The systematic integration of technology enhanced learning for lifelong competence development in a corporate context

Roman Senderek

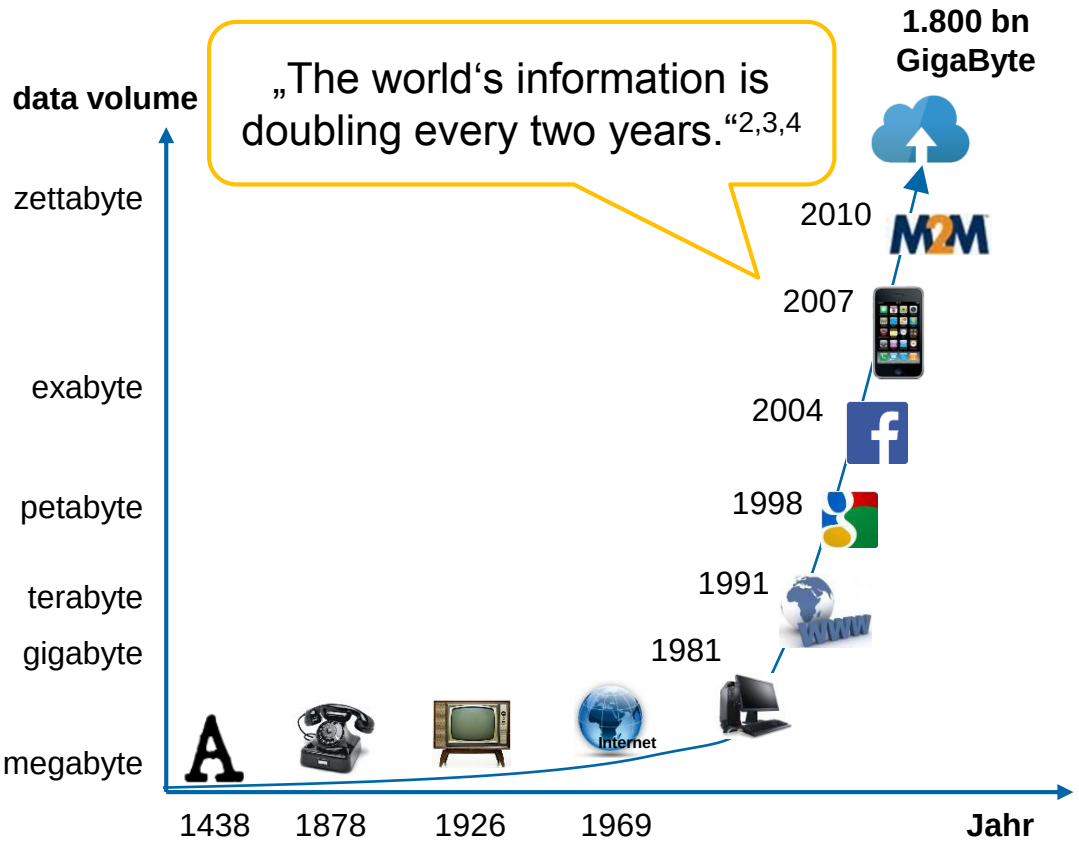
FIR - Institute for Industrial Management at RWTH Aachen University

Agenda

The nature of digitization in the private space

What happens in one minute in the internet?[1]	
~ 6 M requests	~ 4,1 M search requests
~ 140.000 $ turnover	~ 350.000 tweets
~ 200.000 App downloads	~ 100 hours video uploads

