Data Logistics for Logistics Data

Research Dimensions, Foundations and Perspectives

DL4LD steering committee, 28th June 2021

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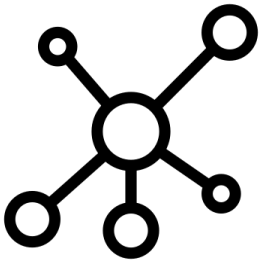
Tom van Engers, Leibniz Institute (TNO/University of Amsterdam), University of Amsterdam

Data Logistics for Logistics Data

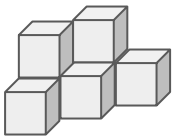
Data Logistics for Logistics Data

informational infrastructure

data
connections
nodes
domains



functional containers



Data Logistics for Logistics Data

socio-physical infrastructure

informational infrastructure

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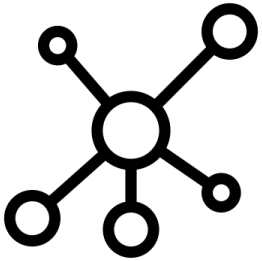

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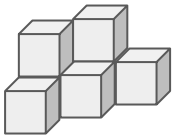

Data Logistics for Logistics Data

socio-physical infrastructure

physical constraints
physical conditions
physical effects
(actual, potential)

Data Logistics for Logistics Data

socio-physical infrastructure

physical constraints
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problems of risk

Data Logistics for Logistics Data

physical constraints
physical conditions
physical effects
(actual, potential)

social practices

legal and other norms

Data Logistics for Logistics Data

socio-physical infrastructure

physical constraints
physical conditions
physical effects
(actual, potential)

users
operators
intermediate bodies
governing bodies
other stakeholders

→ social practices

→ legal and other norms

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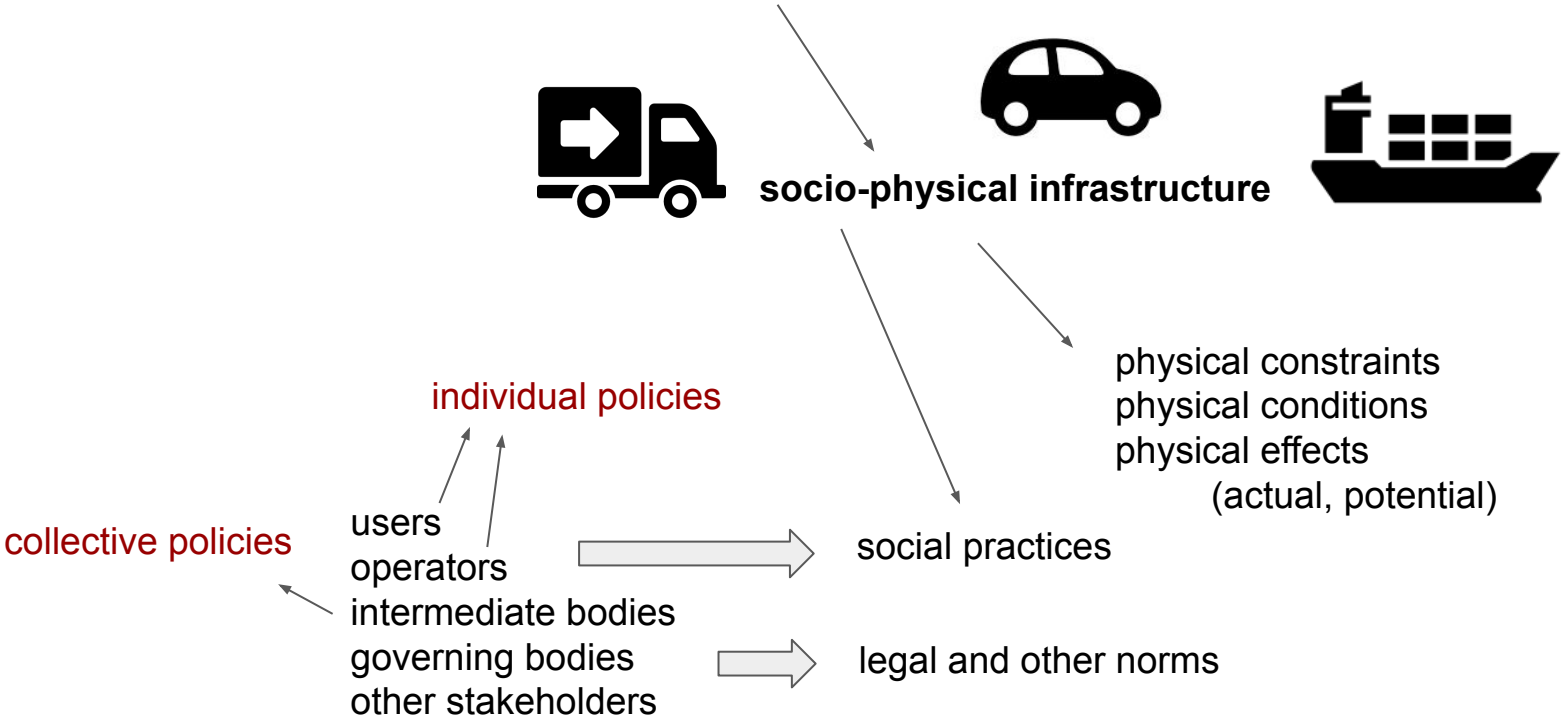

