
INDUSTRIE 4.0 INITIATIVES IN GERMANY AND SELECTED POLICY INITIATIVES

Christian Blobner, Seoul, November 7, 2018



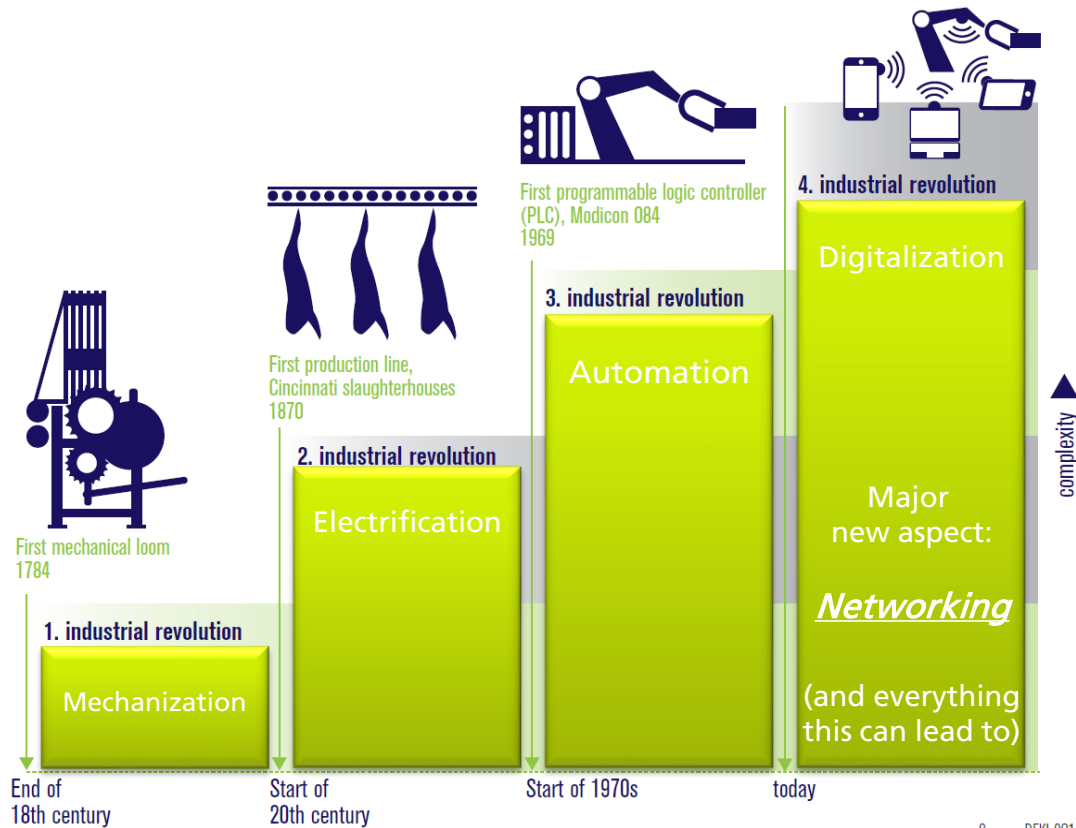
TAKE AWAY MESSAGE

- The discussion on Industrie 4.0 was initiated by industry in Germany with a technology focus
- Objective was to ensure the international competitiveness of German Mittelstand (SME) companies, especially machine manufacturers
- Due to the lack of adoption of Industrie 4.0 technology, the German government as well as regional governments started supporting policy initiatives with a special focus on SME
- Initiatives focus on issues such as providing best-practice application examples and standardization
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Industrie 4.0 and digitalization is more than just a technology question. It questions the fundamental ways companies conduct their business and needs to be tackled holistically.

