

The Robot Revolution and Industrial IoT International Symposium 2025

Japan-Germany Expert Forum

S3-4 Collaboration on Business Model

Prof. Dr. Nils Madeja (Plattform Industrie 4.0 AG6 /Technische Hochschule Mittelhessen)
Mr. Shuhei Sugie (CEO, Innovation Research Institute LLC)

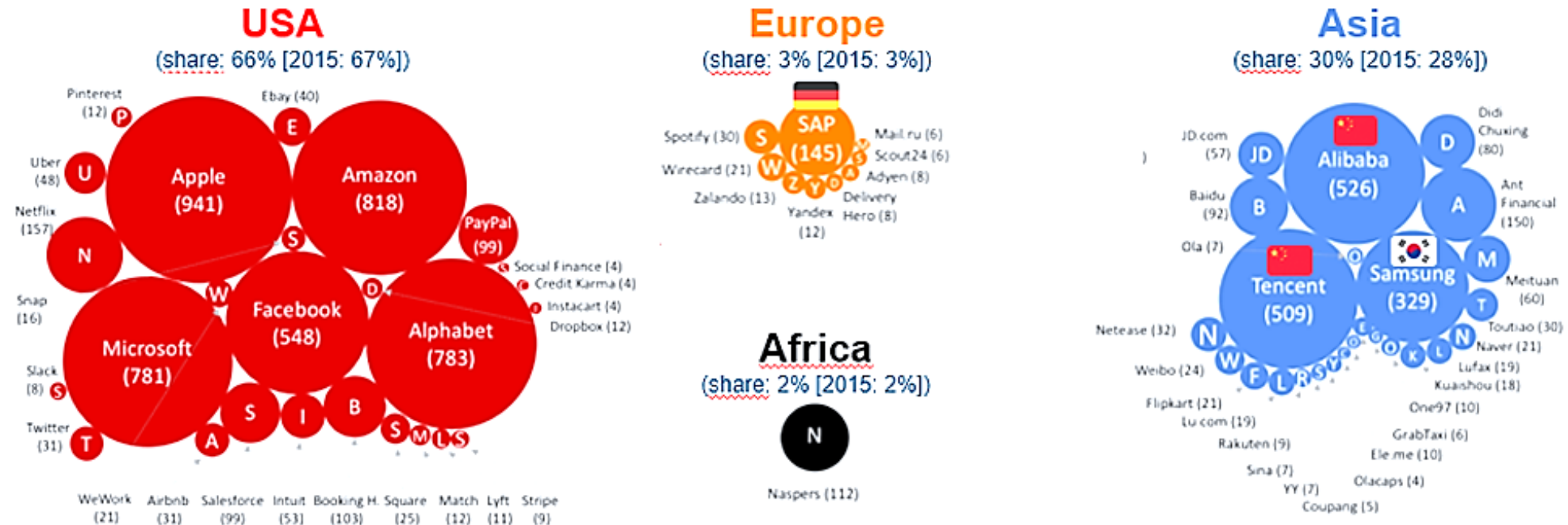
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|---|-----------------------|
| 1. Background | Mr. Shuhei Sugie |
| 2. Japanese Activity | Mr. Shuhei Sugie |
| 3. German Activity | Prof. Dr. Nils Madeja |
| 4. “Digital Platforms in Manufacturing Industries”
in the Umbrella Paper | Prof. Dr. Nils Madeja |
| 5. Future Collaboration | Mr. Shuhei Sugie |

- Dr. Kagermann proposed our cooperation in promoting the B2B platform economy at RRI International Symposium 2018.
- RRI agreed with the Plattform Industrie 4.0 to cooperate in the field of Digital Business Model.
- GER-JPN collaboration slowed down after publication of joint paper “Digital Platforms in Manufacturing Industries” in 2021. Separate activity in Japan and Germany.
- The manufacturing industry is changing from product-driven to service-driven. The business ecosystem and business model transformation is key for the success of industry in the future.
- We restarted a discussion on business model as a new expert meeting in 2024.

Proposal from Prof. Kagermann at RRI Symposium 2018



The most Valuable Companies in the World are Platform Companies – but there is a Regional Imbalance



→ B2C is dominated primarily by USA & China.

