

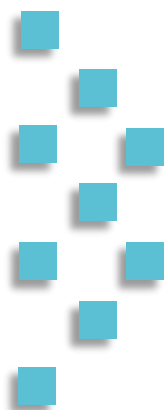


## **D6.5 Social Innovation Factsheet#1**

### **Digital Water: Smart metering and citizen engagement**

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December 2020



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## Project Consortium



# Executive Summary

Social innovation is a raising concept that considers as equally important the technological and non-technological dimensions of innovation. This change is determinant to properly tackle the complexity of societal challenges. As explained by the European Commission, social innovation is embedded in “the development and implementation of new ideas to meet social needs and create new social relationships or collaborations” . It describes the social innovation process as composed of four main phases (i) identification of inadequate/unmet/new societal needs; (ii) development of new solutions in response to these societal needs; (iii) evaluation of the effectiveness of new solutions in meeting societal needs; and (iv) scaling up of effective social innovations<sup>1</sup>.

In the context of Fiware4Water, social innovation means tackling digital water challenges by combining the technological and non-technological dimensions of innovation. The aim is to elaborate Fiware4Water story of innovation by widening the technological solutions to the governance framework, the business process and as important ensure the capacity building of the potential users.

The overall goal of the Fiware4Water Social Innovation Factsheets is to highlight innovation opportunities for scientists, solution designers, implementers, decision-makers, water authorities, in order to foster short-term improvements in the digital water solutions to address data collection, monitoring issues and decision process.

This document presents D6.5 ‘Social Innovation Factsheet’. This deliverable introduces the reason why Fiware4Water focuses on social innovation and why it is of high importance to embrace the different dimensions of innovation to tackle the social issue of water availability through digital water. Then it presents the structure of Fiware4Water Social Innovation Factsheet. Finally, it gives the content of the first Social Innovation Factsheet dedicated to South West Water demo case focussing on smart metering and citizen engagement.

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<sup>1</sup> [https://ec.europa.eu/growth/industry/policy/innovation/social\\_en](https://ec.europa.eu/growth/industry/policy/innovation/social_en)

## Document Information

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Author(s)	Natacha Amorsi (OiEau)
Contributor(s)	Ben Ward (SWW)
Quality check	
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Actual Delivery Date	M19 (December), the delay is explained by the COVID-19 impacts on OiEau staff availability (part time job was implemented) and the necessity to gather mature inputs from Fiware4Water progress
Dissemination Level	Public (Information available in the Grant Agreement)

## Revision history

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## List of Acronyms/Glossary

<b>F4W</b>	Fiware4Water project
<b>SIF</b>	Social Innovation Factsheet
<b>SWW</b>	South West Water

## I. Introduction and background

### I.1. Fiware4Water in a nutshell

FIWARE is a smart solution platform, funded by the EC (2011-16) as a major flagship PPP, to support SMEs and developers in creating the next generation of internet services, as the main ecosystem for Smart City initiatives for cross-domain data exchange/cooperation and for the NGI initiative. So far little progress has been made on developing specific water-related applications using FIWARE, due to fragmentation of the water sector, restrained by licensed platforms and lagging behind other sectors (e.g. telecommunications) regarding interoperability, standardisation, cross-domain cooperation and data exchange.

Fiware4Water intends to link the water sector to FIWARE by demonstrating its capabilities and the potential of its interoperable and standardised interfaces for both water sector end-users (cities, water utilities, water authorities, citizens and consumers), and solution providers (private utilities, SMEs, developers).

### I.2. Why social innovation?

Social innovation is a raising concept that considers as equally important the technological and non-technological dimensions of innovation. This change is determinant to properly tackle the complexity of societal challenges. As explained by the European Commission, social innovation is embedded in *“the development and implementation of new ideas to meet social needs and create new social relationships or collaborations”*<sup>2</sup>. It describes the social innovation process as composed of four main phases (i) identification of inadequate/unmet/new societal needs; (ii) development of new solutions in response to these societal needs; (iii) evaluation of the effectiveness of new solutions in meeting societal needs; and (iv) scaling up of effective social innovations. To really impact society and bring changes of practices for a better understanding of the relation between economic activities and their impacts on the natural resources, each innovation should embrace different dimensions:

- the technological that focuses on new or hybrid solutions
- the capacity development to ensure the solutions will be of value for the potential end-users and in the end be used
- the governance to ensure the decision process, legal and voluntary frame is ready to welcome and support the use and deployment of the solutions
- The economic/business to ensure the model is viable, accessible for actors to deploy the solutions and consider market up-take.