Industrie 4.0

Automation is so 3.0



Source: DFKI 2011

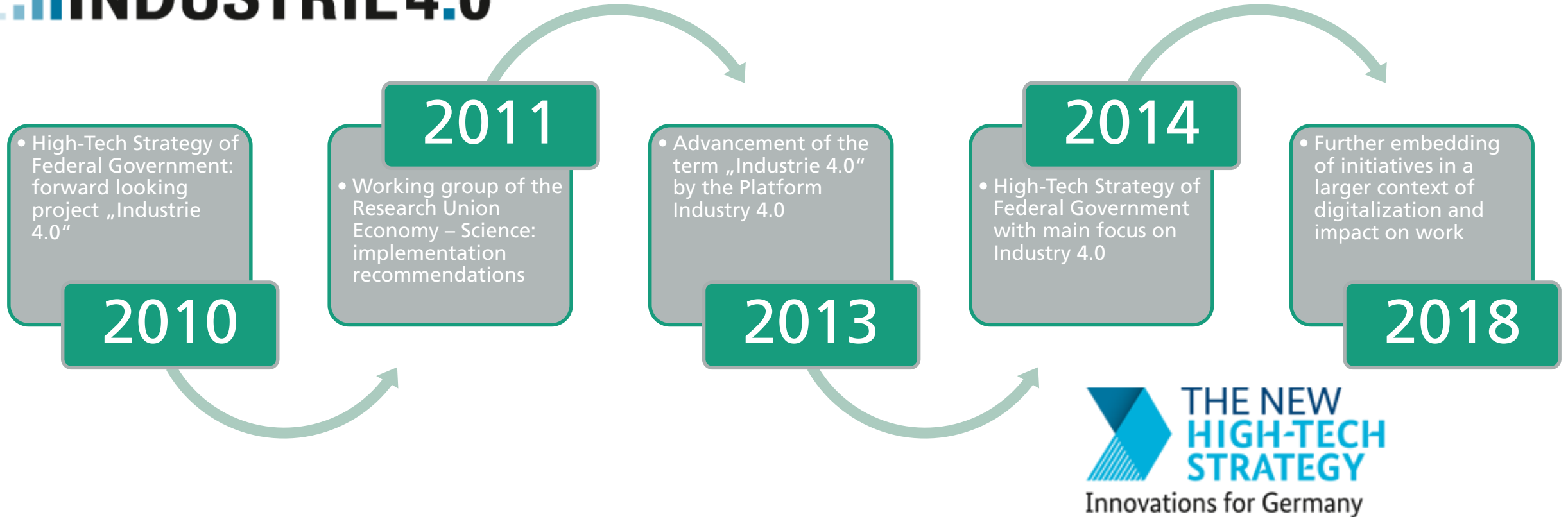
Source: acatech 2013,

http://www.acatech.de/fileadmin/user_upload/Baumstruktur_nach_Website/Acatech/root/de/Material_fuer_Sonderseiten/Industrie_4.0/Final_report_Industrie_4.0_accessible.pdf

- Industrie 4.0 promises a new production paradigm
- Automation technology plays a role but not in the usual sense, i.e. not simply more robots but networking robots with additional production assets to decentralize and automate decision-making
- Core aspect of Industrie 4.0 therefore is networking and smart data use, which enables smarter automation
- Companies can gain competitive advantage by better exploiting data in their production process, by making their products smarter and by providing data-based value adding services

Germany's Industrie 4.0 Strategy

Strategic Timeline



Actors in the German Industrie 4.0 activities

Subdivision of Functions on Federal Level

- Federal Level:
 - **(Fundamental) Research:** Federal Ministry of Education and Research (BMBF, Bundesministerium für Bildung und Forschung)
 - **Knowledge Transfer:** Federal Ministry for Economic Affairs and Energy (BMWi, Bundesministerium für Wirtschaft und Energie)
- Regional supporting Federal States, e.g. Saxony-Anhalt:
 - Digital Strategy of the Ministry for Economic Affairs, Science and Digitalization
 - Supporting regional funding programs



Actors in the German Industrie 4.0 activities

Plattform Industrie 4.0 and the Fraunhofer-Gesellschaft

■ Plattform Industrie 4.0:

- Industry initiated platform, founding members BITKOM (German Association for Information Technology, Telecommunications and New Media), VDMA (German Engineering Association) and ZVEI (German Electrical and Electronic Manufacturers' Association)
- Expanded in 2015 to include further stakeholder from Academia, Research, trade unions and standardization bodies



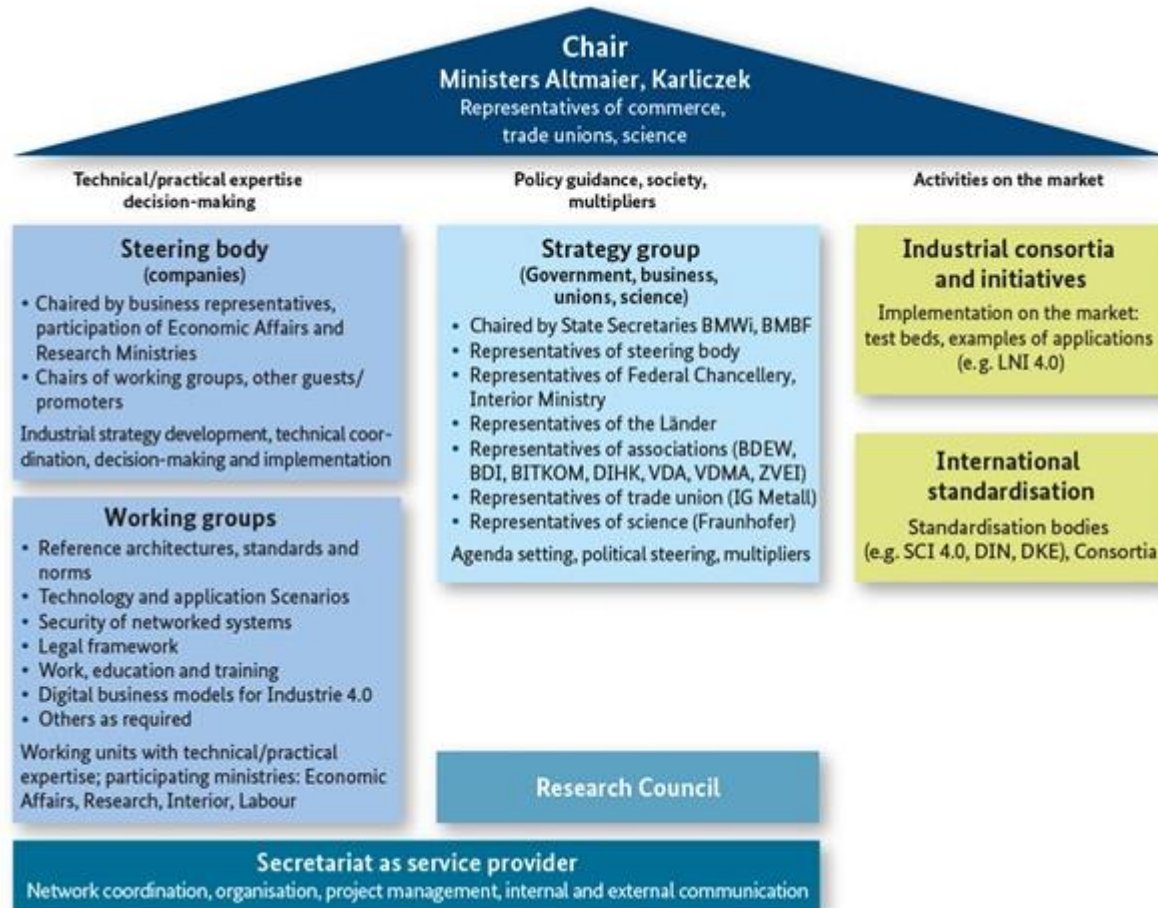
■ Fraunhofer-Gesellschaft:

- Europe's biggest organization for applied research
- More than 70 institutes all over Germany with more than 25.000 staff and a research budget of over €2bn



Actors in the German Industrie 4.0 activities

Plattform Industrie 4.0



■ Working groups:

- Reference Architectures, standards and norms
- Technology and application scenarios
- Security of networked systems
- Legal framework
- Work, education and training
- Digital business models for Industrie 4.0
- Will be adapted as necessary and according to emerging challenges

Source: Federal Ministry for Economic Affairs and Energy (BMWi) https://www.plattform-i40.de/I40/Redaktion/EN/Bilder/graphic-plattform-4-0-old.jpg?__blob=poster&v=2

Actors in the German Industrie 4.0 activities

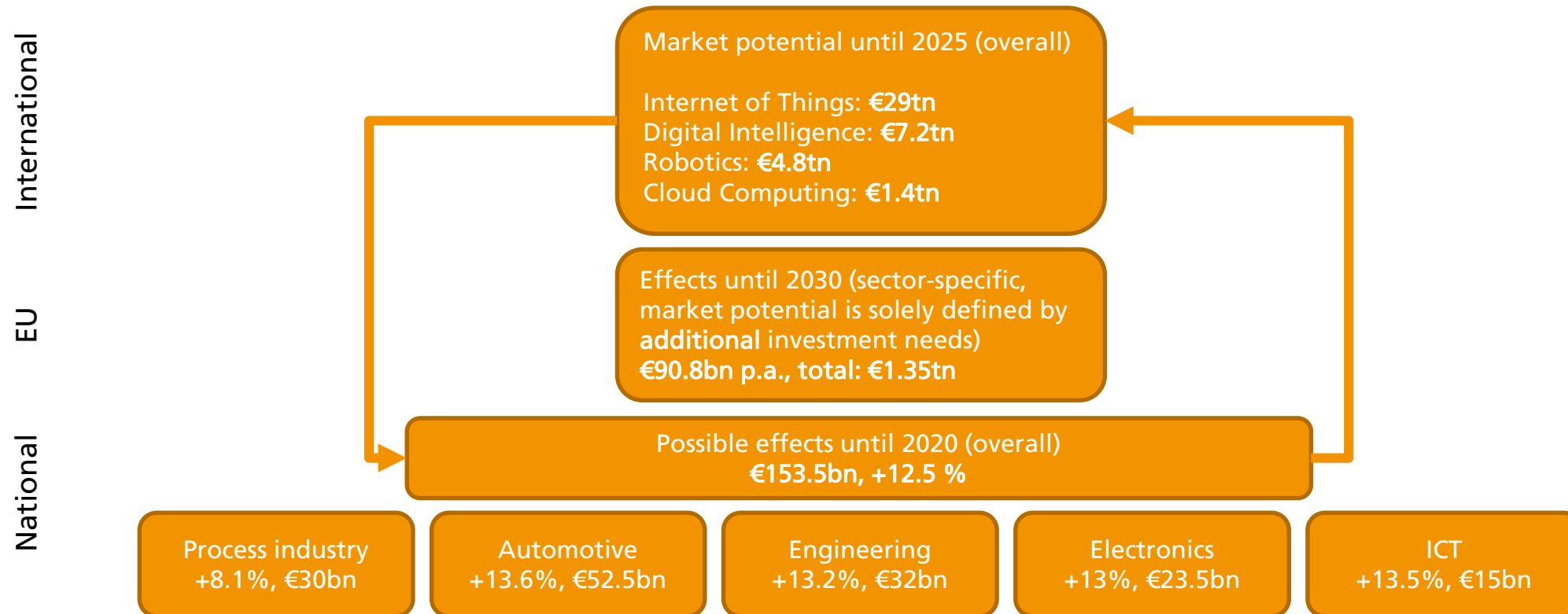
Digital Transformation Triangle for Industry 4.0 in Germany



