10th INTERNATIONAL CONGRESS ON TRANSPORTATION RESEARCH

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Challenges, Opportunities and Barriers of Open Science in Transport Research

Katerina Folla
National Technical University of Athens

Together with:
Afroditi Anagnostopoulou, CERTH/HIT
George Yannis, NTUA

Introduction

- Open Science is a new approach to the scientific process, aiming to provide accessibility to all levels of research community and society, increase integrity and reproducibility of research
- In the EU, the European Open Science Cloud (EOSC) has initiated as a single point of access to all European research data, data services, tools and standards
- The EC aims to set up a community of transport research organizations willing to work on the basis of Open Science
- In this context, the BE OPEN project was funded by the Horizon 2020 Work Programme 2018-2020 aiming to exploit the European Open Science Cloud (EOSC)
  - TOPOS Observatory and Forum (https://www.topos-observatory.eu/)
  - European Code of Conduct on Open Science in Transport

Objectives and Methodology

- The objective of this research is to identify the main challenges, opportunities and barriers of Open Science in transport research

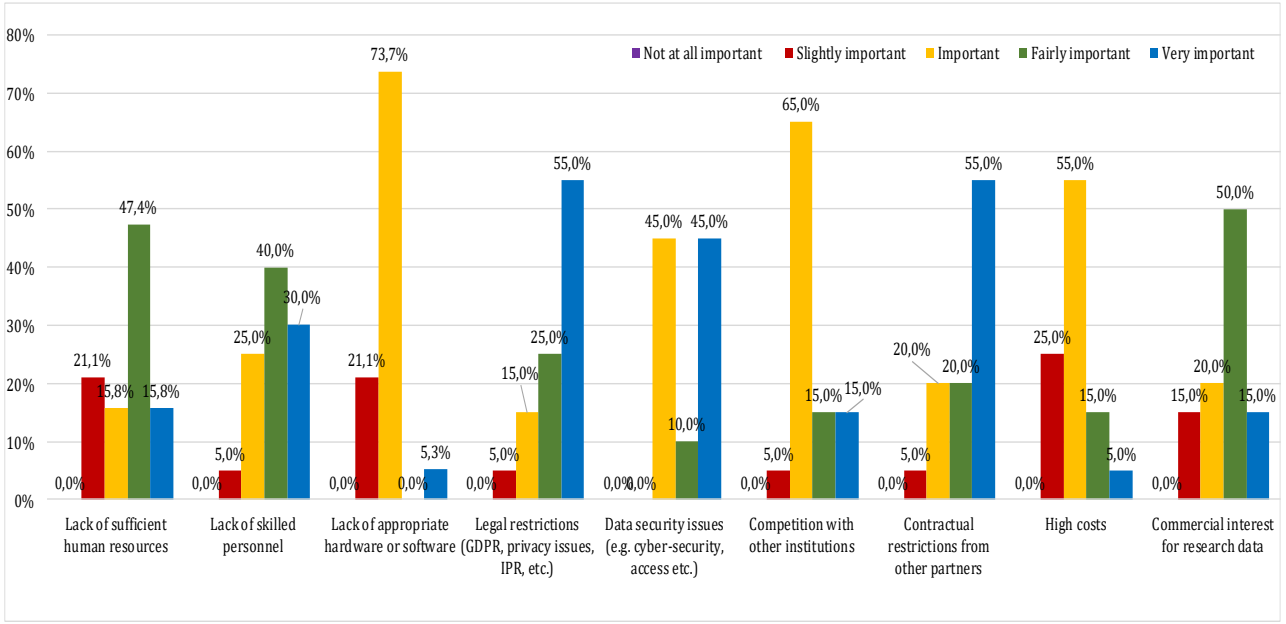
- An on-line stakeholder survey was conducted
- A panel of 18 experts coming from the transport sector was developed
- The survey was held in two rounds: A first questionnaire was distributed to the experts. After the first round, the facilitator of the survey provided an anonymised summary of the experts' answers from the previous round and the experts were encouraged to revise their replies based on the opinions of the other experts
- The questionnaire was composed of 30 questions, based on the identified key areas from the literature review

