UIRR
INTERNATIONAL UNION FOR ROAD-RAIL COMBINED TRANSPORT

IMPROVED DATA SHARING AND AI-BASED FREIGHT TERMINAL EFFICIENCY

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CONSILIS
Innovation and Business Ecosystem Transformation

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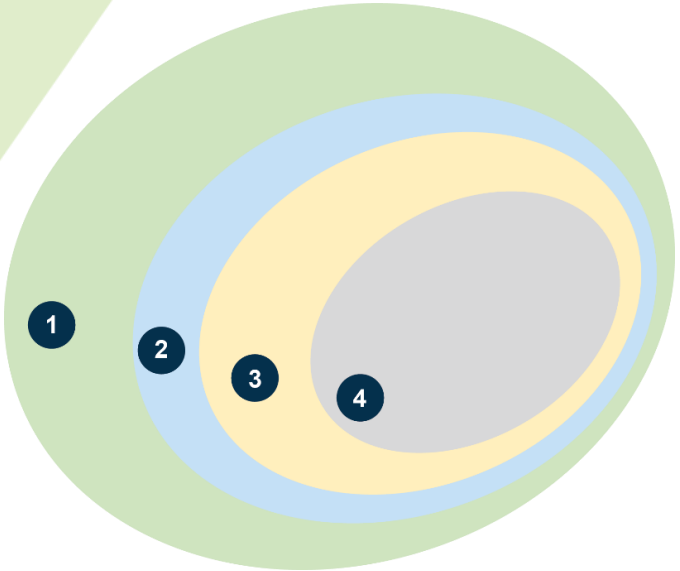
Important step forward towards AI readiness: Choice of the requisite degree of data sharing and data quality

1 **high data quality** (consistency, timeliness, completeness) at **99%** or more



1. **Public:** all data accessible to everybody
2. **Open:** all data accessible to all involved parties (SC stakeholders & contracted IT platforms)
3. **Selective open:** Specific set of data[1] to be shared with all legitimate stakeholders (and contracted IT platforms)
4. **Private:** Only bilateral exchange of all data between two known parties

[1] Standardisation of the supply chain relevant data has not yet happened in the rail and rail-road sector which should be urgently performed

2 high **interoperability**

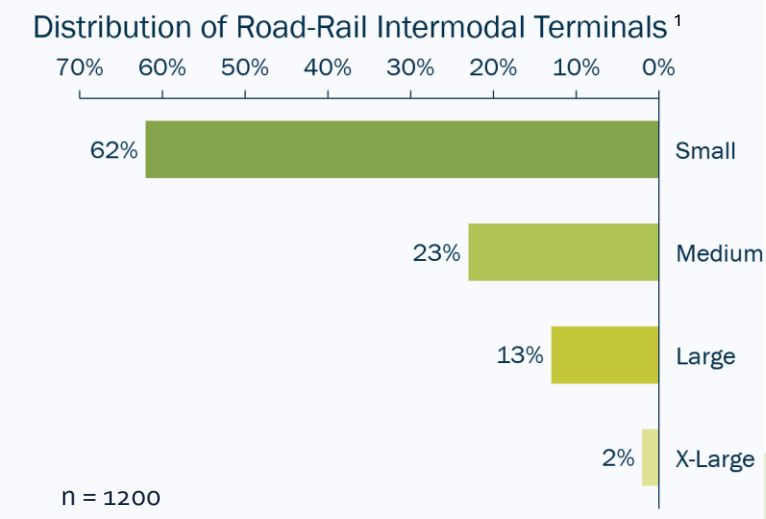
3 following **FRAND** (fair, reasonable and non-discriminatory) **principle**

Data governance to be defined and adopted by all stakeholders

1. **Data governance and sovereignty need to be clarified and supported by all stakeholders (end-to-end)**

