Specific Targeted Research Projects (STReP)

SOCIOTAL

Creating a socially aware citizen-centric Internet of Things

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Content

Section 1- Community interaction

1.1 Y3 Community Interaction

In Y1 and Y 2 the SocIoTal research identified as main barriers to broad IoT adoption:

- lack of understanding by SME's and City Councils
- lack of third party trust providers
- lack of involvement of end-users in building use-cases and developing new services.

In D 6.1 and D6.3 we described how we addressed issue #1-3 in co-creation workshops, dedicated developer sessions, introducing research questions and listening to all local stakeholders. In year 3 we used the Meetups as *Developer Focus Groups* of the software tools, related to issue #2. We bring all issues together in a Stakeholder Coordinator Toolkit. In this deliverable we describe the process and the tools as well.
The total Meetup community engagement in Y1, Y2, and Y3 is 74 Meetups, 1637 members and 1534 attendances. In order to account for the no-shows and people that show up unregistered, experience shows us we must subtract about 15% of this total. That leaves us with 1309 attendances.

- Ghent, 24 Meetups, 561 Members, 557 attendances
- Guildford 19 Meetups, 355 Members, 423 attendances
- Novi Sad 11 Meetups, 260 Members 231 attendances
- Grenoble 10 Meetups, 260 Members, 183 attendances
- Santander 7 Meetups, 201 Members, 140 attendances

The KPI's set for engaging the community identified as relevant to smart city stakeholder coordination, citizens, local SME, hackers, coders, local city officials and service providers, were met.

In its third year the *Guildford* SocIoTal IoT meetup is still drawing a large number of participants, including a core group of regular attenders, although the attendance did drop a little towards the end of the academic year. The attendees mainly consists of members with interests in IoT, business leaders and a few developers. The group has also held meetings outside of Guildford with aims to expand the influence and reach of the Meetups. During the year, meetings have been held in both Woking and London, both of which were well-attended. The topics discussed at the meetings continue to focus on the Internet of Things, and in particular its impact on society in terms of privacy and security. The Meetups have given us the opportunity to disseminate our work on SocIoTal to a wider audience, including many members of the public outside of the world of academia. The speakers and attendees at the Meetups have come from a variety of backgrounds, including both business and technical. In addition, discussions after the main presentations has given us a further opportunity to discuss our work. An additional outcome was the meeting of a freelance journalist at one of the Meetups. He was very interested in the project and from the meetup an interview was organized on the SocIoTal project. The work will be presented on a website discussing projects that will have a positive impact on society, http://atlasofthefuture.org/.

In the third year of the project two meetings in *Cagliari* were hosted, plus a one-day workshop held in the Science and Technology Park of Sardinia, in Pula, during the activities related to a course about IoT platforms, targeted to future developers. The first two meetings engaged 30 people: 15 non developers and 15 developers. These events were organized in collaboration with Need for Nerd (needfornerd.com), a local community targeted to developers mentoring, which currently includes about 2800 members from Italy and counting. The two meetings included project dissemination activities and presentations, platform hands-on and discussions about the Internet of Things, and in particular its impact on society in terms of privacy and security and in terms of business opportunities enabled by IoT platforms, like SocIoTal. Another outcome was a valuable feedback concerning the User Environment and its user-friendliness, along with platform APIs exploration and feedback collection from developers. The one-day workshop, held during a course about IoT, social IoT and related existing platforms, engaged 20 people. It contributed to disseminate the project to students and future developers, allowing them to use the platform to build simple apps with connected devices and smartphones, showing them some security and privacy threats and comparing our approach to other existing platforms. Moreover, during the third year, an interview about the SocIoTal project was organized and broadcasted by a local TV station (TCS, https://youtu.be/wzWMWamqux8) and an additional outcome was an interview by a

local journalist about the project; the article has been published on Sardinia Post[1], a relevant local online newspaper.

In July, the SocIoTal platform has been used on a hands-on lesson in the context of the "Advanced Course of Web, Mobile and Internet of Things". The general course has been organized by CRS4, Sardegna Ricerche and the University of Cagliari [http://wma-iot.it].

The advanced course, an intensive one-week course, was focused on discovering and using some Web platforms for the IoT, taking into account privacy and security issues and user experience. Five platforms have been chosen and analyzed during the week: IFTTT, Paraimpu, Xively, Thingspeak and SocIoTal. SocIoTal has been presented and used and experimented by 20 students, during the fourth day of the week.

The students connected their smartphones, some Arduino-based sensors and Raspberry Pi to build some simple IoT trigger-based applications, they analyzed the Web User Environment platform as end users (filling the evaluation questionnaires) and, as developers, through the User Environment APIs.

A comparative table of the platform has been created on the basis of the received students' feedback, and SocIoTal obtained a good score.

	User Experience	API feedback	Tutorial and use of Arduino, Raspberry	TRIGGER/ACTION	Social Aspect
Xively	Not Good	Not Good	Sufficient	Not Good	no
Thingspeak	Good	Excellent	Not Good	Not Good	no
IFTTT	Excellent	Excellent	Sufficient	Excellent	yes
Paraimpu	Excellent	Excellent	Good	Excellent	yes
SocIoTal	Good	Good	Good	Excellent	yes

Figure 1: A comparative table of the platform

Grenoble has been a very active partner in the Meetups, though it was not a pilot city nor was this kind of activity planned. To give an impression of the liveliness of the meetings this is a brief summary about the LoRA Meetup at Grenoble on 20th of April.

There were 55 persons present. We needed to change of room to welcome all these people. The Meetup has been followed by an apéro. It has been very well appreciated and the notation is 5 stars.

Jerome Demay and Michael Coracin, respectively RF engineer and software engineer at Semtech, made a presentation of LoRa, LPWAN transmission technology developed by Semtech for IoT, and lorawan associated protocol. This communication technology Long Range and Low Power was chosen by many telephone carriers worldwide to deploy their offer IoT. In France in particular, of LoRa networks will be deployed in 2016 by Orange and Bouygues Telecom. An enthusiastic community of open-source, The Things Network, is also creating a network "open" lorawan in several cities around the world. After a technical presentation from Jerôme that took around 1 hour, Mickaël pursued by a demonstration. It consisted of a LoRA tag with a GPS inside embedded in a car (my car). I drove around the meetup room and I went in the mountains far of 10 km from the meetup room. The tag has never been lost by the localization system. A lot of interesting questions have been raised about the RF technologies, the LoRA ecosystem and the business model.

The latest Meetup, September 13, in Grenoble was led by Christine Hennebert and Nicolas Lesconnec, developer and maker evangelist from SigFox, introduced the SigFox solution, products and achievements, with demonstrations for 2h30 in front of an assembly of about thirty people. Those present were passionate about the IoT technology and were very interested. It was followed by numerous exchanges during the aperitif that followed the presentation.

Three people from Semtech were present. As the Meetup was being hosted by an engineering school, we came to the idea of creating a course for Masters' students implementing LoRA technology objects with components of SocIoTal platform to offer students to implement a use case such as whether the cafeteria located in another building is open with a sensor on the shutter and IoT implementation relaying the info in the school or via a SmartPhone app. The course content will be built and delivered by people from CEA and from Semtech. The Sociotal platform will be further validated in real world settings.

In the third year of the project two events were held in Belgrade: one Meetup and one Hackathon; both with a goal to engage users and developers to use the SocIoTal platform. The first event took place in

Belgrade Chamber of Commerce were H2020 TagItSmart and FP7 SocIoTal project was presented to in total of 65 people; mostly students and developers, but also citizens and academic. Presentation included Web and Mobile environment showcase, together with Elevator supervisor Trial deployed in the venue building. Presentations were followed by a discussion about the SocIoTal platform, its deployment possibilities and clarification of some topics from the perspective of citizens and non-developer's users. Also, IoT, its trends, as well as general discussion about its application in Serbia is discussed.

During the IoT Week in Belgrade, a Hackathon is co-organized with ICT research project RERUM, Almanac, ClouT, and industry partner Microsoft, enabling developers and citizens to make services on top of deployed beta instance of SocIoTal platform. A following activities were also a part of the Hackathon including: integration of devices/platforms with the SocIoTal such as Almanac and RERUM devices, Microsoft Azure, ClouT Gateway, etc. The Hackathon was announced 1-2 months ahead of the event, to involve developers and "non-developers" to participate in two categories with starting fund of 10k Euros. Finally there were 6 teams at the event, with total of 20 participants. The valuable feedback was collected using prepared questionnaires as an evaluation methodology process.

The second venue was SenZations' summer school on IoT and its application that took place in Lochow Poland. As a part of the summer school the alpha version of SocIoTal platform available online was evaluated. On the first day of school SocIoTal tutorial was given to the students showing the platform tools, enabler and APIs. During these 5 days there were 6 teams working and developing on top of the platform. The winning teams split the fund of 800E and a trip to a startup competition in Dublin, Ireland.

1.2 Meetups and engagement activities in Santander during the course of the project (y1,2,3), from community engagement to tentatively building develop focus groups

- *3rd IoT Santander Meetup (21st November 2014) - 25 attendees*

The third IoT Santander Meetup took place in the SmartSantander Demonstration Centre of Telefónica and the capacity of 25 people was totally covered. This time, we were graced with the presentation of Emilio Fernández Rodríguez de Liébana, director of Aqualia in Santander, the water supply company in the city. Emilio presented the SmartWater project which Aqualia is deploying in Santander and through which they put the IoT at citizen's service aiming an efficient water management in the city.

The second part of the session was focused on the SocIoTal project. Although the project had been mentioned in the past, here it was presented a whole view of the project. UC partners introduced the objective of bringing the IoT closer to the citizen, the platform to be developed and the use cases and pilots to be implemented during the life project. After the session different questions arose which means that the attendees were interested in the ins and outs of the project.

