Key Capabilities to Thrive at the Nexus of Supply Chain Management and Digitalization

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Agenda

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2. Research Question and Methodology
3. Research Results
4. Summary and Conclusion

Introduction and Background – Logistics and SCM

"Supply Chain Management (SCM) is defined as the management approach concerned with **systemically dealing with strategic coordination of traditional business functions** and the **tactics across** these **within an organisation and across partner organisations** along the supply chain, with the **aim of improving long-term performance** not only of the individual organisation, but also **of supply chain as a whole**."

Supply Chain Management (SCM)…
- response to the evolutionary development of logistics and the SC concept, SCM emerged as theoretical construct defining the **integration of all the activities along the Supply Chain into a seamless process** on a strategic level
- Logistics on the other hand can be placed within the rather **tactical and operative realm of the SC** and is **part of SCM execution**
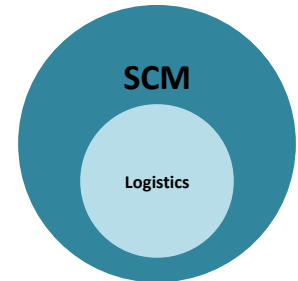
Introduction and Background – Digitalization and Digital Transformation

Digitalization…
- …in the narrower sense „**digitization**" is the creation of digital representations of physical objects, events or analogue media → purely technical process, nothing new.

- …in the broader sense **digitalization** is the total of the effects resulting from this process of digitization → new: performance of systems, connectivity, convergence

- **Digital transformation** is the profound and accelerating transformation of business activities, processes, competencies and models to fully leverage the changes and opportunities of digital technologies and their impact across society in a strategic and prioritized way.
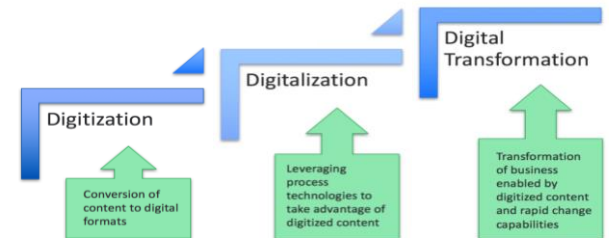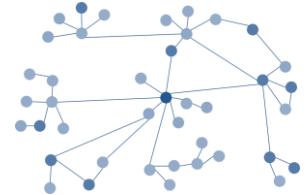
Research Questions and Methodology (1)

From an organisational point of view, Digitalization offers many potentials for improvement at different stages and in different areas, one of these is SCM.

Digital Transformation is often purported to have fundamental impacts on traditionally linear SCs and to provide **the basis for the creation of digital, transparent, anticipatory, real-time and open Value Networks**.

However, despite the variety and plethora of SCM research, little attention has been given to the **actual key capabilities** arising and required at the nexus of SCM and Digital Transformation from practitioners' point of view.

Our research question:

What are the research action fields created by Digital Transformation in Supply Chain Management according to SCM experts and practitioners?
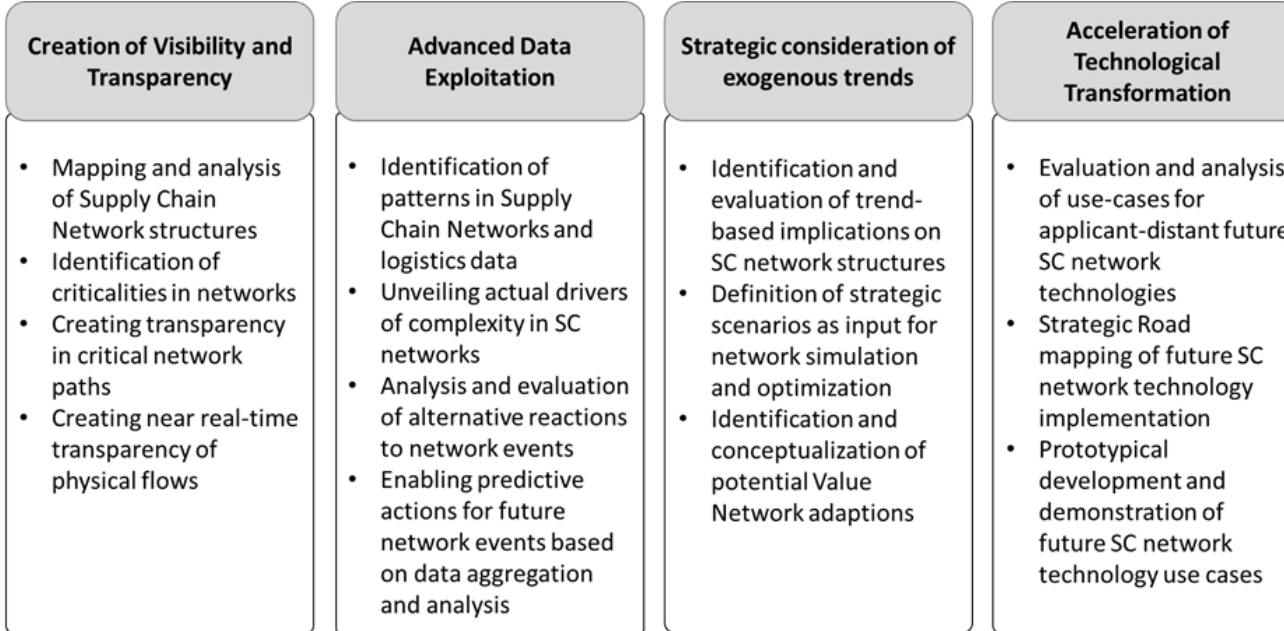
Research Questions and Methodology (2)

- limited availability of comparable, empirically grounded material for SCM → focus group study
  - construct knowledge and **empirically grounded insights** in the form of collected capability needs at the nexus of SCM and digitalization from practitioners' point of view.
  - **3 focus groups, 45 participants**, different branches (from retail, metal industry, automotive sector and IT-sector to logistic service providers, fast moving consumer goods etc.)
- Methodology of **data collection**:
  - moderation by a senior researcher respectively a professor
  - collaborative notes where taken by the moderator and the group using flipcharts
  - Notes were taken by a second observer.
- Methodology of **data analysis**:
  - aggregation based on the QCA approach proposed by Mayring (2000)
  - tentative deduction of capabilites and step-by-step derivation of key-capability groups
  - Cross-check by applying the technique of peer debriefing
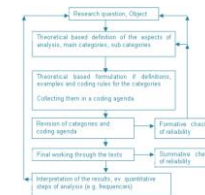
Results – 4 key-capability groups, 14 capabilities

Creation of Visibility and Transparency
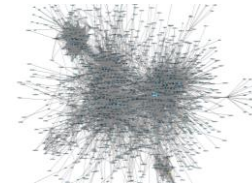
- Mapping and analysis of Supply Chain Network structures
- Identification of criticalities in networks
- Creating transparency in critical network paths
- Creating near real-time transparency of physical flows

Advanced Data Exploitation

- Identification of patterns in Supply Chain Networks and logistics data
- Unveiling actual drivers of complexity in SC networks
- Analysis and evaluation of alternative reactions to network events
- Enabling predictive actions for future network events based on data aggregation and analysis

Strategic consideration of exogenous trends

- Identification and evaluation of trend-based implications on SC network structures
- Definition of strategic scenarios as input for network simulation and optimization
- Identification and conceptualization of potential Value Network adaptions

Acceleration of Technological Transformation

- Evaluation and analysis of use-cases for applicant-distant future SC network technologies
- Strategic Road mapping of future SC network technology implementation
- Prototypical development and demonstration of future SC network technology use cases

Key capability group 1:

Creation of Visibility and Transparancy

Mapping and analysis of Supply Chain Network structures
- visualization of strategic and tactical network-level structures and partners
- identification of central players and deviations between actual & target states.

Identification of criticalities in networks
- evaluation of supplier, customer or material criticality in comparison to other network parts or players,
- analysis of network elements in regard to their vulnerability and susceptibility
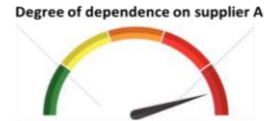
Creating transparency in critical network paths
- identification of blind spots in critical network paths & the resulting data need
- identification, development and provision of supporting data analysis methods and tools if existing data is not exploited sufficiently enough
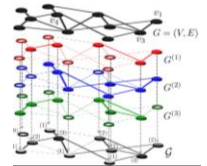
Creating near real-time transparency of physical flows
- identification of conceptual requirements for sensor based solutions
- technological development of prototypical sensor systems and their implementation in defined demonstrator settings or transport infrastructures

Key capability group 2:

Advanced Data Exploitation

Identification of patterns in Supply Chain Network and logistics data
- identification and analysis of Demand Patterns, Usage Patterns, Order Patterns, Transport Patterns, Storage Patterns, Damage Patterns, Seasonal Patterns etc.

