

Trends and Strategies in Logistics: **The Impact of the Corona Crisis on** **International Logistics Networks**

Working Document



Prof. Dr. Frank Straube
Dr. Benjamin Nitsche

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Agenda

1. Methodological Approach
2. Theses on Current Developments of International Logistics Networks
3. Preliminary Results: Fields of Action for Successful Crisis Management
4. Contribution from TUB Research Projects to Fields of Action
5. Contacts

Methodological Approach | Integration of research and practice insights

1.

Preliminary Interviews and Ideation

- **Integration of practice and research insights** thought interviews and guided ideation on current developments and impact on future logistics networks

2.

Qualitative Content Analysis

- Summary of current challenges of Corona crisis for international logistics networks and collection of solution approaches

3.

Theses Development

- Development of **theses on future developments** on international logistics networks based on five **logistics design levels (strategy, networks, process, technology and people)**

4.

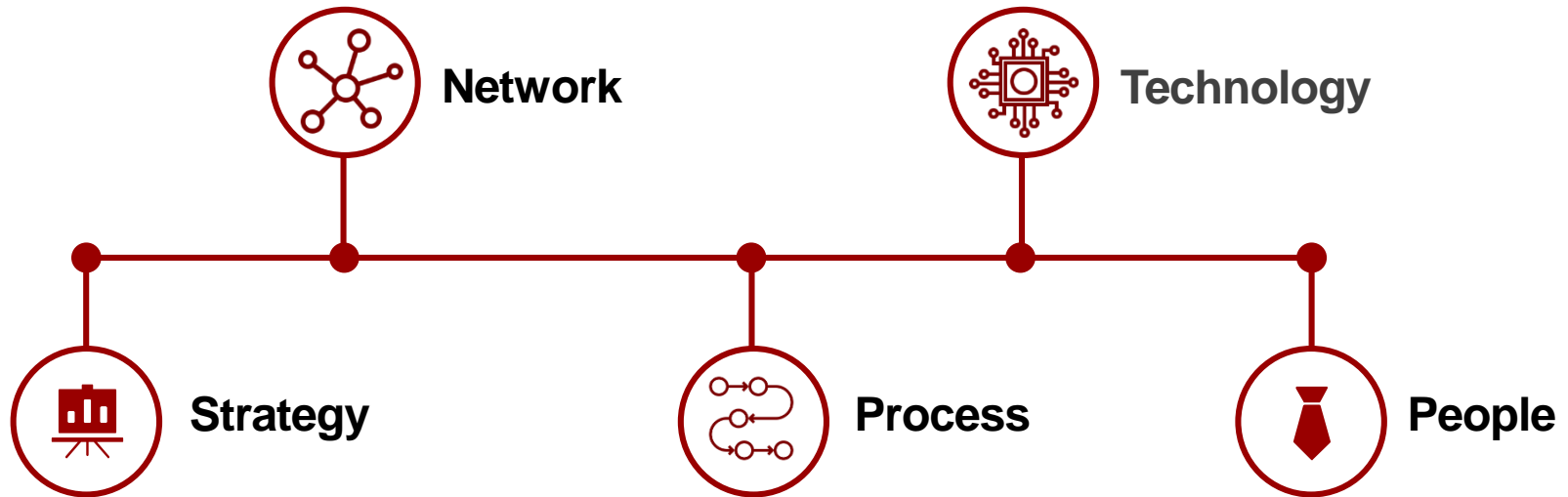
Next Steps and Focus of Online-Discussion

- Structured discussion on current challenges and solution approaches as well as theses through interactive web-format on May 27th 2020 with over 20 logistics managers from manufacturing industry
- Post-assessment of theses to develop guiding principles for future logistics management

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Theses Development for Future Developments of Logistics Networks | Logistics design areas



Based on those logistics design areas, the challenges and strategies discussed through preliminary interviews were categorized and theses on future developments and trends regarding the Corona crisis have been developed.

Strategy | Core decisions of prioritization of logistics goals are the basis for strategic readjustments



Theses

- 1.1 Corporate role of logistics will be strengthened throughout the crisis.
- 1.2 Firefighting will take over important strategic decisions (strategic projects and investments will be postponed).
- 1.3 There will be a paradigm shift away from pure cost thinking towards a holistic approach to sustainability.

Challenges (Excerpt)

- Uncertain political situation with an unpredictable development
- Operational firefighting "eats" the strategy
- Core decision on prioritization of logistics goals in times of crisis and beyond remains challenging

Solution Approaches (Excerpt)

- Short-term:
 - Setup restart task force for goal prioritization and scenario/cause-effect analyses
 - High safety stocks
- Long-term:
 - Corporate decision on future sourcing strategies
 - Create flexibility on product portfolio and corresponding logistics strategies

Network | Future design principles are uncertain but push for localization and flexibilization of sourcing are conceivable



Theses

- 2.1 Without transparency on network structures (incl. 3rd and 4th tier) and current state of suppliers and customers, crisis management will not be possible.
- 2.2 Insolvency of direct or indirect partners in logistics network will challenge those networks for a long time.
- 2.3 Centralized global transport management is not possible and regional emergency centers are needed.
- 2.4 There will be partial nearshoring or increased production in Germany with a high degree of automation.
- 2.5 Future supply networks will be designed for more resilience instead of core efficiency focus.

