

Digital transformation of business models and entire value chains
Prof. (FH) Dr. Julian Müller

A short introduction to myself

Prof. (FH) Dr. Julian Müller

Since 2021: Professor at Kufstein University of Applied Sciences

2018 – 2021: Professor at Salzburg University of Applied Sciences

2015 – 2018: PhD at Friedrich-Alexander-University Erlangen-Nürnberg



Associated projects and publications



Publications (excerpt)

Müller, J. M., Veile, J. W. & Voigt, K.-I. (2020). Prerequisites and Incentives for Information Sharing within Industry 4.0 – An International Comparison across data types. *Computers and Industrial Engineering, in press.*

Birkel, H. S., & Müller, J. M. (2020). Potentials of Industry 4.0 for Supply Chain Management within the Triple Bottom Line of Sustainability–A Systematic Literature Review. *Journal of Cleaner Production, 125612.*

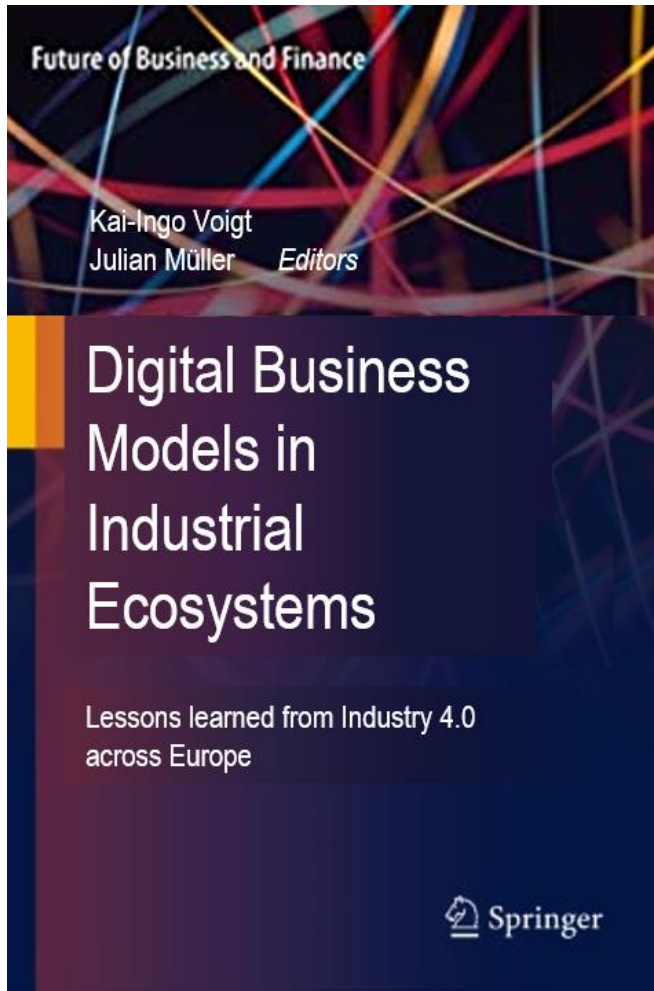
Veile, J. W., Schmidt, M. C., Müller, J. M., & Voigt, K. I. (2020). Relationship follows technology! How Industry 4.0 reshapes future buyer-supplier relationships. *Journal of Manufacturing Technology Management, in press.*

Veile, J. W., Schmidt, M.-C., Müller, J. M. & Voigt, K.-I. (2020). Expected buyer-supplier relationships in the era of Industry 4.0 – An analysis across industry sectors. In: Bode, C., Bogaschewsky, R., Eßig, M., Lasch, R., & Stölzle, W. (Eds.), *Supply Management Research*, Springer Gabler.

Müller, J. M., Buliga, O., & Voigt, K. I. (2020). The role of absorptive capacity and innovation strategy in the design of industry 4.0 business Models - A comparison between SMEs and large enterprises. *European Management Journal, in press.*

Müller, J. M., Buliga, O., & Voigt, K. I. (2018). Fortune favors the prepared: How SMEs approach business model innovations in Industry 4.0. *Technological Forecasting and Social Change, 132*, 2-17.