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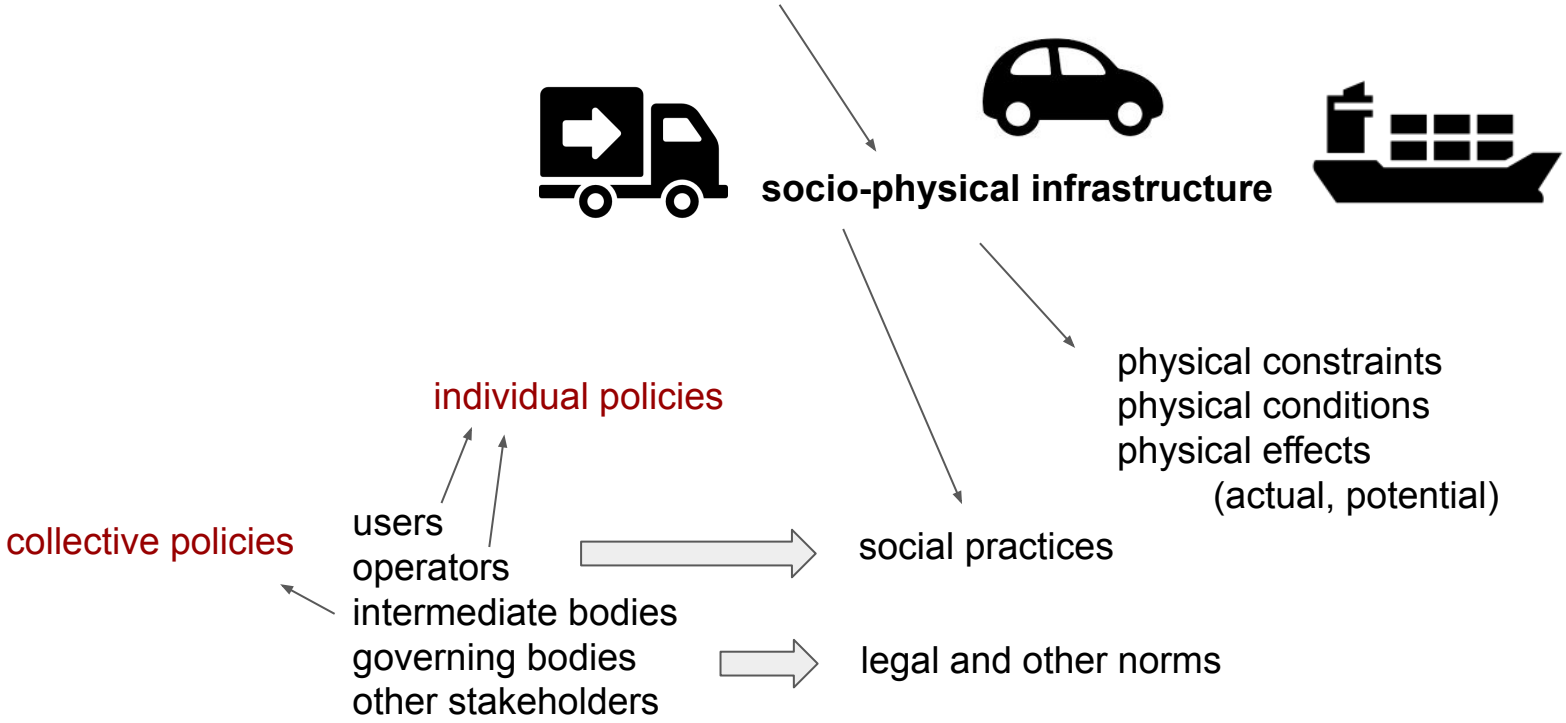