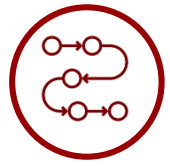
Challenges (Excerpt)

- Ramp-up of suppliers takes more time than own ramp-up
- Missing transparency on state of suppliers (incl. financial state, fear of insolvency) on multiple tiers as well as customers
- Demand shifts in global networks

Solution Approaches (Excerpt)

- Short-term:
 - Regional emergency centers for transport capacity coordination
 - Intense market-monitoring
- Long-term:
 - Enable flexible multi-sourcing approaches
 - Increased nearshoring

Process | Conflict of interest between lean or robust processes and networks slows down adjustment efforts



Theses

- 3.1 Processes and corresponding networks are getting even leaner due to high cost pressure.
- 3.2 Processes and corresponding networks are getting more agile, meaning highly reactive but more cost-intensive.
- 3.3 Without corporate decision on prioritization of logistics goals (e.g. time or cost), process adjustments are not possible.

Challenges (Excerpt)

- Short-term process adjustments to hygienic standards and security precautions decrease productivity
- Conflict of interest between lean (susceptible to fluctuations and efficient) and agile (highly reactive but cost-intensive) processes

Solution Approaches (Excerpt)

- Short-term:
 - Standardization and partial digitalization of processes necessary
- Long-term:
 - Automation of processes
 - Setup of crisis processes for the future (process maps for potential “second wave” of lockdowns)

Technology | Core digitalization challenges remain the same and are even exacerbated



Theses

- 4.1 The corona crisis will push digitalization efforts but core problems still remain the same and will be even harder to solve (e.g. access to accurate, real-time and on-demand data through the network)
- 4.2 The need for automation of logistics processes becomes inevitable (partial independence from personnel).
- 4.3 Intelligent ETA predictions in times of crisis will become major success factors to enable timely responses.
- 4.4 Many technological solutions are already in the market but process-technology-fit remains challenging.

Challenges (Excerpt)

- Predictive systems reach their limits
- Need for digitalization and IT tools becomes inevitable due to high decision complexity
- Data access, accuracy and visibility remain challenging and are even harder to achieve
- Available information and corresponding decisions are not well connected

Solution Approaches (Excerpt)

- Short-term:
 - Make use of existing solutions and platforms
- Long-term:
 - Facilitate AI utilization for timely decision support (e.g. ETA prediction)
 - Increase level of automation (physical and informational automation)

People | The people dimension is often underestimated but has high influence on long-term success



Theses

- 5.1 Shift in employee satisfaction due to current measures has huge impact on long term success but is mostly not monitored.
- 5.2 Digital workspaces and tools can be productive but cannot replace face-to-face interactions.
- 5.3 Crisis management regarding personnel has to be setup.

Challenges (Excerpt)

- Digital workspaces and social distancing can create emotional distance and do not replace face-to-face meetings
- Uncertainty about the economic situation of the company reduces employee satisfaction
- Not everyone is ready for digitalization push and home office

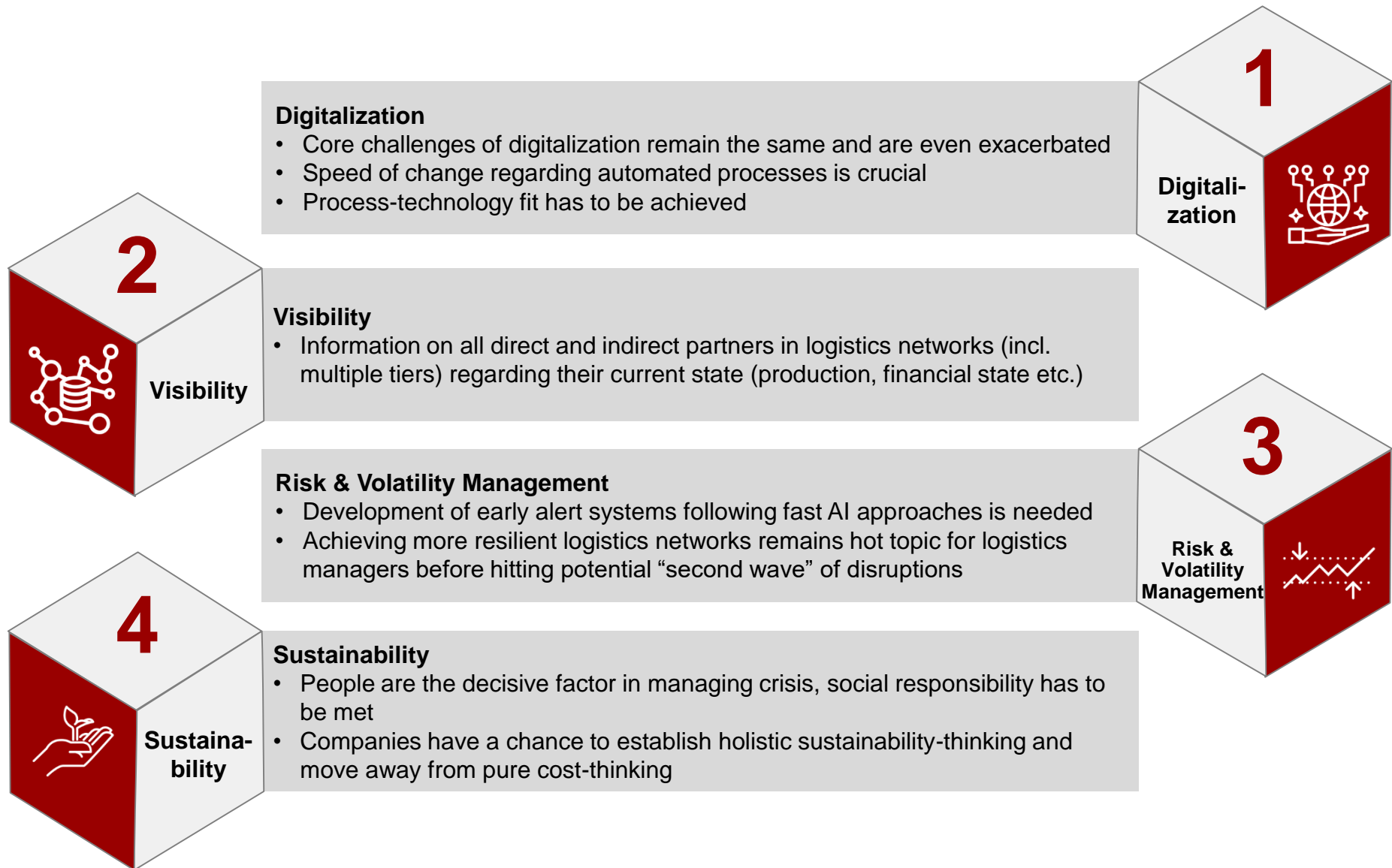
Solution Approaches (Excerpt)