2. **Interfaces need to be fully interoperable**

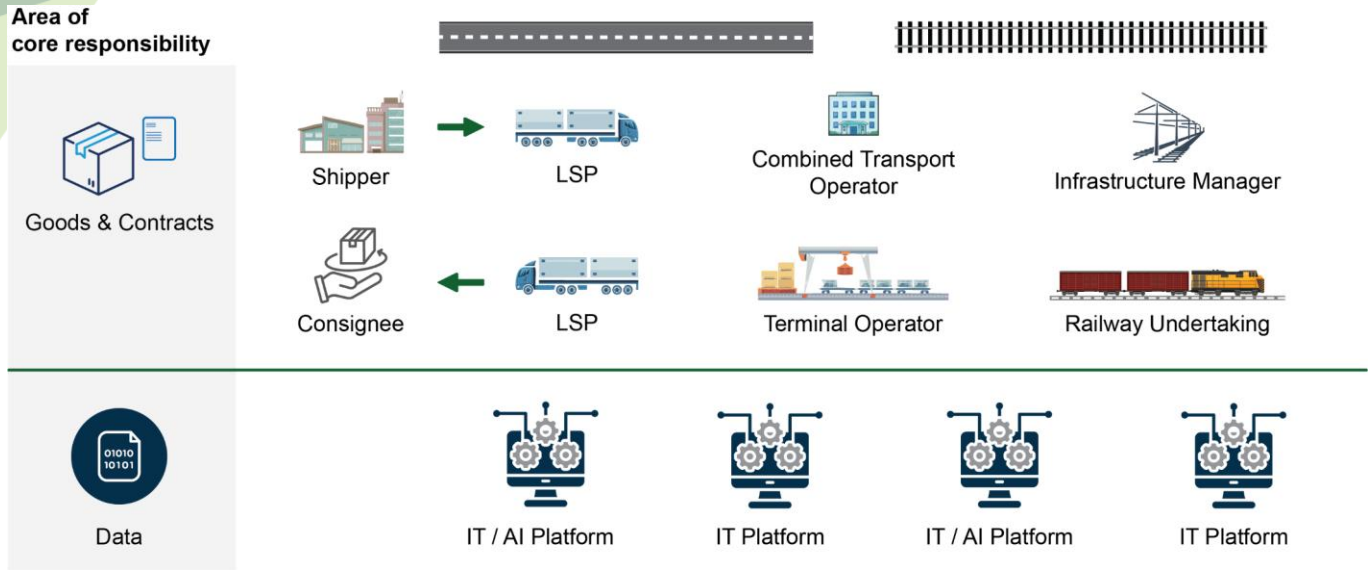
3. **Digitalization of terminals ongoing but not fully achieved yet** (large SME share)



TSI Telematics will be a major step towards fulfilling the preconditions

[1] UIRR/UIC (2020) "UIC Freight Department – 202 Report on Combined Transport in Europe"

Past projects in CT environment



EDICT

Co-funded by the European Union

Collaborative Quality System to improve the interoperability, classification and monitoring of delays & disruptions

