INTERMEDIATE EXPLOITATION PLAN

Bringing SmartH2O to the market

SmartH2O

Project FP7-ICT-619172

Deliverable D8.4 WP8

Document History

Version	Date	Reason	Revised by
1.0	03/04/2015	First version of the deliverable, TOC, DDP	Piero Fraternali
1.1	24/04/2015	Revised TOC	A.E. Rizzoli
1.2	21/05/2015	Updated market analysis from D8.1	A.E. Rizzoli
1.3	1/06/2015	Defined asset marketing sheet	A.E. Rizzoli
1.4	5/06/2015	Initial version of platform marketing sheet	P Fraternali
1.5	06/07/2015	Business models defined	P Fraternali
1.6	08/07/2015	Added PESLE analysis	P Fraternali
1.7	04/08/2015	Added SWOT analysis	P Fraternali
1.8	13/08/2015	Added competitor sheets	A.E. Rizzoli
1.9	24/08/2015	Sales strategies section added	A.E. Rizzoli
2.1	04/09/2015	Data analytics for water consumption disaggregation added	Castelletti A.
2.2	07/09/2015	Communication strategy added	P. Fraternali
2.3	14/09/2015	Contributions to market trends, PEST and SWOT analyses	R. Marzano
2.4	14/09/2015	Addition of product sheets	P. Fraternali
2.5	14/09/2015	Addition of Annexes	P. Fraternali
2.6	14/09/2015	Addition of communication tools	P. Fraternali
2.7	24/09/2015	Update of plans and performed actions	M.Melenhorst
2.8	25/09/2015	Overall check and update	M. Melenhorst, J. Novak,
3.0	30/09/2015	Final version for QA	A.E. Rizzoli
4.0	20/07/2016	Update version based on reviewers' comments	L. Caldararu, P. Fraternali
4.1	20/07/2016	Final version	AE Rizzoli

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The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7-ICT-2013-11) under grant agreement n° 619172.

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Executive Summary

This document is the Deliverable **D8.4, Intermediate exploitation plan**, which, according to the DoW has the following goals.

D8.4) An update of D8.1 that reflects how the exploitation plan has adapted to new inputs gathered from the project progress and advancements. This will include a comprehensive SWOT analysis of the project.

where D8.1 was defined as follows.

D8.1) Early Exploitation plan: In this deliverable each partner describes its initial and expected plans to exploit the results and the foreground assets that will be produced during the project. This deliverable will include the identification of the project results and classify them according to their exploitation potential.

The deliverable provides the following main contributions:

- It expands on the joint exploitation strategy of the core asset developed by the Consortium partners: the SmartH2O platform. A major focus in placed on the joint exploitation of the entire platform, which is the main outcome of the project. However, for improving the impact and the effective use of the project results, partners have also delineated collateral exploitation plans that apply to specific assets in markets complementary to the principal one (the water utility market).
- It provides an overview of the current status of the exploitation plans for the other assets of the project, identified in *D8.1 Early Exploitation plan* and recalled in Chapter 2.
- It updates, where new findings and intensions are available, the individual exploitation plans of the Consortium partners, based on the exploitation plans of each asset and the role of each partner in its development and future commercial or scientific use.
- It provides an outlook on the next actions and a concrete plan of next initiatives.
- It sketches in the annexes several important resources that can be used during the post-project exploitation phase.

This deliverable has been prepared considering the guidelines on IPR management and exploitation planning of *The European IPR Helpdesk*, as embodied in the *"Horizon 2020 - A Guide to IP Management"* blueprint document [EU-IPR-GUI] and in its accompanying documents reported in the references as: [EU-IPR-NDA], [EU-IPR-KT], [EU-IPR-CIP], EU-IPR-LA], [EU-IPR-AA], [EU-IPR-JV], [EU-IPR-SO], [EU-IPR-STD], [EU-IPR-EXP].

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1.   Introduction

This document is the continuation of *D8.1 Early Exploitation plan*, where we illustrate in greater detail the exploitation of the project assets identified in the previous version of the deliverable.

Following the request of the reviewers, this version of the exploitation plan places a major focus **on the integrated SmartH2O platform**, which constitutes the joint exploitation asset and the major result of the project and is described in Section 3.
As a consequence to this editorial decision, **most details on the global market analysis and future exploitation strategies are found in Section 3**.
Section 4, 5, 6, and 7 deal with the remaining individual assets that the Consortium considers exploitable, as already explained in D8.1 Early Exploitation plan and their writing assumes (and thus does not repeat) the findings already illustrated in detail in Section 3; therefore **these sections add only the specific considerations that pertain to the specific asset**.

The content of this deliverable is organized as follows

- Section 2 presents a brief recap of the asset definition reported at month 6 in *D8.1 Early Exploitation plan*. The only variation is that the asset Online gamified bill is now incorporated into the SmartH2O main asset, as a "entry-level" version of the complete integrated product.
- Section 3 contains the core contribution of this deliverable. It focuses on the jointly-exploitable asset: the SmartH2O platform. It perform an in depth analysis of its marketability, addressing:
  - Product/service definition: we precisely address what business need the SmartH2O platform addresses and its value for the customer and describe the solution to it, including a product feature sheet. Product/service definition: we qualify the elements that make the SmartH2O platform a unique offer.
    - o Functionality data sheet: we list the features that the SmartH2O platform offers
    - o Modules and packaging: we describe how the SmartH2O platform can be packaged in different product versions for meeting the needs of different types of customers
  - Market definition: we identify the primary and collateral markets of the platform and examine the market readiness and timeliness of the offer: we show why the SmartH2O offer comes to the market at the right time and highlight the factors that can boost its commercial adoption.
  - Competitor product analysis: we survey the data analytics and gamification products that partially overlap with the functionality of the SmartH2O platform.
  - PEST / SWOT analysis: we pinpoint the factors that define context in which the SmartH2O product/service will be deployed and the salient intrinsic and extrinsic elements that differentiate the SmartH2O offer.
    - o PEST analysis: we highlight the "big picture" that acts as a backdrop for the definition of the SmartH2O offer: the diffusion of a digital culture prompted by the capillary penetration of mobile devices and social communication apps, the rise of the awareness about the sustainable consumption of natural resources, the proactive actions of public administrations and regulators, the technological progress of telecommunication infrastructures, Internet of Things, and Big Data analytics architectures.
    - o SWOT analysis: we zoom in on the specific factors that qualify the SmartH2O effort, its innovation and competitive factors and the potential risks for its commercial exploitation.
  - Marketing, communication and sales strategy: we outline the ingredients of the marketing mix of SmartH2O
    - o Business models: we discuss and contrast two complementary business

models, one centered around the in-premises deployment of the platform and one fully exploiting a cloud SaaS model.

- o Advertising and promotional strategy: we identify the promotional channels that could be used to advertise the future product.
- o Social media strategy: we explain how social media analysis can be implemented to boost advertising and communication.
- o Sales strategy: we identify the sales components and compare alternative sales models (direct / indirect).
- o Communication tools: we describe the tools for communication, some of which have been already designed in a preliminary format.

- Sections 5, 6, 7 and 8 contain the specific exploitation considerations that apply to individual assets. They highlight only the differences with respect to global considerations already detailed for the SmartH2O integrated platform, reported in Section 3.
- Section 9 contains two contributions
  - o It revises the **joint exploitation options** advocated by the *The European IPR Helpdesk*, as embodied in the "Horizon 2020 - A Guide to IP Management" blueprint document [EU-IPR-GUI] and in its accompanying documents (reported in the references as: [EU-IPR-NDA], [EU-IPR-KT], [EU-IPR-CIP], EU-IPR-LA], [EU-IPR-AA], [EU-IPR-JV], [EU-IPR-SO], [EU-IPR-STD], [EU-IPR-EXP]) and expresses how the Consortium perceives the feasibility of such options at the present stage of the project.
  - o It revises the **Individual Exploitation Plans**, already presented in D8.1 early exploitation plans. Each partner only reports on the new findings or intensions that have emerged in the intervening period between the two versions of the deliverable.
- Section 10 concludes the deliverable with an outlook in the future actions; it contains a concrete list of initiatives that the partner will pursue in order to double check the exploitation strategies delineated in this deliverable with a large sample of prospect customers or partners.
- Section 11 contains the list of references.
- A rich set of Annexes complete the body of the deliverable, illustrating various aspects of the exploitation strategy, such as templates of agreements and OS licensing.

2.   Identification of exploitable assets (UPDATED)

As illustrated in *D8.1 initial Exploitation Plan*, the main results and elements of the SmartH2O project with high exploitation potential have been identified and described as **SmartH2O Assets**. Assets are project outcomes with a specific exploitation potential; they include software applications and components, methodologies, as well as vertical applications and the platform as a whole. The Table 1 gives an overview of the assets per category and per type, as identified in *D8.1 initial Exploitation Plan*.

Table 1: SmartH2O Assets per category and type.

Asset Category	Asset	Asset Type	Main users
Gamification / GWAP	Gamified online water bill	Application / SaaS	Consumer
	Board Game & customer loyalty relations	Application	Consumer
	Digital Game (extension)	Application	Consumer
Data collection and fusion components	Real time data stream processing, storage and retrieval framework	Component / SaaS	Utility
Modelling, prediction tools and Decision Support Systems	Dashboard for customer behaviour analysis and water demand planning	Application	Utility
Cross-Category	SmartH2O Platform	SaaS	Utility and Consumers

As a result of effort leading to the intermediate exploitation plan, the asset GAMIFIED ONLINE WATER BILL has been collapsed into the basic, entry-level version of the SmartH2O platform, see Section 3.1.4 Modules and Packaging.

3. SMARTH2O PLATFORM: joint exploitation strategies

3.1 The product and service

The SmartH2O platform is a software solution that permits the utilities to manage demand, optimize operations, and increase customers' satisfaction and engagement.

3.1.1 The need

The SmartH2O platform addresses the following needs of utility companies

- **Demand management**: being able to predict and even shape the demand. Examples of such needs are:
  - Shifting water demand to off peak periods (e.g., to avoid watering the garden in mass at 18.00)
  - Saving water in scarcity periods (see Figure 1, through recommendations, e.g., though personalized water saving tips.
- **Efficiency**: demand management as a way to optimize operations / reduce operational costs
  - Smoothing the water demand peaks reduces the minimum pressure of the water network, which diminishes pipe break, which reduces lost water and unplanned maintenance costs.
  - Smoothing peaks also enables utilities to operate the distribution network, including service reservoirs, without incurring excessively high energy costs.
  - Better customer relations may help the customer detect autonomously small water leaks and alert the utility, which reduces non-revenue water.
- **Customer management**: transitioning from the "local government as a customer" to the "Citizen as a customer" business model
  - Market-based reforms of the water utility industry: ffrom "top-down commodity provider" business model to a "service provider" one.
  - Utility – Citizens partnership. Co-ownership between the local governmente and the utility service providers of the relationship with the citizen/customer.
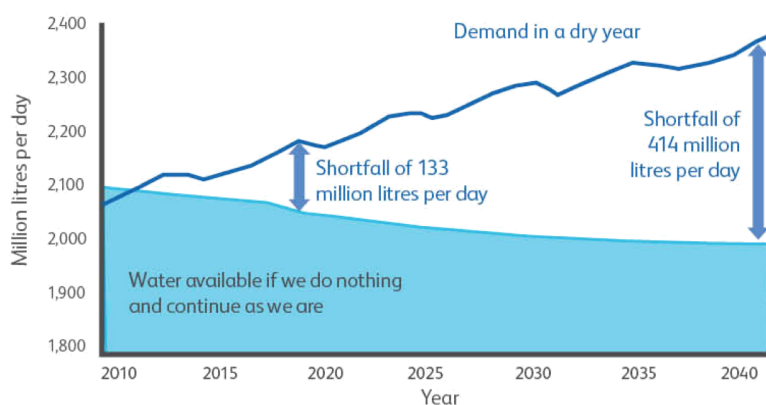
Figure 1: water scarcity forecast in the London region in the next decades.

A recent customer survey by Oracle Inc. of more than 150 North American senior-level (electrical) utility executives found that just half of utilities today are fully leveraging smart grid

data to improve customer service (through forecasting, demand management and improved reliability).

Figure 2 shows the priority areas where managers foresee the more convenient applications of big data analytics and demand management tools in the utility operations.
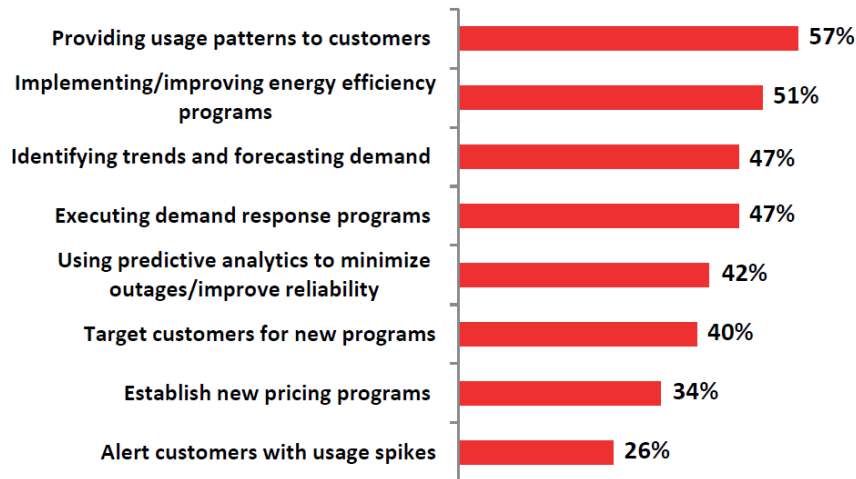
Figure 2: data usage priorities of utilities (Source: Oracle Inc.).

3.1.2   Product/service definition

In one sentence, the SmartH2O platform is a **data-driven demand management solution that enables utilities to include customers in the efficiency loop**.
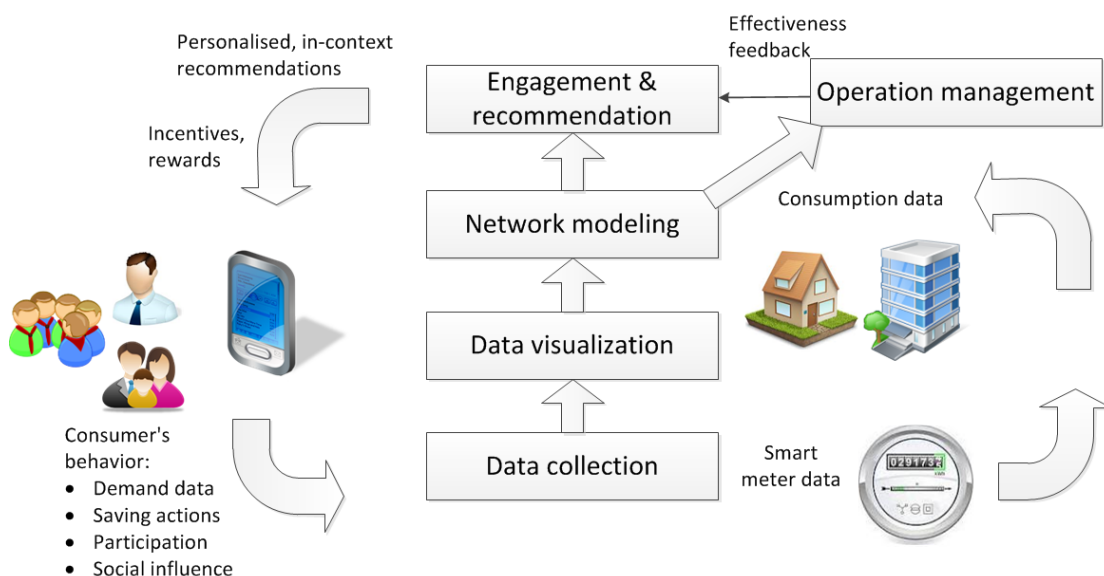
Figure 3: SmartH2O "users in the efficiency loop" message.

Figure 3 pictorially synthesise the goal of the SmartH2O platform, which brings together two powerful emerging market drivers into a n innovative solutions:

- The Internet of Things (IoT) revolution enabled by smart metering and big data management technology.
- The social media revolution: enabled by social networks, games, and gamified business applications, which set the individual at the centre of the interaction.

3.1.3 Functionality data sheet

The functionality that the SmartH2O platform offers to its customers consists of the features and sub-features listed in Table 2.

Table 2: Feature summary of the SmartH2O Platform.

1. Consumption data acquisition
1.1. Multi-standard smart meter data acquisition (multiple vendors, multiple networks, and multiple encoding formats)
1.2. Smart meter data error checking and correction.
1.3. Smart meter data import into repository.
1.4. Data distribution and scalability.
1.5. Secure and privacy respecting consumers' data storage.
2. Near real-time data visualization to the customer
2.1. Web GUI consumption data visualization for the customer
2.2. Mobile GUI consumption data visualization for the customer
3. Customer relationship management
3.1. Integration with commercial and administrative customer database
3.2. Manual customer profile data management
3.3. Utility to customer notification and alert management
3.4. Customer to utility alerts and support request management
3.5. Customer communication program admin GUI for the utility personnel
4. Consumption-based customer classification and demand prediction
4.1. Consumption data analysis
4.2. Consumption-based automated customer clustering and classification
4.3. Customer classification admin GUI for the utility personnel
4.4. Customer demand prediction
5. Customer support
5.1. Comparison to baselines (historical, neighbourhood)
5.2. Personalized water saving tips based on customer's profile
5.3. Premium content
6. Customer engagement and loyalty:
6.1. Individual & collective consumption goals
6.2. Achievements and badges
6.3. Redeemable points programs
6.4. Social network integration
6.5. Engagement monitoring GUI for utility personnel
7. Utility dashboard

7.1. Consumption management KPIs visualization	
7.2. Alert and leak detection history visualization	
7.3. Peak smoothing KPIs visualization	
7.4. Demand simulation	
8. Integration with network management and simulation	
8.1. Import of network of network configuration GIS data (districts)	
8.2. Export of demand forecast data to network management and simulation tools	

3.1.4 Modules and Packaging

The functionality described in the preceding section can be packaged commercially into different systems versions, to facilitate the progressive adoption by customers, who could start with a low complexity, low investment version and then switch to more powerful versions as they progress in the deployment of their metering infrastructure and in the capacitation of their organization.

Table 3 shows the envisioned versions of the SmartH2O platform, with the associated features and target customers.

Table 3: Versions of the Smarth2O platform.

Version	Proposition	Features	Target Customers
Entry level	Collect consumption data and provide feedback to your customers	Consumption data acquisition (1.1, 1.2, 1.3, 1.4, 1.5). Near real-time data visualization to the customer (2.1, 2.2) Customer relationship management (3.3, 3.4) Customer support (5.1) Utility dashboard (7.1, 7.2)	Small medium utilities (e.g., < 20k users), at initial AMI stage of development
Advanced level	Understand and engage your customers for better operations	Customer relationship management (3.1, 3.2, 3,5) Customer support (5.2) Customer engagement and loyalty (6.1, 6.2, 6.3, 6.4, 6.5) Utility dashboard (peak smoothing KPIs visualization)	Medium to large utilities, with expertise in CRM and AMI deployment
Gold Level	Manage demand, simulate customers' response and optimize efficiency and customer satisfaction	Consumption-based customer classification and demand prediction (4.1, 4.2, 4.3, 4.4) Utility dashboard (7.4) Integration with network management and simulation (8.1, 8.2)	Medium to large utilities with consolidated AMI deployment and data analytics in place

3.2 The Market

The primary market of the SmartH2O platform is the **water utility market**. Secondary

markets for the asset are the other utility markets: **energy, gas, and waste utility markets**. In the rest of this section we will consider the positioning of the asset in the primary market.

The distinction of the primary and secondary markets is based on the following considerations:

- The primary market (water utilities) is still at the inception, but is forecasted to grow steadily in the next years, as pressure from water scarcity will prompt more and more public regulators, administrations, and utilities to invest in operational efficiency.
- The secondary markets, especially energy, already see the presence of several large incumbent players (e.g., Oracle, Siemens, IBM, Itron), also owing to a greater homogeneity of geographic contexts. Such markets therefore have higher entry barriers and can be afforded only when a solid presence in the water market is established.
- The achievement of a stable presence in the water market can be instrumental to the entry into the secondary markets, by targeting multi-utilities and cross-selling the SmartH2O platform also to the business units that manage other services than water (gas, energy, waste).

3.2.1 *Market size and trends*

The market potential for the SmartH2O platform is, in the first place, contingent upon the development and diffusion paths of technologies allowing advanced connectivity of devices and systems to exchange data that will be made available by digital meters and any other appliance involved in the water use. .

Smart water technologies are experiencing a first wave of deployment focused mainly on real-time data collectors, which include sensors, meters, and so on. A second wave is expected to be directed to solutions able to effectively employ this burden of data and transform it into business intelligence to better help water utilities in their operational, maintenance and planning decisions, as well as to promote demand management practices.

As this path will develop in the future, according to Smart Water Networks Forum (SWAN), the global market value of smart water technologies is expected to quadruple in the coming decade, from $5.8 billion in 2010 to $22.2 billion in 2020. Other sources of information report even more optimistic forecasts. The Business Insider Intelligence (BII), for instance, in an attempt to estimate the global "Internet of Things" market size up to 2018, has forecasted the water utilities to spend $39 billion in smart technologies in the very next years [source: businessinsider.com]. According to MarketResearch, instead, the smart water management market is expected to grow from $7.3 billion in 2015 to $18.3 billion by 2020, at a Compound Annual Growth Rate (CAGR) of 20.1% from 2015 to 2020 [source: MarketResearch 2015].

3.2.2 *Market readiness and timeliness of the offer*

The timeliness of the SmartH2O platform offer is driven by the following factors:

- Progressive deployment of **digital meters** (aka smart meters) produces an enormous amount of data about the customer's' behavior, leading the utility company to the core business question:
  - "What can we do with such data?"
  - Two main societal contributions of smart metering are available: reducing water demand and increasing the quality of service through better communication with customers. The points below explore how and why conditions have become favourable to smart meters and their associated services.
- **Resource scarcity**
  - Water: climate change is impacting the availability of water resources throughout Europe (see Figure 1).
  - Water sources quality: high-quality and safe water sources are increasingly put at risk in densely inhabited areas. Heavy industry facilities or urban centres make contamination events and pollution more likely.

- Demand management has a key role to play in EU water supplies. Traditionally the less reliable nature of reducing demand vs. increasing supply has led to a preference by system engineers for tangible supply increases over demand reduction. The Water Framework Directive (WFD) and more generally the reduced favourable supply options available and their rapidly increasing marginal costs have made demand management methods like smart metering more attractive to water utilities.

- **Regulation and customer engagement**
    - Water scarcity may induce both European and national regulations to impose standard water balance practices and minimum efficiency standards, and/or to introduce tariff structures that incentivize water conservation Article 9 of the Water Framework Directive (WFD) requires implementation of pricing policies that provide an incentive to use water efficiently. Pricing is a powerful awareness-raising tool for consumers and combines environmental with economic benefits.
    - Article 9 also requires cost-recovery (including environmental and resource costs) for water services. The full cost recovery principle forces water utilities to identify and acknowledge every component of the water cost and to pass them through to customers. This provides incentive to keep resource costs lower and benefit served users.
    - The 2007 Commission Communication on Water Scarcity and Droughts included options related to 'putting the right price tag on water', 'allocating water more efficiently' and 'fostering water efficient technologies and practices'. These water efficiency measures fit into the overall resource-efficiency objective of Europe 2020.
    - The resource cost in the water price regulation has been introduced in some European national contexts. In Italy, for instance, the new tariff structure that has been put in place in 2015 includes a price component meant to proxy the opportunity cost of actual water use taking into account alternative uses [AEEGSI 2014]
    - Some regulators in Europe (see for example OFWAT in England and Wales and AEEGSI in Italy) have already introduced or are gradually introducing performance indicators aimed at measuring the quality of water metering activity. In England and Wales water utilities have to report the *bills for metered consumers*, whereas in Italy 7 indicators have been put in place to regulate the metering quality (one of them measuring the diffusion of self meter reading in the served area)

3.3 Competitive analysis

The market of demand management for utilities sees players mostly coming from two sectors: big data analytics and customer relationship management.

3.3.1 Big data analytics for utilities

This category contains products that specialise in the analysis of large pools of consumption data and provide business intelligence on top of them to optimise operation management.

The products vary from suites Smart Meter Data Management Solutions (SMDMS) that specialize only on data analytics (e.g., Landis+Gyr, TaKaDu) to broader solutions that integrate also network operation management and control (e.g., Siemens, Itron).

Oracle DataRaker

Oracle DataRaker is a big data analytics solution that exploits smart grid data and turns it into insight for electric, gas and water utilities to help streamline business operations, reduce O&M, tackle data challenges and prioritize actions in a resource constrained contexts. Oracle DataRaker encompasses a broad portfolio of applications that leverage big data technologies

such as Hadoop, R, and the Oracle 12c Database.
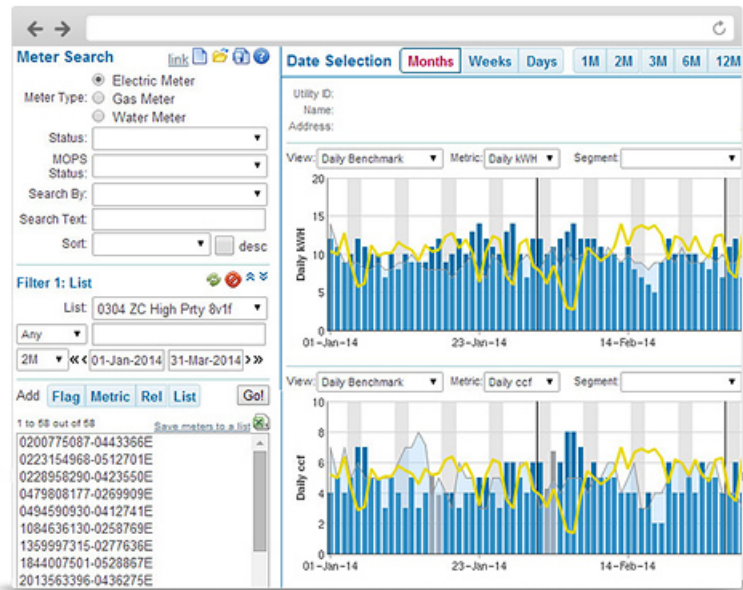
Figure 4: Oracle DataRaker GUI screen.