- Short-term:
 - Restructure shift models and working experience
 - Lateral cooperation of companies to increase employee utilization
- Long-term:
 - Crisis management regarding personnel (roles and responsibilities)
 - Interdisciplinary training of employees to broadened areas of application of employees

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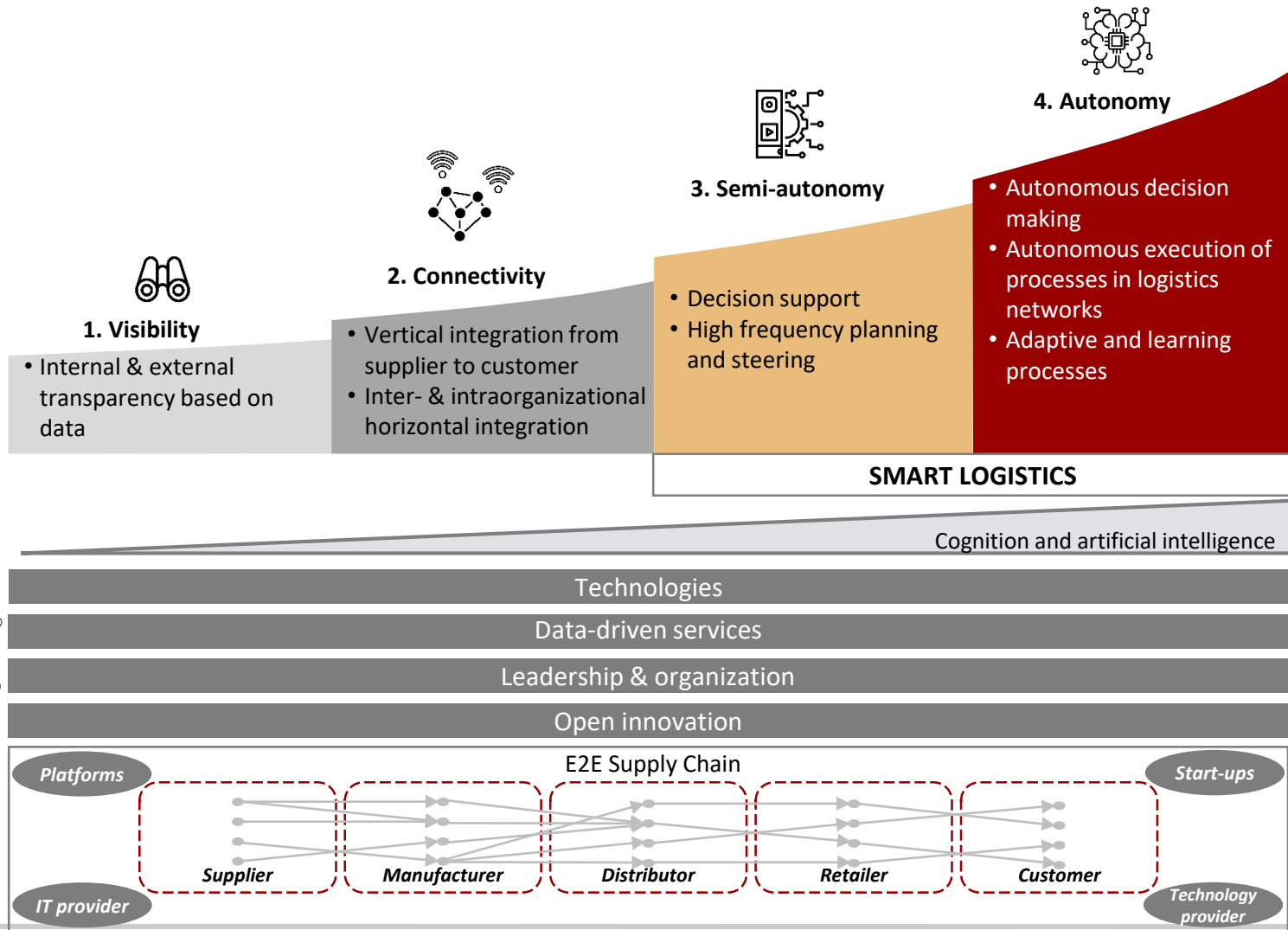
Preliminary Summary | Main fields of action in crisis management



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Digitalization | Pathways of digital transformation in logistics (1/2)