Upcoming Book (expected 2021)



- Editors:** Prof. Dr. Kai-Ingo Voigt, University Erlangen-Nürnberg
Prof. (FH) Dr. Julian Müller
- Publisher:** Springer
- Book series:** Future of Business and Finance

Agenda

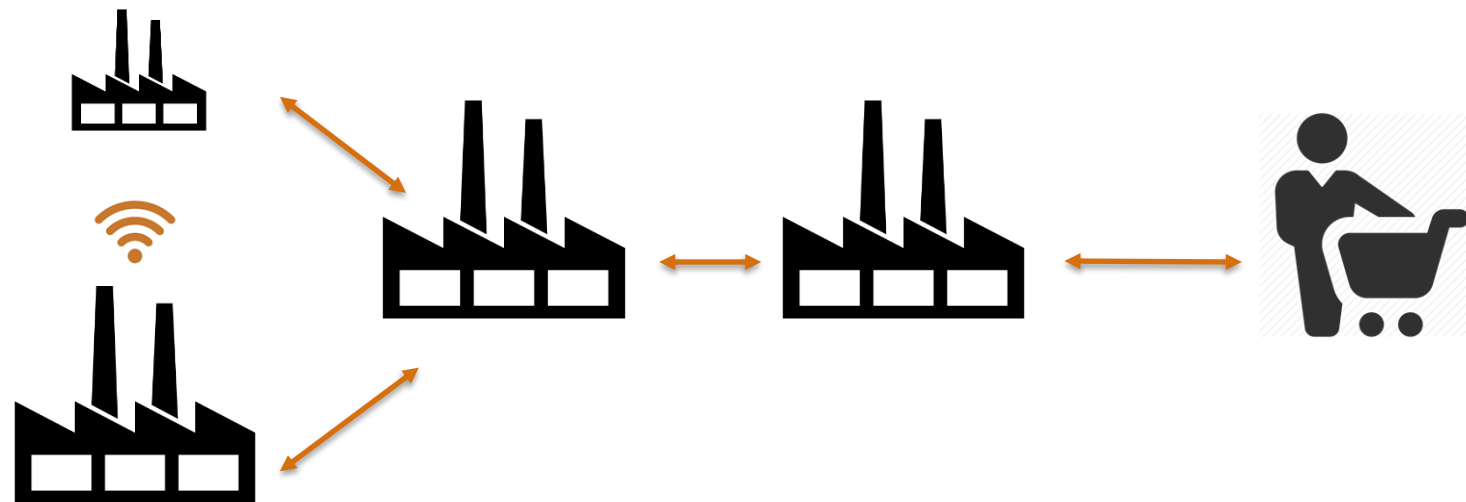
**Industry 4.0 in the
Supply Chain**

Digital business models

Conclusion

Some of the less investigated topics within the concept of Industry 4.0

Industry 4.0 in SMEs



Horizontal and vertical interconnection across the supply chain

New requirements, challenges and strategies of supplier integration in Industry 4.0

RQ 1: New requirements

Data management (10)
Standards & interfaces (8)
Data exchange (6)
Cultural change (5)
Shortening innovation cycles (4)
Customer orientation (3)

RQ 2: Challenges

High complexity (9)
Lack of resources (8)
Inadequate structures and interfaces (8)
Uncertainty (5)
Lack of understanding (5)
Data security (5)
Power shift (5)
New competitors (4)
Data exchange (4)

RQ 3: Strategies

Communication (8)
Digital platforms (8)
Transparency (6)
Contracts (2)
Joint business models (2)
Joint R&D (2)
Resource provision (1)

