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The Smart City and its Citizens

Governance and citizen participation in Amsterdam Smart City

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Summary

The smart city concept is pervasive of the urban development agenda. Smart city is becoming a familiar term also outside the urban expert community. In the collective imaginary, smart cities are the cities for machines rather that for people. Smart cities are associated almost exclusively with technology and knowledge. Citizens, the people from the polis, can have a stronger role in the development and management of their living environment. Smart city developments, in particular, seem to be dominated by large corporations that engage in a seller-buyer relationship with local governments. However, smart cities have the possibility to enhance the involvement and contribution of citizens to urban development.

This work explores the role of governance as a major contributor to citizen participation in smart cities. Governance, along with technology and human capital, is one of the main factors for smart city development. This study argues that governance characteristics play a major role in explaining different typologies of citizen participation. Through a focus on Amsterdam Smart City program as a specific case study, this research examines the characteristics of governance that are present in the overall program and within a selected sample of participatory projects.

The study makes uses of both qualitative and quantitative information, obtained through interviews and meeting with key informants and the review of secondary information. The analysis of this information lead to the identification of governance characteristics, both for the Amsterdam Smart City program and a specific sample of projects, for which specific typologies of citizen participation have been analysed.

The overall Amsterdam Smart City program resulted to be organized around a subset of key actors, that act as coordinators. Such key actors engage relationships with other partners based on a variety of arrangements. This governance model allows and fosters experimental partnerships that can contribute to the overall objectives of the program. Different typologies of citizen participation have been identified, ranging from simple provision of information to citizens to socially innovative practices initiated by citizens. Projects with higher levels of complexity in terms of technology, number of interactions within diverse groups of partners, result in the presence of more formal frameworks with clear ex-ante goal setting. Such governance models are coupled with lower levels of citizen participation, limited to the provision of information. On the other side, frequent interactions within more informal settings contribute positively to information exchange and allow adjustment of objectives. Such governance characteristics allow the establishment of partnerships for co-production of services between citizens, public and private organizations. Socially innovative practices, where citizens are the initiators of activities are associated with project governance that relies on mutual knowledge, trust and lack of formal arrangements.

Citizen participation typologies are affected by the governance characteristics. The analysis and comprehension of governance characteristics plays a crucial role both for a better understanding and management of citizen participation, especially in complex settings where multiple actors are interacting. Further research would be needed to develop a comprehensive theory of citizen participation within complex collaborative models.

Keywords

Smart City; Governance; Participation; Social Innovation; Amsterdam.

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Abbreviations

AEB	Amsterdam Economic Board
AIM	Amsterdam Innovation Motor
AMS	Amsterdam Institute for Advanced Metropolitan Solutions
API	Application Programming Interface
ASC	Amsterdam Smart City
C+L	Clicks and Links Ltd
CitySDK	City Service Development Kit
CTO	Chief Technology Officer
EU	European Union
Fab Lab	Fabrication Laboratory
GDP	Gross Domestic Product
GGD	Geneeskundige en Gezondheidsdienst – Local Public Health Service
ICT	Information and Communication Technology
MIT	Massachusetts Institute of Technology
OECD	Organisation for Economic Cooperation and Development
PPP	Public Private Partnership
RIVM	Rijksinstituut voor Volksgezondheid en Milieu – National Institute for Public Health and Environment
SCK	Smart Citizen Kit
SME	Small and Medium Enterprises
TNO	Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek - Netherlands Organisation for Applied Scientific Research
TU	Technical University
UK	United Kingdom
US	United States of America

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Chapter 1: Introduction

1.1 Background

The concept of Smart Cities is currently considered a "hot topic" in urban development. Especially in Europe, where cities' economic growth lags behind their Asian and American counterparts, is seen as a chance to both enhance cities' liveability and economy. European economies, and therefore cities, are re-orienting themselves towards a knowledge-based economy in order to remain competitive and assure a good quality of life to their citizens.

The process of making a city a "Smart City" involves the interaction of different actors, both from the private and public sector, as well as the citizens body. Moreover, all those interactions not only happen at a local level but also exist at the international level, among multinational corporations, international organizations and national governments. Therefore, city leaders must be able to interact with a number of different stakeholders, both within and outside the city if they want to accomplish the vision of transforming their city. The same applies to the private sector. Nowadays top-down approaches to urban development, both from the public and the private sector, are not seen as acceptable, as they do not recognize and make best use of available local capabilities. A more balanced model would allow the development and strengthening of existing local activities.

In order to allow citizens and small and medium enterprises to participate actively in the development of smart city projects, we argue that the presence of adequate levels of human capital and technology alone are not sufficient. The governance model of a smart city initiative is another key factor influencing the outcome of projects. Therefore, the focus of this research is on the governance characteristics of a smart city initiative that contribute to the presence of user-oriented projects. In this study, we consider user-oriented projects as those that either present features of social innovation or increase citizens' participation in decision-making processes.

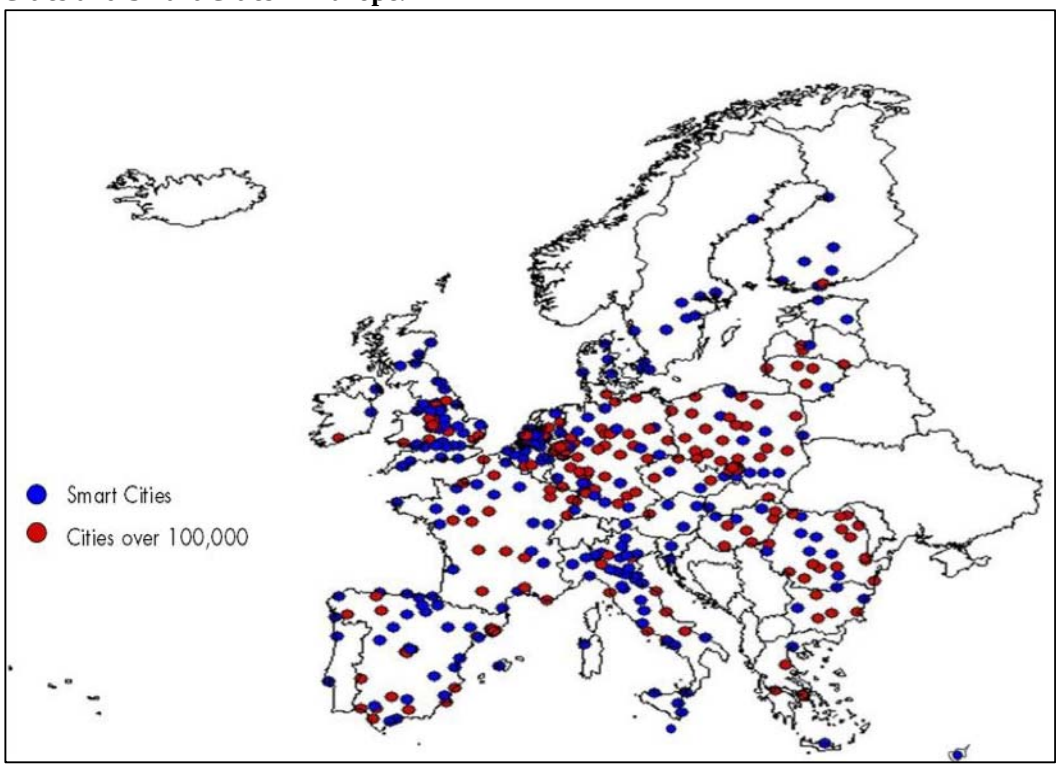
A broad study aiming at mapping smart cities in Europe, conducted on behalf of the European Parliament's Committee on Industry, Research and Energy (Manville et al., 2014), has identified Amsterdam as a leading smart city example, along with Barcelona (Spain), Copenhagen (Denmark), Helsinki (Finland), Manchester (UK) and Vienna (Austria).