As reported by the cluster ICT4Water for the European Commission, with regards to the Digital Water Action Plan: “Despite a promising technological scenario, currently, the water domain is characterized by a low level of maturity concerning the integration and standardization of ICT solutions, their business processes and the related implementation in the legislative framework. This is due to the fragmentation of the sector, no holistic vision being set out and a lack of integration and standardization of the technology”.

In the context of Fiware4Water, social innovation is one of the solution to end this scenario. It means tackling digital water challenges by combining the technological and non-technological dimensions of innovation. It will help to elaborate Fiware4Water story of innovation by widening the technological

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<sup>2</sup> [https://ec.europa.eu/growth/industry/policy/innovation/social\\_en](https://ec.europa.eu/growth/industry/policy/innovation/social_en)

solutions to the governance framework, the business process and as important ensure the capacity building of the potential users.

The overall goal of the Fiware4Water Social Innovation Factsheets (SIF) is to highlight innovation opportunities for scientists, solution designers, implementers, decision-makers, water authorities, in order to foster short-term improvements in the digital water solutions to address data collection, monitoring issues and decision process.

Over the duration of the project (2019-2022), three Social Innovation Factsheets are planned. Each of them will detail one outcome of Fiware4Water through the lens of the four dimensions of social innovation.

- This first SIF is dedicated to the case study developed by South West Water (SWW). It deals with the development of an application for citizens. The ambition of SWW is to start rolling out smart water metering too many of their customers and SWW is looking to Fiware to provide a cost effective, scalable solution to collect, store and analyse smart meter data. A number of micro-services such as a customer smart phone application and automated leakage detection will be built on Fiware architecture. The first angle of this SIF is technological and the other dimensions will be completed.
- The second SIF is planned to focus on the ConSensus approach and deployment of the two Demo Network on the Danube region on and River Basin Organisation. In that case, the first angle of the SIF will be the governance dimension.
- Finally the last SIF will be dedicated to Fiware4water platform and will combine through the four dimensions all the outcomes of the project in terms of new technology, capacity development, governance aspect put into place as well the business model dimensions.

The challenge to develop SIFs during the project is to gather enough mature inputs to have the right amount of materials to be promoted, even if they are not finalised. That is the reason why we are proposing this planning for the SIFs, as the last one will definitely embrace all the deliveries of the project.

### I.3. Structure of the document and Social Innovation Factsheet

This document presents to D6.5.1 'Social Innovation Factsheet'. This deliverable introduces the reason why Fware4Water focuses on social innovation and why it is of high importance to embrace the different dimensions of innovation to tackle the social issue of digital water (section I.2). Then it presents in the section II the structure of Fiware4Water social innovation factsheet. Finally it gives the content of the first SIF dedicated to SWW demo case.

This deliverable will be completed by a specific communication and dissemination document presented in section II. This spin-of document aims at promoting the project's outcomes on Fiware4Water and partners social media, websites and will also complete the communication kit next to Fiware4Water leaflet and poster.



## II. Structure of the Social Innovation Factsheet

The SIF is composed of 4 pages corresponding to an A3 sheet folded in 2 (4 pages A4). Each page corresponds to a block of information.

On the front page (page 1, see image below), general information on social innovation can be found on the right part. Specific information on the issue tackled by the SIF is available on the left part of page 1 with the description section (approx. 1800 characters) and the digital water societal challenge explanation.

The further reading and an overall presentation of the project are presented on page 4

The four dimensions are detailed in the document with the technological solution (approx. 2300 characters), governance structure on page 2 (approx. 2000 characters) and capacity development (approx. 1800 characters), business road on page 3 sections.