- *4th IoT Santander Meetup (22nd May 2015) - 20 attendees*

Until now, Meetups had been focused in the Internet of Things dissemination, with talks introducing the IoT, presenting different applications and projects based on IoT being developed in the city, etc. Once presented the bases of IoT, the next natural step was to perform practical workshops which would allow users to introduce themselves fully into the IoT world, creating their own devices and connecting them to the Internet. One of the main objectives of these workshops was to help users to understand a bit better what the IoT can offer to them, opening a wide range of possibilities when developing new projects.

In light of the above the first workshop was launched at the University of Cantabria premises. There, the attendees (the total capacity of the call, 20 people) was taught about the use of Arduino boards. There were presented the first steps to work with them, the different possibilities they offer and the initial configurations. Next, they found out how to exploit some of their characteristics, the different sensors in the market, and how to attach sensors to the boards and see the information received in the screen of the computer.

This workshop was the first of a series in which the attendees would learn how to easily create IoT devices with different boards by learning its basic functioning, connecting the boards to the Internet, managing them, and investigating bigger projects. All of this under SocIoTal's guidance, since in next Meetups the SocIoTal Web User Environment would be presented as an available solution to manage the devices and the data generated by them.

All the information provided during the Meetup is captured in tutorials that are part of the online Stakeholder Coordination Toolkit.[2] There, apart from general information about Arduino boards, the

different steps to configure the Arduino YUN and how to attach analogue and digital sensors to it are explained.

- *5th IoT Santander Meetup (9th October 2015) - 20 attendees*

With this second practical workshop the aim was to increase the knowledge of the attendees about the creation of IoT devices. This time, they could work with Raspberry Pi boards. Firstly, the fundaments of these boards were introduced, explaining the range of possibilities they offer. Next, the different steps to configure it and the basic concepts to work with it were explained. Once the theory was explained, attendees were able to connect to the board and experiment with it by playing with some analogue and digital sensors.

At the end of the session, the initial version of the Web User Environment which was being developed in the project was presented. The participants showed quite interest about it, asking when it would be finished and available for them. Summarizing, the gathered feedback at the end of the session was very positive.

- *SocIoTal session with developers (27th October 2015) - 6 attendees*

As a consequence of initial contacts at the early months of the project, and the continuous communication with them in following Meetups, developers from the FabLab Santander group were invited to meet. They was exposed to the current state of the SocIoTal project and the APIs developed until then, encouraging them to make use of SocIoTal in their projects.

The meeting took place in Distrito Beta, which is a co-working centre placed in Santander. At the beginning of the session the foundations of the project were described. Next, the APIs developed in SocIoTal were presented leaning on the documentation available in the SocIoTal Wiki. Mainly, it was emphasized the APIs regarded to the Context Manager, presenting a demonstration of its functioning and explaining the data model used in the platform, highlighting how open it is, allowing to register any device they can think about.

The feedback was very positive. They were interested in testing the platform to see if it could fit for them to participate in a forthcoming hackathon to be set in the city. For that purpose, they were provided with a private instance of the platform in order they could test it without interferences of other users, since the communities tool was not integrated at that moment.

- *6th IoT Santander Meetup (29th April 2016) - 17 attendees*

The 6th IoT Santander Meetup was focused on the presentation of the Web User Environment. From what attendees learned during last sessions, they were taught how to, once created the IoT device, send the information to the SocIoTal Context Manager and control it and its information from the Web User Environment.

Following the steps described in the tutorial IV written for this session, participants started by configuring the board (Arduino YUN in this case). Next, the theoretical basis of how to send information to the Internet with these boards was explained. Once this was understood, attendees created a simple weather station with the boards and temperature and humidity sensors.

Following, it was presented the Web User Environment, and the users were invited to create an account and register their devices. The next step was to send the sensor information gathered by the boards to the SocIoTal Context Manager and, in order to understand it better, the SocIoTal data model was presented, highlighting the possibilities it offers. Finally, users were able to create channels in the Web User Environment to subscribe to the data that the devices were sending to the Context Manager.

In this session, participants could have a first contact with the platform. At the end, some questions about the privacy of the data arose, which gave us the chance to present the next step of the platform, the communities' management tool. This concept was of great interest for them, especially for one who belongs to the FabLab Santander, who was provided with a private instance of SocIoTal during the developer session some months ago. As a result, their instance would be updated with the communities' tool and the rest of users will be informed about this new functionality as soon as it is deployed.

- *Visit of students from Higher Level Training Course in Electronic Maintenance 9th June 2016) - 20 attendees*

A group of students from one Vocational Training Integration Center in Santander dedicated to the Electronic Maintenance visited the UC premises in order to learn how the Communication Department works and what can be their possibilities after finishing their courses. Also, as they are performing training about the Internet of Things, they were presented the SocIoTal project. They could see the two points of view when using the platform, from the APIs perspective, in the case they want to use the

different components and functionalities as a pieces of a puzzle to create their own applications and services, and from the Web User Environment perspective, through which they will be able to manage their IoT devices but not going too deep through the APIs. Some of the students were pretty interested, and their teachers agreed to take a deeper look into the platform in order to check if it could fit within their objectives for practices for their students.

- *Presentation of DisApp application (I) (13th July 2016) - 13 attendees*

This meeting was organized with the collaboration of the Santander City Council in order to present the DisApp application to the citizens and install it on their smartphones. The attendees were disabled and non disabled people representing mainly two organizations in the city: Spanish Confederation of People with Physical and Organic Disability and Aphasic Association of Cantabria; and people from the City Councillor of the Personal Autonomy Department.

During the first steps of SocIoTal, a co-creation workshop was organized by Nathalie Stembert in order to draw and find requirements for a future application that could help disable people to find routes without obstacles and useful information for them. Participants with different insights (disable people, City Councillor of the Personal Autonomy Department, people from the City Council, and researches from the UC) could be able to "play" around the use case and extract very interesting requirements that would be useful during the development of the application.[3]

During the meeting the application was presented to the attendees as an application which allows the users to find routes from one point to another in the city avoiding obstacles in the route, but that has to be fed by the users by uploading new obstacles information to the platform, so emphasizing that they are a very important part of the application success. They were presented a tutorial about its use and at the end of the meeting they could install the application on their smartphones.

- *7th IoT Santander Meetup (15th July 2016) - 12 attendees*

This Meetup was focused on the presentation of the last version of the SocIoTal Web User Environment highlighting the communities' functionalities through the Web Interface. The attendees were taught to create communities, register new devices within a concrete community, request access and add users to communities. While the SocIoTal team was explaining the different steps and functionalities, the attendees could create their own accounts and start playing with the platform, showing pretty interest about the new services offered.

Also,the SocIoTal contest was presented where participants were able to present their ideas to be developed with SocIoTal.

- *Presentation of DisApp application (II) 2nd August 2016) - 23 attendees*

This second meeting was also organized with the collaboration of the Santander City Council with the interest of spread the application through the different disable organizations in the region. The attendees were disable and no disable people representing different disable organizations in the city such as the Federation of Associations of Deaf People in Cantabria, the Spanish Confederation of People with Physical and Organic Disability, the Aphasic Association of Cantabria, the Regional Association for Assistance to the Drug Addicts, and the National Organization for the Blind; people from the City Councillor of the Personal Autonomy Department, and ordinary people that did not belong to any association but wanted to participate in the pilot. Although it could be thought that the application is only focused on people with mobility problems since it calculate routes without obstacles, people with other kind of disabilities wanted to participate in the pilot since this kind of organizations are very intertwined and they always collaborate and help with each other. Also, they understood that this application have to be fed by all citizens to make it richer and make it more useful to its users. Apart from volunteer to be users of the application, and update it with new obstacles found along the city, they also provided new ideas and requirements to be taken into account for future implementations of the application, each of them related to their concrete disability. For example, deaf people proposed to include a new type of obstacle to represent the sound system of the traffic lights, in order to alert that one of the systems is not working and that it could be better to select other route avoiding that concrete traffic light.

At the end of the meeting the City Councillor of the Personal Autonomy Department highlighted the possibilities that this kind of technologies open to improve the quality of life of disable people, contributing to build an accessible city for all the citizens. Also, a group of Santander developers presented their willingness to support and evolve over this pilot in order to make it available after SocIoTal ends. So we agreed to provide our support in order they can work from this first version.

From this agreement, the Trade Learning Center from the City Council have requested support in order to easily learn how to use the platform and propose their students to use it for their practices.

- *Awards ceremony (23rd September 2016)*

The September 13th was selected the winner for the contest "Develop your idea with SocIoTal", after the presentations of the participants' ideas that took place on the 9th in the University of Cantabria premises. The winner was Mario Gómez, who presented an idea of an application focused on bike users to share routes, best places to park, multimodality, etc. Two communities of users were represented, depending if the users have their own bikes or use the ones provided by the City Council, since both groups have different needs when using the bikes (different parking lots, different capacities, etc.) Apart from information directly related to the bikes, also information about the public transport would be provided in order to enrich the application and promote a multimodal and sustainable way of transport in the city.

Regarding the DisApp pilot, a raffle was proposed in order to encourage users to use the application and report obstacles along the city during the pilot evaluation. Also, apart from use the application, they should fill a questionnaire about their experience with the application, referring different aspects such as the usability, the look and feel, new ideas, etc. The 19th was raffled the two prices of 250€ and the resulted winners were Marina Cruz and Soraya Armada.

The three winners were notified about the prices and were requested at the Awards Ceremony to be presented with certificates supporting the prizes, since the money was given by bank transfer. Figure 2, Figure 3, Figure 4 and Figure 5 presents some photographs of the ceremony where the Santander City Council and the University of Cantabria partners gave the awards to the winners.