central role of policies → various forms of enforcement (*ex-ante*, *ex-post*)

Data Logistics for Logistics Data

socio-physical infrastructure

physical constraints
physical conditions
physical effects
(actual, potential)

individual policies

collective policies

users
operators
intermediate bodies
governing bodies
other stakeholders

social practices

legal and other norms

central role of policies → various forms of enforcement (*ex-ante*, *ex-post*)

Data Logistics for Logistics Data

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socio-physical infrastructure

having access to relevant information plays an important for agents!

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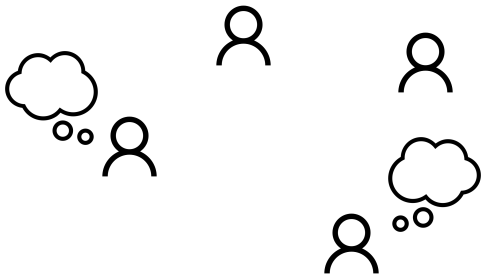

no exchange

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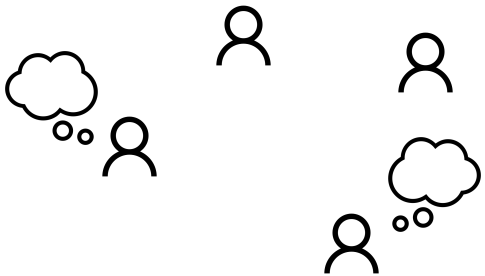

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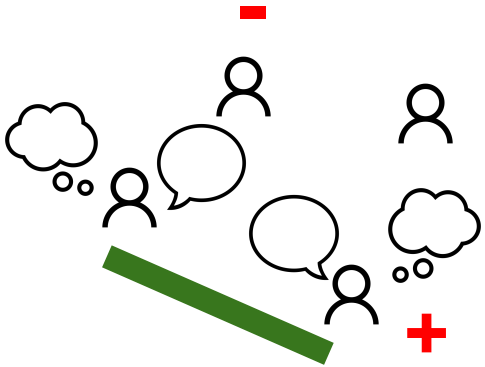

exchange enabled/allowed

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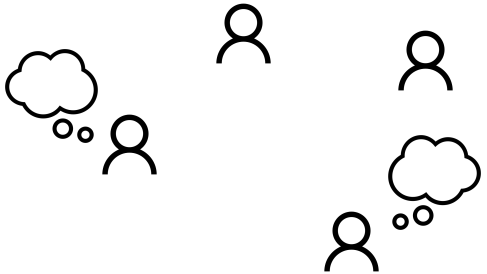

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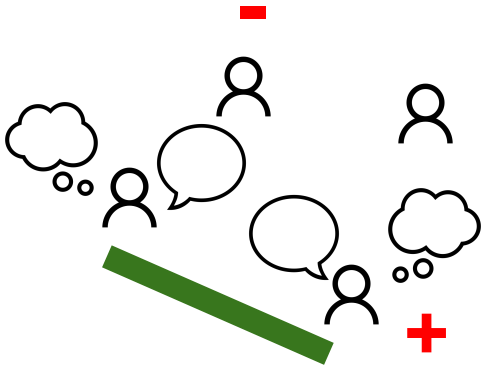