Table 4 summarizes the main features of the Oracle DataRaker product suite.

Table 4: Feature list of Oracle DataRaker.

Meter data management		
	Data quality assurance	
	Outlier detection	
	Defective meter identification	
	Meter tampering identification	
	Geospatial reporting	
	Unbilled sales reporting	
Network management		
	Capacity planning	
	Device lifecycle management	
	Inventory management	
	Demand forecasting	For energy?
Customer Relationship Management		
	Bill cycle monitoring	High/Low bill reporting
	Call center integration	
	Customer program targeting and auditing	
	Customer and building usage reporting	

	Load prediction	For energy?
	Behavioural program analytics	
	Load disaggregation	For energy?
	Water leaks detection	

IBM Intelligent Water

The IBM Intelligent Water is a water management platform that enhances infrastructure visibility to deliver an advanced level of situational awareness, event and incident management, informed decision-making and collaboration among stakeholders. The focus is on different sizes cities and the platform uses advanced data management, visualization, correlation and collaboration technologies to transform the vast amounts of disparate data received from various devices (including metering systems), assets, systems and stakeholders into actionable information that can guide executive and operational decision-making. (http://www-03.ibm.com/software/products/en/intelligentwater)
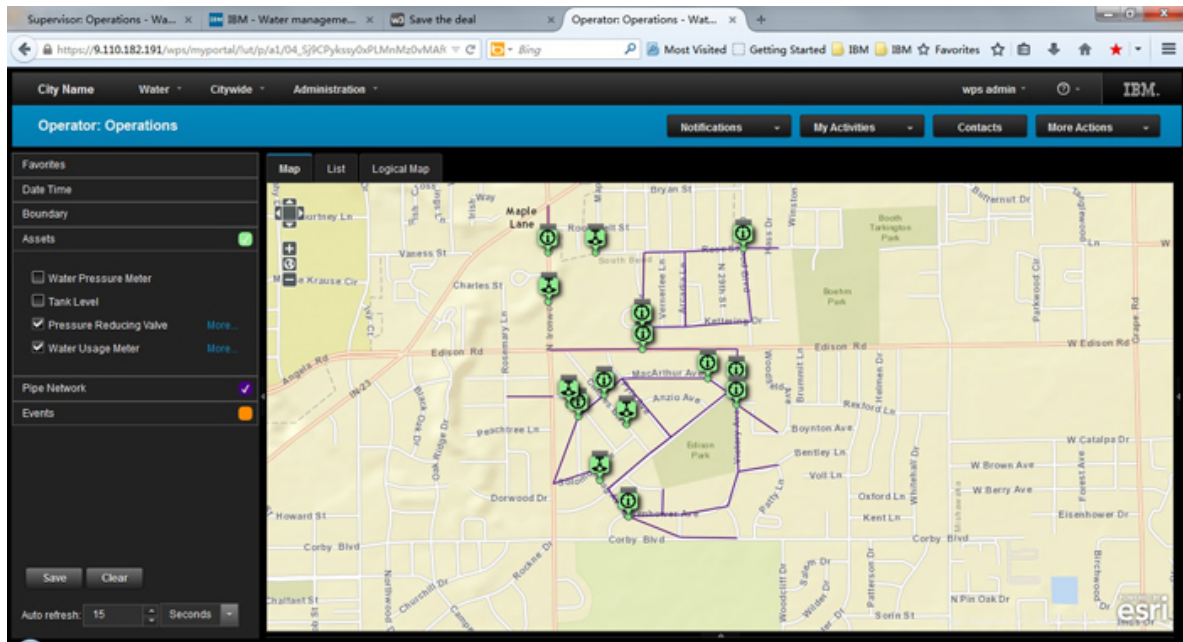
Figure 5: IBM intelligent water GUI screen.

Table 5 summarizes the main features of the IBM intelligent water product suite.

Table 5: Feature list of IBM intelligent water.

Meter data management		
	Data quality assurance	
	Defective meter and water leaks identification	
	Meter tampering identification	
	Predictive maintenance	

	Water pressure optimization	
	Geospatial reporting (different levels of granularity)	
Network management		
	Capacity planning	
	Device lifecycle management	
	Demand forecasting	
Customer Relationship Management		
	Rich semantic model to contextual understanding of the water	
	Real-time intelligent dashboards	
	Adapted to cities and cross-municipality organizations	

Siemens Smart Water

Siemens Smart Water platform aims to seamlessly integrate a new or previously existent metering system, providing actionable data to prevent issues, providing new ways to engage customers and strengthen relationships.
(http://w3.siemens.com/smartgrid/global/en/products-systems-solutions/smart-metering/emeter/Pages/Smart-Water.aspx)

Figure 6: Siemens Smart Water consumer web portal.

Table 6 summarizes the main features of the Siemens Smart Water product suite.

Table 6: Feature list of Siemens Smart Water.

Meter data management		
	Data quality assurance	
	Defective meter and water leaks identification	
	Meter tampering identification	
	Predictive maintenance	
	Capital investment planning	
	Geospatial reporting (different levels of granularity)	
Network management		
	Capacity planning	
	Device lifecycle management	
	Demand forecasting	
	Cibersecurity assurance	
Customer Relationship Management		
	Bill cycle monitoring	
	Call center integration	
	Customer program targeting	
	Customer and building usage reporting	

C3 Energy

C3 Energy is an enterprise that delivers big data analytic solutions for the global energy industry (including residences and small to large commercial and industrial customers). The solutions utilize machine learning and social human-computer interaction models to retrieve the full potential of energy system investments. (https://c3energy.com/products/)
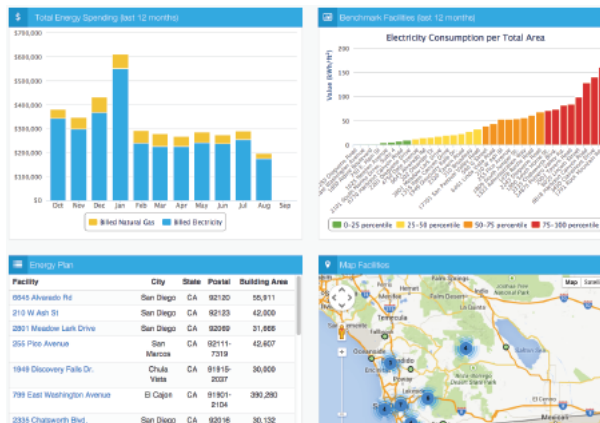
Figure 7: C3 Enterprise GUI screen.

Table 7 summarizes the main features of the C3 Energy product suite.

Table 7: Feature list of C3 Energy.

Meter data management		
	Data quality assurance	
	Defective meter identification	
	Meter tampering identification	
	Predictive maintenance	
	Capital investment planning	
	Geospatial reporting (different levels of granularity)	
	Outage analysis, prediction and restoration	
Network management		
	Capacity planning	
	Device lifecycle management	(High-risk meter identification ?
	Demand forecasting	
	Cibersecurity assurance	
Customer Relationship Management		
	Bill cycle monitoring	
	Call center integration	
	Customer program targeting	
	Customer and building usage reporting	
	Behavioural program analytics	

Landis+Gyr Gridstream

Gridstream is a platform that integrates metering, communications, network management, software grid and consumer applications focusing on electric, water and gas utilities. (http://www.landisgyr.com/gridstream-solutions/)
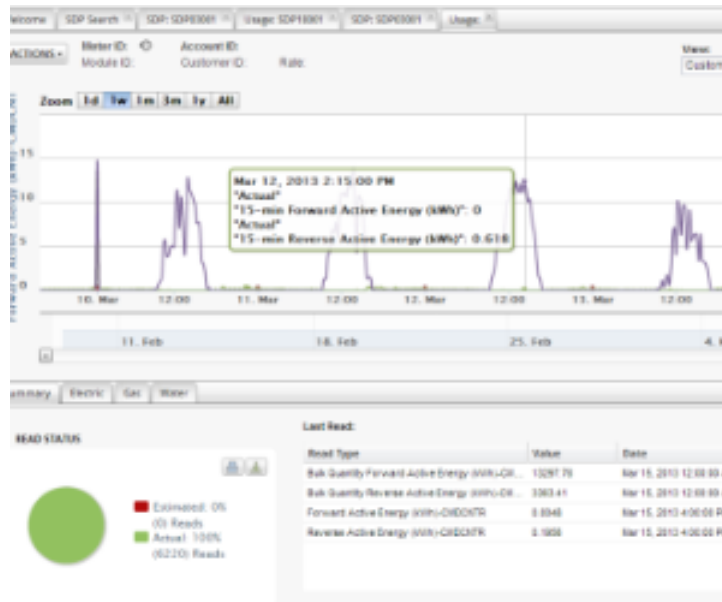
Figure 8: Gridstream GUI screen.

Table 8 summarizes the main features of the Gridstream product suite.

Table 8: Feature list of Gridstream.

Meter data management		
	Data quality assurance	
	Defective meter identification	
	Meter tampering identification	
	Geospatial reporting (different levels of granularity)	
	Outage analysis and restoration	
Network management		
	Capacity planning	
	Device lifecycle management	
	Demand forecasting	
Customer Relationship Management		
	Bill cycle monitoring	
	Customer and building usage reporting	

TaKaDu

TaKaDu is a Software-as-a-Service solution for water utilities and provides alerts, reports and

real-time insights about water distribution network events. The solution uses statistical and mathematical modelling and prediction algorithms to extract significant data out of raw water usage data. (http://www.takadu.com/category/ProductOverview)
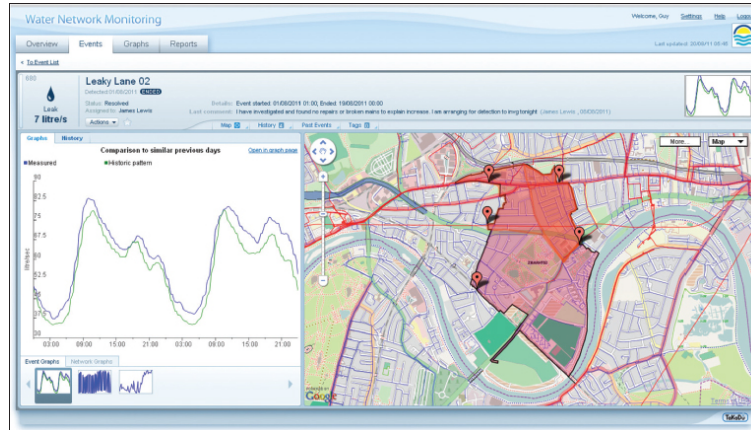
Figure 9: TaKaDu GUI screen.

Table 9 summarizes the main features of TaKaDu product suite.

Table 9: Feature list of Gridstream.

Meter data management		
	Water quality and loss control	
	Defective meter identification	
	Meter tampering identification	
	Geospatial reporting (different levels of granularity)	
	Anomalies analysis and restoration	
Network management		
	Awareness to pressure anomalies and network inefficiencies	
	Demand forecast	
Customer Relationship Management		
	Bill cycle monitoring	
	Decision making integrated tool	
	Customer and building usage reporting	

Itron

The Itron Meter Data Management application is a highly scalable solution that provides utilities with the ability to manage metering and other utility-operated data in one place. Table 10 summarizes the main features of the Itron Meter Data Management product suite.

Table 10: Feature list of Itron meter data management.

Meter data management		
	Data quality assurance	
	Defective meter identification	
	Meter tampering identification	
	Geospatial reporting (different levels of granularity)	
	Analytic and operational reports	
Network management		
	Capacity planning	
	Device lifecycle management	
	Demand forecasting	
Customer Relationship Management		
	Bill cycle monitoring	
	Customer and building usage reporting	

3.3.2   *Data analytics specific for water consumption disaggregation*

This category contains methods and tools developed for disaggregating the total water consumption registered at the household level into the different end-use categories (e.g., shower, bath, washing machine). Although this problem has been largely studied in the energy sector [for a review, see Zeifman and Roth, 2011; Zoha et al., 2012; Carrie Armel et al., 2013, and references therein], few methods have been developed in the water sector.

Trace Wizard

Trace Wizard® [DeOreo et al., 1996] is a commercial software (recently replaced by an on-demand service developed and managed by Aquacraft Inc.) which applies a decision tree algorithm to interpret magnetic metered flow data based on some basic flow boundary conditions (e.g., minimum/maximum volume, peak flow rate, duration range, etc.). Trace Wizard® has currently an edge on water consumption disaggregation techniques and has been used in several research works and projects [DeOreo and Mayer, 1994; Mayer and DeOreo, 1995; Mayer and DeOreo, 1999; DeOreo and Mayer, 2000; Loh and Coghlan, 2003; Mayer et al., 2004; Roberts, 2005; Heinrich, 2007; Mead and Aravinthan, 2009; Willis et al., 2009a; Willis et al., 2009b; Aquacraft Inc, 2011; DeOreo et al., 2011].

Figure 10: Aquacraft Inc. logo (source: http://aquacraft.com).

The disaggregation process is structured in the following steps:

1. Conduct a detailed water device stock inventory audit for each household to determine the presence of appliances and the efficiency rate of each household appliance/fixture;
2. Household's occupants should complete a diary of water use events over a one-week period to gain information on their water use habits;
3. Analysts use water audits, diaries, and sample flow trace data for each household to create specific templates that serve to match water end-use patterns depending on some basic flow boundary conditions;
4. Based on the developed templates, stock survey audit, diary information and analysts' experience, the household total water consumption is disaggregated into individual water end-uses.

It is worth noting that the human resource effort required by Trace Wizard® makes the overall process extremely time and resource intensive, with the quality of the results that is strongly dependent on the experience of the analyst in understanding flow signatures. It has been estimated that the classification of two weeks of data approximately requires two hours of works by the analyst and attains an average classification accuracy of 70% [Nguyen et al., 2013]. In addition, the prediction accuracy of Trace Wizard® is significantly reduced when more than two water use events occur concurrently [Mayer and DeOreo, 1999].

Identiflow, HydroSense, SEQREUS

Other disaggregation tools have been recently proposed in order to achieve higher levels of accuracy than Trace Wizard®, in an automatic way, thus without involving (or at least limiting) expert interventions in the process. These methods, which are still at the stage of academic research projects, are the following:

- **Identiflow**®: a decision tree algorithm [Kowalski and Marshallay, 2003] which performs a semi-automatic disaggregation of the total water consumption by using information on fixed physical features of various water-use devices (e.g., volume, flow rate, duration, etc.) to classify the different end-use events.
- **HydroSense**: a probabilistic-based classification approach [Froelich et al., 2011], which relies on data collected through pressure sensors, with water end-use events classified with respect to the unique pressure waves that propagate to the sensors when valves are opened or closed.
- **SEQREUS**: a mixed approach developed within the SEQREUS project [Beal et al., 2011], which relies on a combination of Hidden Markov Models (HMMs), Dynamic Time Warping (DTW), and time-of-day probability to automatically map the collected data at the household level into particular water end-use categories.

3.3.1 Gamification suites

Badgeville

Badgeville offers an award-winning enterprise gamification and analytics solution delivered as-a-service, featuring tools to build and monitor profiles of user actions, achievements and activities. The product spans three main functionalities:

- In-App Gamification: integrated in 300+ gamification solutions, offer templates and blueprints to track and reward billions of actions per month.
- Achievement Profiles: rich profiles display skill levels, achievements, live activities, progressions, interactions and more to create a multi-dimensional view of customers and employees. Real-time feedback keeps user engaged in targeted actions.
- People Analytics: custom analytics enable customers to track and analyze users and usage so to monitor progression towards business goals.

Figure 11 shows and example of a GUI enriched with Badgeville gamification features.
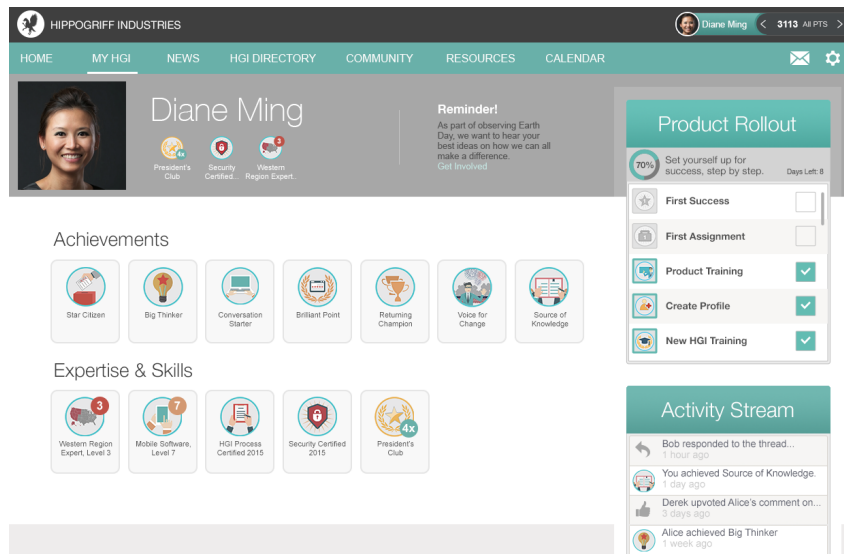
Figure 11: Gamified app GUI with Badgeville.

Table 11. Gamification features of Badgeville.

Gamification features		
	Points	Points systems can be created to track specific or abstract concepts. Points can be translated to levels and status, standing on a leaderboard, or redeemed for prizes. Hidden points can be created to measure any form of employee metrics
	Levels	Form of achievement that uses a status system, in terms of time, grade and perseverance.
	Badges	
	Missions	Missions group rewards into progressive lists or related sets, possibly mapped to a business process
	Contextual Leaderboards	Can be configured to compare specific behavior counts, points accumulated or more sophisticated, contextual metrics, such as top experts in a particular topic or weekly performance contests
	Social Rewards	Recognize actions taken on social networks such as Facebook, LinkedIn, and Twitter. Use of specific keywords can be tracked to influence social behaviors such as tweeting, sharing or liking content, and reward users.
	Activity Streams	Users receive targeted updates from the people and content they follow and general updates from the community.
	Expertise Tracks	Missions that guide users through nested sets of milestones. As users progress through tracks, they earn different levels of expertise and status.

	Real-Time Notifications	Real-time recognition as users perform behaviors and reach milestones.
	Social Notifications	Alert users about relevant actions, driving them to relevant content and events
Achievements features		
	Personalized achievements	match users to specific traits such as location, function and title
	Contextual achievements	rewards pair user behaviors with rich metadata, such as areas of specialization or content types
	Leveled achievements	rewards are granted for reaching designated points thresholds.
Analytics features		
	People Analytics	Display user engagement, course completion, data entered or progressions completed
	Reports	Returning users Content contributing users Questions asked and answered Topical experts Topics of most interest
Platform features		
	Service model	SaaS deployment
	Scalability	Millions of tracked actions per day and billions of API calls per month
	Security	Private cloud, Safe Harbor, SOC2 Type I and SAS-70 Type II compliance. Role-based Access Control for admin.

PugPharm Productions

PugPharm defines itself with the following words: "Imagine an entirely new kind of company. One that uses gameplay principles and technologies to solve challenging business problems."

Founded in 2008, this company offers a complete, end-to-end approach to get a community active and engaged -- and create a playful place where you can foster the identity, reputation, and status of your community members.

The main functionalities offered are:

- Progressions, ranking and rewards frameworks
- Loyalty and status motivations
- Competitive challenges
- Collections and match solutions
- Social matching algorithms
- Real world check-in services

Figure 11 shows the core features of the suite.
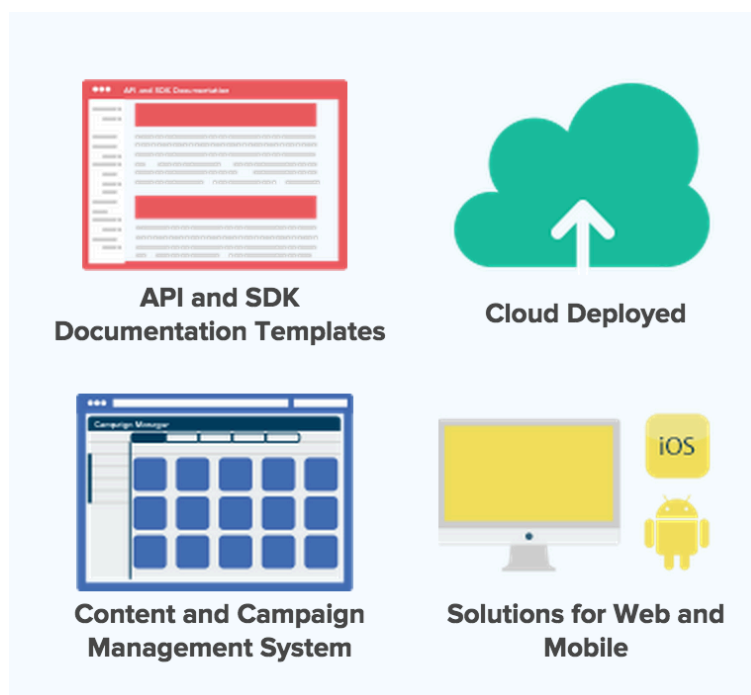
Figure 12: Core Value Proposition of PugPharm.

Table 12. Gamification features of PugPharm.

Gamification features		
	Points	Intrinsically rewarding activities
	Levels	Intrinsically rewarding activities
	Badges	Collaboration, competition, collection, customization
	Missions	Missions group rewards into progressive lists or related sets, possibly mapped to a business process
	Contextual Leaderboards	This is addressed thru the Competitive and collaborative challenges managed by the platform
	Social Rewards	Real World check-in features & Social Matching
	Activity Streams	Collections, contests and activities managed
	Expertise Tracks	Loyalty and status motivators
	Real-Time Notifications	Real-time recognition as users perform behaviors and reach milestones.
	Social Notifications	N/A

Achievements features		
	Personalized achievements	match users to specific traits such as location, function and title
	Contextual achievements	rewards pair user behaviors with rich metadata, such as areas of specialization or content types
	Leveled achievements	rewards are granted for reaching designated points thresholds.
Analytics features		
	People Analytics	Display user engagement, course completion, data entered or progressions completed
	Reports	Extensive reporting modules create business intelligence reports that uncover the secret world of user engagement psychographics
Platform features		
	Service model	SDK
	Scalability	N/A
	Security	N/A

IActionable

The claim of IActionable is the following "We bridge the gap between manager expectations and employee performance" and it expresses exactly the goal and the vision of the company: create a gamified platform able to manage talents and employees with the same engaging rules od the games.

IActionable was founded in 2010 before the word gamification existed. Needless to say, we've been doing this for a while. When it comes to employee gamification, IActionable is the right tool for the job.

Using gamification tool to manage employees performances, in particular:

- *Clear objective expectations*
  Employees often don't know what is expected of them or how well they are meeting those expectations. We make everything crystal clear.
- *Real-time feedback*
  IActionable updates in real-time so everyone always know exactly where they stand and what to focus on.
- *Measure and motivate*
  Reporting is the first step, but we go further by improving performance using gamification elements to mold and direct behavior.

Figure 7 shows the improvements on employee engagement thanks to IActionable.

Figure 13: Core Value Proposition of IActionable.

Table 13. Gamification features of IActionable..

Gamification features		
	Points	Score is a single number that sums up an employee's performance. It fluctuates like a credit score and gives an employee a holistic view of their performance
	Levels	An easy way to add a sense of competition, leaderboards allow you to rank people or teams against each other across any metrics and timeframes you'd like
	Badges	Achievements recognize exceptional performance or long term accomplishments. They are an extra layer of objectives to work towards and are a source of bragging rights
	Missions	IActionable can automate and track a variety of contests used to drive performance and incentives. No more spreadsheets sent over email to update people.
	Contextual Leaderboards	An easy way to add a sense of competition, leaderboards allow you to rank people or teams against each other across any metrics and timeframes you'd like
	Social Rewards	N/A
	Activity Streams	N/A
	Expertise Tracks	N/A
	Real-Time Notifications	N/A
	Social Notifications	N/A

Achievements features		
	Personalized achievements	Goals lie at the heart of our system. You can set up clear objective goals around any metric and interval that makes sense for you
	Contextual achievements	N/A
	Leveled achievements	N/A
Analytics features		
	People Analytics	As part of the software
	Reports	As part of the software
Platform features		
	Service model	Licensed software
	Scalability	N/A
	Security	N/A

Gamify

Gamify is no longer present in the market.

Gigya

Gigya presents itself with the following claim:

"Customer Identity Management provides the tools you need to drive registrations, manage customer data and use it to improve cross-channel customer experiences and relationships.

- *Know your customers on a deeper level*
- *Get a single customer view across channels*
- *Turn data into relationships and results"*

The company promises to allow customers to collect info about their users, collect information about them and help the conversion.

CONNECT
Increase registrations with on-site engagement tools that incentivize conversions to let you easily authenticate users and collect their permission-based identity data.

COLLECT
Consolidate, organize and manage customer identity and behavioral data to power identity-driven relationships, all while maintaining scalability, security and compliance.

CONVERT
Segment customers and integrate first-party data across marketing and service applications to drive valuable user actions and provide personalized experiences.