→ Competition in the B2B sector has not yet been decided. This creates opportunities for Japan and Germany.

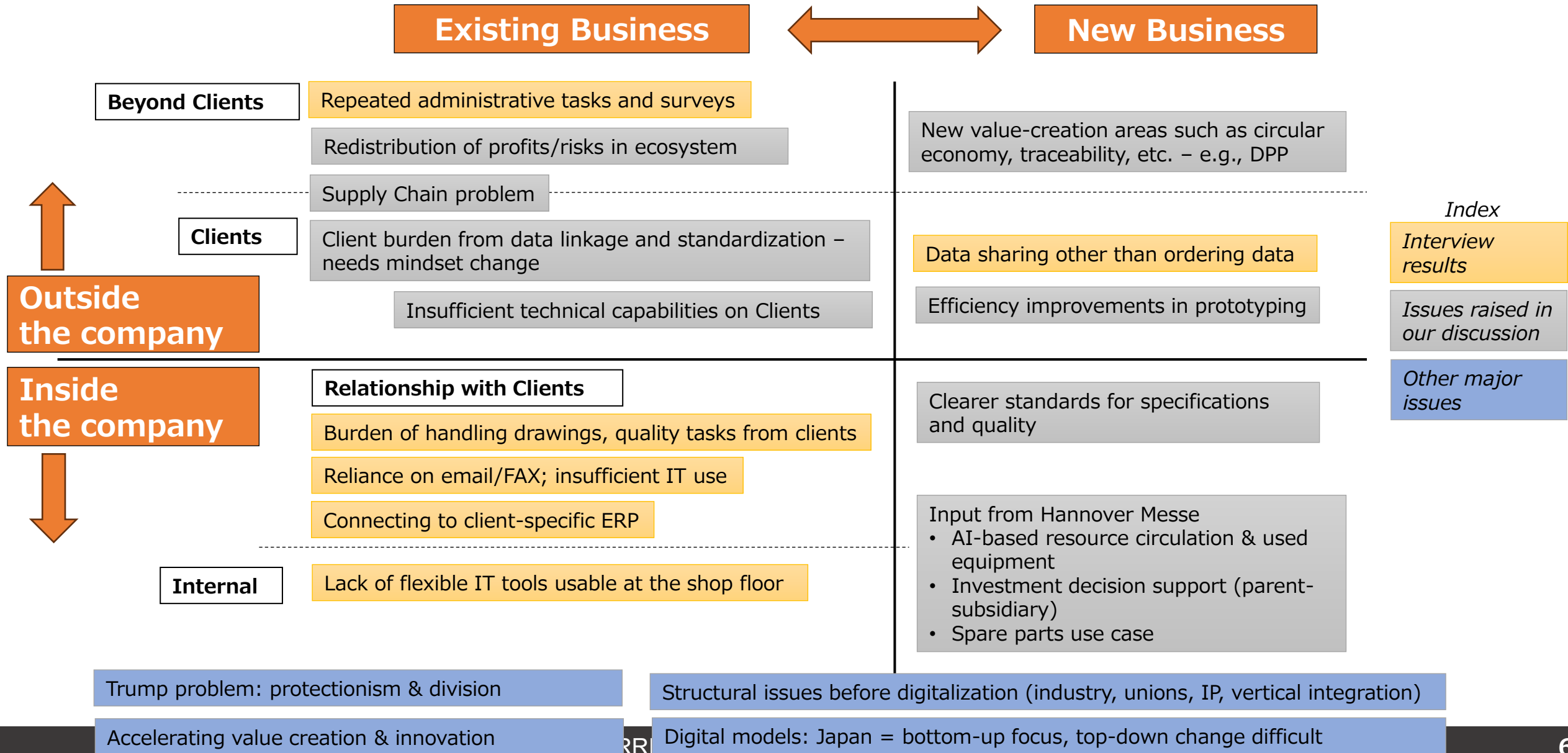
Source: Netzoekonom.de/idea: Peter Evans.

We interviewed four SMEs actively engaged in digital transformation (DX) and discussed the results and key takeaways.