New requirements

- The increasingly demanded ability to collect, store, and profitably evaluate data. (10)
- Creation of interfaces and the implementation of standards - Suppliers need to be willing to adapt to customer-specific standards and inter-faces, even if different standards exist among their customers. (8)
- The willingness to provide data proactively. (6)
- Cultural shift towards common, collaborative value creation - Think and act beyond company borders, increasing partnership-based exchange. (5)
- The understanding of the shortening innovation cycles by Industry 4.0 - Traditional industrial sectors would have to rethink their way of creating value, in order to approach short innovation cycles like those of, e.g., the software industry. (4)
- Increased orientation towards the common end customer of different supply chain partners. The primary goal of value creation should focus on the common end customer and his needs. (3)

Challenges

- High degree of complexity. (9)
- Lack of resources. (8)
- Inadequate structures and interfaces - In many companies, different departments work with different standards and a company-wide coordination does not take place (8)
- Suppliers' uncertainty about the expected developments – “Wait-and-see attitude”. (5)
- Lack of understanding, particularly as for the urgency of implementing Industry 4.0. (5)
- Data security and data protection. (5)
- Changing balance of power. (5)
- Disruptions through new competitors. (4)
- Lack of willingness to exchange data - Data is considered to be a trade secret. (4)

- Precise and comprehensive communication of common standards and requirements. (8)
- The establishment of digital platforms. (8)
- Transparency in communication with suppliers. (6)
- Contractual security - Suppliers need to have a reliable basis with a long-term perspective. (2)
- Creation of joint business models. (2)
- Joint research and development activities. (2)
- Provision of resources. (1)

Problem statement

Problem:

Data transparency across the supply chain has numerous potentials, but suppliers (especially SMEs) lack trust, capabilities and resources to share their data.

Research Questions:

- What prerequisites exist and which incentives can be used that suppliers are willing to share data?
- How can the innovation capabilities of suppliers be bundled?
- How can joint business models within entire supply chains and ecosystems be created?

Results differentiated for data types

	Short description	Higher impact for (data type)
Prerequisites	Social Interaction -> Data Exchange	Delivery details/ inventory data
	Trust -> Data Exchange	Production data, Process data
	Shared vision -> Data Exchange	Process data
	Resources -> Data Exchange	Planning & capacity information
	Existing IT-Link -> Data Exchange	Planning & capacity information, process data, engineering information
	Benefit sharing -> Data Exchange	Production data, engineering information
	Incentives	Data Exchange -> Efficiency
Data Exchange -> Responsiveness		Delivery details / inventory data
Data Exchange -> New business		Production data, Process data
Data Exchange -> Reward		Delivery details / inventory data