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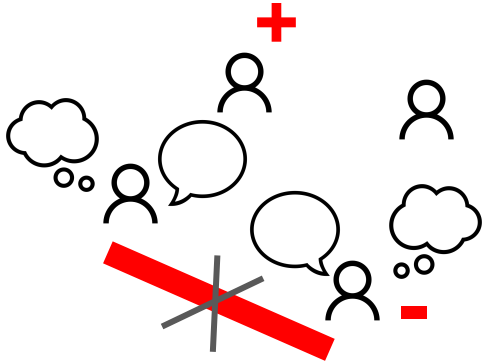

exchange disabled/disallowed

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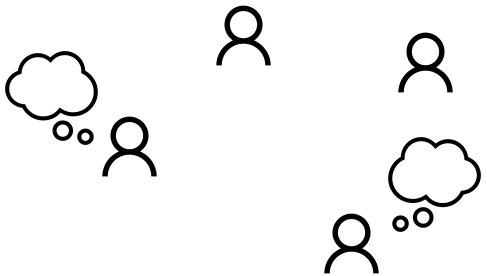
having access to relevant information plays an important for agents!

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



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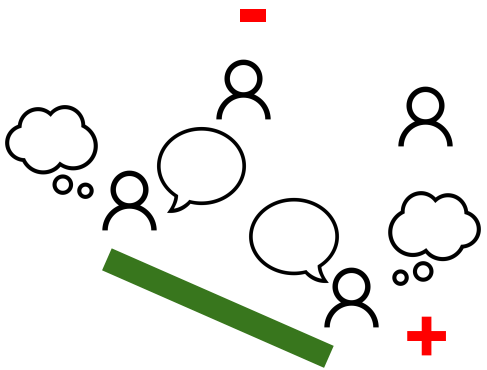

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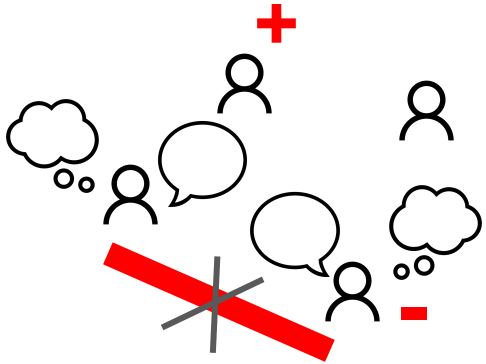

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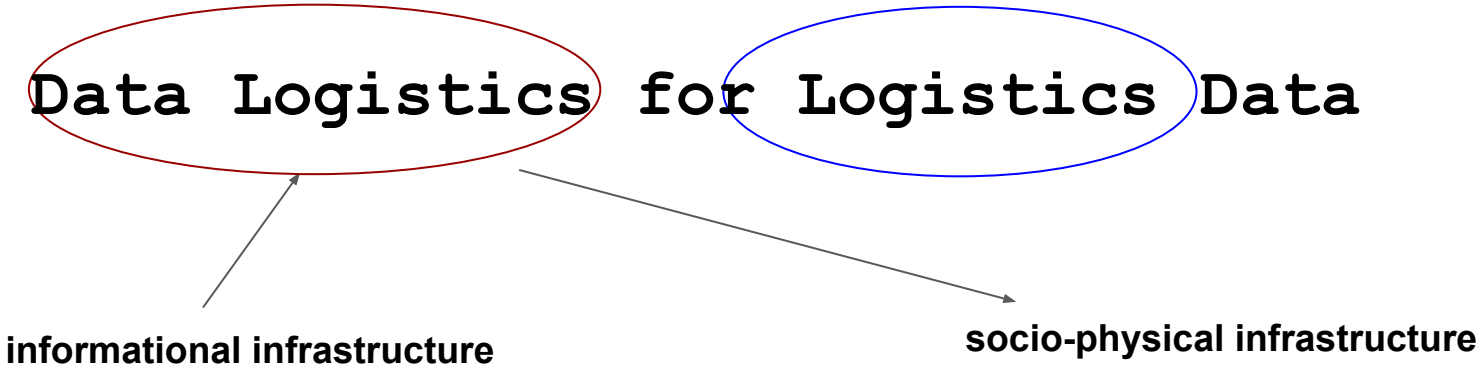


the informational infrastructure runs in itself on a socio-physical infrastructure!

