WIDEST

Water Innovation through Dissemination Exploitation of Smart Technologies

GA number: 642423

http://www.widest.eu/

Document Information

Project Number	642423	Acronym	WIDEST
Full title	Water Innovation through Dissemination Exploitation of Smart Technologies		
Project URL	**http://www.widest.eu**		
Project officer	Erik Pentimalli		

Deliverable	Number	4.5	Title	ICT for Water Management Portfolio 2nd version
Work Package	Number	4	Title	ICT for Water management technologies portfolio

Date of delivery	Contractual	24	Actual	24
Nature	Prototype ☐ Report ☑ Dissemination ☐ Other ☐			
Dissemination Level	Public ☑ Consortium ☐			

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Abstract (for dissemination)	This report focuses on a complete set of ICT for Water solutions that have been identified and collected for the ICT for Water Management Portfolio developed by WIDEST. On the same hand a deep analysis has been made on the data to forecast which services are on demand and which ones will be key factors on the next future as life-changing innovations. Some trends, gaps and barriers of this market are shown in this report.
Key words	Portfolio, solutions, commercial developments

Version Log

Issue Date	Version	Author	Partner	Change
03/01/2017	1.0	Sergi Palomar	Cetaqua	First version
20/01/2017	1.1	Rafael Gimenez	Cetaqua	Revision
23/01/2017	1.2	Sergi Palomar	Cetaqua	Revision
25/01/2017	1.3	Xavier Domingo	Eurecat	Minor revision
27/01/2017	1.4	Sergi Palomar	Cetaqua	Final version

Executive Summary

This report is part of WIDEST (www.widest.eu), a H2020 funded project – Coordination and Support Action (Ref. Number 642423). Deliverable "D4.5 ICT for Water Management Portfolio 2nd version" where its main goal is obtaining an ICT water portfolio to collect a complete set of ICT for Water solutions and made them available for everyone who plays a role in ICT for water sector in Europe.

On the same hand it contains the analysis on how these data has been collected in the ICT For Water Observatory, in order to identify the state of the art of the technology and the gaps, needs, trends, barriers and best practices in the water management on the areas identified in task T4.1, to look for which services are on demand and which ones will be key factors on the next future as life-changing innovations in water cycle.

The final portfolio structure has been defined **integrating the market vision, the innovation opportunities point of view, and the current water regulation**.

To understand this document the following deliverables have to be read.

Number	Title	Description
D1.1	Report with IWO definition and implementation	This report focuses on the definition and implementation of the ICT for Water Observatory (IWO). The IWO defines a methodology to collect, analyse and publish in a knowledge base resources from relevant sources of information related to ICT for Water technologies. This report includes the objectives, methodologies, functionalities and structure the IWO is going to offer and support, conforming the inputs of the literature reviews and commercial developments and technology trends analysis.
D4.1	Methodology for Portfolio Development	The present document contains the proposed methodology to develop, execute and update the ICT for Water Management Technologies Portfolio including the contact strategy, the portfolio structure and the information interchange protocol. The portfolio will be developed as a knowledge management system using principles and methodologies inspired in collective intelligence in order to achieve the vision of a global ICT for Water Management Portfolio.

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1. Introduction

This deliverable is the main deliverable of WP4, which includes a portfolio with the relevant technologies of ICT for water identified along the project. The objective of this deliverable is to bring out a complete set of the solutions portfolio collected so far, in order to set the state of the art of the technology and to identify needs, trends, barriers and gaps in the water management on the areas identified in the task 4.1 of the WIDEST project and made it available for everyone who plays a role in ICT for water sector in Europe.

The ICT for Water Observatory or IWO (defined in D1.1 deliverable) is the main tool aiming to be populated with the WIDEST portfolio (defined in the D4.1 deliverable), but also an important source of information for this deliverable. In order to expand the scope of the task beyond IWO, we had to look for extra sources of information so we could bring diversity and representativeness to the analysis. We did interviews with stakeholders to find out about their solutions and other solutions they know. In the same way we did some research and we talked with ICT start up investors and business angels gathering all the available information so they could give us some input about new technologies and solutions entering the market. With all the information collected we have built up a solid solutions portfolio.

The objective is also to have a holistic vision of the portfolio, verify if the solutions available are representative and check for tendencies or gaps. Initial results are expected to improve over the time, since stakeholders will add their solutions to the portfolio and better considerations and recommendations will be added to the current ones in the topical roadmaps. However, the current analysis has generated very useful information, since some interesting trends start to appear as well as some gaps. We believe that the representation that we have now is a good departure point for creating hypothesis and start defining lines of research towards the final goal around the enrichment of the ICT topical roadmaps.

2. Portfolio Development

2.1 Stages and portfolio fulfill

The background for the following deliverable is provided by the Methodology for portfolio development, which has been richly described in project deliverable D4.1 (Cetaqua, 2016). From a workflow perspective, such methodology defines two basic stages for portfolio development:

- Stage 1: involvement, which is devoted to present the portfolio to every identified relevant stakeholders and foster its participation in the initiative. At the end of the stage, stakeholders must be well-aware of the initiative and a relationship of trust should must have been established.
- Stage 2: maintenance, which aims to ensure the continuous stakeholder involvement along time by keeping a continuous flow of fresh information on portfolio updates. Stage 2 is defined as an ongoing effort once the portfolio is created and critical mass is achieved.

In terms of fulfilment, Stage 1 has been performed until milestone completion based on the inputs collected from partner networks provided by consortium members. Together with stakeholder reference, a comprehensive list of solutions has also been collected as the basis for the initial portfolio content.

At the same time, Stage 2 has been in progress for the last months of the reported period, as an ongoing effort, and specific messages for engagement maintenance have been delivered to selected stakeholders according to the different levels of awareness on the Portfolio.

2.2 Methodology alignment

Although a certain degree of flexibility in terms of scheduling and message delivery on specific procedures has been applied, the sequence of actions reported in this deliverable can be properly aligned against the methodology described in D4.1. Specifically, key aspects of the methodology have been addressed as follows:

- Centralized contact with stakeholders
    - o In order to avoid duplicated requests of information and the resulting overhead for both the consortium member and the contacted stakeholder, interaction with stakeholders has been initially managed in a centralized fashion by the Deliverable Leader. Contact has been centralised to avoid duplications
- Stakeholder representativeness
    - o The portfolio and its base partner networks provides a sufficient representativeness in terms of Stakeholder categories. As defined in D4.1, members for each of the category in the Key actors section have been collected. However, the portfolio doesn't display a symmetric presence of actors per category. Since focus has been put in the market

relevance of the collected stakeholders, a larger number of water utilities and companies have been found.

- Maintenance
  - o Defined strategy
    - Once the Portfolio was created main focus shifted to maintenance, and therefore it has been the main task carried out during the last months of the project. Efforts are expected to continue based on IWO contributions.
  - o Addressed requirements
    - From the initial list of platform requirements defined in D4.1, the following ones are covered by the described actions.
      - A platform accessible for everybody who plays a relevant role in ICT for water field.
      - Must be self-maintained. The supervision must be as low as possible in long term.
      - Must ensure an easy understanding and rapid localization and extraction of the information.
      - Each entry should be valuable by the users in order to prioritize the best entries.