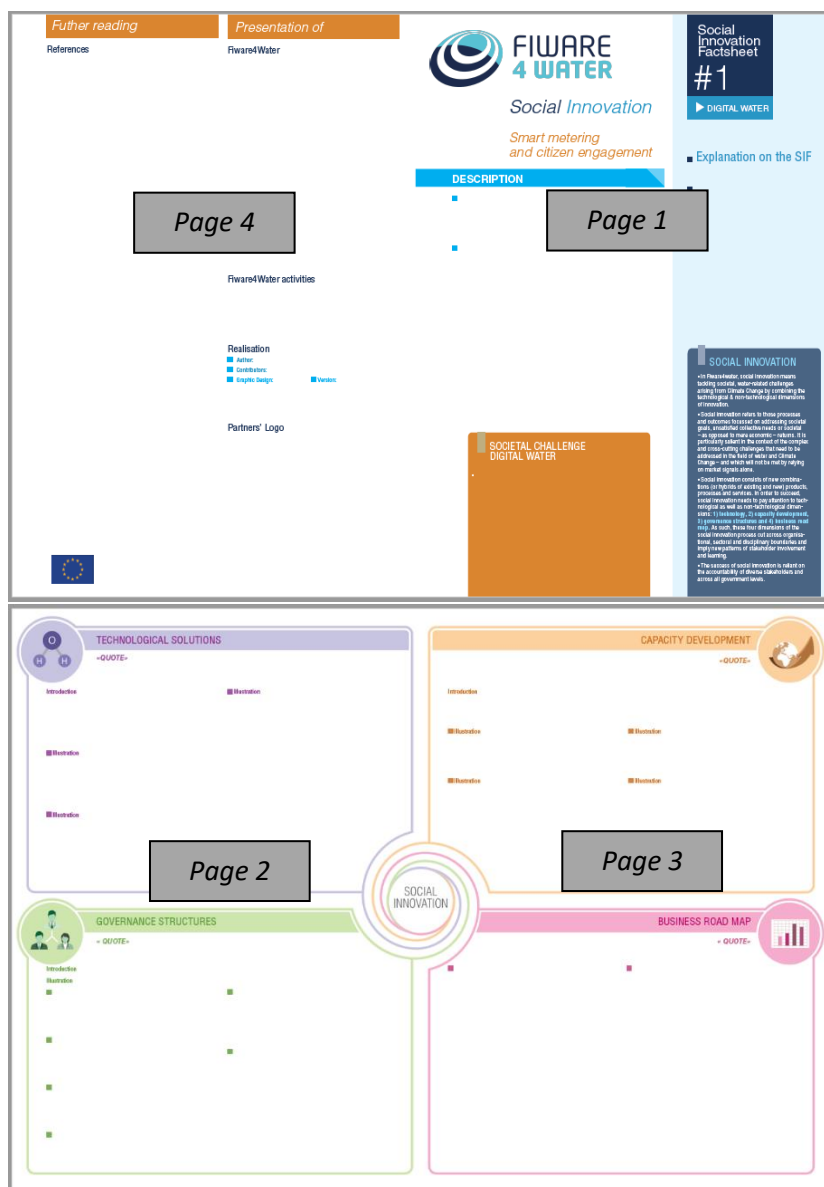


Figure 1: Social Innovation Factsheet template

### III. Content of Social Innovation Factsheet #1: Digital Water-Smart metering and citizen engagement

The main title of the F4W SIF#1 is Digital Water, the sub-theme is Smart metering and citizen engagement.

#### III.1. Page 1: Description

The water sector is facing societal challenges in the context of climate change adaptation. Water availability (in quantity and quality), agriculture, energy, extreme events, population growth, urbanisation and more lately sanitary crisis are some of the crosscutting issues increasing the needs for accurate, on time and meaningful data embracing a much wider questioning: what type of data, how to make them compatible, how to gather them, where to store them and last but not the least how to make them useful and comprehensible for water stakeholders.

Digital innovation for smart water is seen as one key component to answer these questions from the source to the multiple uses of water and support water managers and stakeholders. Digital innovation is creating unprecedented opportunities to leverage data and analytics to inform better system-level choices today and improve future outcomes for watershed management, operations, maintenance, capital planning and customer service [a].