Amsterdam ranks first in a number of selected measures for the performance of smart city programs. In particular, smart city-related initiatives in Amsterdam present a broad spectrum of themes, covering all six characteristics of a smart city (Economy, Mobility, Governance, People, Living, Environment)[1]. Specifically, out of the smart city initiatives identified by the report, Amsterdam Smart City is the only one covering the whole range of smart city characteristics.

At European level, Amsterdam Smart City is seen as a model for allowing bottom-up projects within diverse fields of application (Manville et al., 2014). Therefore, we argue that given that similar initiatives are being developed in other cities, the peculiarity of this case lays in its governance model.

[1] Please refer to chapter 2 for a more in-depth discussion of this element.

Figure 1 - The location of cities with a population of more than 100,000 that are not Smart Cities and Smart Cities in Europe.



Source: European Parliament, Mapping Smart Cities in the EU, (Manville et al. ,2014)

In this research, the focus is on the governance characteristics of Amsterdam Smart City and how they are reflected in different typologies of user-oriented projects. Amsterdam is considered as an example of a "democratic bottom up Smart City project" (Papa et al., 2013, p. 6). Amsterdam Smart City has been selected as a successfully deviant case in the development of user-oriented projects. Since other major factors for smart cities success, like availability of technology and quality of human capital, do not differ significant from other cases, governance characteristics can be considered to be a key driver for user-oriented smart city development.

1.2 Problem Statement

Despite being an typology of urban development model that has attracted much interest, smart cities have been subject to critiques regarding the limited levels of involvement of local actors, either citizens or small firms (Hollands, 2008). As a urban development model that includes a strong focus on technology, infrastructure providers represent a major player in smart city development. Therefore, international information services, electric grid and telecommunication corporations are increasingly focus on urban development, therefore seeing local governments as clients. Such actors, particularly those active at international levels, are often seen as the sole holders of knowledge in those fields and seek cities willing to invest in innovation. By partnering with municipal governments, large firms often tend to leave outside the game local actors, such as residents or smaller local businesses. When following such models, smart cities represent an excellent business opportunity for international technology providers and urban areas looking to attract investments, but fail enhance citizen participation and to create opportunities for local economic and social development.

Public-Private Partnerships for innovation in cities are often perceived as distant entities for urban dwellers. Smart city initiatives that do not exploit the connectivity force of new ICT infrastructure fail to substantially improve not only citizens' quality of life, but also their active participation in urban development.

Many smart city developments present the characteristics of focusing on few large-scale projects, mainly developed by large corporations, with limited impact on citizen participation in urban development. As some examples of citizen-oriented smart city programs exist in Europe, it is interesting to analyse which factors contribute to their realization. As infrastructure and human capital qualities are more or less homogeneous, and also more difficult elements to be influenced in the short-term, the governance model can represent a significant factor to explain the presence of citizen-oriented projects.

Although experts and policy makers recognize the relevance of smart city initiatives, citizens are not intensely involved in their development. While such initiatives present the potential to lead to higher citizen participation in urban decision-making, this rarely happens. According to the final report of SMARTiP project[2] "Smart cities require smart citizens if they are to be truly inclusive, innovative and sustainable" (Carter, 2014, p. 2). Although the element of citizens' participation has not been central in most smart city initiatives, alternative settings are available. Smart city initiatives are often limited to the creation of an attractive environment for international investments, but fail to actively involve citizens.

1.3 Research Objectives

This research aims at understanding the governance characteristics that allow smart city initiatives to be oriented towards the strengthening of citizen participation and the support of bottom-up initiatives.

The elements of this research are:

- Detect different existing typologies of citizen participation in the development of smart city projects.
- Identify key governance characteristics of a smart city initiative characterized by the presence of participatory projects.
- Connect the governance characteristics to the realization of projects oriented towards citizen participation.

1.4 Provisional Research Question

As a starting point the following research questions have been established[3]:

Which type of governance is contributing to user involvement in the Amsterdam Smart City initiatives?

In order to answer the aforementioned research question, the following (provisional) sub-questions will also be addressed:

- What is the governance typology of the Amsterdam Smart City initiative?
- Which typologies of user-oriented projects are being realized within the Amsterdam Smart City initiative?

[2] SMARTiP is a EU funded project on "Creating a People's Digital Agenda for Europe" – www.smart-ip.eu

[3] Please refer to section 3.1 for the revised research questions.

1.5 Significance of the Study

An increasingly vast amount of both academic and practice-oriented literature is dedicated to the theme of smart cities[4]. Also, different approaches have been taken, not only at defining smart cities but also at the creation of different rankings and categorizations. Various studies on European smart cities, such as Caragliu et al. (2011) study based on socio-economic factors, the recent study commissioned by the European Parliament (Manville et al., 2014) or rankings focusing on medium-sized smart cities (Giffinger et al., 2007), do not specifically focus on citizen participation. Moreover, the governance of such programs has not been widely explored as a factor that can explain smart city success.

Governance factors are more difficult to grasp than infrastructural or knowledge-based ones. However, the governance of smart city programs is a factor that can be influenced in the short run more easily than a city's infrastructure and knowledge endowments.

Modifications in the governance model of different smart city programs across Europe can lead to significant gains in terms of citizen involvement. In the context of scarcity of financial resources for local governments, decisions that influence the governance model are more feasible compared to investments in technological infrastructures and human capital.

