

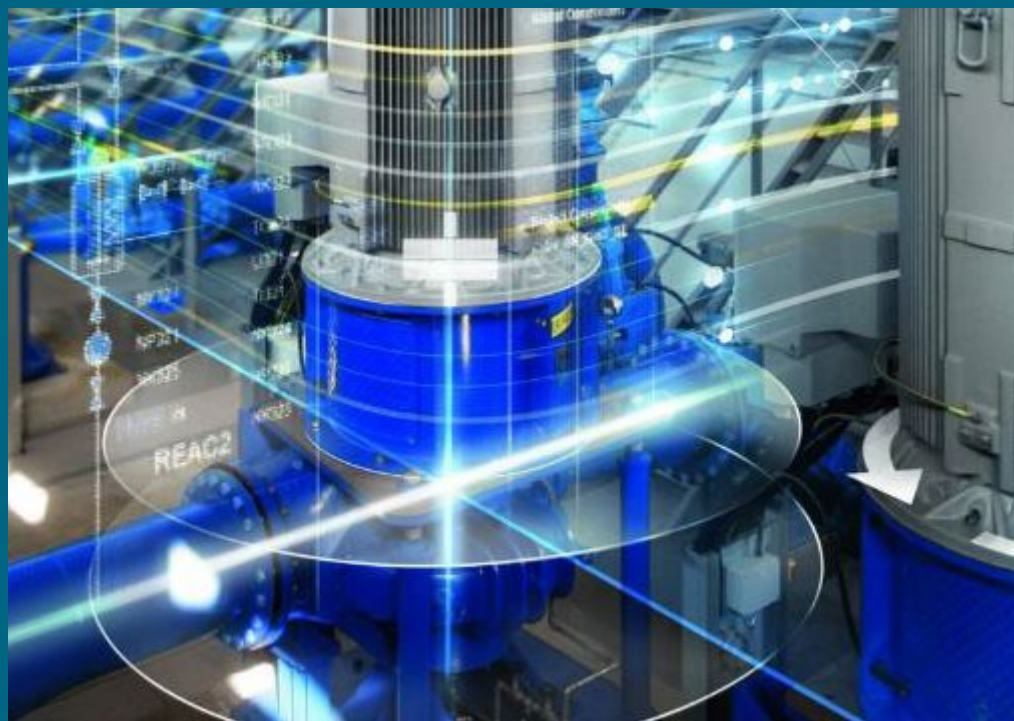
# The VDMA view on Smart Manufacturing

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25. October 2018, Stuttgart



## Understand Products



## Content

- » Introduction „Der VDMA“
- » Smart Manufacturing – One Definition
- » Challenges
- » The role of VDMA
- » Examples of engagement
- » Summary / Conclusion



## Well Positioned



### About 3200 Member Companies

#### 37 Trade associations

- » Expertise in product specific subjects
- » 85 % Small and Middle Size Enterprises (SME)

#### 11 Cross sectional departments

- » Consulting in specific items (Law, Economic, Market analysis)