Figure 14: Core Value Proposition of Gigya.

They have three main tier of service:
- Identity Enterprise
- Identity plus
- Identity

Corresponding to three different level of features.

Identity enterprise delivers the following services:
- Registration as a service
- Social login
- Profile management
- Analytics
- Customer insights
- Identity access
- Identity compliance Customer insight plus
- Progressive and conditional profile
- Federation
- Two-factor authentication
- Signals
- Auditing
- Single sign in

Identity plus delivers the following services:
- Registration as a service
- Social login
- Profile management
- Analytics
- Customer insights
- Identity access

- Identity compliance
- Customer insight plus
- Progressive and conditional profile

Identity delivers the following services:

- Registration as a service
- Social login
- Profile management
- Analytics
- Customer insights
- Identity access
- Identity compliance

Table 14. Gamification features of Gigya.

Gamification features		
	Points	N/A
	Levels	N/A
	Badges	N/A
	Missions	N/A
	Contextual Leaderboards	N/A
	Social Rewards	N/A
	Activity Streams	N/A
	Expertise Tracks	N/A
	Real-Time Notifications	The platform implements a real time notification that can be triggered from the API of events
	Social Notifications	Same as above
Achievements features		
	Personalized achievements	N/A
	Contextual achievements	N/A
	Leveled achievements	N/A
Analytics features		
	People Analytics	As part of the software
	Reports	As part of the software
Platform features		

	Service model	Licensed software
	Scalability	N/A
	Security	N/A

Bunchball Nitro

Bunchball is an online gamification platform that provides to his users a variety of services from the login to the social and local notification.
The platform has a clear focus on business related gamification and on employee engagement.

Nitro: The world's most advanced gamification engine

Customers, employees, and partners do more, learn more, and share more in ways that matter to your business. Now, you can harness the power of gamification to engage your audience.
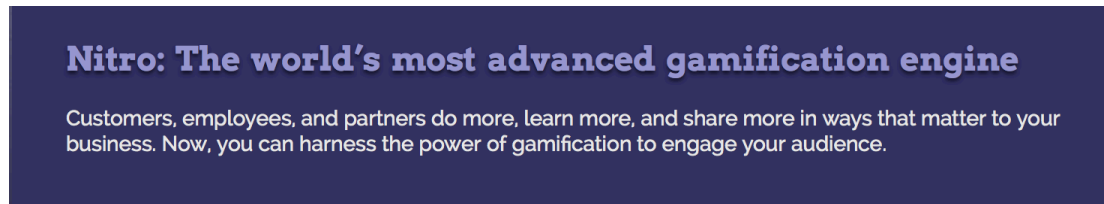
Figure 15: Core Value Proposition of Bunchball Nitro.

The main stream of the company are focused on:
- Motivate employee and partners via
  o Sales team motivational tools
  o Boost employee collaboration tools
  o Accelerated development tools for employee
- Engaging customers and online communities by:
  o Growing the audience
  o Increase customer sales and loyalty
  o Unlock and activate the online community

Bunchball has also many integrations with external tools such as Salesforce making this solution very enterprise oriented.

Nitro

Nitro for Salesforce

Nitro for Remedyforce

Nitro for Jive

Nitro for NICE

Nitro for SAP Jam

Client Services

Figure 16: Nitro integrations.

Table 15. Gamification features of Nitro.

Gamification features		
	Points	As part of the platform
	Levels	Levels can be customized from the online admin tool
	Badges	Both custom and selectable from a prefilled list
	Missions	Both custom and selectable from a prefilled list
	Contextual Leaderboards	N/A
	Social Rewards	Yes, fully customizable
	Activity Streams	Yes, fully customizable
	Expertise Tracks	N/A
	Real-Time Notifications	The platform implemetns a real time notification that can be triggered from the api of events
	Social Notifications	Same as above
Achievements features		
	Personalized achievements	Yes
	Contextual achievements	Yes
	Leveled achievements	N/A
Analytics features		
	People Analytics	As part of the software
	Reports	As part of the software
Platform features		
	Service model	Licensed software
	Scalability	Different solution based on the level of service
	Security	N/A

BigDoor Media

Bigdoor media value proposition is clearly dedicated to big enterprise companies such as Microsoft. They are trying to shift the cash-back paradigm with rewards that are more than just purchases based; you can earn credits by every kind of online activities.
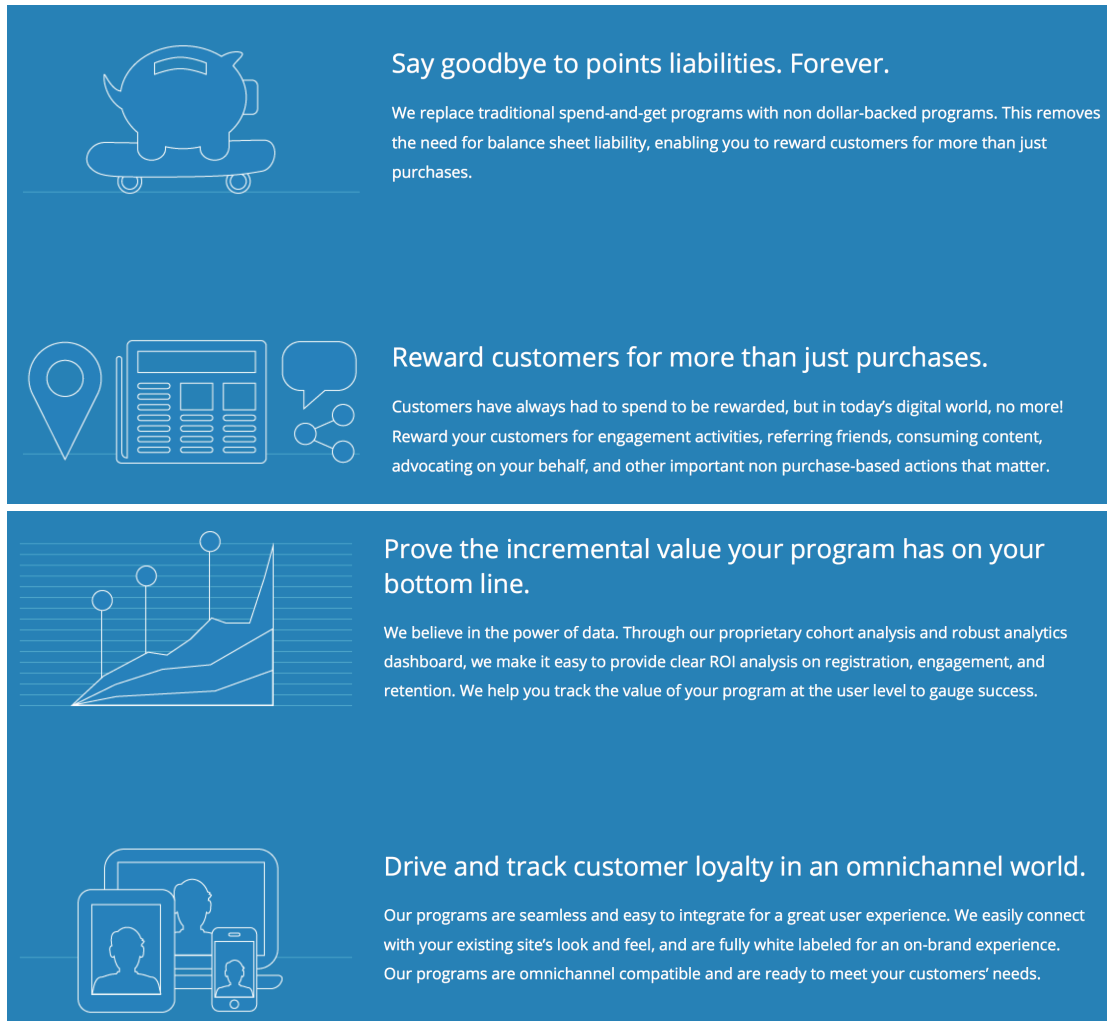
Figure 17: Core Value Proposition of BigDoor Media.

An important piece of the platform is represented by the analytics dashboard to be used by the customers.
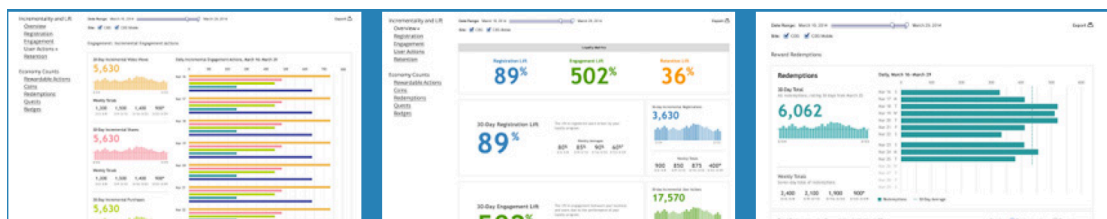
Figure 18: The analytics dashboard of BigDoor.

The main features are:
- Easily report on your program's success with our robust analytics dashboard
- Real-time reporting for the most accurate, up-to-date information
- Cohort reporting for improved personalization and segmentation
- Complete program analytics by user, cross-channel
- Industry benchmark reports for competitive tracking
- Valuable data visualizations

Table 16. Gamification features of BigDoor Media.

Gamification features		
	Points	As part of the platform
	Levels	N/Al
	Badges	Both custom and selectable from a prefilled list
	Missions	N/A
	Contextual Leaderboards	N/A
	Social Rewards	Yes, basic implementation
	Activity Streams	N/A
	Expertise Tracks	N/A
	Real-Time Notifications	The platform implemetns a real time notification that can be triggered from the api of events
	Social Notifications	N/A
Achievements features		
	Personalized achievements	Yes
	Contextual achievements	Yes
	Leveled achievements	N/A
Analytics features		
	People Analytics	As part of the software
	Reports	As part of the software
Platform features		
	Service model	Licensed software
	Scalability	Different solution based on the level of service

	Security	N/A

PunchTab

PunchTab is a software-as-a-service platform empowering retail and CPG brands to engage consumers and gain actionable insights.

This company provide a Consumer Management Platform for Consumer Brand divided in three major pieces:

- Connect
    - Gain meaningful interactions and opted-in consumers on the right channels with the right content.
    - Aggregates and amplifies social media conversations and User Generated Content in one interactive destination
    - Closes the loop with end-to-end behavior tracking and receipt scanning
    - Easily connects to any social channel or digital source with PunchTab's SDK and RestAPI for a unified, omni-channel brand experience
    - Allows Brand Managers to incent specific behaviors, important to the brand
- Understand
    - Generate efficiencies in marketing spend, while increasing loyalty and lifetime value
    - Better personalization and segmentation through proprietary, first-party data
    - A 360 degree view of consumers by aggregating existing data sources with individual consumer data collected through the PunchTab platform.
    - The ability to make better marketing decisions they can correlate to outcomes.
- Act
    - Optimize marketing initiatives with deeper insights at the individual consumer level.
    - PunchTab's Quarterly Analytics Review and strategic marketing execution platform integrations allow brands to:
        - Identify which marketing activities and content increase desired brand outcomes
        - Segment consumers and personalize experiences to increase retention and purchase
        - Easily deliver relevant messaging with integrations like Exact Target and Marketo

Table 17. Gamification features of PunchTab.

Gamification features		
	Points	N/A
	Levels	N/A
	Badges	N/A
	Missions	N/A
	Contextual Leaderboards	N/A
	Social Rewards	N/A
	Activity Streams	N/A
	Expertise Tracks	N/A

	Real-Time Notifications	N/A
	Social Notifications	N/A
Achievements features		
	Personalized achievements	N/A
	Contextual achievements	N/A
	Leveled achievements	N/A
Analytics features		
	People Analytics	Brand managers need a single store of data providing a comprehensive picture of individual consumers.
	Reports	Brand marketers need a simple way to automatically develop insights from consumer-level data and intelligently act on them to optimize marketing spend
Platform features		
	Service model	Saas
	Scalability	No limits
	Security	N/A

3.3.2 Gamified big data analytics

WaterSmart

WaterSmart is the most direct competitor of SmartH2O. WaterSmart Software is a water efficiency solutions company, funded by VC for over 8 million USD by a group of investors led by Physic Ventures. WaterSmart provides a turn-key, cloud-based platform for water utilities to educate residential customers about their water use and make personalized recommendations on how to conserve water. WaterSmart uses behavioral science techniques to increase customer engagement, elevate consumer interest in saving water and money, and increase participation in utility-sponsored efficiency programs. WaterSmart's enterprise product includes an analytics platform, which allows utility managers to view how their customers use water and where efficiencies can be generated. WaterSmart uses advanced analytics and proven behavioral science techniques to increase customer engagement and drive household actions that save water, energy and money. The WaterSmart platform includes tools that allow utility managers to segment customer water consumption data, generate targeted communications, and identify operational efficiencies. WaterSmart manages information for over 2 million water meters throughout North America and recently announced the milestone of more than 1 billion gallons of water saved.
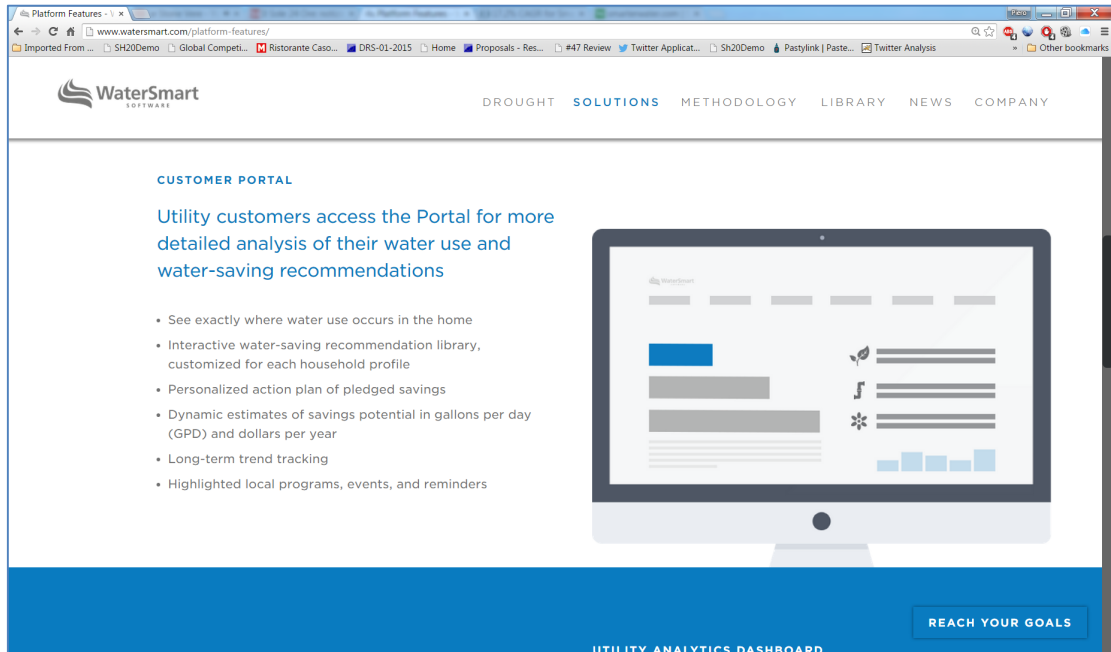
Figure 19: the product feature page of the WaterSmart.com web site.

Table 18: Feature list of the WaterSmart.com solution.

Customer relationship management		
Customer Portal		
Water use report	Personal WaterScore report every billing period	
Water saving recommendations	Customization based on household profile	
Water saving goals		
Estimate of savings	Gallon per day and dollars per year	Water saved calculated using fixed-effects econometric analysis
Long term trends		
Local program and events		
Manual reads		
Water use disaggregation	Usage-based algorithms and detailed customer surveys to disaggregate each residence's water consumption by end use	Reports include customized occupant calculations with property lot sizes and other exogenous data sources, to ensure optimal comparison groups when generating WaterScores
Consumption comparison	With household of similar characteristics	

Targeted communications	About investments, incentives, or other important utility messages	
Utility admin GUI and Data Analytics		
CRM capabilities		
Program participation metrics		
Customer performance		
Customer segmentation	Feature-based and geospatial	
Alerts	High usage and leak	
Integration	With automated meter reading and infrastructure	

How SmartH2O compares to WaterSmart.com

SmartH2O compares directly with WaterSmart with respect to the functionality for the Utility admin GUI and Data Analytics.

It surpasses WaterSmart.com in the Customer Relationship Management functionality thanks to its more advanced gamification program, which goes beyond the comparison to baseline approach of WaterSmart thanks to: multi-area badges and levels, goals (personal and team), contextual leader boards, social rewards and notifications, redeemable goodies, personalized, contextual and levelled achievements, integration with board and digital games for water awareness.

3.4 SmartH2O platform competitive advantage

SmartH2O proposition occupies a unique position in the market of demand management tools for (water) utilities, thanks to its integration of big data analytics and gamified customer relationship management.
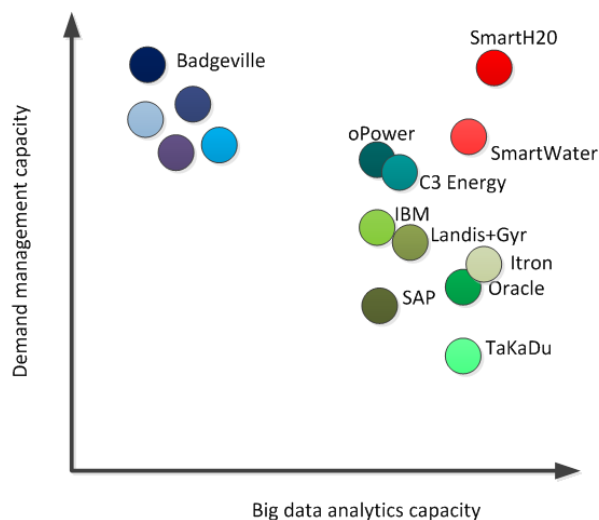
Figure 20: positioning of the SmartH2O platform.

The distinctive competitive advantage of SmartH20 is the integration of water analytics with

gamification, a feature that is not provided by any of the competitor.

Also the best of breed products, such as oPower and WaterSmart, which contain solutions that in part overlap with the SmartH2O approach, does not afford the behavioural change aspect introduced by gamification.

As shown in Figure 20, the market is characterised by two clusters of products: solutions that address only the gamification of the users' behaviour, and solutions that address mostly the consumption analytics.

The former are far from being directly usable by water utility; they require a deep integration effort and assume the availability of a digital system for the collection and visualization of consumption data.

The latter are strong in the water analytics function, also with water leak detection capacity, but stop in front of the (hard) problem of addressing the change of behaviour of the water consumer.

SmartH2O closes the gap between these two classes of systems. Its unique proposition is the integration of real consumption data with the tracking of online behaviour (in the web consumer portal, in the digital game, and in the mobile version of the consumer portal); this allows SmartH2O to collect a broader variety of user's activity signals and deliver a more precise and personalised set of behavioural change stimuli.

3.5   Complementary product analysis

SmartH2O in the water management stack

SmartH2O is part of the broader network and IT infrastructure of a utility.

Figure 21 pictorially overviews (using a darker colour) the functional area of the water management architecture that is covered by the functionality of the SmartH2O platform.
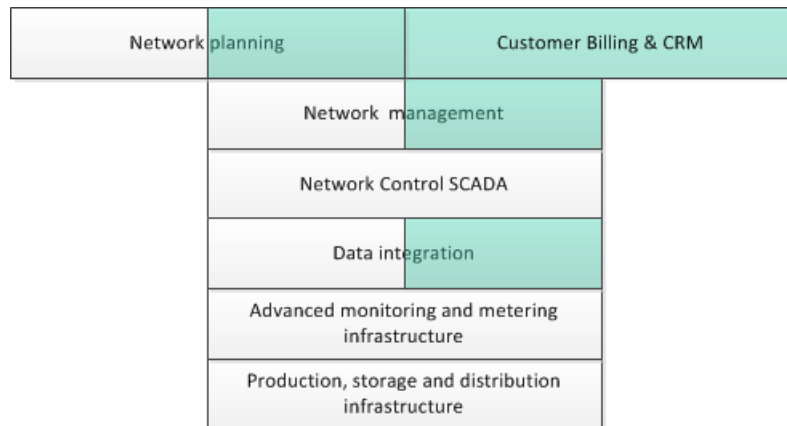
 Figure 21: coverage of the water management architecture by the SmartH2O platform.

Advanced monitoring and metering infrastructure hardware

This Section will be completed in the final version of the deliverable: D8.6 Final exploitation plan.

Water control SCADA solutions

This Section will be completed in the final version of the deliverable: D8.6 Final exploitation plan.

Water network management tools

This Section will be completed in the final version of the deliverable: D8.6 Final exploitation plan.

3.6 PEST / SWOT analysis

This section contains the PEST / SWOT analysis of the SmartH2O platform. The PEST analysis is applied to measures the potential market of utility efficiency tools, whereas the SWOT analysis focuses more closely on the SmartH2O business proposition. PEST analysis is normally performed <u>before</u> SWOT analysis, because PEST helps to identify SWOT factors. PEST and SWOT are two complementary perspectives, which can contain common elements.

3.6.1 PEST analysis

PEST analysis measures the market potential and situation, particularly indicating growth or decline, and thereby market attractiveness, business potential, and suitability of access. It uses four perspectives: Political, Economic, Social and Technological.

Political	Economical
Political The Sustainable Development Goals include the objective of ensuring availability and sustainable management of water and sanitation for all Integrated water resources management, water quality management, institutional capacities, national water strategies and policies, aside from groundwater management, modernization of irrigation systems, on-farm water management and the like are among the fields in which FAO is engaged to address increasing water scarcity and achieve sustainability of water use for food production [source: Food and Agriculture Organization of United Nations] The International Energy Agency projects water consumption will increase by 85% by 2035 to meet the needs of energy production. Global water requirements are projected beyond sustainable water supplies by 40% by 2030 [source: World Economic Forum Global Risks 2015] Movements for free water are active across Europe and can exert some influence on the policy debate. Each year more than 32 billion m^3 of treated water are lost through leakage. An additional 16 billion m^3 are delivered to customers but not invoiced because of theft or poor metering. A conservative estimate of the total annual cost to water utilities worldwide is US $14 billion. (source: World Bank). Smart grids have been deployed massively worldwide since the 2010's. Pillar VII: ICT-enabled benefits for EU society of the Digital Agenda for EU foresees actions for improving the deployment of smart metered distribution networks. The European Digital Agenda target of 75 % of the population using the internet regularly in 2015 was reached in 2014 (source: Eurostat) The application of price cap regulation in more and more contexts across Europe will provide incentives for water utilities to improve operational efficiency (e.g. limiting maintenance costs, decreasing energy costs, reducing leakages, preventing tampering and thefts,…) The full cost recovery principle introduced by the Water Framework Directive will stimulate European regulators to devise tariff schemes able to incorporate water resources costs. The economic regulator for England and Wales water service, OFWAT, for instance, has introduced two water efficiency indicators (the base service water efficiency, BSWE, and the sustainable level of water efficiency, SELWE) which measure utility-level performance. Targets are established for both the indicators, and SELWE enters the formula used to compute the regulated tariff.	**Economical** The global water market size reached 557 USD billion in 2013. Global capital expenditures of utilities was estimated to be worth 195 USD billion in 2013 (source: [UKWRIP14]). The UK water industry features 20 water utilities, which invest £5.85bn in assets each year and £5.17bn in services (source: [UKWRIP14]. Water sector reforms leverage the charging system to incentivize efficient use of water, increase smart metering, and improve the synergies between water and energy [W9]. The German water sector comprised 6,211 water utilities in 2007, of which 5,972 deliver water to the final customers [Z13]. The Italian water sector comprises 1,235 independent firms and public bodies at the end of 2013 (Source: AEEG database). The national regulator approves tariff-covered investments for operational efficiency, which exceeded 1.49 billion € in 2014 (source: AEEG report 2014). Business Insider Intelligence estimates that by 2019 the global Internet of Things market will be more than double the size of the smartphone, PC, tablet, connected car, and the wearable market combined [source: Business Insider 2014]. Efficiency through smart networks is growing. Smart water meter revenue will double by 2019, rising to $1.1 billion, up from $575 million in 2013. By 2020, smart devices will make up 20 % of total revenue for water meters. North America is the leading adopter of AMI networks, but growth is occurring in Europe. France is the fastest-expanding market worldwide, with penetration approaching 50%. Following France in Europe are the U.K., Ireland and Germany—all countries experiencing a rapid transition to adopting two-way smart water meters. (source: IHS Technology Report Smart Water Meter Intelligence Service). The SWM market is expected to grow from $7,340.0 million in 2015 to $18,310.0 million by 2020, at a Compound Annual Growth Rate (CAGR) of 20.1% from 2015 to 2020.Some of the key players in this market include IBM, General Electric, ABB, Itron, Elster Group, Schneider Electric, Sensus, and Takadu. [source: MarketResearch 2015] Demand management and customer engagement s the next efficiency measure. Worldwide utilities are estimated to reach IT spending for customer gamification up to $65 million in 2016 and by the same year 60% of progressive worldwide energy retailers are expected to use at least one gamified application (source: IDC Energy Insights).

Metering efficiency is starting to be taken into account in the regulation of water services in Europe. OFWAT in England and Wales and AEEGSI in Italy have already introduced or are gradually introducing performance indicators aimed at measuring the quality of water metering activity [AEEGSI 2013, OFWAT 2012] At EU level, privacy and data protection issues have been ubiquitous in the policy discussions on the introduction of smart metering systems, within a more comprehensive discussion on the new smart grid paradigm (see, for example, discussions on Data Protection Impact Assessment (DPIA) and Data Protection by Design (DPbD) approach).	

Figure 22: PEST analysis of SmartH2O (continues).