This study aims at adding at a better understanding of the relationship between governance and citizen participation in smart cities, two elements of this urban development model that have been less frequently analysed.

1.6 Scope and Limitations

This research is limited to a specific case study and to its governance characteristics. This study will solely focus on the Amsterdam Smart City program. Only projects that are within this program will be taken into account. Other smart city initiatives that are present in the city of Amsterdam are beyond the scope of this research, as it is not possible to relate their citizen participation characteristics to the governance model of the program.

This study will concentrate on the governance characteristics of the Amsterdam Smart City program. The levels of technological and human capital are also significant elements in explaining the existence user-oriented initiatives, but the analysis of their role goes beyond the scope of this study.

This study will focus on a single case while wider and more generalizable results could be obtained from a comparative study. However, one of the secondary objectives of this study is to explore the smart city phenomenon through the analysis of elements that have been less widely studied in this context. The insights and methodology used in this research could be possibly applied to a wider study.

The study of an acknowledged smart city initiative such as Amsterdam through the analysis of its governance and participatory projects could provide a starting point for the application of this analytical framework to other smart city phenomena.

[4] See Nam and Pardo (2011) for a collection of relevant works.

Chapter 2: Literature review

State of the Art of the Theories/Concepts of the Study

In this chapter, the main theoretical concepts used in this thesis will be presented and discussed. Smart city is one of the latest trends of urban development to have emerged. Smart cities can be interpreted as a result of different urban development paradigms and, to a certain extent, of their combination. Therefore, chapter begins with an overview of the different historical of urban development: state driven, private sector driven and self-organizing models. The rest of the chapter is organized as follows: section 2.2 will discuss the concept of smart city, in section 2.3 governance theories, focusing in particular on network governance and transaction cost economics will be presented and finally in section 2.4 theories on citizen participation and social innovation will be discussed.

2.1 Urban development paradigms

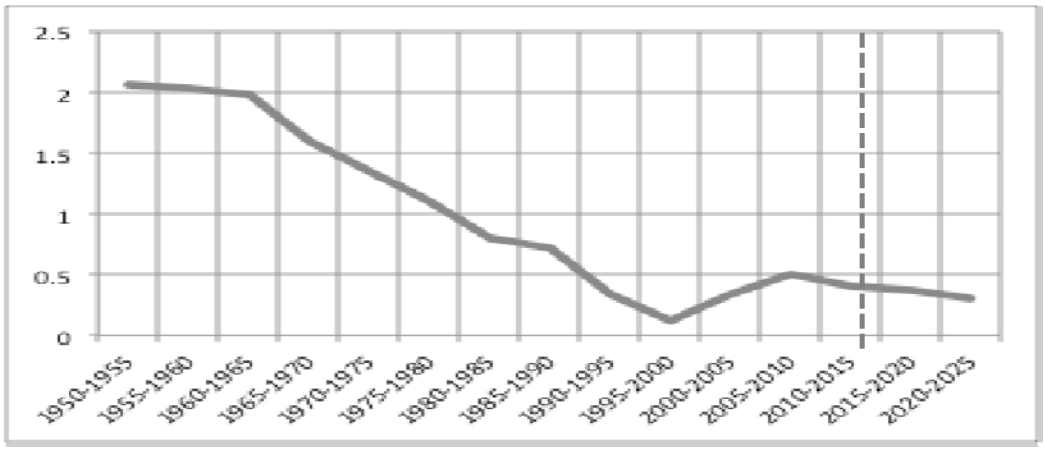
Urban development paradigms have long been one of the primary fields in which different socio-economic and political school of thoughts have clashed and been applied. In Europe, since the end of Second World War, there have been many ways to intend city development. The following discourse best applies to countries and cities that until 1989 belonged to the so-called Western Europe. However, since then, there has been a convergence in urban policy between Western-Capitalist countries and former members of the Communist Bloc.

2.1.1 The Welfarist City

Until the 1980s, urban policies were dominated by a Keynesian approach (Theodore and Peck, 2011), with urban policies often regarded as a central-government responsibility. This way of intending urban development had the public sector as a leading actor. Government or public sector agencies provided most services and housing developments. Public investments were considered to be a primary fuel for economic growth, and welfare systems were established as a re-distributive tool. The establishment of a welfare system was expressed not only in the relationship between government and individuals, but also at the urban policy level, with urban policies often being set at the national level. Cities relied on central government transfers to solve their problems. Urban planning was, therefore, deemed to be a task entirely within the realm of the public sector. By the end of the 1970s, with the end of the post-war reconstruction with diminishing economic growth rates, cities were considered as "victims of the structural economic decline" (Theodore and Peck, 2011, p. 27). However, both the analysis of the issues and the proposed policies were within the context of a state-led, aggregate demand-driven, Keynesian approach.

There is a parallel between the public sector-led urban development and the so-called "rational, comprehensive culture of planning" (Portugali, 2012). With a "Fordist" vision, it was believed that formally and hierarchically defined procedures would allow efficient and logical development of cities. Within the context of an enduring economic growth and steady increase of the urban population, the primary task for local and central governments was to accommodate urban growth spatially and provide the related services. The use of a functional-rational, top-down approach on urban planning was seen an effective way to solve uncomplicated issues (Roo, 2000). In this phase, albeit have significant responsibilities, the complexity level of urban issues that governments had to face was relatively low.

Figure 2, Average Annual Rate of Change of the Urban Population, Europe*



Source: World Urbanization Prospects: The 2011 Revision, United Nations, Department of Economic and Social Affairs, Population Division. *Note: includes Russia and former USSR.

The outbreak of economic crises over the course of the 1970s and the general decline in the rate of economic growth was deeply felt in urban areas. On both sides of the Atlantic, cities were the geographic place where the effects of such macroeconomic conditions were reflected. The end of the post-war reconstruction, a shift towards a service city opposed to the industry city, led urban areas to face new and different issues. Rising unemployment, emerging social problems and a general deterioration of the physical infrastructure (OECD in Theodore and Peck, 2011), required urban governments to pursue other goals than the pure provision of services.

