



P4 People:

- Human-centered
- Digital Up- Re-skilling
- Young Talents attraction

P5 Platforms:

- Open Source / Standards
- Collaboration / Interoperability
- Next Generation Ent Systems

P6 Partners:

- Non-hierarchical collaboration
- Open LivingLabs & Startups
- Digital Innovation Hubs

One Example: Uber and Daimler (Product)

Uber Has Apparently Ordered \$10 Billion Worth of Mercedes S-Class Sedans

That's a lot of expensive luxury cars for an app dedicated to undercutting local taxi prices.



[Reuters reports](#) that Uber has placed a long-term order with Daimler to the tune of "at least 100,000" S-Class sedans. That, fair reader, is a car that costs something like \$100,000 each, making this potentially a \$10 billion deal. (Mar 18, 2016)

The future of EU Industry



Industrie 4.0 is changing the paradigm of manufacturing strategy

Characteristics of new Industrie 4.0

- | | |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 FROM MASS PRODUCTION TO MASS CUSTOMIZATION | Flexible production, short production lead time enabling new business models emergence and affordable customization |
| 2 FROM VOLUME SCALE EFFECT TO LOCALIZED & FLEXIBLE UNITS | From large factories specialized per product in LCC to smart factories with high technological equipment enabling to produce at competitive cost everywhere |
| 3 FROM PLANNED MAKE TO STOCK TO DYNAMIC MAKE TO ORDER | From an organized production, based on planning and forecast and supported by stocks, to dynamic production and yield management, on demand |
| 4 FROM PRODUCT TO USAGE | Integrated conception, services being a key element of the business model/ decision factor |
| 5 FROM COST DRIVEN TO ROCE DRIVEN | Higher ROCE for lower Capital employed as complexity is transferred on numeric |
| 6 FROM TAYLORISM TO FLEXIBLE WORK ORGANIZATION | Remote work (augmented reality, permanent connectivity), Tasks parallelism, flexible organization and management |
| 7 FROM HARD WORKING CONDITIONS TO ATTRACTIVE WORK SPACE | Development of complex artisanal production, with clean/ highly connected work space, white collars intensive |

Most industrial players have launched Industrie 4.0 pilots to test those solutions in legacy plants

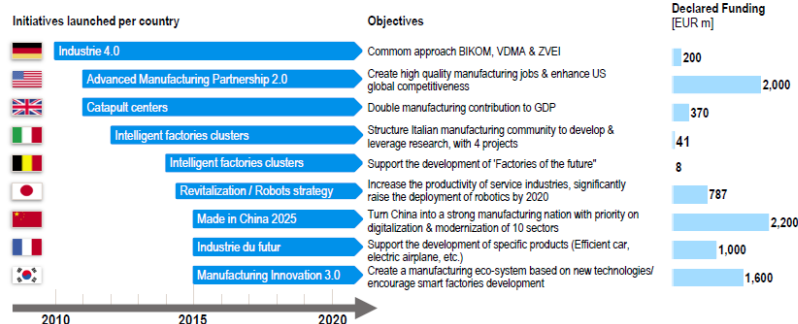


Industrie 4.0 allows to reduce capital employed utilization and increase profit, thus strong impact on ROCE

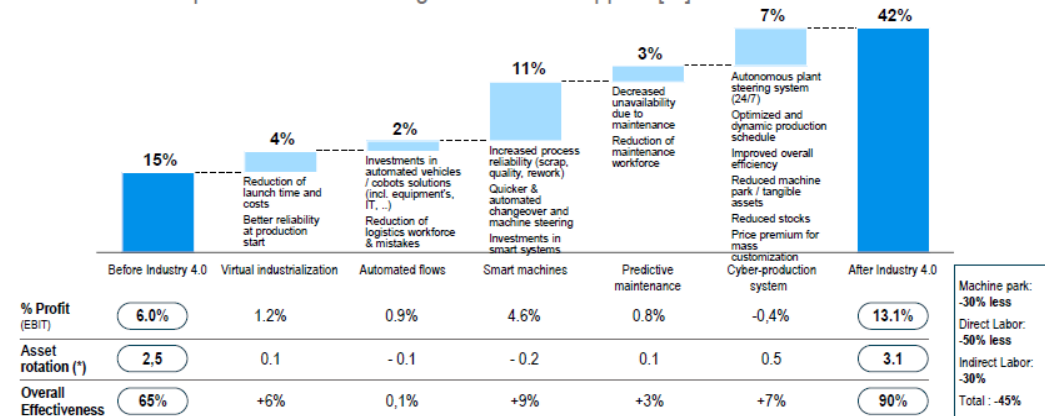
ROCE evolution per lever for an average Tier-1 Auto supplier [%]