2.3 Key Actors

From its inception at D4.1, a clear vision on the relationship between the quality of the portfolio and the representativeness of the Stakeholder sample within has been established. Therefore, a large part of the efforts here described have been addressed into the proper characterization of the Water Ecosystem in terms of who and how should be, included.

First, a series of high level stakeholder categories were defined:

- **Water Technology Companies**: All entities that generate solutions for the water management are considered within this category.
- **Water utilities**: All entities in charge of the direct management of the integral water cycle or part of them are included within this category.
- **Municipalities**: Municipalities and City Councils are the organisms in charge of assuring a correct management of the integral water cycle in the cities.
- **Universities and Research Centres**
- **Regulators / Policy makers/User representatives**
- **Industries with large water consumption**: This category includes all the industries not directly related to integral water cycle but with important water treatment needs within their process of production.

For each of the categories in this list, a set of specific needs (as producers of consumers of information in the Portfolio) and priority channel for communication has been collected.

3. Portfolio

Finally, 233 companies with high tech capabilities and disruptive IT products have been collected in the portfolio. The table below shows the companies that are listed in the portfolio:

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
Iren Acqua Gas	GEOsim Office/Enterprise	GIS	Water supply and distribution	
		Network Pressure		
		Water Distribution Network		
Suez	Hydromodel Host	Data Analytics	Water supply and distribution	Link
		Smart Metering	Sustainable Development	
			Water resources management	
			Data Management & Smart Cities Services	
			Drinking Water Production	
Suez	IdroLewell	Asset Management	Water supply and distribution	
		Data Analytics	Sustainable Development	
			Data Management & Smart Cities Services	
			Drinking Water Production	
Suez	iDrosSmartWell	Asset Management	Water supply and distribution	
		Data Analytics	Sustainable Development	
		Smart Metering	Data Management & Smart Cities Services	
			Drinking Water Production	
Suez	Aquadvanced	Water	Water supply and distribution	Link
		Drinking Water	Water-Energy Nexus	
		Water Distribution Network	Customer Relationship	
		Network Pressure	Data Management & Smart Cities Services	
		Flow	Quality of Water	
		Water Quality		
		Management		
		Leak detection		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
		SaaS		
		Solution		
Suez	Metrawa	Drinking Water	Drinking Water Distribution	
		Water Distribution Network		
		Asset Management		
		Investment		
		Renewal Plan		
Suez	Aquapred	Fraud Detection	Customer Relationship	Link
		Data Analytics	Water supply and distribution	
		Customer Management	Data Management & Smart Cities Services	
		Inspections		
Suez	Advanced Metering Management (SICAM+)	Hydraulic Efficiency	Customer Relationship	
		Meters Analysis	Water supply and distribution	
		Meter Management		
		Revenue Optimization		
		Incomes Maximization		
		Renewal Plan		
Suez	iMeter	Customer Management	Customer Relationship	Link
		Data Analytics	Water supply and distribution	
		Smart Cities	Water in Industry	
		Major Water Consumers	Data Management & Smart Cities Services	
		Water Distribution Network		
Suez	iMeter EV	Customers Management	Customer Relationship	
		Data Analytics	Water supply and distribution	
		Smart Cities	Water in Industry	
		Major Water Consumers	Data Management & Smart Cities Services	

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
		Water Distribution Network		
Suez	iMeter PRS	Customer Management	Customer Relationship	
		Data Analytics	Water supply and distribution	
		Smart Cities	Water in Industry	
		Network Pressure	Data Management & Smart Cities Services	
		Water Distribution Network		
Suez	VHF Smart Metering	Customer Management	Customer Relationship	Link
		Data Analytics	Water supply and distribution	
		Smart Cities	Data Management & Smart Cities Services	
		Massive AMR		
		Water Distribution Network		
Suez	Water Count	Customer Management	Customer Relationship	
		Data Analytics	Data Management & Smart Cities Services	
		Smart Cities		
		Massive AMR		
		Water Distribution Management		
Suez	Galia	Sewage Cleaning	Wastewater and storm water collection	Link
		Asset Management		
		App		
		Web		
		GPS		
Suez	Metresa	DSS	Wastewater and storm water collection	Link
		Assets Management		
		Investments		
		GIS		
Suez	INFLUX	Flood Risk Management	Wastewater and storm water collection	Link

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
		Early Warning System		
		Weather Forecasting		
		Sewage System Model		
Suez	WICAST	Early Warning System	Wastewater and storm water collection	Link
		Weather Forecasting		
Suez	HIDROMET	Early Warning System	Wastewater and storm water collection	Link
		Weather Forecasting		
		Flood Risk Management		
Suez	COWAMA & iBeach	Bathing Water	Sea Water	Link
		Quality Forecast	Quality of Water	
		Water Quality		
		App	1.	
HYDS	Hyds	Early Warning System	Wastewater and storm water collection	Link
		Weather Forecasting		
Hydromodel Host	Hydromodel Host	Hydromodel	Wastewater and Storm Water Collection (including Flood Risk Management)	Link
		Ground Water	Water Supply and Distribution, Water, Sanitation and Hygiene (WASH)	
			Drinking Water Production	
Meteosim	Meteosim	Weather Forecasting	Wastewater and storm water collection	Link
		Numeric Modelling		
Enmohydro	Enmohydro	Environmental Monitoring	Water Supply and Distribution, Water, Sanitation and Hygiene (WASH)	Link
		ERP		
		Water Quality		
Troposfera	Troposfera	Hydromodel	Wastewater and Storm Water Collection (including Flood Risk Management)	Link
		GIS		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
		Weather Forecasting		
Meteoclim Services	Meteoclim Services	Weather Forecasting	Wastewater and Storm Water Collection (including Flood Risk Management)	Link
		Hydromodel		
Aquarimat	Flowless	Leak detection	Data Management & Smart City Services	Link
Nisko Telematics	Nisko Telematics	Remote metering	Data Management & Smart City Services	Link
Blue Technologies	Hydroguard	Water Quality	Quality of Water	Link
		Low Power		
		Sensors		
Sensoils	Sensoils	Water Quality	Quality of Water	Link
		Early Warning System		
		Ground Water		
Kando	Kando	Water Quality	Data Management & Smart City Services	Link
		Early Warning System	Quality of Water	
Syrinix	PipeMinder	Leak detection	Data Management & Smart City Services	Link
		Pipe Monitoring	Water Supply and Distribution, Water, Sanitation and Hygiene (WASH)	
		Real Time		
Innovesi	Innovesi	Asset Management	Data Management & Smart City Services	Link
		SaaS	Water Supply and Distribution, Water, Sanitation and Hygiene (WASH)	
		Smart Cities		
ElectroScan	ElectroScan	Leak detection	Data Management & Smart City Services	Link
		Asset Management	Water Supply and Distribution, Water, Sanitation and Hygiene (WASH)	
GeoSensing	GeoSensing	Satelite	Data Management & Smart City Services	
		Image Processing		
		GIS		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
Optimatics	Optimatics	Asset Management	Data Management & Smart City Services	[Link](#)
		Asset Planning		
		SaaS		
AquaSpy	AquaSpy	Water Sensor	Data Management & Smart City Services	[Link](#)
		Smart Irrigation		
SislTech	SislTech	Waste Water	Water Reuse and Recycling, Water Scarcity and Droughts, Wastewater Treatment (including recovery of resources)	[Link](#)
		Co-digestion		
		Energy Optimization		
		Control		
BYNSE	BYNSE	Smart Irrigation	Data Management & Smart City Services	[Link](#)
Pythec	Pythec	Smart Irrigation	Data Management & Smart City Services	[Link](#)
Modpow	Modpow	Smart Irrigation	Data Management & Smart City Services	[Link](#)
SolChip	SolChip	Energy Optimization	Data Management & Smart City Services	[Link](#)
BioElectric	BioElectric	Waste Water		
		Anaerobic digestion	Water Reuse and Recycling, Water Scarcity and Droughts, Wastewater Treatment (including recovery of resources)	[Link](#)
Seab Energy	SEaB Energy	Waste Water		[Link](#)
		Anaerobic digestion	Water Reuse and Recycling, Water Scarcity and Droughts, Wastewater Treatment (including recovery of resources)	
AGC - Asahi Glass Corporation		Energy Optimization		[Link](#)
		Waste Water	Water Reuse and Recycling, Water Scarcity and Droughts, Wastewater Treatment (including recovery of resources)	
Efinetika	Efinetika	Energy Optimization	Data Management & Smart City Services	[Link](#)
		Management		[Link](#)