#### Headquarter in Frankfurt/Main

#### Offices in Bruxelles and Berlin

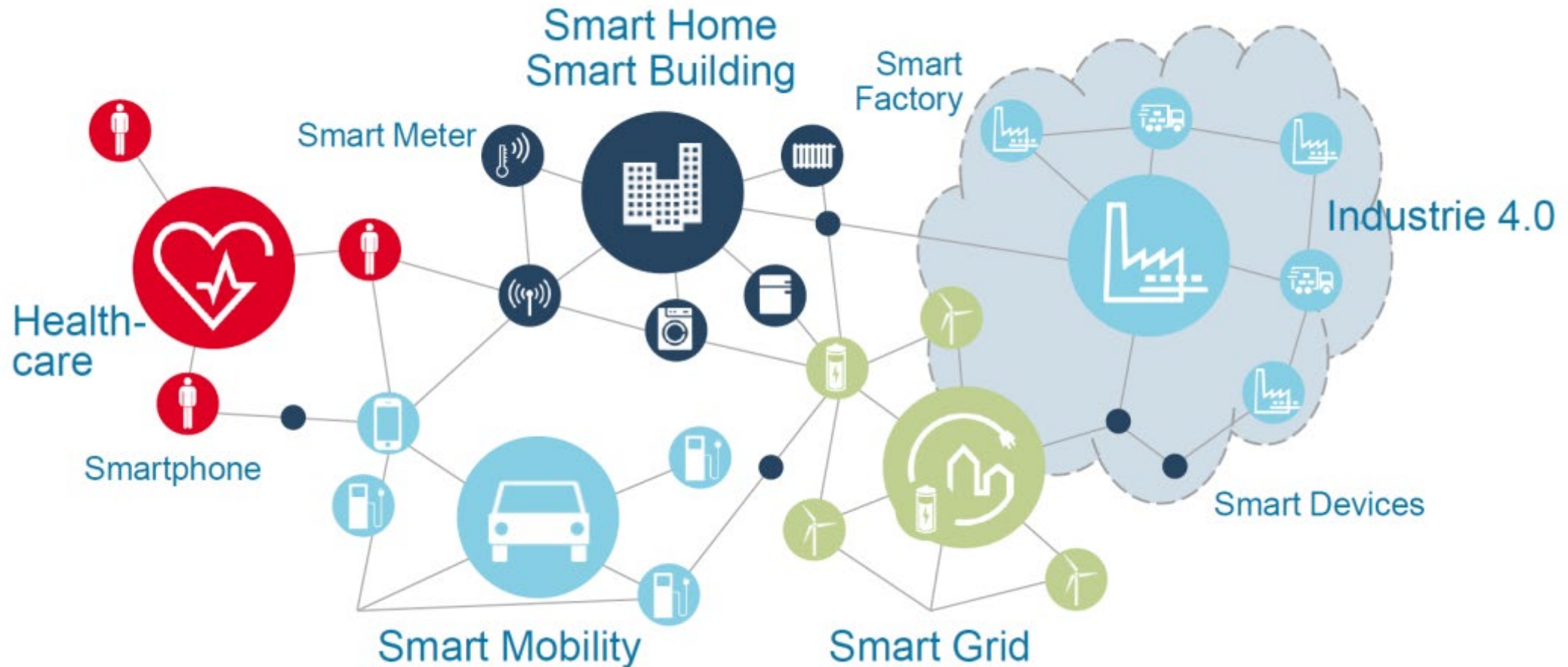
- » Close to Governments

#### Presentations in:

- » Brazil, China, India, Japan, Russia

# Industrie 4.0

## Internet of Things and Services in the smart production





## What about „German Mittelstand“ and Industrie 4.0?



**VDMA is the first point of contact for networking**

**VDMA service for members:  
Determining the individual Industrie 4.0 maturity**

» Tool for the Online-Self-Check [www.industrie40-readiness.de](http://www.industrie40-readiness.de)

### **Results for mechanical engineering industry**

- » Level 5 Top Performer 0,0%
- » Level 4 Expert 2,0%
- » Level 3 Experienced 7,4%
- » Level 2 Intermediate 34,2%
- » Level 1 Beginner 38,6%
- » Level 0 Outsider 17,8%

n=1251, Period Oct 14th 2015 – Jan 16th 2018



## The understanding of Industrie 4.0 becomes clearer



**Need of dedicated digitalization strategy and defined roadmap towards company's own digital future**

- » What will the digital future mean for the own company and future business models?
- » Focus on vertical integration (Machine2Cloud) or horizontal integration (Business2Business)? Or both?
- » Digital improvement or disruptive new concepts?
- » How to integrate international standards and cyber security for your global value creation network?



## The implementation opens up many new opportunities



### The global integrated value creation network allows:

- » Integrated customer and business data in a free world trade
- » New services and business models in open markets
- » Smart products and smart machines for flexible, efficient, resource-saving production environments

**Strong companies in global competition and great opportunities for the employment market**

**Attractive jobs by integration of engineering, automation and IT**



## Key Perceptions after 5 years



### Industrie 4.0 is not available as a technology

- » Companies have to develop and implement their own concept

### Industrie 4.0 means integration and networking

- » Cross-border services and international cooperation must be possible

### Industrie 4.0 provides the framework and the vision

- » The company's own interpretation in line with the global value creation network is the key

### The path is an evolutionary process at different speeds

- » International standards accelerate the evolutionary process



# Guideline strategy of VDMA Forum Industrie 4.0

## Support for the digital transformation of SMEs



Guideline  
Industrie 4.0



Guideline  
Security



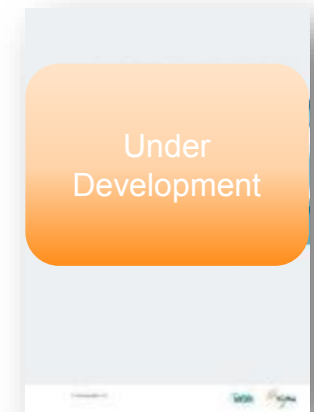
Guideline  
Data Protection



Guideline  
OPC UA



Guideline  
Sensors for  
Industrie 4.0



Guideline  
Interoperability by  
standardized features

Toolbox Industrie 4.0		Industrie 4.0				
Products						
Integration of sensors / actuators						
Communication / Connectivity						
Functionalities for data storage and information exchange						
Monitoring						
Product-related IT services						
Business models around the product						

Toolbox Industrie 4.0		Industrie 4.0				
Production						
Data processing in the production						
Machine-to-machine Communication (M2M)						
Company-wide networking with the production						
ICT infrastructure in production						
Man-machine interfaces						
Efficiency with small batches						

The Toolbox Industrie 4.0 provides a classification of own competencies and is an incubator for new ideas.

