

Implementing Industrie 4.0: Opportunities, Challenges and International Cooperation

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Digitisation of the Economy

Digitisation leads to a fundamental change of economic processes and industries; it changes the way we work and the way we consume.

- Examples: driving a car, organising a value chain (additive manufacturing)
- It is a concern for any (industrialized) economy

However, there are **differences in**

- the **understanding** of digitisation and interconnecting industrial processes
- the **aims** which are pursued
- **political processes** and **measures**

Industrie 4.0 as Driver of Competitiveness

Manufacturing is the core of the German economy

- 15 Million Jobs directly or indirectly dependent on Industry
- Highly Qualified Employees
- High share of exports (75%)
- Strength in Innovation, especially SMEs

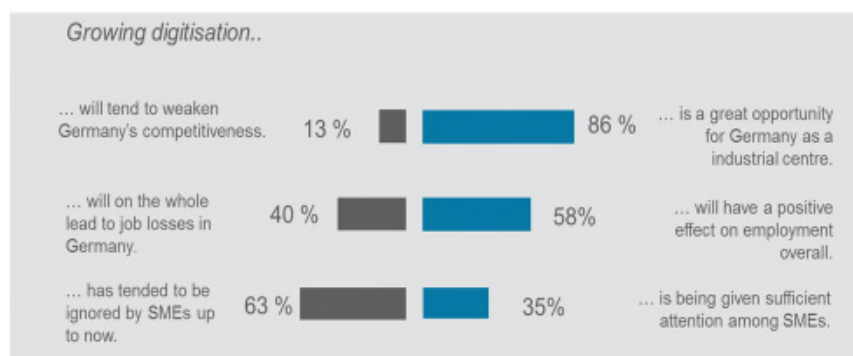
The digitisation of the economy is a **key policy issue for the coming years.**

This is **equally true of**

- **Companies** – investing in new technologies, transforming business models
- **Employees** – meeting new skill requirements
- **Consumers** – asking for and adapting new digital products / services
- **Policymakers** – adapting legal framework, policy support instruments, etc.



Impact of Industrie 4.0 on the Competitiveness of German Industry – Survey Results



What is Industrie 4.0?

1. Scope of *Industrie 4.0*:

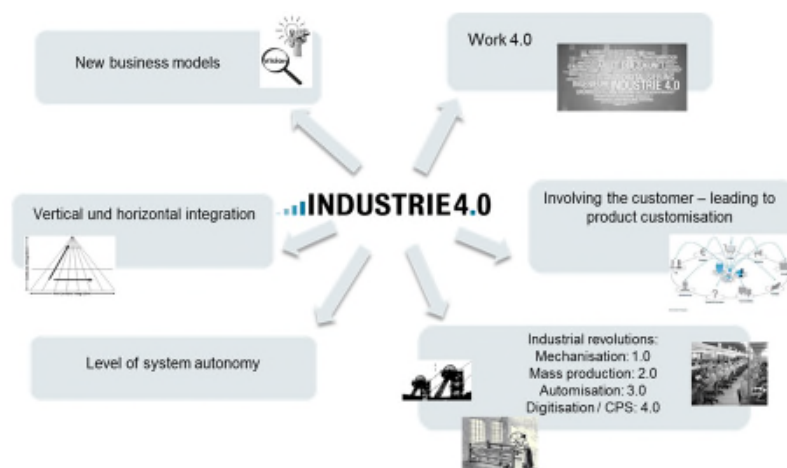
- Huge impact on German industry overall
- But also on German society

2. Our Understanding of „*Industrie 4.0*“

- *Industrie 4.0* / *digitisation of industry* is used to describe the merging of production technology and information technology.
- *Industrie 4.0* represents a new way of organising value chains: people, machines, plant, logistics and products communicate and cooperate directly with one other. Big data and data analytics as key drivers.
- ⇒ *Industrie 4.0* in Germany is predominantly seen as the optimisation of production processes along the whole value chain incl. new business models.



Scope of Industrie 4.0



Economic Impact of Industrie 4.0 in Germany

Microeconomic Level

- Flexible, individualised production and products designed around the customer's needs, cost-efficiency, new (data based) business models

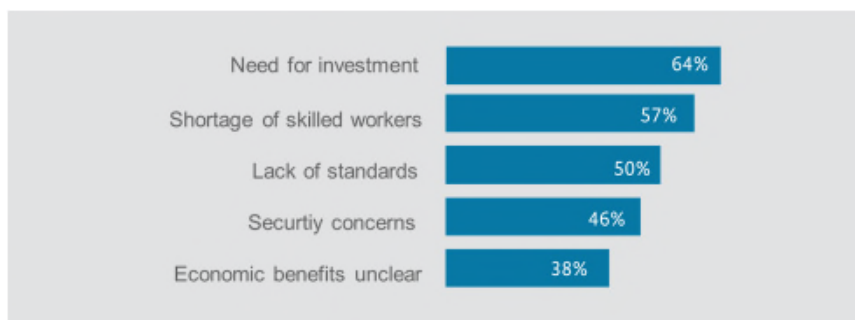
Macroeconomic Level

- Gross value-added expected to increase by €267 billion up to 2025
- Productivity expected to increase by up to 30%, costs to decrease by 2.6% per year
- Investment expected to increase by €40 billion p.a. in the medium term
- Employment expected to increase by 400.000 up to 2025, although a massive structural change on the labour market is to be expected

⇒ In summary: Digitisation of industrial production processes will be one of the main drivers of economic growth / structural change over the coming years.