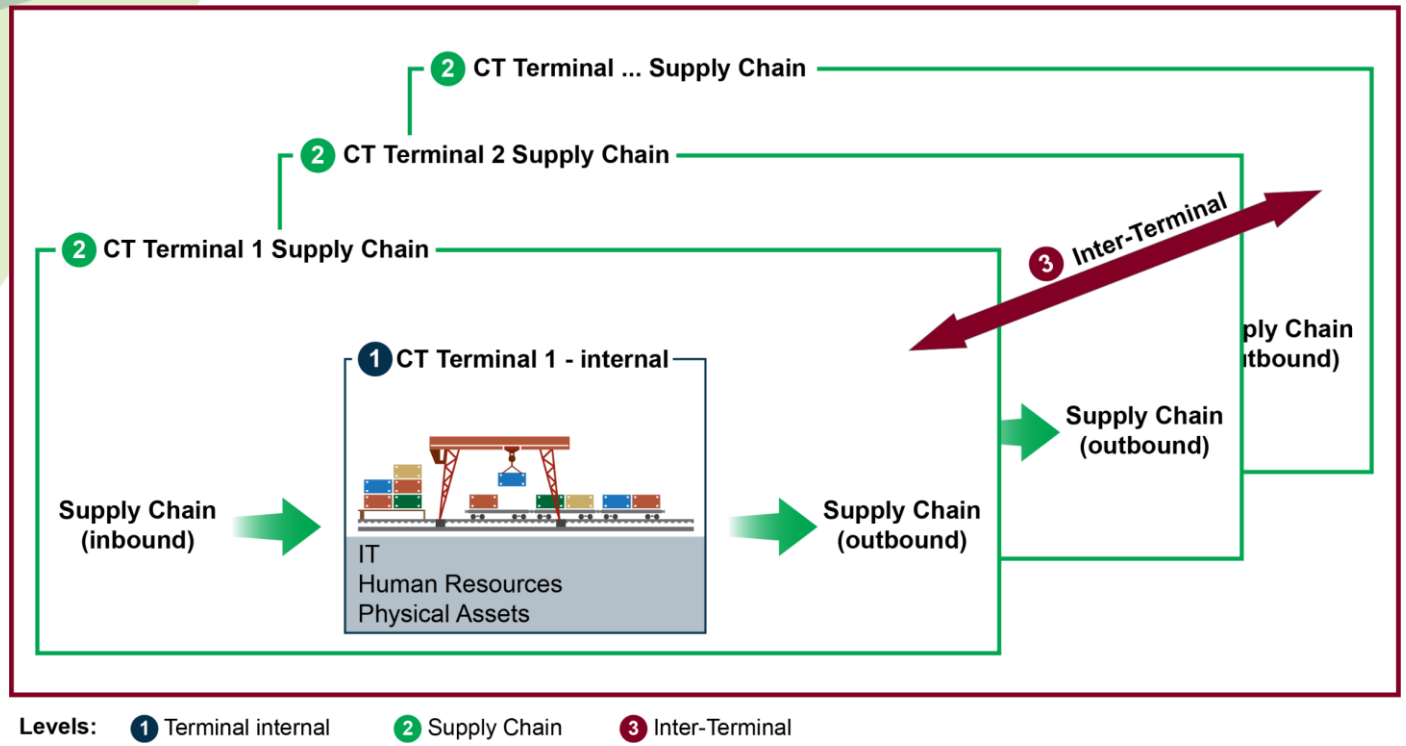
ELETA

Co-funded by the European Union

Rail ETA AI algorithm has proven superior results (accuracy ≥ 89%) compared to existing Train Running Forecast accuracy [1]

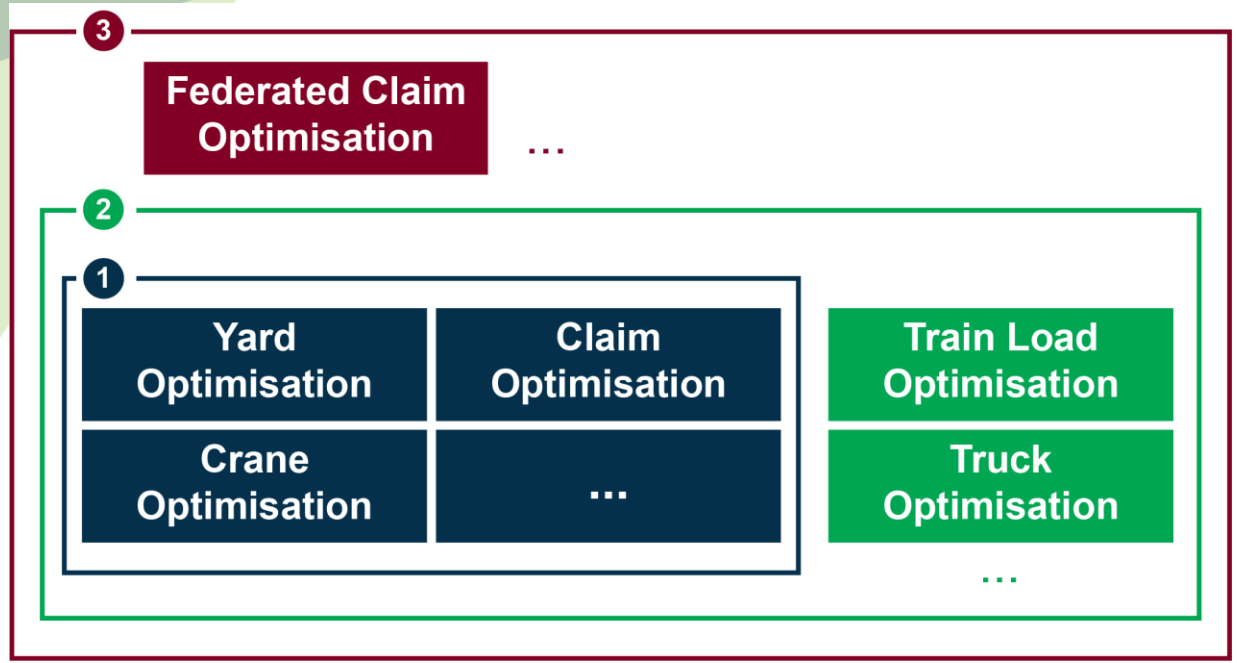
[1] AI-based forecast accuracy for arrival ± 60 min measured ≥ 200 km prior to arrival or 120 min depending on demonstrator train routing

