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Panel 39. Data flow integration: investigating the 'good' of interoperability

Convenors:

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Keywords: data flows, digital platforms, interoperability, public institutions

Data extraction, circulation, and analysis have become core elements of contemporary capitalism's transformations, most notably embodied by digital platforms. These economic actors have influenced, shaped, and controlled data flows, in some cases becoming infrastructures for digital activities, inherently featuring interoperability while acting as gatekeepers. Meanwhile, public and institutional actors have similarly been drawn into this broad "turn to data" (Couldry, 2018). However, they face complex challenges, particularly with regard to data flow integration, due to fragmented governance frameworks, differing national regulations, and the need to balance personal data protection with efficient services. Despite these challenges, public institutions remain strongly oriented toward digital data interoperability. The European Commission has supported public data interoperability since the 1990s through various plans, programs, and strategies aimed at encouraging cross-border data sharing within the EU, with the Interoperable Europe Act of 2024 being the most recent intervention.Academic research has thoroughly explored the socio-technical, political, and legal dimensions of digital interoperability (Bellanova and Glouftsios, 2022; DeNardis, 2011; Pelizza, 2016), offering valuable insights for further investigation, which must rely strongly on interdisciplinary approaches.Given the trajectories of data flow interoperability in the private and public domains—and their intersections—it is important to reflect on the intended "good" of these projects. As interoperability in public institutions is often promoted in the name of citizens' well-being (e.g., proactive social protection, improved public services, smoother interactions with administrations), it is essential to evaluate these claims critically and move beyond rhetoric. At the same time, private platforms often manage data flow integration without sufficient scrutiny, requiring further exploration of how data flows are handled. Therefore, the questions explored in this panel include (among others):

- Who truly benefits from enhanced data circulation at the crossroads of economic and institutional efficiency?
- What broader value propositions exist for the citizens and users whose data fuels these systems?
- As data flows become more integrated, how do these projects address concerns about individual and collective freedoms, particularly for those in vulnerable conditions, such as migrants or people in need?
- What is the significance of national digital sovereignty in this new landscape of integrated data flows?
- How do practices around data use, sharing, and management in public institutions and private organizations shape the implementation and outcomes of interoperability projects?
- How do these practices evolve in response to the increasing integration of data flows, and what tensions or negotiations arise among workers and citizens as they engage with interoperable systems?

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ID 604 - Interrogating Interoperability's Best of All Worlds: The Case of the Greek Interoperability Centre

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Keywords: Interoperability, digital policy, datafication, digital platforms, digital transformation,modular centralisation,information asymmetry

Interoperability has been a driving sociotechnical force for the digital transformation of the Greek state. It is promoted through a public discourse that emphasizes the advantages and benefits of interoperable connections for citizens, businesses and public administration. Citizen-centricity and pro-activeness in tandem with convenience and speed in the provision of digital services are the pillars of such an alluring, almost irresistible, vision.

In this paper, I interrogate the intended "good" of interoperability's vision, by exploring the processes of data integration which are at the back-end of the administration-citizens' interface. I draw from empirical research based on interviews with civil servants and software engineers responsible for building the Greek state's infrastructural backbone for interoperability, namely the Interoperability Centre (IC). I situate these findings in the broader legal and institutional framework of the ongoing digitalisation, as documented by research on policy documents and public interventions by key policymakers.

I analyse the IC of the Greek state as an infrastructural assemblage of social, technical, legal and administrative components. I focus on its software architecture (service-oriented architecture based on an enterprise service bus) as a sociotechnical arrangement which instantiates a particular administrative/institutional logic and renders possible specific ways of making and delivering services via digital channels, on a massive scale and in flexible and fast ways.

The horizontal integration of data flows and the establishment of a systematic inter-governmental communication and data exchange, where once only informational silos existed, triggers two interrelated processes:

- On the one hand, the datafication of administrative processes, which enables the Greek public administration to gather all the information needed about a single case, without reducing its complexity or losing the granular ways of viewing the external environment. This means that accumulating data about an individual person or case does not undo administration's capacity to gain a detailed and comprehensive understanding of that particular person or case. Therefore, public administration can come closer to citizens and attend on their particular needs based on a "whole-person-approach", namely one which is more personalized and informationally inclusive.
- On the other hand, horizontal data flows presuppose the establishment of a powerful sociotechnical and institutional centre, i.e. the IC and the Ministry of Digital Governance. This entails a centralized jurisdiction in terms of deciding on interoperable connections and the orchestration of composite web-services. Therefore, the IC goes beyond the simple role of the broker and auditor of interoperable web-services and turns into a "smart" platform which implements business logic and gathers all data in its database.