2.1.2 The Neoliberal City

In parallel, policy makers started to question the effectiveness of large welfare systems. A general discontent with what the public sector was or was supposed to provide on one side, and a criticism to dependency on welfarist policies created the ground for the introduction of neoliberal discourse in urban planning. Opposed to the public sector-driven developed pursued under Keynesian approaches, neoliberalism had the private sector as the main actor. The market, if freed from government control, is believed to be self-regulating and capable of deliver goods and services in an efficient way and to foster strong economic growth. The retreat of the public sector and the introduction of private initiatives into urban development were fostered initially in the US and UK under Reagan and Thatcher government (Miraftab, 2004). By the early 1980s, the aforementioned countries started a movement towards a private market-led urban development (Theodore and Peck, 2011). Since then, the neoliberal discourse was present in the policy making of virtually all European countries, including the former members of the communist bloc. The private sector was considered to be a better and more efficient provider of services, matching the communities' needs without weighting on local governments' budgets. Coupled with diminishing fiscal transfers from central governments, decentralization policies augmented the responsibilities of urban governments (Harvey, 1989). Therefore, cities had to start to compete in order to attract private investments. In particular, Brenner (2004) identifies a close relationship between the emergence of "entrepreneurial approaches to urban governance" (p. 480) and the shift towards decentralization of governance and spatial re-configurations in Europe. Moreover, those policies have a profound impact on spatial justice. However, a more in-depth analysis of the effects of decentralization of governance goes beyond the scope of this research. Furthermore, with increasing global integration, local governments sought to capture

international flows of investments. Within the globalization process, cities can be seen as nodes of the global networks of firms located within their boundaries (Taylor, 2001). To achieve that, cities had to perform a transition from managerial to entrepreneurial forms of action (Harvey, 1989). Governments had to become active players, searching for new methods to tackle urban issues, often needing to deal with actors from the private sector. Alongside the socio-economic transition from a welfarist and government-led urban development towards a more privately led one, the complexity of urban issues increased. As cities not only had to accommodate physical growth, but also tackle social issues and de-industrialization, local governments needed a change in their role. The way to solve social problems was sought in stimulating economic growth by attracting firms that would create employment and, therefore, create wealth. Increasing the presence of firms had the double objective of increasing the tax base and generating economic growth, with a trickle down effect on employment and thus on citizens' welfare. In order to accomplish new goals, local governments had to relate with different actors and modify their internal functioning accordingly. New Public Management sought the application of business managerial methods to public administration (Klijn and Koppenjan, 2007). Urban development, rather than depending on the relationship with central governments became a function of the relationship with private companies.

Rather than through the complete privatization of the provision of services, the most common form of private-sector involvement in urban development has been through the creation of Public-Private Partnerships (PPPs). In the field of infrastructure provision PPPs can be defined as activities that involve participation or backing from the private sector (Grimsey and Lewis, 2004). PPPs involve a risk sharing synergy of goals between public and private actors. In setting a PPP actors agree on a strategy and contribute with their resources in order to deliver goods or services (McQuaid, 2000). On one side it has been argued that this form of interaction increases citizens' control on the providers, by engaging in a consumer-supplier relationship. The role of the public agents would then change from the one of direct provider to the one of the regulator, ensuring citizens' access to (Batley and Larbi, 2004). In this way, competition among private providers would guarantee a better quality and greater efficiency in the delivery of goods and services. The most common critique to this model is that in the context of local governments' lack of resources and power, the interest of communities would be overwhelmed by the companies' interest (Batley and Larbi, 2004; Miraftab, 2004). According to their critics, rather than generating a win-win situation for communities and local governments, PPPs are just a step towards the realization of the neoliberal city, serving more the interests of companies rather than those of beneficiaries. It is also argued that privately run services are more likely to serve better-off communities than the poorer ones. Therefore, this *modus operandi* is believed to increase polarization and exclude communities from the decision making process (Swyngedouw et al., 2002).

2.1.3 The Self-organizing City

Within a widespread tendency towards greater involvement of citizens in the processes of public decision-making in urban areas, larger attention has been given to behaviours going beyond simple participation. More recently a trend that has been observed is the emergence of a community based and self-organized urban development. On one side, it is a response to unsatisfactory government-driven participatory processes (Boonstra and Boelens, 2011). When not delivered in a satisfactory way, by either private or public actors, goods and services can be provided by socially innovative communities can provide themselves (Moulaert and Swyngedouw, 2010). Self-organized communities can be seen as a result of the long evolution of citizens' involvement in urban policies: starting from a reactive role to government proposals, through the involvement in the multi-stakeholder environment of

public-private partnerships, towards government-backed citizens' initiatives. This can be considered as "scaling up" of the "ladder of citizen participation" (Arnstein, 1969). The element of citizen participation and social innovation will be discussed more in-depth in section 2.4.

In the context of the scaling back of the public sector and reduced interest from private actors, community initiatives can be seen as a less costly method of urban development. It is believed that citizens' initiatives bring with them the capacity of empowering individuals. In the UK such process of opening space for citizens stepping up and organizing the provision of services formerly provided by the government or the market goes under the name of "Big Society". Within those models, citizens are not either users or clients, but themselves providers of goods and services. However, it can be argued that those initiatives are a result of the further retreat of the public sector from its duties. The space for citizens' activism is created when the government is not capable of intervening, and it is not profitable for private companies to do so. However, in most of the cases, effective citizens' initiatives require the involvement of local public and private actors (Bakker et al., 2012). The novelty of such interactions depends on being initiated by citizens rather than from governments, with a truly bottom-up approach. As such, community initiatives can take the form of a hybrid partnership between the government and the citizens. As in many cases the communities most in need of services are also the ones not possessing the physical and social conditions to endogenously develop community-led initiatives, governments should play a facilitative role.

With a more complex policy-making, involving multiple objectives, namely provision of services, economic efficiency, citizens' empowerment, more complex approaches are required (Roo, 2000). Involving communities not only as end-users of a service, but also as co-designers of policies and co-producers requires different governance. Citizens' power not only involves possibility of choosing the supplier, but also the capacity of becoming themselves providers.

Urban development can be led by either the public sector, private enterprises or by the people; however, it often takes a hybrid form composed of two of the aforementioned actors. More recent trends show that those forces act in a less antagonistic way and that "socially innovative initiatives today point at a gradual blurring […] of the lines of demarcation between state, civil society and market" (Moulaert and Swyngedouw, 2010, p. 224), requiring a transformation in governance. Socially innovative practices generated within urban neighbourhoods, in order to grow and spread over wider city areas, need to be connected with networks at different scales (Moulaert, 2010). Is, therefore, argued that urban development can be considered successful if it incorporates actors present at different scales: neighbourhood communities, local governments and also with enterprises that might operate at a global level.

