Urban DataSpace as New Frontier: A Responsible Research and Innovation Perspective

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Smart and Resilient Cities Webinar series

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- Beyond Ethics

Where are we local?

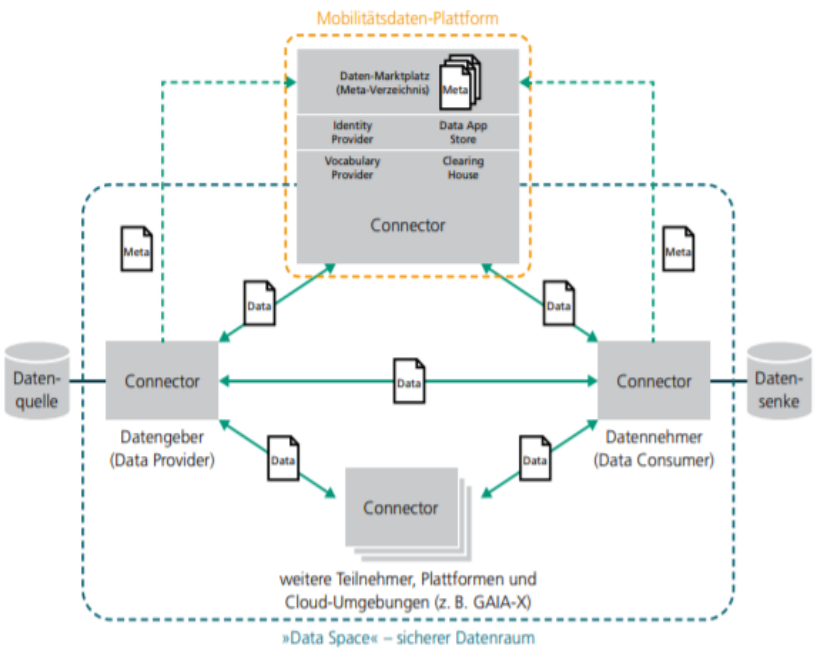
My interest

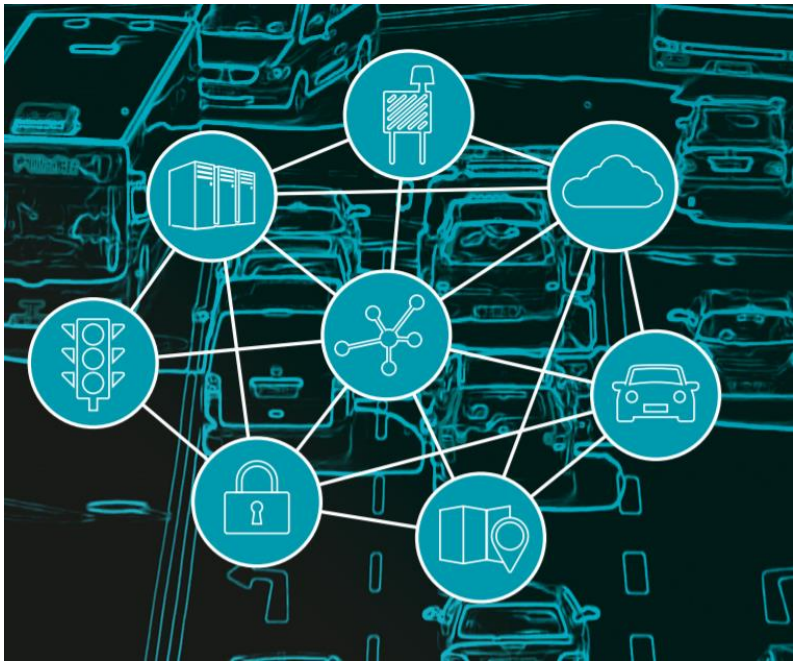
- The politics of DataSpace technology
  - How does it figure in light of core human/political values?
  - What we need to think through re: innovation politics?
  - What are the levers re: R&I policy/governance?

What is DataSpace and what is its short history?

- Data Space is one of the new frontiers of innovation in digital technology
- Franklin et al (2005) suggested that, while relational database management systems served to focus the data management community for decades, rapidly-expanding demands of 'data everywhere' have led to a new field in data science to emerge.
- In recent conceptualizations of industrial Data Space technology (Fraunhofer, 2018), authors envision Data Space as an open business ecosystem for secure exchange and easy linkage of data.
- Smart City projects intend to manage Big Data in urban environments and face similar challenges of organizational complexities. European cities and communities require a set of tools to achieve a sustainable transformation towards smarter cities/municipalities, and a structured approach to leverage the potential of the emerging data driven economy (Cuno et al 2019).
- UDS is suggested to facilitate an eco-system for data exchange and added value creation utilizing the various types of data within a smart city/municipality. UDS may thus be seen as a new type of (urban) infrastructure.

