# Universitat de Girona

University of Girona

# Master Thesis

Perspectives on Citizen Participation for the Digital Age; Urban Development Based Research and Case Study

Islam Bouzguenda/ Master in Smart Cities

1/9/2016

Perspectives on Citizen Participation for the Digital Age; Urban Development Based Research and Case Study

Islam Bouzguenda

Final Master's Thesis

Master in Smart Cities / University of Girona

Supervisor:

Dr. Sergi Nuss Girona – University of Girona

# Acknowledgment:

In the name of Allah, the Beneficent, the Merciful.

**{Read in the name of your Lord Who created**}...Verse (1).Al-Qalam chapter

Praise be to God first, who gave me the strength and the ability to complete this a master's degree...

First and foremost, I thank my mother who stayed up nights and tired for my comfort, my thanks goes to my dad also, who did everything he can from the effort of raising me to educating me, I also thank my dear husband, who was a source of support and backing to lift my spirits, and also thanks to both my father's and mother's in law who have been credited in supporting me to continue my educational achievements and pray for me..

I also thank all those who contributed in educating and teaching me since the early stages of my childhood to higher levels of education and more specifically both from Sultan Qaboos University and University of Girona...

# رسالة شكر

بسم الله الرحمن الرحيم

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ.. آية (1) سورة القلم

الحمد لله الذي أعطاني القوة وسهل لي أموري للحصول على شهادة الماجستير..

أشكر بادئ ذي بدء والدتي التي سهرت الليالي وتعبت من أجل راحتي والشكر موصول لوالدي الذي بذل كل ما يستطيع من جهد لتربيتي وتعليمي كما أشكر زوجي العزيز الذي كان مصدر الدعم والمساندة ورفع معنوياتي وكذلك أشكر كلا من والدة و والد زوجي لما كان لهم الفضل في حثي على الاستمرار في تحصيلي العلمي والدعاء لي..

أشكر أيضا جميع من ساهم في تعليمي وتدريسي منذ مراحل طفولتي إلى مراحل التعليم العليا وأخص كلا من جامعتي السلطان قابوس وجامعة جيرونا ..

# List of Tables and Figures:

## List of Tables:

## List of Figures:

# Table of Contents

# Abstract:

Since we are experimenting now a new era of cities being deployed with smart technologies, citizen participation is a complementary task to these cities. Traditional ways being used for civic engagement are not interesting anymore to most of the citizens, as attracting a diverse group of citizens to participate can be challenging, since citizen involvement is often a leisure-time activity and competes with other ways of spending time (Oksman et al., 2014). This research investigates the possible ways of attracting people to the Co-creation process as well as utilizing the latest innovative technologies that could be applied as a participation tool. This study used the concluded results from the previous practical work as a reference to create a strong theoretical background discussing several aspects of the subject. A conceptual proposal was designed afterwards, including several steps that should be implemented in sequence, followed by the implementation phase which includes a business model strategy and finally a discussion and evaluation of the expected outcomes.

# Chapter 0 - Introduction:

What does it mean to live in a city where everything is measured and technology is all around? Will this city of the future protect us, or will it monitor us? Upon entering the world of smart cities, these are some of the first questions that pop-up in people's minds. This project aims at offering some insight in relation to urban development and public spaces; therefore, on the built-up spaces shared by communities, in which multiplicity of urban functions and diverse needs and expectations meet; thus, where citizen identity and sense of belonging grow and develop.

Anthony Townsend, urbanist and technology expert rather sees it as a city that connects people more, stating that: "a century ago, the telegraph and the mechanical tabulator were used to tame cities of millions. Today, cellular networks and cloud computing tie together the complex choreography of mega-regions of tens of millions of people". This out-of-the-box thinking shows new potentials for using data to help understand complex problems better, such as Co-creating these cities; should this widespread technologies in smart cities empower citizens to interact with their city and participate in its decision-making processes? In the context of this thesis the key term is social participation**, as innovation needs to happen in a broader context having people involved** (Kreutz, 2016). **The new model of the smart city explicitly includes the participation of citizens as sensing nodes** (Mcquillan, 2015) and as "we simply don't do 'smart' very well yet" (Greenfield, 2010), focusing on citizen participation as a key measure of the smartness of the city is the most powerful driving force for innovation.

Referring to the previous cooperative practical work done in Schiedam city, Netherlands, and more specifically regarding the research results and outcomes; it was concluded that in the domain of Co-creation or citizen participation the biggest challenge is getting people interested to participate. Accordingly, in this thesis this problem will be discussed more in deep, reflecting some roots of the problem, such as: governments transparency; citizens satisfactions; utilizing smart cities technologies as a medium of interaction between the citizen and the government; and the formation of public opinion through the use of publicly available technologies as crowdsourcing platforms. Part of the research will focus on the latest technologies applied in smart cities to support citizen participation, in terms of direct and indirect sources of data that could be collected from the citizens. **The expected outcome will be a design for a Dynamic 3D participation tool**; that is taking part in a social crowdsourcing platform that will be conceptually designed by the author, to be used to crowd source ideas and data from the citizens in Schiedam city. In addition to **proposing innovative technological solutions for informing the residents about new projects taking place in the city.** The interface will be applied on the same square taken as a case study in the practical work, and will reflect the idea of the Dynamic Public Spaces, but more in a digitalized way.

Finally, as mentioned before, being introduced to the smart cities world leads to encounter many challenges, such as reaching the excellence that smart city promoters are trying to achieve; in addition to that, working in a community-based research and practice, will create extra challenges as people often behave in unpredictable and subtle ways in their everyday contexts, at the same time, public life constitutes a wider range of emotions and experiences.

# Chapter 1 - Objectives:

Humankind is entering an era of massive data collection, thanks to the internet and mobile devices. This demands clarifying how such data should be used to understand many dimensions of city spaces and its usage. As this thesis is a continuation of the practical project related to this master course, and a reflection of the research results and analysis, emphasizing that better analysis can lead to better action to improve citizens engagement and participation; the objectives of this research include:

- Improving citizens participation in smart cities
- Provide improved Co-creation services, that fulfill the smart city concept
- Empower the usage of technological and social tools available in the city to enable better use of information and communication technologies
- Improve the urban planning process to be more participatory
- Exploring how different stakeholders, especially citizens, may perceive ubiquitous, mixed reality technologies as a part of future participatory urban planning
- Making the urban planning process more visualized, easy-to-access and understood
- Influencing the participation process with 3D interactive design tools and the visualization of the contexts
- Closing the gap between traditional urban planning policy and the latest technologies.


**The expected result, will be twofold:**

**Firstly, a research paper, developing a literature and terminology review related to the subject of technology supported co-creative urban planning, and its derivations,** such as: smart city and smart citizen; digital citizenship; civic engagement and its relation to government transparency; social innovation; and different digital data sources.

**Secondly, the conceptual design and description of an innovative participation tool, supported on 3 stages, namely: 1) Informing Truck; 2) Engaging offline citizens; 3) Online Participation interface; for, afterwards, discussing its implementation possibilities and evaluation of expected outcomes.**

# Chapter 2 - Study Area:

This project is a theoretical and applied continuation of a previously finalized practical project, developed under a cooperation initiative launched between Schiedam City Council and the Master Degree in Smart Cities in the University of Girona (UdG). As a result, the author has been engaged with the citizens in Schiedam, got introduced to the different approaches the city council is utilizing for citizen participation and faced the same problems the city is facing when trying to engage people in designing their public spaces. This Master's Final Thesis is thereby an attempt to complete the work done in the Practicum; extend it more and go further with researching some innovative smart solutions to improve the citizen participation in Schiedam city, but this time looking more forward to the future digital city.

The following are some facts about the Dutch city and the existing participation toolkit currently utilized by the city council to empower civic engagement.

## 2.1 - Schiedam; the city

Schiedam is a city located in South Netherlands in the metropolitan area of Rotterdam, surrounded by Rotterdam from the west, Vlaardingen from the east and Delft from the south. The Surface area of the city is 19.86 sq. Km, the population in May 2014 was 76,650. The city has a culturally diversified society with a 36.2 % (in 2012) of foreigners; Turkish, African, Moroccan and other. Schiedam consists of nine districts: Centrum ('Center'), Oost ('East'), Gorzen ('South'), West ('West'), Nieuwland, Groenoord, Kethel, Woudhoek and Spaland/Sveaparken. Schiedam during the early Industrial Revolution in the 18th and 19th century was very famous for its distilleries and malt houses and production of Jenever (gin), but most of this is now history in museums, the city has faced major crises and decline of traditional distilleries. In the 20th century the city again faced another crisis in shipbuilding industry, but the city claims now that it has almost recovered from this demise. Evidence can be seen in the harbor site, which offers a location to entrepreneurs from a diverse range of industry branches. Schiedam is also well known for the canals and waterways. The city is including the major climate and environmental issues very strongly in its future vision and plans, and looking forward to be a sustainable climate proof and green water city, where treating the environment with care will become second nature to residents, companies and government. These goals are being achieved with some rules set by the government including: local government buildings must become 100% climate neutral; schools and offices are being built in the vicinity of train and metro stations to avoid the need to use a car; the windows of homes will be positioned to receive maximum sunlight to

help reduce heating costs; and waste heat from companies is increasingly being used for heating to ensure that this source of energy is not lost (Municipality of Schiedam, 2010).

## 2.2 - Participation Toolkit in Schiedam

Schiedam, represented by its City Government, utilizes a well-known measure of the influence of those involved in policy-making; the participation ladder (http://www.schiedam.nl). This participation toolkit is composed of a ladder with five steps, each step representing a level of involvement in policy making, the higher on the ladder, the more able to influence are stakeholders. The participation levels are: 1) inform; 2) consult; 3) advice; 4) co-produce; 5) and decision-making. For each project, the level of participation is defined according to certain factors such as: the importance of the project to the neighborhood; the effect on the temporal viability of the project and safety; or the size of the influence of the space.