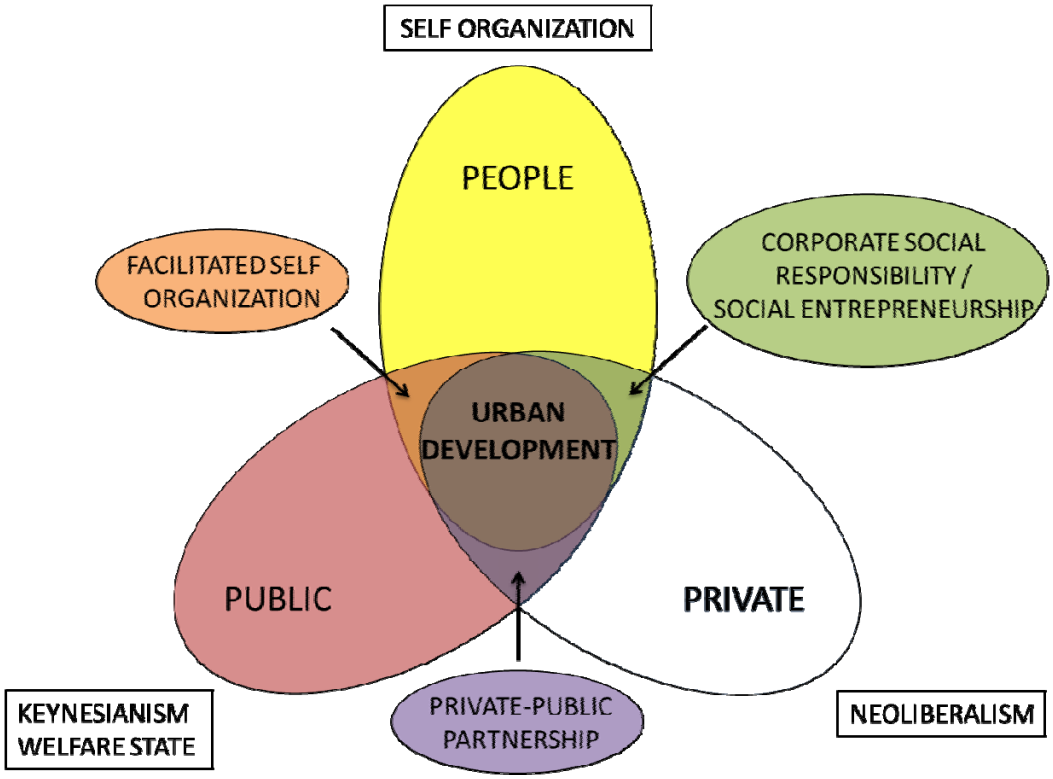
Table 1 - Evolution of City Development

City Type	Main Issue	Strategy	Main actor
Welfarist City	Population Growth	Public Provision of Services	Government
Neoliberal City	Economic Growth	Privatization of Services	Firms
Self-Organizing City	Participation	Citizen Production of Services	Community

Source: author compilation

Table 1 summarizes the different typologies of city development that have been presented in the previous section. The evolution has taken different speeds and times, from country to country, however is possible to see the welfarist city being the protagonist until the 1970s, the neoliberal city emerging during the 1980s and 1990s, with the self-organizing city concept emerging after the breakout of the financial crisis of the late 2000s.

Figure 3 – The different forms of urban development.



Source: author compilation

Figure 3 graphically represents the three main forces in urban development and their hybrids discussed above. In the following paragraph, we will see the smart city as a mode of urban development that can be approached from any of the aforementioned backgrounds. However it will be argued that to be accomplished it should involve the three main actors of urban development.

2.2 The Smart City

The smart city concept has emerged more recently and can be considered as a urban development capable of integrating the aforementioned paradigms. With strong emphasis on technology, connectivity and open information, smart cities have the possibility to incorporate citizens as active partners in urban private-public forms of urban development. If implemented through horizontal partnerships, smart cities potentially present the opportunity to overcome the traditional divisions among urban development actors.

2.2.1 The three dimensions of a smart city

The smart city concept is a rather fuzzy one, as it is comprised of various dimensions and characteristics. According to Nam and Pardo (2011) a variety of conceptual relatives of smart city can be found. Those conceptual relatives can be categorized according to the technological, human and institutional dimensions.

Table 2 - Dimensions and conceptual relatives of a Smart City

Dimensions	Concepts	Factors
Technological	Digital city Intelligent city Ubiquitous city Wired city Hybrid city Information city	Physical infrastructure Smart technologies Mobile technologies Virtual technologies Digital technologies
Human	Creative city Learning city Humane city Knowledge city	Human infrastructure Social capital
Institutional	Smart community Smart growth	Governance Policy Regulations

Source: adapted from Nam and Pardo (2011).

In the definition of a smart city, the technological dimension is generally considered to be the preeminent one: the presence internet based innovative practices is often the basis for labelling a smart city. The existence of a good quality urban Information and Communication Technology (ICT) infrastructure is a fundamental building block of a smart city. The importance of this element is particularly emphasized by a consistent literature and research developed by technology providers. Private corporations active in the fields of telecommunication, transport, software, informatics and electricity are the pushing forward the smart city model. However, despite a consistent literature showing a positive correlation between the presence of ICT infrastructure and economic performance of cities, the concept of smart city goes beyond that (Caragliu et al., 2011).

Smart cities include the human capital component as a key element, originating from increased interest on economic development based on knowledge (Shapiro, 2006) and creativity (Florida, 2003). The presence of an educated and skilled population and workforce is believed to be not only a "new engine" for economic growth of urban areas, but also a key component for the realization of the smart city model. Not only a smart city should possess a skilled and creative workforce, but also it should be capable to learn from other experiences and exchange knowledge (Campbell, 2012).

The combination of the technological and human dimensions makes possible to achieve a creative and technologically advanced cluster, a popular method for achieving urban regeneration and economic growth in de-industrialized west (Moretti, 2013). The use that is made of technology and social capital by "smart urban communities", composed of business, education, government and citizens represents the institutional dimension of a smart city (Lindskog, 2004). Smart communities are those that, involving all actors, use ICT technology and human capital in order to innovate and change in a positive way the urban environment.

2.2.2 The six characteristics of a smart city

The concept of smart city is, however, a rather complex one and according to an extensive body of research (Giffinger et al., 2007; Caragliu et al., 2011; Vanolo, 2014), beside the aforementioned three dimensions, the following six characteristics should be included: smart economy, smart people, smart governance, smart mobility, smart environment and smart living. The three dimensions have an influence on the outcomes of the six characteristics. Different endowments of technology, human capital and institutions result in different blends of smart city characteristics.