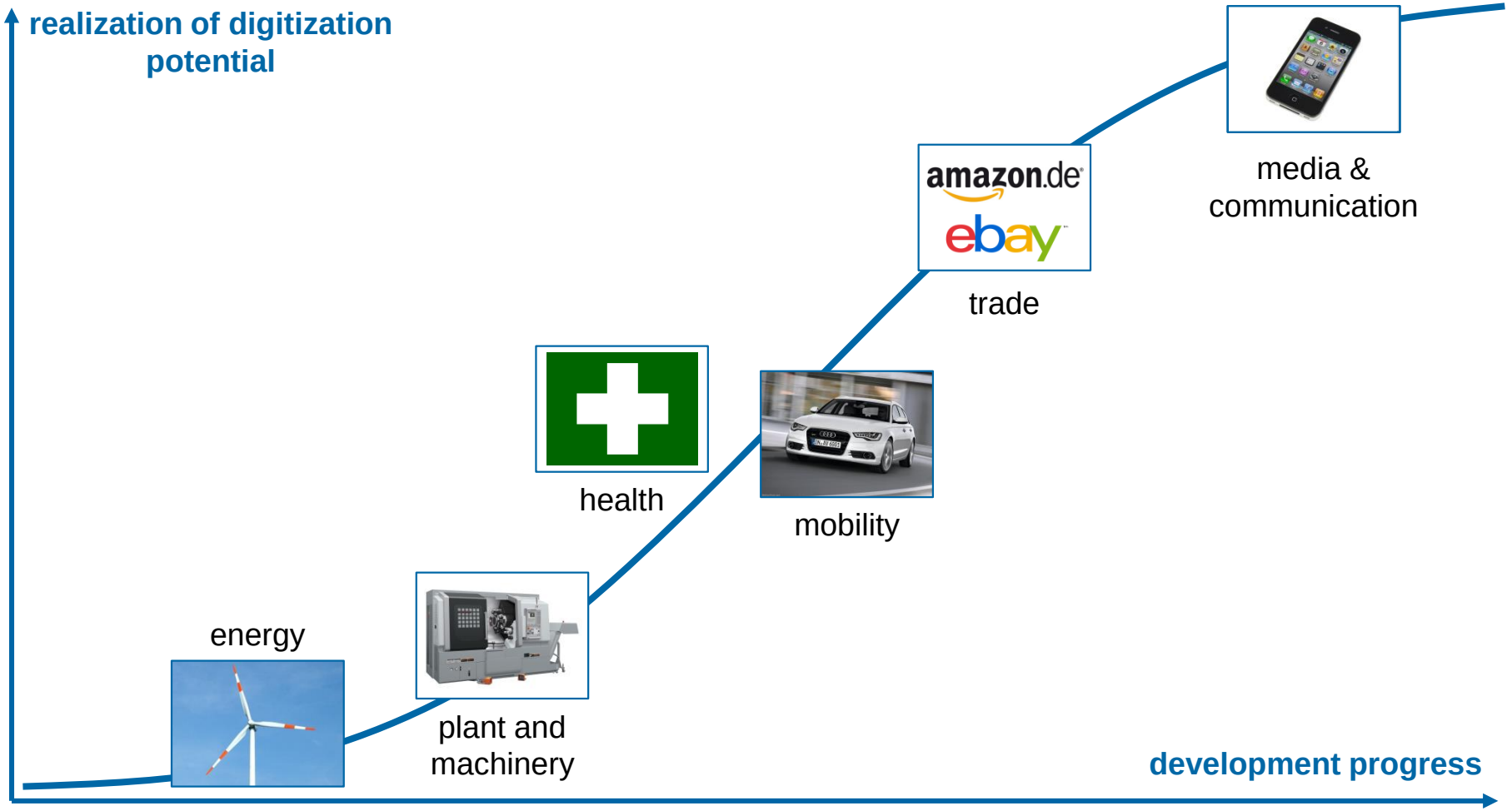
~ 650.000 GB per minute



Each user leaves his digital footprints and creates a digital twin.