The Toolbox is subdivided into two areas:

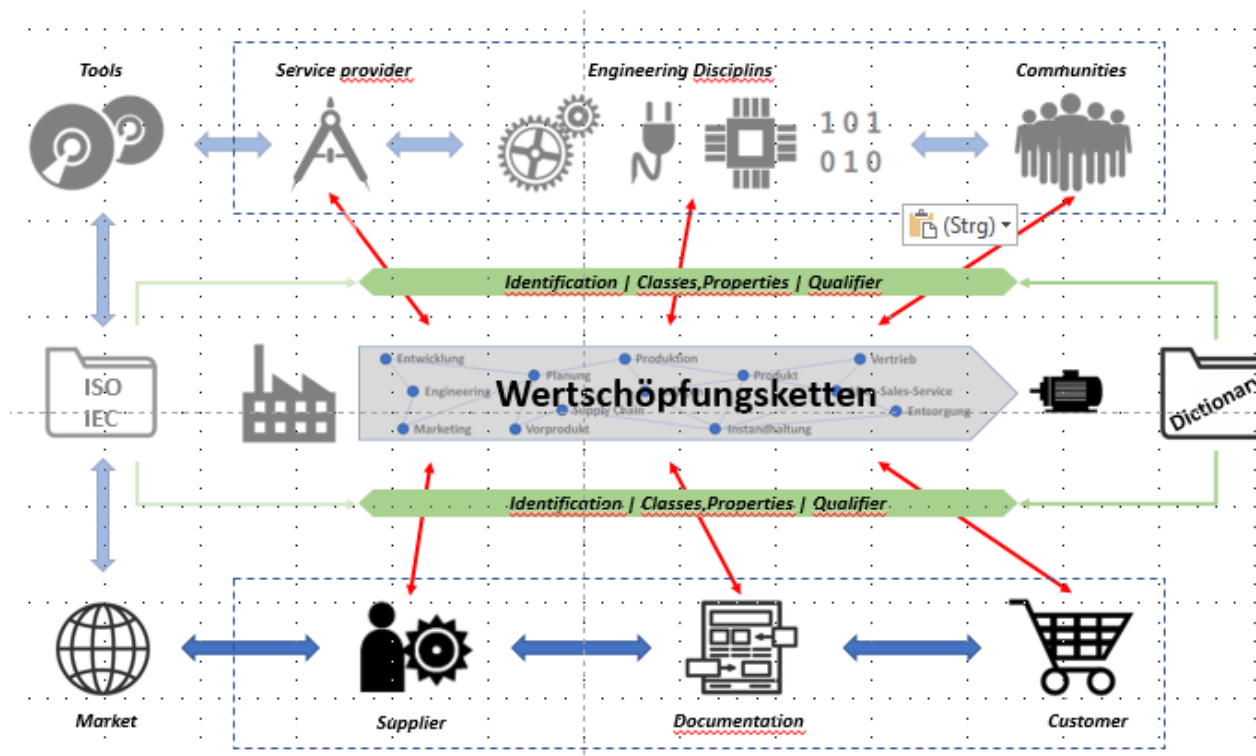
- **Products** (Development of new and future products)
- **Manufacturing** (Development of production)

The Toolbox Industrie 4.0 is a support tool for the classification of competencies and for the creation of new ideas in the area of Industrie 4.0.