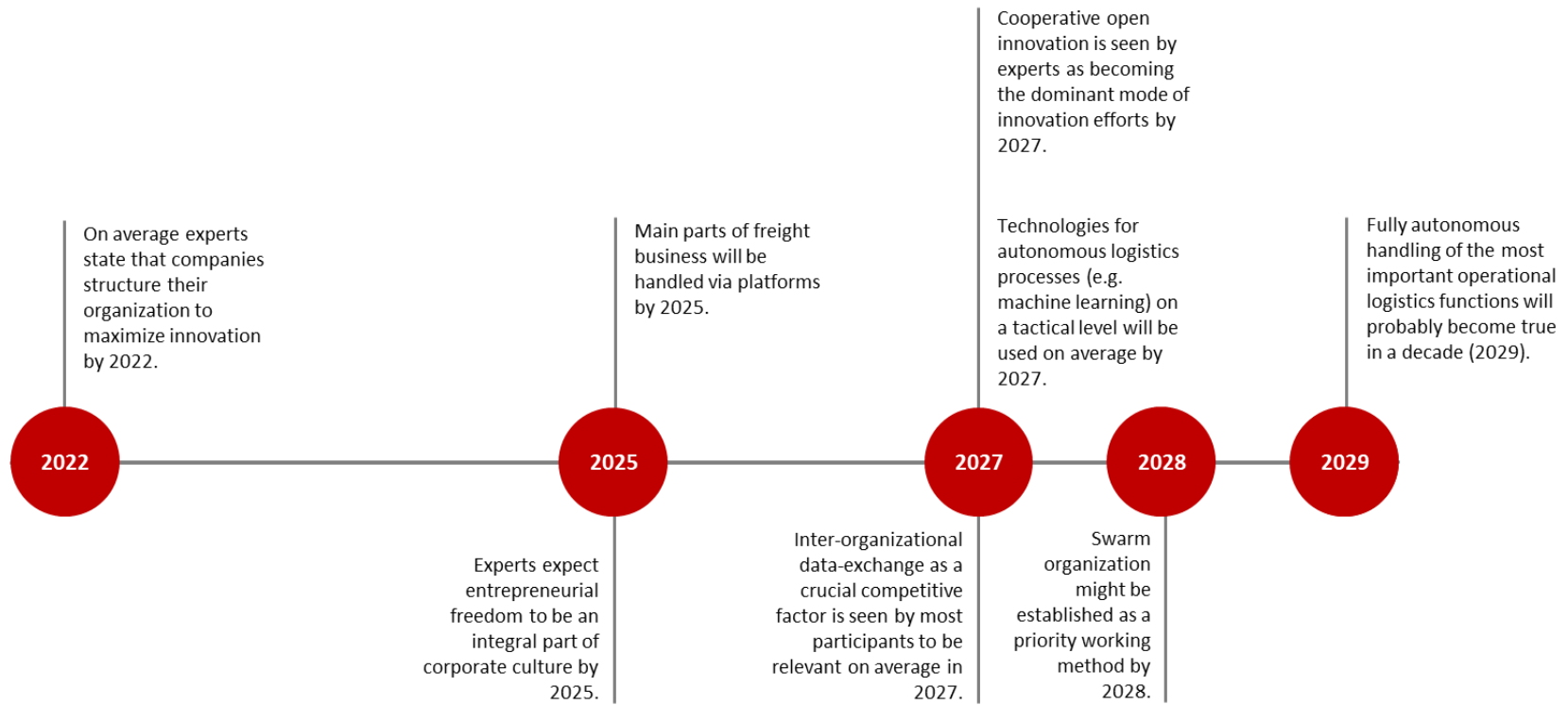


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The Impact of the Corona Crisis on International Logistics Networks

Prof. Dr. Frank Straube
Chair of Logistics, Technische Universität Berlin

Digitalization | Pathways of digital transformation in logistics (1/2)



- It is remarkable that open innovation processes will tend to take longer due to **skepticism about sharing data**. This is also one of the main hindering reasons for the adaption of fully autonomous process on an operational level (2029) and a partly automation of tasks on a tactical level (2027).
- In the short and mid-term run logistics won't become, although it is wishful, totally integrated. However the groundwork to **enable more visibility and to create semi-autonomous solutions** is currently built.

- The overall goal of the Navigator Tool is to **support practitioners in planning robust logistics networks**.
- It helps to **visualize supply chains**.
- It aims to **accumulate supply chain data** that is **widely spread** among different departments and suppliers.
- It provides **valuable planning information, logistics data and management concepts** for different steps of supply chain planning to **improve supply chain robustness**



Freely available:

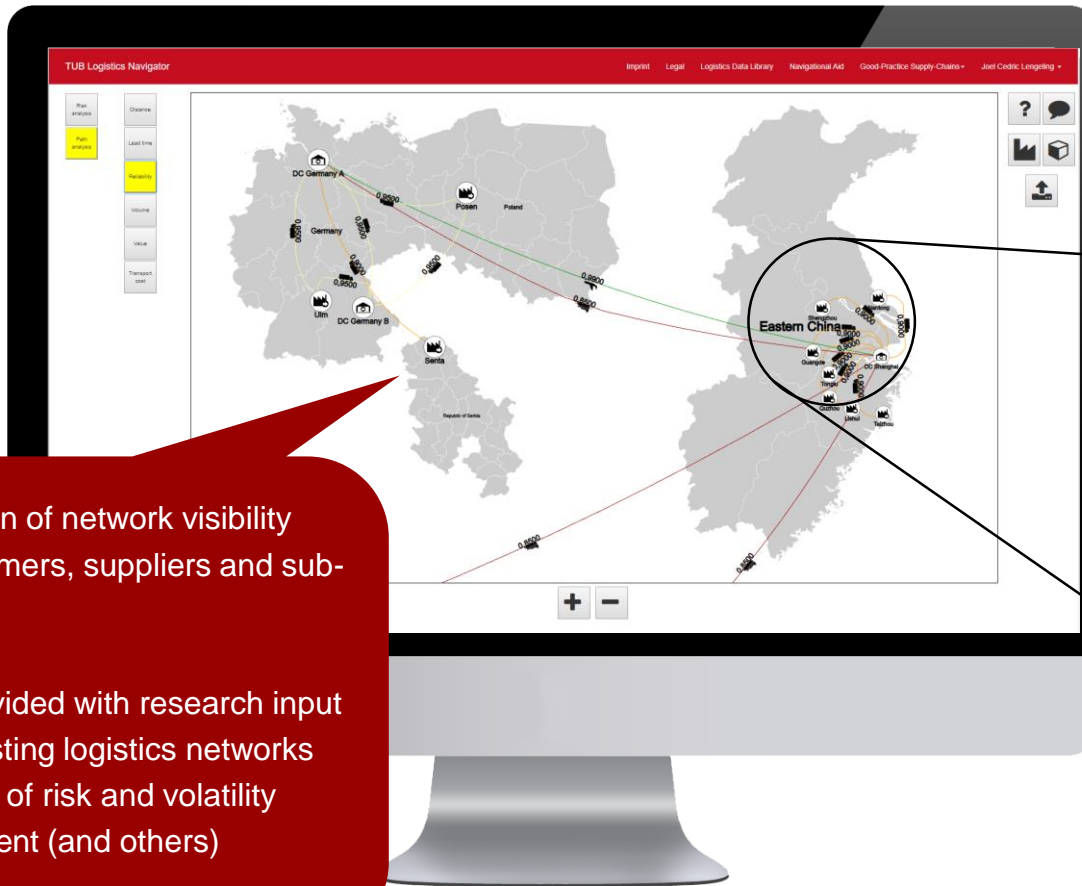
<https://navigator.logistik.tu-berlin.de/>

The Tools Strengths

- **Freely available** and **easily accessible from all around the world** (not requiring any software)
- Helps to easily **pool knowledge** across complicated and complex network structures.
- Aims at making the supply chain planner **critically analyze** her/his network
- Important information will be presented in a structured way that is considered a “**navigational aid**”

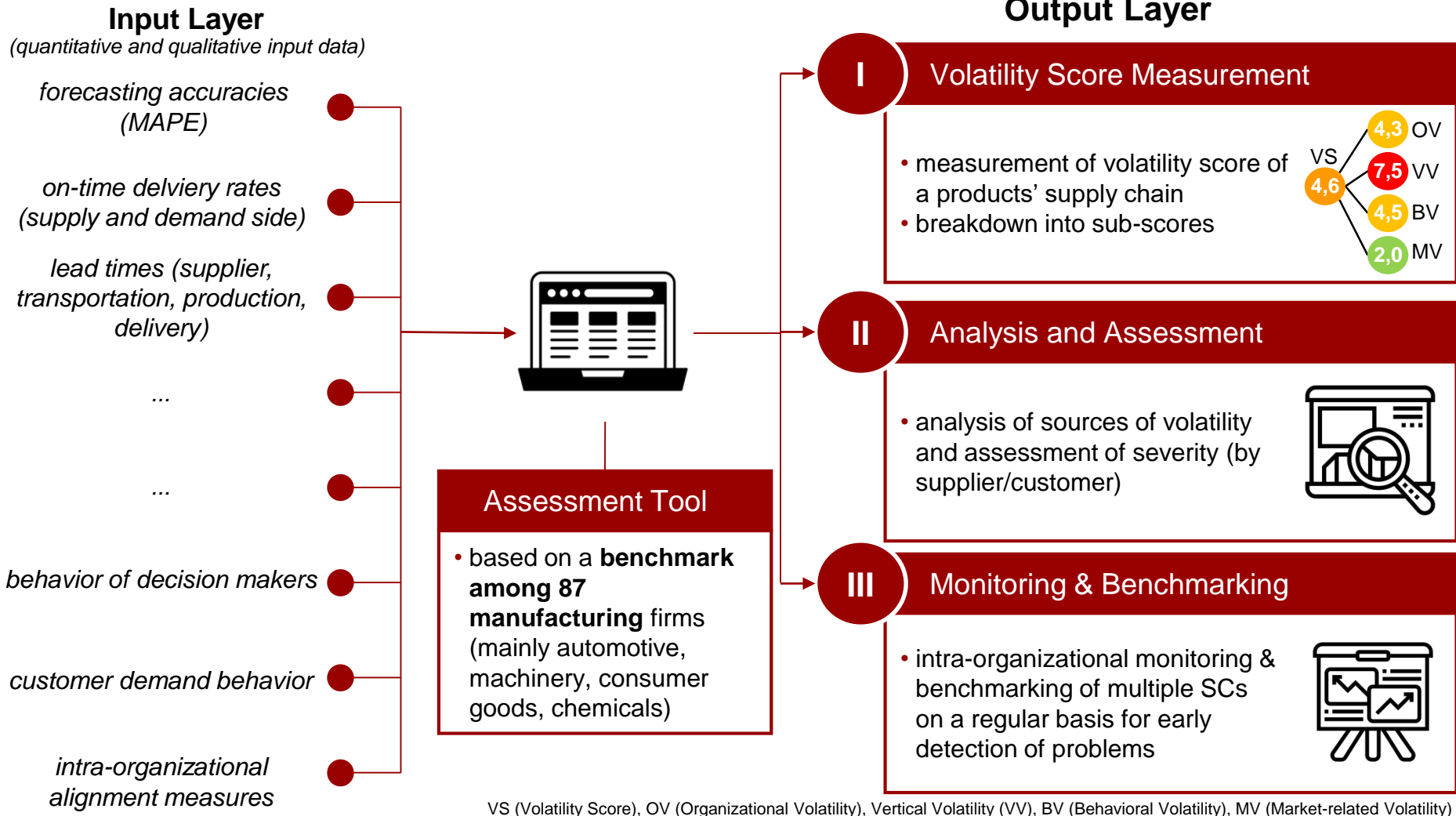
What the Tool is not

- The tool is **not a strategic optimization tool** that automatically adjusts your network to fit an optimal solution.