Delphi Survey

- The Delphi method is a structured communication technique aiming to acquire the most reliable consensus of a group of experts' opinions
- A panel of experts representing all transport modes and various areas of the transport sector (e.g. research, public sector, NGOs, etc.)
- The experts were selected based on their expertise in transport research, transport data and their familiarity with Open Science
- During both stages of the Delphi survey, the anonymity of the experts was kept
- The questionnaire aimed to capture existing differences between the research community and transport professional sector, as well as between public and private sectors

Challenges for Transport Research Community

- The most important challenges were legal restrictions (e.g. GDPR, privacy issues, IPR etc.), as well as contractual restrictions from other partners (75%),
- The lack of skilled personnel (70%) and the potential of commercial interest for research data (65%) were also assessed as important.
- Data security issues (e.g. access, cyber-security) seem to divide experts' opinions in terms of importance

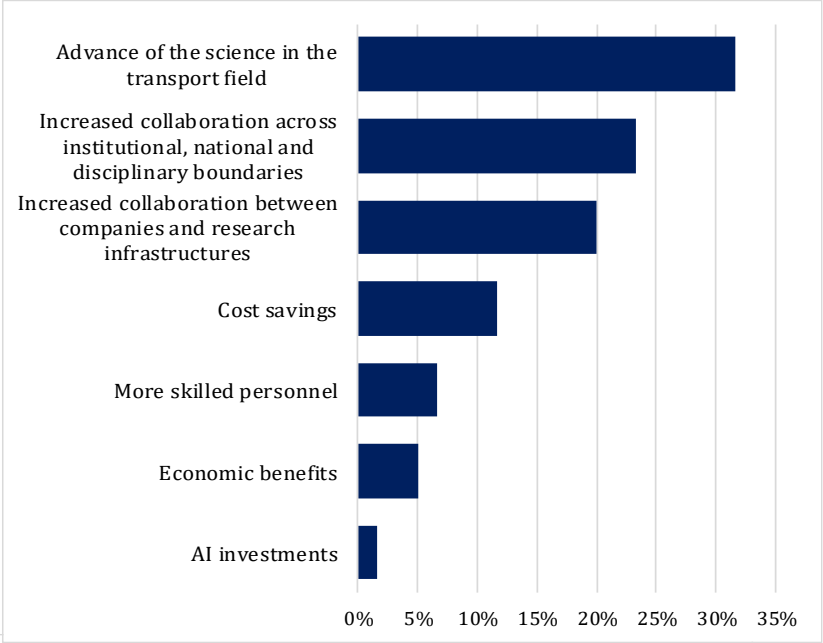


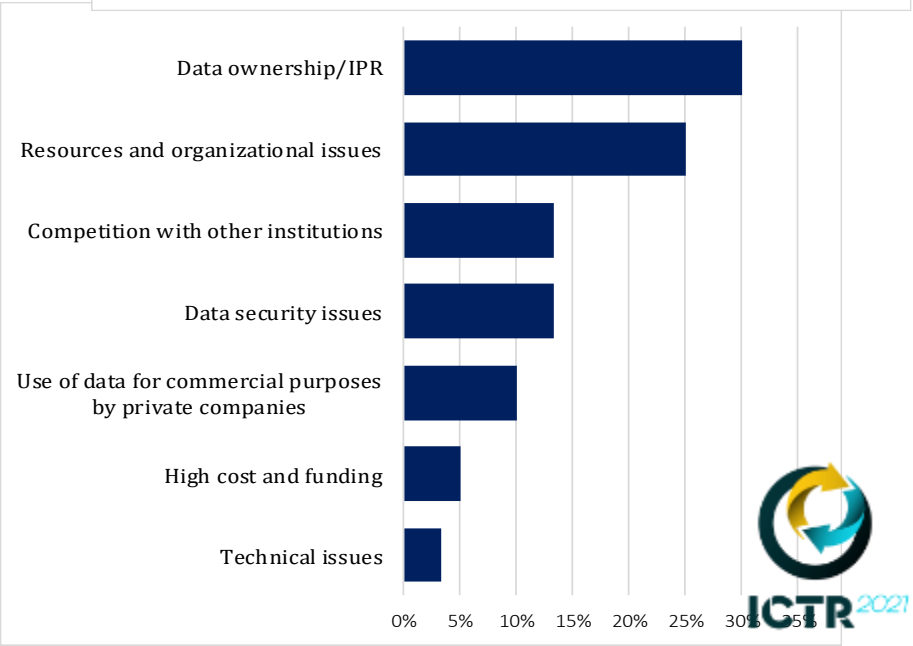
Opportunities and Barriers for Research Institutions