Summary of Interview Results

Viewpoint	Main Issues	Takeaways / Directions
(1) Burden of Drawing Management	Analog drawings, manual instructions, need for extra work	Introduce system for on-site drawing digitization via common platform
(2) Reliability / Copyright / Security	Concerns about reliability of data transfer, secondary use	Build mechanisms to ensure IP protection and usage rights
(3) Burden of Client-Led Structure	Demands from large firms (format, requirements, transactions)	Important to clarify scope of standardization and balance burdens
(4) Data Formats & Standards	Diversity of formats reduces efficiency	Key to secure minimum standardization and partial compatibility
(5) Current State of IT in SMEs	Still rely on paper-based processes, lack of IT staff	Low-code, easy-to-use tools, in-house capacity building
(6) Traceability and Sustainability	Difficulties ensuring full supply chain traceability	Industry collaboration to reduce burden and diversify responses
(7) Support Systems and Cultural Background	Complex procedures, lack of clarity in government support	Visualization of trust frameworks, support systems, and success cases

2. Japanese Activity (2/2)



3. German Activity

Data Space Survey by WG6

Data spaces are at the centre of the data economy and offer significant opportunities for individual companies and industrial ecosystems. At the same time, the increasing sharing of data leads to a significant increase in transparency in the supply and value chains. The use of data spaces can help companies to comply with legal requirements and fulfil European reporting obligations. To date, SMEs have been largely neglected in the various initiatives. The potential of data spaces for SMEs has not yet been widely recognised.

With this short survey, WG6 of the Industry 4.0 platform would like to ascertain the current level of engagement with data spaces in SMEs. Your cooperation will help to recognise challenges and design suitable, functional solutions for SMEs to successfully participate in data spaces.



The middle class as a growth and Driving innovation in the data economy

Data spaces: potential and fields of action

Data spaces are at the heart of the data economy and offer significant opportunities for individual companies and industrial ecosystems. At the same time, the increasing sharing of data leads to a significant increase in transparency in supply and value chains.

The use of data rooms can help companies comply with legal requirements and meet European reporting obligations. To date, small and medium-sized enterprises have been largely neglected in the various initiatives. A comprehensive examination of the potential of data rooms for SMEs has not yet taken place on a broad scale.

The working group on "Digital Business Models" in the Industry 4.0 platform wants to better understand the needs of small and medium-sized companies in order to make data spaces more attractive for this important target group!

Sources:

* Statista, employees and turnover of companies in the manufacturing sector

** ZEW - The Distinct Features of Hidden Champions in Germany, German Innovation Survey, manufacturing industry only

*** SMEs overall; medium-sized companies definition, digitalization and ecological sustainability in companies (bundesnetzagentur.de)

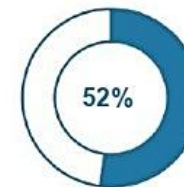
**** Accenture SME Survey 2024, n = 750 (6 countries; German data)

Our strengths: What we can build on

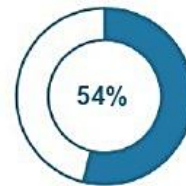
Small and medium-sized businesses are the backbone of the German economy and are central to the transformation to the data economy.



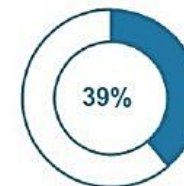
Number of companies
45,214 companies employ fewer than 500 people*



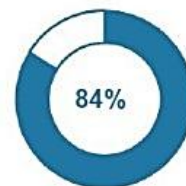
Number of hidden champions
1410 of the 2700 hidden champions worldwide are active in the manufacturing sector in Germany**



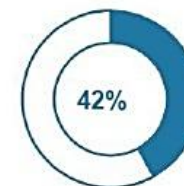
number of employees
54% of employees work in companies with less than 500 employees*



Sales share
Companies with less than 500 employees generate 39% of the Total turnover of the manufacturing industry*



Innovation:
84% of companies want to Innovations their competitive increase ability****



Existence of a digitalization strategy:
42% of medium-sized SMEs*** have a digitalisation strategy***

3. German Activity

Machine Translated by Google

The potential: Where is there room for improvement?

Data economy and data spaces are new concepts that are not yet widely used. Use cases show that concerns are often untenable.