Social	Technological
Internet penetration in EU in 2014 has reached 78,5% of the population and 81% of all households in the EU-28 had internet access (source: Eurostat 2014)

51 % of individuals aged 16 to 74 within the EU-28 used a mobile device to connect to the internet in 2014 (source: Eurostat)

One in ten individuals used software run over internet cloud in 2014 (source: Eurostat)

The most common online social activities for young people in the EU-28 in 2014 is e-mail (86 %) and social networking (82 %); 51% of young people interacted with PA over the internet (source: Eurostat 'Being young in Europe today' report)

In EU-25 one out of two European citizens feel well informed about environmental issues; a vast majority believe that they make efforts for improving the environment, 43% "often", 42 % "sometimes" (source: Eurobarometer 2014]

Flash Eurobarometer on Water shows that 75% of Europeans consider that the EU should propose additional measures to address water problems, 68% recognize that water-related problems are serious and worry equally about water quantity and quality. Citizens wish to do more to protect water resources and view awareness-raising as the most effective means of reducing water-related problems. A majority support water pricing based on volumetric use, and agree that prices should increase as the environmental impact grows. (source: Flash Eurobarometer 344).

Digital gaming is highly popular in the EU. 25 % of EU population plays games at least once per week and 39% declared a fair or high interest. Across Europe, a majority of parents thinks videogames encourage their children to develop more skills and 64% of parents have children who play games (Source ISFE 2014). | Advanced Metering Infrastructure (AMI) technologies growth accelerating, driven by telecommunication infrastructure deployments (e.g., LTE vs HSPA) and legislation push.

Improvements in battery life expectation, to and beyond 20 years, will further reduce the operational cost and accelerate the adoption of AMI (source: Metering International, 2013).

Consumers' data analytics technologies are found as the most prominent area of interested for utilities that deploy smart grid / AMI projects (source: GTM Research 2014)

Proliferation of communication standards for smart grids (Z-wave, Zigbee, IEEE.802.11/16, IEEE.802.22, LTE, Cellular 3G/4G, PLC, etc) increase deployment complexity and call for adaptable architectures.

Security and privacy are prominent issues for AMI acceptance; detailed information of customers' consumption can reveal their life style. Transmission of data over long distance as well as storing the data in various places for re-transmission or analysis can also create vulnerabilities [Mohassel2014]. |

Figure 23: PEST analysis of SmartH2O (continued).

3.6.2   *SWOT Analysis*

SmartH2O SWOT analysis aims to identify the key internal and external factors that are considered essential to achieving the business objectives. The analysis groups key factors into two main categories:

- Internal factors – the strengths and weaknesses internal to the project.
- External factors – the opportunities and threats presented by the environment external to the project.

Strength	Weaknesses
Unique integration of consumption data analysis and gamified customer relationship management	Complexity of the approach that demands capacitation of the utility personnel
Unique data analysis capability that delivers high quality operational and business intelligence and enables water demand management	Limited international reach of the industrial partners that demand business alliances to address the EU market
Original approach that integrates educational games and gamification of consumption	Lack of coverage of the water network operations management, which demands business alliances with water planning and management tool vendors
Lightweight technical approach that demands zero upfront IT investments (cloud deployment)	Lack of coverage of the smart meter sector, which demands business alliances with smart meter vendors
Flexible pricing model (pay per user) that enables adoption by utilities and PAs of different sizes	Data protection and utility conservatism with regards to innovative use of short-term water use information and the potential use of time-changing charging for water supply.
Multi-utility approach easily portable to other sectors (energy, gas), which facilitates uptake and optimises ROI for multi-utilities	
Opportunities	**Threats**
Water scarcity and network operational costs prompt utilities for implementing efficiency measures, both for operational efficiency and for lowering the cost of future system upgrades	Financial restrictions on investments slows down deployment of smart meter infrastructures
EU and national legislation push PAs and utilities towards better demand management	Absence of dominating standard in the IoT sector delays adoption of smart networks by utilities
Diffusion of mobile apps make customers always connected and keen on using digital solutions for water billing and consumption monitoring	Emergence of competitors from the US energy gamification market
Public subsidies and transfers from EU, national and local public budget may source	Public subsidies are decreasing in most countries due to public budget constraints and regulation of State aids.
additional resources for investment in water conservation, and relax financial constraints	High-priority investments, e.g. the modernization and extension of wastewater works and plants according to policy obligations on water quality, can compete with investments in smart water management. For instance, Italy and other EU countries have been prosecuted for the infringement of EU Directives on wastewater treatment and are currently engaged to invest in this sector.
and/or lower debt service costs. Public finance instruments take different forms (e.g. from traditional grants to more innovative project finance schemes).	

Figure 24: SWOT analysis of the SmartH2O platform.

3.7 Marketing, communication and sales strategy

3.7.1 Business models

Two complementary business models can be employed for the commercialization of the SmartH2O:

- On premises software licensing is the traditional way software applications are installed, run and maintained on the IT infrastructure of the purchaser.
- Software as a Service (SaaS), as defined e.g., by Gartner, is "software that is owned, delivered and managed remotely by one or more providers. The provider delivers software based on one set of common code and data definitions that is consumed in a one-to-many model by all contracted customers at any time on a pay-for-use basis or as a subscription based on use metrics."

The **on premises software licensing business model** requires the installation of the SmartH2O platform in the IT infrastructure of the customer.

Table 19 summarizes the differences between the on-premises and SaaS business models from the viewpoint of the software vendor (i.e., the SmartH2O platform vendor).

Table 19: Comparison of on premises and SaaS business models for the provider.

	On premises	SaaS
Cost of installation	Cost of multi-OS installation procedures	Low installation cost on standardized cloud infrastructure
Cost per customer	Technical support for customer performed installation	Low customer image instantiation cost
Time and cost to go-live	Requires on-premises license release, activation and installation	Instantaneous instantiation, possibility of self-provisioning by the customer
Maintenance and release planning	Required on multiple versions (e.g., per each OS)	Centralised on the cloud version, all customers are on the same release. Release cycles are faster (only one version must be supported).
Sales cycle impact	Customer trials difficult	Customer trials easy
Security and privacy	Managed by the customer	Requires commitment to highly secure infrastructure (either owned or licensed by a third party)
Customer data analysis	Not possible	Possible, also cross customers due to multi-tenant data storage
Customization	Available as an additional paid service	Normally not available
Integration	Available as an additional paid service	May be difficult
Mobile support	Need to programmed, sold as additional paid service/version	Natively supported through mobile browser

Table 20 summarizes the differences between the on-premises and SaaS business models from the viewpoint of the purchasers (i.e., the SmartH2O platform customers).

Table 20: Comparison of on premises and SaaS business models for the customer

	On premises	SaaS
Cost	Up-front capital costs for hardware, software licensing, housing, etc.	Pay per use
Customization	Normally limited	Normally available as additional service
Evolutive maintenance	Scheduled by the provider	Available as a personalised service
IT infrastructure	Managed by the provider	Managed by the customer

Security and privacy	Internet access risks	Risk mitigation if access is restricted
Data storage	In multi-tenant, shared infrastructure	In own private structure
Mobile access	Normally granted via mobile browser	Normally provided as additional feature
Integration		
Control	Control of system and data by the provider	Customer controls both system and data

Preliminary considerations about SaaS vs on-premises business models

The comparison of SaaS and on-premises business models illustrated in Table 19 and Table 20 permits a preliminary assessment of the most promising approach for the exploitation of the SmartH2O platform, summarised as follows:

- The **SaaS business model appears to be the most promising one for starting up the commercial activity of the SmartH2O**, because
    - ○ It entails shorter product and service engineering time, which will accelerate the time to market of the research results after the conclusion of the project.
    - ○ It requires a smaller up-front development effort, which reduces the initial capital needed to start-up commercial activity.
    - ○ It enables a sales strategy focused on small and medium utility businesses and PAs, which constitute a majority of the Italian, Swiss, Germany, and France markets.
    - ○ It allows, under proper customers' agreements, a faster and more effective fine tuning of the accuracy of the consumption disaggregation and consumer classification algorithms, permitting the cross-correlation of (suitably anonymised) large pools of consumption data from different water companies.
- The **on-premises business model may be a mandatory choice in special cases**, e.g., to follow up activities with partners Thames Water and Agua de Valencia, who already have in place a fully functional IT infrastructure with which the SmartH2O platform must be integrated.

3.7.2   *Advertising and promotional strategy*

The detailed advertising strategy obviously depends on the specific product configuration and branding options that will be selected for the post-project exploitation, as well as on the available funding for the commercial launch of the SmartH2O platform commercial follow-up product.

However, at this stage of the project, it is still possible to devise the coarse guidelines of an advertising and promotional strategy, derived from that of smaller size competitors (e.g., WaterSmart, Takadu).

The advertising channels more relevant to the promotion of the SmartH2O platform comprise:

- **Search engine targeted advertising**: this channel is pursued by the publication of ads in major search engines (most notably Google and Bing). It entails the careful selection of keywords (a.k.a. "adwords") to be associated with the products and services and the targeting of the countries for which ads should be published as sponsored results in the result set of searches containing the adwords Examples of adwords selectable for SmartH2O advertising include:
    - ○ Water management
    - ○ Smart meter
    - ○ Advanced Meter Reading AMR
    - ○ Advanced Meter Infrastructure AMI

- o Water demand management
- o Leak detection
- o CRM for utilities
- o Gamification for utilities
- **Social media targeted advertising**: social media advertising is a special case of online digital advertising in which the platform is a social network instead of a search engine. The advertising strategy for SmartH2O on social media cab be twofold:
  - o Addressing **generalist social networks** (such as Facebook and G+) in order to raise the awareness about the sustainability benefits induced by the SmartH2O platform in the consumers; this action could indirectly impact the awareness of utilities, who would see an interest in offering to their customers the opportunity to join a gamified community of "green" and ecologically sensible consumers.
  - o Addressing **generalist social networks** such as LinkedIn, Facebook for enterprises (a.k.a. Facebook at Work), and Twitter. These ads would target all professionals involved in the water value chain and would directly impact the visibility of the platform as a potential market player. To optimize the placement in professional social networks, a social media strategy described next will be exploited.
- **Event sponsorship and attendance**: the SmartH2O platform can be advertised directly at major events in the target markets (primary and collateral); this activity has already started, to showcase the research results and pave the way for the post project advertising, by creating curiosity and expectations about the commercial follow up of the project. Examples of the targetable events/programs in the water sector include:
  - o World Water Day events in different countries.
  - o International Water Conference.
  - o European Utility Week.
  - o Aquatech.
  - o WaterPro Conference
  - o Next Generation Water Technology
  - o EWA events and conferences
  - o EIP Water events
  - o Expoapa
  - o Danube - Eastern Europe Regional Water Forum
  - o Accadueo (Italy), Ecomondo (Italy)

To these digital strategies, it is possible to add traditional paper advertising on such business magazines as Global Water Intelligence (International), Servizi a rete (Italy), Utility Week (UK).

3.7.3 *Social media strategy*

The social media strategy is a complement to the advertising strategy that aims at attaining visibility though the exploitation of the **network effect** in social media platforms.

The social media strategy can optimize the advertising strategy by pursuing the amplification of the reach of the advertising though the role of influential social media users, who could propagate effectively contribute to cascading the information about a product or service to their (vast) social audience.

The social media strategy consists of the following steps:

1. Definition of the message: the messages (e.g., mission, vision, key concepts, benefits, case histories) prepared during the communication strategy is optimized for the delivery along social media channel (e.g. shortened for twitter communication)
2. The target social media platforms are selected
3. Influential users in such platforms are identified and networked (e.g., by invitation, mention, re-post, etc)
4. Messages are targeted to the social media platform,possibly mentioning / addressing

/ involving influential users

5. Reach and resonance of messages is monitored for determining effectiveness and impact
6. The strategy is revised (starting from point 1) based on collected feedback.

The social media strategy has been already initiated for the dissemination of the pre-commercial research results f the project.

As an example, the Annex A.8   List of water related twitter accounts contains a list of 500+ highly influential Twitter accounts that are being monitored to determine the ost relevant keywords and hashtags to use in future social communication on Twitter.

3.7.4 Sales strategy

Sales components

The sales of the SmartH2O platform, under a SaaS model, can be decomposed as follows:

- **Service subscription fee**: this may be a scalable yearly subscription, computed e.g., per number of users.
- **Training fees**: this component denotes the training services offered to customers for making them immediately proficient with the use of the platform; thy can be further divided into
  - o **Online training fees**: a web learning channel could be setup and offered by subscription to the customers, offering training materials on all the aspects of gamification and demand management.
  - o **In presence training fees**: traditional, class-based training can be also offered as a service, both on the customers' premises and at the training facilities of the seller.
- **Consultancy:** strategic consultancy services could be offered to companies on all aspects of demand management, AMI deployment, operation optimization, CRM, and gamification**.**
- **Customization and integration**: development services, typically offered on either a project-based fee or time & materials, for the extension of the platform with customer-specific functionality or for the integration of the platform with back-end services of the customer.

Figure 25 shows a possible sales mix for the Smarth2O platform (Service subscription fees 60%, Training fees 10%, Consultancy 10%, Customization and integration 20%)
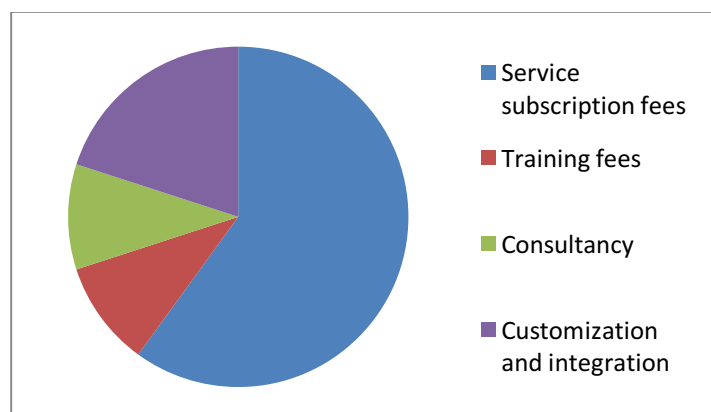
Figure 25: Possible sales mix of the SmartH2O platform.

Sales models

The available sales strategies for the SmartH2O platform, as for any other SaaS software solution, comprise the following models.

- **Online sales**: Marketing and selling a solution via the Web, which requires limited interaction with customers. Typically, this channel is backed by customer support, whose role is focused on answering questions and on-boarding customers.
- **Direct sales**: in-house sales force seeks and engages with prospects to convert them into customers.
- **Affiliate sales**: affiliates are partners who drive online sales. They are similar to a marketing channel and do not provide sales support.
- **Reseller sales**: resellers are partners who act mostly as a marketing channel, without providing any additional value other than managing the sale. These partners derive their revenue through the sales margin provided by the product owner (normally in the range 10-20%). This solution mostly works for installed software providers and hardware vendors.
- **Value-added reseller**: partners who provide services wrapped around the product to deliver a more complete solution to customers. They derive the majority of their revenues through the delivery of services, rather than   from the resale margin.
- **System integrator**: partners who develop more complete solutions by integrating the product with others. They are traditionally focused on installed software and/or hardware, but they can also support SaaS solution providers. As VARs, they make the majority of their revenue through services.
- **Distributor and Value-added Distributor**: these partners broker access to a pool of resellers or value-added resellers. The value of a distributor is to extend reach to many potential partners. They tend to work for well for installed software and hardware vendors.
- **OEM**: companies with their own product to sell, who aim at expanding their offering with complementary products.

The abovementioned models are not all equally suitable for the sales of the SmartH2O platform, especially if a SaaS business model is pursued.

Table 21 identifies the sales models that can be more compatible with the SmartH2O platform, market, and business model.

Table 21: Suitability of sales model to the SmartH2O solution and business model

Sales model	Suitability to SmartH2O	Notes
Online sales	Limited	Integration with AMI makes a completely online model difficult to pursue. Self- provisioning would require making the customers autonomous in the connection of their AMI data to the platform.
Direct sales	High	
Affiliate sales	Low	A pure marketing is not compatible with the nature of the SmartH2O solution.
Reseller sales	Low	The nature of SmartH2O requires adding value to an indirect sales model.
Value-added reseller	High	Added value could reside in the customization of the data connector or of the front-end functionality and look&feel. Both options could be compatible with a SaaS business model.
System integrator	High	System integrators building AMI or network management solutions could incorporate SmartH2O in their offering, also in the case of SaaS deployment.

Distributor and Value-added Distributor	Low	In the water utility market there seem to be no global distribution operators.
OEM	Medium	Hardware vendors of AMI and smart meters could bundle the entry level version of the platform in their product to increase sales value.

The compatible sales models have pros and cons that depend on several factors regarding the SmartH2O solution and the reference market.

Table 22: Comparison of direct and indirect sales model for the SmartH2O platform

	Direct sales model	Indirect sales models (VAR, SI, OEM)
Cost of sales setup	High initial investment in sale force recruiting, training and support.	Lesser up-front investment in sales force build-up. Depending on sales complexity, channel training and support can incur high cost.
Interaction with customer	Provides direct customers' feedback, which may prove valuable in the early stage of product/service development. Allows one to maintain control over the initial case histories.	Pre-sales customer interaction must not be overly complex to be delegated to channel partners. For instance, self-service online demo and trials must be provided to lower the required level of interaction and expertise of the channel partner, especially for OEM.
Sales scalability	Direct sales scale more slowly, due to investment and training requirements. Setting up an own international sales force takes time and high investment levels.	A third party already selling to the target customers may accelerate the scale up of sales. International partnerships, e.g., through global scale SI, may decrease the effort of international sales start-up.
Product/service complexity	Direct sales are most suited if the product / service have inherent complexity, which may impact the pre-sale and post-sale support.	Indirect sales require the transfer of competence to the channel. If the complexity is substantial, the SI channel can be preferable. VAR requires training the partner on the delivery of the solution/service and demonstrating a clear ROI of the service sale. OEM focus is typically on their own product, which may entail a stronger engagement of the solution provider in the service delivery.
Control of the customer	Direct sales permit a better control of the customer relationship, which is particularly valuable during the start-up phase to capitalize feedback and gather case histories.	Channel partner typically own the relationship with the customers. However, especially for the SI channel, part of the service may be delivered by the solution provider, which may entail a sharing of the customer relationship.
SaaS compatibility	Direct sales model is the typical option for SaaS	Indirect sales are less frequently paired with SaaS business models. However,

	offering, because it streamlines the relationship with the customer, which may largely managed online.	SaaS VARs and also SI companies are emerging, e.g., Software Allies[1] provides services around cloud SaaS solutions, such as Salesforce.com. Furthermore, many large software vendors, such as SAP, IBM, and Oracle are progressively offering SaaS to their customers, which will promote a growth of indirect sales channels also for SaaS.

In the light of the observations listed in Table 21 and Table 22, a viable sales strategy for the SmartH2O platform could proceed along the following steps:

- Adopt a direct sales strategy, coupled to the SaaS model, in the inception phase.
- Collect case histories and customer relations.
- Engage in relationships with VARs in the AMI and network management tools sectors, while selling directly.
- Engage in relationships with SIs, while performing projects with large customers, leveraging their existing service suppliers.
- Build an indirect sales channel, starting from VARs and proceeding to Sis, when size of business reaches sufficient critical mass.

More details and hard facts on the definition of the business model of the SmartH2O platform are provided in deliverable D8.5 (SmartH2O – Business Ecosystems Report). Specifically, Section 10 (SmartH2O platform: financial plan) highlights the assumptions behind the financials aspects of the SaaS business model and illustrates the variables characterizing the model, used to estimate the financial flows and break-even of direct sale in SaaS mode.

3.7.5   Communication tools

The post-project communication tools will have a commercial orientation and thus will differ profoundly from the communication tools designed for the SmartH2O project, which have a manifold purpose and audience:

- Conveying scientific excellence to the international community of researchers
- Promoting the Project as part of the EC research funding programs
- Fostering interest from early adopters in the water utility industry.

The post-project communication will be, on the contrary, extremely focused on the business message, having the industrial prospect customers as primary target.

This section describes the current status of planning of the **post-project** communication toolkit, which is necessarily in a preliminary status, because many exploitation decisions that impact communication are still pending and will be clarified as a result of the field trials with the utility partners, which are ongoing at month 18 and will produce an intermediate evaluation of results at month 24 (D7.2 Validation report) and a thorough evaluation of results at month 36 (D7.3 Final overall validation and impact report).

Visual identity, brand, and logo

The visual identity of the post project exploitation will be different from the one of the SmartH2O Project.
It will convey a mix of technological and "green" values, harmonised around the notion of

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[1] www.softwareallies.com

"smart consumption": the main message being that SmartH2O enables a smart relationship between providers and consumers whereby both parties and planet earth as well are winners.

The definition of the visual identity components will proceed along the following steps:

1. Research, Vision & Design Brief
    a. Market analysis and consumer research
    b. Vision, goals and brand personality definition
    c. Logo and identity design brief:
    d. The output of Step 1 is the design brief, which provides a summary of the research phase, with: target audience(s), messaging objectives, values and mission of the brand, and the brand's products/services offering. It should also include budget, design project schedule, file formats for delivery, and other practical considerations.
2. Logo, Identity, & Guidelines
    a. Logo concept and design
    b. Identity resources
    c. Brand and style guideline: the main output of this step comprises the logo and the style guidelines, which prescribe logo usage rules, typeface system, color palette, layout grids, etc. They allow the creation of design collateral and marketing materials with coherent look&feel.

Commercial Web site

The principal incarnation of the brand and identity design is the online presence, which is concretely deployed in a web site and possibly in one or more mobile apps used by the customers.

Post-project Web site design and implementation will be conducted according to the following process:

1. Requirement analysis
    a. User identification and requirements collection
    b. Data and content analysis
    c. Navigational requirements specification
    d. Presentation requirements specification
2. Design
    a. Data design
    b. Site map design
    c. Navigation design
    d. Presentation design
    e. Technical architecture design
3. Implementation and deployment
    a. Database design and deployment
    b. Front-end implementation
        i. Dynamic page templates
        ii. Mark-up and CSS style implementation
    c. Back end implementation
    d. Content production
        i. Text, images, videos
    e. Architecture implementation or provisioning
    f. Application deployment
4. Testing and adaptation
    a. User acceptance testing
    b. Performance testing
    c. Security testing

As an example of the site map design activity, Figure 26 reporta a preliminary version of the site map of a potential customer web site for a SmartH2O platform vendor.
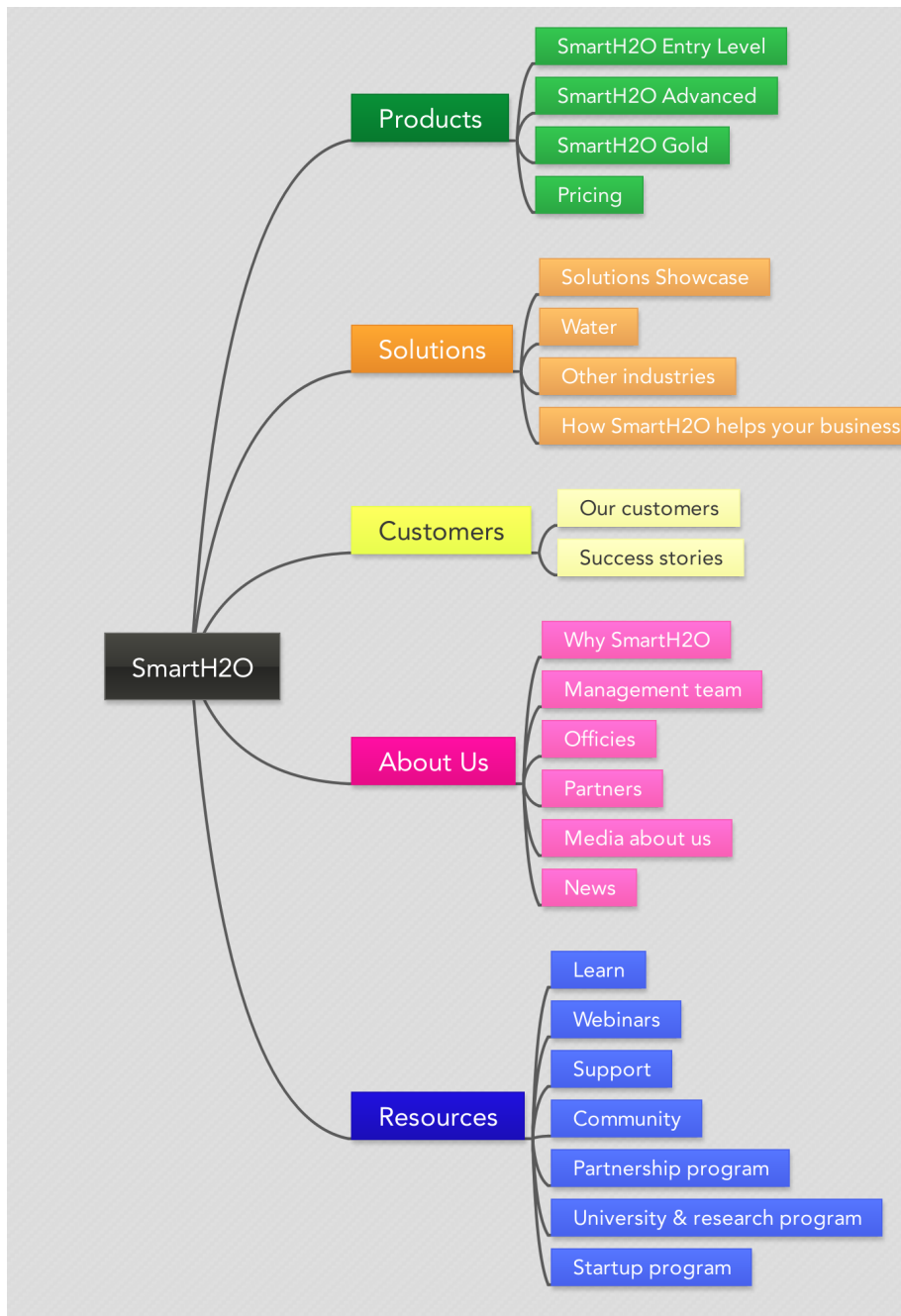
Figure 26: Structure of a SmartH2O vendor site.