- The most important opportunity is considered the advance of science that could be achieved in the transport research through the Open Science (32%).

- Sharing data and publications is considered as a valid way to increase collaborations not only across institutional, national and disciplinary boundaries, but also between companies and research infrastructures

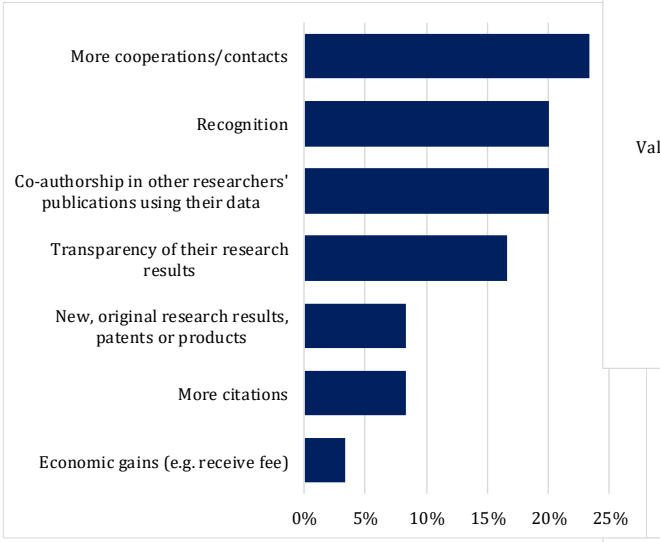
- The main barriers identified for research institutions in sharing open data were
  - data ownership issues/IPR (30%) and
  - resources and organizational issues (25%) related to the transport research institutions



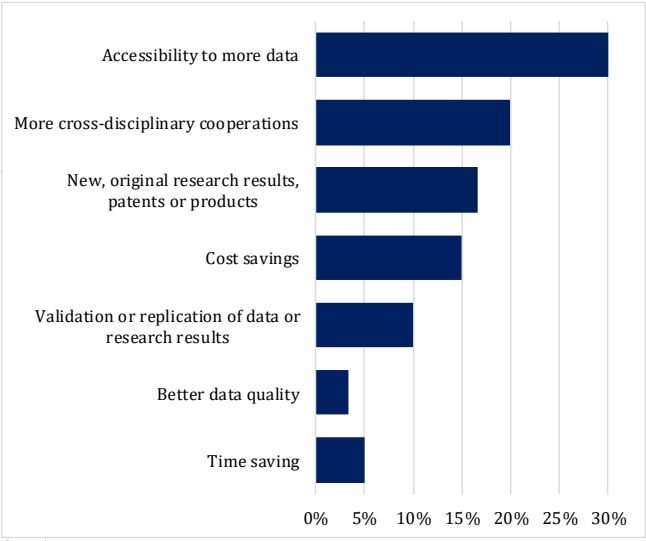


Opportunities and Barriers for Researchers

- Incentives to openly share their data (Fig. a):
  - more co-operations/contacts (23%)
  - recognition in the research community (20%)
  - being co-author to other researchers' publications, who have used their data (20%)
- Benefits from using available open data (Fig. b):
  - accessibility to more data (30%)
  - more cross-disciplinary co-operations (20%)
  - more new, original research results and products (17%)
- Barriers of openly sharing their data (Fig. c):
  - significant effort to produce a dataset
  - data protection and ethical restrictions
- Barriers preventing researchers from using available open data (Fig. d):
  - the insufficient documentation of the data (27%)
  - not easy accessibility to such data (23%)