Figure 1.  Scheidam Participation Ladder[1]

For each step specific instruments were appointed. In the lower level "Inform", the municipality is determining the agenda for decision making and will keep the stakeholders aware; e.g., to inform residents in asphalting roads without any changes. Informing instruments include: information page website, Twitter, Facebook, information meeting (walk), working visit, exhibition and others. The second step is "Consult"; this stage goes beyond informing. The municipality sees stakeholders as partners in the development of policy, but the municipality is not committed to the results arising from the talks. An example is the permitted public participation in drawing-up plans. Consultation instruments include: Schiedam's internet panel; survey; submission of digital visions; and statutory consultation. The third step is "Advise". In this case, the municipality compiles the rules, but gives stakeholders the occasion to contribute with problems

---

[1] https://www.schiedam.nl/participatie

and formulating solutions. Their ideas later will play a full role in the development of the policy. Advising instruments include: participation evening; workshop; expert group; city Debate and Children's City. In the fourth step "Co-production", the municipality and stakeholders jointly will define the problem, and then joint solutions will result. The municipality commits to these solutions with respect to the final decision. An example is the preparation of a draft development plan for a public space. Co-production instruments include: Pressure cooker; workshop; Workgroup Citizen Power Initiatives (Civic Force and its own power) and youth Wijkoverleg. The highest level of participation is "Deciding"; on this level the government is giving the people the full deciding voice. The people decide what should happen and the government executes the decision, this is done with certain subsidies, where a group from the neighborhood will get a yearly budget and have the power to use the budget for subsidies; for example for neighborhood activities.

# Chapter 3 - Theoretical Framework:

## 3.1 - Smart city & smart citizen

In the smart cities arena, a multitude of definitions are found, as there is not yet a specific definition for the smart city, urbanists and technology promoters tend to define it in different manners according to their motivations, such as the following: "a city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens" (Giffinger et al., 2007); "a city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens" (Hall, R. E., 2000); "a city connecting the physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure to leverage the collective intelligence of the city" (Harrison et al., 2010); "a city combining ICT and Web 2.0 technology with other organizational, design and planning efforts to de-materialize and speed up bureaucratic processes and help to identify new, innovative solutions to city management complexity, in order to improve sustainability and livability" (Toppeta, 2010); "a city that is focusing on the use of Smart Computing technologies to make the critical infrastructure components and services of a city—which include city administration, education, healthcare, public safety, real estate, transportation, and utilities—more intelligent, interconnected, and efficient" (Washburn et al., 2010); and finally, "smart cities represent a conceptual urban development model based on the utilization of human, collective, and technological capital for the enhancement of development and prosperity in urban agglomerations" (Angelidou, 2014).

All these definitions are evolving around the Information Communication Technologies, sustainability and improving livability. For the purposes of this research, the working definition of 'smart cities' is the following: smart cities are all urban settlements that make a conscious effort to capitalize on the new Information and Communications Technology (ICT) landscape, keeping their primary concerns; the engagement of the private sector and citizens and the development of an innovative ecosystem (Angelidou, 2014). An example of such smart city, is Barcelona (Spain); in which collaboration is a key to smart city initiatives. The city takes a lead to facilitate it among stakeholders (businesses, academic institutions, government authorities and the residents), while allowing partners to operate as independently as possible and ensuring that their activities meet the aims of the smart city venture (Lee, Bakici, Almirall, & Wareham, 2012).

Furthermore, the city is providing ubiquitous connectivity (corporate fiber optical network, Wi-Fi mesh network, sensor network and public Wi-Fi network) and new services for the citizens, in order to amplify the efficiency of the public sector, offer up-to-date information to citizens and foster their participation in the management of the city, and innovation opportunities by encouraging citizen-to citizen services and open public data (Bakici et al., 2012). In such a way, the city's people are expected to contribute to local governance and benefit from gaining access to multiple services and becoming more participative (Angelidou, 2014). Such types of governments were mentioned by Sheombar (2016), stating that: "smart city innovations occur when 'wicked problems' are solved at the intersection of government, business and society". To date, solutions have mostly been confined to infrastructure and do not scale easily. Governments should focus on solutions that extend beyond infrastructure to include smart citizens. Sheombar (2016) added also: "smart city innovations require a change of attitude for all involved: government, business, and citizens. Smart citizens should be informed, involved and inspired."



**BUILDING SMART INFRASTRUCTURE**

- Internet of Things
- Hyper-connectivity
- Intelligent

**ENGAGING SMART CITIZENS**

- Informed
- Involved
- Inspired

**SMART GOVERNANCE**
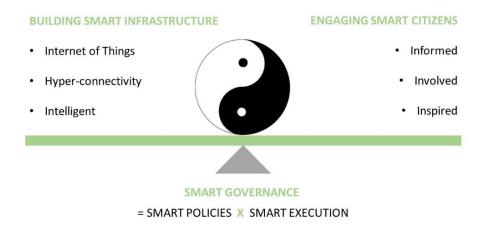= SMART POLICIES X SMART EXECUTION

Figure 2. Smart cities innovation ("Smart Cities Innovation", 2016)

In addition to that, Ertio and Ruoppila (2013) argued recently that mobile participation is rapidly transforming citizens from passive information foragers and receivers to human sensors capable of even complex output. As active smart citizens are a key factor in leveraging human capital and collective intelligence (Angelidou, 2014) in any smart city, ubiquitous connectivity will definitely help in facilitating the valuable interaction with stakeholders enormously, as they provide a collective and encoded space where large scale interaction and collaboration can take place (Angelidou, 2014), creating more connected citizen-to-citizen and as a result more connected citizens to their city.

## 3.2 - Social Innovation

"Social Innovations" are defined by the EU community[2], as innovations that are social in both their ends and their means that simultaneously meet social needs. They are innovations for society but also enhance society's capacity to do, create and act. In this definition, the focus are the ideas, concepts, meeting social needs and creating new collaborations to attend them: "Social innovations are new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations" (Murray, Calulier-Grice and Mulgan, 2010). There are many innovations meeting social needs, but only for social innovations is the distribution of financial and social value tilted toward society as a whole (Moretti, 2015). Integrating the previously mentioned definitions of smart city with the concept of social innovation, will lead us to encounter that smart cities need social innovations because they create new scenarios, new possibilities, to attend new (or older) people needs. Bremen (2013)[3] said that the word "social" made investors run a mile. "Since the 1950s we have been talking about this idea of the city as a complex system ... the part that currently has a business model is the part related to this system: management, energy efficiency, and mobility – all the smart city industry is fed into that. But the other part, which is social innovation and social engagement, they really don't know how to make a business model out of it. Citizens are giving a lot of data, we are telling everybody a lot of things, so can we close the circle and revert it back to the citizens for the improvement of their everyday life". In other words, the social innovation process is not considered as constitutive of smart cities, but it can help in the definition of the same concept of smart city: participation, integrated system, holistic system (Moretti, 2015).

A successful example of implementation of this concept and empowering the social innovation for the benefit of the city and society is The International Association for Public Participation. It has developed a spectrum to encompass various forms of engagement (Fig.3). At one end of the spectrum is *informing*, which might take the form of a mailing or a town-hall meeting in which professional leaders describe a new change effort (and perhaps ask for feedback about it). At the other end of the spectrum is *empowerment*, which supports true self-determination for participants.

---

[2] http://ec.europa.eu/enterprise/policies/innovation/policy/socialinnovation/index_en.htm
[3] http://www.theguardian.com/sustainable-business/smart-cities-sensors-socialinnovatio

## The Spectrum of Community Engagement

**INCREASING IMPACT ON DECISION-MAKING**

| INFORMING | CONSULTING | INVOLVING | COLLABORATING | EMPOWERING |
|---|---|---|---|---|
| Providing balanced and objective information about new programs or services, and about the reasons for choosing them. Providing updates during implementation. | Inviting feedback on alternatives, analyses, and decisions related to new programs or services. Letting people know how their feedback has influenced program decisions. | Working with community members to ensure that their aspirations and concerns are considered at every stage of planning and decision-making. Letting people know how their involvement has influenced program decisions. | Enabling community members to participate in every aspect of planning and decision-making for new programs or services. | Giving community members sole decision-making authority over new programs or services, and allowing professionals to serve only in consultative and supportive roles. |

Figure 3. The spectrum of community engagement (Barnes & Schmitz, 2016)

The further an initiative moves toward the empowerment end of the spectrum, the more community members will feel a sense of ownership over it, and the more inclined they will be to advocate for it. Of course, it's not always possible to operate at the level of full empowerment. But initiative leaders need to be clear about where they are in the spectrum, and they need to deliver the level of engagement they promise (Barnes & Schmitz, 2016). One organization that practices empowerment is the Family Independence Initiative (FII) in Oakland (California), USA. Instead of focusing on delivery of social services, FII invests in supporting the capacity and ingenuity of poor families. Through an extensive data-collection process at six pilot sites, FII has demonstrated that participating families can achieve significant economic and social mobility. Family Independence Initiative[4] argued that they have innovated and tested new approaches to economic and social mobility that demonstrate that low-income families have the initiative and capacity to move themselves and their communities out of poverty.  This happens when families have access to connections, choice, and capital.

## 3.3 - Smart Civic Engagement

Civic engagement is a concept of action that has become part of common vocabulary, not only in the West but also in many other regions of the world as well. The core concept beyond this vocabulary is "Public". Civic engagement deals with public affairs, public discourse and public goods (Finches, 2010). Civic engagement includes acts and, according to the influential political scientist Norris (2001), also knowledge and trust that refer to issues of public or common concerns. It is a concept that is not necessary related to

---

[4] http://www.fii.org/approach/

political concerns as many people think, it goes wider beyond that, as per the political scientist Wuthnow (1991), who stated that; "public discourse must be thought of in terms broader than those of political debate alone. Its essential concern is with the collective, not necessarily in the sense of the entire society, but with the relationships among individuals, between individuals and communities, and among communities. Public discourse - or what is often referred to as the public sphere - is thus the arena of questions about the desirable in social conduct: How shall we live as a people? What do we hold as priorities? To what ends shall we allocate our time, our energy, and our collective resources? Where do we locate hope? How do we envision the good?". These questions could be simply answered by individuals who work in schools, in neighborhoods, on the streets, in museums, and in parks even. Those individuals are the active people who care about acting on their notion of what is good for their community. In some cases that means engaging in a struggle against well-established state and business interests. In other cases it means taking advantage of the opportunities to work in fields that the state and business leave untouched. In most cases, however, it means working with other parties including state and business organizations, to advance some public cause (Finches, 2010). Clary and Snyder (2002), and later Montero (2004), have both noted that civic engagement can be highly beneficial for individuals, institutions, and communities as well as for the surrounding society in general. Hirschmann (1982) and Kelly and Breinlinger (1996) discuss in detail how civic engagement offers psychological and social benefits for the individual: satisfaction, sense of belonging, and social status rewards. To gain these benefits, individuals need to be persuaded to take action voluntarily. Thus, Bendapuni and Leone (2003) have encouraged citizens to adopt more active roles in society. However, several others, such as Huseby (2000) and later Alford (2001), have noted that in order to make real progress in civic engagement, reciprocal trust between people and responsible institutions must be introduced. Trust is obviously one of the key challenges and prerequisites of citizen participation (Hosio et al., 2015). Thus, when trust and community ownership are formed, changes will happen, as people need to engage with one another, and community members need to be seen as producers of outcomes, not just as recipients of outcomes (Barnes & Schmitz, 2016).