Figure 2. Mario Gómez receiving the award for the best idea in the "Develop your idea with SocIoTal" contest.

Figure 3. Marina Terán was recognized for her participation in the DisApp pilot.

**Figure 4. Soraya Armada receiving her award for the participation in the DIsApp pilot.**

Figure 5. Marina Terán, Mario Gómez y Soraya Armada with their certificates as winners of SocIoTal contests.

1.3   The mijnbuurtje interaction - external services

SocIoTal has organised three workshops with mijnbuurtje.nl. We co-hosted the first workshop in the CAPS program, July 8/9, BXL with the brief to propose a smart manner to connect devices and make sense of the information collected, so think of what could be the ideal features of a platform connecting objects with a collective purpose.

Especially on the box 'Sensory Data' in the mijnbuurtje Architecture slide below
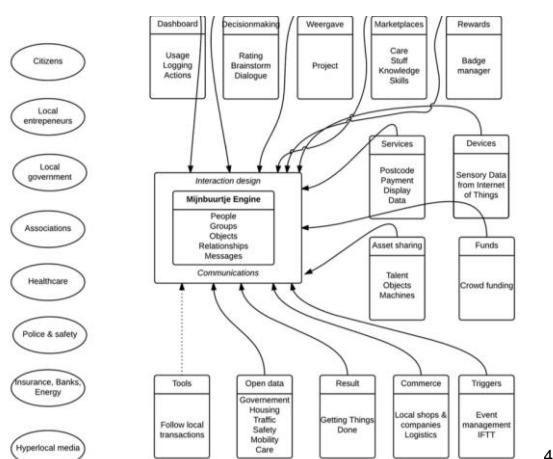
SocIoTal can show how the mijnbuurtje platform can develop, integrate and build #IoT sensors as community assets. It already works on implementing the service sharing of tools like power drills.

They are matching their needs in such a way that the demand is coming from the neighborhood platform, not pushed by companies or councils:
- How to strengthen the neigborhood community by maximizing the usage of #IoT?
- Which #IoT services can become assets of the neighborhood?

The second workshop[5] took place March 11th, in Santander with the aim to establish a common knowledge base and understanding about the level of technology and processes available (from

SocIoTal side) and understanding of the possibilities and options that mijnbuurje offers and may be used to achieve the closest possible level of interaction between SocIoTal and mijnbuurje. The key question from Eric Hendriks: Is it possible to add #IoT like apps and services to a socially cohesion driven neighborhood web platform? was answered positively. According to him SocIoTal has set up good cases in Santander and Novi Sad. What is missing is its becoming really a seamless part of every day life in real neighborhoods.
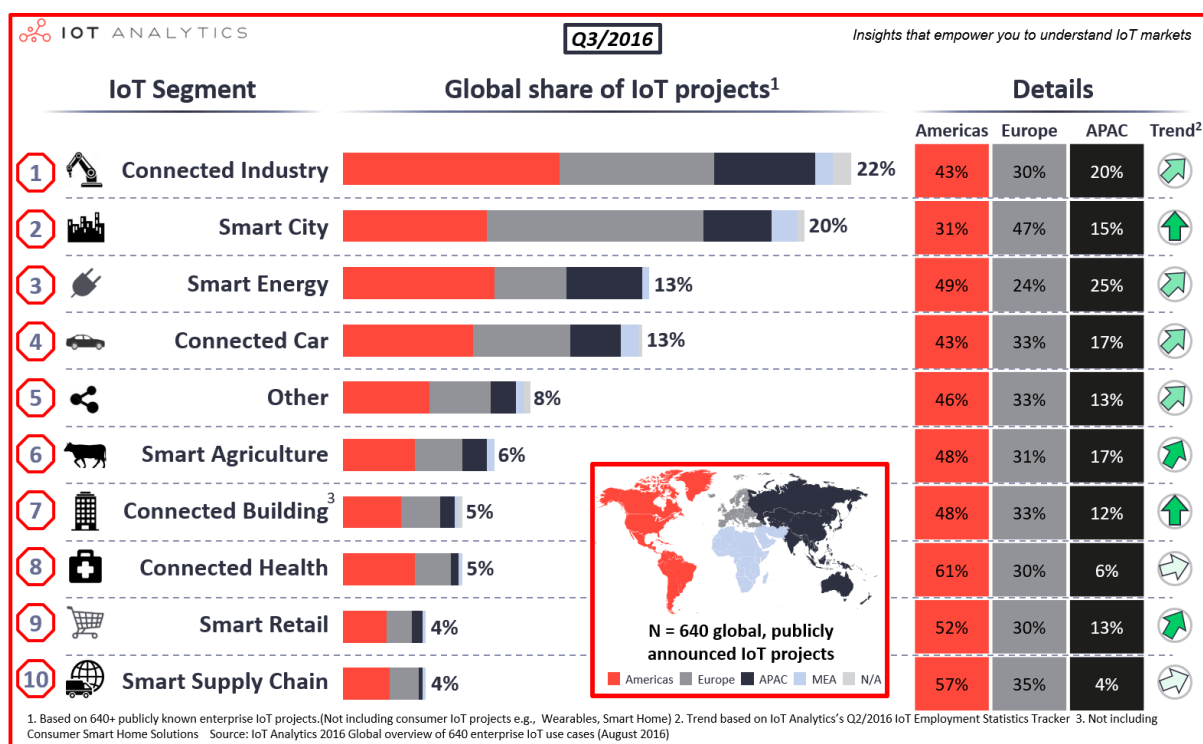
The third meeting will be held in September 28 in Nijmegen with the purpose of exploring IoT applications and SocIoTal tools in the mijnbuurtje architecture: to prepare a small experiment to show how you can bring an IoT service through the SocIoTal dev kit into the mijn buurtje community platform *(target group: IT developers from Munity Services/mijn buurtje),* organise a meeting around the theme How do you connect the IoT with everyday life? *(targetgroup smart city city council developers*) , organise a meeting on the theme How do you develop an IoT solution for your village or neighbourhood? *(targetgroup: technically skilled volunteers).* Activities on the longer term include developing the Munity platform in order for local developers to integrate new IoT services in an easy way.

The report from this workshop as well as the Meetup of September 23 with local hackers at Ghent *Whitespace* that will provide insight into the robustness of the tools, will be available in the online smart city workshop environment. It will be part of the tutorial.

Section 2- Communication strategy to integrate wiki, user dev environment and website (demo's, tutorials, deliverables): The Smart City Coordinator Toolkit

Claire Milne, Visiting Senior Fellow at LSE's Department of Media and Communications, puts forward the case for much wider debate on consumer and public interest issues relating to the Internet of Things (IoT), especially around the vital areas of privacy and security: " An output of the early EU efforts, she states, was the IoT Comic Book, which aimed to explain IoT to a lay audience. She acknowledges that the recent Staff Working Document Advancing the Internet of Things in Europe calls for a "human-centred IoT". "But the lead European body for advancing IoT, the Alliance for Internet of Things Innovation, has made little progress in its stated aim of getting civil society organisations to join, and planned membership fees won't help. Any takers for this opportunity to influence Europe's IoT?"[6]

As the global share of *smart city* in IoT projects is around 20%, SocIoTal wants to take up this challenge with a communicative way of presenting its outcomes.

IoT Segment	Global share of IoT projects[1]	Americas	Europe	APAC	Trend[2]
1. Connected Industry	22%	43%	30%	20%	
2. Smart City	20%	31%	47%	15%	
3. Smart Energy	13%	49%	24%	25%	
4. Connected Car	13%	43%	33%	17%	
5. Other	8%	46%	33%	13%	
6. Smart Agriculture	6%	48%	31%	17%	
7. Connected Building[3]	5%	48%	33%	12%	
8. Connected Health	5%	61%	30%	6%	
9. Smart Retail	4%	52%	30%	13%	
10. Smart Supply Chain	4%	57%	35%	4%	

N = 640 global, publicly announced IoT projects
Americas   Europe   APAC   MEA   N/A

1. Based on 640+ publicly known enterprise IoT projects.(Not including consumer IoT projects e.g., Wearables, Smart Home) 2. Trend based on IoT Analytics's Q2/2016 IoT Employment Statistics Tracker 3. Not including Consumer Smart Home Solutions   Source: IoT Analytics 2016 Global overview of 640 enterprise IoT use cases (August 2016)

In *Tips for City Authorities – How to Avoid Citizen Engagement Pitfalls,* Dr. Mazlan Abbas, CEO of REDtone IOT, asks: "Many citizen engagement mobile apps (example – identifying pothole, drainage faulty traffic light, illegal parking, unattended, etc. issues) failed simply because it's unable to sustain the popularity, usage, and continuous enhancement. Why?"[7]

During the project's lifetime we found that all stakeholders are uncertain as there is very little to none best practice. *Citizens* question privacy and security, as well as added value. *Companies* are slow to adopt to new business models or get pushed by Over The Top players without a real strategic view. A New Electronics survey of 187 *councils* from across England, Northern Ireland, Wales and Scotland by DJS Research found that many local governments across the U.K. lack the capability, leadership and budget to implement smart city projects. This comes as an increasing number of cities worldwide throw resources behind smart city projects to improve their budgets and livability. More than "80% of the councils had minimal to no engagement with smart city planning, with few assigning managers or teams to undertake smart city projects. It is evident that we need leadership to make smart cities work," said John Fox, managing director of street lighting firm Lucy Zodion, which commissioned the study." Needed is "leadership from government to provide a clearer path to delivery and leadership from local authorities to create an over-arching strategy to suit individual cities. The report identified five key barriers to the delivery of smart city projects. They include: poor funding; poor internal prioritization among city leaders; little evidence; insufficient collaboration; and little confidence in smart projects."[8] For example, the Smart

