

Plattform Industrie 4.0

Digital Transformation Made in Germany

Daniel Senff

Workshop „Industrie 4.0 – Chancen für die Photonik“

Grüsch, 04.10.2016

Industrie 4.0

Towards the fourth industrial revolution

*„Durch die digitale Veredelung von Produktionsanlagen und industriellen Erzeugnissen bis hin zu Alltagsprodukten (...) entsteht hier eine **Brücke zwischen virtueller ("cyber space") und dinglicher Welt** bis hin zur wechselseitigen feingranularen Synchronisation zwischen digitalem Modell und der physischen Realität.“*

Kagermann, Lukas, Wahlster (April 2011)

Robert Bosch GmbH – Werk Blaichach (BhP)

Integrated Industrie 4.0 approach

- ▶ Implementation of Industrie 4.0 within the scope of an integrated approach
- ▶ Piloting, implementation, and productive use of Industrie 4.0 applications in numerous production and logistics projects
- ▶ Communication of the underlying understanding of Industrie 4.0 by the plant via various channels: helps workforce, customers, and partners gain a uniform understanding



© Bosch GmbH



“For the site, Industrie 4.0 is not an end in itself. Rather, development into a smart factory is viewed as necessary evolution for the purpose of securing the competitive ability of our own sites as well as that of Germany as a business location.”

Robert Bosch GmbH

Tischlerei Eigenstetter GmbH

Robot milling center for complex and high-quality single-unit production of wood products

- ▶ Within the scope of a project sponsored by ZIM (Central Innovation Programme for SMEs), Tischlerei developed an automated process for machining very large, complexly shaped components made of wood and plastic.
- ▶ An articulated-arm robot known from large-scale production is used in the production process. This robot was adapted for woodworking and equipped with a special hold and control system.



© Tischlerei Eigenstetter GmbH



*“By using the industrial articulated-arm robot, Tischlerei was able to become a supplier for craftsmen, architects, and industry. The automated process enabled the company to its boost material and process efficiency: **Very large milled parts of high quality** can be offered to customers at **comparatively low prices.**”*

Tischlerei Eigenstätter

KapaflexCy

Self-organized capacity flexibility for Industrie 4.0

- ▶ Rigid on-site working hours from 7:00 a.m. to 4:00 p.m. are a relict of the past. In the future, working groups will coordinate their working times via smartphone. Work will be performed as needed – precisely when a customer places an order.
- ▶ The research project supersedes the usual “general” workforce flexibility. As a contribution to the Industrie 4.0 future project of the German federal government, KapaflexCy is showing forward-looking strategies and smart assistants for the flexible production work of the future.



© Bernd Müller, Fraunhofer IAO



Project partners: BorgWarner, Bruker Optik, Flughafen Stuttgart, Institut für Arbeitswissenschaft und Technologiemanagement, Introbest, Kaba, SAP, and Trebing & Himstedt

*“The new tool allows our employees to organize **short-notice shift scheduling** themselves using information available **in real time and mobile devices**,”*

Brady Ericson, President and General Manager, BorgWarner Emissions Systems

What do we mean by Industrie 4.0?

The 4th industrial revolution leads to...

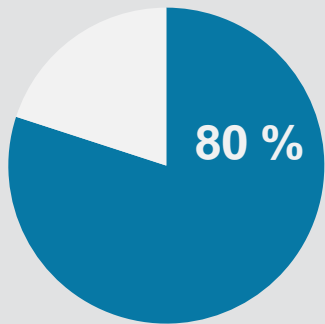
- smart services
- cloud computing
- order-driven production
- ...networked production**
- ...new business models**
- cyber-physical systems
- broadband infrastructure
- vertical and horizontal integration
- leadership
- qualification
- ...changing work environments**
- human-machine interaction
- ...new legal issues**
- work organisation
- big data
- data sovereignty
- standards
-smart factories**
- data protection



Industrie 4.0

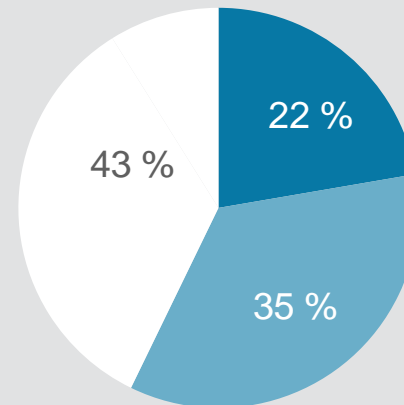
Chances and Challenges for SMEs

How many companies are putting Industrie 4.0 into practice already?



of the companies in the fields of **electric engineering industry and the electrical industry** deal with the issue of „Industrie 4.0“.