Why is it relevant?





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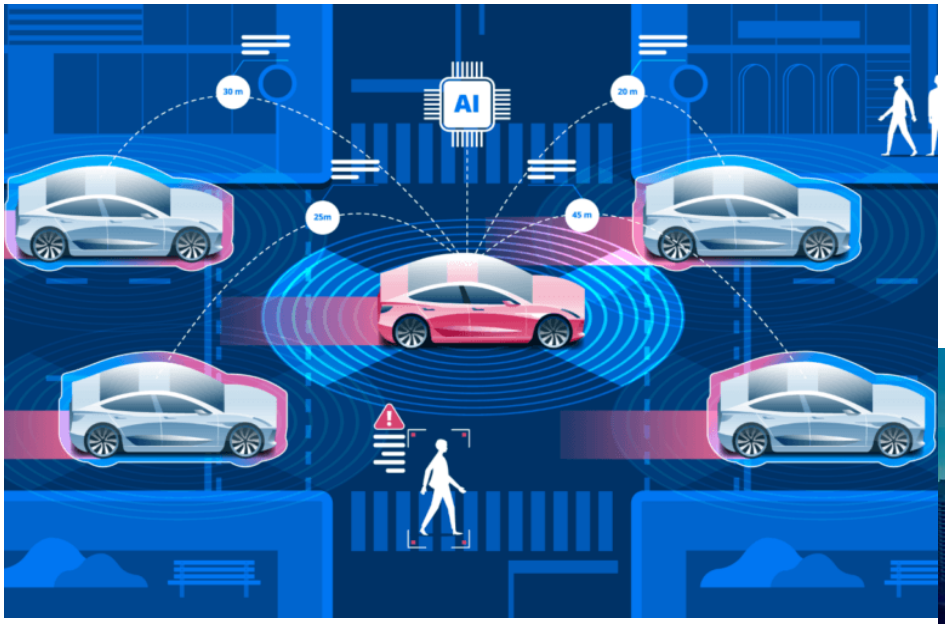
- „…a seamless digital area with the scale that will enable the development of new products and services based on data" (EC 2018).

Connected autonomous vehicles and the smart city



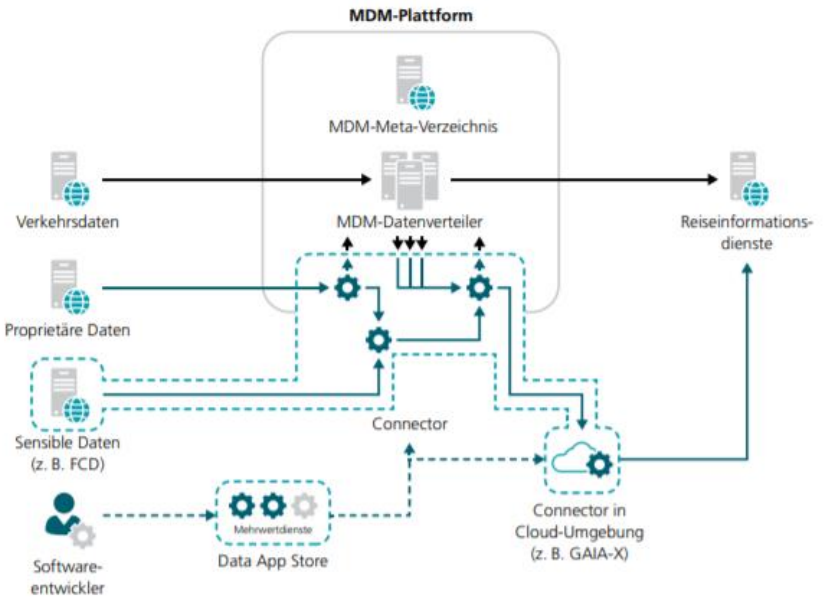
Epistemic landscape

Semantic operability

Big Data structures/integration in UDS as

- compatible,
- standardized and
- interoperable

spatial structure.



Governance landscape/EC

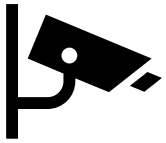
EC "Data Strategy"
single market for data; competitiveness and data sovereignty.
European data spaces: ensure that more data becomes available for use in the economy and society, while keeping companies and individuals who generate the data in control.

- Adopt legislative measures on data governance, access and reuse;
- Make data more widely available by opening up high-value publicly held datasets across the EU and allowing their reuse for free;
- Invest €2 billion to develop infrastructures, tools, architectures and governance
- Enable access to secure, fair and competitive cloud services;
- Empower users to stay in control of their data.