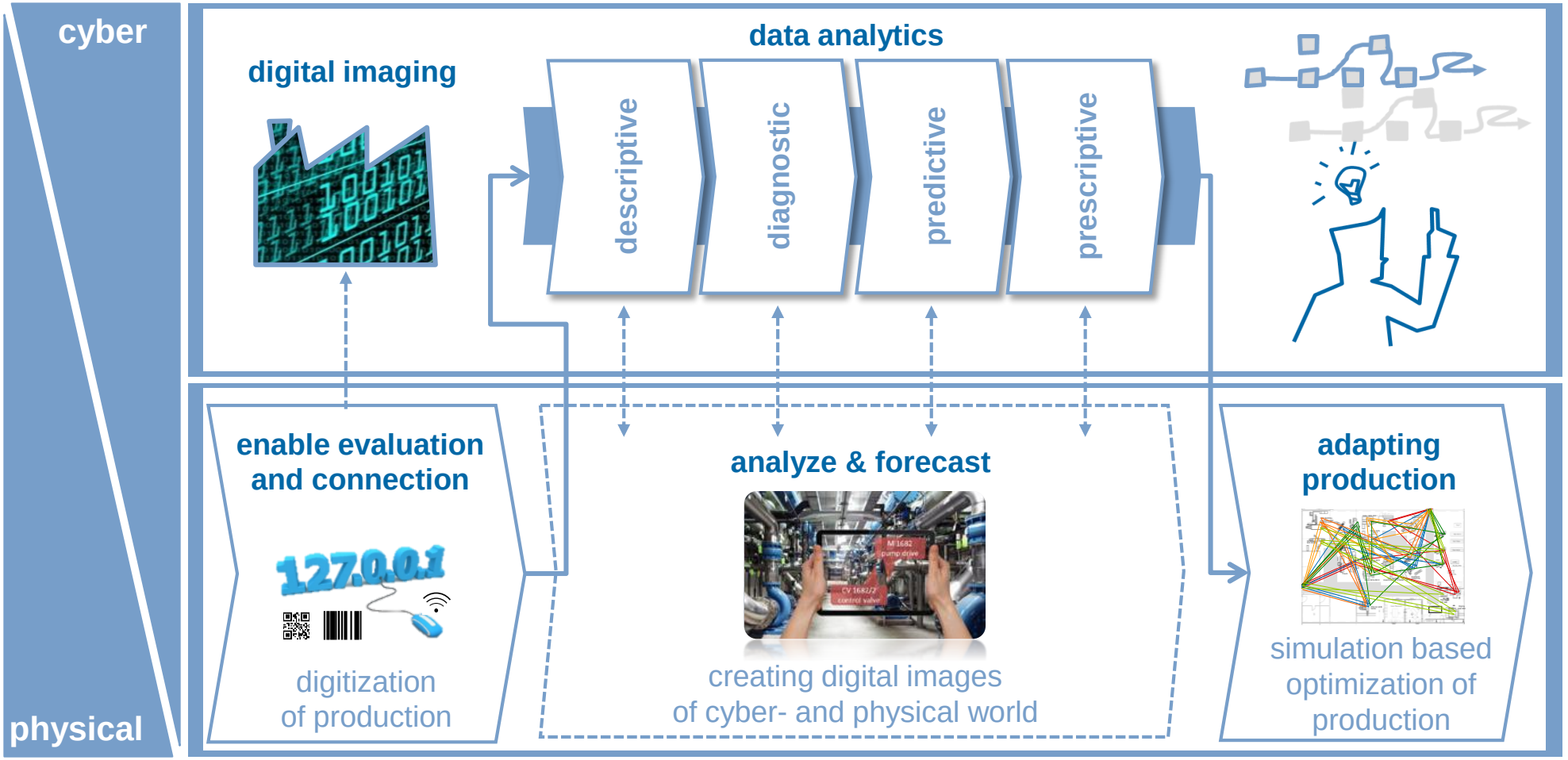
Quelle:
[1] INTEL: What Happens In An Internet Minute, 2013
[2] Gantz, Reinsel: The Digital Universe, 2013
[3] BITKOM: Big Data im Praxiseinsatz, 2012
[4] Abawi et al.: Kunde 2.0 und Mitarbeiter 2.0, 2013
[5] FIR: KVD Service Studie, 2013
Bildquelle: [1-17]