(a)



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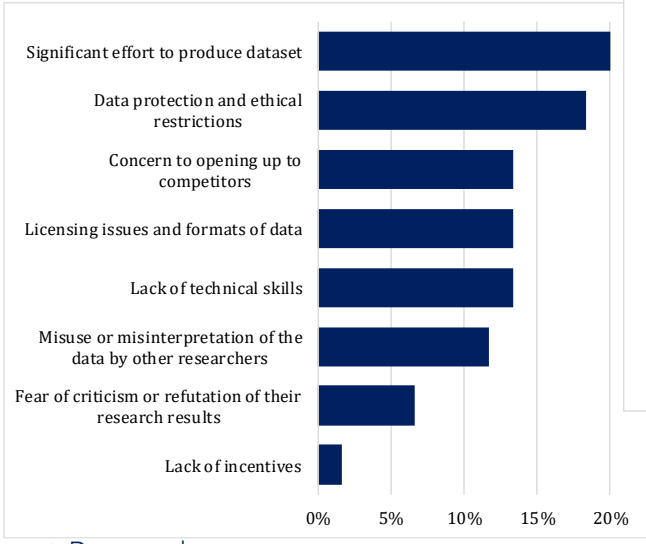

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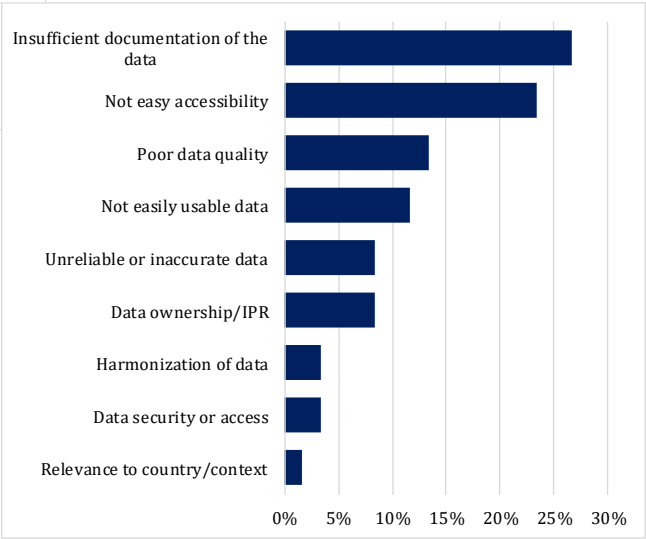

(d)