Scientists Strolle and Hooghe (2005), built one of the earliest new participation styles and methods supporting a fluid type of civic engagement framework. The framework focuses at four elements: 1) structure, 2) issues, 3) mobilization and 4) style of involvement. The two important elements for the purpose of this thesis are 'issues' and 'style of involvement'. In terms of issues, it is said that new initiatives are less concerned with institutional (political party) or ideological politics. Instead, lifestyle elements are politicized with actions that may not even be called political. In line with this are 'subpolitics' or daily decisions, such as shopping, taking on a political meaning (Micheletti, 2003). Close to home issues, such as waste control, can make people feel connected without the requirement of formal membership or

ideological identification, say Stolle and Hooghe (2005). Type of involvement is less collective or group oriented. It can be supported by advocacy networks and can have a far-reaching impact on business or government, but the act is usually individualized: a purchase decision, forwarding an email, voting on a website (Finches, 2010).

In contemporary, it is believed that new forms of engagement that allow for flexibility and individuality gain popularity among younger generations in modern societies, such as platforms instead of organizations (Finches, 2010). Such platforms, present partially the pervasive technologies deployed in modern smart cities. In this context, civic engagement is clearly one research domain that may benefit from communities being presented with better communication capabilities through the use of pervasive technologies (Hosio et al., 2015). As the new public agora is emerging through the Internet, the web has been identified as a platform that supplies new possibilities for an interactive virtual public arena, enabling top-down efforts to shape cities through continuous bottom-up participation. New-Media platforms such as Facebook and Twitter are the new enablers of multi-directional information flows in a faster and broader way than ever before, including more and more individuals, especially younger people, to engage with their city (United Nations, 2015).

## 3.4 - Civic Engagement vs Government Transparency

Civic engagement is considered a reflective of government transparency. Engaging a community is not an activity that leaders can check off on a list. It's a continuous process that aims to generate the support necessary for long-term change. The goal is to encourage intended beneficiaries not just to participate in a social change initiative but also to champion it (Barnes & Schmitz, 2016). Lasting change is not possible without community; bottom-up approach is the base for civic engagement, communities don't accept the top-down approach anymore. Such approach as one in which elected officials, philanthropists, and leaders of other large institutions launch and implement programs and services without the full engagement of community leaders and intended beneficiaries (Barnes & Schmitz, 2016). Leaders, not unreasonably, are apt to assume that bottom-up methods will only slow the implementation of programs, that is true, but this is how trust is built in governments. It is not easy to get the community satisfied and have trust in their government, and the harder even is to maintain that trust. Former director of data and analytics for a US city said: "The problem is that they didn't trust us. Relationships matter. Not enough was done to ask people what they wanted, to honor what they see and experience. Many of our initiatives died —not because they didn't work but because they didn't have community support". To win such support, policymakers and other leaders must treat community members as active partners (Barnes & Schmitz, 2016). Collins (2001),

argues that effective leaders first get the right people on the bus and the right people in the right seats, and then they figure out where to drive it. Too often, social change efforts don't engage the right mix of people. When leaders seek to bring data-driven solutions to low-income communities and communities of color, they must take care to apply an equity lens to this work. Members of those communities not only should be "at the table"; they should hold leadership positions as well. Applying an equity lens involves working to build trust among participants and working to ensure that all of them can engage fully in an initiative. Achieving equitable participation, moreover, requires a commitment to hearing all voices, valuing all perspectives, and taking swift action to correct disparities of representation. And although this process cannot eliminate power dynamics, leaders should strive to mitigate the effects of power differences (Barnes & Schmitz, 2016).

Civic engagement in many countries, is not just about joining hands in watering flower beds at museum parks. In many cases, it is a serious battle and a hard struggle with the formal powers to defend interests, to fight for civil rights, to raise one's voice, and even to —sometimes with overt anger and despair— protest against injustices that people experience on a day-to-day basis, especially people outside the mainstream and people who suffer economic hardships (Finches, 2010).

## 3.4.1 - Digital Government

Modern citizens expect national, regional and municipal authorities to respond rapidly to social needs and issues. And they expect it to happen in a transparent and responsible manner. Fast access to information is crucial in this regard. While policy is threatening to lag behind, adequate solutions are available (IBM Software, 2014). Changes in technology are so profound and are happening so fast that leadership teams are struggling to keep up. Some private companies in Netherlands are hosting a set of one or more experience workshops and masterclasses to make leaders —through active participation— understand and feel what digitization means ("Digital Leadership", 2016). Governments are faced with a number of challenges. The road to better service will undoubtedly involve social media, mobile technology and Big Data. They will develop into a proactive service provider for every individual citizen. The relationship between citizens and governments needs to be redefined (IBM Software, 2014).
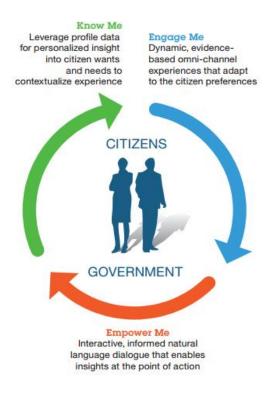
Figure 4. Redefined relationship between government and citizens (IBM Software, 2014)

This redefined relationship will be based on three pillars: Know me – Engage me – Empower me. "Know me": governments will use the data they have on citizens in order to offer a personalized service based on the individual needs of every citizen. "Engage me": governments will evolve from a reactive to a proactive model in which interaction between the government and individual citizens or organizations will take place across various channels. "Empower me": citizens will be well-informed thanks to a targeted personal service based on interaction between governments, organizations and citizens (IBM Software, 2014).

All over the world, there are examples of governments who have successfully implemented technology to upgrade their services, protect citizens and to guarantee national security. In Memphis (USA) the local police department analyses enormous amounts of real-time data from any number of sources. Advanced computer algorithms enable local authorities to predict which areas will be affected by crime. Since the introduction of the system, crime figures in Memphis are down by 24 percent. The Guardia Civil (Spain) handles large amounts of information every day, which it has to analyze with care so that it can be used in different fields of application, such as investigating crimes and psychology. It considers data analysis a fundamental factor for an effective and efficient performance of its public service. A substantial improvement has been noted in procedures of the Crime Investigation Department, and the Psychology

Department can now internally develop tests that previously had to be purchased (IBM Software, 2014). Responsible for maintaining the national civil registry, which contains personal data on all Austrian residents, the Austrian Federal Ministry of the Interior needed the ability to provide secure, real-time access to the registry as required by law. With more than 2.300 cities and villages submitting data and changes, redundant data and registry access issues interfered with the collaboration and interoperability that the agency hoped to achieve. Without a way to manage, resolve and share this large volume of data, the Ministry struggled to gain insight into its citizens and their needs. They achieved the following: reduced the cost of locating and readying dedicated civil defense vehicles in the event of a disaster by 40 percent; helped engender a double-digit decrease in burglaries in Eastern Austria; saved more than € 1.1 million per year in school and kindergarten operations and labor costs; protected privacy of residents by ensuring that authorized persons only have access to the data allowed to them. A large US medical and social benefits organization used Big Data analytics, including ad hoc queries of more than 70 data sources, to reduce the time it took to conduct analyses from weeks to just four hours. More than € 100 million in improper payments were immediately identified, including payments made to thousands of dead people (IBM Software, 2014).

## 3.5  - Digital citizenship/ Digital Engagement

Today it is unthinkable to have a strategy that is not digital, everything around us is following the digitization process; in our life, governments, academic, economy, etc. As information technologies have emerged recently as means to better connect institutions and individuals; Sulonen and Horelli (2012) in their exploration of civic engagement and information and communication technology–mediated participation in general, concluded that a holistic ICT-assisted approach to gathering and diffusing information is important in the future. The digitization of our society has redefined the way in which citizens interact with one another. Modern society is mobile. Citizens and consumers prefer to use their smartphone to surf the net and make online purchases. Thanks to social media, citizens now have a virtual seat in the corporate boardroom. People share their experiences with the products and services provided by companies and governments online (IBM Software, 2014). Angelidou (2014) reports that Barcelona city gives a good example of the type of support that should occur to the digitization process of the city, stating: "what is more, it is highly desirable to combine digital changes with targeted physical and institutional ones, achieving economies of scope through integrated projects, like Barcelona did. Physical planning and social policy can and should underpin the digital or 'smart' dimension of the city". Digital Transformation is like going on a journey with a clear vision about the destination, but some uncertainty about the road ahead.

This is a transformation that requires internal and external collaboration with a variety of stakeholders ("Digital Leadership", 2016). Only when these stakeholders will be given equal opportunities to participate and access the new technologies; open civic engagement will happen. Thus, citizens are the key players to leverage our digital age. Going back to the origins of the vocabulary, T. H. Marshall (1949) defines "Citizenship" as "a status that is bestowed on those who are full members of a community". Later in (1992) he defined the same as "endowing all members of a political community with certain civil, political, and social rights of membership, including the right to share everything in the social heritage and to live the life of a civilized being according to the standards prevailing in the society". Moving to our digital smart cities, Mossberger et al. (2008) stated that "digital citizenship is the ability to participate in society online", arguing that information technology is assumed a secure place today in the civilized life and prevailing standards of the modern society. They see that the internet in our days has the potential to benefit society as a whole, facilitate the membership and participation and encourage the social inclusion of individuals in society (Warschauer, 2003), in the same way education has promoted democracy and economic growth before. Digital citizen is however the citizen who uses the Internet regularly and effectively on a daily basis (Mossberger et al., 2008). Until 2006, digital citizens in the USA were accounted for little under half of the population, and only twenty seven percent of the Americans still do not go online at all (Pew Internet and American Life project 2006). Speaking after ten years, these numbers are much different, especially after the widespread of smartphones; now, citizens with no Internet access are for sure much less. Digital citizens today, are those who use technology frequently, who use technology for political information to fulfill their civic duty, and who use technology at work for economic gain (Mossberger et al., 2008). When examining online participation aspects in the society, we should encounter three major aspects; the inclusion in prevailing forms of communication through regular and effective use; the impact of Internet use on the ability to participate as democratic citizens; and the effect of the internet on the equality of opportunity in the marketplace. Evidences by Mossberger et al. (2008) show that internet use does not indeed have significant benefits for democratic participation and economic welfare, but increases the likelihood of voting and civic engagement. Other findings establish that, as internet use grows, some patterns of social exclusion appear, as per Angelidou (2014), who sees that digitization of all citizen services will exclude the citizens with no internet access, stating that "the digitization of citizen services can have splintering effects on the social cohesion of society, as social groups with limited access to digital resources may find themselves completely isolated by losing their access to their physical counterpart (think banks versus internet banking, city hall services versus online birth certificates, libraries versus e-books, voting centers versus e-voting, etc.)". The fact that by 2020 an estimated 10 billion mobile devices will be in use worldwide (IBM Software, 2014), will lead to rethink the previous statement, as there are several examples

of governments across the globe who have successfully adapted their service to today's mobile reality, keeping in mind that not every service can be translated into a mobile application and the fact that not every citizen owns a smartphone or a tablet, quickly realizing that although a government doesn't need to be 100 percent mobile, it can optimize the relationship with its citizens by making certain crucial services available in the form of a mobile app (IBM Software, 2014).