Both of these tendencies lead to the entrenchment of a particular form of centralisation, which I describe by coining the concept of "modular centralisation". Modular centralisation pertains to a seemingly paradoxical combination of a centralized component on which a great number of flexible and loosely-coupled administrative processes heavily depend.

I conclude by highlighting the information and power asymmetries which are established among state agencies as well as between public administration and citizens because of the IC's jurisdictions and affordances and juxtapose them to the best of all interoperable worlds promised by the IC.

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ID 625 - Visions of interoperability and the growth of regional information infrastructures to integrate health and social care settings in Scotland

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Robin Williams, University of Edinburgh
Kathrin Cresswell, University of Edinburgh

Keywords: Visions of interoperability, Integration of health and social care using digital technologies, Patchwork of integration efforts

Digital technologies are now central to bridge institutional segmentation and fragmentation of the health and care systems to provide integrated care. These digital technologies facilitate the sharing of information between various professional and non-professional entities to integrate health and social care sectors, by forming information infrastructures. Information infrastructures are invisible socio-technical bases which are embedded into everyday practices as well as needs of people in the form of information systems through standardisation. However, various health and care providers use information systems that might not be interoperable or have the same information requirements or standards or have an established legal basis for sharing information resulting in increased workload and employment for workarounds by users to share information.

The Key Information Summary (KIS) in Scotland is an electronic health record that has been used for over a decade to extract and share key patient information from General Practitioners (GP) to Out of Hours (OOH) services, the Scottish Ambulance Service (SAS), hospital specialists, social workers, and carers across multiple long-term and end-of-life pathways.

Using a Biography of Artefacts and Practices framework, this qualitative study aimed to look at the process of implementation, adoption, and use of KIS, in various health and social care settings over time to domesticate and facilitate data sharing. Multi-stied ethnography was employed to understanding how technology design, use, and adoption evolved over time and were shaped by social, organisational, cultural, and visions of interoperability.

Data analysis followed a hybrid approach wherein Technology People Organisation and Macro-environment (TPOM) Framework was used to develop a priori codes and theories from Science Technology and Innovation Studies, and Implementation sciences was used inductively for thematic analysis. Findings from the study highlight that the implementation, adoption, and use of KIS in multi-stakeholder care pathways required the interlinking of different information systems with limited interoperability to suit the evolving imaginaries of interoperability. This resulted in contentions around the use of KIS, varied information requirements of the users over time, as well as employment of contextual workarounds to retrieve information by different service providers, leading to patchworks of integration efforts.

A key takeaway is that the integration of health and social care services using digital technologies is an ongoing, long-term process that undergoes iterative waves of change. Achieving meaningful integration requires recognising significant socio-organisational and technological challenges while ensuring strategic alignment with the diverse needs of stakeholders. Effective implementation demands a clear vision that acknowledges the varying information needs, capabilities, and existing systems of different actors within the healthcare and social care ecosystem. These insights contribute to the broader discourse on employing digital technologies for integration, emphasizing the necessity for adaptable policies and infrastructure that support interoperability and long-term sustainability in health and social care.

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ID 662 - FAIR and Interoperability: Designing a Research Platform for Improved Scientific Data Governance

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Keywords: FAIR principles, FAIR by Design, Interoperability, Heterogeneous data, Data governance, Experimental research,Metadata standardisation

Research Context. Digital technologies and FAIR principles (Findable, Accessible, Interoperable, Reusable) have transformed interdisciplinary research practices by improving data management. However, ethical, infrastructural, and legal challenges persist, particularly regarding the responsible reuse of sensitive data (Jacobsen et al., 2020; Mons et al., 2017).

1. Emergence of FAIR Principles and Regulatory Framework. Introduced in 2016 (Wilkinson et al.), FAIR principles have been integrated into European initiatives (Horizon Europe, EOSC) to enhance data traceability and interoperability. However, their application to complex datasets (e.g., social surveys, biomedical data) remains limited due to technical constraints and GDPR compliance requirements. Managing heterogeneous formats and anonymizing sensitive data require innovative solutions (Mons et al., 2021).

2. Limitations of Existing Digital Platforms. Current infrastructures (Zenodo, NAKALA) provide storage solutions but struggle to implement a FAIR by Design approach, which is essential for full data lifecycle traceability (Robinson-Garcia et al., 2017; Pouyllau, 2022). For instance, EOSC and ELIXIR focus on technical interoperability but fail to adapt to interdisciplinary needs (Steinhoff et al., 2020). Additionally, managing standardized metadata for heterogeneous data (e.g., health, social sciences) remains a challenge, limiting optimal data reuse (Mons et al., 2020).