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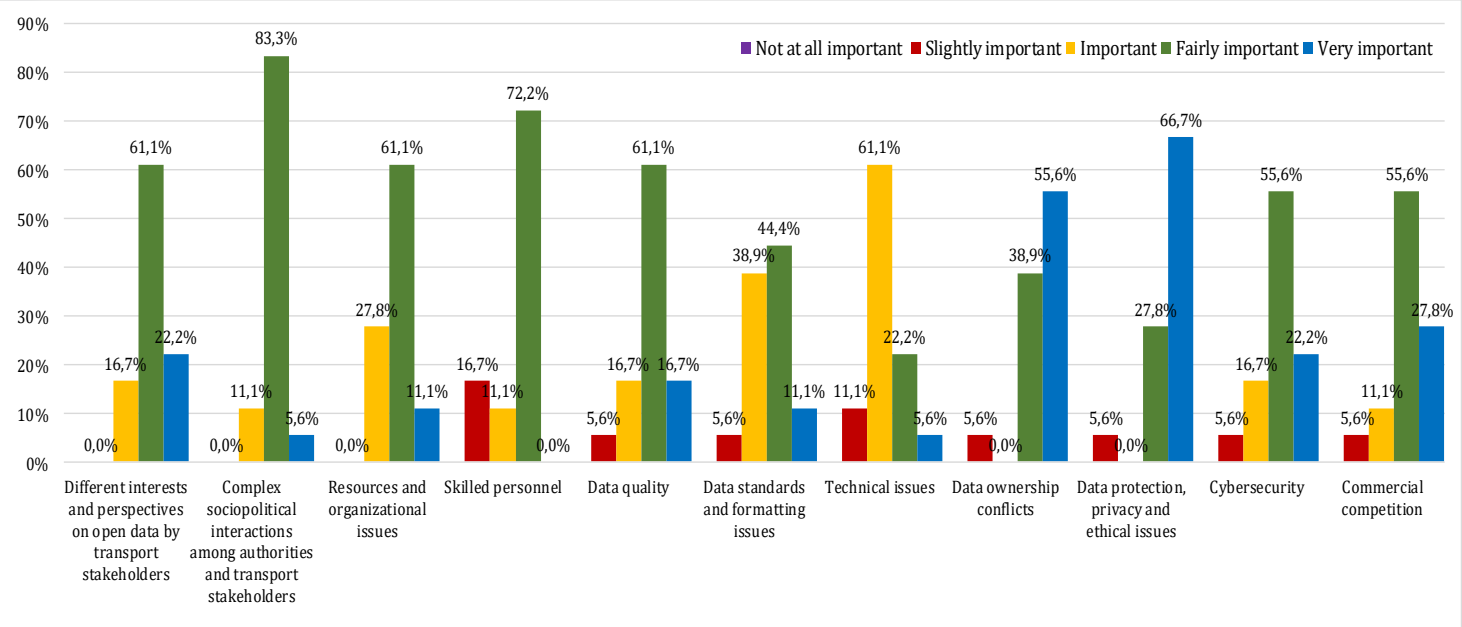
Challenges for Transport Companies and Authorities

- The most important challenges identified were:
  - data protection, privacy and ethical issues
  - data ownership conflicts
  - complex socio-political interactions among authorities and transport stakeholders
  - commercial competition
  - different interests and perspectives on open data by transport stakeholders