## 3.5.1 - Data Sources

With the help of technology citizens have the potential to be more informed, connected and engaged with the world around them more than ever before. More and more today, government services associate with the gathering and exchange of huge amounts of data. These data come from a large number of sources: from historical sources to video, audio and mobile phone signals, sensors and social media. Increasingly, it is unstructured data collected in real time (IBM Software, 2014). The ability to measure, monitor and track the digital traces people leave as they go about their daily lives, has turned into true capital for an increasing number of urban stakeholders (Valkanova, 2014). Yet, it is still unclear how this urban data, and the technologies able to acquire and display it, can be of true value to its citizens, the people who generate it (Townsend et al., 2010).

Before talking about the value of these data, what are the best ways to collect and later display it? Goncalves et al. (2013) argue that, in the context of crowdsourcing public opinion using urban pervasive technologies, there are several initial barriers when using only mobile phones, such as additional configuration efforts (e.g., installing apps, accessing Web pages) or even financial costs. In contrast to mobile-only environments, utilizing situated and public interfaces does not require citizens to make any extra effort to engage, or bear financial costs (Hosio et al., 2015). On the other hand, the combination of data visualization as a means to represent citizen data in attractive and insightful ways in public spaces, with ubiquitous technologies for displaying, sensing and interacting, could potentially make us more informed and engaged citizens (Foth et al., 2011). But Muller et al. (2010) noted that "the space of public deployment is a rich yet challenging environment within which to deploy infrastructure and applications". Several considerations, including the intertwined social practices of the space, the robustness of the technology, vandalism, differing stakeholder interests, and even weather conditions bring about constraints when deploying technology in such authentic settings. Thus, keeping the option for a movable or unfixed public infrastructure that could be removed in such cases and keeping the main connection with the citizen through an online platform, will form a great combination and a solution for the previously mentioned problems.

Finally, referring to the efficiency of such public deployment in the civic engagement process, Hosio et al. (2014) have described how initial engagement deployments are easy to "sell" to third parties, because they essentially get something for nothing. What is difficult, then, is guaranteeing officials' commitment to civic engagement projects in the long term.

The following two sections, contain some of the latest technological approaches used to collect data from citizens either in direct ways when citizens by themselves step ahead and participate in any event or try a public deployment, or indirect sources, through sensors and real time data produced by the people without real intention to participate in anything.

3.5.1.1 - Direct sources of data

Social Innovation Labs

Social Innovation Labs refer to online platforms or physical spaces, offering unique processes that involve diverse stakeholders in a given field, creating an environment conducive to innovation and experimentation. They focus on startups and business development around topics such as energy, environment, civic participation, people, society challenges and how new technologies and new forms of cooperation can result in change and impact. Some of the successful examples include:

1. Civic Innovation Lab, Lahore, Pakistan (http://codeforpakistan.org/lahore/ ): A civic innovation lab conformed mostly of volunteers who work in collaboration with government, non-profits and media. They work with technology, data, policy and design projects to strengthen their communities. Some of their projects are: Fuel Locator, an app to help people find fuel available in times of shortage; Social Storytelling App, an app to empower citizens to be heard –people can share their stories with the world and even find solutions together.

2. Lab for the City, Mexico City (http://labcd.mx/labforthecity/): a hybrid (governmental and civic) innovation lab facilitating collaboration and dialogue between citizens and government. They promote creativity and innovation in and out of government and are constantly prototyping and testing practices and ideas to adapt them to the needs of the city.

3. BCNLab, Barcelona, Spain (http://www.barcelonalab.cat/ca/): Barcelona Laboratori is a place and platform for creativity from the Future Institute Barcelona. Their main objective is to encourage innovation through public and private collaboration between the arts, science and technology. The lab's origin lies on the culture domain, but they experiment a lot with technology (e.g. hackathons) and citizen science.

4. Innovation Labs, Kosovo (http://kosovoinnovations.org/): As a civic innovation lab, it works on projects related to children and youth. With the use of information and technologies they "can analyze and understand the dynamics of need and service provision in ways never previously possible: we can uncover pockets of vulnerability, understand need in real time, and radically increase transparency and accountability."

Crowdsourced Data

Many discussion went around data collection or producing data in need, since most data is not at hand and is more or less closed data, proposing crowdsourcing approaches. Crowdsourced data that could be collected through crowdsourcing platforms, which is one of the publicly available technologies used to empower citizen participation through formation of their public opinions (Hosio et al., 2015), is one of these approaches. There was an interesting discussion on personal data philanthropy and the growing willingness of individuals to 'donate' personal data for the public good (Quaggiotto & Prasanna Lal Das, 2013). Efforts for crowdsourcing in recent years, show that user reported data can be an alternative to traditional surveys. Another aspect is the development of low-cost sensors that it is widening the landscape of data tracking, in addition to the growth of smartphone usage in developing countries, this is a potential venue for data collection in the near future. One example of these crowdsourcing approaches is;

1. Quantified Self (http://quantifiedself.com/): This USA based company focuses on supporting new discoveries about people themselves and their communities that are grounded in accurate observation and enlivened by a spirit of friendship. Self-tracking tools are there base for many innovations.
2. Citizen Lab (http://www.citizenlab.co): from the Netherlands, this is an online platform focusing on citizen sourcing, allowing governments to tap into their collective intelligence and collect their creative ideas. CitizenLab rewards citizens for their input. Every action a citizen undertakes online results in an increase of its engagement score. This engagement score leads to citizen badges, indicating the citizen's status, and opportunities for the city to reward their valuable input with real-life benefits.

Public Interactive Displays

Public interfaces (Public Displays) are mainly used for interaction between citizens and city officials (Hosio et al., 2015). In the context of civic engagement, researchers are looking into how citizens can connect

better with the city using display deployments. Foth, Florian, and Satchell (2013) have discussed the future research directions of urban screens, highlighting how such resources no longer typically have just a single fixed purpose, and how they increasingly affect our everyday interactions in general, Langheinrich, and Schieck (2014) explain, using media theory, why interactive displays are particularly fitted for enriching the lives and communication of local communities. They describe how interactive displays allow users to leave their digital mark on the space, and how the displays act as human extensions in that space. Some examples include:

1. Discussions in Space (DIS) prototype, is a public display reported by Schroeter et al. (2012) in Brisbane, Australia. DIS allows users to post content publicly for authorities and passersby to view and interact with.

2. Hosio et al. (2012) have reported on a public display deployment that allows users to create content using public displays and then post it online, directly from the displays, for city officials to interact with. Their findings highlight the playfulness and general effectiveness of displays in reaching especially younger citizens.

3. Viewpoint, presented by Taylor et al. (2012), poses opinions on a small screen from local officials and allows anyone to either disagree or agree using a short message service (SMS).

4. Wray Photo Display, from the United Kingdom, is a longitudinal public display. Its original purpose was exploring the affordances of interactive screens by providing a shared photo board, the display has since been appropriated over the years for several civic purposes, such as creating a shared history of the area and promoting awareness of local official events. In the end it has become evident that the Wray Photo Display is capable of supporting the local community in various imaginative ways (Taylor and Cheverst, 2012).

## 3.5.1.2 - Indirect sources of data

Research around tracking and monitoring of humans has been sensitive to the privacy and ethical problems surrounding the topic, yet little knowledge and insight into other human aspects has been offered (Valkanova, 2014). However, people often behave in unpredictable and subtle ways in their everyday contexts, in addition to the fact that public life constitutes a wider range of emotions and experiences. The potential of recording, tracking and representing movements and other information to facilitate social and cognitive processes has been explored through the following approaches:

1. Affectiva (USA, http://www.affectiva.com): is an emotion recognition software bringing emotional intelligence to the digital world, transforming not only how humans interact with technology, but especially how humans interact with each other, it is emotion-aware computing. This software is mostly used in the marketing field, to know people's emotions after watching a certain advertisement or movie.

2. Happiness Meter (Dubai, UAE): it provides an amazing approach for social innovation and open government. It is an initiative to measure the public's happiness and satisfaction with government services. The system will enable decision makers to monitor the types of government services that people are most happy about, and identify the geographical areas where these services are being provided (Neil Halligan, 2014).

3. CyclePhilly (Philadelphia, USA; http://www.cyclephilly.org/) is a smartphone App tracking bikes for recording citizen's bicycle trips. Data from the app can be used by regional transportation planners in the Philadelphia area, to make it a better place to ride.

4. Measuring Poverty Through Real-Time Data: As part of a big data exploration, the UN Global Pulse, UNDP, QCRI and the World Bank have teamed up on a series of projects, challenges, and competitions to unearth key questions, explore data sources (both open and big data), and take a fresh look at old problems, one of the projects was how to measure poverty through real time data. Results conclude the following ideas: 1) looking at data from retail chains to track consumption patterns and analyze the risk of poverty on a regular basis, for example, having exact figures from recent weeks of how certain commodities have been purchased. How staple food is maybe replaced by luxury food items and vice versa; 2) Bonus-points-collecting services have fine granular data for millions of consumers, and larger and smaller shifts in consumption patterns can be analyzed and localized in real time; 3) Another approach is data from insurance companies, which could be used as an early indicator for vulnerabilities; 4) A participant proposed measuring the distance of daily commuting and how this might change due to economic constraints; or energy providers could provide data for payments as an early indicator when electricity or heating bills cannot be paid (Kreutz, 2013).

