Data Logistics for Logistics Data
Research Dimensions, Foundations and Perspectives

DL4LD steering committee, 28th June 2021

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Data Logistics for Logistics Data
Data Logistics for Logistics Data

- informational infrastructure
- data connections
- nodes
- domains
- functional containers
Data Logistics for Logistics Data

informational infrastructure

socio-physical infrastructure

data connections
nodes
domains

functional containers
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socio-physical infrastructure

physical constraints
physical conditions
physical effects
(actual, potential)
Data Logistics for Logistics Data

socio-physical infrastructure

physical constraints
physical conditions
physical effects
(actual, potential)

problems of risk
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- socio-physical infrastructure
  - physical constraints
  - physical conditions
  - physical effects
    (actual, potential)
- social practices
- legal and other norms
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- Users
- Operators
- Intermediate bodies
- Governing bodies
- Other stakeholders

Socio-physical infrastructure

- Physical constraints
- Physical conditions
- Physical effects
  (actual, potential)

Social practices

Legal and other norms
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socio-physical infrastructure

individual policies

users
operators
intermediate bodies
governing bodies
other stakeholders

collective policies

social practices

physical constraints
physical conditions
physical effects
(actual, potential)

legal and other norms
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central role of policies → various forms of enforcement (ex-ante, ex-post)
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socio-physical infrastructure

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(actual, potential)

legal and other norms

central role of policies → various forms of enforcement (ex-ante, ex-post)
Data Logistics for Logistics Data

having access to relevant information plays an important role for agents!
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no exchange
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- informational infrastructure
- socio-physical infrastructure

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- no exchange
- exchange enabled/allowed
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- informational infrastructure
- socio-physical infrastructure

having access to relevant information plays an important role for agents!

regulations apply: e.g. privacy, GDPR, competition laws

- no exchange
- exchange enabled/allowed
- exchange disabled/disallowed
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informational infrastructure → socio-physical infrastructure

the informational infrastructure runs in itself on a socio-physical infrastructure!
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The informational infrastructure runs in itself on a socio-physical infrastructure!

Two normative dimensions that interact with each other: informational and physical
Policies <-> Agents <-> Infrastructure Actors
Policies ↔ Agents ↔ Infrastructure Actors

guide

enable

informed by  control
Physical Logistics

Policies -> Agents -> Infrastructure Actors

Physical transportation

Data Logistics

Policies -> Agents -> Infrastructure Actors

Informational transportation
impact can eventually be observed only on the physical level!

Physical Logistics

Policies -> Agents -> Infrastructure Actors

Physical transportation

Policies -> Agents -> Infrastructure Actors

Informational transportation

Data Logistics
Policies -> Agents -> Infrastructure Actors

**Physical Logistics**

- physical transportation

**Policies -> Agents -> Infrastructure Actors**

**Data Logistics**

- informational transportation

impact can eventually be observed only on the physical level!

infrastructural interventions occur on the informational level!
Impact can eventually be observed only on the physical level!

Infrastructural interventions occur on the informational level!
From higher-level to lower level policies
From higher-level to lower level policies

- User’s policy of policies
- User’s policy on expectations
- External policy artefact

CONSOLIDATION

- High-level policy
- Expectations

OPERATIONALIZATION

- Value effects synthesis

Monitoring & enforcement policy

- Situated policy
- Low-level policies
- Access control policies, routing policies, etc.
What will come out of our research

**Policies** ->

**Agents** ->

**Infrastructure**

**Actors**

**Xin:** theory of incentive design for deciding enforcement mechanism/strategies

**Mostafa:** testing framework for policies in advance against real markets; operationalize agents that can take care of monitoring and enforcement; agent scripts could be used for diagnosis

**Lu:** uses of machine learning for situational awareness at infrastructural side necessary to decide interventions

**Reggie:** infrastructural backbone, API and modules for actors, auditors, etc.

**Giovanni:** models of policy representation, reasoning and operationalization
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