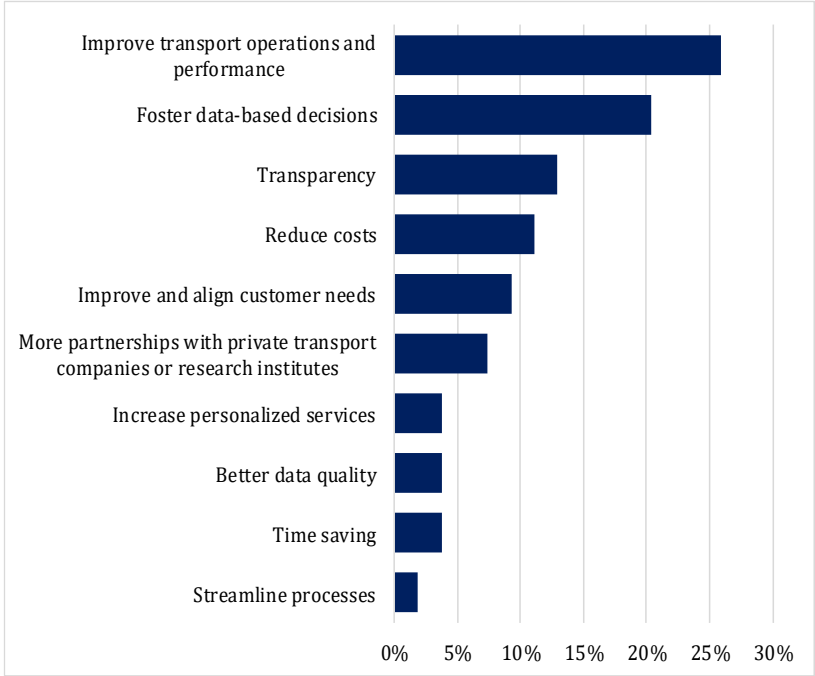


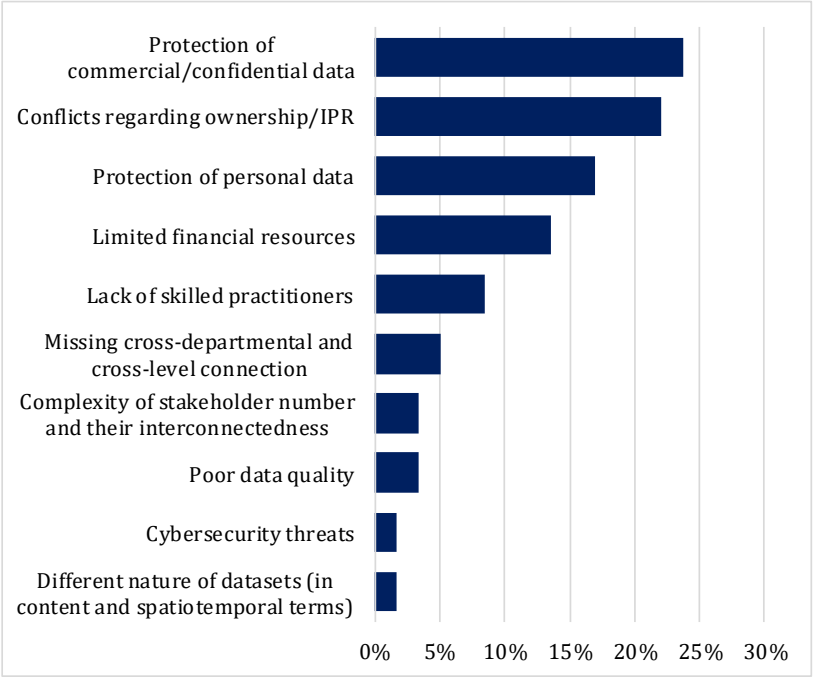
Public Transport Authorities

- The need for skilled personnel was highlighted as an additional challenge for public transport authorities

- Main opportunities arising for public transport authorities from using open data services:
  - improvement of transport operations and performance (26%)
  - fostering data based decisions (20,4%)

- Main barriers of sharing data for public transport authorities:
  - protection of commercial/confidential data (24%)
  - conflicts regarding ownership/IPR (22%)
  - protection of personal data (17%)