About **20 %** of these companies have implemented concrete Industrie 4.0 solutions.



Companies in the field of **machinery and plant engineering**

- Yes, intensively.
- Yes, marginally.
- No, but we heard about it.
- No, we have not heard about it yet.

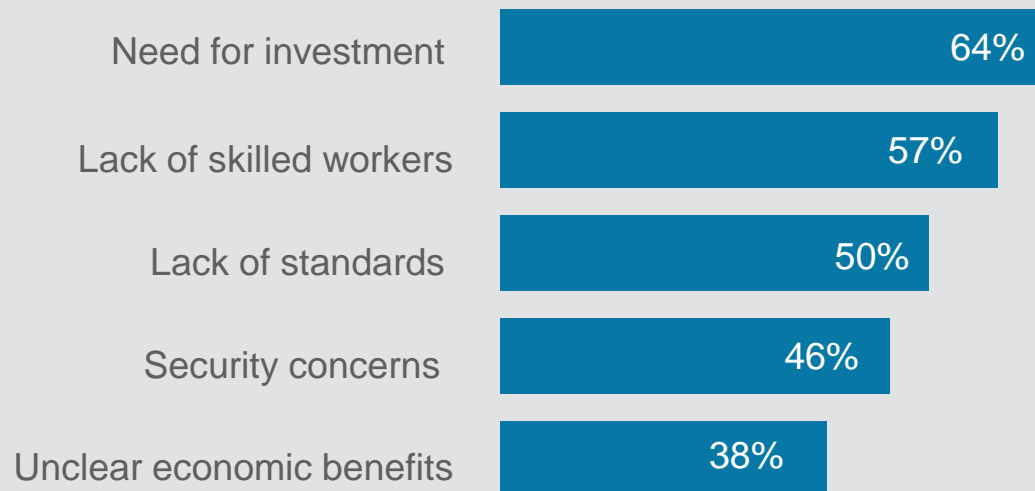
Source: Survey among members of Zentralverband Elektrotechnik- und Elektronikindustrie e.V. (ZVEI), Oct 2014

Source: VDMA: Industrie 4.0-Readiness (Oct 2015); N= 431 companies in machinery and plant engineering with more than 20 employees

Industrie 4.0

Chances and Challenges for SMEs

What are the challenges?



Plattform Industrie 4.0:

*Shaping the digital transformation
together*

The digitale Transformation Needs a broad-based foundation

Industrie 4.0...

- ▶ ... is a project of and for society as a whole...
- ▶ ... , which requires a close alliance amongst the private sector, academia, politics, trade unions and associations ...
- ▶ ... and needs to be translated into practice and be implemented now.



The **Plattform Industrie 4.0** provides support for the coordinated and organised transition into the digital economy in Germany

The Plattform Industrie 4.0

Guarantees impact and visibility



Recommendations



SME
Mobilization



National &
International
Cooperation



The working groups

*Impulse generator of the
Plattform Industrie 4.0*

The Working Groups

Five thematic priorities

Reference architectures, standards and norms

Chair:
Dr. Peter Adolphs,
Pepperl + Fuchs

Research and innovation

Chair:
Johannes Diemer,
Hewlett Packard Enterprise

Security of networked systems

Chair:
Michael Jochem,
Robert Bosch GmbH

Legal Framework

Chair:
Dr. Hans-Jürgen Schlinkert,
ThyssenKrupp

Work, education and training

Chair:
Dr. Constanze Kurz
IG Metall

The Working Groups

From disussion papers to recommendations



Consolidated results of leading expert on today's Industrie 4.0-challenges

- ▶ RAMI 4.0 - Comprehensive reference architecture for industry 4.0
- ▶ Future scenarios for Germany's production industry
- ▶ Fundamentals on IT-security in connected value chains for SMEs
- ▶ Legal Framework: Industrie 4.0 and law 3.0?
- ▶ Work, education and training for and in a digitized industry

The Plattform Industrie 4.0:

Service agency for the digital transformation

Virtual Map Industrie 4.0

Where Industrie 4.0 is put into practice already today.