**Unveiling actual drivers of complexity in SC networks**
- Identification of the actual triggering events of network complexity resulting in e.g. out-of stock situations or the need for express deliveries
- identification of critical and non-critical players adding high level complexity,
- provision of data based decision basis for deriving network adaption requirements

Analysis and evaluation of alternative reactions to network events
- Simulation and optimization of e.g. abruptly changed customer demands or seasonal variance, unforeseeable events etc.

Enabling predictive actions for future network events
- prediction of customer demands, seasonal changes, future bottleneck resources as bases for decisions
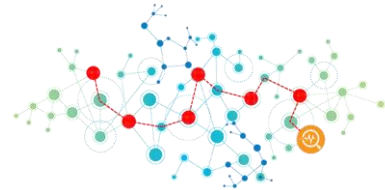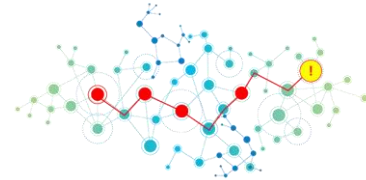
Strategic Consideration of Exogenous Trends

**Identification and Evaluation of trend-based implications**
- Identification of disruptive events, socio-demographic trends, changing customer demands or political and environmental trends and evaluation of their impact on SCM

Definition of strategic scenarios as input for Value Network Simulation and Optimization
- preparation of optimization scenarios for simulation models of strategic Value Networks

Identification and conceptualization of potential Value Network adaptions
- identification of strategic action fields based on the scenarios evaluated and tested.
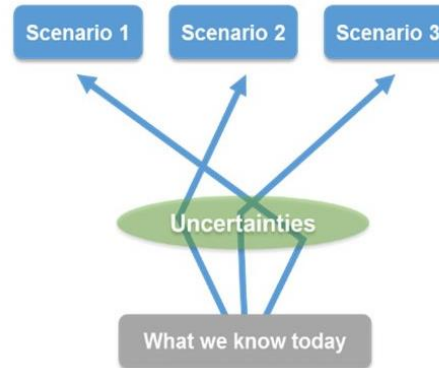
Key capability group 4:

Acceleration of Technological Transformation

Evaluation and analysis of use-cases for applicant-distant technologies
- Analysis of Blockchain and Deep Learning use cases in SC networks and the quantitative evaluation of their impact on SCM key figures

Strategic Roadmapping of future network technology implementation
- strategic roadmapping of concrete next steps and projects required to create the organisational basis for implementing BC and DL

Prototypical development & demonstration of future network technology
- development and / or adaption of new / existing Blockchain and Deep Learning-based solutions to specific use cases to prove the practical feasibility and the economic viability

Summary and Conclusion

4 key capability groups and 14 capabilites:
- Creation of Visibility and Transparency
- Advanced Data Exploitation
- Strategic Consideration of Exogenous Trends
- Acceleration of Technological Transformation

Proactively driving the digital transformation of existing SCs into digital Value Networks instead of just reacting passively to it is amongst the **top priorities of SCM experts** and practitioners.

Being able to **combine three main areas** was found to be crucial for the future of SCM:
- **hardware technologies** (e.g. sensor systems, microelectronics etc.)
- **software solutions** (e.g. Artificial Intelligence, Simulation and Optimization, Pattern Recognition, etc.)
- and most important 3.) the **Logistics and SCM-domain expertise** to apply HW and SW in SCM application fields
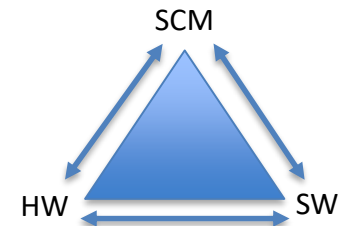
THANK YOU FOR YOUR ATTENTION!

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