Degree of digitization across different industries

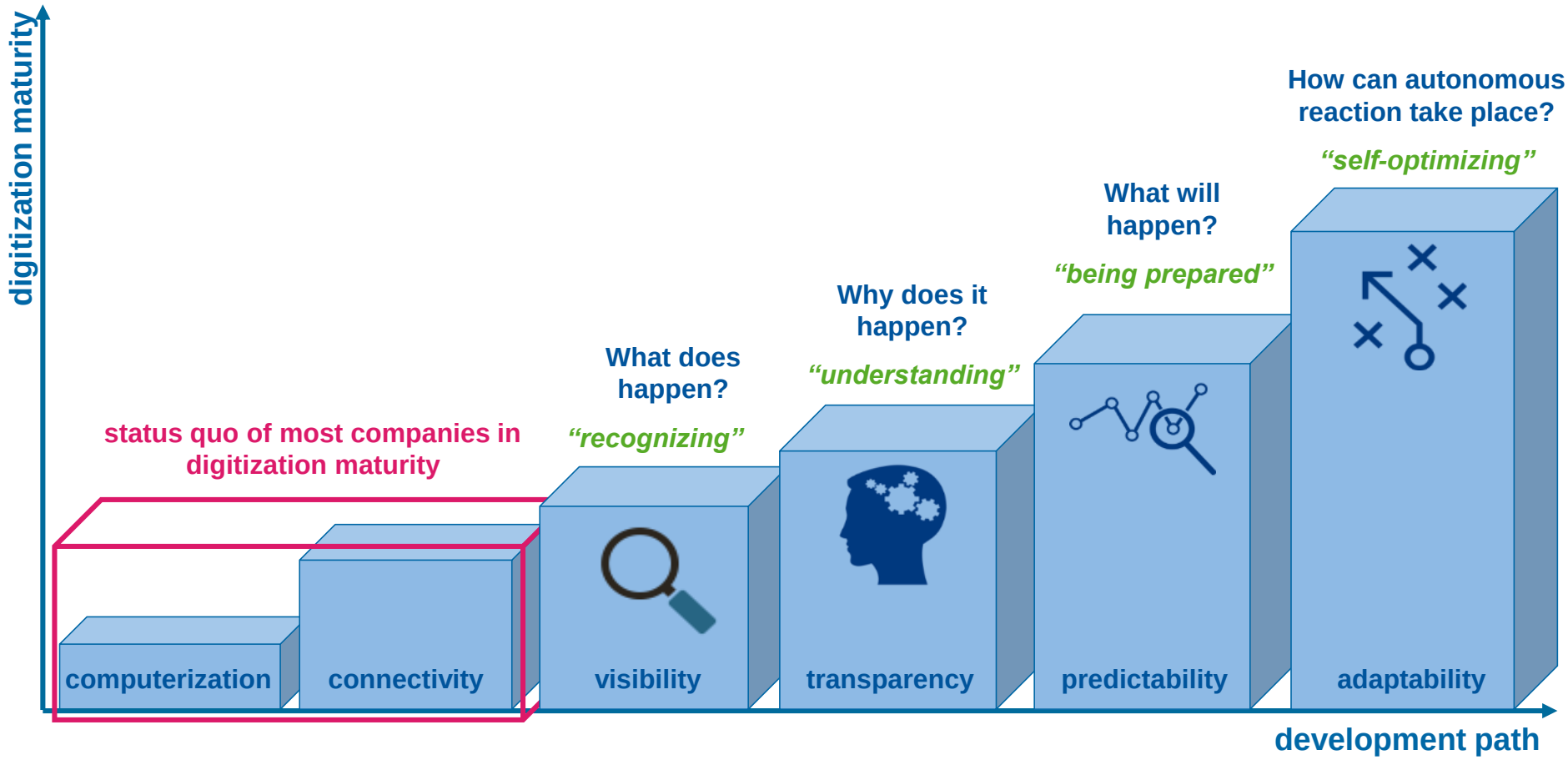


Quelle:
[8] Acatech: Smart Service Welt, 2014
[24] Google

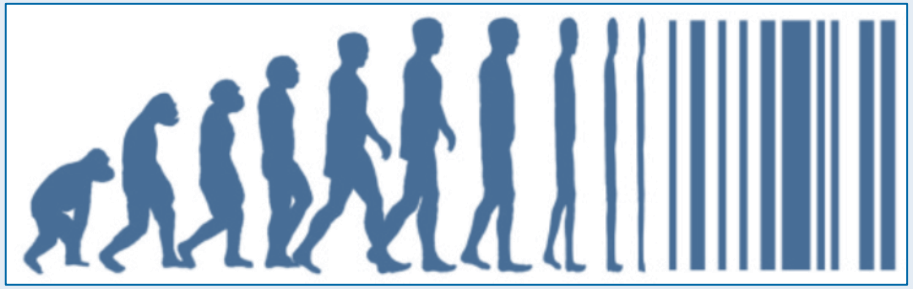
The learning factory aggregates data in “digital images“ and anticipates the optimal work and production schedules



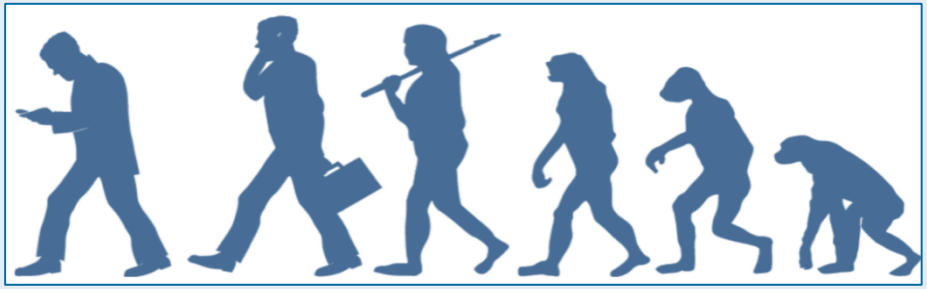
Companies' digitization maturity levels differ across industries and regions



Labor‘s development perspectives in a digitized industrial environment



- polarized organizations
- residual non-automatized work tasks remain for humans
- see-through employees
- massive lay-offs
- blurring spatial and systematic barriers



- swarm organizations
- humans decide and control
- highly qualified employees
- creation of new jobs
- better models for work-life balance

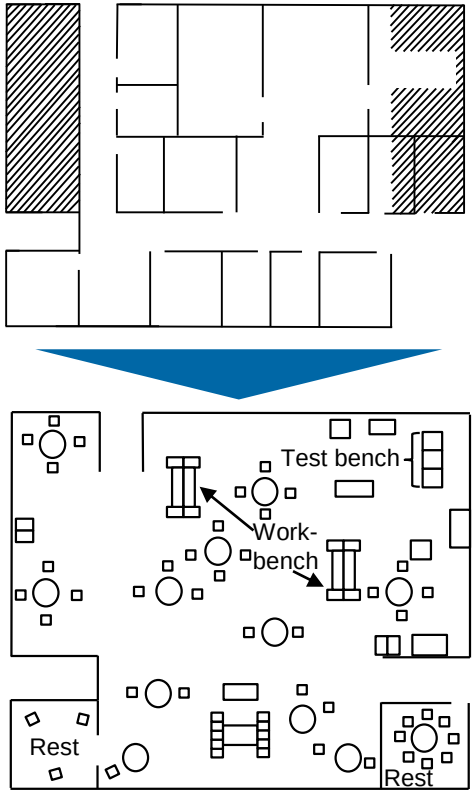
Future competencies defined by companies