Source: https://lni40.de/lni40-content/uploads/2017/04/ueberuns_kooperation_dreieck_eng.png

Industrie 4.0 in Germany

Expected impacts on Germany through Industrie 4.0



Source: Figure adapted from Wischmann et al. (2015), Industrie 4.0: Volks- und betriebswirtschaftliche Faktoren für den Standort Deutschland , https://www.iit-berlin.de/de/publikationen/industrie-4-0-volks-und-betriebswirtschaftliche-faktoren-fuer-den-standort-deutschland/at_download/download

Industrie 4.0 in Germany

SWOT analysis for German companies and Industrie 4.0

S

- leadership in Europe for industrial production systems
- front runners in I4.0 implementation
- Serve 30 % of sensor world market
- Leaders applying for ind. Robots
- Covering major parts of the value chain of the national innovation system

W

- Lack of AM technology providers
- Lack of industrial (production near) data and information platforms
- Low international market share for in IT-security and mobile internet

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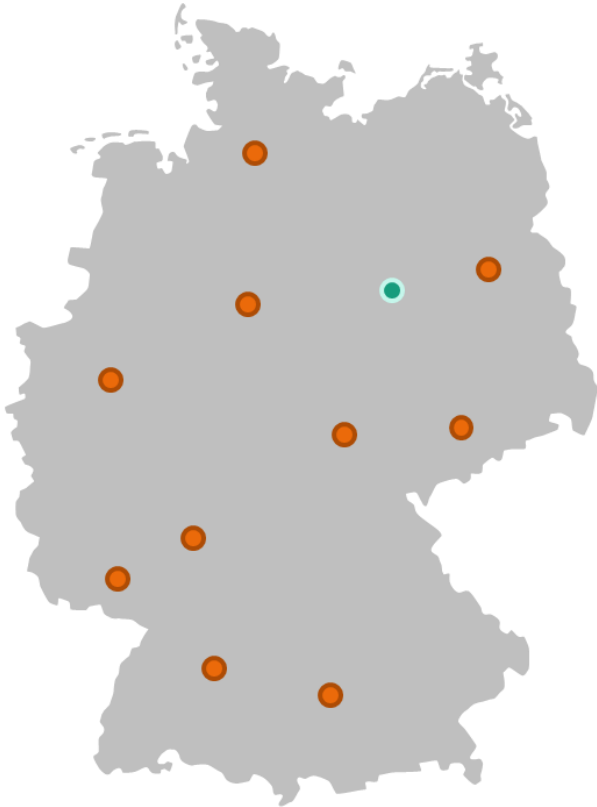
- IoT as disruptive technology with high economic potential
- Increasing demand and special industrial sensors
- New value added in ind. countries
- Germany's location factors as basis to be leading suppliers of Industry 4.0 solutions

T

- Competitiveness dependent on investments
- Implementation of I4.0 in SME lacking
- Standards might be defined outside of Germany
- Europe as a whole lost shares of global industrial value added.

