Overview
Plattform Industrie 4.0

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What do we mean by Industrie 4.0?

The 4th industrial revolution leads to...

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

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Industrie 4.0
What is the added value for my company?

Assure Quality  Minimize Time-to-Market  Increase Productivity  Expand Flexibility
Industrie 4.0
Chances and Challenges for SMEs

How many companies are putting Industrie 4.0 into practice already?

- About 20% of these companies have implemented concrete Industrie 4.0 solutions.
- 80% of the companies in the fields of electric engineering industry and the electrical industry deal with the issue of "Industrie 4.0".

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
A change with potential for growth

78 billion Euro until 2025!
Industrie 4.0
What are the challenges for companies?

- IT - Competences
- Data Security
- Costs for Investments
- Infrastructure
- Work and Company Structures
- Standards
Industrie 4.0
Production is reorganised: as well at work.

What profiles of requirements are directly affected by substitutability?

Share of activities that can already be replaced by machines today (in percentage)

<table>
<thead>
<tr>
<th>Professions</th>
<th>Potential of Substitutability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helping Professions</td>
<td>46.0</td>
</tr>
<tr>
<td>Skilled Employee</td>
<td>45.4</td>
</tr>
<tr>
<td>Specialists</td>
<td>33.4</td>
</tr>
<tr>
<td>Experts</td>
<td>18.8</td>
</tr>
</tbody>
</table>

Source: IAB-Kurzbericht 24/2015: Folgen der Digitalisierung für die Arbeitswelt: „In kaum einem Beruf ist der Mensch vollständig ersetzbar“ (K. Dengler/ B.Matthes)
Plattform Industrie 4.0:
Shaping the digital transformation together
The digital 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 Platform Industrie 4.0 provides support for the coordinated and organised transition into the digital economy in Germany
Plattform Industrie 4.0
Structure

Chair
Ministers Zypries, Wanka
Representatives of commerce, trade unions, science

Technical/practical expertise decision-making
Steering body (companies)
- Chaired by business representatives, participation of Economic Affairs and Research Ministries
- Chairs of working groups, other guests/promoters
- Industrial strategy development, technical coordination, decision-making and implementation

Strategy group (Government, business, unions, science)
- Chaired by StS Machnig, StS Schütte
- Representatives of steering body
- Representatives of Federal Chancellery, Interior Ministry
- Representatives of the Länder
- Representatives of associations (BDEW, BDI, BITKOM, DIHK, VDA, VDMA, ZVEI)
- Representatives of trade union (IG Metall)
- Representatives of science (Fraunhofer)
Agenda setting, political steering, multipliers

Industrial consortia and initiatives
Implementation on the market: test beds, examples of applications

International standardisation
Consortia, standardisation bodies, DKE and others

Working groups
- Reference architecture, standardisation and norms
- Research and innovation
- Security of networked systems
- Legal framework
- Work, education and training
- Others as required
Working units with technical/practical expertise; participating ministries: Economic Affairs, Research, Interior, Labour

Scientific Advisory Committee

Activities on the market

Secretariat as service provider
Network coordination, organisation, project management, internal and external communication

Labs Network Industrie 4.0
Standardization Council I4.0
The Plattform Industrie 4.0
Guarantees impact and visibility

- Recommendations
- SME mobilization
- National and international cooperation

... for sciences, economics, politics

information, mobilisation, practical examples

networking, exchange
Plattform Industrie 4.0
Five things we do.

1. Focus on the needs of businesses and of end users
2. Create a central point of contact (for international partnerships and alliances)
3. Ensure acceptance through high transparency and participation
4. Develop a common language, objective and key messages
5. Establish clear structures and reliable processes for the day-to-day work of the platform

The Plattform Industrie 4.0 is the moderator of and catalyst for the exchange amongst all societal actors in the pre-competitive phase.
The Plattform’s Project Office

The central coordination hub

1. In charge of coordinating the network – especially of the committees and working groups
2. Responsible for all organisational matters regarding the Platform, as well as for project management
3. Manages the internal and external communication of the Platform
4. First point of contact for all enquiries

The Secretariat is the coordinator of the Plattform Industrie 4.0 and the communication manager of the Plattform.
The working groups

*Impulse generator of the Plattform Industrie 4.0*
The Working Groups
The heart of the platform

- Five Working groups with focus on various thematic priorities
- The groups are understood as a work forum set up by representatives from businesses as well as works councils and trade unions
- Participation in the working groups is open for all interested and qualified representatives from businesses and works councils
- Criteria for the participation are a proven subject-specific expertise together with an effective mandate from the represented organisation and a regional multiplication effect
The Working Groups

Five thematic priorities

Reference architectures, standards and norms
Chair: Kai Garrels, ABB STOTZ-KONTAKT GmbH

Research and innovation
Chair: Johannes Diemer, EntServ Deutschland GmbH

Security of networked systems
Chair: Michael Jochem, Robert Bosch GmbH

Legal Framework
Chair: Dr. Hans-Jürgen Schlinkert, ThyssenKrupp

Work, education and training
Chair: Konrad Klingenburg, IG Metall
Industrie 4.0 needs a „lingua franca“, to guarantee interoperability between various digital ecosystems. Standardization thus plays an important role and should be prioritized. RAMI 4.0 defines an important reference point when developing new standards. By setting up use cases in test beds interoperability is promoted and the aggregated results support further standardization processes.