All countries have launched Industrie 4.0 initiative, Germany and US first, followed by China, Japan and rest of Europe

Worldwide initiatives & related investment announced



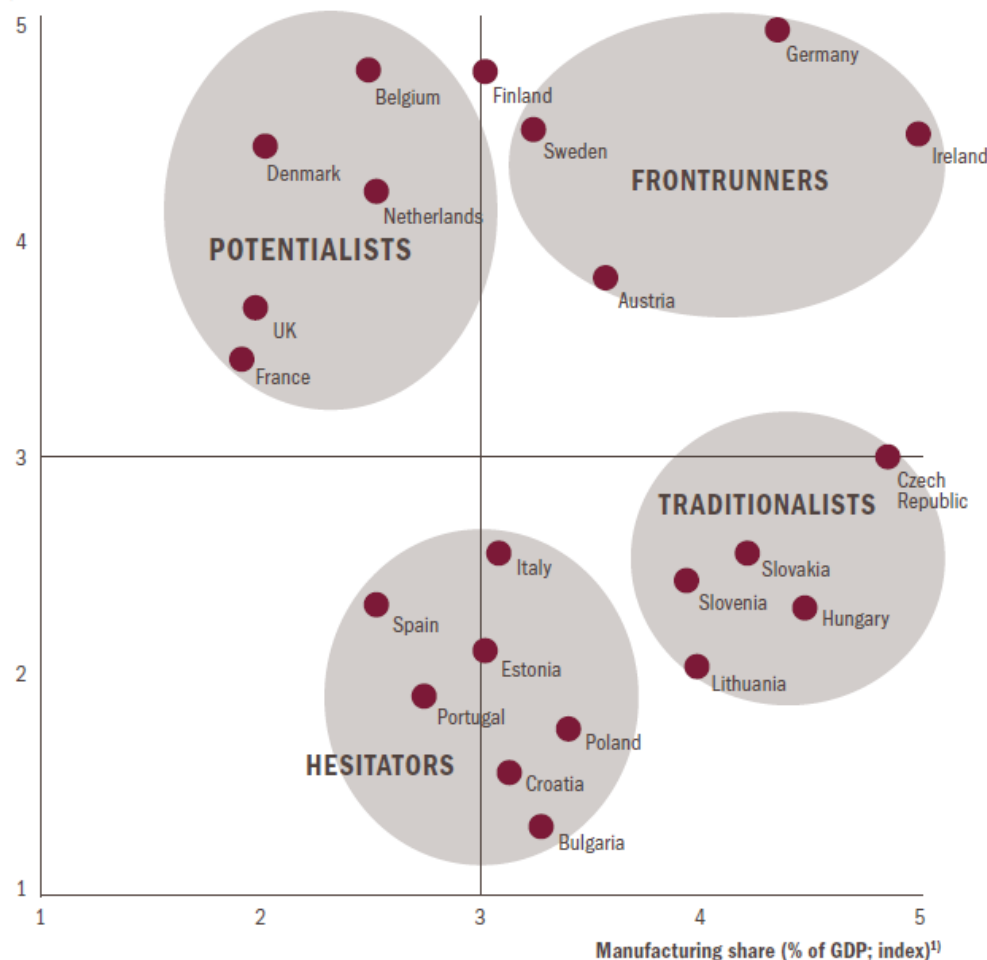
Source



Industrie 4.0 readiness index



RB Industry 4.0
Readiness Index¹⁾²⁾

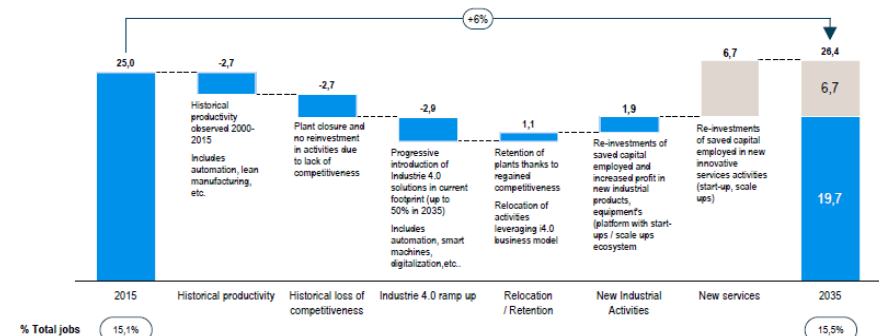


1) 1 – low, 5 – high

2) Adjusted for outliers Cyprus, Latvia, Luxemburg, Romania, Greece

Employment destruction / creation in Europe following Industrie 4.0 implementation in 2035