Popularity of data rooms:
Only 16% of companies have a good understanding



Data availability:
42% complain about lack of Data availability



Cost:
61% of companies fear high Costs for participation in data rooms

Source: Accenture SME Survey 2024, n = 750 (6 countries; German data)

The reasons: What can we work on?

A paradigm shift is needed to realize the potential of data sharing. This becomes clear when we listen to the voices of practitioners.

Culture:

I am a product-oriented company.
The identity of our company is based on our products. Services are difficult to anchor in the engineering mindset of our employees and the company.

Core business:

My business model works as it is.
I don't yet see the potential of data-driven business models; my core business is my product.

Trust:

There is a lack of trust in data sharing.
What effort is involved in data preparation? What happens to my data? Who uses the data? How can I understand what happens to my data?

To use:

The added value for me and my customers is not clear.
I know how to sell products, but how can I offer product-service systems or smart services? The performance promises of service-oriented business models are not always clearly visible to either providers or users.

Capacity problem:

I lack resources for complex transformation processes.
I don't have the time or capacity to delve deeply into new approaches and worry about implementation. I need a plug-and-play solution.

Expense:

The time and financial expenditure is not manageable.
The return on investment is not easy to determine. This is easier to calculate when investing in machinery and equipment. Necessary investments, for example in technology and the digitalization of basic processes, cannot be estimated.

Complexity:

This all seems more than complicated.
Practical success stories are still rare; so far, primarily concepts have been shown for several years. The effort required to deal with these issues is high, but above all there is a lack of convincing examples.

Those:
Survey of 24 companies by AG 6 between October 2023 and March 2024

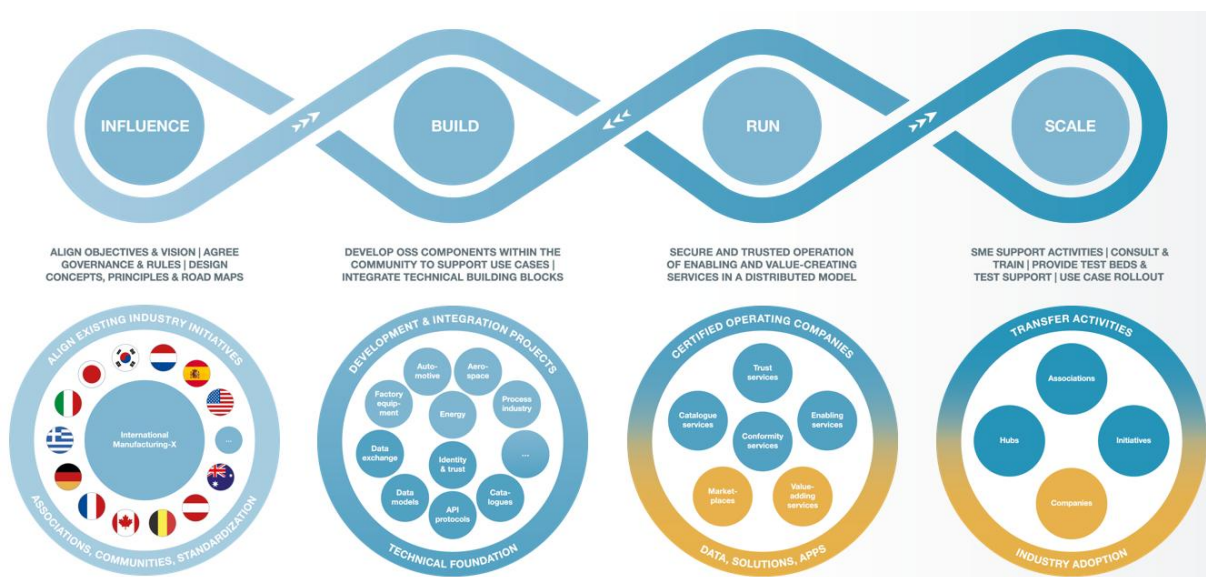
**We need your expertise.
Take part in our survey!**

Survey on data economy in SMEs



Authors: Svenja Falk (Accenture Holding), Tobias Guggenberger (Fraunhofer ISST), Andreas Hamper (Fraunhofer IIS), Nadja Hoßbach-Zimmermann (Fraunhofer IIS), Lukas Moschko (Robert Bosch GmbH), Jonas Wirth (Trumpf SE & Co. KG)

3. German Activity



Transfer Projects (e.g. SCALE-MX, ...)