- Co-creation of network visibility with customers, suppliers and sub-suppliers
- Being provided with research input for readjusting logistics networks in the field of risk and volatility management (and others)

Risk & Volatility Management | Volatility assessment tool has been developed and applied in practice



Risk & Volatility Management | SMECS: Smart Event Forecasts for Seaports



Developing a **decision-supporting system** that allows a **target-oriented and more efficient disruption management** by the **proactive detection of delays** along the maritime transport chain

Predictive Analytics

ETA prediction for maritime door-to-port processes

Development of container-based ETA* predictions for truck-rail transports incl. node points (terminals, train yard)

Prescriptive Analytics

Actor-specific risk management model

Integration of actor-specific recommendations for action depending on the occurring ETA and disruptions

Increasing the reliability of logistics chains through Artificial Intelligence (AI)

Consortium



TU Berlin
Chair of Logistics
(project coordination)



DB Cargo



Kühne Logistics University

Partner

> 10 companies of the entire maritime transport chain



Partner of the IHATEC project "EMP 4.0"

Founding



Bundesministerium für Verkehr und digitale Infrastruktur



IHATEC Innovative Hafentechnologien

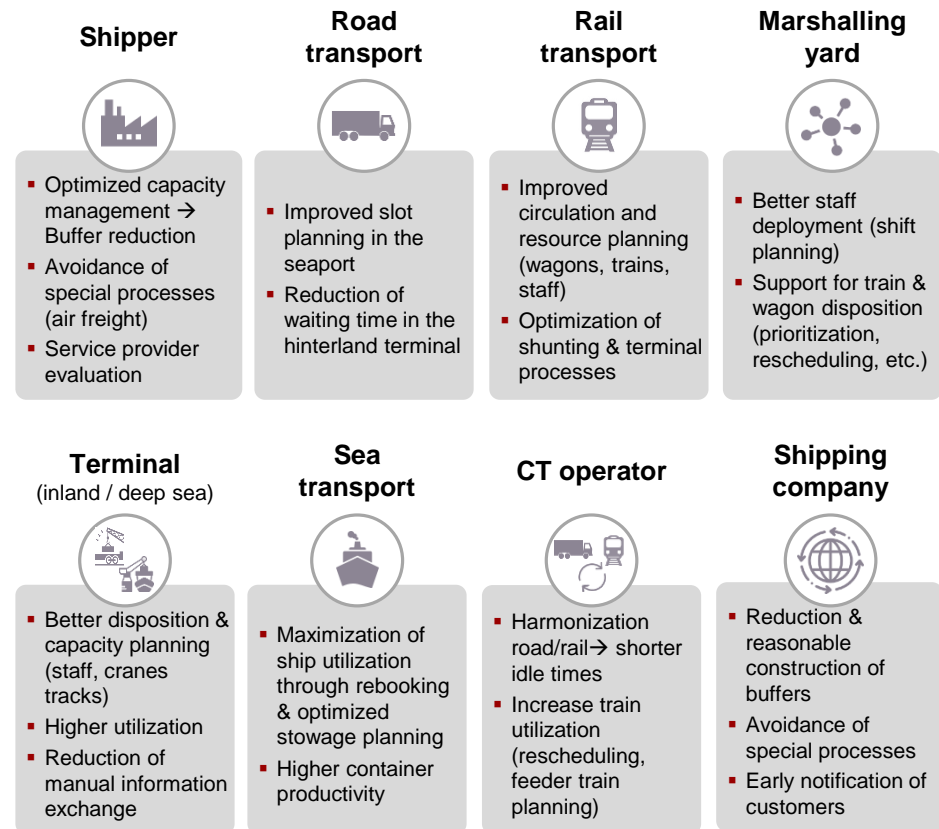
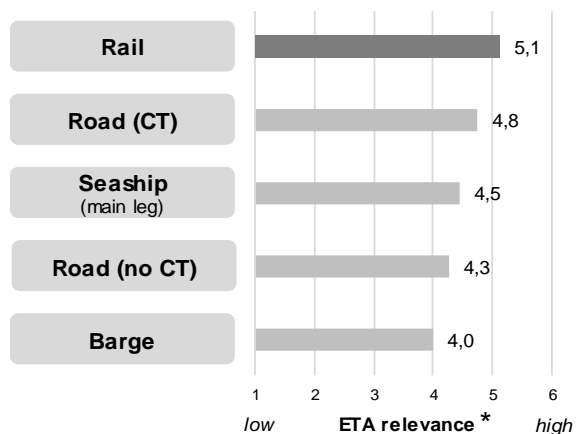
Duration

01.09.2017 – 29.02.2020

Risk & Volatility Management | SMECS: Various operational benefits of a cross-actor ETA for the transport chain



- The cross-actor approach enables users to **evaluate timely consequences** for up- and downstream processes in order to **avoid connection conflicts**
- ETA is primarily seen as an instrument for (early) **support in operational decision problems**, e.g. disposition of personnel, vehicles, tools, infrastructure
- **Improved demand and capacity management** lead to an **increased asset utilization** and a **reduction in risk buffers** along the transport chain
- The enabled **early communication of delays** contributes to an **increasing customer satisfaction**