Terminals can thrive on improved data & interoperability

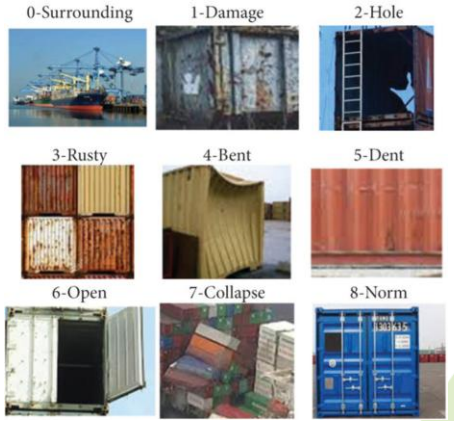


- **On all 3 levels AI can be applied**
- **AI support degree:** from augmentation to automation

Which efficiency potentials can AI help to identify



Example:
Federated claim processing uses image data of container claims, trucks etc. to learn faster from multiple terminals to reduce error rates



Source [1]

Levels: 1 Terminal internal 2 Supply Chain 3 Inter-Terminal

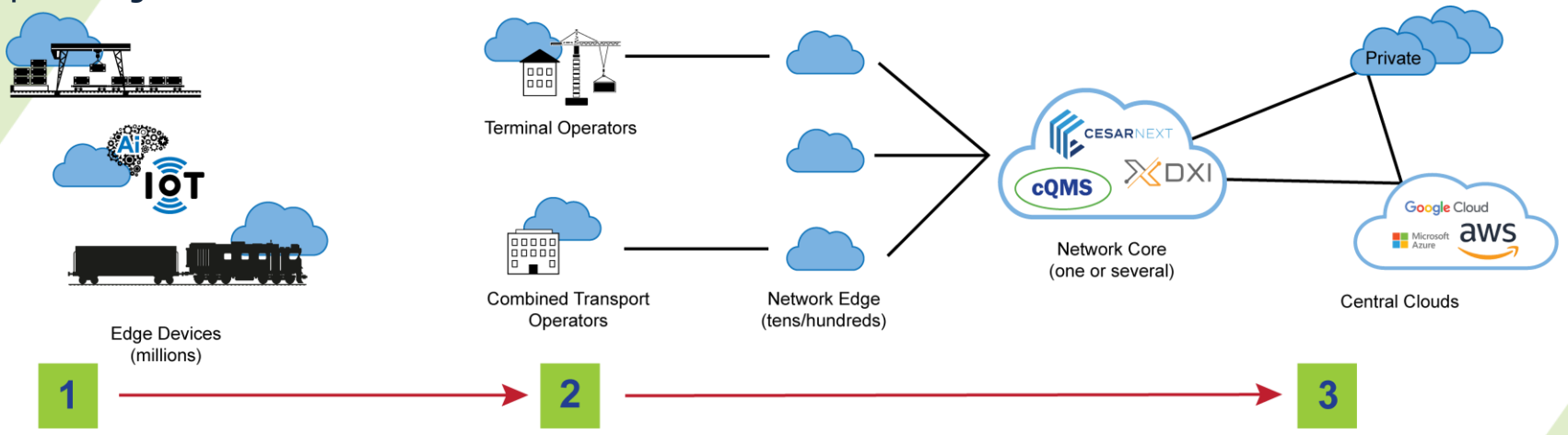
Complementary AI Use

Overcome digitalization deficits of today's unstructured data exchange
-> use GenAI to close data gaps (approx. 40% of data still unstructured e-mails or excel files)