SCALE-MX is the transfer initiative of Manufacturing-X, in which X projects develop data spaces for different industries. SCALE-MX aims to demonstrate the benefits of industrial data spaces to users, providers and multipliers and to motivate them to participate. The team is working on making the concept of data spaces understandable, connecting companies and scaling data spaces. SCALE-MX is funded by the BMWK and is an association of VDMA, ZVEI, Niedersachsen Next, Bayern Innovativ, DIHK Service GmbH and WIK under the leadership of VDMA and ZVEI.

Transfer Initiatives (e.g. Next Level Mittelstand)

Benefit from the advantages of the Next Level Mittelstand ecosystem

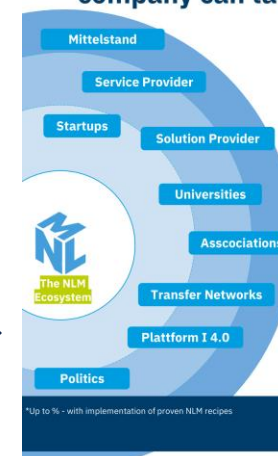
Digitization presents SMEs with challenges that no company can tackle alone.

NEXT LEVEL MITTELSTAND



Together strong - that's Next Level Mittelstand

We are a strong implementing community of SMEs, experts and an overarching NLM ecosystem. NLM members contribute their challenges, build on tried-and-tested solutions and digitalization strategies and implement them together, driven by SMEs. This is how we ensure our long-term competitiveness.



Focussed & Efficient

Benefit from 70% shorter development and implementation times, 80% less use of resources, higher quality thanks to swarm intelligence and massively reduced development risk*.

- 70 % Faster in implementation
- 80 % Reduction of project costs
- 100 % Reduction technical risks

Become part of the implementation community. From the Mittelstand. For the Mittelstand.

Transfer Alliances (e.g. Transfer-Network)

Transfer Network Industrie 4.0

Joining forces for the digital Mittelstand



Partners: Innovators, Multipliers, "Field Representatives"

In the TN-I4.0, transfer actors exchange ideas, identify synergies, and pool resources in joint initiatives (e.g., case studies, events, mapping, topic catalogs). The partners of the Transfer Network — and ultimately SMEs — benefit from these activities.

The network is open to additional players.

In AG6 we discuss the success factors that enable SME participation in digital ecosystems – and explore the open questions that arise from this. For example:

1. Purpose & Value

- Why do companies decide to join data spaces?
- How do data spaces improve existing business models – and where do they create entirely new ones?
- How can an actor within a data space create tangible value in a specific role?

2. Access & Barriers

- What costs (financial, technical, human) are involved?
- What are the minimum technical requirements?
- How can “on-ramp” models be designed for smaller players?
- How can SME skills and know-how gaps be closed?

3. Governance & Incentives

- How much autonomy can SMEs retain vs. mandatory rules?
- What incentives (financial, operational, strategic) drive participation?

4. Value Sharing & Monetization

- How is SME value contribution defined and rewarded?
- Which business models are viable (fees, revenue share, pay-per-use, data products)?

5. Evaluation & Impact

- Which KPIs best measure ecosystem success with SME participation?
- How can SME feedback be integrated into governance?
- Which mechanisms ensure continuous learning and improvement?

4. “Digital Platforms in Manufacturing Industries” in Umbrella Paper

- **Redefining Manufacturing’s Role in Addressing Societal Challenges**

In response to issues such as the circular economy, demographic shifts, and regional disparities, manufacturing must evolve into a driver of sustainability and social value creation. International standardization provides a shared foundation, while **new business models spanning the entire product-service lifecycle enable both industrial transformation and societal impact.**

- **Evolving Human-Machine Relationships and Rebuilding Industrial Culture**

The collaboration between humans and machines is shifting from efficiency to co-creation and emotional engagement. Promoting a positive working culture and a sense of purpose in manufacturing is key to attracting future talent. International frameworks for **skills development and standardized competencies** are essential to support this cultural renewal.

