



A data governance framework for a federated logistics data space

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Abstract: Data sharing is an emerging area in logistics. Although the potential of data sharing in logistics is widely recognised, data sharing in inter-organisational collaboration models still need to be thoroughly investigated. This article examines the benefits of data sharing in logistics using a federated data space. The data space involves parties such as rail transport, inland waterways, and port community systems to share their data on shipment possibilities. This promotes visibility over the shipping modalities and facilitates a modal shift. We explore and derive the International Data Spaces (IDS) initiative's conceptual framework on federated data space for secure, controlled, and trusted data sharing in logistics. The logistics industry is driven by small and medium-sized businesses with relatively small investment capacity and IT capabilities, as well as a small number of global firms running their own IT systems. Federated data space offers interoperability for data sharing between discrete platforms through data space connectors. These connectors utilise common protocols to support these services. This approach allows the participating organisations to use any platform they are comfortable with to connect to the entire network of data ecosystems. The article also investigates what kind of data should be provided, who will be the provider, and how it will be shared among users.

The dynamics of such data space are complex and have strong concerns about data sensitivity. Involved parties are reluctant to exchange confidential information with competing companies or relinquish their data ownership control. Federated data space needs to address the complexity of accessing the data, the responsibilities of actors in the data space, and decision rights to ensure that data sharing is bound ethically and empowers trust between the parties. To address these concerns, data governance needs to be put forward in the logistics data space that defines responsibilities and data ownership. Inspired by the data governance framework for a federated data space in different sectors, such as healthcare, we explore their principles and potential outcomes in logistics.

This paper contributes to the data governance framework for a federated logistics data space toward a Physical Internet as follows: a.) we define the pillars for a data governance framework for a federated logistics data space, b.) we identify the actors in the ecosystem based on their role, c.) we explore the usage of policies between the actors for sharing sensitive data in a collaborative environment. This fills the knowledge gap in contriving a trusted data-sharing ecosystem. The suggested framework supports practitioners and policymakers in identifying, understanding, and improving the data governance framework in the federated logistics data space and Information System ecosystem. Federated logistics data space with a concrete data governance framework enables data interoperability and provides standardised platform services for data sharing. This facilitates a modal shift and creates opportunities for sustainable logistics.

Keywords: Modal shift, Federated data space, Data Governance, Sustainable Logistics.

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Physical Internet Roadmap ([Link](#)): *Select the most relevant area(s) for your paper: ☐ PI Nodes, ☐ PI Networks, ☒ System of Logistics Networks, ☐ Access and Adoption, ☒ Governance.*