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
		Smart Metering		
Prodeval	Prodeval	Energy Optimization	Sustainable Development	
			Water-Energy Nexus	
Deepki	Deepki	Data Analytics	Data Management & Smart City Services	Link
		Energy Optimization		
Element Six	Element Six	Waste Water	Water Reuse and Recycling, Water Scarcity and Droughts, Wastewater Treatment (including recovery of resources)	Link
WETNET	WETNET	Leak detection	Data Management & Smart City Services	Link
		Drinking water	Drinking Water Production	
		Asset Management	Drinking Water Distribution	
		Water Distribution Network	Water resources Management	
			Water Supply and distribution	
WCI Environmental Solutions	WCI Environmental Solutions	Water Quality	Quality of Water	Link
CleaRivers	CleaRivers	Water Quality	Sustainable Development	Link
			Quality of Water	
Gradiant	Gradiant	Energy Optimization	Water-Energy Nexus	Link
Airobotics	Airobotics	Asset Management		Link
		Water Distribution Network	Data Management & Smart Cities Services	
			Water supply and distribution	
RZEE - VigiLeak	RZEE - VigiLeak	Leak detection	Water supply and distribution	Link
GreenIQ	GreenIQ	Solution	Data Management & Smart Cities Services	Link
		Smart Irrigation	Water resources Management	
Advetec - Raptor	Advetec - Raptor	Waste Water	Water resources Management	Link
			Sustainable Development	
Fluxsense	Fluxsense	Waste Water	Water supply and distribution	Link

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
Elecwater (Griswold water systems)	Elecwater (Griswold water systems)	Waste Water	Sustainable Development	Link
Advizzo	Advizzo	Data Analytics	Data Management & Smart Cities Services	Link
		Management	Water resources Management	
		Water Distribution Network	Sustainable Development	
Alvim	Alvim	Water Quality	Sustainable Development	Link
			Water supply and distribution	
Flyability	Flyability	Asset Management		
		Water Distribution Network	Data Management & Smart Cities Services	Link
			Water supply and distribution	
Osmos Group	Osmos Group	Water Distribution Network	Water supply and distribution	Link
		Asset Management	Data Management & Smart Cities Services	
Atlantium	Atlantium	Drinking water		Link
		Water Distribution Network	Data Management & Smart Cities Services	
		Water Quality	Drinking Water Distribution	
			Quality of Water	
			Water supply and distribution	
Evoqua - NEXED	Evoqua - NEXED	Drinking water	Drinking Water Production	Link
		Water Quality		
Apana	Apana	Asset Management	Water supply and distribution	Link
		Drinking water	Data Management & Smart Cities Services	
		Leak detection		
		Water Distribution Network		
Deighton - dTIMS	Deighton - dTIMS	Asset Management	Water resources Management	Link

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
			Data Management & Smart Cities Services	
BioEnTech	BioEnTech	Management	Water resources Management	Link
Indegy	Indegy	Asset Management	Data Management & Smart Cities Services	
		Management	Water resources management	Link
		Water Distribution Network		
Aquacraft	Aquacraft	Data Analytics	Data Management & Smart Cities Services	Link
		Water Distribution Network	Water supply and distribution	
Haogenplast	Haogenplast	Water Quality	Drinking Water Distribution	Link
			Water resources Management	
KourisPower	KourisPower	Energy Optimization	Water-Energy Nexus	Link
Hydrantech	Hydrantech	Smart Metering	Data Management & Smart Cities Services	Link
Smarty Planet	Smarty Planet	Smart Metering	Data Management & Smart Cities Services	Link
		Data Analytics	Water Supply and Distribution	
HydroLowHead	HydroLowHead	Energy Optimization	Water -Energy Nexus	Link
Aqua Alarm	Aqua Alarm	Water Distribution Network	Quality of Water	
		Water Quality	Drinking Water Distribution	Link
			Water Supply and Distribution	Link
Valor Water Analytics	Valor Water Analytics	Data Analytics	Customer Relationship	
Yzatec	Yzatec	Smart Metering	Water Supply and Distribution	Link
			Drinking Water Distribution	
Tandler	Tandler	Water Distribution Network	Water Supply and Distribution	Link
Sieker	Sieker	Storm water	Data Management & Smart Cities Services	Link
XPSolutions	XPSolutions	Storm water	Data Management & Smart Cities Services	Link

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
PI2 Technologies	PI2 Technologies	Waste Water	Wastewater treatment	[Link](#)
Opticits	Opticits	Solution	Data Management & Smart Cities Services	[Link](#)
Acoustic Sensing - SewerBatt	Acoustic Sensing - SewerBatt	Water Distribution Network	Water Supply and Distribution	[Link](#)
			Data Management & Smart Cities Services	
Precision Hawk	Precision Hawk	Asset Management		
		Water Distribution Network	Data Management & Smart Cities Services	[Link](#)
			Water supply and distribution	
RedZone Robotics	RedZone Robotics		Data Management & Smart Cities Services	[Link](#)
			Water Supply and Distribution	
Silixa	Silixa	Asset Management	Data Management & Smart Cities Services	[Link](#)
Aquatic Informatics	Aquatic Informatics	Data Analytics	Data Management & Smart Cities Services	[Link](#)
			Water resources management	
SewerVue	SewerVue	Management	Data Management & Smart Cities Services	[Link](#)
			Wastewater treatment	
Echologics	Echologics	Asset Management	Water Supply and Distribution	[Link](#)
		Water Distribution Network	Data Management & Smart Cities Services	
		Network Pressure		
vHive	vHive	Asset Management		[Link](#)
		Water Distribution Network	Data Management & Smart Cities Services	
			Water supply and distribution	
Widhoc	Widhoc	Asset Management	Data Management & Smart Cities Services	[Link](#)
		Water Quality		
		Water Distribution Network		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
Neptune Water	Neptune Water	Leak Detection	Water Supply and Distribution	Link
			Data Management & Smart Cities Services	
Aganova - Nautilus	Aganova - Nautilus	Leak Detection	Water Supply and Distribution	Link
			Data Management & Smart Cities Services	
INFLOWMATIX	INFLOWMATIX	Network Pressure	Water Supply and Distribution	
			Drinking Water Distribution	Link
Pure Technologies	Pure Technologies	Water Distribution Network	Water Supply and Distribution	Link
			Drinking Water Distribution	
KingDiamond	KingDiamond	Waste Water	Wastewater treatment	Link
		Water Quality	Sustainable Development	
BRINERGY	BRINERGY	Energy Optimization	Sustainable Development	Link
CYSNERGY	CYSNERGY	Energy Optimization	Sustainable Development	Link
ENKROTT	ENKROTT	Waste Water	Sustainable Development	
			Water reuse and recycling	Link
TREATEC21	TREATEC21	Waste Water	Wastewater treatment	
			Water reuse and recycling	Link
HYDRO-GUARD	HYDRO-GUARD	Smart Metering	Water Supply and Distribution	Link
			Drinking Water Distribution	
ESTRUAGUA	ESTRUAGUA	Asset Management	Water resources management	Link
			Drinking Water Production	
			Management of the water cycle in industry	
CLEARAS - ex ALGEVOLVE	CLEARAS - ex ALGEVOLVE	Waste Water	Wastewater treatment	Link
			Sustainable Development	
MODPOW	MODPOW	Smart Metering	Sustainable Development	Link
			Water Scarcity and droughts	
Wellntel	Wellntel	Smart Metering	Water resources management	Link