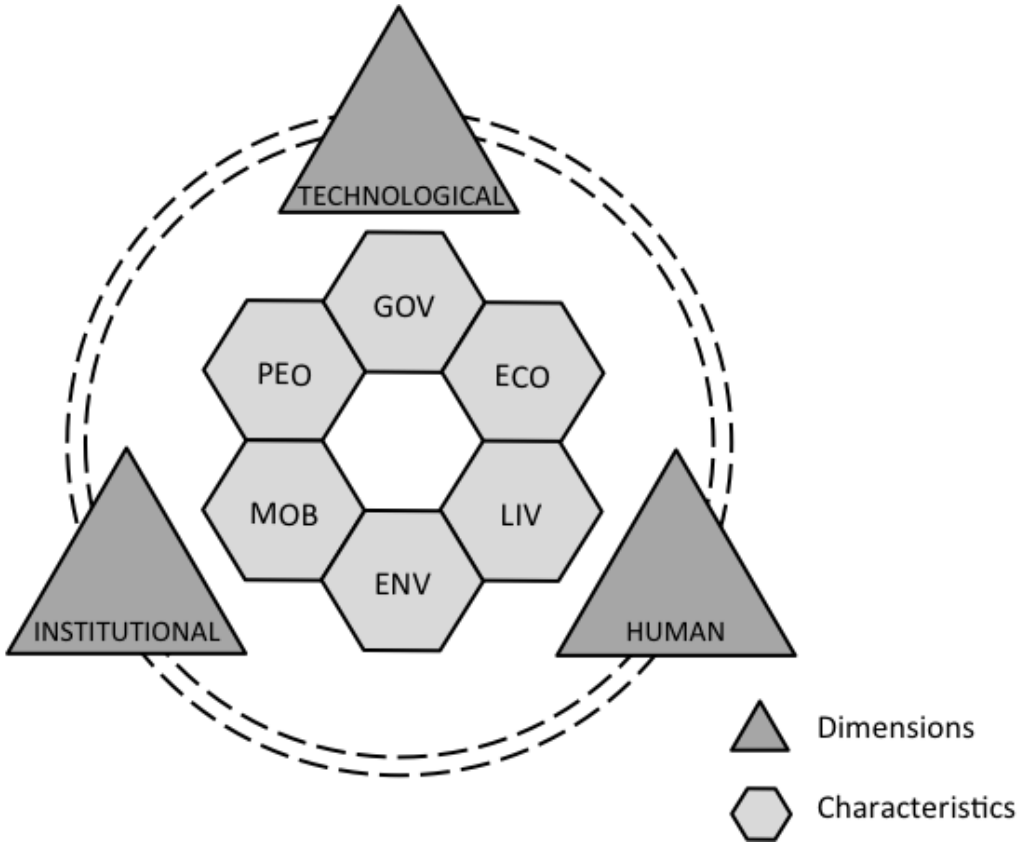
Table 3 - Smart City six Characteristics.

Characteristic	Theory	Feature
Smart Economy	Regional Competitiveness	Entrepreneurialism, Innovation, International integration
Smart People	Human and Social Capital	Flexibility, Creativity, Tolerance, Qualification level
Smart Governance	Participation	Transparency, participation in decision-making, quality of political strategies
Smart Mobility	Transport and ICT Economics	Accessibility, ICT availability, modern and sustainable transport systems.
Smart Environment	Natural Resources	Sustainable resource management, Natural attractiveness, Lack of Pollution
Smart Living	Quality of Life	Educational, Cultural and Health facilities, Safety, Housing, Social Cohesion, Tourist attractions

Source: adapted from Giffinger et al., 2007; Caragliu et al., 2011; Vanolo, 2014

A number of studies as assessed and ranked smart cities accordingly with the aforementioned features. Most notably Caragliu et al. (2011), have assessed the economic performance of European cities and the correlation with smart city indicators. According to their comparative study, employment in creative industry, transport quality and e-governance indicators are positively correlated with welfare measured as GDP per capita. However, little is said on how the presence of those "smart factors" generates economic growth and whether GDP per capita is a correct measure of the success of a smart city. Other case study based research (Bakıcı et al., 2013) have focused on the exploration some practical smart city policies and initiatives, related to the pillars of infrastructure, human capital and information. However, even the analysis on most successful cases, little attention has been given to the process of participation of local communities to the process of co-creation and co-production. Within a different body of research (Schaffers et al., 2011) it has been argued that Smart Cities, seen as urban development modes that enhance the use of internet-based applications, present the potential to generate user-driven innovation. It has been observed a lack of research on the side of citizen-driven innovation within the context of the smart city model. Figure 4 summarizes offers a graphical representation of the three dimensions and six characteristics of a smart city.

Figure 4 - Dimensions and characteristics of a Smart City



Source: author elaboration based on (Giffinger et al. 2007; Manville et al. 2014)

2.2.3 Critical views

The smart city model has been subject to some critical views. Therefore, possibly because of its popularity, the smart city model is often questioned. Seen within the context of a global race towards ensuring urban competitiveness, the concept of smart city is considered to be an "urban labelling" phenomenon (Hollands, 2008). Accordingly, ICTs are seen as just an alternative method for urban regeneration, leading to the creation of an attractive environment for international investments, with limited space left for local actors. Critics see the smart city as new a pro-business and neo-liberal mode of urban development, going beyond the provision of physical infrastructure. It is argued that Smart Cities are just another form of business-dominated city, with the creation of an innovative and environmentally friendly environment just being a new way of attracting capital. Another element that is often discussed is whether the development of a smart city model serves the needs of corporations looking for attractive investments or truly addresses the needs of cities. The risk in this mode of operation is double: on one side private investments can flow to other locations once more attractive conditions are found, on the other is argued that information technology might increase the existing divisions (Hollands, 2008). The creation of a technologically advanced and green image of a city may just serve the purpose of attracting investments, professionals and tourists, rather than serving the needs of the existing populations (Vanolo, 2014). However, as local competitiveness is believed to remain at the core of EU cohesion policy, the upgrading of local growth strategies towards the knowledge economy is considered to remain a main policy direction (Schaffers et al., 2011). Within this vision, smart city initiatives have the potential to generate employment in an economically and environmentally

sustainable manner. While on one side, the smart city model intended in this way is seen to be a tool used by entrepreneurial local governments to proactively attempt to integrate their city within the global network of investments, on the other, it is interpreted as a new space for expanding the business of multinational companies.

Therefore, if we consider not only the technological and knowledge component, but we include the citizens' involvement, we can define the concept of smart city, as it will be used in the forthcoming pages. According to one of the most widespread definitions (Caragliu et al. 2011, p. 70), a city is considered to be smart when:

"[…] investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance."