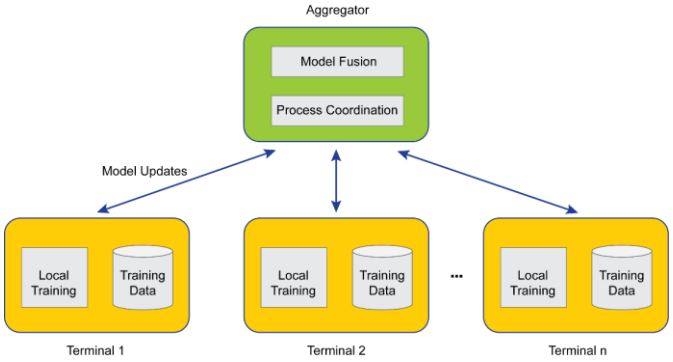
[1] Wang, Z et al. (2021) Multitype Damage Detection of Container Using CNN Based on Transfer Learning, In: Mathematical Problems in Engineering

Federated AI-based learning can increase the learning curve for inter-terminal data exchange

Data processing view:



Logical view:



Adoption and application areas for improved efficiency

Operational terminal process efficiency stages:

1. Standardisation of data and interoperable interchange
2. Efficiency improvements through improved data quality
3. AI-based improvement based on good data quality

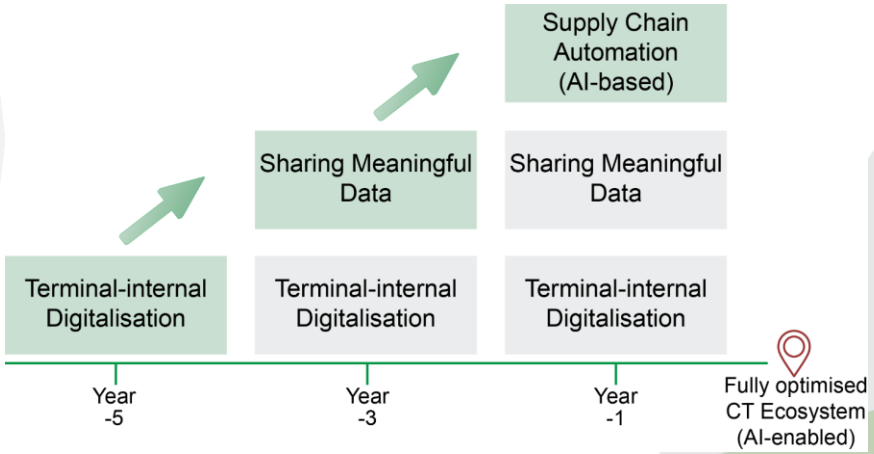
Administrative efficiency areas to be augmented by (generative) AI:

1. AI-applications for administrative office tasks
2. AI-applications for communication
3. AI-applications to improve data

Implications for terminals and total CT freight business ecosystem for core operational processes

1. **Willingness to share data of high quality without hurdles**
2. **Thorough analysis of processes & benefits on 3 levels**
3. **Clear-cut cost-benefit analysis and assessment of collaboration benefits to economize learning time and costs**
4. **AI projects preferably in areas where prerequisites are fulfilled** ("avoid provider promise trap")
5. **Efficient end-to-end data exchange & AI potentials to achieve better end customer satisfaction**
6. **Future resilience will require more data sharing & digitalization** (e.g. customer requirements, CO_2, eFTI, Combined Transport Directive)

Collaborate to build future Combined Transport digital supply chain ecosystem now!



Confirmatory scientific research: Ströher, T. et al. (2025) Bridging carbon data's organizational boundaries: toward automated data sharing in sustainable supply chains in *Electron Markets* 35, 33

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