Data Logistics for Logistics Data

informational infrastructure

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

socio-physical infrastructure

physical constraints
physical conditions
physical effects
(actual, potential)

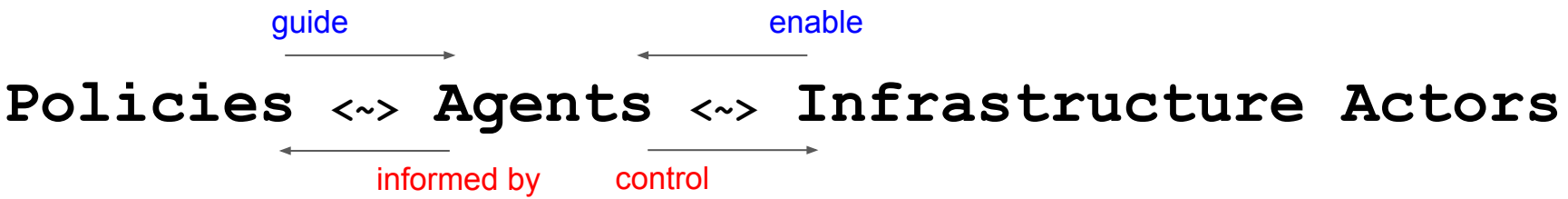
network users
network operators
network intermediate bodies
network governing bodies
network other stakeholders

→ social practices

→ legal and other norms

two normative dimensions that interact with each other: informational and physical

Policies <~> Agents <~> Infrastructure Actors


guide
enable
Policies <~> Agents <~> Infrastructure Actors
informed by
control

Physical Logistics

physical transportation

Policies -> Agents -> Infrastructure Actors

Policies -> Agents -> Infrastructure Actors

informational transportation

Data Logistics

impact can eventually be observed only on the physical level!

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physical transportation

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informational transportation

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Physical Logistics

physical transportation

Policies -> Agents -> Infrastructure Actors

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informational transportation

Data Logistics

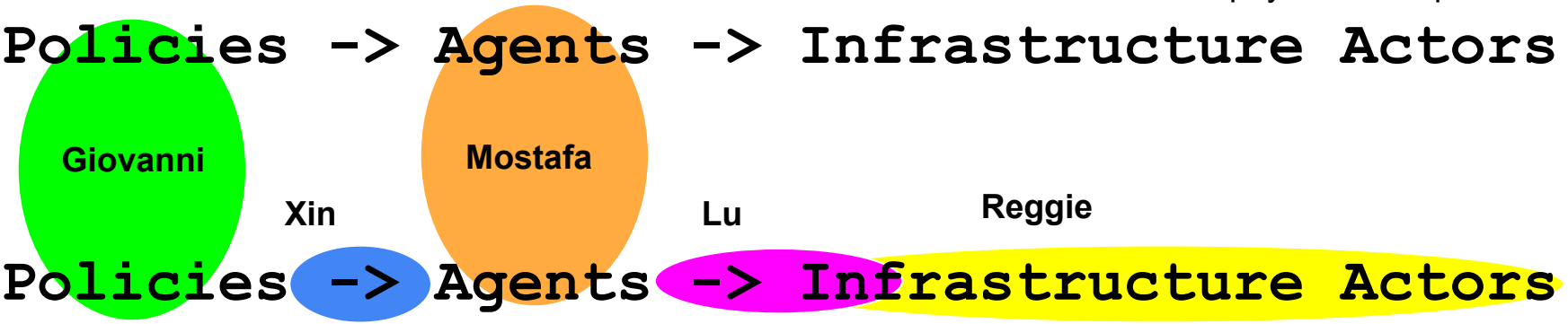
infrastructural interventions occur on the informational level!

impact can eventually be observed only on the physical level!