250 examples of application of Industrie 4.0...

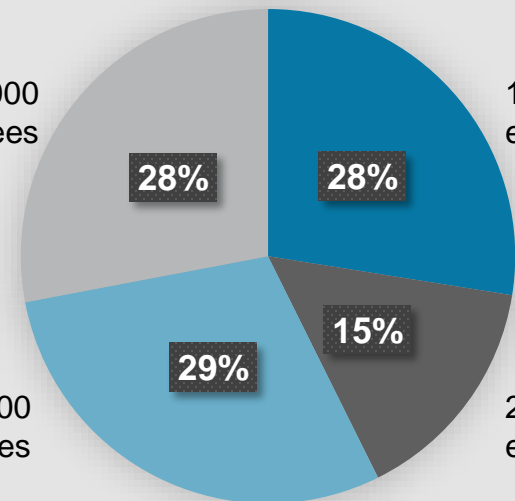
...within **small, medium and large sized** enterprises from various branches.

Number of employees within the enterprises



More than 15.000 employees

1-250 employees



5.000-15.000 employees

250-5.000 employees

[multiple answers possible]

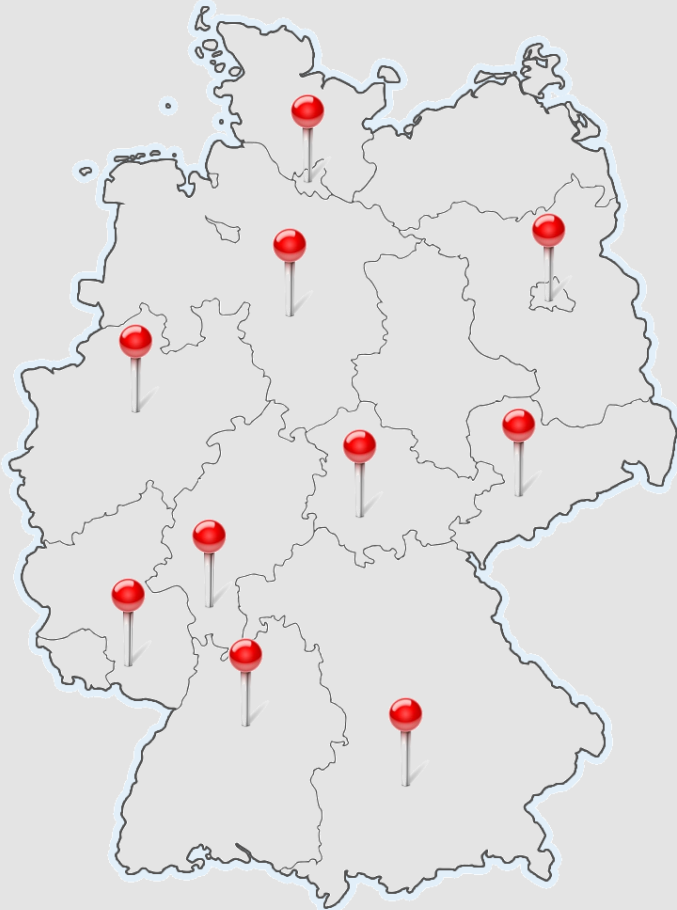
<http://www.plattform-i40.de/I40/Landkarte>