	company‘s capabilities	employees skills/knowledge
technology-/data-oriented	– data evaluation and data analysis – IT security – Cloud architecture – artificial intelligence – user-Support/ service technology	– interdisciplinary way of thinking and acting – managing complexitiy – human - computer/machine – interaction – problem-solving and optimization competence
process-/customer-oriented	– process management – customer relationship management – IT- business analysis – eCommerce/Online-Marketing – consulting	– increasing process know-how – participation in innovation processes – coordination of processes – service orientation
infrastructure-/organization-oriented	– handling of specific IT systems – network/ database administration – IT architecture – data security	– leadership competence – autonomous/individual decisions – social competence and communication skills

Source: acatech 2016: 12

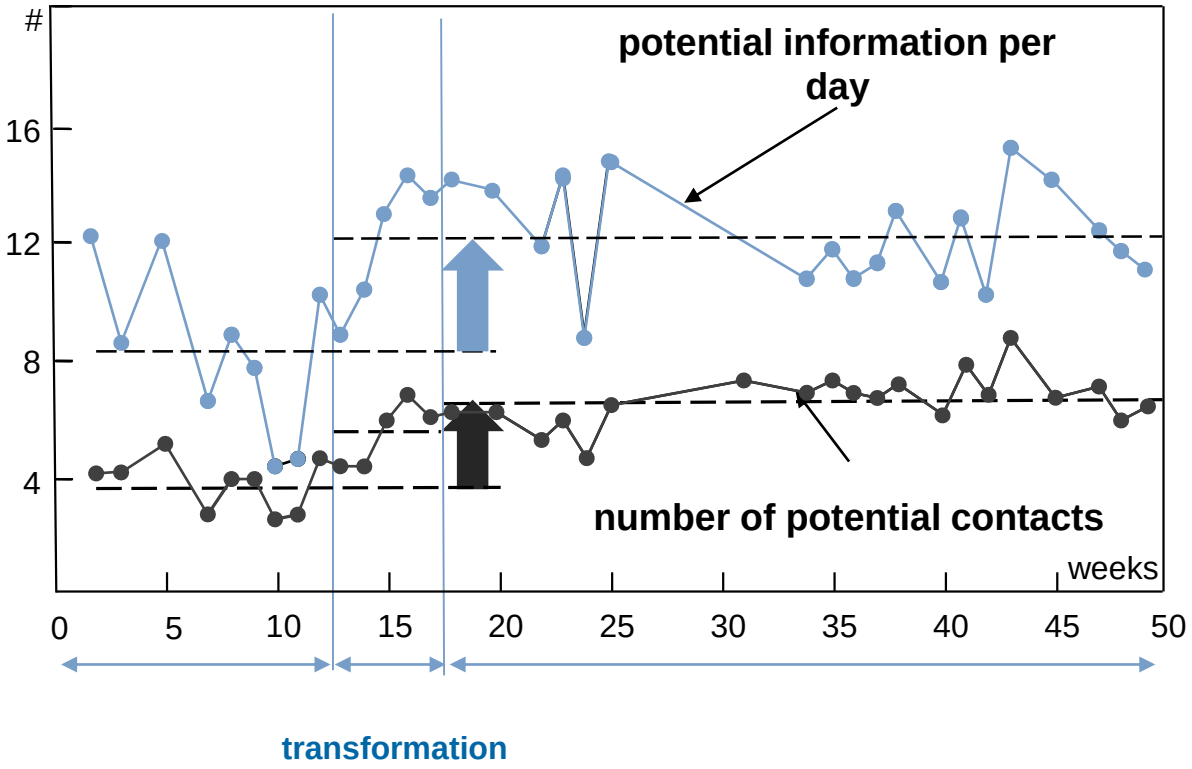
New digitized work systems will disruptively change information and communication