5. Crime fighting through big data: A successful example of crime fighting through analytics can be found in Memphis, Tennessee, USA. Since the local police department introduced Big Data and analytics, crime figures have dropped by 24 percent. The local PD now has a better understanding of when criminal acts are likely to occur. Based on a large number of variables, a predictive model was developed to predict crime in real time. The local police can map zones of criminal activity in a short time span and link them to variables such as the weather, holiday periods or specific events.

This enables police officers to anticipate possible threats with lightning speed and predict under what circumstances the crime risk in specific areas will increase (IBM Software, 2014).

## 3.6 - Participatory urban planning in the context of a digital city

According to Angelidou (2014), strategic planning for a digital city development still remains a rather abstract idea for several reasons, including the fact that it refers to still largely unexplored and interdisciplinary fields. Stakeholders (local governments, research institutions, grassroots movements, technology vendors, property developers, citizens, etc.) are often driven by conflicting interests. However, gathering all these different ideas and trying to come up with the best for the community projects is not an easy job. Stakeholders in participatory urban planning can be categorized into five groups: 1) decision-makers; 2) companies; 3) citizens; 4) academic science community; and 5) environmental agents. Companies are counted as actors in the building industry, e.g., architectural and construction business. Local politicians and city officials are decision makers who prepare initial plans and processes of community development programs and activities. Citizens can be called end-users of local community plans (Oksman et al., 2014).

The civic potential of widespread computing technologies has been increasingly explored within academic and urban planning communities. Levy et al., (2015) described the relationship of these technologies with participatory urban planning our days stating that "citizen participation is a cornerstone of urban planning. One common criticism is that the process can be cumbersome and slow. However, in the face of recent advances in information and communication technologies (ICT), those problems can be easily overcome, making it possible to extend public participation to a wider sphere of urban planning matters". In other words, when urban planning ideas are digitally presented and tested already in the early stages, the projects are more likely to proceed smoothly, in a good spirit and are not in danger of being delayed or halted as a result of political or social resistance. When possible problems in the planning can be detected already at the early stages, the result can be qualitatively better in many ways. There is also a possibility of minimizing economic risks when there is no need to make costly changes afterwards, when it is noticed that something went wrong in planning (Oksman et al., 2014).

Speaking about the problems of the existing participatory approaches, that normally work in a top-down process and limited to municipal workshops, participants usually have limited time to digest, discuss, and include those issues that really matter in the specific context of the process. Another fact is that recent participatory methods in urban planning projects cannot be applied to all citizens as such. For instance, public workshops are connected to a certain time and place, and busy working families and younger age groups, in particular, are often left out. Young segments have showed more interest in online surveys, but

reaching younger age groups and getting them to become actively involved and to participate in urban planning presents a clear challenge (Oksman et al., 2014).

So, how can we improve the participatory urban planning approach and how can we solve the existing problems? According to political decision-makers, interviewed by Oksman et al. (2014), recent urban planning approaches could be improved by paying more attention to the availability of information and inclusion of citizens at the right time in the urban planning processes. For Olsson et al. (2012) augmented reality technology for public participation in urban planning, can increase users' willingness to participate in urban planning events. At least new augmented reality visualizations can help people to visualize the intention of the design better than with traditional drawn plans. Moreover, digitizing services and publishing them online makes them more visible to citizens and allows them to participate any time they want (Oksman et al., 2014). To invite new groups for the participation process; web-based public participation and proper technologies can help to involve new groups of citizens in the planning process (Noujua, 2010)

The participative urban planning process includes several steps to be completed successfully. The first step is 'Informing' the citizens about the ongoing projects, this step requires a great attention since it is the most relevant step to attract participants. Innovative or attractive information channels can support information seeking, sharpen communication and lower the threshold for participation (Oksman et al., 2014). Several politicians perceived the development of information processes and increasing awareness of ongoing projects and statements as especially important, so that all citizens would have the opportunity to obtain up-to-date information on important projects if they wanted to (Oksman et al., 2014). The information on ongoing urban planning projects is usually available on the city net portal or in paper format at the municipal office. However, not all citizens are capable of acquiring the necessary information. Thus, more attractive digitalized informing channels that could be portable and easy to relocate at the ongoing project location would be more efficient.

The next step is the actual 'Participation' practice. This participation step should offer equal and real-time ways to analyze, prioritize and comment on plans. Citizens, in particular, need to be encouraged and motivated to give their feedback, which requires open information sharing via commonly used media channels and technologies (Oksman et al., 2014). Concerns related to this step include user's privacy and type of presented information and data to the citizens. Oksman et al. (2014) discussed the idea of more digitalized ways of participation through public interactive displays or public deployment; the emphasized problem in such approaches is the privacy of the users. They found that people are more willing to participate in urban planning through their personal mobile phones or devices, and more likely to do it at home or private places referring to privacy concerns, and that they would mostly like to have an access to participatory urban planning service through municipal web pages. Types of information presented to the

citizens should include alternative plans through visualizations, and plans that are too detailed and complete should be avoided (Oksman et al., 2014). The last step is collecting the feedbacks and analyzing them. It must be taken into consideration that visualized participatory design tools for urban planning should also be efficient at collecting and processing user feedback and other data. In the other hand, the proliferation of new technologies in participatory urban planning is affected by the maturity of the technological solutions, implementation expenses, acceptability and ease of use.

Last but not least, citizens should be informed, for instance, that answering the survey was useful and that their feedback has been considered in the urban planning process. There are currently no proper tools for this. Could the same information tool used again for informing them with the results?

# Chapter 4 - Methodology:

The methodological approach presented in this section is reflecting the previously discussed concepts and terms related to participatory urban planning and more specifically the results and findings of the practical work about Schiedam city, where it was found that in the domain of Co-creation or citizen participation the biggest challenge is getting people interested to participate. Thus, in this context the author is suggesting a conceptual proposal containing the main idea, how it will be implemented and a discussion and evaluation of it. **It will contain also a set of tools and mainly three parts that should be applied in sequence. First,** an innovative idea that could be implemented by any city council to increase the awareness of citizen participation by influencing the first step for any participatory approach which is "Informing" the people about the planned projects in the city. **Second,** applying the traditional participation ways to keep offline citizens engaged. **Third,** a visual design for an online participation tool that supports the idea of "Interactive 3D Drawings" to help citizens Co-create their city projects through a more visualized ways.

# Chapter 5 - Conceptual Proposal:

## 5.1 - Concept (3 stages participation tool)

### 5.1.1 - Informing Citizens about Planned Projects

As seen in Schiedam, "Informing" (the first step in the participatory ladder utilized by Schiedam City Council) is a suitable participatory method by itself, for basic urban development actions generating minor changes (such as asphalting roads). Informing instruments include: information page website, Twitter, Facebook, information meeting (walk), working visit, exhibition and others. Yet, informing citizens is still the initial step for any urban co-creation process (Oksman et al., 2014). Therefore, the author is suggesting a more innovative way, based on visualization tools that could be utilized to inform the residents about more substantial nearby planned projects in their district, feel and understand the projects more, as well as encouraging them to participate more effectively in the design process through the second two steps.

Step One: Informing Truck
The idea could be applied through a portable 3D animated box or room (Figure.5) that could be fixed on a truck and moved from one place to another each time the municipality wants to inform the citizens about a new plan for a project. The truck will stop at the required location and people will be invited to enter to watch a short 3D animated movie about the new proposals; optionally, a nominal amount like € 1 could be applied, to cover the expenses of the 3D animation, or for nudging participants' engagement in the participatory process.



Figure 5. Portable 3D Animation Box (source: Amazon.com)

### 5.1.2    - Keeping offline citizens engaged

Keeping offline citizens engaged is relevant, as there is a big group of offline people in the city that could be interested in Co-creating their city projects, considering specially the fact that elderly people are more active in civic engagement than younger citizens or other groups of people. And probably many of them do not have access to internet, and even so, it would be somehow difficult for them to use the interactive 3D drawings more than younger citizens. For this purpose, a second participatory step is included in the designed model.

Step two: Direct Feedback

After finishing the first step (accessible to both online and offline citizens) and watching the short 3D animation movie, all participants are invited to give their feedback either on a technological tool such as an IPad or through written comments. With the IPads also the website will be open to give a chance for participants to learn how to use it with the support of the participation agent in the truck. participants can test it while there and even register on the participation process by entering a sms code received to their personal smart phones, that will allow them to enter the platform at home, with changes saved (if they have actually produced any sketches with the IPad). Using the IPad will allow the users to participate online through the platform (Step 3), unlike being satisfied with the written comments that will not allow to explore all the tools of the online version; which is the Third step.

### 5.1.3    - Visual Online Participation tool

The third step in this approach is an online crowdsourcing platform conceptually designed to convert the idea of the "Dynamic Public Spaces" proposed earlier in Schiedam's Practical project to a more digitalized one. The platform will support the idea of civic engagement and facilitate citizens' participation in designing different projects. Design of the participatory urban planning tool within the crowdsourcing platform would take place via a visualized Co-creation section. This visual interface is proposed through an "Interactive 3D Drawings". Similar type of drawings were developed earlier as part of Schiedam practical project, where the Van 't Hoff square located at Oost district in Schiedam, Netherlands (Fig.6) was considered as a case study given the opportunities for a redevelopment plan.
Fig.7 shows the existing real condition of the square vs produced 3D drawings for the proposed design by the author, feeding on citizens' proposals collected in workshops.
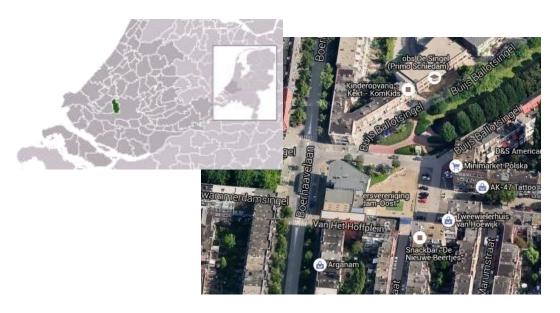
Figure 6. Van 't Hoff Square Location in Schiedam, Netherlands (source: Wikipedia)



Figure 7. Real Photos Vs 3D Drawings (source: Maps & Own data)

## 5.2 - The Platform in Details

Home page (Fig.8) will include an inspiring world to empower the idea of a Smart citizen.



Figure 8. "Home" page design (source: own data)

About page (Fig.9) will include a briefing about the website idea, goals and instructions to the users.