- **Rail transport** represents the **most relevant application for ETA** due to high operational significance for the actors (cargo volume per vehicle and associated load peaks as well as higher planning complexity)

Sustainability | Ecological sustainability in logistics can be achieved in various areas



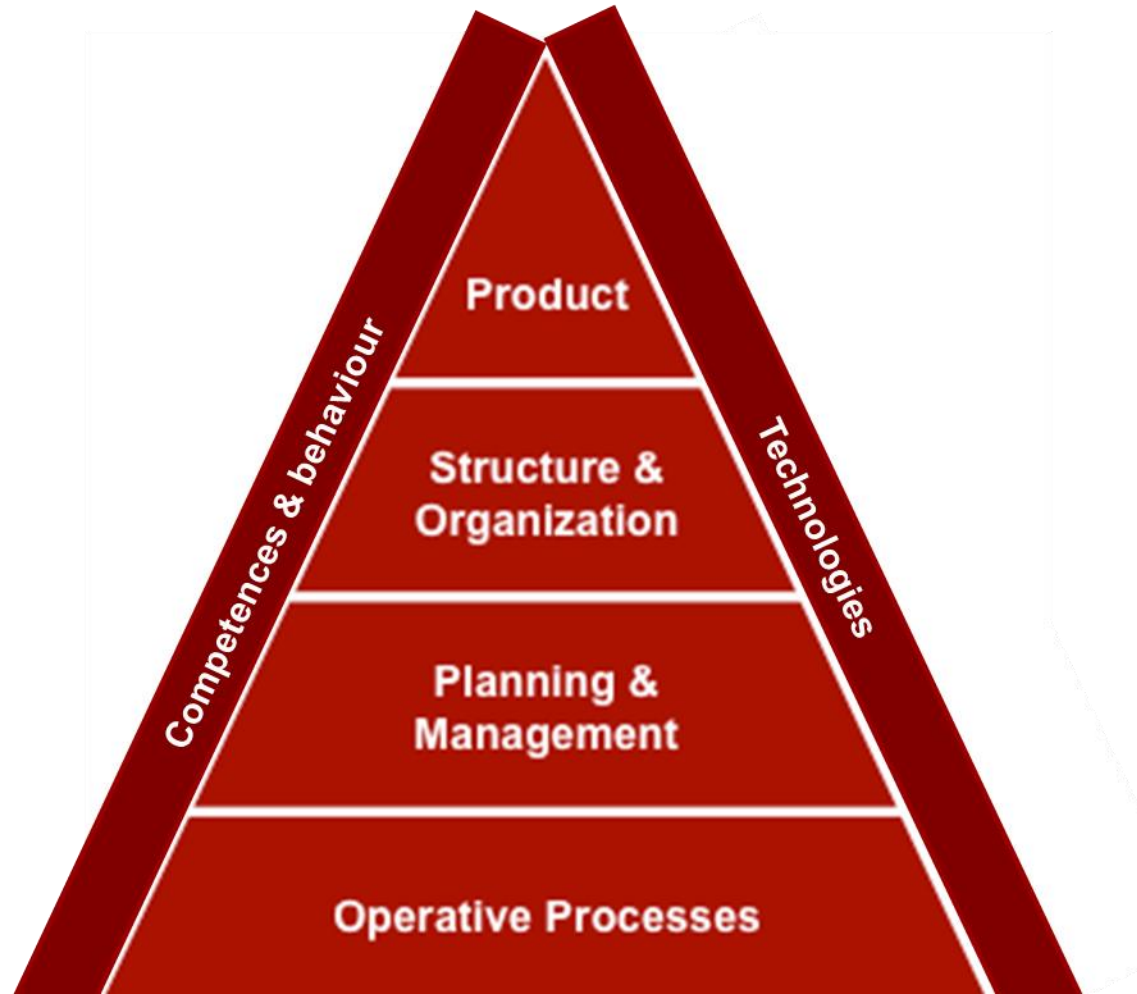
Scope

All Products

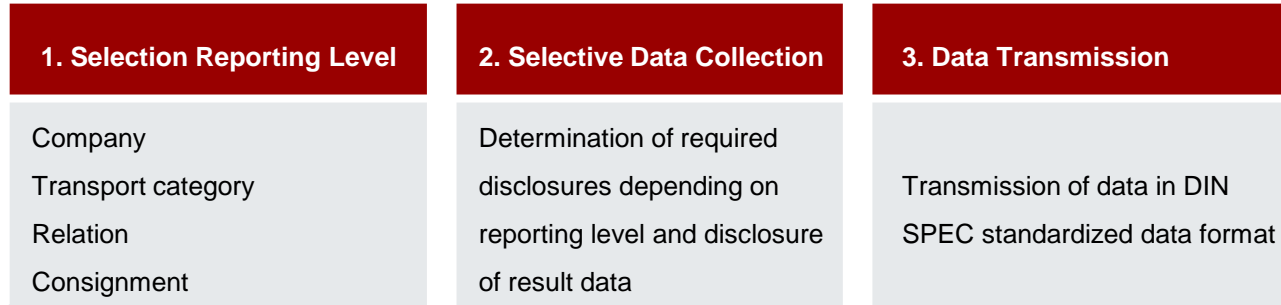
Entire Value Chain

Single Business Functions

Single Tasks and Processes



Sustainability | DIN SPEC 91224: Cross-company accounting of transport-related emissions - Collection and transmission of relevant data