Chicago Collaborative is working with the City of Chicago and the operators of the Array of Things urban sensing project to engage with residents broadly. They have identified five main concerns[9]:

- Leverage existing physical infrastructure
- Engage the local data ecosystem (i.e., partner with local researchers or non-profits)
- Employ a clear data management strategy
- Address security and privacy concerns with transparency
- Turn collected data into action

Smart city projects have plenty of on-paper advantages, but city leaders are keen to remain in the good books of residents and broken promises, lack of city funds, and failed projects don't make a good resume. Democratic Rep. Suzan DelBene said at an Information Technology and Innovation Foundation event in Philadelphia that more federal investment is needed to ensure that "regardless of private sector investment, the government will be there to back projects and offer advice and pilot programs so we get best practices"[10]

Most organizations are not highly confident in their preparedness to complete each phase of an Internet of Things (IoT) initiative in-house and about one-third of IoT project needs require support from external vendors, according to research released by TEKsystems.[11]

The SocIoTal toolkit is addressing these issues. The graphic toolkit has five sections: on security and the SocIoTal tools, relevance, ecosystem, compliance and mega trends in smart cities. The Stakeholder Coordinator Toolkit addresses the barriers and incentives that were identified during the projects lifetime. They are described in the yearly WP6 reports (D6.1, D6.3, and D6.4 and D/5). The issues identified are strongly aligned while every City has its own areas of focus.

It is online at
theinternetofthings/smartcityworkshop
and will be continuously updated
A pdf is hosted on SocIoTal.eu with links to Council.
The Consortium is guaranteeing github support for two years after the closing of the project.

3.1   Eclipse Foundation

In order to provide a robust dissemination of the work performed during the SocIoTal project, the initial aim was to use the Eclipse platform. SocIoTal project representatives were approached by an Eclipse representative at IoT week 2015 in Lisbon. The Eclipse representative discussed the advantages of the Eclipse platform for the hosting of code and applications to other avenues such as GitHub. The main advantage was the visibility of the Eclipse platform.

3.1.1   The Eclipse View on Licensing
Eclipse have created their own licence for the Eclipse projects. According to Eclipse, the Eclipse Public Licence (EPL) is aimed at being business friendly. The Eclipse Foundation would like business to be able to adopt and use software that forms part of the projects without fear of infringing the copyright.

On their website they state:
Eclipse views license compatibility through the lens of enabling successful commercial adoption of Eclipse technology in software products and services. We wish to create a commercial ecosystem based on the redistribution of Eclipse software technologies in commercially licensed software products.

3.1.2   Eclipse and SocIoTal
The aim was to incorporate the SocIoTal project into the Eclipse Foundation as a project. However, we ran into the issue of licensing which means that this was not possible. The issue relates to third party tools that we have used in the SocIoTal project. The licence of these tools is incompatible with the EPL. Some of the tools we have used are licenced with GPL or AGPL. For example, the main database for storing information is based on the Fiware Orion Context Broker, which includes a MongoDB instance. This is licensed with GPL and AGPL and these are incompatible with the EPL Therefore they cannot be used in an Eclipse project.

We have had many discussions with Eclipse concerning incorporation of the SocIoTal project into the Eclipse Foundation as a project. However, it wasn't until a later stage that the issue of licencing arose. It was when we were discussing the third party tools that we used in the construction of the SocIoTal framework that Ian Skerrett (VP Marketing, Eclipse Foundation) began flagging it as an issue and asked us to report back on the licences of the third-party tools that were being used. It was then that we were informed that they were incompatible with the EPL and it would not be possible to use them in an Eclipse project.

Ian Skerrett has stated that other projects have run into this issue. Some projects have taken the time to replace the GPL and AGPL components, while the Eclipse Foundation have had to turn down others due to the conflict in licencing. He states that "The intent is that anyone should be able to use an Eclipse project in a commercial product." He also states that AGPL (and GPL) is not considered business friendly.

3.1.3   Information on the Eclipse Public Licence
The Eclipse Public Licence (EPL) is used to licence software from the Eclipse Foundation. It is designed to be business-friendly and features weaker copyleft provisions than other licences such as the GNU General Public Licence (GPL) or GNU Affero General Public Licence (AGPL). EPL is not compatible with GPL or APGL.
From EPL FAQ (https://eclipse.org/legal/eplfaq.php#GPLCOMPATIBLE)

Are the Eclipse Public License (EPL) and the General Public License (GPL) compatible?
The EPL and the GPL are not compatible in any combination where the result would be considered either: (a) a "derivative work" (which Eclipse interprets consistent with the definition of that term in the U.S. Copyright Act) or (b) a work "based on" the GPL code, as that phrase is used in the GPLv2, GPLv3 or the GPL FAQ as applicable. Further, you may not combine EPL and GPL code in any scenario where source code under those licenses are both the same source code module.
Based upon the position of the Free Software Foundation, you may not combine EPL and GPL code in any scenario where linking exists between code made available under those licenses. The above applies to both GPL version 2 and GPL version 3.

What licenses are acceptable for third-party code redistributed by Eclipse projects?

The current list of licenses **approved** for use by third-party code redistributed by Eclipse projects is:
Apache Software License 1.1
Apache Software License 2.0
W3C Software License
Common Public License Version 1.0
IBM Public License 1.0
Mozilla Public License Version 1.1
Common Development and Distribution License (CDDL) Version 1.0
GNU Free Documentation License Version 1.3
BSD
MIT

Licenses that are **not approved** for use include:
GNU GPL 2.0
GNU LGPL
Sun Binary Code License Agreement

3.2   Liaison with other projects

SocIoTal has collaborated with SMARTIE in the testing of some of the components developed and evaluation of possible synergies. Additionally in the context of the IERC meeting and the IoT Week 2016 several exchange of experiences and ideas has been considered in special with RERUM with a proposal of a common workshop within the WF-IoT 2016 conference.

3.3   Summer School

SenZations Summer School was used as a wheel for the evaluation of the platform and user engagement as well as for interaction and integration with other projects. During the third year of project there was one Hackathon event organized as a part of the Summer School, engaging together more than 40 students, technicians and IoT enthusiasts.

The goal of the SocIoTal Hackathon was to provide participants technology developed during the project to enable them to deliver services and application on top of it. A motivation for the participants was 800 € and 6 tickets to a start-up competition held in Dublin.

In addition, LoRa network was deployed during the Hackathon and integrated with the SocIoTal Context Manager. Gateway was used for the aggregation of data and its forwarding to the Context Manager. All participants have successfully connected their devices to the LoRa.

The technology provided to the participants from the SocIoTal project was as follows:

- Mobile Environment (Android app – add device to workspace by QR code scanning)
- SocIoTal Web Environment (web platform – manage devices from user's workspace)
- F2F enabler Android application for the recognition of the social context based on distance between two persons;
- Gait recognition Android application for recognition of user that utilize device based on walk pattern;
- SocIoTal Idm Issuer
- SocIoTal Capability Manager
- SocIoTal Policy Decision Point
- SocIoTal   Policy Administration Points
- SocIoTal Context Manager (pub/sub component with storage capability)

Before the start of the Hackathon tutorial was given on enablers and component to introduce the project, its architecture and APIs. There were two winning application "IoT breath analysis" and "Farmer's Ubiquitous Network", both splitting the main rewards and the tickets for the start-up competition.

Section 4-Academic Dissemination

WP leader presentations: Hans Crescent Symposium, in London on February 20[12], IoT ASia Smart City Forum March 31[13], DSI Slovenia[14], GES Taipei[15], Politecnico di Milano university[16], the Danish Technological Institute (DTI)[17] and a short report on Thingscon Eindhoven, in Smart Cities World: Collaborative toolchains for smart cities & the need for friction.[18]

Regarding the current state of academic dissemination, Table 2 includes a list of the scientific (peer reviewed) publications related to the project. It should be noticed this table is accumulative showing the publications from the beginning of the project.

Number	Publication type	DOI code	Publication title	Date of publication	Publication journal	Publication event	Source volume	Source issue	Author name	Author affiliation name
1	Paper	10.1002/ett.2771	User-Centric Smart Buildings for Energy Sustainable Smart Cities	January 2014	Transactions on Emerging Telecommunications Technologies			http://onlinelibrary.wiley.com/doi/10.1002/ett.2771/abstract	Moreno, María V and Zamora, Miguel A and Skarmeta, Antonio F	University of Murcia
2	Paper		A Holistic IoT-based Management Platform for Smart Environments	To appear		IEEE ICC 2014 - Selected Areas in Communications Symposium ('ICC'14 SAC')		http://icc2014.ieee-icc.org/index.html	María V. Moreno, José Santa, Miguel A. Zamora and Antonio F. Skarmeta	University of Murcia
3	Paper	http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6803136	User Role in IoT-based Systems	6-8 March 2014		IEEE World Forum on Internet of Things WF-IoT 2014.		http://sites.ieee.org/wf-iot/	M. Victoria Moreno, José Luis Hernández Ramos and Antonio F. Skarmeta	University of Murcia
4	Paper	DOI 10.1109/WAINA.2014.161	A Framework for Citizen Participation in the Internet of Things	2014		International Workshop on Pervasive Internet of Things and Smart Cities (PITSaC 2014).		http://www.aina-conference.org/2014/	M. Victoria Moreno, José L. Hernández, Antonio F. Skarmeta, Michele Nati, Nick Palaghias, Alexander Gluhak and Rob van Kranenburg	University of Murcia, Centre for Communication Systems Research
5	Paper	DOI 10.1109/WAINA.2014.160	A New Location-Aware Authorization Mechanism for Indoor Environment	2014		International Workshop on Pervasive Internet of Things and Smart Cities (PITSaC 2014).		http://www.aina-conference.org/2014/	M. Victoria Moreno, J. Luis Hernández and Antonio F. Skarmeta	University of Murcia
6	Paper		SocIoTal: Creating a Citizen-Centric Internet of Things	2014		4th International Conference on Information Society and Technology (ICIST 2014)		http://www.yuinfo.org/icist2014/icist_registration.html	Nenad Gligoric, Srdjan Krco, Ignacio Elicegui, Carmen López, Luis Sánchez, Michele Nati, Rob van Kranenburg, M. Victoria Moreno, Davide Carboni	DunavNET, University of Cantabria, Centre for Communication Systems Research, University of Liepaja, University of Murcia, CRS4