Physical Logistics

physical transportation

Policies -> Agents -> Infrastructure Actors

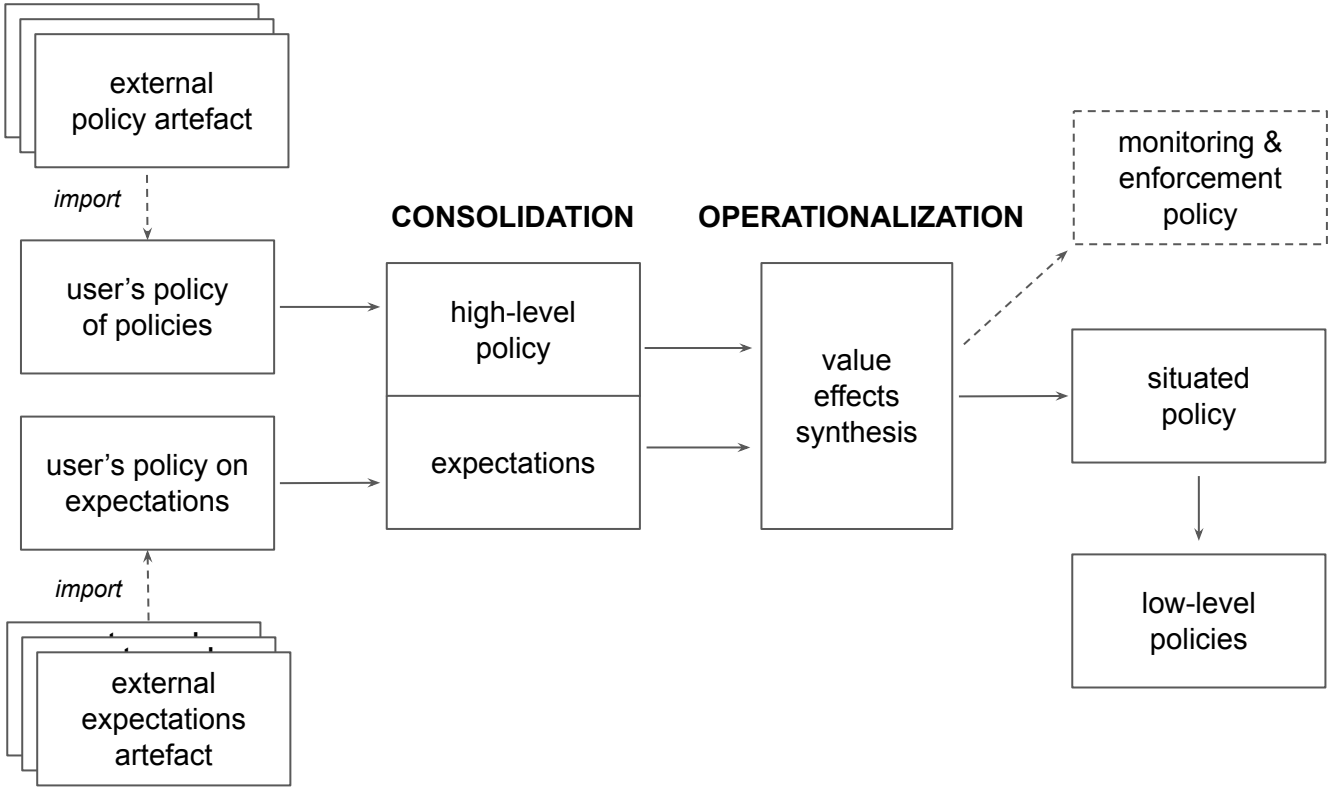


informational transportation

Data Logistics

infrastructural interventions occur on the informational level!