Industrie4.0 in Germany

Initiative for regional SME 4.0 Competence Centers



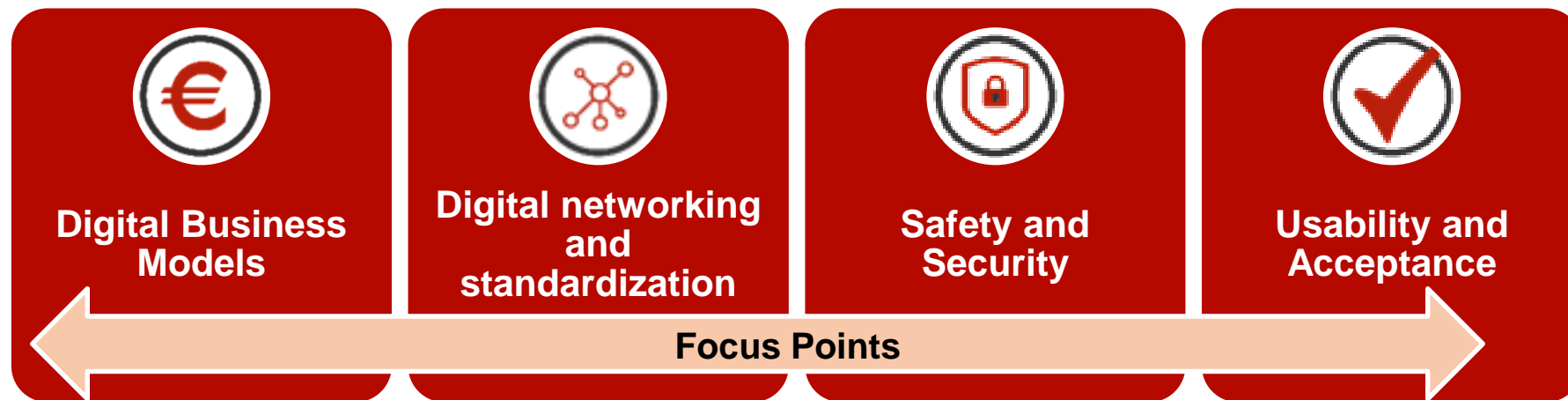
Mittelstand 4.0 Kompetenzzentren

- Objective
 - Raising awareness for opportunities of digitalization among SME
- Approx. 20 regional competence centers all over Germany
 - One-stop-shop for SME seeking support in all matters of digitalization and Industrie 4.0
 - Providing on-site support for SME
 - Demonstration site for new technology
 - Supporting implementation projects
 - Fostering knowledge- and best-practices exchange between regional SME
 - Network of competence centers share knowledge

Examples of SME4.0 Competence Center

Regional Magdeburg SME4.0 Competence Center

- Facilitating Digitalization – in Saxony-Anhalt and beyond
 - Create trust in Digitalization for SME
 - Embolden and empower SME to take up Digitalization solutions
 - Make it possible to actively experience Digitalization potentials



Examples of SME4.0 Competence Center

Thematic SME4.0 Competence Center Planning and Construction

- Thematic Competence Center focusing on topics in the construction industry with a specific focus on Building Information Modelling (BIM)
- Project partners distributed throughout Germany, establishing regional centers with thematic foci
- Regional centers focus on different aspects of digitalization in the life-cycle-phases of construction projects (design, planning, construction, crafts and trades, operation)



European level coordination of SME support

Digital Innovation Hubs and Competence Center for SME

- VDTTC officially recognized as a European Digital Innovation Hub providing companies with cutting edge support towards Industrie 4.0
- Supporting international networks to increase access to knowledge
- DIH as one-stop-shops for companies, especially SME, to improve their competitiveness through digitalization
- VDTTC as a central actor in a network of regional stakeholders to promote and support digitalization in Saxony-Anhalt and beyond



**Digital
Innovation
Hubs**



Mittelstand 4.0
Kompetenzzentrum
Magdeburg



Mittelstand 4.0
Kompetenzzentrum
Planen und Bauen

Industrie 4.0 initiatives in Germany

Bringing together different levels of support for SME

Awareness Raising, Networking & Training



PARTNERNETZWERK
WIRTSCHAFT 4.0 | Sachsen-Anhalt



Pre-competitive technology solutions



EUROPÄISCHE UNION
EFRE
Europäischer Fonds für
regionale Entwicklung



EUROPÄISCHE UNION
ESF
Europäischer
Sozialfonds



Bundesministerium
für Bildung
und Forschung



Bundesministerium
für Wirtschaft
und Technologie



Horizon 2020
European Union Funding
for Research & Innovation

Industrial Research



Fraunhofer
or other
research / implementation
actors

directly contracted
by industry

Industrie 4.0 initiatives in Germany

Bringing together different levels of support for SME

Awareness Raising, Networking & Training



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Mittelstand 4.0
Kompetenzzentrum
Magdeburg



Mittelstand 4.0
Kompetenzzentrum
Planen und Bauen

Free of charge offering to companies

- Networking of companies, research providers, universities, stakeholders
- Organization of regional thematic events, conferences and workshops
- Company visits, individual and convoy consulting
- Digitalization Check-Ups
- Trainings on digitizing business processes, digital business models, agile project management, standardization, sensors and automation, communication networks, employer attractiveness, inter-generational learning, corporate culture and motivation – *and more*
- Funded through regional government and federal government (BMWFi)

Industrie 4.0 initiatives in Germany

Bringing together different levels of support for SME

Pre-competitive technology solutions



Horizon 2020
European Union Funding
for Research & Innovation


Limited own-contributions by companies

- Cooperation between regional research actors and universities
- Companies involved as implementation partners / use case providers
- Working on relevant company challenges
- Potential for companies to work in national and international project consortia, supporting international knowledge exchange and transfer and internationalization
- Own contribution and focus depending on funding source and rules
- Fraunhofer IFF currently involved in more than 20 ERDF funded projects with regional companies plus nationally- and EU-funded projects
- Research partners often support companies administratively

Industrie 4.0 initiatives in Germany

Bringing together different levels of support for SME

Industrial
Research

 **Fraunhofer**
or other
research / implementation
actors

directly contracted
by industry

Full costs to be covered by companies

- Companies directly contract research actors for industrial research projects
- One-to-One relationship or consortium approach, depending on theme
- Projects can range from “simple” process analysis and reorganization to technical prototypes to development of full manufacturing systems, i.e. *from a couple of thousand Euro to a couple of million Euro*
- Specific introductory cooperation concepts available, e.g. *Fraunhofer IFF Industrie 4.0 Check-Up* starting at about €30k, to develop a medium-term oriented digitalization strategy (not just technology oriented)
 - Good format to establish trust and understanding between parties
 - Good basis for going into further technology-oriented projects
 - Internationally well received format

Support example “Digital Business Models”

Everybody needs to be disruptive – right?!?