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7	Paper	10.1007/ s00500- 014- 1278-9	A soft computing based location- aware access control for smart buildings	13 April 2014	Soft Computing			http://link.springer.com /article/10.1007/s0050 0-014-1278-9	José Luis Hernández Ramos, M. Victoria Moreno, Antonio J. Jara and Antonio F. Skarmeta	University of Murcia
8	Paper		An IoT Based Framework for User Centric Smart Building Services	To appear	International Journal of Web and Grid Services			http://www.inderscienc e.com/jhome.php?jcod e=ijwgs	Moreno, María V and Zamora, Miguel A and Skarmeta, Antonio F	University of Murcia
9	Paper	10.1080/ 0020716 0.2014.9 15316	DCapBAC: Embedding Authorization logic into Smart Things through ECC optimizations	22-may- 14	International Journal of Computer Mathematics			http://www.tandfonline. com/toc/gcom20/curre nt	José L. Hernández-Ramos, Antonio J. Jara, Leandro Marín and Antonio F. Skarmeta	University of Murcia
10	Paper	10.1007/ 978-3- 319- 06811-4 10	Internet of Things Security, Privacy and Trust Considerations	2014		10th VLDB Secure Data Management Workshop (SDM 2013)		http://www.hitech- projects.com/sdm- workshop/sdm13.html	Antonio F. Skarmeta and M. Victoria Moreno	University of Murcia
11	Paper	10.1007/ 978-3- 319- 06608- 0_48	Privacy-Preserving Collaborative Anomaly Detection for Participatory Sensing	2014		18th Pacific-Asia Conference on Knowledge Discovery and Data Mining		http://pakdd2014.pakd d.org/	Sarah M. Erfani, Yee Wei Law, Shanika Karunasekera, Christopher A. Leckie, and Marimuthu Palaniswami	The University of Melbourne
12	Paper		Towards Privacy- preserving Data Sharing in Smart Environments	2014		3rd International Workshop on Extending Seamlessly to the Internet of Things (esIoT- 2014)		www.esiot.com	José Luis Hernández-Ramos, Jorge Bernal Bernabé and Antonio F. Skarmeta	University of Murcia
13	Paper	10.3390/ s140609 582	How can We Tackle Energy Efficiency in IoT Based Smart Buildings?	2014	Sensors Journal			http://www.mdpi.com/1 424-8220/14/6/9582	M. Victoria Moreno, Benito Úbeda, Antonio F. Skarmeta and Miguel A. Zamora	University of Murcia
14	Paper		CARD: Context- Aware Resource Discovery for mobile Internet of Things scenarios	2014		IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks		N/A	Riccardo Pozza, Michele Nati, Stylianos Georgoulas, Alexander Gluhak, Klaus Moessner, Srdjan Krco	University of Surrey, DNET

15	Paper		Privacy-Preserving Security Framework for a Social-aware IoT	2014		8th International Conference on Ubiquitous Computing & Ambient Intelligence (UCAmI 2014) & 6th International Work-conference on Ambient Assisted Living (IWAAL 2014)		http://link.springer.com/chapter/10.1007/978-3-319-13102-3_67	Jorge Bernal Bernabe, J. Luis Hernández, M. Victoria Moreno and Antonio F. Skarmeta	University of Murcia
16	Paper		Co-creation as the Key to a Public, Thriving, Inclusive and Meaningful EU IoT	2014		8th International Conference on Ubiquitous Computing & Ambient Intelligence (UCAmI 2014) & 6th International Work-conference on Ambient Assisted Living (IWAAL 2014)		http://link.springer.com/chapter/10.1007/978-3-319-13102-3_65	Rob van Kranenburg, Nathalie Stembert, M. Victoria Moreno, Antonio F. Skarmeta, Carmen López, Ignacio Elicegui and Luis Sánchez	University of Cantabria, University of Murcia
17	Paper	DOI 10.1109 JIOT.2014.2359538	Security Protocols and Privacy Issues inot 6LoWPAN stack: A synthesis	2014	Journal of IoT				Christine Hennebert and Jessye Dos Santos	CEA Grenoble
18	Paper	10.1109/ISSNIP.2014.6827606	Profiling spatial and temporal behaviour in sensor networks: A case study in energy monitoring	2014		IEEE Ninth International Conference on Intelligent Sensors, Sensor Networks and Information Processing (IEEE ISSNIP)		http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6827606&tag=1	Rashidi, L.; Rajasegarar, S.; Leckie, C.; Nati, M.; Gluhak, A; Imran, M.A; Palaniswami, M.	University of Melbourne, University of Surrey
19	Paper	10.1109/ICC.2014.6884036	Spatio-temporal estimation with Bayesian maximum entropy and compressive sensing in communication	2014		IEEE International Conference on , Communications (IEEE ICC)		http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6884036	Rajasegarar, S.; Leckie, C.; Palaniswami, M.	University of Melbourne

			constrained networks						
20	Article	10.1109/ MTS.20 14.2345 203	Participatory Sensing, Privacy, and Trust Management for Interactive Local Government	2014	Technology and Society Magazine, IEEE		vol. 33	http://ieeexplore.ieee.o rg/xpl/articleDetails.jsp ?arnumber=6901335	Marusic, S.; Gubbi, J.; Sullivan, H.; Law, Y.; Palaniswami, M.	University of Melbourne
21	Paper	10.1016/ j.jcss.20 14.12.02 1	SAFIR: Secure Access Framework for IoT-enabled Services on Smart Buildings	2014	Journal of Computer and System Sciences			http://dx.doi.org/10.10 16/j.jcss.2014.12.021	José L. Hernández-Ramos, M. Victoria Moreno, Jorge Bernal Bernabé, Dan García Carrillo and Antonio F. Skarmeta	University of Murcia
22	Paper		An Indoor Localization System Based on 3D Magnetic Fingerprints for Smart Buildings	2014		2015 IEEE RIVF International Conference on Computing & Communication Technologies, Research, Innovation, and Vision for the Future (RIVF)		http://ieeexplore.ieee.o rg/xpl/login.jsp?tp=&ar number=7049897&url =http%3A%2F%2Fiee explore.ieee.org%2Fx pls%2Fabs_all.jsp%3F arnumber%3D704989 7	M. Victoria Moreno and Antonio F. Skarmeta	University of Murcia
23	Article	10.1007/ 978-3- 319- 09177- 8_14	Future Human-Centric Smart Environments	2014		Modeling and Processing for Next-Generation Big-Data Technologies, Modeling and Optimization in Science and Technologies		http://link.springer.com /chapter/10.1007/978- 3-319-09177-8_14	María V. Moreno-Cano, José Santa, Miguel A. Zamora-Izquierdo, and Antonio F. Skarmeta	University of Murcia
24	Paper		Managing Context Information for Adaptive Security in IoT Environments	2015		International Workshop on Pervasive Internet of Things and Smart Cities (PITSaC 2015).		http://voyager.ce.fit.ac. jp/conf/aina/2015/	José L. Hernández-Ramos, Jorge Bernal Bernabe, Antonio F. Skarmeta	University of Murcia
25	Paper	10.1109/ JSAC.20 15.2393 436	Toward a Lightweight Authentication and Authorization Framework for Smart Objects	2015	IEEE Journal on Selected Areas in Communications			http://ieeexplore.ieee.o rg/xpls/abs_all.jsp?arn umber=7012039&tag= 1	José L. Hernández-Ramos, Marcin. P. Pawlowski, Antonio J. Jara, Antonio F. Skarmeta, Latif Ladid	University of Murcia

26	Paper	10.1007/ s00500- 015- 1705-6	TACIoT: multidimensional trust-aware access control system for the Internet of Things	2015	Soft Computing			http://dx.doi.org/10.10 07/s00500-015-1705-6	Jorge Bernal Bernabe, Jose Luis Hernandez Ramos, Antonio F. Skarmeta Gomez	University of Murcia
27	Paper	doi:10.3 390/s15 0715611	Preserving Smart Objects Privacy through Anonymous and Accountable Access Control for a M2M-Enabled Internet of Things	2015	Sensors Journal			http://www.mdpi.com/1 424-8220/15/7/15611	José L. Hernández-Ramos, Jorge Bernal Bernabé, M. Victoria Moreno and Antonio F. Skarmeta	University of Murcia
28	Paper	10.1109/ IMIS.20 15.49	Certificateless and Privacy-enhancing Group Sharing Mechanism f or the Future Internet	2015	4th International Workshop on Extending Seamlessly to the Internet of Things (esIoT- 2015)	www.esiot.com			José L. Hernández-Ramos, Jorge Bernal Bernabe, Salvador Perez Franco, Antonio F. Skarmeta	University of Murcia
29	Conferenc e Paper	10.1109/ VTCSpri ng.2015. 7145918	Location-Based Pseudonyms for Identity Reinforcement in Wireless ad hoc Networks	2015	IEEE Vehicular Technology Conference- Spring 2015 (IEEE VTC- Spring'15)			http://ieeexplore.ieee.o rg/xpls/abs_all.jsp?arn umber=7145918&tag= 1	Iulia Tunaru, Benoît Denis, Bernard Uguen	Commissariat a l'Energie Atomique
30	Conferenc e Paper		Privacy Issues in 6LoWPAN wireless sensor network	2015	Connected security Word, eSmart 2015			http://www.smartconta ctlessworld.com/	Christine Hennebert, Jessye Dos Santos and Cédric lauradoux	Commissariat à l'Energie Atomique
31	Conferenc e Paper		Preserving privacy in secured ZigBee Wireless Sensor Network	2015	IEEE World Forum IoT			http://www.ieee-wf-iot.org/	Christine Hennebert, Jessye Dos Santos and Cédric lauradoux	Commissariat à l'Energie Atomique
32	Conferenc e Paper	10.1109/ ICUWB. 2015.73 24430	Cooperative Group Key Generation Using IR-UWB Multipath Channels	2015	IEEE International Conference on Ubiquitous Wireless Broadband (IEEE ICUWB'15)			http://ieeexplore.ieee.o rg/xpls/abs_all.jsp?arn umber=7324430&tag= 1	Iulia Tunaru, Benoît Denis, Régis Perrier, Bernard Uguen	Commissariat à l'Energie Atomique