Only available in German

Competence Centres for SMEs

Supporting companies in the process of digitization



National Competence Centers on the Digitalization of the Economy

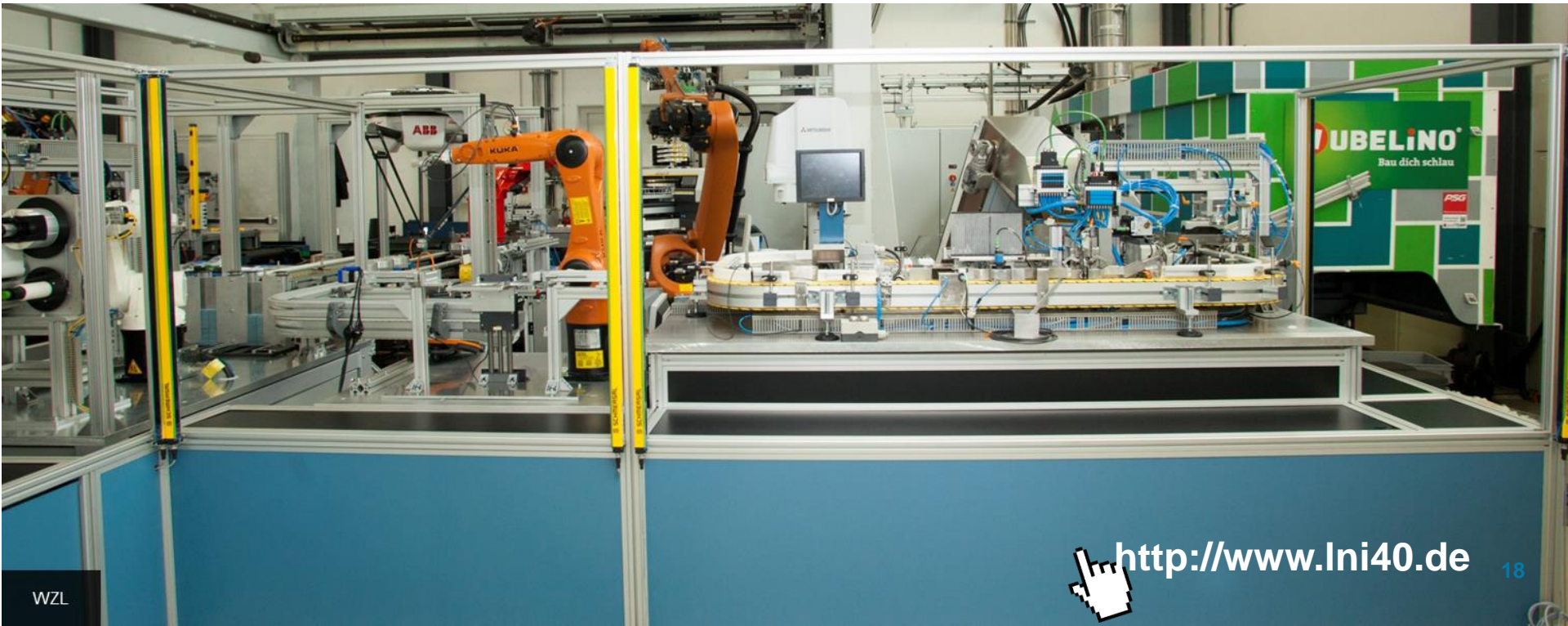
- ▶ established as **regional point of contact** for the German Mittelstand
- ▶ provide **hands-on information** on specific opportunities of digitalization
- ▶ assist companies in **developing own digital solutions** and projects
- ▶ offer individual support on **training and education**

Industrie 4.0 testbeds

First-Class testing facilities for hands-on evaluation

Labs Network I40: **Coordinated Network of publicly available testing facilities** for suppliers and end users

- ▶ supported by **public funding program** (BMBF) to minimize entry barriers for SMEs



Plattform @ Events

Where Industrie 4.0 can be discussed practically

The platform mobilizes within
Germany...



Industrie 4.0 @Mittelstand
Series of events with Chamber of
Trade and Industry all over
Germany



... and continuously invites to exchange latest
developments, questions and views on Industrie 4.0

The Plattform in the world

As an international hub...

...the Plattform is creating a **strong international network** and maintains a dialogue with international alliances:

Industrial Internet Consortium (IIC)



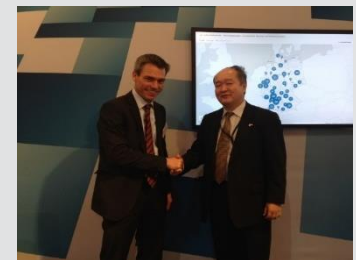
cooperation with **China**



Alliance Industrie du Futur **France**



Robot Revolution Initiative **Japan**



... as a **central contact** for international cooperations with European, American and Asian partners.

Plattform Industrie 4.0

Platform's Project Office

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