example: workplace redesign



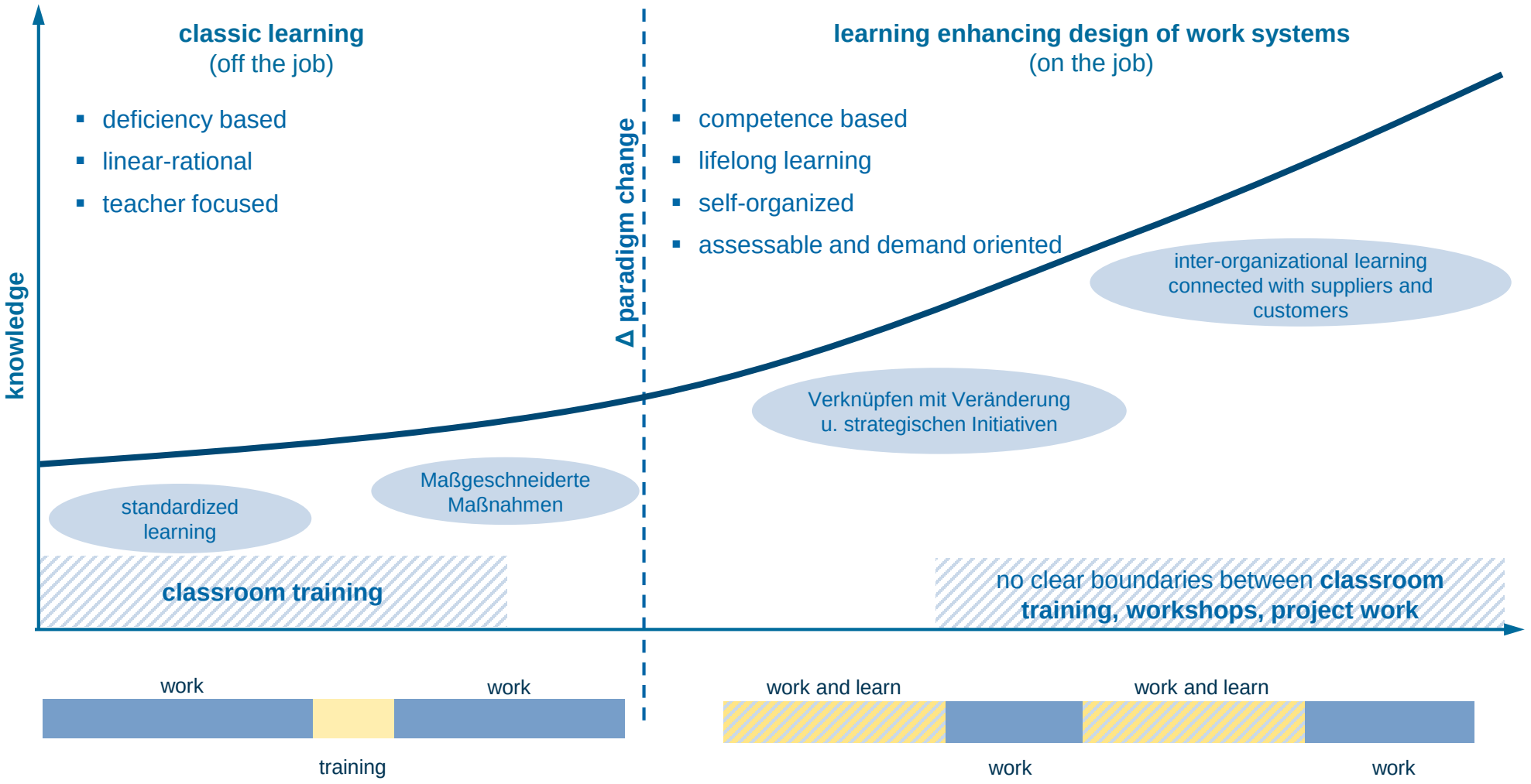
former workplace design

new workplace design



Source: Allen (1984), Pentland (2012)

Development of corporate competence development



Learning in a digitized work environment

The smart factory requires new, flexible and work based competence development programs

- increase of networked production and complexity of production and service processes
- real-time planning and managing of these processes affects work content, work processes and work environments
- shorter innovation cycles lead to technological disruptions
- increase of customization of products and services

→
- higher employees' flexibility
- employees have to cope with increasing task complexity
- employees have to cope with more and more indirect tasks

Concept for the learning enhancing design of work and production systems for digitized work environments

- learning enhancing design as responsibility of industrial engineering in planning new or reorganizing existing work systems
- adapting employees' competencies to the specific requirements of the smart factory
- selection and evaluation of technologically enhanced learning systems and workplace learning approaches for the future human resource development
- testing and validation in the "Demonstrationsfabrik Aachen" as well as with the project partners