White Paper on Artificial Intelligence
- Transparency
- Shared value creation
- Respect for each other's commercial interests
- Ensure undistorted competition
- Minimised data lock-in

"Towards a common European data space"
- Proportionality in the use of private sector data
- Purpose limitation
- 'Do no harm'
- Conditions for data re-use
- Mitigate limitations of private sector data
- Transparency and societal participation

Governance challenges



- Value chain gaps between different data collection and management standardization initiatives (top-down and bottom-up initiatives; local/regional/national, private/public).
- Fragmented and non-transparent knowledge and value chains in urban data ecosystems
- Industry push and a regulatory pull that creates potential conflicts between different stakeholders.

Policy procrastination, as lack of shared positions of academia and/or business hinders policy makers to even understand, let alone address the governance challenges

De-facto regulation (as technologies advance they create regulatory lock-ins) by innovation and business communities.

Societal values are deprivileged over business or technology innovation interests, risking technical lock-ins as well as major public costs (such as increased inequality, lack of access etc.) due to policy non-action.

Theoretical framework beyond engineering: ANT & RRI

Actor Network Theory

(Latour, Law, Mol)

- Technology as distributed agency in actor-actant networks
- Networks as performed material semiotic spaces
- Multiple realities (Euclidean, network, ?)

Responsible Research and Innovation

(Owen, Von Schomberg, MacNaughten)

- Social desirability of technology
- Anticipation
- Reflexivity
- Responsiveness
- Inclusivity

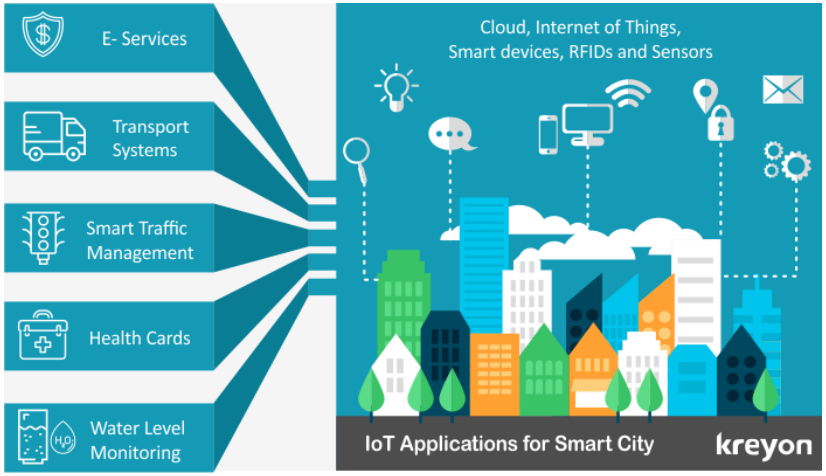
Semiotics of dataspace (mapping the problem)

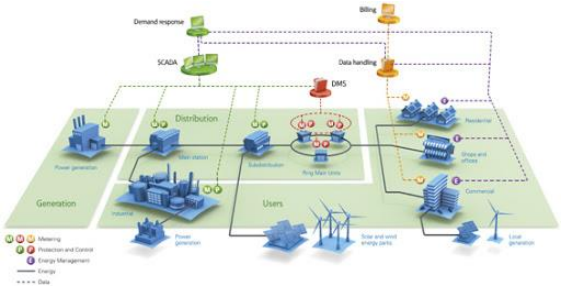
“ ”

- DS as ’sign relational complex’;
- *pragmatics of data science:* ascertaining, assessing and researching the processes by which signs relate to the agents who use them to refer to things in the world and to communicate their intentions about those things to other agents who may have similar or different intentions concerning the same or different things;
- A new dimension in the material semiotic universe?

- AI learning issues (e.g. debiasing);
- Black boxing
- Semiotic complexities
- Multistability/multidimensionality

Applications: AVs, Smart energy provision, Aerial mobile technologies, …. – all connected





Ethics of DataSpace

Trustworthy DS

(Based on Trustworthy AI principles)

- ? human agency and oversight
- ? technical robustness and safety
- ? privacy and data governance
- ? transparency
- ? diversity, non-discrimination and fairness
- ? environmental and societal well-being and
- ? accountability

Beyond ethics

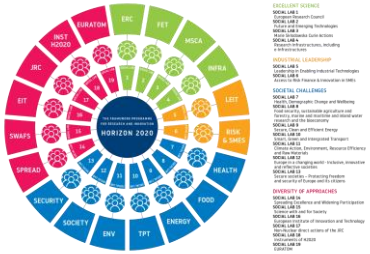
Responsible DS

(Based on ARRI principles)

Current projects in RRI

https://newhorrizon.eu/

NEW HORRIZON



https://riconfigure.eu/

riconfigure
Reconfiguring Research and Innovation Constellations

Social lab methodology as experiential research method to address **DS semiotics** as "wicked problem" (a social or cultural problem that is extremely difficult to solve for several reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems.

