Data Week Session Report

Name of the session	AI and Data Spaces for sustainable smart city – water and other key resources challenges
Organizer	Gerasimos Antzoulatos, Ilias Gialampoukidis, Stefanos Vrochidis, Roberto Di Bernardo

Description of the session & speaker(s)

The increasing usage of digital technologies in all aspects of human lives has caused a rapid increment in data generation. The smart use of data by leveraging their potential requires more effective and efficient data management processes by tailoring advanced AI technologies for preprocessing, predictive and prescriptive data analytics. This can have transformative cross-sectoral effects by creating new market opportunities and boosting the sustainable growth of public organisations as well as private small and medium-sized enterprises. Especially, in the heavily fragmented water sector the undergoing digital transformation, by adopting big data analytics, and obeying simultaneously the FAIR principles and the EU water-related directives, can offer the potential for improved holistic sustainable water management for social good and industrial green transition. The objective of this session was to bring together scientists, researchers, policy makers, and other stakeholders to share knowledge and results, discuss topics of common interest towards the creation of a water data space, to foster collaboration between related EU projects in the disciplines of extreme data analytics, data management, and explainable machine learning on water-related data and metadata that come from different countries, in different languages and formats. Measures towards the creation of a harmonised and federated ecosystem based on the data space, focusing on the water sector and related data-driven ecosystems.

The following presentations took place:

- Introductory presentation by Ilias Gialampoukidis who open the session and welcome the speakers and the audience.
- *Key challenges in digital transformation in the water sector* presented by Andrea Rubini (Water Europe)
- *Waterverse: Setting the basis, measures and a framework towards the creation of a water data space* presented by Gerasimos Antzoulatos (Centre for Research & Technology Hellas (CERTH) - Information Technologies Institute (ITI)) and Roberto Di Bernardo (Engineering Ingegneria Informatica (ENG))
- *GREAT: Can Data Spaces help align local, national, and continental efforts in the European Green Deal?* presented by Mark Dietrich (EGI foundation)
- *TEMA: Trusted Extremely Precise Mapping and Prediction for Emergency Management* presented by Antonio Filograna (Engineering Ingegneria Informatica (ENG))
- *PathoCERT: A water data information ecosystem for first responders to manage pathogen contamination emergencies* presented by Demetrios Eliades (KIOS Research and Innovation Center of Excellence, University of Cyprus) and Eloisa Vargiu (Cetaqua – Water Technology Center)
- Discussion and Q&As - Closing Remarks moderated by Ilias Gialampoukidis

Main topics of discussion

The keynote speaker Andrea Rubini highlighted the key challenges that the water sector should address to accomplish the digitalisation process and achieve a water-smart society. He pointed out the need for data privacy and security of the sensitive data generated in the water industry-related operations by the usage of digital equipment (IoT, SCADA systems, hydraulic models etc.). The diverse technologies along with the lack of an industry-wide protocol and standard emerge challenges in the scalability and interoperability of the adoption of digital solutions across multiple industrial sites. Furthermore, the aging water infrastructure in many cities, on one hand, along with the need for upgrading the data management and analytics processes on the other hand, due to the large volume of data that are generated, are two other challenges. Additionally, stakeholder engagement and cooperation are critical issues for successful digitalisation. In rural areas, the challenges are related to the lack of reliable internet connections that cause difficulties in seamless access to advanced digital technologies. Also, there are challenges generated by agriculture and farming such as the data ownership and control of data as well as the complexity in the customisation and adaptability of digital solutions in agriculture due to a variety of farming practices and conditions. Finally, he gave recommendations that should be realised to deal with the above challenges.

In the WATERVERSE's project presentation the speakers described the basis, measures and a framework towards the creation of a water data space focusing on the main objectives and aspects that WATERVERSE project has set to deal with. In the 3rd presentation, Mark Dietrich raised a critical question about aligning local, national and global efforts in the preparation for the green deal data space. This multi-scale alignment is a key factor in achieving the sharing of quality and consistent data. It was also shown how, in GREAT, water is considered as an aggregation element across different sectors. Furthermore, the need for the development of a framework that facilitates the transferability of situational data from different disaster types in various geographic regions to relevant end-users aiding them to make the best possible operative decisions was discussed in the 4th presentation in the context of the TEMA project. Finally, during the last presentation was highlighted the evolution of data sharing between authorities over the last decades in relation to technological advances. The PathoCERT project deals with the issues of the collection, storage, retrieval, and sharing, among various stakeholders, of heterogeneous data related to water contamination.

Main outcomes

- Need to develop and deploy a Water Data Space to face the challenges related to data sharing and the interoperability among applications, IoT devices, and systems in the water sector.
- The Water Data Space will assist to the efforts for water digitalisation as well as to establish a water-smart society.
- Need to establish an interaction and connection among different data spaces and strengthen the cross-thematical collaborations. This multi-scale aligning among local, national and global data spaces allows the interoperability and data sharing between different thematic data spaces such as water, energy, transport etc.
- Need to create a Data Space for Emergency Situations which combines the related data spaces such as Water, Energy, Mobility DS in order to tackle efficiently data interoperability and data sharing challenges.
- Positive reactions in LinkedIn:

Contribution of the session to the Strategic Agenda/Roadmap for Data and AI

- Boost collaboration across communities - In terms of overall vision, the session wants to solicit a better integration of different actions/activites that too often are too fragmented even though addressing the same or similar issues. The attempt is to overcome (knowledge) communities' silos in order to have research&innovation results that can reply to real-world questions. The session put tother several research entities, companies and initiatives that are working on data related topics but in a close collabortation with domain related stakeholders (in particular in the water sector, i.e. Water Europe) trying to achieve meaningful impact on society looking at climate changes and emergency management.
- Achieve global impact and maximize societal & Environmental benefits - AI, Data and Robotics technologies are recognised to be valid support to boost the global GDP, moreover they can give a valuable contribution to climate change mitigation and natural resources management. The session, starting from previous activities performed by the involved partners involved (in other editions of the DataWeek, but also in Water Europe events), puts the basis for a continue dialogue towards the definition of a Data Space and related technologies specifically for Water as a key natural resource to be safeguarded, now more than in the past.

Expected length of document: 2-4 pages, please be precise and content-driven. Your input will be published as part of the Data week report and used as input for upcoming activities.

Thank you very much!