Industrie job destruction and creation [millions, Western Europe]



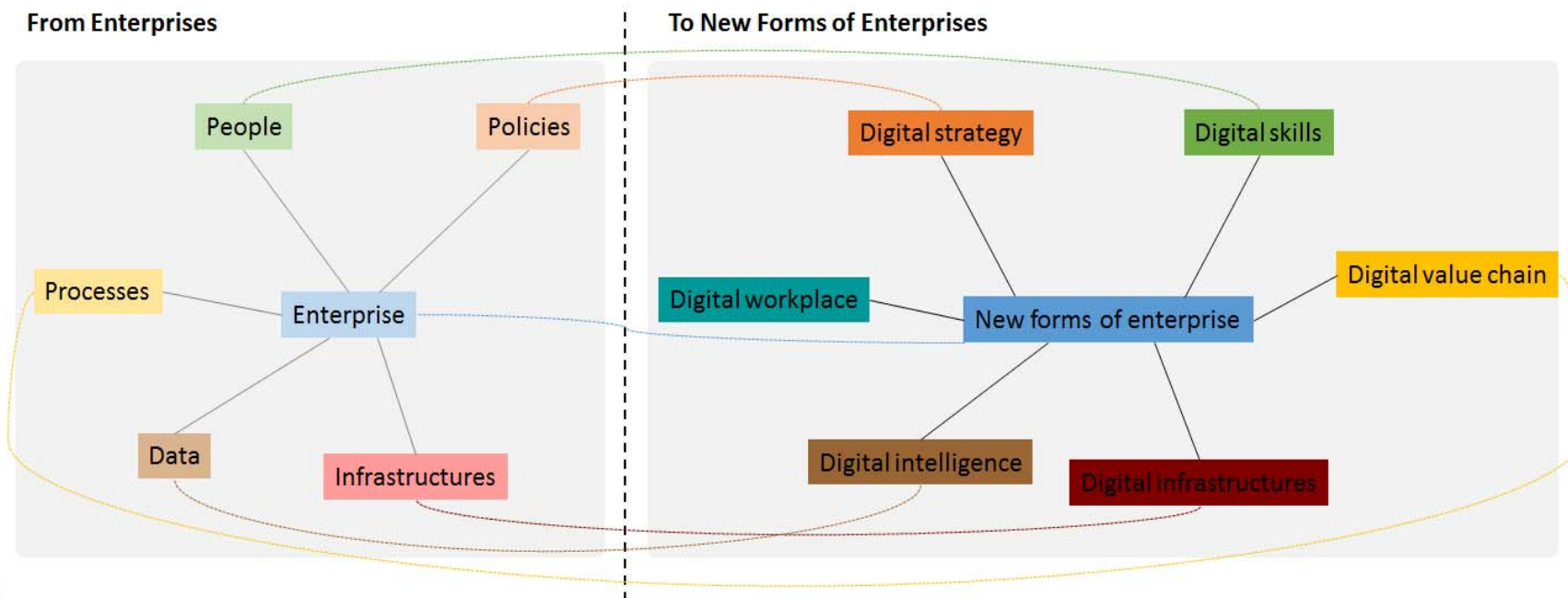
Risks / Challenges Industrie 4.0

	COMMON PLATFORM INFRASTRUCTURE	Common infrastructure enabling communication vertically / horizontally and throughout development
	COMPETENCES DEVELOPMENT	New competencies emerging : data scientist, developers, data managers, etc. Education of people at all level
	LABOR FLEXIBILITY	Flexible labor environment Entrepreneurial contract
	SKILL EVOLUTION	New qualification of tasks (new tools, tasks and methodologies) Evolution of jobs : less repetitive tasks, more client oriented tasks
	CYBER SECURITY	Ensure protection of data and technologies
	LEGAL & STANDARDS ENVIRONMENT	Create standards/ norms to support disruption Develop common infrastructure (5G, ..)