3. Towards Collaborative and Participatory Science. Participatory approaches, such as those promoted by the Citizen Social Lab, engage citizens in all stages of research, fostering co-creation of knowledge. However, current tools show technical and cultural gaps, particularly in including vulnerable populations (e.g., autistic individuals) while ensuring GDPR compliance (Vicens et al., 2018; European Data Protection Board, 2019). Managing sensitive data requires flexible platforms with strict anonymity measures and inclusive interfaces (Schmermbeck et al., 2024).

Research Hypotheses. This study explores the technical and cultural barriers to applying FAIR principles, with a focus on data accessibility and the active participation of underrepresented populations. The central question is: How can FAIR and GDPR requirements be effectively integrated into data governance to ensure responsible and inclusive management?

Methodology

- A mixed-methods approach is adopted:
- Critical analysis of existing solutions and literature review.
- Development of the Collective Science platform, designed with FAIR by Design and Privacy by Design principles. It incorporates:
- Tools for managing sensitive data (anonymisation, dynamic consent).
- Persistent identifiers (DOI) for traceability.
- Participatory modules adapted to diverse user profiles, including individuals with disabilities.
- Experimental tests:
- Interactive video game to assess engagement in neurodivergent participants.
- Experimental tasks measuring inclusivity and FAIR compliance.
- Results are analysed using qualitative (interviews) and quantitative methods (accessibility metrics, data quality).

Conclusion. While FAIR principles have revolutionized data management, their optimal implementation

in interdisciplinary contexts requires technical and methodological innovations. The Collective Science platform offers an integrated solution combining FAIR traceability, GDPR compliance, and participatory inclusion. This approach highlights the need for tools adapted to the ethical and technical challenges of sensitive data while promoting open and collaborative science.

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ID 684 - The "good" of interoperability in modern labor market. An exploratory research on platform work

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Keywords: Platform Economy, Data Interoperability, Digital Reputation, Transitional Labour Market.

Purpose: The paper aims to explore the "good" of data interoperability in modern labour markets. It proposes an exploratory research on intra-sectoral occupational transitions in the platform economy in the absence of a right of workers to the interoperability of their personal data. In this way, we try to understand how the non-interoperability of workers' personal data affects the functioning of the labor market and the capacity of people to successfully face occupational transitions.

Methodology: The research took place in the city of Catania (Sicily, Italy), between June and October 2020, and involved 120 riders working for Glovo, Just Eat, Foodys, Social Food, and Winelivery. At the time of the survey, there were no administrative data and longitudinal datasets that would allow us to reconstruct the phenomenon of occupational transitions in the sector under study, nor in relation to other sectors of the platform economy, therefore the information necessary for this reconstructive exercise was obtained through social research techniques and through the analysis of employment contracts. The methodology employed combines techniques that belong to social research - structured interview (N=120), focus group (N=11) - and legal analysis (study of riders' contracts). The research activity carried out was guided by the following questions:

- How widespread are intra-sector employment transitions?;
- What drives workers to face these transitions?;
- What problems do workers encounter during these transitions?.

Findings: Non-interoperability of data weakens the mobility power of people within labour markets. In particular, non-interoperability of personal data hinders the completion of employment transitions aimed at improving one's working conditions. The emerging evidence supports the introduction of a right to personal data interoperability provided by Directive 2024/2831 on improving working conditions in platform work.

Originality: The paper offers empirical evidence on the connection between the personal data interoperability and modern labour markets functioning. In this way, It demonstrates the value of data interoperability for new groups of workers and more precisely for their capacity to successfully face occupational transitions.

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ID 900 - 'One fit for all': A view on the platform economy of European interoperability

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Keywords: Europe, platform economy

In its efforts to create a single market for data, the European Commission has launched various data space initiatives across all sectors of society (such as agriculture or health) that would help overcome existing technical and legal barriers to seamless data sharing. From a technical point of view, these policies are

enforced by means of setting up a highly scalable and modular backend infrastructure that can be tailored to any business needs. This paper shows the importance of considering the move toward digital platform business models in the 'making' of European interoperability, both by looking at their technicalities and performativity. Adopting a material–technical perspective on platforms as developed within media studies, and bringing this literature in conversation with Science and Technology Studies (STS) and European studies, this paper suggests that a focus on the political economy of platforms and their technical configuration is key to understand how this novel form of data integration is re-ordering power arrangements over data sharing and governance. Through a detailed study of the roll out of DG CONNECT's open-source middleware platform "Simpl", this paper seeks to make two broader contributions. First, it identifies a new logic of platform economy behind the implementation of EU digital policy initiatives (such as the Data Governance Act and the Data Act) that enables new decentralised practices of data sharing and use to emerge across the public and private sectors. Second, it draws out how this new logic is accompanied not only by the coopting of platforms as "services" but also crucially by a breakdown of the categories of data provider/consumer, owner/user.