Standardization is a key aspect for all international cooperation of the Plattform Industrie 4.0
One task of the working group is the localization of norms and standards within the existing reference architecture RAMI 4.0. Following the initiative of the working group RAMI 4.0 has been published and certified as a DIN Specification DIN-SPEC 91345 as well as international norm „IEC PAS 63088: Smart manufacturing – Reference architecture model industry 4.0 (RAMI4.0)“. Regarding a further definition of the RAMI 4.0 architecture, communication interfaces between objects play a central role. The working group has defined the administration shell – providing information on the so called digital twin of the physical object. The definition of further semantics as a lingua franca is another precondition for a connected production within Industry 4.0.
Key Recommendation

The strategic development of the research agenda as well as providing an overview of research activities on Industrie 4.0 is continuously relevant and will show the potentials to synchronize and coordinate existing measures.

At the same time, observations of research and developments need to systematically be mainstreamed especially through scenarios and use cases to promote an ecosystems for Industrie 4.0 innovations.
Security should serve as "Enabler for a digitized production within the value creation networks. Companies need to know their weak points and should be able to evaluate their security demands as well as invest in and set up necessary measures for a secure production system.

Industrie 4.0 doesn’t stop at national borders. To ensure a global interconnectedness, international standards which especially consider security requirements need to be established.
Working Group

Legal Framework

Chair:
Dr. Hans-Jürgen Schlinkert, ThyssenKrupp
What changes have to be made to adapt today's legal framework to the conditions of the digitized manufacturing world?

Important aspects of cooperation beyond companies' borders shall be fixed through **contractual agreements**, rather than setting up a new regulatory framework. The right to personal data protection applies constitutive to the data of persons. **Consequently anonymization and pseudonymizing of data** is of particular importance within the Industrie 4.0 scenarios. Moreover, it is necessary to **adapt the European legal framework** to the new requirements.
The working group analyses five legal fields with regard to their need for adaptation:

- the law of intellectual property, and employment law
  = protection of combinations of data, data leaks, data ownership
- Labour Law
  = working time, codetermination, rights of instruction, Claim to/obligation to training
- civil law and civil procedure law,
- the law of IT security and data protection law,
- product liability law and product safety law,
Qualification, education and training, and competence development should generally be business-oriented and flexible due to the changing requirements. Increasing the attractivity of the dual education systems though new offers for requalification and life long learning is a key success factor. This also means jobs are age-appropriate to promote learning and increase workspace-integrated, flexible learning environments. Especially MSE need special assistance.
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: 28%
- 1-250 employees: 28%
- 5,000-15,000 employees: 29%
- 250-5,000 employees: 15%

[sample text: More than 15.000 employees, 1-250 employees, 5.000-15.000 employees, 250-5.000 employees]

http://www.plattform-i40.de/I40/Landkarte
Testbed network Industrie 4.0
Where Industrie 4.0 can be tested for practical use

The platform offers …

Erproben   Vernetzen   Gestalten

...an overview of existing test-beds in Germany and provides information on further support structures to use those test-beds.
Competence Centres for SMEs
Supporting companies in the process of digitization

- **Aim:** Support SMEs in the process of digital transformation.
- **10 Competence Centres and 1 Competence Centre Digital Craft** as contact point for SMEs.
- **Started already:** Hannover, Dortmund, Kaiserslautern, Darmstadt, Berlin, Digitales Handwerk – Hannover, Augsburg, Chemnitz, Hamburg, Ilmenau, Stuttgart
- **Planned:** Cottbus, Kiel, Magdeburg, Saarbrücken, Lingen, Siegen, Bremen, Rostock
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
Shaping Industrie 4.0-Standards
Where Industrie 4.0 standards are discussed

- Initiate and develop standards for digital production.
- Coordinate standardization activities nationally and internationally.
- Close cooperation with the working group 1 of the Plattform Industrie 4.0.
The Plattform in the world
As an international hub…

… as a **central contact** for international cooperations with European, American and Asian partners.
Plattform Industrie 4.0
Platform’s Project Office

Plattform Industrie 4.0
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www.plattform-i40.de [also available in English]
Available Publications (in English)

Reference Architectural Model Industrie 4.0 (RAMI4.0) – An Introduction

Structure of the Administration Shell

Interaction Model for Industrie 4.0 Components

Network-based communication for Industrie 4.0

All publications can be downloaded from the Online Library of Plattform Industrie 4.0

www.plattform-i40.de/i40/Navigation/EN/InPractice/Online-Library/online-library.html
Research Roadmap
Industrie 4.0
including Application Scenarios

Application scenario in practice: order-controlled production of a customised bicycle handlebar

Benefits of Application Scenario Value-Based Service

Exemplification of the Industrie 4.0 Application Scenario Value-Based Service following IIRA Structure

Available Publications (in English)

All publications can be downloaded from the Online Library of Plattform Industrie 4.0

www.plattform-i40.de/i40/Navigation/EN/InPractice/Online-Library/online-library.html
Working Group
Security of networked systems

Available Publications (in English)

- IT-Security in Industrie 4.0
- IT-Security in Industry 4.0 fields of action for operators
- I4.0-Security in Education and Training
- Security in the Administration Shell (yet, only available in German)
- Technical Overview: Secure Identities
- Technical Overview: Secure cross-company communication
- Security in RAMI 4.0
Working Group
Security of networked systems

Available Publications (in English)

Industrie 4.0 – How well the law is keeping pace

In the spotlight: Industrie 4.0 – Issues surrounding data
Industry 4.0-Guide to qualification and advanced training for small and medium-sized enterprises (only in German)

Examples and recommendations for education and training