Online demo and automatic demo generator

The Consortium has already produced a toolkit for the rapid setup of online and on premises demos, which has been successfully used to show practical examples of the interaction with the SmartH2O platform in a number of events.

The main functions of the automatic demo generator are as follows:

- It allows the rapid installation on a local host of all the principal components of the SmartH2O platform, with a simplified architecture that is compacted into a single machine.
- It supports the automatic restore of realistic database content (users and consumption data), which are created synthetically in order to be fresh and

consistent at each demo event. The data are generated by mimicking the consumption data of real users, and all the averages and baselines are reconstructed at demo installation time.
- It supports the local manipulation of the content of the demo in order to showcase the operations made by the customer and by the utility admin personnel; after the completion of a demo, it supports the re-initialization of the database with the standard content, to restart a new demo afresh.

The demo installation kit is package as a software bundle accompanied by a documentation manual (70 pages), not included in the deliverable for space reasons [].

Institutional Presentation

The institutional presentation is the backbone of the illustration of the future product/service to prospect customers.

At this stage of the project, a draft of the institutional presentation has been prepared, with the following content:
- Home page, with slogan and payoff
- Outline
- Profile of the company (who we are)
  - Mission and vision
  - History
  - Business units
  - Markets and Customers
- The SmartH2O solution
  - The need
  - The solution in a nutshell
  - Benefits for the customers
  - Technical architecture
  - The consumer portal
  - The admin dashboard
  - Cloud and BigData infrastructure
- Why SmartH2O
  - For the water utility
  - For the consumer
- Highlights (optional)
  - The behavioural science approach
- Experiences
  - Customer case 1
  - ..
  - Customer case N
- Commercial information
  - Licensing models
  - Pricing

Figure 27 shows an example of the institutional presentation slides.

Figure 27: example of a slide from the institutional presentation (The Need).

Case histories / success stories

Case histories are data sheets that convey in a compact manner the benefits of adopting martH20 in a specific customer's project. They can be used in a variety of ways:

- Published in the institutional web site;
- Attached to a periodic newsletter.
- Printed as leaflets and distributed at events and roadshows
- Printed as poster and used at events and roadshows.

Figure 28 shows the layout and content of a possible case history sheet, usable for SmartH2O platform (the graphics is only illustrative, and can be easily adapted to the final VI chosen for the platform).

Figure 28: Template of a SmartH2O case history.

4. GAMIFIED ONLINE WATER BILL

This asset has been collapsed into the basic, entry-level version of the SmartH2O platform, see Section 3.1.4 Modules and Packaging.

5. BOARD GAME & CUSTOMER LOYALTY SOLUTION

5.1 Asset description

The board game and the companion mobile app solution is a unique value proposition for the market aiming to leverage on the appeal coming from the board game product enhancing it with the digital extension.

In our case the board game is more properly a card game designed to be played by families and aiming to raise the awareness around water consumption.

The game is based on a classic "push your luck" paradigm used in card and board game since the Egyptians and here revisited in order to be appealing for a juvenile audience.

The game is supposed to be given to the customer of the utilities that showed water saving behaviours as a reward

Figure 29: the Drop! card game package.

5.2 Market definition

The Drop! card game and the digital extension form a complete ecosystem to be sold as a B2B product for companies that want to increase their customers loyalty therefore our potential customers are companies, utilities and any business with a strong customer-centric politics.

5.3 Product/service definition

Drop the card game is a classic card game with a set of fully colour cards and a digital app that completed the user experience. The app is not mandatory but is required to fully exploit the potentials of the gamification features we put in place.

5.4   Competition Analysis

There are some products already on the market that mix the physical board or card game with a digital extension. The majority of those games are totally entertainment related products and even big brands in the market approached this multi-media , in the real sense, approach.

Activision published Skylander as a video game with a physical extension that allows the kid to expand the game experience with physical action figure that are translated into digital characters. Games in the series are played by placing character figures on a device that reads the figures' tags through NFC and imports the character represented by the figure into the game as a playable character

Figure 30: the Skylander game and product line.

The Skylander approach is a very solid marketing one and implies that the player needs both the physical game and the digital one in order to compete.

Many other manufacturers adopted another approach like starting from the board game and then create the companion app that unlocks specific game modes and features.

Some examples are reported in the following sections.

5.4.1   XCOM

Based on the video game series of the same name, XCOM puts up to four players in charge of a military organization that must defend Earth from invading extra-terrestrials. Each player has a different role and a host of things to keep track of.

The digital side of things—an app that's available for iOS, Android, PC, Mac, and even web browsers—keeps the game from falling into a common pitfall of cooperative games: veteran players who want to control everyone's turns.

Along with setting timers and announcing actions, the app takes the game's state into account and triggers events accordingly. If there are too many satellites in orbit, for instance, the action order gets scrambled.

In this game the digital extension is a companion app that help the user stay engaged while the board game goes on.

5.4.2   GOLEM ARCANA

Players stage battles between rival factions who employ magical war machines. Figures on the board represent your golems, but there's also a knight that controls each one and whose presence is entirely digital. You must select your knights when building your army in the app, and each one has a special ability to integrate into your strategy. Armies also have the favour of godlike beings called ancient ones, who can grant bonuses or curse your enemies during the course of the battle and are also chosen through the app. Mixing the knights, factions, and ancient ones provides a surprising amount of variety, even if you're just using the six golem figures that come in the base set.

Figure 31: the Golem Arcana game.

Those are just some examples of board games with digital extension, but what differentiate Drop! From any other product on the market is the resalable and white-labelling ecosystem we created.

Drop! was conceived as a product that can easily be adapted to many different industries and sold to different type of customers that want to increase their client's loyalty.

Another main differentiator is that Drop! was designed as a Customer Retention and branding product and not ad a fully flagged commercial product.

All the above listed games are meant to be a fully functional commercial product sold to the customers, essentially a B2C product.

Drop! is at the very essence a B2B tool sold in licensing to companies that want to increase their customers loyalty.

5.5 SWOT Analysis

Drop! SWOT analysis aims to identify the key internal and external factors that are considered essential to achieving the business objectives. The analysis groups key factors into two main categories:

- Internal factors – the strengths and weaknesses internal to the project.

- External factors – the opportunities and threats presented by the environment external to the project.

Strength	Weaknesses
Unique integration of physical card game and a digital companion app	Potential complexity in playing with cards and then use the mobile app
The product is appealing for juvenile audience creating a bridge between the app world and the real one.	Potentials low engagement due to lack of refreshment of the question in the app.
Opportunities	**Threats**
Engaging an entire family with a unique product.	Potential competition from big brands in the game market may cannibalize our audience

Figure 32: SWOT analysis of Drop!

5.6 Marketing strategy

Since there are two potential exploitation path: the C2C product to be sold in stores and the white-labelling and licensing of the whole ecosystem the marketing plans will vary as well.

For the C2C product distribution we are aiming to build a specific business plan. We want to address two main market at first: Italy and France. The choice is mainly driven by the size of the markets and the opportunity of using distributors we already work with.

The initial launch will be in Lucca Comics and Game Fair in 2016 and then in the Hessen fain again in 2016.

After this first phase in which we will collect user's feedback from the fair's audience we will plan the distribution using a Italian distributor that has direct connection with many POS both in Italy and in France.

For the B2B product the plan revolves mainly around the creation of a solid and appealing value proposition for businesses.

We will try to close deals with firms that are in the Customer Loyalty market so that they will be able to sell the Drop! ecosystem to their clients as a service.

The Drop! structure easily adapts to many different industry and that's a design feature since the beginning of the game design. We can easily serve: utilities (water, power, gas) and any other business sector (automotive, tech, etc.)

Based on the outcome of the partnership plan we may also think about direct sales of the

platform in licensing.

6. DIGITAL GAMES (EXTENSION TO THE BOARD GAME)

6.1 Asset description

Drop the digital game (Drop!TheQuestion) is the natural extension to the card game. The basic board game can be played alone but with the digital app the cards will be extended with an augmented reality feature that prompt the player with question aiming to test her awareness on a responsible use of water.

The app will available on the major mobile phone platform and will also connect the user with the online portal allowing us to profile the users.

Figure 33: Preliminary screenshots of Drop! The Question digital game.

6.2 Market definition

Our target market is composed of the owner of the card game and of the general public interested in trivia games with a "green" and "eco" orientation.

The envisioned approach to the market and the consequent business model are based on the response to the following questions.

- What problem is your app trying to solve and how?
    - Drop!TheQuestion solves the problem of educating people on the value of water while entertaining them with a quiz-based game.
- What is unique about your app and would people pay for this?

  Drop!TheQuestion uses a unique mix real and digital gaming, being playable in conjunction also to the Drop card game.

- What else do you think your app users would be willing to pay for?
    - Drop!TheQuestion users could be willing to pay also for other editions of the game, based on other sustainability topics, such as energy consumption,

> pollution, etc..
- What business models do competing apps use and how well have they worked?
  - Competitors have exploited two models: in-app advertising and purchases and paid premium version. In the generalist sector, QuizDuello has more than 17M downloads.

6.3 Product/service definition

Drop the digital extension is a series of mobile apps connected to the gameplay of the card game. By downloading for free the apps the player will be able to extend his game experience.

6.4 Competition Analysis

At the present time, on the marker, there are no products that implement the kind of features offered by the coupling of the card game and its digital extension.

The market of green and eco-games is still at the inception, as ecological and green games are mostly spinoff of other initialtives and/or backed by public funding and agencies.

Among the ongoing initiatives, we mention:

- Ecogamer.org: a website with a variety of free online environmental game reviews and ecological footprint calculators.
- Planet Science: a collection of online interactive games and other fun activities like quizzes. Gamers must create a perfect world by mixing and matching the building blocks to create a perfect world in an ecologically sensible way.
- BBC Climate Change[2]: the game tests the player in her decision making skills, while holding the job of President of the European Nations. Players must tackle climate change and stay popular enough with the voters to remain in office.
- ClimWay[3]: the game is about helping reach specific climate goals. Players have to create a climate plan to reduce greenhouse gas emissions by a certain percentage in a certain time frame. Plans can include setting up alternative energy sources, reducing human consumption etc
- WWF games: WWF publishes an array of educational games[4] for environment awareness and sustainability ("games with a message"). For instance, in the Toxic Blaster, players are piloting a jet-sub into the insides of a polar bear, a whale, and a man to blast away toxic molecules.
- EPA sponsored games[5]: the US Enviroment projection agency publishes Recycle City, a game where players play the role of the Dumptown Manager and create their own scavenger hunt and learn what it takes to help protect the environment.
- Ecokids: The Canadian website Ecokids[6] lists environmental games in categories like Wildlife, Climate Change, Energy, Water, Waste, Land Use, for different age levels. For instance, in The Journey of a Wildlife Photographer players have to become a wildlife photographer and check out how animals and birds have adapted to the environment.
- Eco: Strange Loop Games is is developing project to create a new kind of open world multiplayer game where the survival of every player on the server depends on

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[2] http://www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/

[3] http://climway.cap-sciences.net/us/index.php

[4] http://wwf.panda.org/how_you_can_help/games/

[5] https://www3.epa.gov/recyclecity/

[6] https://ecokids.ca/

careful management of in-game resources[7]. Funded by the U.S. Department of Education, Eco aims at becoming a platform for teaching middle school students about ecology in a communal, cloud-based game world, based on tools familiar to anyone who's played Minecraft.

Most of the mentioned titles are simple, free to play or publicly funded educational games, not connected to a commercial title nor endowed with a board or card game counterpart.

The differential factors of Drop!TheQuestion are:

- its connection to the board game Drop;
- its integraton into a digital water utility consumer portal, which make the player part of a richer and more stimulating game/gamified environment, where she can apply part of the knowledge acquired playing the game to actually improve her water consumption, which is then reflected in the smart metered consumer portal and may yield further real or virtual rewards.

This original mix of features enables the possibility of selling the game with a white label business model, where an utility company sponsors the distribution of a branded version of both the card and digital games for engaging their customers.

A different, yet correlated, case is WWF-sponsored games[8]: as of 2015, the WWF has collaborated with EA games, publisher of popular games such as the official NBA game, to offer special WWF in-game items available only for a limited time within traditional games. A fraction of the revenues goes back to to WWF. This case may hint at the possibility to exploit in-game purchases to deliver water sustainability widgets, now delivered only through the Consumer Portal, also through the digital game.

6.5   SWOT

Drop SWOT analysis aims to identify the key internal and external factors that are considered essential to achieving the business objectives. The analysis groups key factors into two main categories:

- Internal factors – the strengths and weaknesses internal to the project.
- External factors – the opportunities and threats presented by the environment external to the project.

Strength	Weaknesses
Unique integration of physical card game and a digital companion app The multimedia experience is able to engage both traditional players and tech savvy ones.	You need to download the app to extend the game experience.
Opportunities	Threats
Many enhancements may be designed for the mobile app in order to segment the users and profile them.	Potential competition from big brands in the game market may cannibalize our audience

Figure 34: SWOT analysis of the board game.

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[7] https://www.strangeloopgames.com/announcing-a-new-world/

[8] http://wwf.panda.org/how_you_can_help/games/

6.6   Marketing strategy

The business model of Drop!theQuestion is primarily based on the sale of the mobile app to individual customers. Table 20 surveys the available business models for mobile digital games, with their advantages and disadvantages.

Business model	Pros	Cons
Free With Ads (In-App Advertising)	Enables rapid diffusion Mobile advertising budget growing Good possibility of exploiting user's data (activity, etc)	Low innovation Jeopardizes user experience Conflicts with green and environmental friendly spirit of the game
Freemium (free + locked features)	Enable quick growth and feature preview "Try before buy" increase customer satisfaction and loyalty	Difficult to tune the amount of feature to be locked or enabled for free Risk of dissatisfaction of the large customer base using the free version May conflict with the social and educational nature of the game
Paid	Effective revenue model Immediate revenue flow Selects more engaged users No in-app ads, better user experience	Hard competition in app stores Revenue shared with app store Requires very high quality for top positioning in app stores (five star rating) Cost barrier to reach critical mass of downloads
In-App Purchases	May work well for water consumption widgets Enables partnerships and with utility company and environmental associations	Complex to implement May jeopardize user's experience, if not designed carefully
Subscription (paid content)	Possibility of basing paid content on geographical region and quantity of questions Continue revenue stream	Not clear if acceptable by users
Sponsorship (affiliate advertisers who provide in-app users rewards)	Innovative model Advertising is more focused and relevant to users Win-win for both app developers and advertisers (utility company)	Still new Acceptance rates not well known

Table 20: Comparison of business models.

Table 21 discusses the suitability of the mainstream business models to the case of

Drop!TheQuestion digital game.

Business model	Fitness	Notes
Free With Ads (In-App Advertising)	Mid	The aim is to become the best app for water awareness, which entails the objective of delivering a value that users would be willing to pay for. However, advertising sould be selected with care, not to conflict with the green and ecological value of the app (e.g., socially responsible advertisers only).
Freemium (free + locked features)	Low	The fixed and simple set of features of the game may not allow the definition of a free, yet attractive, version, with enough paid features to attract customers towards the purchase of the paid version.
Paid	Mid	This option is pursuable under two conditions: 1) the user experience is truly exceptional; 2) initial funding allows intense marketing
In-App Purchases	Mid	Difficulty to set up a sales channel may be overcome by the interplay with the advertisers and water gadget / rewards producers already hosted in the Consumer Portal.
Subscription (paid content)	Low	Difficulty to motivate people to pay only for content
Sponsorship (affiliate advertisers who provide in-app users rewards)	High	Possibility to affiliate with utility companies and equipment vendors (white label version)

Table 21: fitness of business models to Drop!TheQuestion.

7. SMART METER DATA MANAGEMENT COMPONENT – SMDMC

7.1 Asset description

The **Smart Meter Data Manager** (SMDM) component objective is the acquisition and processing of data streams from smart meters and consolidation within the SmartH2O database. On top of this critical feature for the SmartH2O project, SMDM component will continue being developed towards an independent solution targeting to provide business intelligence for utility companies and other markets requiring real time meter processing (e.g. vending machines).

Figure 35: A screenshot of the SMDM user interface.

7.2 Market definition

For business developments outside the SmartH2O project, SMDM solution targets B2B energy and gas utilities. It is envisaged as a cloud service following the SaaS subscription model.

The expected market for the SMDM solution is the same market that has been analyzed for the whole SmartH2O platform in Section 3. Also, the selling model will consider selling SMDM both as a standalone component communicating with the existing ecosystem and integrating SMDM the existing analytics of the utility company.

7.3 Product/service definition

Smart Meter Data Management is a solution dedicated to leveraging the use of smart meter measurements across utility organizations. It acquires and process data independently of the hardware measurement device upon a standard interpretation of the meter ID – timestamp – value pair. The solution loads, validates and stores metering data in order to facilitate the business processes of utility companies.

7.4 Competition analysis

Smart Meter Data Management is in a direct competition with big data gatherers and analytics systems such as the ones presented in Section 3 (E.g. IBM Intelligent Water, Oracle DataRaker, Siemens SmartWater or C3 Energy)

SMDM will take advantage of the SmartH2O platform as primarily selling point while we will consider the integration of SMDM into existing data processing flows of the water utilities and utility companies

7.5   PEST/SWOT analysis

The SWOT analysis of SMDM considers the factors that can influence its market success:

Strength	Weaknesses
Real time parallel processing of big amount of metering data Real time analytics for identifying relevant insights regarding water usage Pay as you go monetizing scheme easy to assimilate as an OPEX cost for the utility company	The solution need integration to the current data flow of the water utility company
Opportunities	Threats
Interesting enhancements can be imagined in regard to the integration scenarios towards the downstream of the utility organization and its clients	Potential competition from big brands in processing metering data and their alliances with smart meter producers could put SMDM in a difficult situation regarding the monetization of the solution.

Figure 36: SWOT analysis of the SMDM component.

7.6   Marketing and sales strategy

Smart Meter Data Management solution in its entirety (as a data gathering instrument and analytics tool) considers a two-way marketing approach.

The main approach will be dedicated to the water utilities (and later energy and gas utilities) to take use in a real time approach of the water consumption data and the insights that can be inferred out of it. The secondary approach will take into account the end-user needs in regard to own water consumption and due payments considering in the same time the impact of his water usage footprint in relation to the environment.

An action plan regarding marketing activities will be set in order to measure the most effective marketing actions that can be leveraged in order to impact a maximum number of customers

(an increased number of local water utilities with a not so high water consumers or a restrained water utilities from bigger towns and cities with an increased number of water users).

Regarding the sales strategy, specific actions will be considered. Such compulsory actions will consider discovering the best suited way for packaging the value provided by SMDM solution (discovering the best price that the users could pay for the value), building a strong customer relationship, enforcing our value proposition with ROI calculation and client examples, dedicating a selling channel within the software company (Set Mobile) as well as within the joint partnership. Other selling actions will be permanently considered as for example: participating to fairs and exhibitions dedicated to water management and water sustainability, opening an online selling channel and dedicating a web site for rising awareness in regard to the water consumption over the environment.

8. DASHBOARD FOR CUSTOMER BEHAVIOUR ANALYSIS AND WATER DEMAND PLANNING

8.1 Asset definition

The SmartH2O platform relies on three main elements to close a feedback loop able to modulate and influence water demand behavior:

- The Gamified online bill (and its accessories, the board game and the digital extensions), through which demand reduction objectives are communicated to the user
- The Smart Meter Data Management Component, which makes available the smart meter data, measuring the instantaneous water consumption, to the last element
- The dashboard for customer behaviour analysis and demand planning
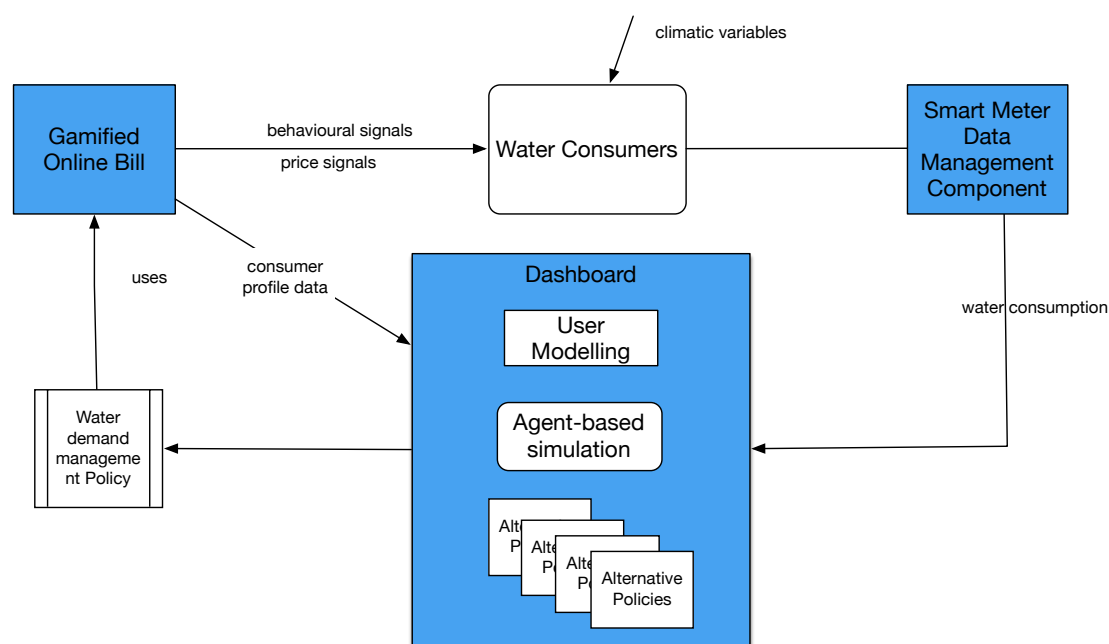
Figure 37: overview of the logical flows among the dashboard and other SmartH2O components.

In this section we focus on the specific asset represented by the Dashboard for Customer Behaviour Analysis and Demand Planning, henceforth "the Dashboard" in short.

The Dashboard is aimed at managers from the water utility. They can use the dashboard to profile their customers and to extrapolate their consumption patterns under various scenarios. In particular, the Dashboard allows to explore the potential impact of:

- Deploying gamification objectives and the impact of social norm and network effects
- Innovative pricing schemes

The Dashboard is centered around the Agent Based Modelling and Simulation Component which contains models of

- Users' water consumption behaviour, based on user profiling data and psychographic variables, elicited from the consumers through the gaamified bill in the SmartH2O platform
- User response to price stimuli: the elasticity of water price.
- User sensibility to network interaction: how much the users respond to comparison against examples of sustainable water consumption behaviour by other users in their network or circle of friends, both real and virtual

The key point in the effective use of the Dashboard is the calibration of the above models, which can require an extensive training period.

8.2   Market definition

The expected market for the Dashboard is the same market that has been analyzed for the whole SmartH2O platform in Section 3.

It would be possible to sell the Dashboard as a standalone component and feeding it with offline data in order to allow the water utility to gain insight about its customers, and to use the agent based modeling component to explore the possible evolutions of water demand.

8.3   Product/ service definition

The Dashboard is implemented as a loose collection of software artifcats that can be either implemented as software as a service within the SmartH2O Platform, but they can also be used independently as software units.

The licensing model of SmartH2O is based on an open source access to the code, and the main revenues are to be generated by the consulting services to be provided for the set-up, execution and management of the Dashboard elements.

8.4   Competition analysis

The single Dashboard component is directly in competition to big data analytics systems such as the ones presented in Section 3.

The unique selling point of the Dashboard is given by its integration in the SmartH2O platform, as only thanks to this integration the advantages make it a unique element in the panorama of available solutions for water demand management.

9. JOINT AND INDIVIDUAL EXPLOITATION PLANS (UPDATED)

This section:

- revises the joint exploitation options advocated by the The European IPR Helpdesk, as embodied in the "Horizon 2020 - A Guide to IP Management" blueprint document [EU-IPR-GUI] and in its accompanying documents (reported in the references as: [EU-IPR-NDA], [EU-IPR-KT], [EU-IPR-CIP], EU-IPR-LA], [EU-IPR-AA], [EU-IPR-JV], [EU-IPR-SO], [EU-IPR-STD], [EU-IPR-EXP]) and expresses how the Consortium perceives the feasibility of such options at the present stage of the project.
- Updates the Individual Exploitation Plans, already presented in D8.1 early exploitation plans. Each partner only reports on the new findings or intensions that have emerged in the intervening period between the two versions of the deliverable.

9.1 Joint exploitation plan for the SmartH2O platform

9.1.1 Definition of IPRs

Identification of background knowledge

The only background knowledge is constituted by the **Gamification Engine**, property of WebRatio s.r.l., third-party of Politecnico di Milano.

The Gamification Engine is one of the results of the CUbRIK FP7 project, which WebRatio has reengineered into a commercial product for the gamification of enterprise business applications.

The rights to use for research purposes of the version of the Gamification Engine produced by the CUbRIK project have been transferred from CUbRIK and WebRatio to the SmartH2O Consortium at the beginning of the project, with the signature of a memorandum of understanding by the CEO of WebRatio, and the Coordinators of CUbRIK and SmartH2O.

The Gamification Engine has been incorporated into the gamification functionality of the SmartH2O platform. Therefore suitable post-project IPR usage rights agreements will be signed between the interested SmartH2O parties and WebRatio.