“New forms of enterprises”

New forms of enterprises are defined as “**Digital Enterprises** of the Future, driven by **constant business model transformation and innovation**, acting as multi-sided platforms built on -as well as emerging from- digital innovations at the global, as well as local level, to produce **shared value for their whole ecosystem**”.







(FutureEnterprise, 2014)



Sensing Enterprise is as “an enterprise **anticipating future decisions** by using multi-dimensional information captured through **physical and virtual objects** and providing added value information to enhance its **global context awareness**”.

(FInES Cluster, 2013)

Business opportunities are tremendous...

						
	Internet of Things	Biz Intelligence	Big Data	eCommerce	Enterprise Social Networks	Intellectual Property
Current Market Size	\$1.9 Trillion (2013)	\$14.4 Billion (2013)	\$8.6 Billion (2013)	\$1.7 Trillion (2013)	\$800 Million (2013)	\$180 Billion (2011)
Future Market Size	\$7.1-14.4 Trillion (2020)	\$16.8 Billion (2015)	\$16.6 Billion (2015)	\$6.7 Trillion (2020)	\$4.5 Billion (2016)	\$209 Billion (2016)
Yearly Growth Rate	20.7-33.5%	8%	40%	19.7-9.9%	78%	9%
Biggest Obstacle	High Upfront Investments	Experience & Customisation	Data Supply & Structure	Dominant Players in Market	Lack of Interoperability & Trust	Legal System Challenges

Massive potential for Europe

- 315 million daily Internet users
- €415 billion in additional GDP/year

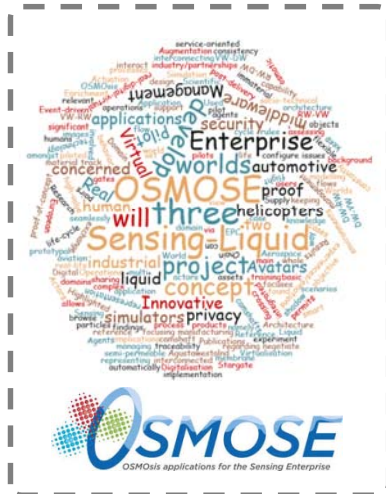


Digital Single Market

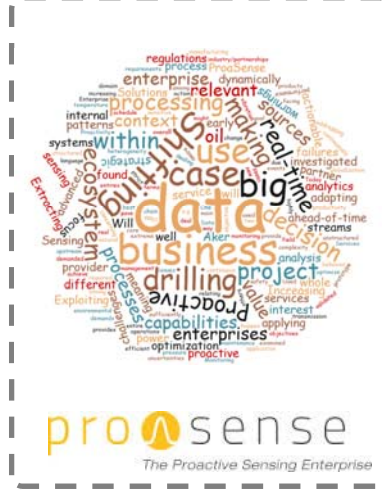
But... Europe's digital market is not her own...

- 42% of online economic activity is within individual Member States' borders;
- Only 4% is cross-border:
 - 52% of attempted cross-border orders within the EU are geo-blocked
- 54% of online economic activity involves US-based services

5+1 Sensing Enterprise Projects



Interconnecting Real, Digital & Virtual Worlds



Proactive Sensing Enterprise



Sensing & Simulation in Factory Workplace



Capability Driven Development



RFID Data Management



CSA for Digital / Sensing Enterprise

Offerings to Stakeholders

Enterprises SMEs Web Entrepreneurs



MOOC on “New Forms of Enterprise: How to deliver digital business innovations and capture value”



Enterprise Lab with Education and Business Seeds



Digital Business Playground

Researchers



Research Roadmap on new forms of enterprises



Digital Business Innovation Framework

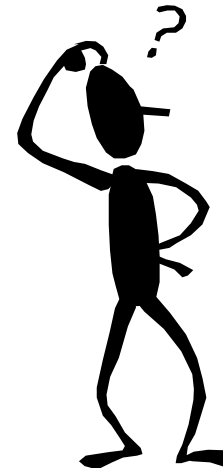


Enterprise Lab with Research Seeds

Policy Makers



Policy Recommendations for new forms of enterprise and digital transformation



Thanks for your attention!

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