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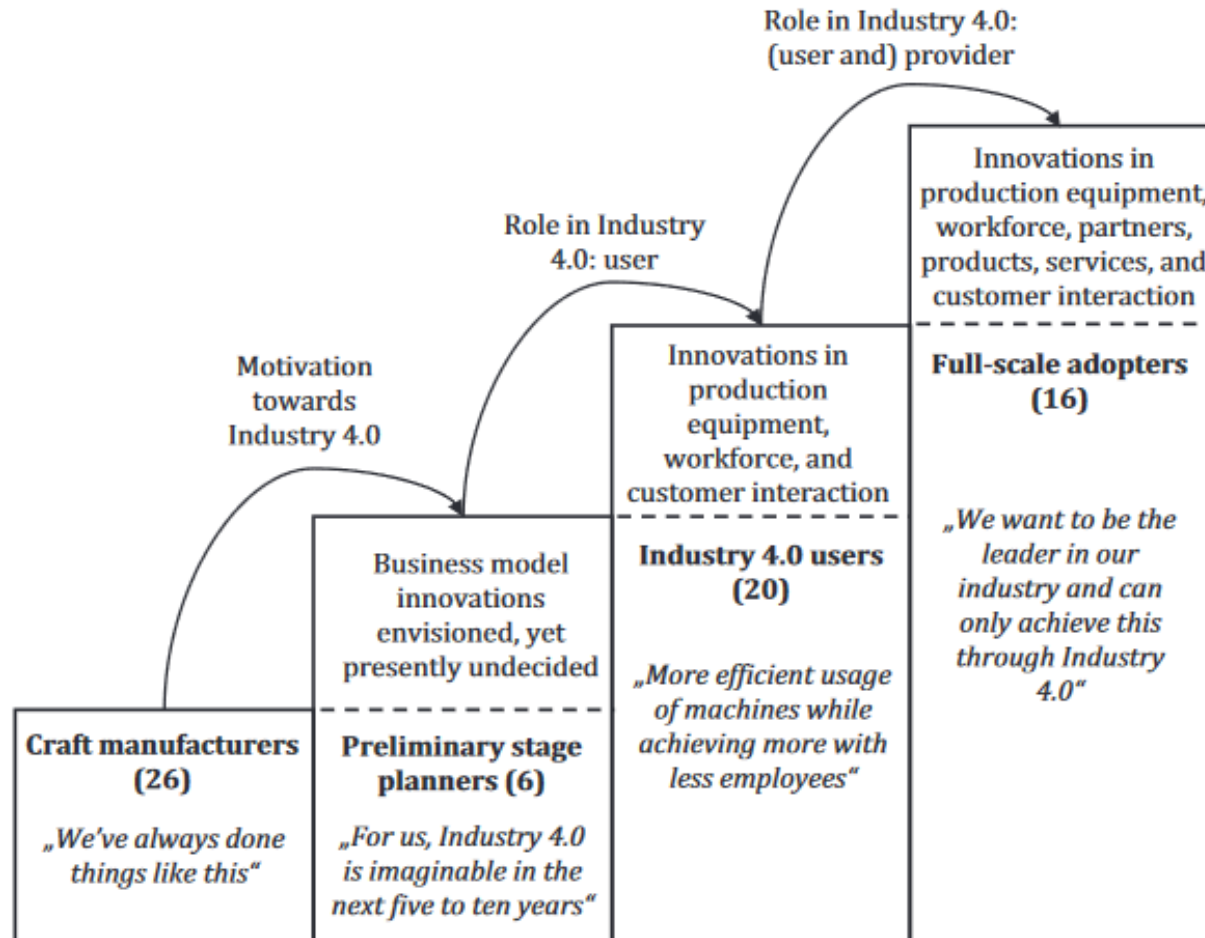
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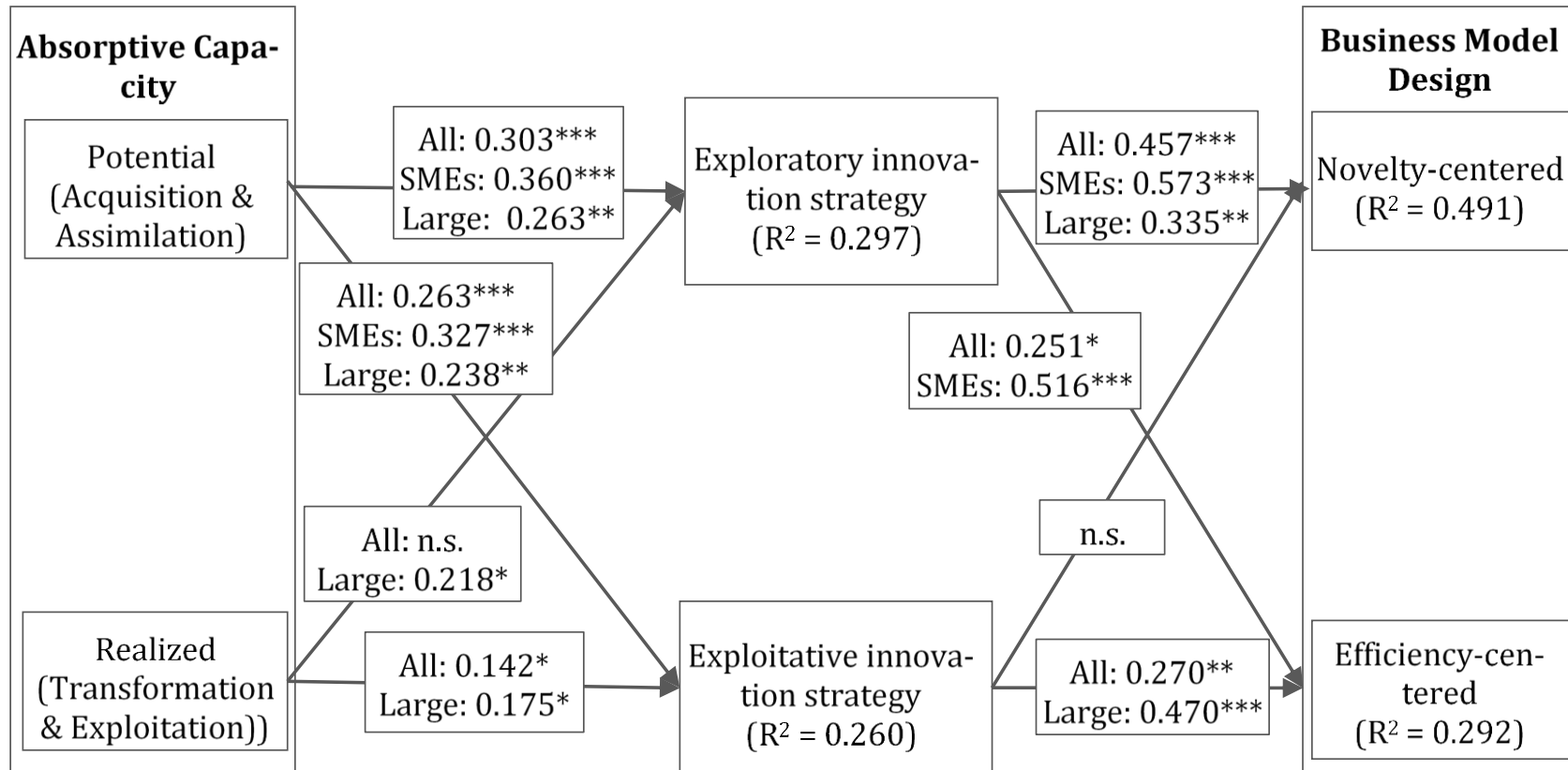
Requirements of digital business models