The smart city model, as seen in the previous sections, is a model of urban development resulting from the interaction of different actors, presenting a multitude of different characteristics and goals. It is argued that a smart city is generated by the interaction among citizens, public and private actors. The smart city is a multi-dimensional concept, with a multitude of goals. Within a multi-stakeholder and multi-dimensional environment, smart city initiatives require governance in order to be successful (Nam and Pardo, 2011). Determining the success is not a simple task either, however, we can argue that as well as performing well in the aforementioned "Six Characteristics" a smart city initiative presents a governance model that involves and empowers citizens in the co-creation of innovative solutions. Rather than focusing solely on the outcomes, a key element is represented by the process of visioning, designing and implementing smart city initiatives.

2.3 Governance

As seen in the previous sections, the complexity level of urban issues has been increasing and therefore the different ways of managing it have been deployed. While on one side, the term 'government' defines recognised public institutions, with powers traditionally separated between legislative, executive and judicial. On the other side, the term 'governance' refers to negotiated interactions between different actors shaping policy areas (Marcussen and Torfing, 2007). In general, it is possible to define governance as:

> "the reflective self-organization of independent actors involved in complex relations of reciprocal interdependence, […] based on continuing dialogue and resource-sharing to develop mutually beneficial joint projects […]" (Jessop 2003, p. 101)

According to Rhodes (1997), the main characteristics of governance are:

- Interdependence between organizations, either public, private and from the civil society.
- Interactions between network members arising from necessary resource exchange and negotiation of objectives.
- Existence of "game-like" interactions based on trust and with rules resulting from negotiations and agreements among actors.
- Autonomy from the state, presence of an element of self-organization; the state can steer governance networks, but without a predominant position.

Moreover, the interacting actors can be either from public, private or citizens' organization, adding a complexity layer (Klijn, 2008).

As seen, the term 'network' is a recurring one in governance literature, but is also intended to categorize a specific typology of governance, opposed to hierarchical and market-like governance typologies.

2.3.1 Network Governance

Since the 1980s in the Netherlands and later in other western European countries, Network Governance has emerged as an alternative to the other types of governance. On one side, hierarchical top-down forms were proving to be incapable of dealing with complex societies. On the other side, market governance as promoted by New Public Management, was failing to establish more stable relationships beyond those generated by economic exchanges (Meuleman, 2008). Moreover, Network Governance by focusing on more horizontal types of relationships among actors could provide a fertile ground for higher participation of citizens in decision-making processes, either directly or through civil society organizations. Building on definitions presented in the previous section network governance can be defined as:

> "A relatively stable, horizontal articulation of interdependent, but operationally autonomous actors who interact through negotiations that take place within a relatively institutionalized community which is self-regulating within limits set by external agencies and contributes to the production of public purpose." (Torfing, 2007)

In particular the network kind of governance is believed to be better capable in dealing with complex policy processes involving a multitude of actors from different spheres.

Within governance networks, as recognized by Klijn (2006), while a multitude of actors are involved in the decision-making, none of them is capable of deciding autonomously on the issue. Explaining the importance of the elements of interdependencies and of resource sharing. Moreover, complexity in decision-making processes arises not only from the presence of different actors with potentially conflicting objectives. It also depends from differing perceptions and knowledge about a problem, a variety of strategies within diverse arenas and the presence of complex institutional settings (Klijn, 2006).

The network governance model assumes a policy process to be successful if it achieves a shared objective through a collective action (Klijn and Koppenjan, 2007). Goal effectiveness for a single actor is not an adequate evaluation method. The achievement of an actor objective might not be relevant for the assessment of the whole network. While according to rational choice model a process would be evaluated as successful if it realized the formal policy requirements, new public management theories posed greater emphasis on the realization of outcomes, with less attention posed to the formal process. Network management differs from the above also in the evaluation of a policy process. The assessment is oriented by ex-post satisfaction criteria, including the evaluation of the realization of win-win situation. Win-win situations are assessed by aggregating the subjective ex-post evaluations of different actors. Ex-post evaluation by actors of the process and outcomes should be complemented by assessment of the openness, carefulness and reliability criteria (Klijn and Koppenjan, 2007).

Moreover, different actors have different priorities and perceptions of the problem and, therefore, propose different solutions (Klijn and Koppenjan, 2007). Uncertainty derives by unpredictability and lack of knowledge of other actors' goals and strategies.

According to the same authors, the main elements of network governance are:

Actors, with different perceptions regarding problems and therefore different strategies aimed at influencing a process.

Networks, intended as a collection of autonomous and interdependent actors, with an uneven distribution of different resources and therefore diverse roles.

Games, composed of different arenas where decisions are taken and rounds regarding a specific subset of issues. **Arenas** are seen as the "playing ground of more or less coherent sets of actors, with organisational arrangements where decisions are being taken" (Klijn, 2006, p. 260)

Through the recognition that none of the actor has a central authority and of the absence of a hierarchy, policy networks require a different style of management, dealing with the interactions or the structure of the network. Therefore, in most of the cases the interactions happen at the inter-organizational level.

According to Klijn and Koppenjan (2007), network governance can take two main strategies:

- Process management, aimed at the improvement of interactions between actors, trough: selection and activation of actors, realization of converging perceptions, creation of temporary organizations and conflict management.
- Institutional design, targeting the realization of changes in the network. Assuming that institutional characteristics influence strategies; in particular influencing: network composition, network outcomes and network interactions.

Increased complexity, in terms of number of actors, mutual dependencies, leads to a greater importance of the two aforementioned strategies. Therefore, either the process features or the structure of the network can explain the result of a policy process.

The focus of such model is on the complex interactions emerging within public, private and citizens organizations (Klijn, 2008). It acknowledges that networks cannot be steered from an external actor, nor be self-steering, but rather self-organized structures should emerge. Within this model it should be recognized the fact not all actors of the network have the same power and, therefore, a key factor is the existence of rules that allow all actors to interact. While a rational-functional model would suit a rather streamlined and simple process (Roo, 2000), governed by a central actor, more complex and dynamic and open-ended process requires a different management.

Within the realm of knowledge intensive institutions, trust, one of the central elements in network governance, is considered to be a more important element than authority and economic efficiency, respectively the main elements of hierarchical and marked governance (Meuleman, 2008). According to the same author, within knowledge intensive environments, network governance is effective, because it possess a certain degree of flexibility and is paired with actors highly capable of processing information.