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
BIOGILL	BIOGILL	Waste Water	Wastewater treatment	Link
Tech4Plus	Tech4Plus	Waste Water	Wastewater treatment	Link
DAS-EUROPE	DAS-EUROPE	Waste Water	Wastewater treatment	Link
		Energy Optimization	Sustainable Development	
INCRO	INCRO	Energy Optimization	Sustainable Development	Link
INOTEC	INOTEC	Waste Water	Wastewater treatment	Link
NUTRINSIC	NUTRINSIC	Waste Water	Wastewater treatment	Link
WSN MORE	WSN MORE	Smart Metering	Data Management & Smart Cities Services	
		Asset Management		Link
VitaOne8 - Biosure	VitaOne8 - Biosure	Waste Water	Sustainable Development	Link
			Wastewater treatment	
Phytec	Phytec	Smart Metering	Data Management & Smart Cities Services	Link
		DSS	Sustainable Development	
Ductor	Ductor	Waste Water	Wastewater treatment	Link
			Sustainable Development	
RQMicro	RQMicro	Water Distribution Network	Quality of Water	Link
			Water Supply and Distribution	
			Drinking Water Distribution	
SCFI	SCFI	Waste Water	Wastewater treatment	Link
			Sustainable Development	
Euphore	Euphore	Waste Water	Wastewater treatment	Link
		Sludge		
BYNSE	BYNSE	Smart Metering	Data Management & Smart Cities Services	Link
		Data Analytics	Sustainable Development	
			Water Scarcity and droughts	
SislTech	SislTech	Waste Water	Wastewater treatment	Link
		Energy Optimization	Water-Energy nexus	
PANGEA	PANGEA	Waste Water	Wastewater treatment	
		Energy Optimization		
HM Solution	HM Solution	Waste Water	Wastewater treatment	Link
			Sustainable Development	

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
Optimatics	Optimatics	Asset Management	Data Management & Smart Cities Services	Link
		Data Analytics	Drinking Water Distribution	
		Energy Optimization	Water Supply and Distribution	
		Smart Metering		
		Water Distribution Network		
AquaSpy	AquaSpy	Smart Metering	Data Management & Smart Cities Services	Link
		Data Analytics		
Biotrack	Biotrack	Smart Metering	Quality of Water	Link
		Water Distribution Network	Water Supply and Distribution	
			Drinking Water Distribution	
Voltea	Voltea	Water Quality	Quality of Water	Link
BlueLeg Monitor	BlueLeg Monitor	Smart Metering	Quality of Water	Link
			Data Management & Smart Cities Services	
			Water Supply and Distribution	
EFC Separations	DELFT University	Waste Water	Wastewater treatment	Link
Renergy	Renergy	Energy Optimization	Water-Energy nexus	Link
i-Real	i-Real	Smart Metering	Data Management & Smart Cities Services	Link
		Data Analytics		
StormWater Italia	StormWater Italia	Flow	Data Management & Smart Cities Services	Link
			Wastewater and storm water collection	
LG Sonic	LG Sonic	Smart Metering	Data Management & Smart Cities Services	Link
		Water Distribution Network		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
CTG - Chelsea Technologies Group	CTG - Chelsea Technologies Group	Smart Metering	Data Management & Smart Cities Services	[Link](#)
		Water Quality	Water Supply and Distribution	
ITS Europe	ITS Europe	Smart Metering	Data Management & Smart Cities Services	[Link](#)
		Water Quality		
Applitek	Applitek	Smart Metering	Data Management & Smart Cities Services	[Link](#)
		Water Quality	Water supply and distribution	
			Drinking	
Unisense Environment	Unisense Environment	Smart Metering	Data Management & Smart Cities Services	[Link](#)
		Air Quality	Sustainable Development	
		Waste Water		
OPTIQUA	EventLab	Smart Metering	Data Management & Smart Cities Services	[Link](#)
		Water Distribution Network	Water Supply and Distribution	
HIDROSAT DYNAMICS	HIDROSAT DYNAMICS	Energy Optimization	Water-Energy nexus	[Link](#)
Waterscope - Knot Kft	Waterscope - Knot Kft	Smart Metering	Quality of Water	[Link](#)
		Water Quality		
InfoSense	InfoSense	Smart Metering	Water supply and distribution	[Link](#)
		Water Distribution Network	Data Management & Smart Cities Services	
		Acoustic inspection		
Smart Sensor Technology	Smart Sensor Technology	Smart Metering	Data Management & Smart Cities Services	[Link](#)
OriginClear	OriginClear	Waste Water	Wastewater treatment	[Link](#)
NeoTop Water Systems - TopItUp	NeoTop Water Systems - TopItUp	Solution	Water resources management	[Link](#)
GeoSensing	GeoSensing	Smart Metering	Data Management & Smart Cities Services	[Link](#)