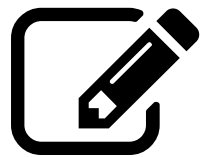
Disruption is easy!

- If you start from scratch and/or do not have any physical assets.



Disruption is hard!

- If you have physical and financial assets, investment cycles, customers, supply chains, employees, relevant IP, distribution networks.



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company
logo here



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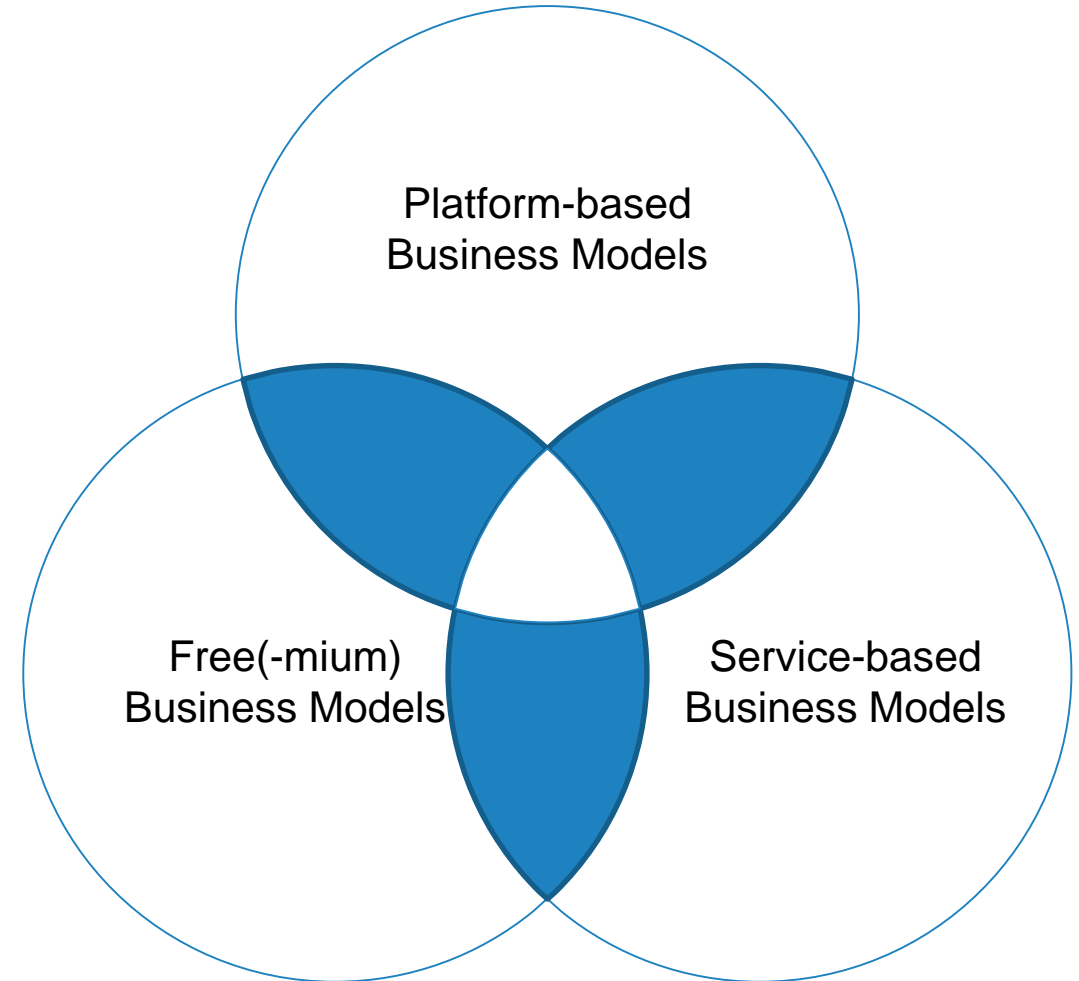
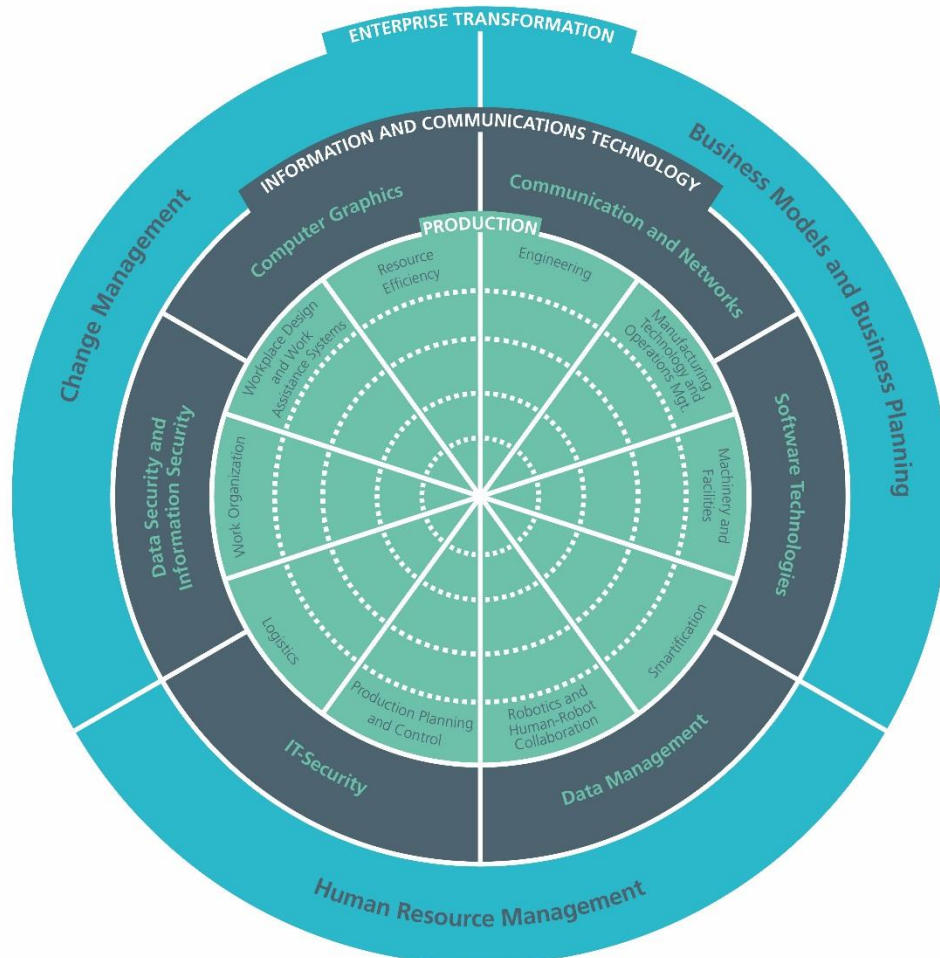