33	*Conference Paper*	ISBN:978-86-85525-16-2	Smart City Services for Citizen-Centric Internet of Things	2015	5th International Conference on Information Society and Technology Proceedings				5th International Conference on Information Society and Technology	Nenad Gligoric, Srdjan Krco, Dejan Drajic, Ignacio Elicegui, Carmen López, Luis Sánchez, Michele Nati, Jorge Bernal Bernabé, José L. Hernández-Ramos, Davide Carboni, Alberto Serra	
34	Paper	doi: 10.5220/0005475704980503	Humanizing the Internet of Things - Toward a Human-centered Internet-and-web of Things	2015	WEBIST 2015 - 11th International Conference on Web Information Systems and Technologies				http://www.scitepress.org/Portal/PublicationsDetail.aspx?ID=KWME3sdYT6w=&t=1	Antonio Pintus, Davide Carboni, Alberto Serra, Andrea Manchinu	CRS4
35	*Conference Paper*	http://dx.doi.org/10.1109/ICC.2015.7248384	Accurate detection of real-world social interactions with smartphones	2015		IEEE International Conference in Communications				Palaghias N, Hoseinitabatabaei, S.A. ; Nati, M. ; Gluhak, A. ; Moessner, K.	University of Surrey
36	*Conference Paper*	10.1109/WF-IoT.2015.7389153	Dynamic security credentials PANA-based provisioning for IoT smart objects	2015	IEEE 2nd World Forum on Internet of Things (WF-IoT)	IEEE 2nd World Forum on Internet of Things (WF-IoT)				José L. Hernandez-Ramos, Dan García Carrillo, Rafael Marín-López, Antonio F. Skarmeta	University of Murcia
37	*Journal*	10.3390/s150717168	MagicFinger: 3D Magnetic Fingerprints for Indoor Location	2015	Sensors Journal		15	7		Daniel Carrillo, Victoria Moreno, Benito Úbeda and Antonio F. Skarmeta	University of Murcia
38	~~Book~~	0302-9743	MagicFinger: A New Approach to Indoor Localization	2015		9th International Conference on Ubiquitous Computing & Ambient Intelligence (UCAmI 2015)	9454	10		Daniel Carrillo, Victoria Moreno and Antonio F. Skarmeta	University of Murcia
39	*Conference Paper*	10.1109/Kaleidoscope.2015.7383648	A required security and privacy framework for smart objects	2015		ITU Kaleidoscope: Trust in the Information Society (2015)				Antonio Skarmeta, José L. Hernández-Ramos, Jorge Bernal Bernabe	University of murcia

40	~~Book~~	10.1201/ b19516-12	A User-centric Decentralised Governance Framework for Privacy and Trust in IoT	2016	Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations				Jorge Bernal Bernabé, José Luis Hernández, Moreno, V., Antonio F. Skarmeta, Niklas Palaghias, Michele Nati and Klaus Moessner	University of Murcia Centre for Communicati on Systems Research
41	*Conferenc e Paper*	ISBN: 978-1-4799-6664-6	Opportunistic Smart Object Aggregation based on Clustering and Event Processing	2016		IEEE International Conference on Communications (ICC-2016)			Fernando Terroso-Saenz, José Luis Hernandez Ramos, Jorge Bernal Bernabé, Antonio Fernando Skarmeta Gomez	University of Murcia
42	Book	ISBN: 978-87-93379-81-7	Trusted IoT in the Complex Landscape of Governance, Security, Privacy, Availability and Safety	2016	Digitising the Industry - Internet of Things Connecting the Physical, Digital and Virtual Worlds				Elias Z. Tragos, Jorge Bernal Bernabe, Ralf C. Staudemeyer, Jose Luis Hernandez Ramos, Alexandros Fragkiadakis, Antonio Skarmeta, Michele Nati and Alex Gluhak	University of murcia
43	*Journal Article*	(accepte d, in press)	ARMY: Architecture for a Secure and Privacy-aware Lifecycle of Smart Objects in the Internet of My Things	2016	IEEE Comunications Magazine				José L. Hernández-Ramos, Jorge Bernal Bernabe, Antonio Skarmeta	University of Murcia
44	*Conferenc e Paper*	accepte d	Ephemeral : Lightweight Pseudonyms for 6LowPan MAC addresses	2016	PIMRC	PIMRC			Jessye Dos Santos, Christine Hennebert, Cédric Lauradoux, Jean-Christophe Fonbonne	CEA-LETI

45	Journal article	accepted	A Survey on Mobile Social Signal Processing	2016	ACM Computing Surveys		48	http://dx.doi.org/10.1145/2893487	Niklas Palaghias, Nikos Loumis, Stylianos Georgoulas and Klaus Moessner	University of Surrey
46	Conference Paper		Quantifying trust relationships based on real-world social interactions	2016		2016 IEEE International Conference on Communications (ICC)		http://dx.doi.org/10.1109/ICC.2016.7510835	Niklas Palaghias, Nikos Loumis, Stylianos Georgoulas and Klaus Moessner	University of Surrey

Table 2: Scientific (peer reviewed) publications related to the project

Furthermore, Table 3 provides a list of dissemination activities (publications, conferences, workshops, web sites/applications, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters) that are related to the scope of SocIoTal. This table shows the dissemination activities from the beginning of the project

Number	Type of activities	Main leader	Title	Date/Period	Place	Type of audience [2]	Size of audience	Countries addressed
1	Workshop	Srdjan Krco (DNET), Svjetlana Krco (DNET)	Workshop #1-#9: Meeting with Local Communities, Tenants Councils and Public Companies, September-October 2013	September-October 2013	Novi Sad			
2	Workshop	Rob van Kranenber, Srdjan Krco, Nathalie Stambert	Workshop#10: Co-creation Workshop with Research Teams	28th February 2014	Novi Sad	Research teams from DunavNET, City of Novi Sad, Centar za Promociju Nauke Beograd, Javno Preduzece Informatika		
3	Workshop	Rob van Kranenber, Srdjan Krco, Nathalie Stambert	Workshop#11: Rob van Kranenber and Srdjan Krco, Nathalie Stambert, Co-creation Workshop with Local Communities/Tenants Councils	29th February 2014	Novi Sad	Representatives of Tenants Councils and Local Communities		
4	Workshop	Rob van Kranenber, Srdjan Krco, Nathalie Stambert	Workshop#12: Co-creation Workshop with Computer Users (not programmers)	29th February 2014	Novi Sad	Computer Users (but not programmers)		
5	Workshop	Rob van Kranenber, Srdjan Krco, Nathalie Stambert	Workshop#12: Co-creation Workshop with programmers	29th February 2014	Novi Sad	Programmers/ developers		
6	Panel	Srdjan Krco (DNET)	Living bits and things 2013: "Sociotal: Project overview and use cases"	13th November 2013	Bled, Slovenia			

7	Meetup	Srdjan Krco (DNET), Rob van Kranenburg (RD)	Iot Meetup#1: "Internet of Things in Novi Sad: Technology, the City, Society and Citizens "	27th February 2014	Faculty of Philosophy, Novi Sad				
8	TV show	Srdjan Krco (DNET)	TV Show "Naukovati" - Internet of things	24th May 2014	Radio Televizija Novi Sad				
9	Meetup	Srdjan Krco (DNET), Rob van Kranenburg (RD)	IoT Meeup#2: "Second IoT Meetup"	24th April 2014	Faculty of Philosophy, Novi Sad				
10	Meetup	Srdjan Krco (DNET), Rob van Kranenburg (RD)	IoT Meetup#3: "Danube IT conference"	29th May 2014	Danube IT, Ribarsko ostrvo, Novi Sad				
11	Panel	Srdjan Krco (DNET), Nenad Gligoric (DNET)	Living bits and things 2014: "Fostering End-user involvement into the Citizen-centric Internet of Things"	4th June 2014	Bled, Slovenia				
12	Conference sponsored	DNET, UMU	PITSaC, International Workshop Pervasive Internet of Things and Smart Cities (PITSaC 2013)	14-15 May, 2014	Alberta,Canada	Scientific Community,			Worldwide
13	Thesis (PhD)	M. Victoria (UMU)	An IoT-based Information Management System for Energy Efficiency in Smart Buildings	31st October 2014		Scientific Community, Industry, Other			Worldwide
14	Panel	M. Victoria Moreno (UMU)	IoT Week 2014. Best Practices for involving communities in European IoT projects	19th June 2014	London (UK)	Scientific Community, Industry			Worldwide
15	Panel	Antonio F. Skarmeta (UMU) Srdjan Krco (DNET)	IoT Week 2014. Semantic Interoperability; Security, Privacy, Trust & the ARM	18th June 2014	London (UK)	Scientific Community, Industry			Worldwide
16	Conference sponsored	UMU	8th International Conference on Ubiquitous Computing and Ambient Intelligence (UCAmI 2014)	2nd-5th Dec 2014	Belfast (UK)	Scientific Community			Worldwide
17		Srdjan Krco (DNET), Rob van Kranenburg (RD)	IoT Meeup#4: "IoT Museum"	18th Septembar 2014	Faculty of Philosophy, Novi Sad				
18	Meetup	UC	1st IoT Santander Meetup	21th February 2014	Santander (Spain)	Citizens	19		Spain
19	Meetup	UC	2nd IoT Santander Meetup	30th May 2014	Santander (Spain)	Citizens	25		Spain
20	Workshop	Nathalie Stembert, Rob van Kranenburg, UC	Co-creation Workshop with Research Teams		Santander (Spain)	Research Team from SocIoTal and other IoT projects	8		Spain
21	Meetup	UC	3rd IoT Santander Meetup	21st October 2014	Santander (Spain)	Citizens	25		Spain
22	Meetup	UC	4th IoT Santander Meetup - Workshop to create IoT devices (I)	22nd May 2015	Santander (Spain)	Citizens	21		Spain