Fiware4Water specifically tackles these issues through the development of IT solutions along the water cycle. In this Social Innovation Factsheet (SIF) the focus is put on the solutions developed by South West Water (SWW), aiming at engaging with behavioural science experts to implement innovative approaches that empower customers towards water efficiency. Doing so, SWW intends to become the first Water Company in the UK using FIWARE to exploit the capabilities of smart meters for feedback to the customers and increasing water saving awareness [b].

BOX1: South West Water (SWW) provide drinking water and wastewater services for approximately 1.7 million customers in the South West of England, and drinking water services to approximately 0.5 million customers in Bournemouth, South England [b].

#### III.2. Page 1: Social innovation

Fiware4Water intends to link the water sector (especially the urban one) to FIWARE by demonstrating its capabilities and the potential of its interoperable and standardised interfaces for both water sector end-users (cities, water utilities, water authorities, citizens and consumers), and solution providers (private utilities, SMEs, developers).

Over the duration of Fiware4Water (2019-2022), three SIFs will be delivered. Each of them will present Fiware4Water outcomes through the lens of social innovation. The South West Water technology development to engage with citizens is the focus of the first Fiware4Water SIF.

As detailed below, social innovation combines four dimensions: technological, governance, capacity development and business road map. Each is described in a specific section of this thematic Social Innovation Factsheet.

In Fiware4Water, social innovation means tackling societal, water-related challenges arising from Climate Change by combining the technological & non-technological dimensions of innovation.

In the context of Fiware4Water, social innovation is perceived as one step to open the water sector towards a higher level of maturity concerning the integration and standardization of ICT solutions, their business processes and the related implementation in the legislative and governance framework, while raising awareness on digital water.

As detailed below, social innovation combines four dimensions: technological, governance, capacity development and business road map. Each is described in a specific section of this thematic Social Innovation Factsheet [c].

- Social innovation refers to those outcomes (products and services) focussed on addressing digital water issues, such as interoperability, standardisation for a better water management taking into account the specific value of water, which makes it impossible to only rely on the economic returns.
- Social innovation consists of new combinations (or hybrids of existing and new) products, and services. In order to succeed, social innovation needs to pay attention to technological as well as non-technological dimensions: 1) technology, 2) capacity development, 3) governance structures and 4) business road map. As such, these four dimensions of the social innovation process cut across organisational, sectoral and disciplinary boundaries and imply new patterns of stakeholders' involvement and learning.
- The success of social innovation is reliant on the accountability of diverse stakeholders and across all government levels.

### III.3. Page 2: Technological solutions

Quote “The digital transformation of water is currently enabling real time water quantity and quality monitoring, vastly improved management of infrastructure assets, direct consumer engagement and facilitating the adoption of off-grid and localized infrastructure technologies” [a]

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SWW goal, within the context of Fiware4Water European project, is to create a FIWARE enabled pipeline to retrieve consumption data from smart meters and provide this data to customers via a smart phone application to drive positive changes in water use behaviour, reduce consumption and reduce the customers' water bill. The technological innovation is based on a series of development [b], [c], [d]:

- Smart water meters and masts were installed in Great Torrington, Devon in the South West of the UK to transmit daily water consumption data via Sigfox to Fiware and a SWW owned data store. By December 2019, SWW were receiving daily data for around 100 customers who had signed up to the trial.
- A link between Sigfox and the FIWARE context broker is delivering consumption data to the FIWARE ecosystem where it can be stitched together with other datasets through the use of common data models in a common data structure known as JSON-LD. Rainfall data and energy consumption could for example be integrated within this data to help predict water consumption and help SWW manage supply in real time. Downstream of the context broker, the data will be saved in a database for billing and trend analysis.
- A utilities web application will provide a user-friendly interface to help SWW staff to detect customer leaks, promote water efficiency practices and encourage customers to switch to a metered bill and save money. Under the hood, powerful machine learning will trigger alarms and make water consumption predictions.
- In addition, linking FIWARE to EPANET, the open source water distribution modelling software, to allow real time simulations could provide helpful insights for the management of network

incidents such as bursts. To test this theory, the standard EPANET model data structure (.inp) is being converted to the FIWARE standard JSON-LD format developed by Exeter (partners of Fiware4Water). Data from meters or pressure sensors will be retrieved from the FIWARE context broker and used to update the model, allowing EPANET to simulate the water distribution in the network using real-time data feeds from IoT technology.