Identification of foreground knowledge

The foreground knowledge of SmartH2O corresponds to the main modules of the SmartH2O architecture (see Figure 10 of deliverable *D6.2 Platform architecture and design*) plus the Drop! board game and Drop!TheQuestion digital game.

Component	IPR owner	Type of component	Used in asset
SmartH2O Database	POLIMI	Database schema	SmartH2O platform, Dashboard for customer behaviour analysis and water demand planning, Smart meter data management component, Gamified online water bill
Enterprise Service Bus	SMOB	Back end	SmartH2O platform, Gamified online water bill
Smart Meter Data Manager	SMOB	Back end	SmartH2O platform, Smart meter data management component, Dashboard for customer behaviour analysis and water demand planning
Water Utility	POLIMI	Web / mobile	SmartH2O platform, Gamified online

Customer Portal		front end	water bill
Water Utility Admin Portal	POLIMI	Web front end	SmartH2O platform, Gamified online water bill
Games Platform[9]	MSM	Mobile app + back-end	SmartH2O platform, Digital Games
Pricing Engine	UOM	Algorithm	SmartH2O platform
Models of User Behaviour	SUPSI-POLIMI	Algorithm	SmartH2O platform, Dashboard for customer behaviour analysis and water demand planning
Agent Based Modelling	SUPSI	Algorithm	SmartH2O platform
Authentication Gateway	SMOB	Back end service	SmartH2O platform
Social Network Crawler and Data Analyser	POLIMI	Back end service + front end	SmartH2O platform
Drop! Board Game	MSM	Board game	SmartH2O platform, Board Game & customer loyalty solution

Table 23: IPRs of the SmartH2O foreground knowledge.

9.1.2 Evaluation of exploitation options

This section reviews the exploitation channels for public research results, as defined by the European IPR Helpdesk Guidelines [EU-IPR-EC]. It identifies the viable options based on the assets developed in the project and the associated IPR configurations.

Open source

The Consortium has identified the release of the software in the Open Source, as a measure for maximising impact at the international level. The Open Source deployment of SmartH2O must be implemented in such a way not to jeopardize the joint and individual exploitation plans of the partners.

This entails a careful examination of the available OS licensing schemes and the comparison between their terms of usage and the dissemination and exploitation goals (and obligations) of SmartH2O.

The open source strategy design will proceed along the following steps:

- Specification of the IP protection requirements.
- Identification of the components amenable to open source release.
- Identification of the open source business models applicable by the partners in the individual and joint exploitation, including e.g. [WikiOSBM, Koenig04, MF2014],
  - Embedded
  - Dual
  - SaaS
  - Transaction
  - Advertising
  - Patronage
  - Consulting
  - Support
  - Optimization

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[9] At the time of writing, the Games Platform supports one digital game: the Drop!TheQuestion mobile game.

- Assessment of the open source licensing schemes more adequate to the business model, including e.g. [WikiCOSL],
  - MIT
  - Apache
  - LGPL
  - BSD
  - EPL
  - ECL
  - ..
- Mapping between business models, FOSS licensing schemes and SmartH2O exploitation requirements

The open source strategy of SmartH2O is described preliminarily in this document, D8.4 intermediate exploitation plan, and then will be consolidated in D8.6 Final exploitation plan, when all the exploitation and business constraints of SmartH2O have been examined at depth after a period of real field tests with the implemented prototypes.

At the current status of the analysis, a preference prevails for the MIT licence (the text is reported in Annex), which has the following desirable properties that agree with the exploitation attitude of the Project:

- It is a permissive license, short and easy to understand.
- It lets third parties include and extend the code as long as they provide attribution back to the IPR owner and do not the IPR owner liable.

For example, very popular software toolkits such as jQuery and Rails have dopted the MIT License.

Table 24 summarizes the current status of reflections about the most preferable licensing scheme associated with each SmartH2O asset, based on the principal IP protection requirements and the properties of the license.

Component	IPR owner	Business model	IP protection requirements	Type of licensing envisioned [WikiCOSL]
SmartH2O Database	POLIMI	Support and consulting	Only attribution.	MIT license.
Enterprise Service Bus	SMOB	Support and consulting	Only attribution.	Apache License 2.0
Smart Meter Data Manager	SMOB	SaaS deployment, on premises licensing	Only attribution.	MIT license.
Water Utility Customer Portal	POLIMI, WebRatio	SaaS deployment, on premises licensing	Only attribution.	MIT license.
Water Utility Admin Portal	POLIMI, WebRatio	SaaS deployment, on premises licensing	Only attribution.	MIT license.
Games Platform[10]	MSM	SaaS deployment, on	Only attribution.	MIT license.

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[10] At the time of writing, the Games Platform supports one digital game: the Drop!TheQuestion mobile game.

		premises licensing		
Pricing Engine	UOM	Internal and collaborative research. Consulting and support.	Free for research and commercial usage; only attribution required	MIT or LGPL
Models of User Behaviour	SUPSI-POLIMI	Internal and collaborative research. Consulting and support.	Free for research and commercial usage; only attribution required[11]	Apache / MIT license
Agent Based Modelling	SUPSI	Internal and collaborative research. Consulting and support	Free for research and commercial usage; only attribution required.[12]	MIT license
Authentication Gateway	SMOB	Support and consulting	Only attribution.	Apache License 2.0
Social Network Crawler and Data Analyser	POLIMI	Internal and collaborative research. Consulting and support.	Free for research and commercial usage; only attribution required.	MIT license
Drop! Board Game	MSM	Print & Play version; Commercial version	Board game	Creative Commons, BY NC SA

Table 24: summary of the open source policies envisioned for the SmartH2O assets.

Notes about the Board Game Licensing Scheme:

Information regarding the licenses schemes for "Open Source Like" board games are scarce and scattered around the web and specialized websites and forums like Boardgamegeek, thus the decision on how to make a game like Drop! Open source without diminishing the business exploitation of the game by MSM was tricky. Games and Software are similar products, because they are both collections of rules. Open source software is software anyone can modify and enhance because its source code is publicly available (and because its creators have given everyone permission to alter it). Open source games are likewise games that players can adapt to fit their preferences. The open nature of these games allows players to build on designers' ideas. Non-digital games like board games and card games can also do so according to open source principles. For example, some game designers will release their materials under Creative Commons licenses so players can download, replicate, and, in some cases, even modify them.

Designers may do this because they feel it makes discovering their games easier. Potential

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[11] *The source code of the sparse optimisation algorithm is freely available, but it requires MATLAB Optimisation Toolbox to be executed. The algorithm also uses the free YALMIP package, the license of which is available at http://users.isy.liu.se/johanl/yalmip/pmwiki.php?n=Main.License. The source code of the FHMM + iSDTW based algorithm is freely available, but it requires Python v2.7 language with the NILMTK (http://nilmtk.github.io/), Anaconda (http://continuum.io/downloads), Sklearn (http://scikit-learn.org/stable/) and Ucrdtw (https://github.com/klon/ucrdtw) packages, all freely available.

[12] The executable code of the ABM model is freely distributed. The source code of the ABM model is free for research and commercial usage, but it requires a valid AnyLogic 7 license to be compiled and executed.

players are more likely to try unfamiliar games if they can access and acquire the materials they need to play those games with little difficulty—or if they are able to receive copies of games from friends who recommend them.

Designers might also release their games under Creative Commons licenses because they feel that doing so helps promote their games' longevity. They feel that players who can freely share game materials are more likely to continue playing those games in the future (and to introduce those games to others).

By opening the design process, creators can more easily gather large groups of playtesters and hone their products more quickly than they could if the design process was closed or conducted in secret.

A prime example of this approach is the "Card Against Humanity" case. The game is sold both as a printed card game and downloadable for free to allow players to create their own copies under the "Print & Play" principle. Cards Against Humanity is available under a Creative Commons BY-NC-SA 2.0 license. That means that players can use, adapt, modify and share the game for free, but can't sell it without the owners' permission.

The success of the game can be largely attributed to its licensing scheme, which incentivized the distribution of the game through the web and let players modify the game to expand it beyond the designers' initial hopes.

Other similarly successful games using similar licenses are "Zombie in my Pocket", "Dungeon of D" and "Dead of Night".

Moonsubmarine decided to licence the Drop! Boardgame under a Creative Common "Attribution-NonCommercial-ShareAlike 3.0 Unported" licence. This choice has been made to increase the number of potential customers interested into the game, to let the players understand the rules of the game and improve them to fix any possible unseen defect and provide suggestions and ideas for possible future expansions, while letting Moonsubmarine to retain the rights to sell the boardgame in stores.

The assets will be distributed in low resolution format both as an incentive for the players to buy the printed version of the card game to fully enjoy the art of the characters and to reduce the risks of unauthorized reselling of the boardgame.

The characters design and assets, being part of the same licence, could be used to create other non-commercial games or to expand the description of the world created for the Drop! Cardgame by designing comics, children books or animation films.

Internal and Collaborative research

The internal and collaborative research exploitation options refer to the prosecution of the research and development activates initiated in the project, by both academic and industrial partners.

Individual (internal) research objectives are described in the subsections specific to each partner within section 9.2 Individual exploitation plans (UPDATED).

The envisioned collaborative research plans address the following areas:

- Water consumption disaggregation: principal investigators POLIMI, SUPSI, UPV.
- User modeling and demand prediction: principal investigators POLIMI, SUPSI, UPV
- User modeling and pricing sensitivity prediction: principal investigators POLIMI and UoM.
- Gamification optimization: principal investigators POLIMI, WebRatio, MSM.

Internal product development

Internal product development is a viable option for those assets where the IPR belong to a single enterprise-type entity (e.g., a SME), such as, for example the Game Platform (MSM) and the Smart Meter Data Manager (SMOB).

Internal service creation

Internal service development is not relevant to the SmartH2O assets, because none of the partners envisions the sales of pure services, disconnected from the sales of a product.

The Software as a Service paradigm, a hybrid between licensing and product development,

can instead be applied to the SmartH2O platform, as described in the section on the SmartH2O platform Sales Models.

Licensing

Licensing is the allocation of usage rights upon the payment of a fee or another non-monetary compensation (e.g. attribution or reciprocity in the access to extensions). The SmartH2O project foresees the association of an open licensing scheme to all project results, in order to foster the uptake and achieve maximal exploitation at the international and European level, also outside the Consortium. Section 9.1.1 Definition of IPRs summarizes the ownership of the different SmartH2O assets; section Open Source highlights the type of license that the owning partners foresee for the foreground knowledge generated in the project.

Joint-venture

Joint venture is a type of collaborative commercialization, which may range from short-term projects (non-incorporated joint venture), normally narrow in scope, to long-lasting strategic partnerships with multiple members and stakeholders (joint venture company) [EU-IPR-EC]. The SmartH2O joint exploitation plans described in Section Joint Exploitation plans entail the establishment of commercial exploitation agreements among the partners, which configure a form of joint-venture for the post-project exploitation.

Spinoff

A spin-off refers to a separate company usually established to bring IP, in this case resulting from public funding, onto the market [EU-IPR-EC].

SmartH2O partners (POLIMI) and third party (WebRatio) have a consolidate experience in spinoff creation. As explained in the annex A.6 Memorandum of Understanding, the third party WebRatio is itself a spinoff of the ESPRIT Project W3I3.

The option of creating a spinoff will be carefully compared with the option of establishing commercial agreements among the SME partners (MSM, SMOB, WebRatio), which have already a consolidated business in complementary markets.

Standardization

SmartH2O partners (POLIMI) and third party (WebRatio) have experience in standard creation. WebRatio is the promoter of the OMG standard Interaction Flow Modeling Language (IFML[13]) and OMG active member; WebRatio is probably the author of the first OMG international standard produced by a SME stablished as a result of an EU-funded project. Piero Fraternali and Marco Brambilla, from POLIMI, have authored the international book on the IFML standard [BF2014]. POLIMI and WebRatio are taking part to the ongoing standardization effort at OMG in the domain of the Internet of Things, which is extremely relevant also to the utilities industry and the water sector.

Consultancy

Consultancy will be pursued by both academic and SME partners, as a means of adding value services on top of the products engineered and commercialized after the project.

The following consulting areas are envisioned:

- Strategic consulting to (water) utilities on business model evolution and competitive advantage.
- Strategic consulting to (water) utilities on the process of AMI adoption.
- Technical consulting to (water) utilities on big data collection, integration, and analysis.
- Technical consulting to (water) utilities on user modeling and demand management.
- Technical consulting to (water) utilities on CRM implementation and gamification.

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[13] http://www.ifml.org/

9.1.3 Result protection

The Consortium has embraced an open strategy for the exploitation of results, which entails a soft result protection policy that is based on business-friendly open source licensing schemes that require only the attribution of the foreground knowledge IPR to the owner party but a allows amply possibilities to third parties for usage, modification and exploitation. As a consequence of this philosophy, the Consortium does not envision the patenting of results.

9.1.4 Agreements with third parties

The SmartH2O Consortium has already signed a pre-commercial agreement, in the form of a Memorandum of Understanding, with the CUbRIK Project and its partner WebRatio, for the use of the Gamification Engine, a pre-commercial component developed by WebRatio in CUbRIK, which transforms users' actions into achievement and rewards.

The terms of the MoU, the full text of which is reported in Annex, allows the SmarH20 reuse the gamification engine and extend it for adaptation to the water management use case of the project.

As a next step to this MoU, a contract amendment has been requested (pending approval), by which WebRatio will formally enter the project as a third party of POLIMI (WebRatio is a former spinoff company of POLIMI, with a long history of participation to EU projects and IPR exploitation). The detailed motivations of the submitted third-party request are reported in the Annex.

Furthermore, the post-project exploitation will potentially require the signature of commercial third-party agreements, especially with vendors in the complementary market areas already identified (see Section on Complementary product analysis).

To anticipate work, the Consortium has prepared a blueprint of an International Partner Agreement, the text of which is included as an Annex, which can be used as a draft to produce actual commercial agreements of two kinds

- With third-parties acting as value added resellers of the SmartH2O platform, both with the SaaS or the on-premises model.
- With third-parties producing complementary products, granting to SmartH2O the rights to resell or distribute their complementary products together with the SmartH2O platform.

9.1.5 Confidentiality management

The SmartH2O Consortium has taken an open approach to the disclosure of the foreground knowledge produced in the project, with the ultimate aim of maximizing the impact of the research at the European level.

This openness is manifest in the following decisions, already taken in the project proposal:

- Most deliverable are qualified as Public, except a few necessary exceptions (the administrative reports, the exploitation plans and the database of user information).
- Foreground software and algorithms are published in the open source, in popular repositories.
- Data sets, after suitable processing for privacy enforcement, are also published on open data repositories, made available to researchers.

Despite this open attitude, the need may arise in the contact with future prospects to protect the disclosure of sensitive information, such, for example, the marketing and sales strategies devised in the exploitation plan and the envisioned or planned business alliances.

In all the cases in which the Consortium partners foresee the necessity of confidentiality protection, a Non-Disclosure Agreement (NDA) will be signed with the external third party.

A blueprint of such an NDA is provided in Annex A1.

9.2 Individual exploitation plans

9.2.1 SUPSI

SUPSI confirms its initial exploitation plan, as detailed in D8.1. SUPSI exploitation will focus on:

- Development and application of algorithms for user profiling, based on water consumption and on socio-demographic data of the services.
- Development and application of disaggregation algorithms for the identification of end use patterns.
- Development and application of agent based models.

Applications of the above techniques will be tested on other domains, such as gas and electricity.

9.2.2 POLIMI

POLIMI confirm its commitment to in exploiting SmartH2O results, as already stated in *D8.1 Initial Exploitation Plans*:

- All the assets and results of the project will be exploited to strengthen POLIMI's position as one of the internationally recognized excellence centres
- The **Gamified online water bill** and the **Digital Game** will be generalised into a horizontal Gaming Framework, so to make it applicable to other gamification projects.
- The **disaggregation algorithms** for the identification of the end-use patterns will be generalized so to be potentially used by other water utilities as well as in other sectors, such as energy or gas.
- The **agent-based user behavioural models and water demand prediction at the household level** will be generalized into a tool for supporting water utilities in testing alternative water demand management strategies.
- **Water demand models** and **Innovative pricing schemes** will be improved jointly with UoM, e.g., to pursue advisory research contracts with utilities and regulatory authorities, while econometric methodologies and conceptual frameworks can be reused for exploratory research in the broader field of resource efficiency.

The introduction of WebRatio as a third-party with national and international exploitation intentions also makes POLIMI envision an post-project exploitation option in the provisioning of **strategic and technical consulting services**, to European utilities addressed by WebRatio's exploitation actions. For the purpose of exploitation, POLIMI can also take advantage of its affiliation to the regional technological cluster LEC (Energy and cleantech cluster - http://www.energycluster.it/en), a network of energy and water utilities, suppliers and service providers.

9.2.3 EIPCM

Contribution to the project

EIPCM leads WP2 (Requirements, design and specifications), provides a major contribution to the research work package WP4 (Saving water by social awareness) and plays a major role in the impact work packages WP8 (Business development) and WP9 (Communication and dissemination). It also contributes to WP3 (User modelling) and WP 5 (Saving water by dynamic water pricing). EIPCM's key technical contributions include:

- Conceptualization and specification of user stories and use cases that will drive the development of the SmartH2O platform
- The definition of the intended usage and outcomes of the SmartH2O platform and the Social Awareness App
- Specification of functional and non-functional requirements guiding the system design and development of the SmartH2O platform
- Conceptual design of the Social Awareness App based on the Gamified Bill metaphor and of the Dashboard for customer behaviour analysis and water demand

planning

- Development of techniques for the analysis of community roles, people influence and trust in social networks, in support of the social awareness and gamification approach of SmartH2O
- Development of incentive models for stimulating users to cooperate in the execution of smart water management tasks
- Design of the user-centered evaluation methodology for the case study validation methodology

Involvement and return expected

The exploitation efforts of EIPCM are primarily focused on the usage of smartH2O results for new research proposals on national and European level and the integration in the teaching activities of its staff. For this purpose, EIPCM has contacted a number of environmental associations, local utilities and municipalities to first raise awareness and second to acquire these organisations as project partners for new proposals. In this acquisition process, the Smart H2O portal has been used as a demonstrator to illustrate the value of SmartH2O assets for these organisations. More specifically, the Dashboard for customer behaviour analysis and water demand planning, as well as the gamified social awareness app have proven to attract the attention of the contacted organizations. As such, they demonstrate not only the added value of Smart H2O for the contacted organizations, but also the expertise of EIPCM with respect to social computing, gamification, user-centered design, social network analysis and knowledge visualization.

This strategy has already resulted in the submission of a number of follow-up proposals that strongly leverage the assets that have resulted from the SmartH2O project. EIPCM has played a strong part in the construction of these proposals also by acquiring new partners: environmental associations, municipalities, and local utilities. Here, we mention POWER, MAKESENSE and ElectricEel project proposals that also involved several other partners from the smartH2O consortium. EIPCM actively worked on the involvement of (German) partners in the project proposals.

These proposals allow EIPCM to further extend their expertise on and track record on platforms seeking to change human behaviour by applying gamification mechanisms, information visualisations, and social network analysis and community analysis techniques. In addition, by demonstrating the platform to local utilities and environmental associations also new leads for the business exploitation for other partners of the consortium (e.g. POLIMI/WebRatio) can be created. In this way, the individual exploitation strategy is aligned with and also supports the joint exploitation activities of the consortium.

9.2.4   TWUL

Thames Water's role in the project is to trial when the software platform when and as possible, and to develop its thinking and customer outreach on the topic of dynamic charging associated with smart metering. TWUL is a service provider user rather than creator, so TUWL do not plan to exploit any parts of the project for its own gain. The exploitation TWUL envisages is to potentially use the products designed, or the concepts exemplified by the products, to better serve customers and better convince regulators that TWUL is fulfilling its statutory duties and providing water services at least cost whilst maintaining a well-managed supply-demand resource balance. Better service to customers could take the form of better and more fair pricing schemes that incentive more responsible and socially beneficial consumption patterns, and also better engagement and communication with the customer base. Regarding communication with regulators, the work being done by the SmartH2O team on how to justify/set changes in pricing related to potential energy cost savings and deferred network investments could be valuable to us.

Specifically, the TWUL is considering taking forward the following points:

- Evaluate smart water platform for future use once smart metering IT infrastructure is in place, and evaluate the potential role and benefits of such a platform
- Show Thames clients platform output at workshops or customer feedback forums to elicit customer opinions on smart metering, its use of personal and metering data and its potential impact on water charging such as dynamic pricing
- Exploit SmartH2O analysis regarding economic and engineering impact of dynamic pricing, in order to evaluate the potential system-wide benefits of smart metering.

9.2.5   SETMOB

Set Mobile will offer the Smart Meter Data Management service as a cloud B2B data gathering and analytics solution dedicated to water utilities (and later to energy and gas utilities) both as a standalone component and integrated in the existing data processing flow.

The envisaged selling model is SaaS. In case that custom connectors are needed for fulfilling specific customer business scenarios (to SCADA or ERP interfaces), this will be ensured as dedicated developments.

Set Mobile intends to offer multi level support services, starting from a base plan in which the water utility is able to run in self-service the solution using the cloud deployed solution to fully managed services.

The strategy envisaged for ensuring the best possible Service Level Agreement (SLA) is customer centric with a focus on customer needs

9.2.6   SES

SES main objective is to offer the SmartH2O solution to Swiss municipalities and Swiss water agencies. The prospected solution starts from offering the outsourcing of metering and billing consumers as a preliminary step to then allow the sale of various SmartH2O modules, according to the needs of the specific situation.

Commercial agreements with the other SmartH2O partners will be explored according to the specific customer needs.

9.2.7   MOONSUBMARINE

Moonsubmarine ltd will offer to B2B clients the whole customer loyalty package. We will offer a white-labelling of the card game and of the mobile apps along with a full customization of the whole layout and questions.

The card game and mobile apps offer may be easily adapted to many different industries: utilities, food, transportation and many others.

We may offer different level of service from the fully branded app to the semi-branded solution.

The fully branded solution will allow the client to brand the card game and the mobile apps with his brand and colours and no reference to Moonsubmarine will be present. Moonsubmarine will be responsible for the full development of the customized solution, the production and the support for the apps.

The semi-branded solution may have different degrees of customization and will be distributed as a Moonsubmarine ltd product in partnership with the client.

9.2.8   Aguas de Valencia

Aguas de Valencia will exploit the results of the project mainly through its owned company Emivasa, which is the water utility company responsible for the water supply service in the city of Valencia. Emivasa is a joint company, owned 80% by the Aguas de Valencia, and 20% by the City Council. Not only Emivasa, but also Aguas de Valencia as a group, will capitalise on the results of the SmartH2O project.

The main exploitation objectives of Emivasa and Aguas de Valencia in the SmartH2O project are:

- To provide clients with an interactive tool that permits involving the consumer in the management of water demand;
- To use the appeal of the SmartH2O portal as a way of getting more and better contact information from clients;
- To offer the SmartH2O portal as an additional service to complement the set of new tools (e.g. virtual office, mobile app, etc.) made available for customers of the Aguas de Valencia Group and which are aimed to enhance significantly the communication between the service provider and the client;
- To use the different results of the project (e.g. Drop!TheQuestion or Drop! as a card game) as motivational drivers in workshops about water being carried out with scholars not only during the project but also later on;
- To obtain relevant information at household level (e.g. number of occupants, type of house, etc.) from users registered in the portal in order to better characterise consumption patterns and thus improving the accuracy consumption forecasting algorithms;
- To cooperate with POLIMI and UPV research groups in order to improve clustering and characterisation of users by analysing not only the consumption information obtained during the pilot but also working on the extended database available in Aguas de Valencia;
- To gain knowledge about the possible impact of different dynamic pricing schemes as an alternative to manage demand, especially under shortage conditions;
- To assess what is the real interest and the impact of serious games in the behaviour of real users in Spain and in particular in the Valencian region;
- To capitalise on the results of the SmartH2O project in order to set the basis for future possible collaborative projects related to smart metering, consumption patterns and customer's involvement.

Moreover, if the SmartH2O portal implemented in the Valencia case study proves to be a useful mechanism to improve customer's engagement with the water service, the portal might be extended in near future to other municipalities managed also by the Aguas de Valencia group.

9.2.9   *Universitat Politècnica de València*

The exploitation of SmartH2O results and lessons learned by UPV focuses on the following:

- Strengthen the collaboration between UPV and the other partners in the areas of work of the different WPs. This collaboration might include the preparation of consortiums for future research proposals.
- Enhance the collaboration between UPV and the water supply company of Valencia and project partner, EMIVASA, in order to co-develop further research and activities to benefit the city of Valencia, as an example of smart city in the use of water resources
- Use the results and experiences gained as the basis of new research activities, research proposals and teaching purposes
- The gamification activities developed in SmartH2O will be further applied in other contexts, and the knowledge acquired will be used in the development of further gamification schemes in which UPV could be involved in the future
- The developments and information on water costs, water bills and water pricing policies by SmartH2O will serve as basis for further research and, if possible, translated into a generalized methodology to develop smart urban water pricing policies. If possible, the applicability of similar methods in the agricultural sector will be further examined.
- The developments and application of disaggregation algorithms for identification of end use patterns will be an essential contribution to the project. This will be tested in a selected sample of households in Valencia. The results will serve as input data in

further research, as a way to enhance our knowledge of consumption patterns in Valencia. Its results will be a valuable addition to continue with the research on the water-energy nexus at the household level already started at UPV.

10. Implementation and Action Plan

10.1 Performed actions

The consortium has already performed a number of activities and implemented numerous specific actions to prepare and implement the joint exploitation and individual exploitation plans. This includes:

1. **the creation of leads with national, international and local utilities** in the countries of the project partners through meetings, presentations and demonstrations of the (first assets) of the smartH2O platform (e.g. Stadtwerke Haßfurth, ESA Energy and Automation etc.; see **Table 25**).