23	Summer School	DNET	SenZations' 14 - 9th Summer School on IoT Applications	31th August - 06th September 2014	Biograd na Moru (Croatia)	Students, PhD students, developers		
24	Panel	Nenad Gligoric (DNET), Srdjan Krco (DNET)	SocIoTal – Creating Citizen Centric Internet of Things, ICT Forum 2014	14th-16th October 2014	Nis (Serbia)	Scientific and business clusters		
25	Panel	Nenad Gligoric (DNET)	Smart City Services for Citizen-Centric Internet of Things	8th-11th March 2015	Kopaonik (Serbia)	Scientific community		Worldwide
26	Panel	Nenad Gligoric (DNET)	Panel session for involving dorms in SOCIOTAL	17th April 2015	Borsko jezero (Serbia)	Non scientific community (dorms presidents)		
27	Meetup	Srdjan Krco (DNET), Boris Pokric (DNET)	SocIoTal presentation and call for participation as end users/developers	21st April 2015	Belgrade (Serbia)	Business clusters and government agencies		Serbia
28	Meetup	Nenad Gligoric (DNET)	MeetUP: SocIoTal presentation and API evaluation	1st July 2015	Novi Sad (Serbia)	Developers		Serbia
29	Meetup	Dejan Drajic (DNET)	SocIoTal presentation for local community	13th July 2015	Novi Sad (Serbia)	citizens		Serbia
30	Conference sponsored	UMU	International Workshop Pervasive Internet of Things and Smart Cities (PITSaC 2015)	24th-27th 2015	Gwangju (South Korea)	Scientific community		Worldwide
31	Conference sponsored	UMU	International Workshop on Extending Seamlessly to the Internet of Things (esIoT 2015)	8th-10th July 2015	Blumenau (Brazil)	Scientific community		Worldwide
32	Meetup	UC	5th IoT Santander Meetup - Workshop to create IoT devices (II) and Web User Environment	9th October 2015	Santander (Spain)	Citizens and developers	20	Spain
33	Session with developers	UC	SocIoTal session with developers (platform presentation)	27th October 2015	Santander (Spain)	Developers	6	Spain
34	Conference sponsored	UMU	IEEE World Forum on Internet of Things (WF-IoT) 2015	14-16 December 2015	Milan (Italy)	Scientific community, Industry		Worldwide
35	Meetup	DNET	MeetUP: Services from Smart Cities. SocIoTal platform presentation and Hackathon announcement	23rd December 2015	Belgrade, Chamber of commerce (Serbia)	Citizens, Students, Developers	54	Serbia
36	Meetup	DNET	MeetUp: IoT Week announcement and SocIoTal tools presentation	8tj March 2016	Belgrade, Chamber of commerce (Serbia)	Citizens, Students, Developers	65	Serbia
37	Meetup	UC	6th IoT Santander Meetup - Workshop SocIoTal platform	29th April 2016	Santander (Spain)	Citizens, developers	17	Spain
38	Workshop	UMU	IoT Week Belgrade	May 31th-June 2nd 2016	Belgrade (Serbia)	Panel Session on IoT Security and Privacy	50	European
39	Session with students	UC	Visit of students from Higher Level Training Course in Electronic Maintenance	9th June 2016	Santander (Spain)	Students	20	Spain
40	Hackathon	DNET	IoT Week Belgrade - Hackathon	May 31th-June 2nd 2016	Crown Plaza Hotel, Belgrade, Serbia	Students, developers, citizens	25	European

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41	Meetup	UNIS	IoT Guildford Meetup	6th April	Guildford (UK)	Citizens, Developers	6	UK
42	Workshop	UMU	IoT Week Belgrade	May 31th-June 2sd 2016	Belgrade (Serbia)	Panel Session on IoT Security and Privacy	50	European
43	Workshop	UMU	IERC Meeting	June 24th	Valencia (Spain)	AC3 meeting	75	European
44	Workshop	UMU	AIOTI GA	30th May	Berlin (Germany)	GA		European
45	Conference Panel	UMU	EIP SCC Meeting	April 28th	Webinar	'Addressing Privacy in Smart Cities' Webinar	35	European
46	Summer School	DNET	SenZations' 16 - 11th Summer School on IoT Applications	27th August – 02nd September 2016	Lochow (Poland)	Students, PhD students, developers	60	Worldwide
47	Meeting	CRS4	SocIoTal Events & NeedforNerd	8th june 2016	Cagliari	Citizens, Students	15	Sardinia
48	Meeting	CRS4	Sociotal Events & NeedforNerd	9th June 2016	Cagliari	Developers, Students	15	Sardinia
49	TV/Press release	CRS4	TCS TV station interview about SocIoTal project	17th May 2016	Pula	Citizens		Sardinia, Italy
50	Workshop/course	CRS4	Advanced course in Web plaforms for the IoT	July, 2016	Pula	Students	20	Sardinia
51	Press release	CRS4	Article about SocIoTal on SardiniaPost online newspaper	14th July 2016	Cagliari			Sardinia, Italy
52	App Presentation	UC + SDR	Presentatin of DisApp application (I)	13th July 2016	Santander (Spain)	Citizens	13	Spain
53	Meetup	UC	7th IoT Santander Meetup – Web User Environment with Communities functionalities	15th July 2016	Santander (Spain)	Citizens, developers	12	Spain
54	Press release	SDR	Press release about DisApp application http://www.eldiariomontanes.es/agencias/cantabria/201607/17/personas-discapacidad-prueban-aplicacion-729338.html	17th July 2016	Spain			Spain
55	App Presentation	UC + SDR	Presentation of DisApp application (II)	2nd August 2016	Santander (Spain)	Citizens	23	Spain
56	Workshop	DNET	IoT Convivio	19 Sep 2016	Milan (Italy)	Industry, public administration	40	Italy

Table 3: Dissemination activities related to the project

Section 5- Conclusions

The SocIotal toolkit is timely. The social and stakeholder need in the smart city debate is becoming recognized widely. It is no longer seen as nice to have, but as a key focus alongside the technical implementation.

Oxford academic Igor Calzada is "particularly wary of a model, which seems to be dominant especially in the US, that sees citizens mainly as just customers to whom the administrations provide services. If you see citizens only as customers, cities become just social reward, material exchange, relationship based markets. But as we have seen recently, markets can also fail." [19] In cities that want to call themselves really smart, "citizens cannot just be managed like data entries, or left as an afterthought: a concern that seems to be shared also by Peter Sany, president of the non-profit TM Forum, who organized the conference Calzada spoke: "there are four 'P's. You have to start with people."[20]

Commercial organisations, "including telecoms providers and utilities, often explain their needs to local councillors, who then want to implement a top-down approach to create a smart city. "But that does not work," says Corné Kriesels, co-ordinator, cables and pipes, for the city of Breda. "To create a successful smart city, only a bottom-up approach will succeed. A municipality must first pay attention to what is happening in the city and then look critically at the processes and workflow in its own organisation.""[21]

For example in Lisbon, the need for BIP/ZIP (Bairros e Zonas de Intervenção Prioritária), a program developed by the city for priority measures in difficult city neighbourhoods. was determined following detailed analysis of quantitative and qualitative data on building substance as well as of social, climatic and economic indicators.[22]

Sicco Santema, professor of B2B marketing and supply chain management at the Delft University of Technology, states "supply chain costs will be cut by 15% to 20% if parties work together." According to him the creation of an open supply chain where only one party collects source information and shares it with the rest of the chain, throughput can be reduced significantly and the cost savings will be substantial. In the Netherlands there are too few examples of supply chain information-sharing. "There are often too many interests," he says. "The current aim of many organisations is to gather as much information as possible, and then to guard that information like a lion. The danger of keeping information to yourself is that Google will eventually be your biggest competitor, he says. "Information and the availability of information is critical in supply chain optimisation. That is what Google and Amazon do best."

By giving local citizens access to the system containing information about works and other reports, the number of reports is reduced, says Kriesels. "The nature of the reports has changed," he adds. "Where previously people mentioned, for example, a pile of sand that was lying somewhere, the reports we get now are more serious in nature."[23]

Based on the original work of Antonio Pintus, Davide Carboni, Alberto Serra and Andrea Manchinu of CRS4 in their paper **Humanizing the Internet of Things** *Toward a Human-centered Internet-and-Web of Things[24] (*published in Proc. of 11th International Conference on Web Information Systems and Technologies (WEBIST) the aim of this investigation in SocIoTal is to investigate positioning the focus of activities in Y3 in order to market the potential of SocIoTal.