Main Challenges for Implementing Industrie 4.0 (Part 1) – Survey Results Germany



Main Challenges for Implementing of Industrie 4.0 (Part 2)

1. Responding to the **physical and security-related challenges** of large data flows:
 - A **well developed digital infrastructure**: The amount of data that is being exchanged will increase exponentially, and it needs to be exchanged in real time.
 - **Standards**: The number of connected devices (50 billion by 2020) will drastically increase as digitisation and the networking of production processes continues.
 - **Data Security**: The exchange of data and the storage of data in the cloud must be secure.

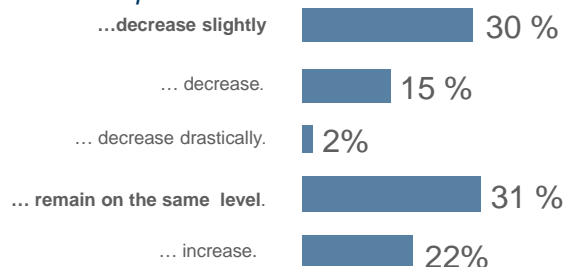
⇒ Conditions for attracting investments from companies (mostly technical).
2. High degree of **openness to digital solutions**: in company management, workforce and in the general public:
 - New business models and work patterns can only be introduced successfully if there is a consensus between companies and their employees.



Main Challenges for Implementing Industrie 4.0 (Part 3)

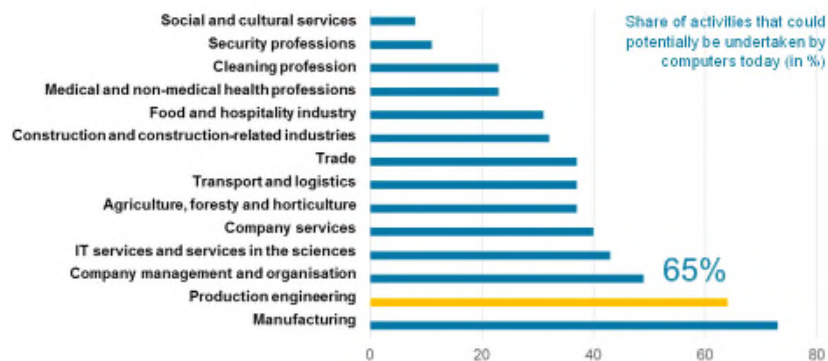
3. Mobilise SMEs:
 - SMEs are the backbone of German Economy
 - But: They are often not aware of the benefits of Industrie 4.0

Costs are expected to...



Main Challenges for Implementing Industrie 4.0 (Part 4)

4. Challenges for the workforce



Main Challenges for Implementing Industrie 4.0 (Part 5)

5. International cooperation in the field of Industrie 4.0

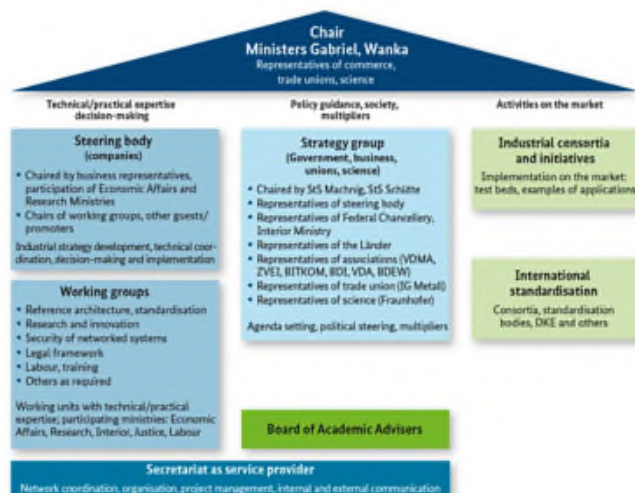
- Principles
 - Mutual advantage
 - Driven not only by government, but first and foremost by industry
 - Pursue similar goals in international organisations (e.g. standards)
 - Implement a similar structure (e.g. Platform Industrie 4.0 structure)
 - Mutual learning from best practise
- Forms of cooperation
 - Government-level, but involving companies and platforms also
 - Platform-level
- Clearly defined outcome
- ➔ Need for international cooperation to adress the challenges of digitisation. Germany/Platform Industrie 4.0 has so far established cooperation with EU Commission, China, Japan, France, IIC and within the G7/G20 context.

Progress on Industrie 4.0 in Germany

- Launch of **Plattform Industrie 4.0** at the Hannover Trade Fair (2015)
 - Incorporates all of the relevant actors across society: **government, business, academia and trade unions**
 - **Central national point of contact** (also for international partnerships and alliances). One of the world largest networks for Industrie 4.0 with more than 250 actors from over 100 organisations directly involved.
 - Five pre-competitive working groups on: **standards, research and innovation, security in connected systems, legal framework, labor and training issues**
 - **Goals of the Platform:**
 - Develop concrete recommendations for industry and policy makers regarding the various fields of action.
 - Develop/Show options and use cases for implementing Industrie 4.0 within businesses; create awareness for new business models
 - Mobilizing SMEs and create sensitivity for the topic of digitisation



Structure of the Plattform Industrie 4.0



Outcome of the Plattform Industrie 4.0



➤ Mobilising SMEs

- (i) **Online map** showing **more than 200 successful examples** of Industrie 4.0 implemented at companies (11/2015)
- (ii) **Regional events for SMEs** together with DIHK (since 02/2016)
- (iii) Establishment of **competence centers for SMEs** (advising SMEs in implementing Industrie 4.0 solutions (12/2015),
- (iv) **Labs Network Industrie 4.0** for SMEs ("Testbed Infrastructure"), initiative by private companies / research institutes (11/2015)
- (v) Government support schemes esp. for SMEs and R&D.

➤ Standardisation: RAMI4.0 in national standardisation procedure

➤ Adapting "Legal Framework 3.0" to "Industrie 4.0"

➤ Development R&D Roadmap (currently under revision)



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