2. **field activities** assessing important exploitation parameters for framing the business offers, such as monitoring time and effort of deployment and integration of the various SmartH2O assets in the IT infrastructure of the partner utilities (in Tegna case study, Valencia case study and the TWUL case), which will permit an estimation of the adoption cost by future customers of the platform of an asset; identifying integration and deployment issues related to different technical infrastructures and water network management standards of the different utilities involved (SES, TWUL, EMIVASA) in order to evaluate alternative deployment configuration of the SmartH2O products and services (e.g., hosted vs in- house).

3. **demos at business events** such as the Aquality Forum in Italy and Expo APA in Romania, and the Expo in Milan

4. **Identification of technical and business gaps** in meetings with potential adopters to refine the definition of the SmartH2O product and service offer and identify the missing features that can be covered with strategic partnerships, so to obtain a complete solution fulfilling all the market requirements (e.g. with Metropolitana Milanese, Stadtwerke Haßfurth; see **Table 25** for complete list).

5. **the initiation and creation of new project proposals** building upon, extending and transferring first smartH2O project results into integrated, multi-domain energy saving and new application domains (e.g. energy efficiency, social innovation, integrated water and energy management).

First exploitation results include the successful involvement of several utilities, municipalities and environmental associations in new project proposals building upon smartH2O assets and involving different configurations of partners from the consortium, some of which have already been accepted. This demonstrates the positive perception of the usefulness of the smartH2O assets and platform for the utilities, citizen associations and municipalities who committed to the new proposals. Some of these include environmental associations such as NABU (+500.000 members) and Legaambiente (+150.000 members), the German utility Stadtwerke Haßfurth (+10.000 installed base of smart meters) or the ESA Energy and Automation, the leading provider of automation devices and services in Italy (see **Table 25** for list of performed contacts and acquired partners).

In the POWER project, a user-driven Digital Social Platform (DSP) for expansion and governance of POWER existing water networks will be set up, intended to share the knowledge and experience of water scarcity, security, quality and water consumption-related issues in different EU local authorities, thus creating an important tool for EU water policy. This project includes 4 test sites in European cities with related water utilities and has already been approved by the EC (to start in January 2016).

The MAKESENSE proposal for the ICT 10 – 2015 call (Collective Awareness Platforms for Sustainability and Social Innovation) has been planned to study, build, and experiment at scale a collective awareness platform for behaviour change and sense making integrating water and energy use, drawing on the lessons learnt from Smart H2O. The envisioned socio-technical system aims at facilitating the definition of collective and individual goals, the

emergence of alternative use patterns, including unconventional ones created by individuals or communities, the collection of data in support of behavioural change and decision making, and the evaluation of collective and individual decisions.

The ElectricEel project has been proposed in the Energy Efficiency call, with a focus on transferring first results and lessons from smartH2O to energy conservation in public buildings. Its main goal is to study, implement and test the effectiveness of methods and tools for improving energy efficiency in public buildings, with an ICT citizen's behavioral change platform supporting all the phases of individual and collective decision making. Similarly, in the DAFNE proposal an innovative analytical decision-making framework for integrated water and energy policy-making has been proposed in the environmental water management call.

Table 25: List of generated exploitation leads.

Entity/country	Role	Contacted by	Goal/Result	When
British Gas IT	Gas utility prospect for transfer of smartH2O platform to new application domain	POLIMI / MSM	Explore options for collaboration and transfer possibilities in a different utility subsector	Q4 2014
ESA spa http://www.esa-automation.com/	Vendor of sw-hw solution for smart grids, AMI sw integrator, technical partner	POLIMI	Acquired as partner for ElectricEel project proposal	Q1+Q2 2015
Legaambiente (Italy)	NGO for environmental protection	POLIMI	Acquired as project partner for MAKSENSE project proposal	Q1 2015
Naturschuzbund Deutschland (NABU) https://www.nabu.de/	NGO for envirronmental protection	EIPCM	Acquired as project partner in follow-up proposals (MAKESENSE, ElectricEel)	Q1+Q2 2015
Unabhängiges Institut für Umweltfragen e.V. http://www.ufu.de/de/das-institut.html	Research and education institute on environmental issues	EIPCM	Acquired as project partner in follow-up proposal (ElectricEel)	Q1+Q2 2015
Stadtwerke Haßfurth GmbH	Utility	EIPCM	Acquired as	Q1+Q2

http://www.stadtwerkhassfurt.de/	provider for the city of Haßfurth		associate partner (MAKESENS E) and full project partner (ElectricEel) in follow-up proposal	2015
BUND – Friends of the Earth Germany	NGO Environmen tal association	EIPCM	Meeting and presentation for motivating participation in MAKESENS E proposal	Q1 2015
City of Rostock	Municipality	EIPCM	Letter of interest for participation in future proposals	Q1+Q2 2015
City of Potsdam	Municipality	EIPCM	Incentivizing participation in future proposals	Q1+Q2 2015
City of Berlin	Municipality	EIPCM	Incentivizing participation in future proposals	Q1+Q2 2015
Naturstrom https://www.naturstrom.de/	Renewable energy provider	EIPCM	Incentivizing participation in future proposals	Q1+Q2 2015
Polarstern Energie https://www.polarstern-energie.de/	Renewable energy provider	EIPCM	Incentivizing participation in future proposals	Q1+Q2 2015
Next Hamburg http://www.nexthamburg.de/	NGO for participatory city manageme nt	EIPCM	Incentivizing participation in future proposals	Q1+Q2 2015
Deutsche Gesellschaft fuer Umwelterziehung (German association for environmental education) http://www.umwelterziehung.de/	Networking organisation	EIPCM	Incentivizing participation in future proposals	Q1+Q2 2015
Eco-Schools Network	International networking organisation	EIPCM	Incentivizing participation in future	Q1+Q2 2015

http://www.ecoschools.global/	for sustainable schools		proposals	
Bundesverband Schule Energie Bildung http://www.schule-energie-bildung.de/	Networking organisation promoting education on energy efficiency in schools	EIPCM	Acquired as associated partner in ElectricEel proposal	Q1+Q2 2015

10.2 Action plan

This deliverable has presented the current status of the work about the exploitation of the SmartH2O platform as a whole and of some specific assets that can be derived from it.

The future work will be targeted to the production of D8.6 Final exploitation plan, due at the end of the project.

Such work will comprise the following activities:

1. Finalization of the exploitation plan of the Smarth2O platform as a whole, with focus on:
   a. The selection of the joint exploitation options among those identified and listed in Section 9.1.2 Evaluation of exploitation options.
   b. The identification of the financial needs for the engineering of the project results into a marketable product.
   c. The identification of initial prospect markets and customers.
   d. The identification of initial technological partners.
2. Completion of the exploitation plans for the individual assets: board game & customer loyalty solution, digital games (extension to the board game), Smart meter data management component – SMDMC, Dashboard for customer behaviour analysis and water demand planning[14].

In view of the abovementioned objectives, the partners have already set up an action plan of meetings with potential prospect customers and technology partners, who will be contacted in order to validate the business exploitation approach delineated in this document. This includes both follow-up activities with already initiated contacts as well as new contacts for the creation of new leads.

For all the entities listed below a preliminary contact has already been established.

Entity/country	Role	Contacted by	Goal	When
Metropolitana Milanese spa (IT) www.metropolitanamilanese.it	Water utility of Milan, prospect adopter	POLIMI	Deploy SmartH2O to their customers	4Q 2015
TEA spa (IT) www.teaspa.it	Water utility of Mantua, prospect adopter	POLIMI	Deploy SmartH2O to their customers	1Q 2016
CAP Holding spa (IT)	Water utility	POLIMI	Deploy	4Q

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[14] We recall that the asset: Gamified Online Water Bill has been repositioned as the entry level version of the SmartH2O platform global asset.

www.gruppocap.it	of Milan metropolitan area, prospect adopter		SmartH2O to their customers	2015
ESA spa http://www.esa-automation.com/	Vendor of sw-hw solution for smart grids, AMI sw integrator, technical partner	WebRatio	Cross sell SmartH2O to the energy industry	1Q 2016
Maddalena (IT) www.maddalena.it	Smart meter producer, technical partner	POLIMI	Cross sell SmartH2O to their customers	1Q 2016
LSI Lastem http://www.lsi-lastem.it/	PMI, water appliance vendor	WebRatio	Cross sell SmartH2O to the customers	4Q 2015
Pipetech http://www.pipetech.it/	PMI, water appliance vendor	WebRatio	Cross sell SmartH2O to the customers	4Q 2015
DHI Italy (IT)	Network management sw vendor	POLIMI	Cross sell SmartH2O to their customers	1Q 2016
ASMAT TORINO	Water utility of Torino prospect	Webratio	Water utility optimization and and gamification	4Q 2015
A2A/ Amsa	Utility	Webratio	Water utility optimization and and gamification	4Q 2015
Cap Holding	Water Utility	Webratio	Water utility optimization and and gamification	4Q 2015
Aquedotto Pugliese	Water utility of Puglia prospect adopter	Webratio	Water utility optimization and	4Q 2015
ACSM Agam	Utility (Water and Gas	Webratio	Water utility optimization and and gamification	1Q 2016
City of Rostock	Municipality	EIPCM	Acquiring as partner for smartH2O dissemination and future proposals	Q1 2016
City of Potsdam	Municipality	EIPCM	Acquiring as partner for smartH2O dissemination and future proposals	Q1 2016

City of Berlin	Municipality	EIPCM	Acquiring as partner for smartH2O dissemination and future proposals	Q2 2016
Stadtwerke Haßfurth GmbH http://www.stadtwerkhassfurt.de/	Water utility provider for the city of Haßfurth prospect adopter	EIPCM/ Webratio	Water utility optimization and gamification	Q1/ Q2 2016
Eco-Schools Network http://www.ecoschools.global/	International networking organisation for sustainable schools	EIPM	Acquiring as partner for smartH2O dissemination and future proposals	Q1 2016
Bundesverband Schule Energie Bildung http://www.schule-energie-bildung.de/	Networking organisation promoting education on energy efficiency in schools	EIPCM	Acquiring as partner for smartH2O dissemination and future proposals	Q1 2016

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A. Annexes

A.1 Template of SmartH2O Non-Disclosure Agreement

INTERNATIONAL MUTUAL NON-DISCLOSURE AGREEMENT

This Non-Disclosure Agreement ("Agreement") is entered into as of the date last written below between <SMARTH2O PARTNER>, a < TYPE OF ENTITY> organized under the laws of <COUNTRY> having its place of operation at <ADDRESS> ("**SmartH2O**"), and <THIRD PARTY>, a < TYPE OF ENTITY> organized under the laws of <COUNTRY> having a place of business at <ADDRESS> ("**3rdPARTY**").

The parties to this Agreement agree as follows:

1. DEFINITION. "Confidential Information" means the terms and conditions of this Agreement, the existence of the discussions between the parties, the information described in Section 2 below, and any other information concerning the Purpose defined below, including but not limited to, information regarding each party's product plans, product designs, product costs, product prices, finances, marketing plans, business opportunities, personnel, research and development activities, know-how and pre-release products; provided that information disclosed by the disclosing party ("Disclosing Party") in written or other tangible form will be considered Confidential Information by the receiving party ("Receiving Party") only if such information is conspicuously designated as "Confidential," "Proprietary" or a similar legend. Information disclosed orally shall only be considered Confidential Information if: (i) identified as confidential, proprietary or the like at the time of disclosure, and (ii) confirmed in writing within thirty (30) days of disclosure. Confidential Information disclosed to the Receiving Party by any affiliate or agent of the Disclosing Party is subject to this Agreement.

2. DESCRIPTION. The Confidential Information to be disclosed under this Agreement is described as follows:

SMARTH2O:

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3RDPARTY:

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3. PURPOSE. The Receiving Party may use the Confidential Information solely for the purpose of ("Purpose"):

SMARTH2O:

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3RDPARTY:

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4. DISCLOSURE. The Receiving Party shall not disclose the Confidential Information to any third party other than employees and contractors. The Receiving Party shall have entered into non-disclosure agreements with such employees and contractors having obligations of confidentiality as strict as those herein prior to disclosure to such employees and contractors to assure against unauthorized use or disclosure.

5. EXCEPTIONS TO CONFIDENTIAL INFORMATION. The Receiving Party shall have no obligation with respect to information which (i) was rightfully in possession of or known to the Receiving Party without any obligation of confidentiality prior to receiving it from the Disclosing Party; (ii) is, or subsequently becomes, legally and publicly available without breach of this Agreement; (iii) is rightfully obtained by the Receiving Party from a source other than the Disclosing Party without any obligation of confidentiality; (iv) is developed by or for the Receiving Party without use of the Confidential Information and such independent development can be shown by documentary evidence; (v) becomes available to the Receiving Party by wholly lawful inspection or analysis of products offered for sale; and (vi) is transmitted by a party after receiving written notification from the other party that it does not desire to receive any further Confidential Information. Further, the Receiving Party may disclose Confidential Information pursuant to a valid order issued by a court or government agency, provided that the Receiving Party provides the Disclosing Party: (a) prior written notice of such obligation; and (b) the opportunity to oppose such disclosure or obtain a protective order.

6.   RETURN OR DESTRUCTION OF CONFIDENTIAL INFORMATION. Upon written demand by the Disclosing Party, the Receiving Party shall: (i) cease using the Confidential Information, (ii) return the Confidential Information and all copies, notes or extracts thereof to the Disclosing Party within seven (7) days of receipt of demand; and (iii) upon request of the Disclosing Party, certify in writing that the Receiving Party has complied with the obligations set forth in this paragraph.

7.   INDEPENDENT DEVELOPMENT AND RESIDUALS. The terms of confidentiality under this Agreement shall not be construed to limit either party's right to develop independently or acquire products without use of the other party's

Confidential Information. The Disclosing Party acknowledges that the Receiving Party may currently or in the future be developing information internally, or receiving information from other parties, that is similar to the Confidential Information. Accordingly, nothing in this Agreement will prohibit the Receiving Party from developing or having developed for it products, concepts, systems or techniques that are similar to or compete with the products, concepts, systems or techniques contemplated by or embodied in the Confidential Information provided that the Receiving Party does not violate any of its obligations under this Agreement in connection with such development. Further, subject to Section 8, the residuals resulting from access to or work with such Confidential Information shall not be subject to the confidentiality obligations contained in this Agreement. The term "residuals" means information in non-tangible form, which may be retained in the unaided memories of persons who have had access to the Confidential Information, including ideas, concepts, know-how or techniques contained therein. A person's memory is unaided if the person has not intentionally memorized the Confidential Information for the purpose of retaining and subsequently using or disclosing it. Neither party shall have any obligation to limit or restrict the assignment of such persons or to pay royalties for any work resulting from the use of residuals.

8. NO LICENSES. Each party shall retain all right, title and interest to such party's Confidential Information. No license under any trademark, patent or copyright, or application for same which are now or thereafter may be obtained by such party is either granted or implied by the disclosure of Confidential Information.

9. DISCLAIMER. CONFIDENTIAL INFORMATION IS PROVIDED "AS IS" WITH ALL FAULTS. IN NO EVENT SHALL THE DISCLOSING PARTY BE LIABLE FOR THE ACCURACY OR COMPLETENESS OF THE CONFIDENTIAL INFORMATION.

None of the Confidential Information disclosed by the parties constitutes any representation, warranty, assurance, guarantee or inducement by either party to the other with respect to the infringement of trademarks, patents, copyrights, any right of privacy, or any rights of third persons.

10. EXPORT. The parties acknowledge that the Confidential Information disclosed by each of them under this Agreement may be subject to export controls under the laws of Italy and other applicable laws. Each party shall comply with such laws and agrees not to knowingly export, re-export or transfer Confidential Information of the other party without first obtaining all required authorizations or licenses, and any other.

11. TERM. This Agreement shall continue from the date last written below until terminated by either party by giving thirty (30) days written notice to the other party of its intent to terminate this Agreement. Notwithstanding such termination, the obligations of the Receiving Party concerning confidentiality shall terminate five (5) years following receipt of the Confidential Information.

12.   GENERAL. Each party acknowledges that monetary remedies may be inadequate to protect Confidential Information and that injunctive relief may be appropriate to protect such Confidential Information.

The Receiving Party shall not reverse-engineer, decompile, disassemble, modify or copy (except for back-up copy) any software disclosed to it under this Agreement and shall not remove, overprint or deface any notice of confidentiality, copyright, trademark, logo, legend or other notices of ownership or confidentiality from any originals or copies of Confidential Information it obtains from the Disclosing Party. Interface Information necessary to achieve interoperability with independently created computer programs will be made available, where the Receiving Party is entitled to such information under applicable law, upon written request and payment of the relevant fee.

The parties hereto are independent contractors. Neither this Agreement nor any right granted hereunder shall be assignable or otherwise transferable.

If any term of this Agreement shall be held to be illegal or unenforceable by a court of competent jurisdiction, the remaining terms shall remain in full force and effect.

This Agreement may be modified only by a writing signed by both parties.

This Agreement shall be construed in accordance with the laws of Italy. The parties accept the exclusive jurisdiction of the Italian courts, provided that either party shall at all times have the right to commence proceedings in any other court of its choice with appropriate jurisdiction for interim injunctive relief.

This Agreement represents the entire agreement of the parties hereto pertaining to the subject matter of this Agreement, and supersedes any and all prior oral discussions and/or written correspondence or agreements between the parties with respect thereto all of which are excluded.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date last written below.

SmartH2O Representative   3rd Party Representative

By _____   By ……………………………

Name_____   Name………………………….

Title _____   Title…………………………….

Date _____   Date …………………………….

A.2   Template of SmartH2O Partner Agreement

International
Partner Agreement

PARTNER AGREEMENT

BETWEEN

The Company

AND

[Partner name]

Partner Agreement consisting of 15 Articles and 5 Annexes

PARTNER AGREEMENT

This Agreement is made and entered into as of [date]

by and between

The Company, a company located in ……, with registered address in ………….., and registration number ……….., in person of its legal representative …………(the "Company")

and

[Partner name and definition], a company located in [Partner country], with registered address in [Partner address] and registration number [Partner registration number], in person of its legal representative [Partner legal representative] (the "Partner" and altogether with the Company, the "Partners")

RECITALS

A) The Company is inter alia engaged in the business of developing, distributing, marketing and licensing computer software products, and wishes to distribute the Products and provide related services within the Territory.

B) Subject to the terms and conditions specified below, Partner is interested in distributing the Products and providing related services within the Territory.

NOW THEREFORE, Partners hereto agree as follows.

Article 1 - Definitions

1.1. In this Agreement the following words shall have the following meanings:

a) "Agreement" shall mean this agreement and the Annexes attached hereto.

b) "Products" shall mean those products which are listed in Annex A, as such Annex can be amended from time to time in good faith by Company.

c) "Media" shall mean the media on which the Products are supplied by Company.

d) "Software" shall mean those software described in Annex A and functional to the Products specified therein or amended (as the case may be).

e) "Territory" shall mean the area, region, or country detailed in Annex C in which Partner is allowed to distribute the Product and provide the Services

"Proprietary Rights" shall mean all or any trade marks, or service marks (and in each case applications therefore) trade names, patents, licenses, copyrights of all descriptions and rights by whatever name called affording equivalent or similar protection (both in [country] or elsewhere throughout the world) and any confidential or technical information, know-how, research and development information, specifications, prototypes, tables of data, calculations and formulae, product codes and designations, whether in eye or machine-readable form and rights under the Paris International Convention for the Protection of Industrial Property of 1883 and article 30 (late article 36) of the EU Treaty in respect of those items.

f) "Confidential Information" shall mean all information embodied in or related to the Product, the methods of programming and techniques used to create the Product which has been disclosed to or received by Partner, whether or not such information is intrinsic to the products, processes and training that constitute or are supplied in connection with the Product, including information related to all computer hardware and software and their computer applications, improvements, enhancements, or developments. Moreover, Confidential Information shall include any and all information which has one or more among the following characteristics: it has been marked with the "Confidential" wording or other equivalent; it is secret in the sense that it is not, as a body or in the precise configuration and assembly of its components, generally known among or readily accessible to persons within the circles that normally deal with the kind of information in question; it has commercial

value because it is secret; it has been subject to reasonable steps under the circumstances, by the person lawfully in control of the information, to keep it secret.

g) "Commencement Day" shall mean the day when this Agreement becomes effective.

h) "Working Days" shall mean Monday, Tuesday, Wednesday, Thursday and Friday.

i) "Term of the Agreement" shall mean the one year starting from Commencement Date.

j) "Expiry Date" shall mean the end of the Term of the Agreement.

Article 2 - Appointment and Purpose of this Agreement

2.1. Subject to the terms and conditions hereunder, Company hereby appoints Partner to sell the Products to the maximum number of customers whose principal place of business is located within the Territory. The appointment is done on a non-exclusive basis. Partner shall purchase and sell the Products in its own name and on its own behalf. Therefore, Partner shall be considered to be an independent contractor. The relationship between Company and Partner shall not be construed to be that of employer and employee, nor to constitute a partnership, joint venture or agency of any kind and Partner shall have no right to enter into any Agreements or commitments in the name of, or on behalf of, Company, or to bind Company in any respect whatsoever. In addition, Partner shall not obligate or purport to obligate Company by issuing or making any affirmations, representations, warranties or guaranties with respect to the Products to any third party.

2.2. Partner shall not solicit orders from any prospective purchaser with its principal place of business located outside the Territory. If Partner receives any order from a prospective purchaser whose principal place of business is located outside the Territory, Partner shall immediately refer that order to Company. Partner shall not accept any such orders. Partner may not deliver or tender (or cause to be delivered or tendered) any Product outside of the Territory.

Article 3 - Presales Activity

3.1. During the Term of the Agreement Company guarantees to Partner:

i. all the documentation (both technical and commercial) related to Products;

ii. all the upgrades (both minor and major) of Products;

iii. technical training and certification about Products;

iv. sales training about Products;

v. high-priority support on Products;

vi. Partner logo on Company website.

3.2. Company hereby grants to Partner a non-transferable license for commercial use such as demo.

Article 4 - Product Distribution

4.1. During the Term of the Agreement Partner will be able to:

i. deliver and sell Products to its customers, buying them at a discounted price from Company, following the schema in Annex A;

ii. deliver and sell all the training related to the Products to its customers, providing to Company a commission following the schema in Annex A.

Article 5 - Partner Sales Activity

5.1. During the Term of the Agreement Partner will use the best effort to promote the sale and distribution of the Products and to provide adequate support, which effort shall include the following:

    i.   Establishing and maintaining appropriate, attractive and accessible premises and facilities for the demonstration of the products.

    ii.   Provide an adequate, trained sales and technical staff to promote the sales and support of the Products.

    iii.   Undertake promotional campaign and canvas prospective users to stimulate the sales of the Products.

Article 6 - Obligations of Partner

6.1. Partner, every 3 months, shall send to Company a report that contains:

    i.   All the Products sold and the selling price

    ii.   All the revenues generated by training related to the Products and the amount of revenues

    iii.   The Forecast that takes in consideration all the opportunity of the next 6 months, every 3 months. Such forecasts procedures has to be previously specified by Company and agreed by Partner.

6.2. The report shall follow the schema defined in Annex D.

Article 7 - Target, Commission, Territory and Pricelist

7.1. Yearly target and commission plan will be decided every year accordingly by Company and Partner each year as illustrated in Annex B;

7.2. Company will decide accordingly with Partner a minimum target level below which Partner will not receive its commission and Company can decide to terminate the partnership;

7.3. Company will provide Partner with the official Products price lists, as per Annex E;

7.4. At any time Company is free to change the price lists;

7.5. Territory has to be defined accordingly with Partner and Company preceding the commencement of any sales activities, as per Annex C.

Article 8 - Confidentiality

8.1. Confidential Information shall not be divulged or disclosed to third Partners, whether it is in whole or in part, oral or in writing, in pictorial form or in magnetic diskette or in whatsoever other form.

8.2. This obligation does not exist if the information

    i.   was already available to the public or

    ii.   was made available to the public following receipt without the recipient being responsible for this or

    iii.   was made available to the recipient by a person considered by the recipient at the best of his knowledge to be authorized to do so or

iv. was already known to the recipient or developed by him independently or is to be disclosed on account of a judicial decision or law. Upon such a reason becoming known, the recipient of the information shall be obliged to notify the provider of the information to this effect without delay.

8.3. The recipient of information shall be obliged to provide proof of any of the exceptions outlined above.

8.4. Partners shall exercise the same care in maintaining the confidentiality of the received information as they would with regard to their own operating secrets. They shall assure each other that their respective employees - insofar as they are in a position to learn of such information - shall be covered by the same obligation regarding confidentiality.

8.5. Except for that foreseen herein regarding the possibility of transmitting information, even related to the assignment or transfer of rights, all rights to this information shall remain the property of the Party providing the information. Independent of the term of this Agreement, each Party shall continue to use information supplied in accordance with this Agreement only for an additional period of one year following expiry of the Agreement.

Article 9 - Warranties and Liabilities

9.1. Company's warranty is strictly limited to that provided in the User Documentation. Partner must notify Company in writing, of any claim that the said Product does not comply with the warranties specified in said User Documentation not later than 90 days from delivery under penalty of forfeiture of the warranty itself .

9.2. In no way Company shall be liable for indirect damages, consequential damages, lost profits or lost savings. Moreover, Partner hereby expressly waives all rights or recourse against Company and agrees to indemnify Company from all and any claims or actions for damages, expenses, losses or liability arising from or in any way connected with any act or omission of Partner together with all and any costs (legal or otherwise) connected therewith howsoever arising and whether suffered by customers, Company, or otherwise.