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
		Water Distribution Network	Water Supply and Distribution	
			Drinking Water Distribution	
Liquitech	Liquitech	Water Quality Solution	Quality of Water	Link
Lotus Filter Systems	Lotus Filter Systems	Waste Water	Wastewater treatment	Link
			Sustainable Development	
CQM	CQM	Water Quality	Quality of Water	Link
			Water Supply and Distribution	
			Drinking Water Distribution	
Elbit Security Systems	Elbit Security Systems	Leak Detection	Water Supply and Distribution	
		Water Distribution Network	Drinking Water Distribution	Link
Radiflow	Radiflow	Water Distribution Network	Drinking Water Distribution	Link
ACT - Applied Cavitation Technologies	ACT - Applied Cavitation Technologies	Waste Water	Wastewater treatment	Link
Solex Water	Solex Water	Waste Water	Wastewater treatment	Link
			Sustainable Development	
ADES	ADES	Energy Optimization	Water-Energy nexus	Link
				Link
ICS2	ICS2	Cybersecurity	Water resources management	Link
		Asset Management	Data Management & Smart Cities Services	
Cosmo Company	Cosmo Company	Data Analytics	Data Management & Smart Cities Services	Link
		Asset Management	Water supply and distribution	
Perga Ingenieros	Perga Ingenieros	Energy Optimization	Water-Energy Nexus	Link
Utilis	Utilis	Multispectral images	Water supply and distribution	Link
		Smart Metering		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
		Leak Detection		
		Water Distribution Network		
Gutermann	Gutermann	Leak Detection	Water supply and distribution	Link
		Water Distribution Network	Drinking Water Distribution	
Powercom	Powercom	Smart Metering	Data Management & Smart Cities Services	Link
		Management	Water supply and distribution	
			Drinking Water Distribution	
Aquarius Spectrum	Aquarius Spectrum	Leak Detection	Water supply and distribution	Link
		Water Distribution Network	Drinking Water Distribution	
Applied CleanTech	Applied CleanTech	Waste water	Wastewater treatment	Link
			Sustainable Development	
SEAS - Société de l'Eau Aerienne Suisse	SEAS - Société de l'Eau Aerienne Suisse	Water	Drinking Water Production	Link
		Energy Optimization	Water-Energy Nexus	
			Quality of Water	Link
ElectroScan	ElectroScan	Leak Detection	Water supply and distribution	
		Water Distribution Network	Drinking Water Distribution	
Lumense	Lumense	Water Quality	Quality of Water	Link
		Smart Metering		
Calgary University	OXYMEM	Smart Metering	Quality of Water	Link
		Water Quality		
OptiRTC	OptiRTC	DSS Sewer Net	Wastewater and storm water collection	Link
		Waste Water		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
MANTECH	MANTECH	Smart Metering	Quality of Water	Link
Centriair	Centriair	Waste water	Wastewater treatment	Link
Wirepas	Wirepas	Smart Metering	Data Management & Smart Cities Services	Link
DEA DRONES	DEA DRONES	Asset Management		Link
		Water Distribution Network	Data Management & Smart Cities Services	
K-NORD	K-NORD	Waste water	Wastewater treatment	Link
TOMCO2	TOMCO2	Waste Water	Wastewater treatment	Link
		Water Quality	Quality of Water	
Solaris Synergy	Solaris Synergy	Energy optimization	Water-Energy nexus	Link
Eco-sistems	Eco-sistems	Osmosi		Link
		Energy optimization	Water-Energy nexus	
Innovesi	Innovesi	Smart Metering	Data Management & Smart Cities Services	Link
Wadis	Wadis	Water Quality	Quality of Water	Link
Vbact	Vbact	Water Quality	Quality of Water	Link
			Water reuse and recycling	
SUBTECH	CemConex	Water Distribution Network	Water Supply and Distribution	Link
			Drinking water Distribution	
AUG SIGNALS	Triton	Smart Metering	Water Supply and Distribution	Link
		Water Distribution Network	Drinking Water Distribution	
		Water Quality	Quality of water	
Hoffman&Hoffman	Sandsense	Asset Management	Water Supply and Distribution	Link
		Smart Metering	Drinking water production	
Nanomyp	Nanomyp	Smart Metering	Quality of Water	Link
		Water Quality		
ROTARY WAVE	ROTARY WAVE	Energy Optimization	Water-Energy nexus	Link

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
DinamE	DinamE	Energy Optimization	Data Management & Smart Cities Services	Link
TUBENERGY	TUBENERGY	Energy Optimization	Water-Energy nexus	Link
TECNOTURBINES	TECNOTURBINES	Energy Optimization	Water-Energy nexus	Link
ALTERNATIVE ENERGY INNOVATION SHEAT-R	HEAT-R	Energy Optimization	Sustainable Development	Link
SYRINIX	SYRINIX	Smart Metering	Data Management & Smart Cities Services	Link
		Leak Detection		
KARDINAL	KARDINAL	Smart Metering	Data Management & Smart Cities Services	Link
NVP ENERGY	NVP ENERGY	Waste Water		
		Energy optimization	Wastewater treatment	Link
IMAGEAU	IMAGEAU	Smart Metering	Data Management & Smart Cities Services	Link
			Water resources management	
AGROPIXEL	AGROPIXEL	UAVs and drones images analysis	Data Management & Smart Cities Services	Link
		Computer vision	Sustainable Development	
		GIS		
ADEX SL	ADEX SL	Asset Management	Sustainable Development	Link
RENTACS	RENTACS	Water Quality	Quality of Water	Link
		Drinking Distribution Network	Water Supply and Distribution	
			Drinking Water Distribution	
Stream Control	Stream Control	Drinking Distribution Network	Water Supply and Distribution	Link
		Asset Management	Drinking Water Distribution	

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
BlueGreen Water Technologies	BlueGreen Water Technologies	Water Quality	Quality of Water	[Link](#)
			Water resources management	
STI-Subsurface Technologies Inc	AquaFreed - AquaGuard	Water Quality	Quality of Water	[Link](#)
		Well cleaning method	Water resources management	
PAPA Pump - Water Powered Technologies	PAPA Pump - Water Powered Technologies	Pump system	Water resources management	[Link](#)
		Energy Optimization	Water-Energy nexus	
			Sustainable Development	
BIOGASNALIA	BIOGASNALIA	Waste Water	Wastewater treatment	[Link](#)
			Sustainable Development	
KANDO	KANDO	Smart Metering	Sustainable Development	[Link](#)
		Industrial discharges monitoring		
Strathkelvin Instruments	Strathkelvin Instruments	Wastewater toxicity tracking	Wastewater treatment	[Link](#)
		Wastewater toxicity testing	Sustainable Development	
		Process Optimization		
		Monitoring Sludge health		
ECOTECK	ECOTECK	Well cleaning robots method	Quality of Water	[Link](#)
		Water Quality		

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
Blue I Water Technologies	Blue I Water Technologies	Smart Metering	Quality of Water	Link
		Water Quality	Water Supply and Distribution	
		Water Distribution Network	Drinking Water Distribution	Link
SPEETECT	SPEETECT	Smart Metering	Quality of Water	
		Water Quality	Water Supply and Distribution	Link
		Water Distribution Network	Drinking Water Distribution	
IO Sight	IO Sight	Data Analytics	Data Management & Smart Cities Services	
		Data Management	Water-Energy nexus	
		Energy Optimization		
Sensoil	Sensoil	Water Quality	Sustainable Development	Link
		Leak Detection		
Aqua Rimat	Flowless	Water Quality	Sustainable Development	Link
Phase 3 Technologies	Phase 3 Technologies	Asset Management	Sustainable Development	Link
		DSS		
Nisko Telematics Systems	Nisko Telematics Systems	Smart Metering	Data Management & Smart Cities Services	Link
Lucid Energy	Lucid Energy	Energy Optimization	Water-Energy Nexus	Link
Flow Industries - Airshock	Flow Industries - Airshock	Well cleaning	Water resources management	Link
		Water Quality		
Curapipe	Curapipe	Leak detection	Water supply and distribution	Link
			Drinking Water Distribution	
Fieldbit	Fieldbit	Augmented Reality	Data Management	Link
		Asset Management	Water supply and distribution	