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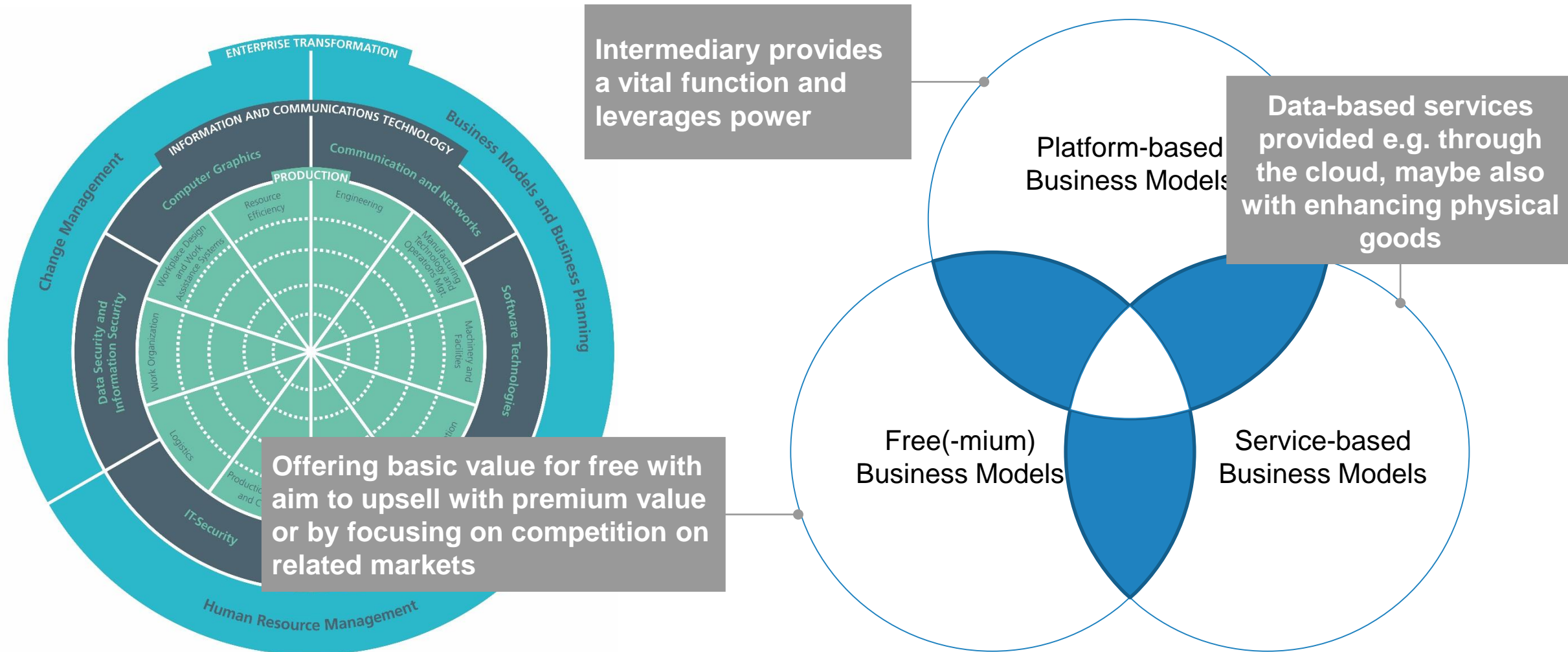
What do we mean by business model transformation?