Quadruple Helix as a socially inclusive, iterative innovation process method to address **DS semiotics** to create a stakeholder inclusive environment to arrive at socially desirable outcomes.

Perspective

COVID-19 and the onlineification of research: kick-starting a dialogue on Responsible online Research and Innovation (RoRI)

Robert Braun, Vincent Blok, Anne Loeber & Ulrike Wunderle

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ABSTRACT

The COVID-19 crisis opened up discussions on using online tools and platforms for academic work, e.g. for research (management) events that were originally designed as face-to-face interactions. As social scientists working in the domain of responsible research and innovation (RRI), we draft this paper to open up a dialogue on Responsible online Research and Innovation (RoRI), and deliberate particular socioethical opportunities and challenges of the onlineification in collaborative theoretical and empirical research. An RRI-inspired 'going online' approach would mean, we suggest, trying to make academic events and research activities more inclusive, researchers' attitude to their work more reflective and suggest processes that are more responsive to societal needs and ethical concerns. For such systematic reflection, we suggest using the RRI-heuristic provided by Owen et al.,

Related article

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Innovation, 2019

Joint declaration Horizon Europe
Alexander Gerbe
Innovation, 2020

Responsible rese science educatio impact of using c

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COVID-19 poses dangers of "onlineification of everything" and (big)data driven R&I.

SCIENCE AND SOCIETY

Improve alignment of research policy and societal values

The EU promotes Responsible Research and Innovation in principle, but implementation leaves much to be desired

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Historically, scientific and engineering expertise has been key in shaping research and innovation (R&I) policies, with benefits presumed to accrue to society more broadly over time (1). But there is persistent and growing concern about whether and how ethical and societal values are integrated into R&I policies and governance, as we confront public disbelief in science and political suspicion toward evidence-based policy-making (2). Erosion of such a social contract with science limits the ability of democratic societies to deal with challenges presented by new, disruptive technologies, such as synthetic biology, nanotechnology, genetic engineering, automation and robotics, and artificial intelligence. Many policy efforts have emerged in response to such concerns, one prominent example being Europe's Eighth Framework Programme, Horizon 2020 (H2020), whose focus on "Responsible Research and Innovation" (RRI) provides a case study for the translation of such normative perspectives into concrete policy action and implementation. Our analysis of this H2020 RRI approach suggests a lack of consistent integration of elements such as ethics, open access, open innovation, and public engagement. On the basis of our evaluation, we suggest possible pathways for strengthening efforts to deliver R&I policies that deepen mutually beneficial science and society relationships.

Alignment of R&I objectives with societal benefits, which transcend exclusive economic value, is a globally relevant concern (3). Aspiration of stronger science and society interrelationships have been visible in U.S. research management efforts, as well as in Canada and Europe. In H2020, to which the European Commission (EC) allocated nearly €80 billion for the 2014–2020 funding period, the EC enumerated RRI as a priority across all of H2020 activities (a "cross-cutting issue") to deepen science and society relationships and be responsive to societal challenges. To date, €1.88 billion have been invested across 200 different R&I areas (e.g., quantum computing, graphene nanotechnology, human brain research, artificial intelligence) in more than 1100 projects related to various dimensions of RRI (see the figure). Inclusion of RRI in Horizon 2020 aims to integrate research policy and societal concerns, including about gender in science, and about disruptive technologies such as robotics.

H2020 reflected the commitment of the European Union (EU) to the precautionary principle with regard to R&I policy, and the deepening commitment of the EC to mainstream concerns related to science and society integration (4, 5).

RRI principles and practices have been designed to enhance inclusive and democratic modes of conducting R&I to reflect current forms and aspirations of society (4). Formal adoption and exploitation of RRI in H2020 coalesced around six thematic domains of responsibility ("keys"): public engagement, gender equality, science education and science literacy, open access, ethics, and governance (6). As a relatively young concept, these six keys cover only a part of RRI as it is discussed in the academic literature. Their integration in the European R&I ecosystem was advanced by various political- and policy-level ambitions (3–5). The forthcoming Ninth Framework Programme, Horizon Europe (2021–2027), includes further mention of RRI, as well as additional efforts to increase responsiveness of science to society through elements of the so-called "three O's agenda" (i.e., open innovation, open science, openness to the world) (7).

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Responsibility is normative political rhetorics and not implemented policy

Thank you.

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