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
METEOSIM	METEOSIM	Meteorological and environmental forecast	Data Management & Smart Cities Services	Link
		Data Analytics		
TROPOSFERA	TROPOSFERA	Meteorological and environmental forecast	Data Management & Smart Cities Services	Link
		Data Analytics		
BIOCOMPOSTAJES	BIOCOMPOSTAJES	Waste Water	Wastewater treatment	Link
METEOCLIM SERVICES	METEOCLIM SERVICES	Meteorological and environmental forecast	Data Management & Smart Cities Services	Link
		Data Analytics	Sustainable Development	
AJ Blomesystem - ENMO hydro	AJ Blomesystem - ENMO hydro	Water Quality	Quality of Water	Link
		Water Distribution Network	Water supply and distribution	
			Drinking Water Distribution	
SUDS - Sistemas Urbanos Drenaje Sostenible	SUDS - Sistemas Urbanos Drenaje Sostenible	Urban sewage systems	Wastewater and storm water collection	Link
FILTERBOXX	FILTERBOXX	Waste Water	Wastewater treatment	Link
			Sustainable Development	
SmarTap	SmarTap	Smart Metering	Sustainable Development	Link
		Data Analytics		
		Leak detection		
TYPHON	TYPHON	UV Disinfection	Quality of Water	Link
		Water Quality		
OPTIMITIVE	OPTIMITIVE	Energy Optimization	Water-Energy Nexus	Link
AMPHOS 21	AMPHOS 21	Smart Metering	Water resources management	Link
		Modelling	Water supply and distribution	

Partner	Commercial Dev.	Key Tag	Thematic Area	Link
SGENIA	SGENIA	Environmental sensors	Water supply and distribution	[Link]
		Asset Management	Sustainable Development	
FOCUS	FOCUS	Leak detection	Water supply and distribution	[Link]
		Fibre optics analysis	Drinking Water Distribution	
Integra Soluciones Ambientales	Integra Soluciones Ambientales	Waste Water	Wastewater treatment	[Link]
CONAQUA	CONAQUA	Modelling	Sustainable Development	[Link]
XPRESA GEOPHYSICS	GEOSCAN	Computer Vision	Water supply and distribution	[Link]
		Georadar	Data management and SmartCity services	
DSET Solutions	DSET Solutions	Energy Monitoring and Optimization	Sustainable Development	[Link]
			Water supply and distribution	
KUNAK	KUNAK	Smart Metering	Water supply and distribution	[Link]
IPRESAS - Ingenierías de Presas	UPV	Water resources	Water resources management	[Link]
		Dams		
GLOBAL ENERGOS	SEINON	Energy Optimization		[Link]
		Monitoring		
HYDROMODEL	HYDROMODEL	Hydrogeological models	Water resources management	[Link]
HYDS	HYDS	Meteorological and environmental forecast	Wastewater and storm water collection	[Link]

Table 1. Portfolio collected solutions

All the entries collected have been classified by Thematic Area, and in a more detail through Key Tag, to allow a better later analysis of the different types of solutions, trends and future needs to be covered within the sector with the proliferation of new technologies.

4. Portfolio Analysis

The most effort has been addressed to gather information on the existing water ICT portfolio and to make a final analysis of the collected solutions. The classification of the solutions depending on the main water management activities which they belong (thematic areas' distribution) has served as the starting point for the analysis done and as part of the work on the IWO platform. Such classification, also may contribute to define a clear roadmap to where the efforts has to be addressed to efficiently cover water management necessities due to its ICT demand and the identification of the areas where no enough ICT development had been done at the moment.

4.1   Thematic Area Analysis

The final portfolio at this moment has 233 solutions including solutions from companies, research centres etc. In this chapter, we will describe the analysis made to the thematic areas and the tags assigned to each solution of the portfolio. Figure 2 shows the solutions thematic areas' distribution. It must be considered that most solutions are classified into two or more thematic areas.

Figure 2 "Word cloud for thematic area analysis"
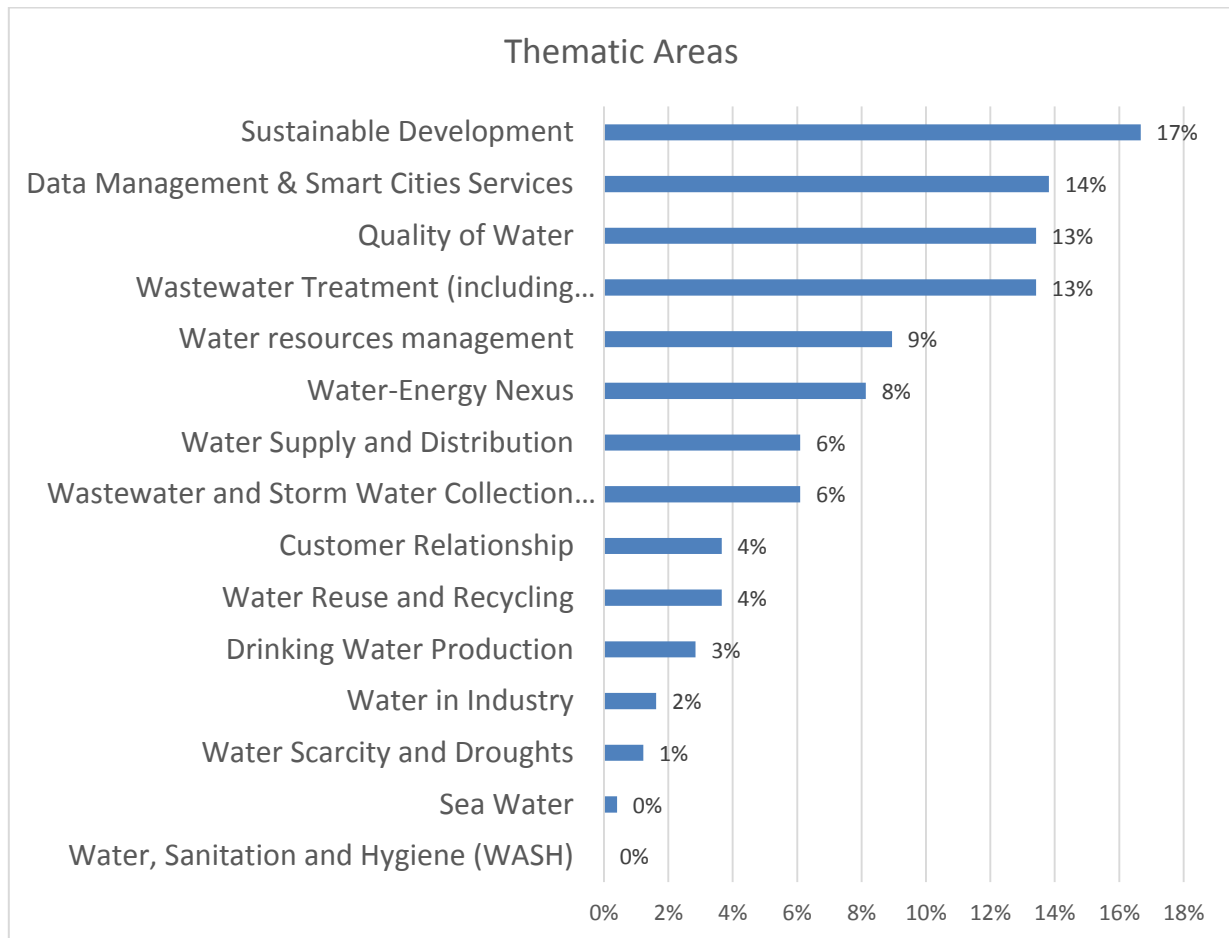
Figure 3 "Portfolio solution's thematic areas distribution"

Four thematic areas contain 63% or more of the solutions analysed. From Figure 3, we can see that "Sustainable Development", "Data Management & Smart Cities" and "Quality of Water" thematic areas are by far the most supported areas with almost 44%, which means that half the solutions are classified into this category. This is maybe because almost every ICT water solution tends to be considered a Smart City solution.