### III.4. Page 2: Governance Structure

Quote: “Water governance is the set of rules, practices, and processes through which decisions for the management of water resources and services are taken and implemented, and decision-makers are held accountable” [a].

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Facing the need to promote and develop digital tools to support the management of water but also to better connect water to other policies, different governance initiatives are raising in Europe and throughout the world. The citizens and their representatives through associations have become key actors. In the end, all changes of practices will be valid if accepted and integrated in the everyday routine. On the other hand, it means that the policy and decision makers are accountable for the propositions made and decisions taken. This is very true for the digital water field addressing water citizens’ consumption. To provide better water services and tailor the demand to the supply in the most efficient way, accurate data on consumption have become crucial. But accessing real time consumption data requires that the technologies are available and the consumers agree to use these technologies which lead to governance issues.

- At the European level, ICT4Water cluster is a hub for EU-funded research and innovation projects developing digital innovations for the water sector. It brings projects together supporting them to (i) exchange information and best practices (ii) disseminate and exploit project outputs (iii) contribute to defining digital water strategies and (iv) contribute to policy development in digital and water domain [b].
- At the trans-national level: the DigitalWater2020 synergy group is composed of five European projects funded by the European Union’s Horizon 2020 Research and Innovation programme. Aqua3S, DigitalWater.City, Fiware4Water, Naiades and Scorewater act together to (i) support decision making and bring innovative water digital solutions to the market and (ii) achieve wide uptake among utilities, municipalities, SMEs and start up, software industry and general public [c].
- At the local level: SWW demo case benefits from the World Water Quality Alliance initiative. To raise awareness and engage with citizens for the development of the digital water solutions, a Local Water Forum is being created. It is composed of volunteers who want to participate in actions which will contribute to solving water-related problems. Volunteers will meet together with members of the local council or local water company and representatives of Fiware4Water. They will be given an introduction to the water situation in the World and then asked about local water issues. Then they will create an idea for a local water plan [d].

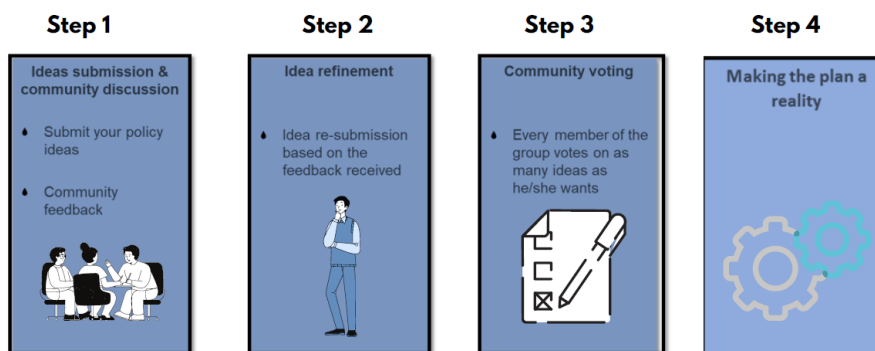


Figure 2: Steps of a Local Water Forum [d]

### III.5. Page 3: Capacity development

Quote “Enhancing institutional and individual capacity is key to promoting effective water management” [a]

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Capacity development is defined by the United Nations Development Programme (UNDP) as an integral process for the mediation, strengthening, preservation and further development of individual, organizational and societal capabilities, in order to realize functions, solve problems and set and achieve sustainable goals [b]. Delivering solutions and ensuring they are meaningful and reach potential end-users require the whole cycle of raising awareness on the tackled issues, co-development and additional training to the solutions. These different dimensions are fully integrated in Fiware4Water solutions development. Some examples are:

- At the scale of the comprehension of the end-users and technological requirements to develop digital solutions using the Fiware platform, the first steps have consisted in gathering the technological needs while understanding the societal perspectives on digital issues. The former was approached with a series of deliverables available on the project website dealing with *Requirements from use cases* [c], *Requirements from end-users* [d], *Requirements for innovation* [e], all leading to the *Gap analysis and final requirements* [f]. The latter was addressed in a specific study of the current public perception of digital water and other related innovations [g].
- At the scale of the co-development of solutions, the community engagement initiative is being set for SWW demo case. It is important to co-design technology with users, in this case, the community of Great Torrington. The aim is to work with the public and the council to design a platform that helps communities reduce their water usage. Findings from the study will feedback to the EU and UN World Water Quality Alliance (UNWWQA) [h]. This approach is also used to support the Demo Network focusing on the Danube region.
- At scale of the raising awareness and training dimensions, the first initiative has been put into place with an on-going series of webinars that have targeted the academic and developers' communities, the River Basins Organisations, the Fiware community. This will be carried on until the end of the project and additional training tools will be developed such as a MOOC.

### III.6. Page 3: Business roadmap

Quote “Social innovation relies on means other than market mechanisms in order to link the demand and supply sides”.

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At that stage of the project, only a first insight can be provided on the key elements of the business approach. This will be further explored with the development of Fiware4water business model. Nevertheless, the following scheme highlights the key business opportunities that exist at the different stages, indicating key activities and their socio-environmental values for co-creators, as the digital water solutions have the transformative power to build new access markets, to increase economic productive capacity for a better resource management.

Stakeholders from both sides (solution providers and potential users) need to interact during the different stages of the innovation process to create a common ground for the co-production of the required knowledge: from the comprehension of the need to the design, implementation and use of innovative digital water solutions [a].



Figure 3: Business road map illustration

## III.7. Page 4: Further reading

### References for the Description

- [a] Sami W., White C., Webb R., Cross K, Glotzbach R. (2019) *Digital Water: Industry leaders chart the transformation journey*, IWA, Xylem, June, <https://iwa-network.org/publications/digital-water/>
- [b] Fiware4Water website: <https://www.fiware4water.eu/demo-cases/united-kingdom-smart-metering-and-citizen-engagement-case>
- [c], Amorsi N, Sonia Siauue S, Wehn U. (2017), *AfriAlliance social innovation factsheet on monitoring drinking water quality for improved health in Africa*, AfriAlliance, 4p., <https://afrialliance.org/knowledge-hub/afrialliance-social-innovation-factsheets/social-innovation-factsheet-11-monitoring>.

### References for the technological dimension

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- [b] Pocock J. (2020), *Demo case update from South West Water*, South West Water, Fiware4Water, February, [https://www.fiware4water.eu/sites/default/files/200219\\_Fiware4Water\\_\\_Demo\\_case\\_update\\_SSW.pdf](https://www.fiware4water.eu/sites/default/files/200219_Fiware4Water__Demo_case_update_SSW.pdf)
- [c] Ward B. (2020) *Demo case update from South West water*, South West Water, Fiware4Water, March, [https://www.fiware4water.eu/sites/default/files/F4W\\_Democase\\_-\\_Word\\_from\\_SWW\\_-\\_final.pdf](https://www.fiware4water.eu/sites/default/files/F4W_Democase_-_Word_from_SWW_-_final.pdf)
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- [c] DigitalWater2020 (2020), poster, <https://www.fiware4water.eu/news/digitalwater2020-poster>
- [d] Elelman R. (2020), *A call for volunteers, the world water quality alliance and Fiware4Water: How to become part of your local water forum*, WWQA, European Commission, Fiware4Water, [https://www.fiware4water.eu/sites/default/files/F4W\\_VOLUNTEER\\_GUIDE.pdf](https://www.fiware4water.eu/sites/default/files/F4W_VOLUNTEER_GUIDE.pdf)

### References for the capacity development

- [a] SIWI, <https://www.siwi.org/what-we-do/capacity-building/>
- [b] UNDP (2009), *Supporting capacity development—The UNDP approach*, New York, p.4.