Agenda

1 Introduction – current challenges due to digitization

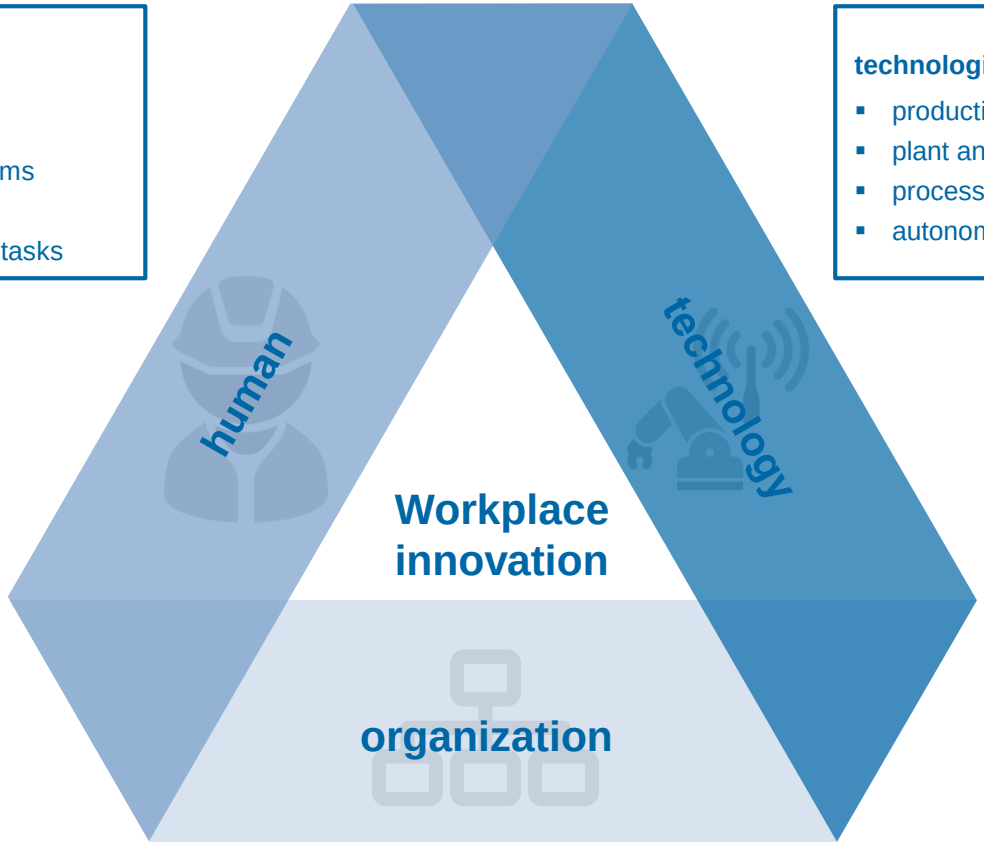
2 The integration process of corporate technology enhanced learning

3 Conclusion

Digitization: migration approaches

human perspective

- human role
- human-technology-interaction
- design of intelligent assistance systems
- labor division human vs. automation
- upgrading of qualifications and work tasks



technological perspective

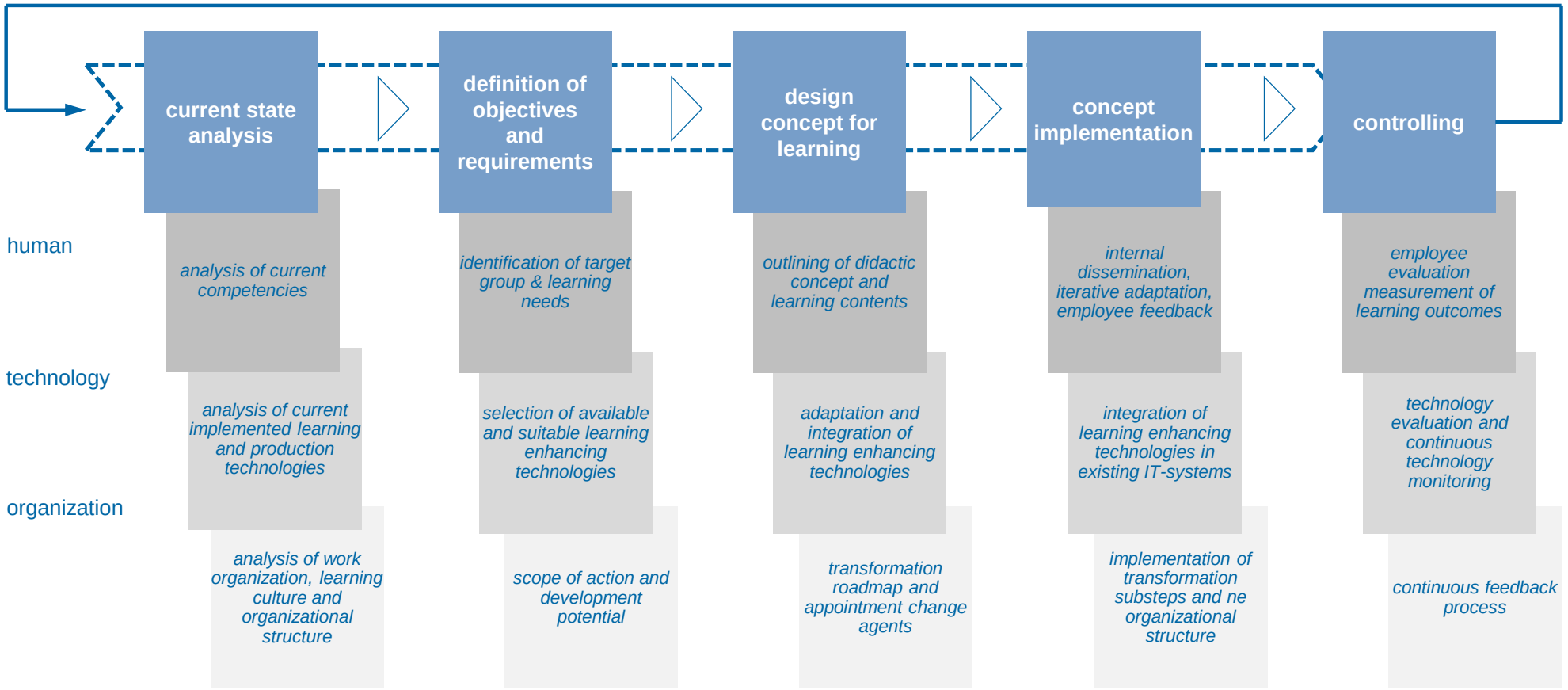
- production system integration
- plant and machinery integration
- processes and logistics
- autonomous self steering systems