As expected, another field of interest is Wastewater treatment, on the fourth position. From the fourth down, we find solutions related to asset management, simulations and other water network analysis tools. ICT ease the way the water systems are studied, designed and operated, and optimised. The use of advanced modelling to plan construction projects, use smart metering to optimise supply, shape demand and forecast, with an increasing degree of certainty, which parts of our existing networks are more likely to fail and therefore capture the interest of implementing ICT solutions by water operators and managers.

The eighth most classified thematic area is "Waste Water and Storm Water Collection (including Flood Risk Management)". In this category we find mostly early warning system and weather prediction tools, and finally the forth trend identified is "Customer Relationship". In this last trend, we find mostly ICT solutions for remote metering and fraud detection.

On the other hand, we find seven thematic areas that have less than 5% of the solutions classified in them. With only a few number of solutions classified, we find the "Water Sanitation and Hygiene" and "Sea Water", where when calculating its percentage they don´t even reach 1% of representation. It is important to mention that this last one has taken profit of the adaptation of some modelling made for the "Water Supply and Distribution" and has arose more interest on the operators and managers and also on the ongoing European projects over the last years. The adaptation of existing solutions to fit specific scenarios such as modelling of sanitation systems or integrated management tools will be also considered as solutions with its respective tags in the deeper future study.

In this first analysis by thematic area, a broad and numerical analysis to have some knowledge of the ICT market trends have been done basically on the grouped areas. The next steps will be deeply study inside each thematic area and taking into account the adaptation of the existing developments.

4.2 Tag Analysis

Figure 4 show the solutions tags' distribution. As in the thematic analysis, most solutions have two or more tags assigned.

Figure 4 "Word cloud for tags analysis"

Tags
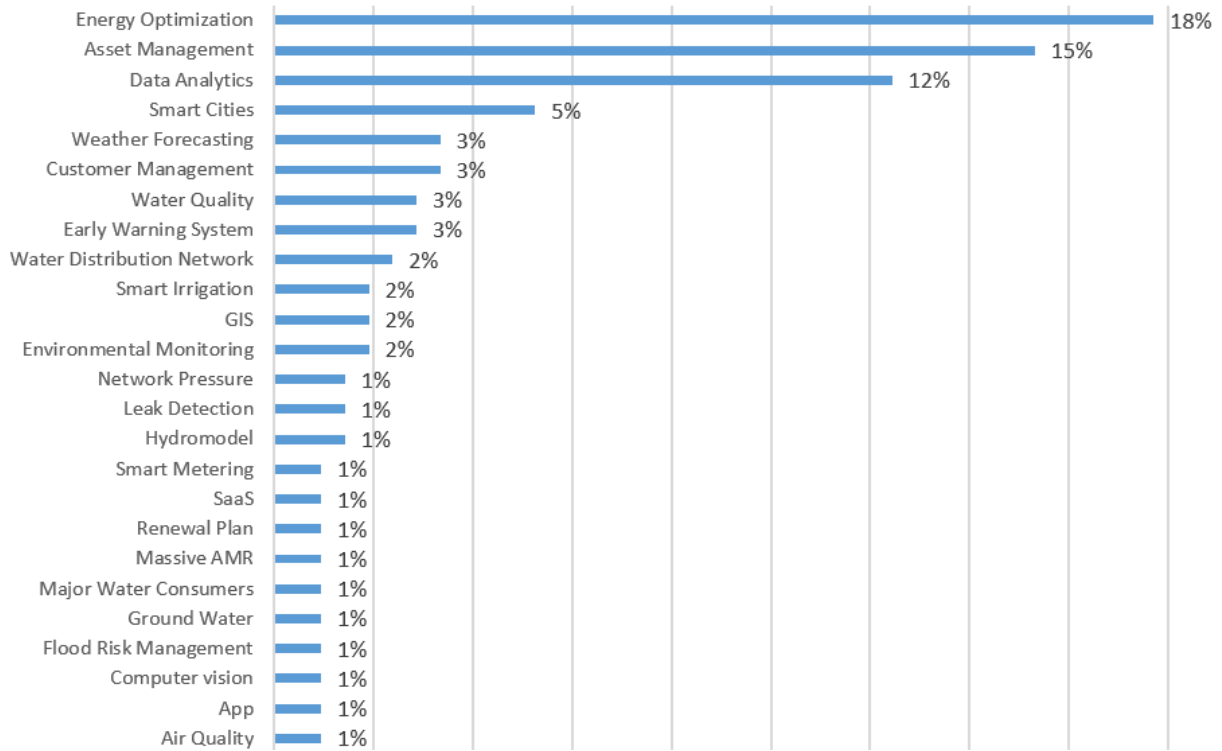
Figure 5 "Portfolio solution's tags distribution"

On the high end of the distribution, we find four tags assigned to 50% of the solutions or more. Starting top three of the solutions, we have Energy Optimization, Asset Management and Data Analytics, where seems to be the core value for most of the ICT solutions, and everything related to water network is classified into asset management, mostly including real time information and predictions of the water network status. Following this top four trends we find four tags with 3%: "Weather Forecasting", "Customer Management", "Water Quality" and "Early Warning Systems".

On the lower end of the distribution, we find 29 tags mentioned once that makes 3% of the solutions analysed. We can find tags that coincide with the lower distribution of the thematic areas like "Co-digestion", "Hydraulic Efficiency", however many more are just mentioned once because every user can choose the tags he wants and that lead to a lot of variety.

4.3 Trends and forecast growth

Strategic technology trends are rapidly changing disruptive trends with significant potential for enterprise impact over the next three to five years and IT cannot afford to ignore them. An exercise of abstraction has been made to correlate thematic areas and tags from the recollected info on the portfolio and the

technologies that Gartner lists with more growth for 2017 – 2018 (Gartner, 2016), so thematic areas with low participation but with high growth potential could be detected and enhanced in next future to cover all areas of growth.

It is important because this trends will drive the greatest disruption to the IT landscape over the next years, so identify these critical technologies and emerging fields on time, will improve the critical technologies that must be explored to support the move to digital business. Digitalization and the digital business are catalysts of change that are affecting the human-machine relationship and driving better customer outcomes. In these exploitation of Smart Technologies, WIDEST could use these forecast as planning assumptions on which to base their strategic plans because of new emerging technologies are used to come out of nowhere and they cover large areas over time.

In Water field (Eurecat, WIDEST -D2.3 Smart Water Grid topical roadmap, 2016), all digitalized things are making assisted economic decisions. The increased use of computing machines in decision making is extending into the realm of financial choices with increasing consistency. This makes one begin to think about how many of the economic decisions we make will be supported by, then automated through, digital technologies. In fact, customer engagement through mobile devices is an assumed and expected reality of most people to the degree that mobile commerce is expected to become too big for anyone to ignore.