# Interoperability by standardized features Guideline

## Benefits

- » Linking common concepts and standards to a "digital information map" and facilitating the understanding of the overall context
- » Basics are directly usable for the
  - product development in an I-4.0 market
  - conversion of production into an I-4.0 structure
- » Immediate economic profit for companies, also basis for a "later" implementation of the I-4.0 concept
- » "Tangible" implementation for all employees, lowering the inhibition threshold to Industry 4.0





## Standardized interfaces as a precondition for Industrie 4.0

### Goal

- » Integration of components, machines and systems
- » Cross-company interoperability in the factory

### Need

- » Replacing manuals and data sheets by information models
- » Standardized information about components and machines from different manufacturers

### Benefit

- » Plug & Work for a quick assembly of machines and reorganization of plants
- » Efficiency improvements by independent condition monitoring and predictive maintenance

# VDMA-Spec's fitting into Industrie 4.0 concepts

## Examples (1)



### VDMA 66415 „Engineering Datenaustausch Mechanik–Elektrik–Software“

- » The most important engineering tool is Excel
- » This Barrier of Information Flow shall be solved

### VDMA 66421 „Reference process for seamless production planning – Standardized procedure for production systems engineering”

- » Has been initiated after Research of how to overcome the heterogenous System landscape
- » The document describes a reference Process, how to analyse the own processes and get a harmonized Process
- » **Has been transferred to ISO 18828 (5 Parts)**
  - One part defines KPIs for an Improvement Process based on VDMA 66412

# VDMA-Spec's fitting into Industrie 4.0 concepts

## Examples (2)



**VDMA 66412 „Manufacturing Execution Systems (MES) – Kennzahlen**  
has been transferred to

**ISO 22400 “Automation systems and integration — Key performance indicators (KPIs) for manufacturing operations management (MOM) —**

- » **Part 2: specifies and describes the KPIs mainly for discrete part manufacturing**
- » Is currently available in several parts with the main objective to improve the production planning and control via KPIs as an objective assessment instrument

## Need of standardized interfaces



**IEC 62541 (OPC UA) is the favored interface standards in the mechanical engineering industry**

- » OPC: Open Platform Communications
- » UA: Unified Architecture

**OPC UA is one open standards and protocol independent**

**No rigid connection, but flexible integration of devices**

**Standardized data and information enable**

- » Plug & Work
- » Condition Monitoring and Predictive Maintenance
- » Optimization of the production

A white USB-A cable is shown on the left side of the slide. Below it is a diagram consisting of a vertical bar with two sections: a top grey section labeled 'Communication' and a bottom blue section labeled 'Information'. A blue callout box points from the 'Information' section to a white box containing the text 'Standardized data and information'.

Communication

Information

Standardized  
data and  
information

## Industrie 4.0 Communication Guideline

Based on OPC UA



# Guideline Industrie 4.0 Communication with OPC UA



## Benefit

- » VDMA positioning to OPC UA
- » Favor development of OPC UA Companion Specifications
- » Designed not only for small and medium-sized enterprises of VDMA

## Content

- » Benefit: Why should manufacturers implement OPC UA
- » Migration path: How should manufacturers implement OPC UA
- » Guideline shows the steps that companies must take to ensure interoperability in the industrial environment.

## Guideline is available in English

<https://industrie40.vdma.org/>

in cooperation with

Fraunhofer  
IOB-IMA

VDMA



# VDMA-Guidelines and Specifications Examples

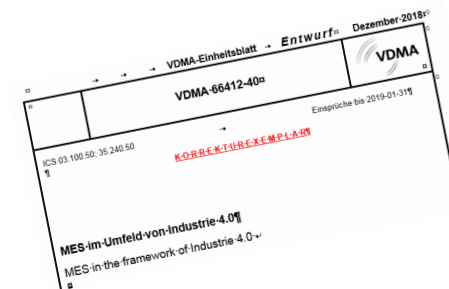
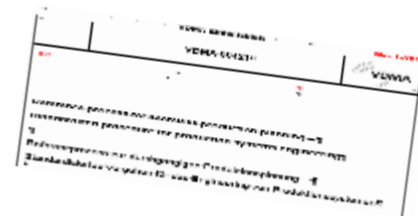
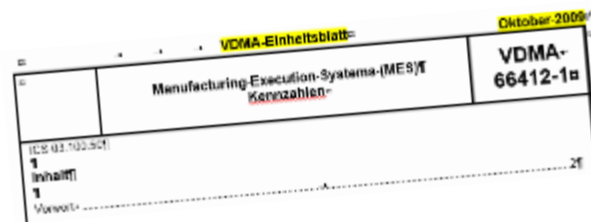
## VDMA guidelines



Published this year  
Available Here




## VDMA Specifications



## **New opportunities for employees**

**Human will remain in the center of all activities**

**The digital transformation in the working world is a collective approach with all stakeholders**

» Staff, companies, unions, society, politics and science

**The new challenges are a huge chance for the future**





Stay curious,  
always on the ball  
and motivated

Remember Voltaire:  
"The best is the enemy of the good."

Thank you  
Thank you  
for your attention!

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