Figure 9. "About" Page Design (source: own data)

Engagement page (Fig.10) will be displaying the current planned projects by the municipality that require participation before the proposed deadline, project description will be available, current situation of the area via a street view link and expected goals to be achieved. Users could choose first to go through a questionnaire (Fig. 11) related to different project's aspects and add more notes if they would like about the

project or what they have seen in the Informing Truck, or skip this option and press on the "3D Participation" button to move to the next page.
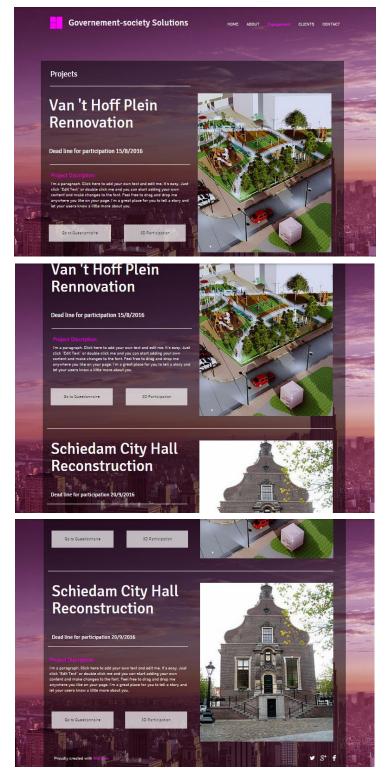


Figure 10. "Engagement" Page Design (source: own data)

Figure 11. "Questionnaires" Page (source: own data)

3D participation page (Fig. 12 &13) will be displaying the main tool in this platform; utilizing the 3D interactive drawings. The drawings are basically 3D animations of a certain place; roads, public parks, squares or urban terrains that present any project planned by the city council. It will contain two types of elements Design tools and Design Indicators.



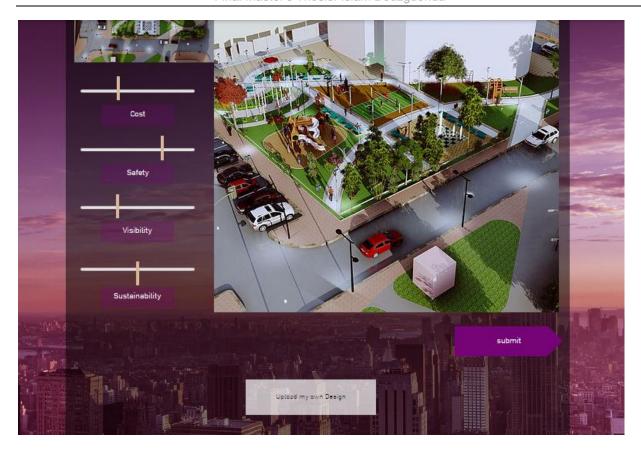Figure 12. "3D Participation" page (1) (source: own data)

Figure 13. "3D Participation" page (2) (source: own data)

5.2.1 - Design Tools

The utilization of the tool in general will work through **two basic windows**. The small window on the top left is the **original 3D of the planned project** that cannot be changed, it will be used by the user as a reference to check the original project setting and how it is planned by the municipality. Users can rotate and zoom in and out and move in three dimensions the drawing. The **second big window** at the bottom right is the main window **where the user can propose changes**. The same effects are applicable, in rotating, moving and zooming the drawing. Yet also, it would allow adding, removing, replacing and changing some of the elements properties in the drawing. Users are entitled to change the drawing items (trees, cars, street's furniture...etc.), move them, delete some and add more if needed; e.g., users can add some trees to the road or add more street furniture. **By pressing on any object in the drawing; a list of properties will appear (Fig. 14),** for example by pressing on the road; a list will appear containing the width of the road, the allowed speed, if it is one way or two way, does it has a cyclist path...etc. **Users could change some of these properties depending on the municipality setting and design.** Other elements in the drawing have the possibility to be replaced, moved or deleted. For example by pressing on any tree (Fig. 14); a list of

properties will appear containing the type of tree, size, age and if it is used for shade and sound proofing or it is a fruit tree...etc. In addition to the possibility of deleting the tree or adding more similar or moving it somewhere else. The same is applicable to many elements such as; chairs, lights, rubbish bins. Table.1 shows all the possible input options by users.

Table 1. Design tool input options (source: own data)

| | Category | | |
|---|---|---|---|
| **Input options** | **Modify** | **View** | **Add** |
| | Delete | Rotate | Written statement |
| | Move | Zoom | Free hand sketches |
| | Copy/paste | | 2D & 3D drawings |
| | Scale | | |
| | Select | | |



Figure 14. Utilization of the Participation Tools (source: own data)

## 5.2.2 - Design Indicators

In addition to the ability to change and suggest, there will be a feedback tool based on customer defined factors with the help of the "Indicators"; another option proposed to give users the ability to plan a more realistic design that fits the City council budgets, schedules and rules, by including a set of indicators for cost, safety, visibility, sustainability and multi-functionality that can be shown at the left side of the

page (Fig. 13). The indicators function is controlling the user's proposed design and indicate the best setting. **The basic idea behind the process of the indicators is counting the number of added elements that should not exceed the limits set by the municipality**. The indicators will function only when the number of a certain elements will go below or higher than the limits set by the municipality, to **work as a sensing alarm for the users to go back to a more realistic design**. User's aims are: maximum environmental sustainability; maximum safety; optimized costs; optimized visibility and optimized multi-functionality. Taking the example of the Van 't Hoff Square case; the following (Table. 2) will explore the functions of the indicators when a certain user's changes are applied.

Table 2. Design indicators in function (source: own data)

| | Number of trees exceeds 30 | | | | |
|---|---|---|---|---|---|
| | Cost | safety | Visibility | Environmental sustainability | Multi-functionality |
| User's Design | High | Low | High | High | Low |
| Municipality Designed range | Number of trees should be between (10-30) | | | | |
| | **Number of street lights less than 10** | | | | |
| | Cost | safety | Visibility | Environmental sustainability | Multi-functionality |
| User's Design | Low | Low | Low | - | High |
| Municipality Designed range | Number of street lights should be between(10-20) | | | | |
| | **Number of seating chairs is 20** | | | | |
| | Cost | safety | Visibility | Environmental sustainability | Multi functionality |
| User's Design | - | - | - | - | - |
| Municipality Designed range | Number of seating chairs should be between(10-30) | | | | |

Table. 2 first situation shows the case **when the user added too many trees until it exceeds the limit set by the municipality which is 30, the indicators of the cost, visibility and sustainability will go high, as the cost of planting and taking care of these trees will be higher, the visibility or the appearance of the square will be better or more beautiful and the sustainability indicator will go high as planting trees is considered one of the indicators of a more sustainable city. Safety and multi functionality will**

**be low as trees often relate to more darkness and a feeling of insecurity or potential crime, multi functionality will be less as trees will minimize the multi usage of the space by blocking the way or the view in case of events or other.** The same concept is applicable to the second situation where the number of street lights are less than 10, **unlike the third situation where we can see that no changes happened on the indicators as the number of elements set by the user is within the range.**

Finally, the user can save the modifications and submit it by pressing the "Submit" button (Fig. 13). Skilled sketchers and designers are welcomed to submit completely different design or plans by pressing on "Submit my Own Design" button, in several format including PDF, 3D files, written files or even sketches by young teenagers. **Some reward system will be applied in case a user design ended up being used, such as formal invitation to take part in a future tender or a scholarship for some creative activity**; to encourage citizen to continue their contributions as well as attracting others to contribute as well.

# Chapter 6 - Implementation: (Business model strategy)

After discussing the development phase aspects and the conceptual product in details, a business model is proposed to justify the idea and help in developing a real competitive project in the market. According to Porter (1982), there are 3 main forms to obtain a competitive advantage, which he names generic strategies: Differentiation, Cost Leadership and Focused or High Segmentation. The selected strategy for this proposal is "Differentiation" is which the whole idea and the platform was designed in a way to be perceived by clients as different / better in some attributes than the available similar products offered by other competitors and offering a new unique experience to the users. For instance any firm can differentiate by adding more value in one or more of the following; Quality, Innovation, Design, Technology, Service, Distribution channel and Brand image (Arbussa,2016).

The proposed firm in this project will consider the terms related to Innovation, Design and Technology. The idea by the author where the "Informing Truck" was proposed will take the form of **differentiation by its degree of novelty in the design and technology** where the 3D animations will be implemented for several projects and in the same time **in the way of interaction with the user** to play a better role in decreasing the gap between the architectural drawings and plans produced by the municipality architects or designer and the normal citizens; in such a way any normal citizen young or old will be able to understand the proposed design by the municipality better and could interact with it through the online participation tool and easily implement his ideas. Other aspect is the multi usage possibility and flexibility, for instance the truck could be replaced with small ship containers (much cheaper) with the 3D visualization infrastructure or the same truck could be used for return sessions with the presence of some municipal technical expert. The second part of the product "3D Participation Tool" will consider the same differentiation strategies by means of its degree of novelty in the design and technology, the way of interaction with the user to reach the ultimate user satisfaction and the possibility of turning it to an App that will be a great solution for innovative return initiatives. As a result the product in general will maximize citizenship engagement in urban development processes and will reduce time required to plan, discuss, approve and develop an urban project (hence, trying to prevent delays from social refuse and successive arrangements of plans and projects)

Risks for differentiation in the other hand includes; price for the differentiation is too high or the fact that the market is covered by focused firms with lower prices or even that the client's preferences are changed.

## 6.1 - Competitive strategy

**Potential clients;** Europe would be the seedbed market, given the wide range of participatory policies in force (from European Directives, to national, regional and local laws), the high number of countries and high number of cities in a relatively small territory and the growing urban population trend. Potential clients could include two categories; Municipalities / City Councils, or Big Information Technology Firms dealing with Civic engagement projects.

**Users** are basically everyday citizens who are interested to participate in Co-creating their city.

**Competitors** are firms or websites with similar goals; Placevision and Citizenlab are some examples.
Placevision (http://placevision.net); is an American web communications firm who develops public participation websites, applications, and visualization tools for zoning, economic development, and land use planning. Some of their designed projects (http://placevision.net/project/kenosha/ ) reached the level of 3D visualization but with a minimal interaction with the users who suppose to be technical planners and designers. Other projects applied the usual methods of participation through online comments and questionnaires.
CitizenLab (www.citizenlab.co) is basically a crowdsourcing platform that is used to consult citizen opinion in different issues related to their city.
Some of the main **added values** of the proposed product compared to other similar platforms or usual participation methods include:

• Participation time saving in project discussion compared to other traditional methods

• Latest 3D visualization technologies applied to Citizen Participation methods

• User friendly application, including a unique and different experience exploring real projects

• Sustainability and durability with the possibility to be transformed to a mobile App

• Mobility by mean of a movable Informing Truck that could be moved to any place.