Changes in value creation and value offer							
<i>Unique Selling Proposition</i>	Unique features				Marketing of software and data features		
<i>Standardization</i>	Within systems	Among systems	Industry-specific standards	Redefinition of ideal processes	Restructuring of existing processes		
Organizational aspects							
<i>Acceptance</i>	Company internal		Company external		Usage of well-defined measures		
<i>Finance</i>							
<i>Leadership</i>	Cultural change		Role-model function	Realization strategy			
<i>Communication</i>	Open communication	Company-wide communication	Differentiation of target groups	Multi-channel communication	Accompanying of communication channels		
<i>Data disclosure</i>	Data sharing		Data security		Data ownership		
Structural changes							
<i>Agility</i>	Flexibility of strategy			Dynamic processes			
<i>Competencies</i>	Internal	External		Partnerships	Ensuring long-term existence		
<i>Interactions</i>	Coherent design objects			Holistic view			
Technological aspects							
<i>Process controlling</i>	Definition and constant monitoring of actual and target state		Definition of evaluation criteria		Differentiation of controlling instruments		
<i>Data quality</i>	Data availability	Data correctness	Data relevancy	Data consistency	Data origin	Data interpretation	Data currency

Stage-gate model for Industry 4.0 business model innovation in SMEs



Results for new business models



*** p < 0.001, ** p < 0.01, * p < 0.05, n.s. = not significant

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Digital business models often require data from the supply chain