organizational perspective

- cooperation and collaboration
- cross company and internal networks
- value chain integration

Quelle: TU Dortmund

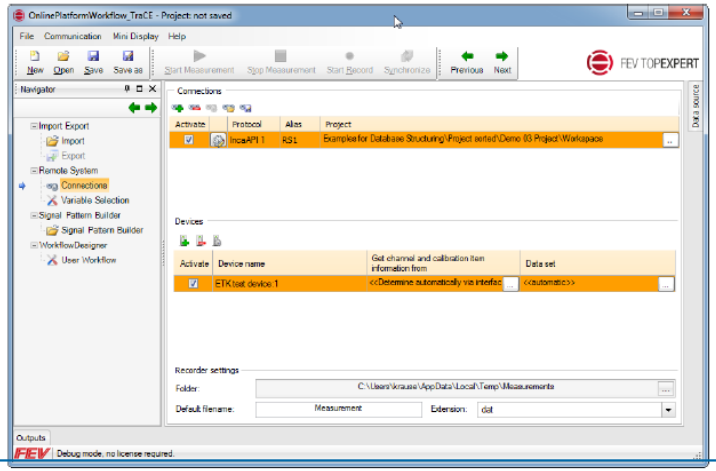
The integration process of corporate technology enhanced learning



Minimum viable learning solutions in the corporate world

- HELLA KGaA – one of the largest automotive suppliers in Germany (35.000 employees)
- developed a mobile application for conjoint failure recognition and solution
- feedback opportunities and continous improvement
- worldwide rollout this year

- FEV GmbH – an internationally active company specialized in engineering solutions (4.000 employees)
- developed a learning enhancing software solutions for application processes of electronical controlling devices of automobile engines
- based on expert knowledge of lead users, a software tool was created that visualizes processes and can guide personnel step-by-step to the solution of a task



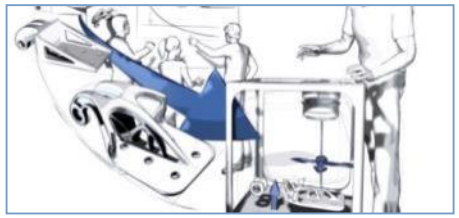
Agenda

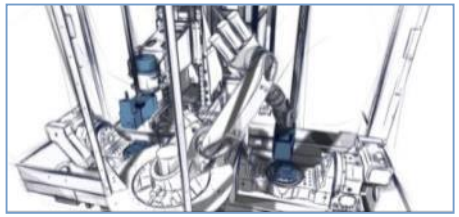
1 Introduction – current challenges due to digitization

2 The integration process of corporate technology enhanced learning

3 Conclusion

Summary





- **digitization,** the main driver of industrial transformation, develops at a rapid speed
- integration of human resource development, information technology design and work design is necessary
- the decisive factor is the initial **positioning** of the company itself on its **path to a digitized production** – where do we stand today?
- The effects of digitization will **change labor and work organization** in the industrial production significantly
- The **requirements** for employees' qualifications and competencies will **increase significantly**
- new **approaches for work-based human resource development** will be necessary to cope with the effects
- **minimum viable learning solutions** are a way to lead companies and their employees to a digital production and service world

Thanks a lot for your attention!

www.fir.rwth-aachen.de

fir an der RWTH AACHEN

Campus-Boulevard 55 - 52074 Aachen

drs.

Roman Senderek

Project Manager

Telephone: +49 (0)241 477 05-225
Fax: +49 (0)241 477 05-199
E-Mail: Roman.Senderek@fir.rwth-aachen.de