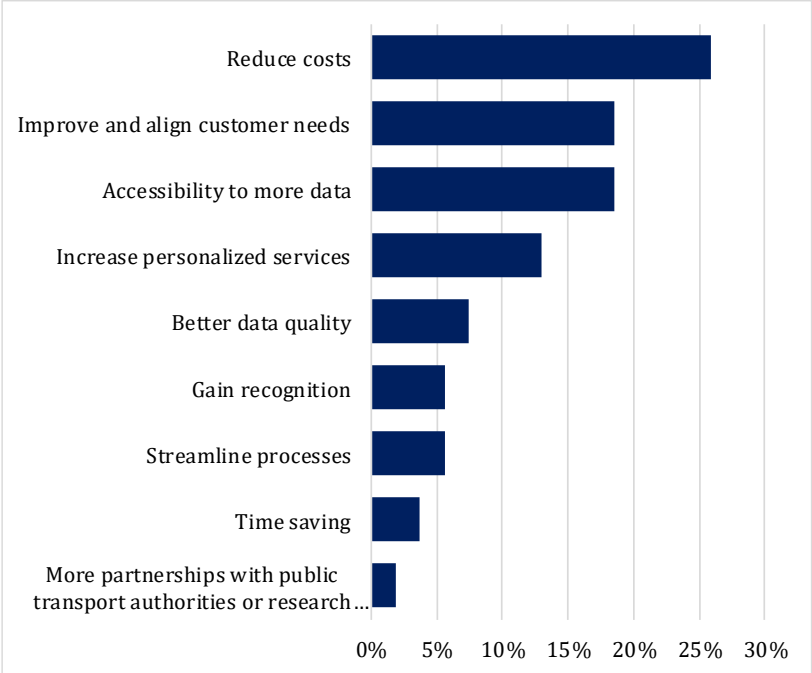


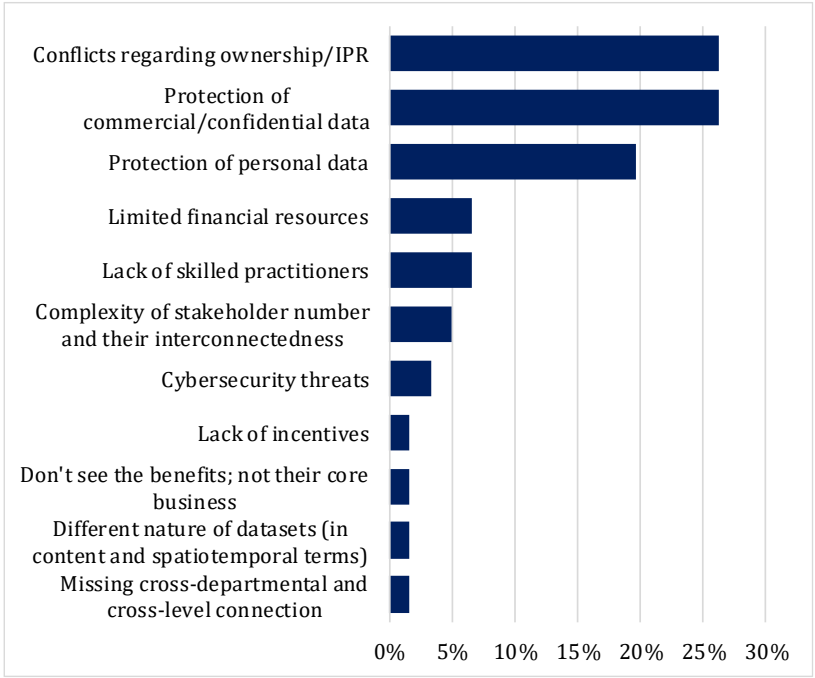
Private Transport Companies

- Commercial competition and the different interests and perspectives on open data by transport stakeholders were also identified as additional challenges

- Main opportunities arising for private transport companies from using open data services:
  - reduction of the costs (26%)
  - improvement and alignment of customer needs (18,5%)
  - accessibility to more data (18,5%)

- Main barriers of sharing data for private transport companies:
  - conflicts regarding ownership/IPR (26%)
  - protection of commercial/confidential data (26%)
  - protection of personal data (20%)





Conclusions (1/2)

- Open Science is considered as a key contributor in the advancement of science, however, there is still a reluctance from the side of research institutions to adopt an Open Science policy
- The main challenges are legal and ethical restrictions (e.g. GDPR, privacy issues, IPR, etc.) as well as contractual restrictions from their partners
- Open transport data, especially in the public transport sector, have been a success story for several countries, by exploiting open datasets and creating transport related applications or other tools
- Private transport companies are more reluctant to share openly their data, especially when operating in highly competitive markets

Conclusions (2/2)

- The transition of transport research towards Open Science could generate new and alternatives ways for researchers to conduct their work offering several opportunities and benefits
- This transition has also an impact on the interaction of the research community and the society increasing the quality of consultation processes, fostering transparency and progressing quality assessment of scientific results
- Industry stakeholders should also promote a new culture of sharing and developing new infrastructures for dissemination
- Adequate legal frameworks adopting EU regulations and/or modifying existing national legislations are needed to ensure proper use of open data, open software, etc.

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