[c] Makropoulos C, Kossieris P. (2020), *Deliverable 1.1 Requirements from Demo Cases*, NTUA, Fiware4Water, January, 118p., [https://www.fiware4water.eu/sites/default/files/delivrables/F4W-D1.1-RequirementFromDemoCases\\_final\\_0.pdf](https://www.fiware4water.eu/sites/default/files/delivrables/F4W-D1.1-RequirementFromDemoCases_final_0.pdf)

[d] Elelman R. (2020), *Deliverable 1.2 Requirements from end-users*, EURECAT, Fiware4water, January, 30p, [https://www.fiware4water.eu/sites/default/files/delivrables/F4W-D1.2-RequirementsFromEndUsers\\_final.pdf](https://www.fiware4water.eu/sites/default/files/delivrables/F4W-D1.2-RequirementsFromEndUsers_final.pdf)

[e] López F. (2020), *Deliverable 1.3 Requirements for innovation*, Fiware Foundation, Fiware4Water, February, 54p, [https://www.fiware4water.eu/sites/default/files/delivrables/F4W-D1.3-RequirementsForInnovation\\_final.pdf](https://www.fiware4water.eu/sites/default/files/delivrables/F4W-D1.3-RequirementsForInnovation_final.pdf)

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[g] Elelman R. (2020), *A Study of the current public perception of digital water and other related innovations*, EURECAT, Fiware4Water, November, 38p., <https://www.fiware4water.eu/sites/default/files/delivrables/F4W-D5.1-PublicPerceptionDigitalWater-final.pdf>

[h] Elelman R. (2020), *A call for volunteers, the world water quality alliance and Fiware4Water: How to become part of your local water forum*, WWQA, European Commission, Fiware4Water, [https://www.fiware4water.eu/sites/default/files/F4W\\_VOLUNTEER\\_GUIDE.pdf](https://www.fiware4water.eu/sites/default/files/F4W_VOLUNTEER_GUIDE.pdf)

## References for the business Roadmap

[a] Amorsi N., Sonia Siauve S., Wehn U. (2017), *AfriAlliance social innovation factsheet on monitoring drinking water quality for improved health in Africa*, AfriAlliance, 4p., <https://afrialliance.org/knowledge-hub/afrialliance-social-innovation-factsheets/social-innovation-factsheet-11-monitoring>.

## III.8. Page 4: Fiware4Water presentation

Fiware4Water is a three years project funded by the European Horizon 2020 research and innovation program. Fiware4Water links the water sector especially the urban one to FIWARE by demonstrating its capabilities and the potential of its interoperable and standardised interfaces for both water sector end-users (cities, water utilities, water authorities, citizens and consumers), and solution providers (private utilities, SMEs, developers).

Website: <https://www.fiware4water.eu/>



Figure 4: Fiware4Water concept



### a) Fiware4Water activities

The solutions developed by Fiware4Water tackled the whole water cycle while being embedded in a social approach with the 4 demo cases addressing (i) the raw water supply optimisation (Greek case), (ii) the water supply system management (French case), (iii) the intelligent control of waste water (Dutch case) and (iv) the smart metering and citizen engagement (English case). The promotion and solutions uptake are experimented through Fiware4Water Demo Networks at the Danube region level (DemoNetwork#1), with the River Basins organisations (DemoNetwork#2) and with FIWARE Ecosystem (DemoNetwork#3).

### b) Realisation

Author: Natacha Amorsi (Office International de l'Eau)

Contributors: Ben Ward (South West Water)

Graphic design: OiEau.

### c) Acronyms

MOOC: Massive Open On-line Course

SIF: Social Innovation Factsheet

SWW: South West Water

## IV. Conclusion

Deliverable 6.5.1 presents the first Social Innovation Factsheet delivered by Fiware4Water. A specific designed document will be produced out of it for communication and promotion of Fiware4Water outcomes.

Considering the on-going progress of the project and the fact that the solutions are still under development, not all the information exists to fully described the four dimensions. Nevertheless, a first detailed glimpse is given on how the four dimensions of social innovation can be articulated, how the technological, governance, capacity development and business/economic dimensions work together in complementary ways to ensure the solutions tackle the complexity of societal challenge such as the water availability thanks to digital solutions.

The next two issues will focus on (i) the social approach used by Fiware4Water to ensure the end-users are part of the development of the IT solutions and the acceptability of those and (ii) the final one will provide the full social innovation picture of the IT platform being delivered by Fiware4Water, which aims at providing a secure environment for IT solutions developers to answer the specific needs of water stakeholders.