**Segmentation**; proposed idea was designed mainly to target large number of people without specifying certain group of people, as the users of the Informing Truck will be users from all ages with different backgrounds, even if they are willing later to participate in the design through the Online platform or not. the same is applicable to the website; users could be technical people like architects, planners or designers

or even normal citizens that could use the questionnaires on even upload a freehand sketch or written statement commenting on the project.

**Pricing**; as the competitive chosen strategy for this project was "Differentiation" an added cost of differentiation must be considered, but this will also depend on the sales volume. Although some of the components like the Informing truck could have some alternative cost-effective options such as small ship containers (much cheaper) with the 3D visualization infrastructure. The price generally will include the price of the instruments; the truck, the portable 3D animation box, the IPads and hard copies to be used for in site questionnaires and the price of designing the 3D animations and the website. Approximate prices are as follow: 3D animation box USD 10,000 ($ from hereon), medium size van truck 30,000 $, IPad and other instruments 2,000 $, cost of producing a 3D animation for a medium size project 1500 $, cost of designing the website with an advanced 3D participation tool, 3,000 $, other extra cost if implementation and services 5,000 $. All these costs could be managed through two types of **promotions**; either the municipality or the city council will take over all these costs and everything will be privately owned by them; the truck, the instruments and the website will be designed specifically to that city. Second option; a specialist firm will be dealing with all these costs and will be offering services to different cities depending on the need, in which the firm will be owning the truck the instruments and could offer to design the websites to each city depending on the need and usage. The firm in this case will be paid on a monthly basis upon offering its services to the targeted city council, company or any organization willing to utilize the idea.

**Structure of the firm**; the author is suggesting to present his idea through a new firm that will be offering all the previously mentioned services. The main players in the firm could be an Architect, software developer and marketing and developing agent.

**Scalability**; options to scale the project and improve the development strategy could include the signage of a collaboration agreement with a local council, such as Schiedam, for developing an Innovation project under one of the European urban programs, like Urbact[5] that aims specifically at increasing multi-sectoral and multi-level governance of urban development, targeting at creating and supporting citizen participation and the so called Local Action Groups, multi-sectoral bodies for co-creative processes under the 5 helix governance concept (source). Therefore, as a pilot experience in one specific place in a network project including other cities, implementation and business model conclusions could be extracted, as well as background data necessary for the expansion of the product, such as tailored maid databases about urban

---

[5] http://urbact.eu/

elements (trees, benches, lights and the like) applicable at different geographical areas, and their performance according to the indicator system. Furthermore, interactions from these elements in order to model integrated sustainability, costs, multi-functionality could be assessed, strengthening the usability of the platform. Last but not least, the fact that Schiedam is part of the Eurotowns Network could be a good asset for generating such a project with a set of cities observing and contributing and perhaps becoming future customers.

## Chapter 7 - Discussion & Evaluation:

Behind the Concept design a good point to mention, is the benefits of getting people informed first via the "Informing truck" then the possibility the complete the co-creation process at home via the online participation tool. Goncalves et al. (2014) who emphasize the role of public displays as the engagement initiator. Said that: "a display can create awareness of the participation possibilities, and then users may well to use other channels for the actual interaction". **In this project the "Informing Truck" is the engagement initiator playing the role of a public display that will create awareness about the current projects planned by the municipality.** Other reasons behind designing the concept idea to be divided to several steps, in which the second step should be completed privately at home or office, because as per the research results of Hosio et al.,(2015), **people are not willing to write much in public**, or could give a better feedback at home, referring to responses such as "I would not give very negative or enthusiastic feedback in public," or "I would probably think more if I was at home using a web application"(Hosio et al., 2015). With regards to cost efficiency, alternative cost-effective options could be evaluated such as the case of the Informing truck by means of replacing it by small ship containers with the 3D visualization infrastructure, in order to start-up the company with 4-5 of them instead of a van, and allocating the cost of transport, setting and removal from different city locations (in this case hiring of train, lorry and crane services) to the customer, in order to allow running several projects at once. Yet, for a pilot case and for more agility of the service, the full-truck model appears to be preferable. Converting the Online participation tool to an App could be a great solution for innovative return initiatives, such as Periscope or Facebook Live sessions open to any citizen, in which a local government representative explains the project outcomes and responds citizens' demands posted on the platform or at real time in either social network.

Second thing to discuss regarding the conceptual proposal is the efficiency of the used methodology and how far the proposed idea and platform can be implemented in real life; to increase the attractiveness of the Co-creation and citizen participation process as well as predicting its accuracy and successfulness.

Table. 3 shows the most relevant advantages and disadvantages of the used approach.

Table 3. Most relevant advantages and disadvantages of the used approach (source: own data)

| Advantages | Disadvantages |
|---|---|
| • A proposal reflecting the results and findings of a conducted research<br>• Suggesting a solution to an existing problem that can be faced by any city council<br>• Digital solution, easy to apply or cancel<br>• Sustainability and durability<br>• Joyful attractive design especially to young citizens and teenagers | • No sample or pilot is there to test the citizens reactions<br>• A proposal designed without the citizens participation<br>• Difficulty of reaching offline citizens especially elderly people<br>• Possibility of usage difficulty<br>• Difficulty in analyzing visual base data |

**Advantages of the conceptual proposal:**

- A proposal reflecting the results findings and problems faced on a conducted research:

The result findings and problems faced in the previously conducted project related to Schiedam city influenced the author to propose this idea, especially the problem related to lack of participants faced by the author himself as well as the city council in general when trying to co-create any project in the city.

- Suggesting a solution to an existing problem that can be faced by any city council:

The fact that the suggested solution is not tailored for a certain city and can be applied worldwide by any municipality or city council; is adding more value to the approach, in addition to that the problem the author is suggesting the solution is a big barrier to any governmental association trying to empower citizen participation.

- Digital solution, easy to apply or cancel:

The proposal is suggesting to convert the concept of the Dynamic Public Spaces to a more digitized one, this will help to minimize the limitation of the application or cancelling the approach is case it was unsuccessful, unlike the physical application of the concept.

- Sustainability and durability:

Since the main proposal is depending on a digital interface, through an online platform, the ability to transform the website to a mobile App will be easier. As in our days most of the people prefer to use their mobile phones rather than computers or laptops.

- Joyful attractive design especially to young citizens and teenagers:

The designed interface was meant to be similar to the online games, where you can change, move and remove things; to encourage the youth and young citizens to participate more in Co-creating their city and empower the feeling of owning the city inside them. In addition to that, the idea suggested to inform the people through the portable 3D animation box will be very attractive for all types of citizens.

**Disadvantages of the conceptual proposal:**

- No sample or pilot is there to test the citizens reactions:

As this proposal is being a part of a master thesis, there will be no chance to test the proposal in real life, thus will be a negative point as we cannot guess the people reactions and how far it could be successful.

- A proposal designed without the citizens participation;

As this thesis is discussing in deep the citizen participation aspects, it would be a good idea if this proposal was designed with the citizens or at least their opinions and thought was taken in consideration, but for the same previous reason, doing this research for academic purposes will lead us to accept the conceptual facts only.

- Difficulty of reaching offline citizens especially elderly people:

One of the main barriers that come up when dealing with this digital age, is considering the offline citizens or people without an internet reach; elderly people, children, people living in rural areas…etc.

- Possibility of usage difficulty:

Users of the website or the platforms will be from different backgrounds, not all of them are engineers or having good knowledge of the computer and 3D drawings, maybe some of them will face a little difficulty in using the application especially the part where they have to move the drawing rotate the objects and place them in the correct location.

- Difficulty in analyzing visual base data:

The main difficulty that could be faced by the city council  is analyzing this huge quantity of visual base data that will be produced by the users of the website, how they could use this images and get the common items or decide what is the preferred design by most of the citizens.

After the implementation phase city councils or controllers of the project should think about how they could feedback users or citizen who chose to participate in any project, to encourage them to continue and show them that they take their designs and comments seriously. The previously mentioned idea about having a reward system that will be applied in case a user design ended up being used, such as formal invitation to take part in a future tender or a scholarship for some creative activity is one of the options. Other option could be public and accountability events to present and discuss outcomes and conclusions, showing the user's input and how it was taking in consideration in the output or the final design. This process will work in the same time as an evaluation system the measure the user's satisfaction on the new system and it successfulness and functionality.

One of the main challenges that was taken into consideration that, attracting a diverse group of citizen to participate can be challenging, since citizen involvement is often a leisure-time activity and competes with other ways of spending time (Oksman et al., 2014), that why the engagement initiator was planned to look like a leisure activity (3D Animation Truck) to help in attracting more people.

## Chapter 8 - Conclusion:

The aim of this research was developing creative alternatives related to the process of Designing in Co-creation, has driven to a broad variety of results and outcomes. Parallel discussion about the problems the researcher faced and the expected and unexpected results, allowed to reflect on several topics related to citizenship participation methods. Key findings exposed the problem of lack of participants; an expected fact that each city council is facing -i.e. empty spaces will increase opportunity for crime as a result of social exclusion-; and that it is not easy to get everybody satisfied in the city. By creating a dynamic public space, people will be attracted to the space, they will interact with the space, and the city will collect data and create a database according to the citizen's preferable. This database could be updated frequently, and will be a reference to the city's future projects. A second finding reflects the unexpected results related to the high levels of unsafety and insecurity in the neighborhood. This could be also solved with the same re-design approach, because dynamic public spaces will be safer thanks to high presence of people and use intensity, derived from the multi-functionality of the site and its flexibility to host different activities and audiences, at one certain moment and throughout the year.