Under the paradigm that everything can be intelligent, more cost-effective in an optimized process, a digital mixing through IoT, Big Data and Data Analytics allow this kind of paradigm, focusing the big trends in three big areas:

- **Intelligent**
    - Applied AI & Advanced Machine Learning
    - Intelligent Apps
    - Intelligent Things
- **Digital**
    - Virtual & Augmented Reality
    - Digital Twins
    - Blockchains and Distributed Ledgers
- **Mesh**
    - Conversational Systems
    - Mesh App and Service Architecture
    - Digital Technology Platforms
    - Adaptive Security Architecture

Comparing this previous classification with the top 5 Thematic Areas and Tags, more less is aligned due to in Sustainable Development, cost effective solutions are detected, and also on Data Management & Smart Cities Services (Eurecat, WIDEST - D2.2 Smart City Connection topical roadmap, 2016), Data Analytics allows to transform data into value.
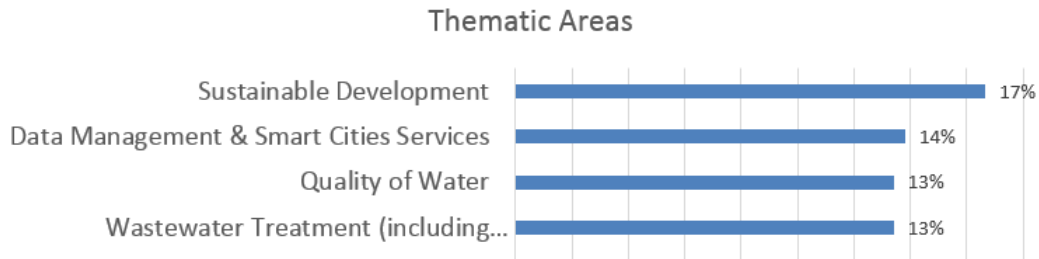
Thematic Areas

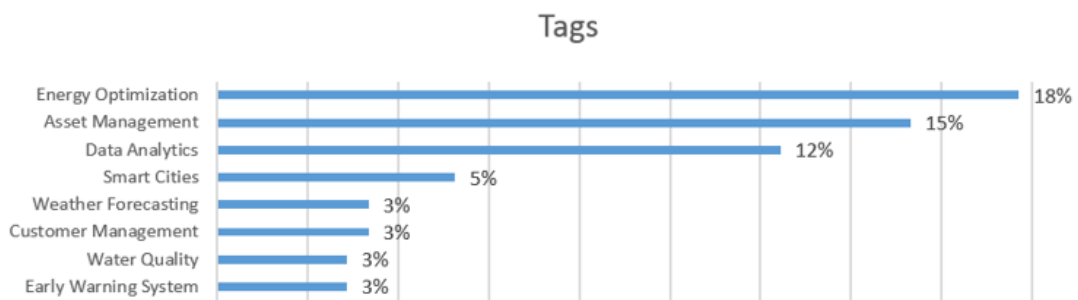*Figure 6 "Thematic Areas 66 % representation"*

Tags

Figure 7 "Tags 62% representation"

Some disruptive areas will allow secondary applications even more disruptive. The following are the areas of application that have the most potential within the set of portfolio solutions detected.

AI and machine learning have reached a critical tipping point and will increasingly augment and extend virtually every technology enabled service, thing or application. Creating intelligent systems that learn, adapt and potentially act autonomously rather than simply execute predefined instructions is primary battleground for technology vendors through at least 2020.

AI & Advanced Machine Learning

AI and machine learning (ML), which include technologies such as deep learning, neural networks and natural-language processing, can also encompass more advanced systems that understand, learn, predict, adapt and potentially operate autonomously. Systems can learn and change future behaviour, leading to the creation of more intelligent devices and programs. The combination of extensive parallel processing power, advanced algorithms and massive data sets to feed the algorithms has unleashed this new era.

In Water field, you could use AI and machine-learning techniques to model current real-time consumptions, as well as predictive models of consumption patterns based on their likelihood of being fraudulent. Organizations seeking to drive digital innovation with this trend should evaluate a number of business scenarios in which AI and machine learning could drive clear and specific business value and consider experimenting with one or two high-impact scenarios.

Intelligent Things

New intelligent things generally fall into three categories: robots, drones and autonomous vehicles. Each of these areas will evolve to impact a larger segment of the market and support a new phase of digital business but these represent only one facet of intelligent things. Existing things including IoT devices will become intelligent things delivering the power of AI enabled systems everywhere including the water utilities.

As intelligent things evolve and become more popular, they will shift from a stand-alone to a collaborative model in which intelligent things communicate with one another and act in concert to accomplish tasks. However, nontechnical issues such as liability and privacy, along with the complexity of creating highly specialized assistants, will slow embedded intelligence in some scenarios.

Virtual & Augmented Reality

Virtual reality (VR) and augmented reality (AR) transform the way individuals interact with each other and with software systems creating an immersive environment. For example, VR can be used for training scenarios and remote experiences. AR, which enables a blending of the real and virtual worlds, means businesses can overlay graphics onto real-world objects, such as hidden wires on the image of a wall. Immersive experiences with AR and VR are reaching tipping points in terms of price and capability but will not replace other interface models. Over time AR and VR expand beyond visual immersion to include all human senses. Enterprises should look for targeted applications of VR and AR through 2020.

Adaptive Security Architecture

The evolution of the intelligent digital mesh and digital technology platforms and application architectures means that security has to become fluid and adaptive. Security in the IoT environment is particularly challenging. Security teams need to work with application, solution and enterprise architects to consider security early in the design of applications or IoT solutions. Multi-layered security and use of user and entity behaviour analytics will become a requirement for virtually every enterprise.

5. Conclusions and Recommendations

Thanks to information given by the WIDEST project's stakeholders, we have built a solid ICT for Water solutions portfolio with 233 solutions collected. Even the number of solutions registered in the portfolio could be increased, its volume and diversity allowed us to run a deep analysis which was the main objective of this deliverable.

The information available has allowed us to spot some initial trends regarding ICT for Water Solutions. We believe we can take the Thematic Areas with more solutions registered as a valid trend of solutions development, where the most solutions occurrence were:

- "Sustainable Development" with 17%, portfolio solutions
- "Data Management and Smart City Services" with 14% of solutions

While the Thematic Areas with less occurrences were:

- "Water, Sanitation and Hygiene (WASH)" and Sea Water or non-occurrence

On the other hand, comparing it with the Tag analysis done and the trends and forecast growth, the is a clear evidence that the optimization of control of processes, where high representation of solutions on the energy efficiency field, asset management and data analytics, involves transforming these processes with new technologies that provide improved solutions, and sometimes also disruptive solutions that allow progress. Processes will become intelligent towards more cost-effective an optimized process, so the digital mixing through IoT, Big Data and Data Analytics will be the solution in a lot of areas, especially in Intelligent, Digital and Mesh.

As mentioned before, we will continuously update the ICT solutions portfolio analysis as the stakeholders keep uploading ICT solutions into the IWO. We will continue to observe the evolution of the trends, gaps and findings made in this stage analysis.

Regarding recommendations to the topic roadmaps, we consider is worth going on and increase the ICT solutions and the roadmaps permanently as an exercise, because in future stages this analysis can bring more valuable insights for the sector.

6. References

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