- **Uniform data retrieval** from logistics service providers at the sub-service providers used
- **Uniform preparation** and transmission of **data** to clients
- Use of the service provider data for **emissions balancing** in a uniform process/system
- Query/use of data, e.g. for service provider **evaluation** during commissioning
- **Dissemination of the standard**, e.g. by specifying the reporting format for the assignment

Example of data fields dependent on report level:

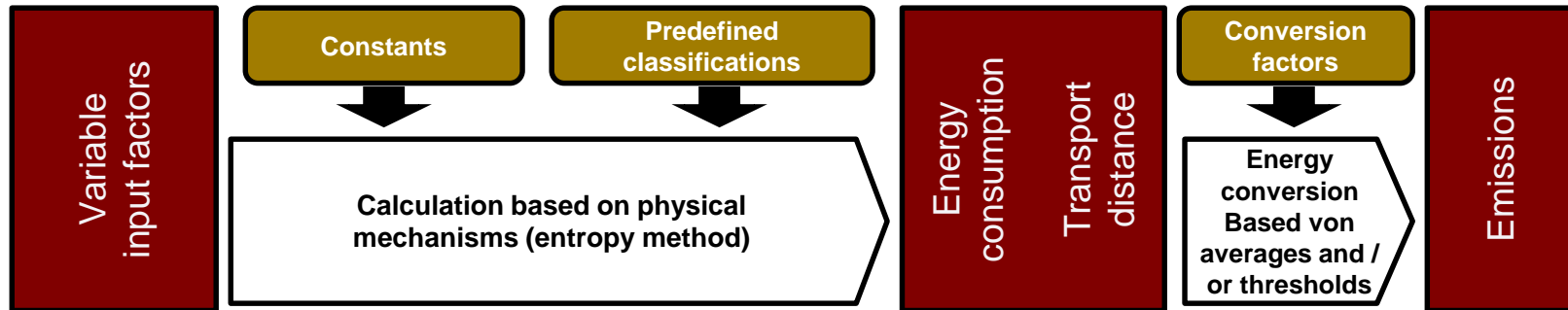
		Data section														
		Transport category	Consignment				Sender	Recipient	Transport section				Vehicle	Trip / result		
Reporting level	Data fields to be filled in															
Company	[Grid of shaded cells indicating data field requirements]															
Transport category	[Grid of shaded cells indicating data field requirements]															
Relation	[Grid of shaded cells indicating data field requirements]															
Consignment	[Grid of shaded cells indicating data field requirements]															

Mandatory information according to DIN SPEC 91224

Optional according to bilateral agreement

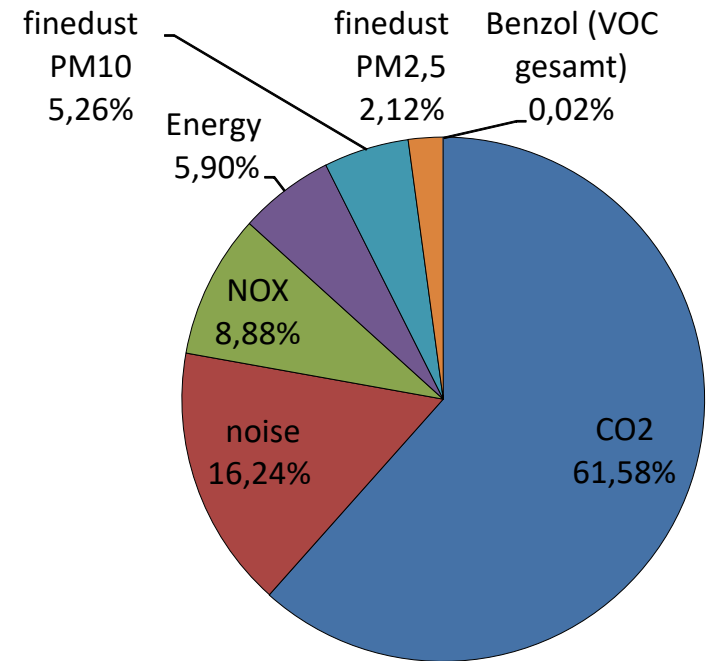
Not necessary according to DIN SPEC 91224





- **High level of detail:** Method for different transport modes and handling processes based on physical mechanisms (entropy method)
- **Universality:** Determination of different types of emissions within logistics processes including CO₂, NO_x, benzene, fine dust, area, noise, waste emissions
- **Decision and planning support:**
 - Tool-based determination of emission factors and ecological KPIs
 - Standardization of different types of emissions based on “pollution points”
 - Designation of comparable ecological KPIs (e.g. ecological efficiency) and visualization of the computed result

- Method of ecological scarcity as a concept to weight environmental impacts (record-manage)
- Different environmental impacts are converted into “pollution points” (UBP) and can then be compared.
- Ecological factors consist of
 - characterization (optional)
 - standardization
 - weight
- Input values for the calculation of ecological factors
 - current ecological situation
 - standardization of the current ecological situation in relation to a reference value
 - target situation recommended by environmental policy (priorities of the environmental policy of the government)
- Unit of an ecological factor is “pollution point” (UBP) per emission unit, e.g. 33.8 UBP per kg CO₂



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We are currently working on the topic and keep you posted on recent developments and findings generated through industry workshops and other discussions.



Prof. Dr. Frank Straube
Chair of Logistics
Technische Universität Berlin

-
Head of Chair of Logistics

Phone: +49 30 314-22877
E-Mail: straube@logistik.tu-berlin.de



Dr. Benjamin Nitsche
Chair of Logistics
Technische Universität Berlin

-
Project Team

Phone: +49 30 314-26007
E-Mail: nitsche@logistik.tu-berlin.de

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