From higher-level to lower level policies



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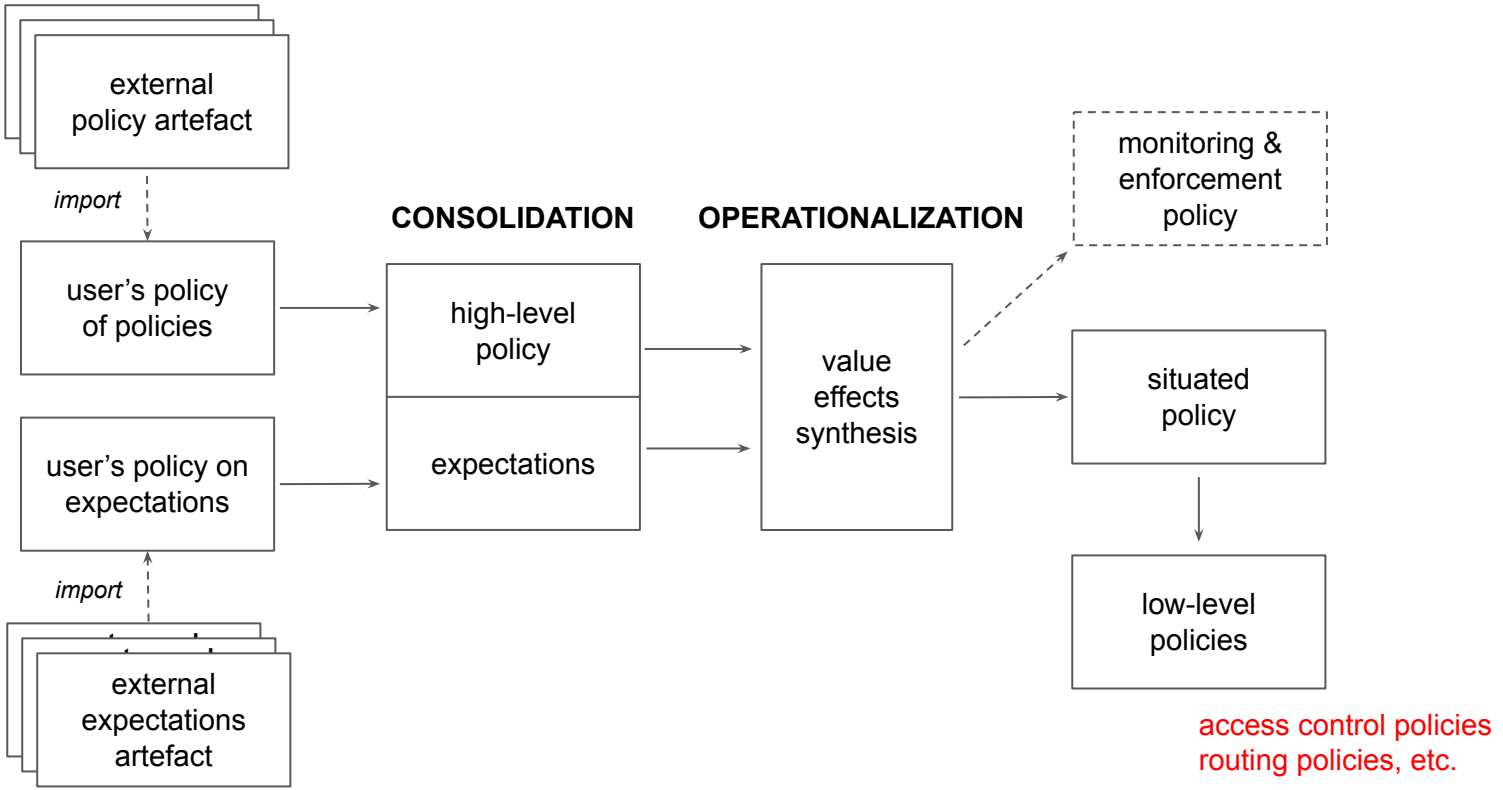

What will come out of our research

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

Giovanni: models of policy representation, reasoning and operationalization

Policies ->
Agents ->
Infrastructure
Actors

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.

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