# References:

- Alford, J.R. 2001. "We're All in This Together: The Decline of Trust in Government, 1958–1996." In What Is It About Government That Americans Dislike? eds. J.R. Hibbing, and E. Theiss-Morse, Cambridge: Cambridge University Press, 28–46.
- Bakici, T. (2012). State of the art – Open innovation in smart cities. In Open innovation Mechanisms in Smart Cities. Project co-funded by the European Commission within the ICT Policy Support Programme (Deliverable D1.1.1).
- Bendapuni, N., and R.P. Leone. 2003. "Psychological Implications of Customer Participation in Co-Production." The Journal of Marketing 67 (1): 14–28.
- Chourabi, H., Nam, T., Walker, S., Gil-garcia, J. R., Mellouli, S., & Nahon, K., et al. (2012). Understanding smart cities: An integrative framework. In Proceedings of the 45th international conference on system sciences, Hawaii
- Christian Kreutz, M. R. (2013, March 21). Data dive: Measuring poverty through real time data [Blog post]. Retrieved from http://europeandcis.undp.org/blog/2013/03/21/data-dive-measuring-poverty-through-real-time-data/
- Christian Kreutz, M. R. (2016, February 23). SMART CITY INNOVATION IS NOT HAPPENING WITHOUT CITIZENS [Blog post]. Retrieved from http://www.crisscrossed.net/2016/02/23/smart-city-innovation-not-happening-without-citizens/
- cities.eu/download/smart_cities_final_report.pdf
- Clary, E.G., and M. Snyder. 2002. "Community Involvement: Opportunities and Challenges in Socializing Adults to Participate in Society." Journal of Social Issues 3: 581–92.
- Dan mcquillan, P. H. D. (2015). Resilience and the Future of Democracy in the Smart City. Paper presented at 25th anniversary conference of the Centre for the Study of Democracy, London, England. Retrieved from http://danmcquillan.doc.gold.ac.uk/resilience-smartcity-democracy.html
- Digital Leadership [Illustration]. (2016, January 1). Retrieved from http://kankantree.com/workwithus.html
- Foth, M., Forlano, L., Satchell, C., and Gibbs, M., editors (2011). From Social Butterfly to Engaged Citizen: Urban Informatics, Social Media, Ubiquitous Computing, and Mobile Technology to Support Citizen Engagement. MIT Press.
- Foundations for Smarter Cities. IBM Journal of Research and Development, 54(4).
- Gaia Moretti, M. R. S. (2015). Social Innovation in (smart) cities. Paper presented at The 3rd Global Virtual Conference, Thomson, Slovakia. Retrieved from file:///C:/Users/Lenovo/Downloads/Social%20Innovation%20in%20(sma.pdf
- Giffinger, R., Fertner, C., Kramar, H., Kalasek, R.,Pichler-Milanović, N., & Meijers, E. (2007). Smart Cities: Ranking of European Medium-Sized Cities.
- Giulio Quaggiotto, M. R., & Prasanna Lal Das, M. R. S. (2013, February 25). Would you give up your personal data for development? [Blog post]. Retrieved from http://europeandcis.undp.org/blog/2013/02/25/would-you-give-up-your-personal-data-for-development/
- Greenfield, A. (2010). Everyware: The Dawning Age of Ubiquitous Computing. New Riders.
- Greenfield, A. and Shepard, M. (2007). Urban Computing and Its Discontents. Architectural League of New York.
- Hall, R. E. (2000). The vision of a smart city. In Proceedings of the 2nd International Life Extension Technology Workshop, Paris, France, September 28, Available from
- Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010).
- Henk Finches, M. R. (2010). Civic Engagement in Contemporary Japan (Rev. ed.). New York, USA: Springer New York.
- Hirschmann, A.O. 1982. Shifting Involvements: Private Interest and Public Action. Princeton, NJ: Princeton University Press.
- Hosio, S., V. Kostakos, H. Kukka, M. Jurmu, J. Riekki, and T. Ojala. 2012. "From School Food to Skate Parks in a Few Clicks: Using Public Displays to Bootstrap Civic Engagement of the Young." In Proceedings of the 10th International Conference on Pervasive Computing. Berlin Heidelberg: Springer, 425–42. http://dl.acm.org/citation.cfm?id¼2367345. http://www.osti.gov/bridge/servlets/purl/773961- oyxp82/webviewable/773961.pdf
- Huseby, B.M. 2000. Government Performance and Political Support: A Study of How Evaluations of Economic Performance, Social Policy and Environmental Protection Influence the Popular Assessments of the Political System. Trondheim: Department for Sociology and Political Science.

- *IBM Software. (2014). Paradigm shift within the government - Redefining the relationship between citizens and governments (NIW00000NLEN-00). Retrieved from http://59b82f819db5e3056f09-ac5d4832c0f5888d8e0a39abefebad55.r13.rackcdn.com/PARADIGM-SHIFT-WITHIN-THE-GOVERNMENT_WhitePaper2014.pdf*

- J. Noujua, "WebMapMedia: A Map-based Web Application for Facilitating Participation in Spatial Planning", Multimedia Systems, 2010, vol. 16, nro. 1, pp. 3-21, Online ISSN: 1432-1882.

- Jim Collins, M. R. (2001). *Good to Great* (Rev. ed.). New York, USA: Harper Business.

- *Karen Mossberger, M. R. S., Carolina J. Tolbert, M. R. S., & Ramona S. McNeal, M. R. S. (2008). Digital Citizenship ( The internet, society and participation) (Rev. ed.). Hong kong, Japan: Massachusetts Institute of Technology.*

- Kelly, C., and S. Breinlinger. 1996. The Social Psychology of Collective Action: Identity, Injustice and Gender. London: Taylor & Francis.

- Lee, M., Bakici, T., Almirall, E., & Wareham, J. (2012). New governance models towards an open Internet ecosystem for smart connected European cities and regions. In Open innovation, directorate-general for the information society and media, European commission (pp. 91–93).

- Margarita Angelidou, M. R. S. (2014). Smart city policies: A spatial approach. *Cities*, *41*(1), 3-11. doi:10.1016/j.cities.2014.06.007

- Melody Barnes, M. R., & Paul Schmitz, M. R. (2016). Community Engagement Matters (Now More Than Ever). Stanford Social Innovation Review, 14(2), 32-39. Retrieved from http://ssir.org/articles/entry/community_engagement_matters_now_more_than_ever#bio-footer

- *Melody Barnes, M. R., & Paul Schmitz, M. R. (2016). Community Engagement Matters (Now More Than Ever). Stanford Social Innovation Review, 14(2), 32-39. Retrieved from http://ssir.org/articles/entry/community_engagement_matters_now_more_than_ever#bio-footer*

- Montero, M. 2004. Introducci_on a la psicologia comunitaria. Paidos, Buenos Aires.

- Municipality of Schiedam. (2010). **City Vision Schiedam 2030.** Schiedam, Netherlands: Municipality of Schiedam.

- Murray, R., Caulier-Grice, J., Mulgan G. (2010). The open book of social innovation, NESTA, The Young Foundation.

- Neil Halligan, M. R. (2014, October 12). Dubai's 'Happiness Meter' to measure gov't services [Illustration]. Retrieved from http://www.arabianbusiness.com/dubai-s-happiness-meter--measure-gov-t-services-567517.html#.V0Q1rZF9600

- *Nina VALKANOVA, M. R. S. (2014). PUBIC VISUALIZATION DISPLAYS OF CITIZEN DATA DESIGN, IMPACT AND IMPLICATIONS (Tesi Doctoral UPF / 2014). Retrieved from https://www.dropbox.com/s/tcgfgp1ri2n2t47/tnv.pdf?dl=0*

- *Pew Internet and american life project. 2006. Febrrary-April 2006 Data for internet usage over time. Available at http://pewinternet.org/trends/UsageOverTime.xls*

- Sara Levy, M. R. S., Karel Martens, M. R. S., & Rob van der Heijden, M. R. (2015). *The Everyone City* (Rev. ed.). doi:10.1007/978-3-319-18368-8_17

- Schroeter, R., M. Foth, and C. Satchell. 2012. "People, Content, Location: Sweet Spotting Urban Screens for Situated Engagement." In Proceedings of the 2012 Designing Interactive Systems Conference. New York: ACM, 146–55. http://dl.acm.org/citation.cfm?id¼2317980.

- Simo Hosio, M. R., Jorge Goncalves, M. R., Vassilis Kostakos, M. R., & Jukka Riekki, M. R. (2015). Crowdsourcing Public Opinion Using Urban Pervasive Technologies: Lessons From Real-Life Experiments in Oulu. *Policy & Internet*, *7*(2), 203-222. doi:10.1002/poi3.90

- T. Olsson. A. Savisalo M. Hakkarainen, and C. Woodward, "User Evaluation of Mobile Augmented Reality in Architecture", eWork and eBusiness in Architecture, Engineering and Construction, G.Gudnason and R. Scherer, Eds. Taylor & Francis Group, London, pp. 733–740, 2012.

- Taylor, N., and K. Cheverst. 2012. "Supporting Community Awareness With Interactive Displays." IEEE Computer 45 (5): 26–32.

- Taylor, N., J. Marshall, A. Blum-Ross, J. Mills, J. Rogers, P. Egglestone, D.M. Frohlich, P. Wright, and P. Olivier. 2012. "Viewpoint: Empowering Communities With Situated Voting Devices." In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, eds. J.A. Konstan, E. H. Chi, and K. Hook. New York: ACM, 1361–70. http://dl.acm.org/citation.cfm?doid¼2207676.2208594.

- Toppeta, D. (2010). The Smart City Vision: How Innovation and ICT Can Build Smart, "Livable", Sustainable Cities. The Innovation Knowledge Foundation. Available from http://www.thinkinnovation.org/file/research/23/en/Toppeta_Report_005_2010.pdf

- United Nations. (2015). *The Tel Aviv Yafo declaration for Habitat III "smart civic engagement"* (1). Retrieved from https://www.habitat3.org/bitcache/4e0358d7d6fd7851dfa37f04ace365b0fce69f4f?vid=561840&disposition=inline&op=view

- Vienna, Austria: Centre of Regional Science (SRF),Vienna University of Technology. Available from http://www.smart-

- Virpi Oksman, M. R. S., Antti Väätänen, M. R. S., & Mari Ylikauppila, M. R. S. (2014). *Future Illustrative and Participative Urban Planning*. Paper presented at The Sixth International Conference on Creative Content Technologies, Tampere, Finland. Retrieved from https://www.thinkmind.org/index.php?view=article&articleid=content_2014_2_10_60052

- Virpi Oksman, M. S., Antti Väätänen, M. S., & Mari Ylikauppila, M. S. (2014**). Co-creation of Sustainable Smart Cities** Users, Participation and Service Design (1). Retrieved from file:///C:/Users/Lenovo/Downloads/ubicomm_2014_7_20_10039%20(3).pdf

- Warschauer, M. 2003. Technology and social inclusion: Rethinking the digital divide. Cambridge, MA: MIT Press.

- Washburn, D., Sindhu, U., Balaouras, S., Dines, R. A., Hayes, N. M., & Nelson, L. E. (2010). Helping CIOs Understand "Smart City" Initiatives: Defining the Smart City, Its Drivers, and the Role of the CIO. Cambridge, MA: Forrester Research, Inc. AvailableFromhttp://public.dhe.ibm.com/partnerworld/pub/smb/smarterplanet/forr_help_cios_und_smart_city_initiatives.pdf