9.3. Company shall be held responsible solely for Products which do not conform to the User Documentation, observance of EC Directive 85/374 on product liability and the related legislation in relation to the defects and liabilities if and to the extent its gross negligence is demonstrated.

Article 10 - Copyright

10.1. Title to all Media and User Documentation which relate to the Products supplied by Company shall remain in Company.

10.2. At all times the copyright and Proprietary Rights in the Products and User Documentation and any translations thereof shall remain in Company.

10.3. Partner agrees not to infringe the Proprietary Rights of Company.

Article 11 - Term and Termination

11.1. This Agreement shall start on Commencement Date and be effective for the entire Term of the Agreement . Thereafter and unless notice is given 3 months before Expiry Date in accordance with article 1 below, this Agreement shall continue for further periods of 1 year. In such further periods, either Party shall be entitled to terminate it by giving written notice thereof in accordance with § 11.2 below at least three months prior to the renewed day of expiry.

11.2. Either Partners shall have the right to terminate this Agreement by simply giving notice thereof upon occurrence of one or more of the following events:

   i.   either Party becomes insolvent or goes into voluntary liquidation or receivership or is declared bankrupt;

   ii.   either Party violates Article 8 - ;

   iii. it expires according to § 11.1 above.

11.3. In the event of other essential breaches to this agreement, the non-defaulting party can serve a notice on the defaulting party to perform within an appropriate time of 15 days from receipt, declaring that, unless performance takes place within such time, this agreement shall automatically terminate.

11.4. Partners agree that termination of this ag   reement shall not prevent the survival of any debts and/or credits towards accepted orders.

11.5. Company shall have the right to terminate this Agreement once Partner doesn't reach the minimum amount of the established yearly target (see § 7.2). This amount is to be decided between Partner and Company while discussing the yearly target, and can be subject to variability during the years.

Article 12 - Assignment of Contract and Transfer of Ongoing Business

12.1. This Agreement constitutes a personal contract. Therefore, Partners shall not transfer or assign the same or part thereof without the other Party's written and express consent.

12.2. Partners agree that the transfer of either Party's ongoing business will be permitted only to the extent it is done with entities having the ability (whether financial, technical or other) to perform this Agreement and undergoing the terms and obligations set forth in this Agreement.

Article 13 - Miscellaneous

13.1. Notice. All notice and other communications to be given under or by reason of this Agreement shall be in writing and shall be deemed to have been duly given when delivered in person or sent by electronic mail and facsimile addressed as follows:

Company: Stefano Butti, stefano.butti@Product.com, facsimile +39.02.3671.4291

Partner: [Person, Email, Facsimile]

or to such other address as any party may from time to time designate as to itself, by notice as provided herein.

13.2. Entire Agreement. This Agreement and the Annexes attached hereto, which form an integral part of this Agreement, contain the entire understanding between Partners with respect to the subject matter hereof. All previous documents, undertakings and agreements with respect to the subject matter hereof, whether verbal, written or otherwise, between Partners are hereby cancelled and shall not affect or modify any of the terms or obligations set forth in this Agreement. No modifications of this Agreement shall be made except by written agreement between Partners.

13.3. Waiver. The failure of either Party to exercise any of its rights or to enforce any of the terms, conditions or provisions under this Agreement shall not be deemed to be a waiver of any such rights nor shall such Party be prevented from subsequently asserting or exercising any such rights in respect to similar events.

Article 14 - Governing Law and Language

14.1. This Agreement shall be deemed to have been made in [country] and shall be construed and interpreted in accordance with the internal laws of the [country].

14.2. The language of this Agreement shall be the English language and the construction and interpretation thereof shall be by reference to the English version and not any translation thereof.

Article 15 - Arbitration

15.1. All disputes arising out of this Agreement, including but not limited to those concerning its validity, interpretation, performance and termination, shall be referred to an arbitral tribunal consisting of three arbitrators, one being the President, according to the International Arbitration Rules of the Chamber of National and International Arbitration of Milan, which Partners declare that they know and accept in their entirety.

IN WITNESS WHEREOF, Partners hereto have caused this Agreement to be executed by their duly authorized representatives.

DATE

For and on behalf of Company   For and on behalf of Partner

Annex A. Products

Product Licenses, Software Upgrades, Maintenance Subscriptions and Support Subscriptions.

Product Solutions

Official Training Courses

Annex B. Economics

Partnership Level

For 2011 Partner will be entitled "Product [Silver|Gold] Partner"

Entry fee

Partner will pay an entry fee of [to be defined] €.

Target

For 2011 the target will be [to be defined] €.

Training

Company will deliver to Partner the following training courses:

Course	Duration
Sales & marketing course	[to be defined]
Basic technical course for pre-sales	[to be defined]
Complete technical course and certification	[to be defined]

Licenses

Company will give to Partner 1 License of Product Enterprise Edition (for applications development valid during the entire period of partnership. [to be removed if Silver]

A discount of [to be defined] will be given for the purchase of any additional License.

Commissions

When Partner sells one or more Products to a Customer, Partner will keep a percentage of the invoice amount, the remaining part will be payed to Company.

The percentage depends on the type of Product sold and the target reached, according to the following scheme:

Product sold	Percentage kept by Partner	Percentage if target reached
Product License, Software Upgrade, Maintenance Subscription, Support Subscription, Product Solution	[to be defined]	[to be defined]
Product Course, delivered by Partner	[to be defined]	[to be defined]
Product Course, delivered by Company	[to be defined]	[to be defined]

The commission plan will be renegotiated at the end of each year.

Annex C. Territory

[to be defined]

Annex D. Sales and Forecast Report

Sales Report

Selling date	Product sold	Quantity	Selling price	Customer company	Customer contact	Customer source	Notes

				details	details		
…	…	…	…	…	…	…	…

Forecast Report

Expected closing date	Expected product sold	Quantity	Expected selling price	Customer company details	Customer contact details	Customer source	Notes
…	…	…	…	…	…	…	…

Annex E. Official Product Price list

See attached files.

A.3   MIT License

```
The MIT License (MIT)

Copyright (c) [year] [fullname]

Permission is hereby granted, free of charge, to any person obtaining a
copy of this software and associated documentation files (the "Software"),
to deal in the Software without restriction, including without limitation
the rights to use, copy, modify, merge, publish, distribute, sublicense,
and/or sell copies of the Software, and to permit persons to whom the
Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING
FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER
DEALINGS IN THE SOFTWARE.
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A.4   Memorandum of Understanding between CuBRIK and SmartH2O

CUbRIK collaboration MOU

CUbRIK "Human-enhanced time-aware multimedia search"

Memorandum of Understanding for Collaboration Between

CUBRIK "Human-enhanced time--aware multimedia search" European Commission FP7 Collaborative Project -- G.A. 287704 Represented by the coordinating partner, Engineering S.p.a. and by WebRatio srl (developer of the gaming framework)

And

SmartH2O "An ICT Platform to leverage on Social Computing for the efficient management of Water Consumption" (Grant agreement no: 619172) Represented by the coordinating partner Scuola Universitaria Professionale della Svizzera Italiana (SUPSI)

Background

The CUbRIK research project aims at challenging current limitations of multimedia search by developing a framework to support a novel generation of search--- based applications and share knowledge and experiences with technology providers, enterprises, content owners, software integrators, social network and crowdsourcing providers, researchers and SMEs. The systematic integration of machine, human and social computation for multimedia search will be offered for experimentation and trials in different business contexts. The CUbRIK project poses a strong focus on multimedia search empowered by networked human computation, combining the principles of user behaviour analysis, crowdsourcing, social network and trust analysis and gaming with a purpose. The CUbRIK project recognises the value of fruitful collaboration with research projects such as SmartH2O for the further improvement and promotion of the developed framework.

WebRatio has developed in CUbRIK a software component called the gamification framework, which supports the gamification of business applications of any kind. WebRatio has a strong interest in validating the gamification framework in other use cases outside those of the CUbRIK project, most notably in the utilities industry. SmartH2O has a strong interest in experimenting with innovative gamification technologies and methodologies, especially in the field of water management.

SmarthH20 recognises the value of collaborating with an innovative IT research project supported by the European Commission and comprising top rank industrial and research partners.

Purpose of the MOU

Purpose of this Memorandum of Understanding (MOU) is to define a framework of collaboration between the CUbRIK project consortium and the SmartH2O project consortium.

Areas of collaboration

The parties have identified the following key collaboration areas: § Testing and evaluation of the CUbRIK gamification engine, produced by WebRatio s.r.l. partner of the CUbRIK Consortium in Joint Research Unit with Politecnico di Milano, in relevant environments and activities carried out by SmartH2O especially in the area of gamification of water management applications. § Providing support to SmartH2O in deploying and testing the gamification framework in relevant scenarios for water management. § Providing valuable feedback to the CUbRIK consortium about the utilization of the gaming framework applied to utilities industry, with specific focus on the water and energy management sectors.

Modalities of collaboration

In the framework of this MOU the parties will: § The CUbRIK partner WebRatio will provide to SmartH2O full access to the CUbRIK gamification framework as relevant supporting documentation; § The CUbRIK partner WebRatio shall support SmartH2O in the set-up and deployment of the gamification framework for the purpose of testing them in relevant environments and use cases. § The CUbRIK partner WebRatio and SmartH2O consortium members will participate to a meeting (in presence or virtual), to share results and mutual feedback on the gamification framework deployment and testing in the SmartH2O user scenarios; § Both parties will deliver a final report on the activities conducted.

Funding

The current MOU does not constitute any financial commitment for any of the parties. Each party will put forward its own required financial resources to accomplish the tasks foreseen by the MOU.

Confidentiality

Both parties commit to treating to treat all information exchanged as confidential information, to be used solely for the purposes of the current MOU, and not to disclose such information to any third party, nor to make it publicly available or accessible in any way, except with the prior written consent of the other party.

General Conditions

This MOU is not legally binding. It states the intention of the two parties to collaborate. This agreement may be modified at any time upon mutual written consent of both parties, and may be terminated at any moment upon written request of either party.

Duration

This MOU shall become effective upon signature by the authorized officials from each party and shall be valid until the end of the SmarthH20 project. It may also be extended by mutual agreement of the parties involved. In any case, the partners of the SmartH2O and of the CUbRIK projects will be able to continue to use, at no cost, any concrete result and outcome of the collaboration between the parties. Maintenance, support, update and upgrade services of the gamification framework are not included. WebRatio srl can offer such services at the most favorable condition to all the project partners, upon a separate agreement with each interested party.

Signatures

Date: 1/7/2014, Location: Palermo (IT)

Date: 1/7/2014, Location: Manno (CH)

On behalf of CUbRIK project Mr. Vincenzo Croce Project Manager of CUbRIK Mr Stefano Butti CEO of WebRatio srl

On behalf of SmartH2O Mr Andrea Rizzoli Project Manager of SmartH2O

A.5 Amendment request: addition of WebRatio as a Third Party

Request of third party

This document presents the motivations for Politecnico di Milano to call WebRatio as a third party to the SmarH2O project.

Background and motivations

WebRatio has participated as third party of Politecnico di Milano in the CUBRIK FP7 project, where it has developed the gamification engine, one of the resulting assets of the Project.

The gamification engine is a software framework capable of transforming streams of generic users' actions into rewards and achievements, according to a customizable set of gamification business rules.

The usage rights of the gamification engine has been granted by WebRatio to the SmartH2O Consortium, with a memorandum of understanding signed on 1/7/2014 among the CEO of WebRatio (Dr. Stefano Butti) and the Project directors of the CUbRIK Project (Dr. Vincenzo Croce) and SmartH2O Project (Dr. Andrea Rizzoli).

The SmartH2O Consortium has made use of the gamification engine for accelerating the development of the SmartH2O platform and has interacted positively with WebRatio. The Consortium considers the expertise of WebRatio in the multi-utility market a very relevant contribution to the validation of the project results, both in their technical aspects and in the deployment within the pilot test sites, and to the development of a strong business plan for post-project exploitation.

WebRatio sees a great potential in the assets developed in the SmartH2O project, and considers that participating in the project as a third party could strengthen its position of an innovative SME in the utility market.

Role and contributions to SmartH2O

WebRatio will contribute mainly to the following work packages of SmartH2O:

WP4 Saving water by social awareness, contributing its expertise in the assessment and optimization of business gamification services form multiple industrial sectors, with special focus on the production of the *D4.4, Final social game and implicit user information techniques* (m30) and on the technical and business validation of the marketability of the SmartH2O assets at the end of the project.

The funding allocated by POLIMI to WebRatio and the effort of WebRatio is estimated as follows. POLIMI transfers 6 PM to WebRatio. As the cost rate for personnel is different, WebRatio will be able to contribute with 9 PM on WP4.

Allocated funding from POLIMI to WebRatio:	
Personnel cost (6MM on WP4)	40.800€
indirect cost (83% overhead)	33.864€
Total eligible cost	74.664€
Total funding	**55.998€**
Allocated effort and cost of WebRatio:	
Personnel cost (9MM on WP4)	45.900€
Travel cost	760€
Total direct cost	46.660€

Indirect cost (56% overhead)	27.996€
Total eligible cost	74.656€
Total funding	**55.992€**

Profile of the third party

Third party: WebRatio

WebRatio (www.webratio.com) is an Italian SME founded by professors and students of Politecnico di Milano 2001**, as a result of the ESPRIT Project W3I3 (WWW-based Intelligent Information Infrastructure[15]).** The company has a long history of R&D within EU funded projects (BPM4People, Automobile, Cooper, CUbRIK, PHAROS, WebSi) and still devotes 20% of its turnover to R&D. Its core business is the development of innovative software tools and services, built with WebRatio, a model-based development suite for creating and maintaining Web and mobile applications via a simple visual language and automatic code generators; and with WebRatio BPM, an innovative tool for designing Business Process Models with the OMG's BPMN notation and automatically generating Web applications supporting the processes. These products are originally the commercial and industrial outcome of an international patent, developed in the W3I3 project. Today, WebRatio works with national and international customers and is present in Europe, USA, and Latin America. WebRatio has several customers in the PA and utility industries and is actively working on business application gamification for sustainability.

WebRatio is also active in standardization: **it is the inventor of the OMG standard Interaction Flow Modeling Language (IFML)[16]** and OMG active member; WebRatio is probably the author of the first OMG international standard produced by a SME stablished as a result of an EU-funded project.

Key personnel from WebRatio

Stefano Butti CEO (M) Graduated at the École Nationale Supérieure de Techniques Avancées (ENSTA) in Paris and has got a second degree in engineering cum laude at Politecnico di Milano. His professional interests started from the technical aspects of information technology and extended to include the organizational and business issues behind the transfer of innovative products to the marketplace. He has been one of the company's founders and he is presently the CEO of WebRatio, responsible of business development and planning.

Aldo Bongio CTO (M) His professional interests include XML, Web modeling languages, advanced Web architectures, and Web design patterns. He is the developer of the first version of the WebRatio runtime framework and code generator. He is co-author of the book: Designing Data-Intensive Web Applications (Morgan-Kaufmann, 2002). He has been one of the company's founders.

Roberto Acerbis (**M**)   **Head of Professional Services** He has been one of the company's founders and has 12 years of experience in customers' solutions. Has specific expertise in the definition of commercial exploitation of advanced products and services in several markets, including the utility market.

Massimo La Rosa (M): project manager, has directed several industrial projects for developing advanced services for the utility industry, with national large scale and SME customers.

Valentina Riva (**F**) Service developer, has a background on IFML modelling and Web/mobile application specification, development, and evaluation. She has worked on software integration projects for the utilities industry.

Relevant Projects and Activities

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[15] ftp://ftp.cordis.europa.eu/pub/esprit/docs/projst.pdf

[16] http://www.ifml.org/

[Coordinator] Smart Cities call, *PROACTIVE* (FESR, Lombardy Region, http://proactive.webratio.com/): the project addresses environmental sustainability, land safety, and management of utility resources in public administrations by leveraging last generation telecommunication technologies as well as multimedia user generated content as a tool for monitoring resources and alerting citizens.

[3rd party with PMI] The FP7 *CUBRIK* Project (http://www.cubrikproject.eu/) investigates novel multimedia content processing techniques combining pure machine-based processing with human and social intelligence at all stages in media analysis - from feature extraction to search and validation. The vision is to enrich the experience by incorporating rather than by emulating human and social capabilities in all processes.

[Coordinator] The AutoMobile project, funded by the EC under the FP7, Research For SMEs call, aims at designing and bringing to the market innovative methodologies, software tools, and vertical applications for the cost-effective implementation of cross-platform, multi-device mobile applications, i.e. business applications that can be accessed by users on a variety of devices and operating systems, including PC, cellular / smart phones and tablets.

The BPM4People project, funded by the EC under the FP7, Research For SMEs call, aimed at designing and bringing to the market innovative methodologies, software tools, and vertical applications for the implementation of Social Business Process Management (Social BPM), i.e., processes collaboratively defined and collaboratively executed by organizations and their stakeholders (employees, customers, citizens). http://automobile.webratio.com/

Relevant Publications, and/or Products, Services

Roberto Acerbis, Aldo Bongio, Marco Brambilla, Stefano Butti: Model-Driven Development Based on OMG's IFML with WebRatio Web and Mobile Platform. ICWE 2015: 605-608

Roberto Acerbis, Aldo Bongio, Marco Brambilla, Stefano Butti, Stefano Ceri, Piero Fraternali: Web Applications Design and Development with WebML and WebRatio 5.0. TOOLS (46) 2008: 392-411

Nicola Aste, Aldo Bongio, Stefano Ceri, Marco Fais, Maristella Matera, Alessandro Raffio:Model-Driven Design of VoIP Services for E-Learning. COOPER 2007

Roberto Acerbis, Aldo Bongio, Marco Brambilla, Stefano Butti: WebRatio 5: An Eclipse-Based CASE Tool for Engineering Web Applications. ICWE 2007: 501-505

Designing Data-Intensive Web Applications by Piero Fraternali, Marco Brambilla, Aldo Bongio, Sara Comai Stefano Ceri, Morgan Kayffmann, (Dec 1, 2003)

Stefano Ceri, Piero Fraternali, Aldo Bongio: Web Modeling Language (WebML): a modeling language for designing Web sites. Computer Networks 33(1-6): 137-157 (2000)

A.6 List of water related twitter accounts

mryh2odistrict	dowwaterenergy	denverwater	2030wrg
Watereuseassoci	unc_water_inst	bvwater	wateraid
Superwaterman	watermeetsmoney	waterfdn	wefstormwater
Nexusplatform	dropcountr	siwi_media	unigrac
mavensnotebook	charitywater	txwri	aaronbh2o
Cawaterboards	wateredfdn	lisawdownes	karmaockenden
Pvowell	swsmag	cdnwaternetwork	dtm1993
Meterhero	veoliawatertech	gwpnews	waterwheelmag
Waterisyourbiz	waterweeksg	cwardmorris	wriaqueduct
Johnwrf	ge_water	desalitech	watermizz
Nrdcwater	otaymark	efcatunc	stukhan
Greeleywater	snwa_h2o	martin_currie	improve_intl
Valorwater	mwaterco	oasyswater	h2otrends
Sdcwa	portlandwater	wsaa_water	iucn_water
Robrennerwrf	worldwatertech	beingwaterwise	alexisjmorgan
Waterwatchdog	ooskanews	nacwa	smitsstef
Lpawater	xyleminc	aqua_vitae_risk	unuinweh
Wvamwater	ukwrip	wateryouthnet	ngwatweets
g_boccaletti	digdeeph2o	pacificinstitut	oxymem
movinh2oforward	mwdh2o	willsarni	conserveh2org
Blueeconomyca	illinoiswea	wtrkat	phillyh2o
centralbasin	iwahq	cleanh2oaction	nycwater
irwdnews	kineticohq	melbournewater	dcwater
stellaartois	canadianwater	isleutilities	kellytsanders
h2opportunity	unitedwater	rmeeusen	waltonwater
sustainwater33	cleanwaternews	water21magazine	unitedutilities
wateruk	yolles	yorkshirewater	securingwater
madh2o	circleofblue	coy_debra	matt_weiser
takadu	thewatercouncil	sfwater	waterforfood
socalwatercomm	waterwarden	mitwater	valueeverydrop
watertapontario	h2oclimateforum	eleanorh2o	jcganter
ourwatercounts	watercorpwa	mysaws	indiawater
wateraidamerica	otaywater	ucanrwater	neorsd
easternmuni	rhackley	chanceofraincom	johnforwash
txawwa	grundfos	njamwater	ircsource
nrwa	uim_journal	watertechonline	medindoagua
waterinthewest	uswp	sfwmd	wsscwaternews
sdpubutilities	ca_dwr	wsiconfexpo	kolsaw
amwater	ofwat	wiawwa	sewer_chic

scottish_water	paulrogerssjmn	arcadisglobal	napachats
aguanomics	treepeople_org	chriscmooney	euenvironment
wallywaterdrop	markgrossi	guardiansustbiz	greenallianceuk
dietvorst	ch2mhill	ginaepa	sciencedaily
dgtwater	unicefusa	epa	ericholthaus
waterkeeper	revolvemagazine	handwashingsoap	climatehotnews
ircwash	kimmarotta	unep	cechr_uod
david_tickner	jerrybrowngov	foresteru	eaudeparis
andrearizzoli	southernwater	suezenv	guardianeco
southwestwater	planabby	highcountrynews	glblctzn
usbr	cynthiabarnett	kentpage	nsf
sanwatforall	washunited	defragovuk	fairfaxcounty
lynnbroaddus	kategalbraith	2degreesnetwork	iagua
onedrop	nedbreslin	africagreenmedi	billgates
richardashley99	urbanwatertower	greenbiz	climateprogress
johnwsauer	worldtoiletday	wallacejnichols	kpcc
h2obuildingserv	cfishman	yalee360	abcnews
sanitation2015	ramsarconv	markruffalo	nasa
jfleck	Ypard	iucn	paulcoxon
americanrivers	c_l_t_s	weather_west	revkin
watercrunch	nchudeau	ecowatch	huffpostgreen
chinawaterrisk	highlyanne	kcranews	theagu
srotillon	ddimick	usgs	bjornkhaugland
utilityweek	healthebay	pewenvironment	unhabitat
csutilities	stwater	pepsico	sunsetmag
watsancollabcou	nature_org	makower	3blmedia
_seqwater	anglianwater	scidevnet	unicef
oc_sewers	worldtoilet	craigtimes	natureclimate
washadvocates	greencrossint	nrdc	_inwisconsin
tdsianjames	eparesearch	ascetweets	eepublishing
Bakirp	ceresnews	scienceadvances	undp
perimeter	nestle	iiasavienna	daninierenberg
opendefecation	eparegion2	noaaocean	washingtonpost
arroyov	rivrchik	triplepundit	marketplace
valleycrest	jordanbrianl	nasasmap	mercnews
ecocentered	wwf	natgeo	noaa
Weftec	worldresources	shaunmckinnon	businessgreen
michellesegrest	kurtisalexander	ensiamedia	care2
Ciwem	usacehq	csrwire	cgiar
Ladwp	conservationorg	interior	weatherchannel
eparegion3	envagency	takepart	good
Eldaily	cdp	oxfam	suzyji

theeconomist	smarterplanet	dfid_uk	hydroaholics
usda	expo2015milano	economistevents	ClimateandWater
fastcodesign	iied	fgw	CAWaterAlliance
raulpacheco	unfoundation	forbes	UCDavisWater
londonist	usatoday	ft	waternomics_eu
tr_foundation	wsj	g	AStillwellPhD
agu_eos	allafrica	grist	AYHoekstra
dowchemical	ap	guardian	CAWaternow
hickforco	bbcworld	guardiannews	Stuart_Orr
nwsbayarea	cfigueres	huffingtonpost	EGU_HESS
sciencemagazine	cnbc	huffpostimpact	JayFamiglietti
texastribune	cnn	huffpostindia	PrincetonWater
fastcoexist	euractiv	ibm	WaterIntel
rosegeorge3	instagram	ibmresearch	Cate_Lamb
stanford	mashable	independent	H2ODraganSavic
utsandiego	nbcnews	indiegogo	WaterOnline
latimesgraphics	originmagazine	ipcc_ch	Waterwise
columbia	sfchronicle	janwerners	Water
independent_ie	slate	kickstarter	EPAwater
michaelemann	smithsonianmag	kqed	wskep
azcentral	theatlantic	latimes	WaterRF
cbsnews	time	motherjones	PeterGleick
fastcompany	ucirvine	noaancdc	lesommer
leodicaprio	un	npr	AbrahmL
newyorker	unilever	nytimes	HeatherRippman
sfgate	eurekalertaaas	qz	UN_Water
rtccclimatenews	oecd	reuters	EPAwatersense
sciencenews	unesco	sacbee_news	h2oexecutive
physorg_com	climatereality	salon	MadWaterUtility
sciam	mghydro	sharethis	WaterDeeply
nwssacramento	pewtrusts	sustaincities	GroundwaterAct
faonews	buzzfeed	techreview	ryanrbart
faoknowledge	mit	telegraph	saveourwater
kbhome	60minutes	thehill	SaveTheWater
unsdsn	ajam	twitter	IntlWaterSummit
gdndevelopment	barackobama	ucberkeley	ASCE_EWRI
usaid	bbcnews	uniofexeter	CaptDocMike
climatecentral	business	unrightswire	AYHoekstra
nprnews	bw	wef	SlaterWaterLaw
worldbank	citylab	who	glennonUAlaw
irishtimes	cocacola	wired	Hydroaholics
dukeu	davos		ClimateandWater

CAWaterAlliance	AStillwellPhD	Stuart_Orr	PrincetonWater
UCDavisWater	AYHoekstra	EGU_HESS	WaterIntel
waternomics_eu	CAWaternow	JayFamiglietti	Cate_Lamb