- **Innovation in Design and Production Systems with Global Interoperability**

Design and production systems are becoming more agile, flexible, and sustainable through digital technologies. International standardization ensures interoperability, while modularization, decentralized production, and **data-driven service models** support global collaboration and competitiveness.

- **Building a Trusted Data & AI Ecosystem with Inclusive Support**

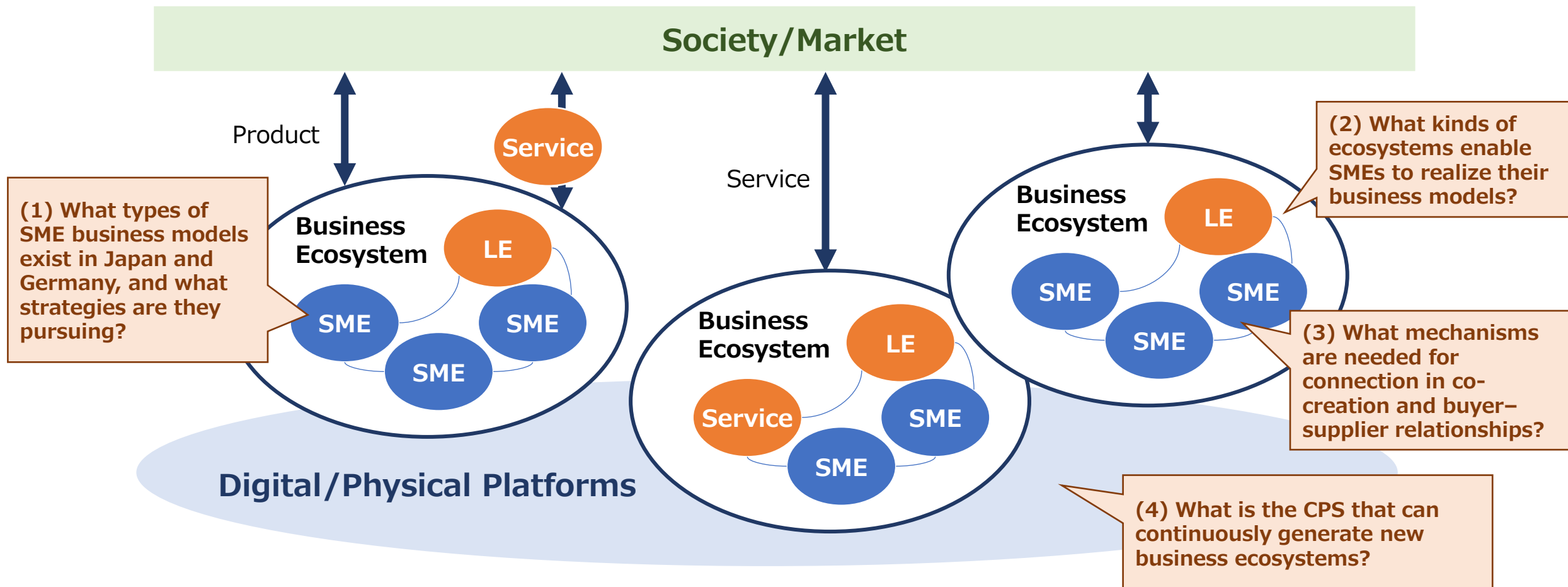
Accelerating the use of data and AI requires a trusted, transparent, and interoperable ecosystem. **Inclusive support structures for all stakeholders – including SMEs** – and international education initiatives are vital to foster **sustainable innovation and the emergence of new business models.**



Expert Group “Digital Platforms in Manufacturing Industries”

This group promotes digital business models via real-world B2B use cases, expanding focus to SMEs and publishing joint insights on platform ecosystems and data-sharing challenges.

1. First, compare the two studies to identify similarities/commonalities and differences between them.
2. Second, identify focus areas/topics for further detailed study on either side (these do not need to be identical).
3. Third, prioritize the different focus areas/topics so that we can establish an ongoing comparison.



Thank you for your attention

Danke für Ihre Aufmerksamkeit

ご清聴ありがとうございます