- The value proposition of the application can comprise the improvement of city services and the stimulation of local economy by mobilizing new market segments (citizens with a disability and tourists with a disability), an intermediary function between different stakeholders, certification for shop owners, clear, accurate and useful information for people with a disability and efficient (transportation) routes.
- The costs of the application are mainly identified in terms of design, development and publicity.
- Most users of the application are probably not willing to pay for the application.
- The revenue of the application can come from alternative solutions rather than direct payments i.e. certifications, donations, intermediary costs, percentage of payments through the application, subsidies, etc.

- The success of the application is largely based on the involvement, participation and collaboration of its users. It is evident to raise awareness to increase the usage of the application and involve as many different stakeholders as possible.
- Engage non-disabled people to gather and share valuable information in the form of pictures and comments in order to increase the community.
- The DISMAP application is not only interesting for Santander, it can be expanded and the concept can be carried out in many other cities.

In the light of all these factors and the desk research, the decision was therefore made to offer the SocIoTal enablers as a technical toolkit within a larger offering of a smart city workshop that can be globally run anywhere, by one of the two SME in the consortium, Resonance Design (aka Council), as an external service offered as part of the general consultancy and workshop offerings of Council, theinternetofthings.eu.

In this way the original premise of the project, that there would be a need for an open source IoT platform with extreme low barriers to both developers and citizens therefore opening up a potential for cities to engage without the full stack offerings of large IT/IoT providers, has been validated.

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[1] http://www.sardiniapost.it/innovazione/sociotal-la-piattaforma-rende-linternet-delle-cose-accessibile-a-tutti/

[2] also http://sociotal.eu/content/knowledge-transfer

[3] Deliverable D6.3. Report on second year community interaction. Co-creation workshop Santander (Section 3.1)

[4] W: www.mijnbuurtje.nl E: Eric@mijnbuurtje.nl T: @mijnbuurtje

[5] Hendriks E., **Hoe verbinden we Internet of Things met het alledaagse leven van mensen in dorpen en wijken?** Verslag van meeting in Santander, 11 maart 2016[5] Een voorbeeld hiervan het het projectteam van het Sociotalproject. Zij ontwikkelden in de steden Santander en Novisad samen met de gemeente een complete infrastructuur van sensoren, van aansturing, communicatie en opslag. Ook ontwikkelden ze een Open Source software ontwikkelomgeving waarin je via een API op een veilige manier gegevens kunt opvragen van een netwerk van apparaten zoals sensoren maar ook telefoons, zodat je zelf hiermee toepassingen kunt ontwikkelen.
Sociotal heeft bewezen wat er allemaal kan met de IOT technologie en mooie praktijkcases in Santander en Novi Sad opgezet.
Wat ze echter nog missen, is de vertaling en gebruik hiervan naar het dagelijkse leven, naar 'vanzelfsprekend' gebruik in de leefgemeenschappen in dorpen en wijken.

[6] Helping to shape the Internet of Things – a role for civil society?
http://blogs.lse.ac.uk/mediapolicyproject/2016/06/03/helping-to-shape-the-internet-of-things-a-role-for-civil-society/ This blog gives the views of the author and does not represent the position of the LSE Media Policy Project blog, nor of the London School of Economics and Political Science. Copyright © 2014 LSE

[7] Dr. Mazlan Abbas : Tips for City Authorities – How to Avoid Citizen Engagement Pitfalls. In: IOT Talk Series (Part-6) – Making Sense of Data – But What Data? Posted on August 1, 2016, by IOT World

[8] Power D. Most U.K. councils' smart city projects just hot air. Posted on July 13, 2016
http://readwrite.com/2016/07/13/most-u-k-councils-smart-city-projects-simply-hot-air-cl4/

[9] Startz G., 5 Points to Remember for Engaging Citizens with the Internet of Things
http://www.govtech.com/fs/5-Points-to-Remember-for-Engaging-Citizens-with-the-Internet-of-Things.html

[10] Curry D., U.S. lawmakers want to make smart city projects less risky
http://readwrite.com/2016/07/31/bill-smart-city-projects-cl4/

[11] The survey defined the Internet of Things and IoT-related initiatives as any internet-like network of physical objects and infrastructure, containing embedded technology with the purpose of communicating, sensing or interacting with their internal states or the external environment.

http://www.staffingindustry.com/Research-Publications/Daily-News/Most-not-confident-in-preparedness-for-Internet-of-things-36726

[12] RvK spoke on SocIoTal in the panel Smart Cities Infrastructures and Business Models: Alternatives
· Rob van Kranenburg, Founder Internet of Things Council ('15)
· Usman Haque, Founding partner of Umbrellium ('15)
· Adam Greenfield, Founder and Managing Director of Urbanscale ('15)
· Denis Roio (AKA Jaromil), CTO and co-founder of Dyne.org ('15)
at the Hans Crescent Seminar "Beyond the Smart City: Towards a Democratic Alternative": 20 Feb. - Agenda 26 januari 2016 15:22 The Hans Crescent Symposium has grown out of informal meetings hosted by Julian Assange at the Ecuadorian Embassy. The second symposium in the series "Beyond the Smart City: Towards a Democratic Alternative" is concerned with formulating democratic, non-neoliberal alternatives to smart cities. In particular, we will be discussing the following themes:

- Broader political and theoretical analysis of the smart city
- The infrastructures and business models of the smart city
- Impact of financialisation of public services and infrastructure
- Innovative public policies alternatives for the XXI century democratic-open source City

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[13] Highlights of Smart City initiatives from different countries and background perspectives on local issues/challenges, lessons and insights e.g. prioritising projects, enabling civic engagement and thriving social fabric, determining returns, addressing: ""Can Smart Cities be Too Smart for Our Own Good?"", designing BY whom FOR whom, the role of social/communal intelligences, resilience etc. Moderator: Rob van Kranenburg, Founder, The IoT Council, The Netherlands
Rob van Gijzel, Mayor of Eindhoven and Chairman of the Brainport Foundation, The Netherlands
Charles Lin, Deputy Mayor, Taipei City Government, Taiwan
Tan Kok Yam, Head, Smart Nation Programme Office, Singapore
Trent Mayberry, Managing Director - Solution Design, Accenture Digital
[14] http://dsi2016.dsi-konferenca.si/default.aspx?id=119&l1=10
[15] http://www.global-economic-symposium.org/symposium/taipei-workshop
[16] See http://www.osservatori.net/internet-of-things and Derven O'Neill: The lecture hall at the Università Bicocca in the centre of Milan was full to overflowing for today's conference on the Internet of Things. All 930 seats were taken with standing room only to hear what the big names in the industry had to say on the topic.
The event was opened with a summary of results from research conducted by the "Osservatorio Internet of Things".
The concluding presentation on the topic was given by Rob van Kranenburg, the founder of the IoT Council who made a number of interesting points. Van Kranenburg is working on the EU project, SOCIOTAL which addresses the objective : "A reliable, smart and secure Internet of Things for Smart Cities". He said that we need engineers not just operationally but also in politics, at the top to facilitate the growth of IoT. He also said that to get the public onboard with IoT, people need to own their data, whether it comes from wearables, from their car, from their home, from all applications... the user should then entitle service providers to enrich that data and play it back to them. If we really want IoT to take off, this is what needs to happen!
http://www.theinternetofthings.eu/derval-oneill-internet-things-what-big-players-had-say-morning-topic
[17] Danish Technological Institute, 3th of June: There will be around 80 different participants (in the big conference hall in building 1 at DTI in Taastrup) for your presentations. The participants are not IoT experts. Therefore it would be great, if you can elaborate on IoT in a way, where you involve the participants – that come from across of DTI's organisation. You are also most welcome to consider a dynamic mix of a rather presentation, which can create a discussion around What are the impacts of IoT and why is IoT so important (create a context to the public debate also around open versus closed and to privacy/security)?
[18] https://smartcitiesworld.net/opinions/collaborative-toolchains-for-smart-cities--the-need-for-friction-by-rob-van-kranenburg-founder-iot-council
[19] F. Guerrini : To Be Really Smart, Cities Need To Be Built Around People
http://www.forbes.com/sites/federicoguerrini/2016/09/19/engaging-citizens-or-just-managing-them-smart-city-lessons-from-china/#1b2c7a1b2dda
[20] idem
[21] Loohuis, K., Netherlands needs 'bottom up' approach to create smart cities
Creating a smart city is not just about technological innovations – it also means connecting existing networks and resources in a smart way. The Dutch city of Breda is a pioneer in this area.
http://www.computerweekly.com/feature/Netherlands-needs-bottom-up-approach-to-create-smart-cities
[22] BIP/ZIP is a tool for supporting on-site projects. Available capacities are organized in network format and existing neighbourhood groups and organizations energized.
http://blog.goethe.de/weltstadt/archives/120-Lisbons-Obstinacy.html
[23] Loohuis, K., Netherlands needs 'bottom up' approach to create smart cities
Creating a smart city is not just about technological innovations – it also means connecting existing networks and resources in a smart way. The Dutch city of Breda is a pioneer in this area.
http://www.computerweekly.com/feature/Netherlands-needs-bottom-up-approach-to-create-smart-cities
[24] CRS4, Loc. Piscina Manna Ed.1, Pula, Sardinia, Italy {pintux, dcarboni, alserra, manchinu}@crs4.it This paper describes work undertaken in the context of the SOCIOTAL project (www.SocIoTal.eu).