© Neugebauer, Reimund; Hippmann, Sophie; Leis, Miriam; Landherr, Martin (2016): Industrie 4.0 - From the perspective of applied research. 49th CIRP Conference on Manufacturing Systems (CIRP-CMS 2016). Available online at www.sciencedirect.com

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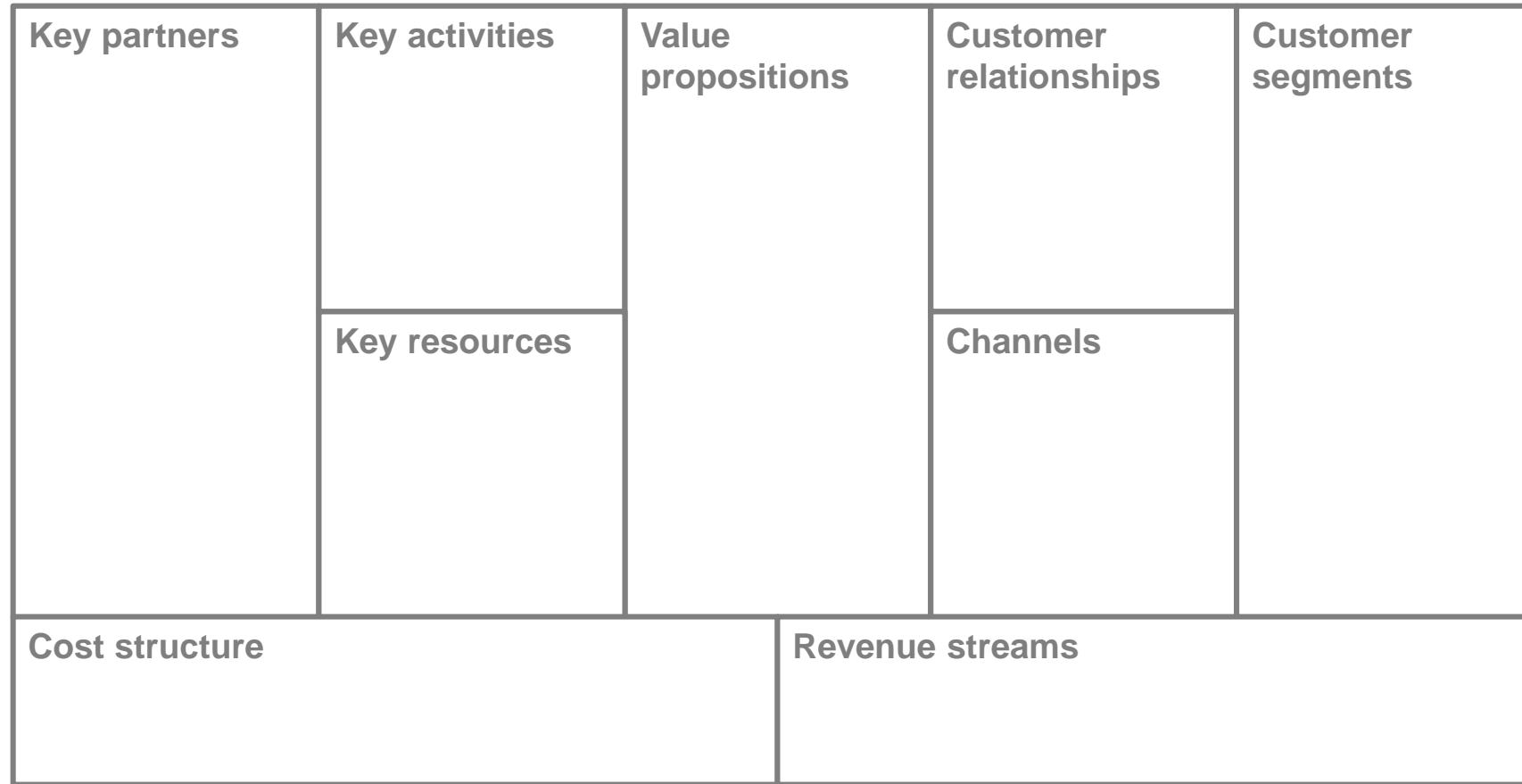
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Support example “Digital Business Models”

Business Model Canvas



Constantly question the form you compete on the market

- Customer-oriented perspective
- Resources-oriented perspective
- Value-oriented perspective

Support example “Digital Business Models”

You need to know how to do it – ramifications can be complex

Online-Platform

- Automated sale through large online platform or market pull (e.g. Dash-Button)



Washing machine manufacturer

- Sale of washing machine with option to buy detergent through App



Detergent manufacturer

- Sale/free washing machine with subscription of detergent



Quelle: Screenshot von Amazon.de, Fotos: <https://pixabay.com/de/kapseln-waschmittel-fl%C3%BCssig-3325812/> und <https://pixabay.com/de/waschmaschine-w%C3%A4scheservice-2668472/#>

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