2.3.2 Transaction costs

In complex settings, a multitude of actors are involved in mutual exchanges. Complex systems' interactions involve the presence of transaction costs. According to economists such as Oliver Williamson, there is an important matching between governance structures and transaction costs. Transaction costs are those happening when "a good or service is transferred across a technologically separable interface" (Williamson, 1981, p.552). When an exchange occurs among actors that operate in accord the transaction costs are reduced. Assuming that agents involved in transactions have a bounded rationality, complexity cannot be dealt with purely in terms of contracts: different mechanisms are needed in order to reduce transaction cost. In order to define transaction costs, the critical elements are: uncertainty, asset specificity and frequency (Williamson, 1979). Uncertainty generates adaptation, asset specificity stimulates coordination and frequency facilitates knowledge transfer, creates

embeddedness and enhances cost efficiency (Jones et al., 1997). Trust is a fundamental element for increasing the cooperation among actors, by enhancing information exchange; it is also an important element in the reduction of uncertainties regarding the strategic behaviours of other actors (Klijn, 2006). A successful form of governance should be able to deal with adaptation, coordination and the protection of exchanges. Therefore, there is a direct relationship between transaction costs and governance typology: market-like governance is effective with non-specific assets, while more structured typologies deal better with highly specific transactions. Most of transaction cost economics analysis refers to relationships between pairs of actors, without emphasis on more complex settings involving multiple stakeholders such as networks. Despite that, the frequency of dyadic exchanges is an important determinant of embeddedness through the creation of social control (Jones et al., 1997). By integrating elements of social network theory into transaction cost economics, is possible to move from the analysis of dyadic relationships to the one of systems. As we have seen there is a relationship between governance forms and transaction costs. Moreover the relations between actors are structuring networks and thus fostering the emergence of successful governance arrangements.

According to Williamson (1996), the concept of trust as a factor reducing transaction costs cannot be applied to commercial transactions between pairs of actors. For these typologies of exchanges, contractual arrangements that protect cost-effectiveness are more suitable than relationships based on trust. However, the same author recognizes that trust is an important element within the institutional settings. Institutional trust, therefore, refers to the "social and organizational context" (Williamson, 1996, p. 275), within which transactions occur.

2.4 Citizen participation

In the following sections, we will discuss different typologies of citizen participation and social innovation. We argue that by combining traditionally recognized typologies of citizen participation with socially innovative citizen initiatives is possible to cover a wider spectrum ways in which citizens are involved in urban development.

2.4.1 Traditional typologies of citizen participation

Participation in public decision-making is a concept that has been used for a long time, since Arnstein's (1969) creation of the "Ladder of Citizens Participation". As noted more than forty years ago, different typologies and levels of participation are possible, ranging from manipulation to citizen control. According to the author, citizen participation is a categorization of citizen power. As it is argued, in many cases participation takes a tokenistic form, being just a consultation directed by public administrations. Bishop and Davis (2002) describe participation as "the expectation that citizens have a voice in policy choices"; therefore it appears to be the recognition of participation being a basic element of any policy making. Departing from this proposition it is then argued that different policy objectives require different typologies of participation. In more practical terms, there is not anymore a hierarchy of participation, but rather a map of the different typologies.

Table 4 - Typologies of participation

Type	Objective
Information	Provision of information from decision makers.
Consultation	Evaluate reactions and gain feedback.
Partnership	Involvement in decision-making.
Standing	Invitation of third parties in the (legal) review process.
Consumer Choice	Customer preferences shaping a service through choice of products.
Control	Delegate control of an issue to the electorate.

Source: adapted from Bishop and Davis (2002)

Citizen participation can take different forms and its presence in decision-making processes is widely considered as a positive element. However, as described by Irvin and Stansbury (2004), citizen participation is both a difficult element to achieve and might involve pitfalls. Under certain conditions, according to the authors, citizen participation can prove costly and time consuming. Technical complexity, as might be the case in smart city initiatives, is a factor contributing to the high costs of citizen participation. Therefore, efficient citizen participation is obtained when the setting allows for frequent contacts among stakeholders and a credible facilitator is present.

Moreover, citizen participation in urban decision-making appears to be a significant element in settings involving new developments. Therefore, besides being an important element in urban visioning processes[5], citizen participation can find an adequate ground in smart city development. Technology, in this case can be seen both as an enabler and as a barrier to citizen participation.

The typologies of citizen participation described so far share the feature of not being originated by citizens themselves. Hence, they can be considered as top-down forms of citizen participation, where either public or private decision-makers take the initiative. However, citizen participation in urban development is not limited to the aforementioned typologies, a further category of citizen participation involves the citizens as initiators.

2.4.2 Social Innovation

As it is possible to observe in the previous section, none of the participation typologies that have been listed present the aspect of citizens initiating the production of a good or a service. Therefore, it can be argued that a further category of citizen participation exists, falling outside the typical classification of participation. This category includes bottom-up activities initiated by citizens. Social innovation, according to Moulaert and Swyngedouw (2010), happens when the specific needs of a community are satisfied through a collective action. This is especially the case when a good or a service is not either provided by the private or the public sector. Social innovation is usually thought to closely related to communities. Bakker et al. (2012) claim that collective action is realized when a group of people are involved in an initiative, even if the idea originated from a single individual. According to Moulaert (2010), social innovation is tied to a spatially localized community, mostly to urban neighbourhoods. Social innovation occurs when citizens take initiatives aiming at solving

[5] Refer to D'Hondt (2011) for an example of guidelines for citizen participation in urban visioning

societal issues affecting wider groups. In most of the cases individuals either form groups of partners with other organizations in order to achieve these goals.

It does not mean that citizens or communities operate with complete independence from other public or private actors. Socially innovative initiatives, therefore are a form of partnership with other actors, mainly from the public sector (Moulaert, 2010). The peculiarity of this form is that citizens are the leading originating actor in the initiative (Bakker et al., 2012). As many citizen initiatives are dependent on public support, the government's role is rather a facilitative role. While it is argued that authentic self-organization should be community-based and autonomous regarding government control (Boonstra and Boelens, 2011) and it is a reaction from urban neighbourhoods excluded by urban regeneration programs either led by municipal bodies or private corporations. However, it is also argued that public bodies can support self-organized communities through the creation of a legal framework (van Meerkerk et al., 2013) and by acting as facilitators in either the network structuration or the process management (Bakker et al., 2012). An interesting element of social innovation is its connection with governance. On one hand, while a supporting governance model is needed for its emergence, on the other social innovation itself can result in a transformation in governance (Moulaert, 2010), as government are working more in collaboration with other actors.

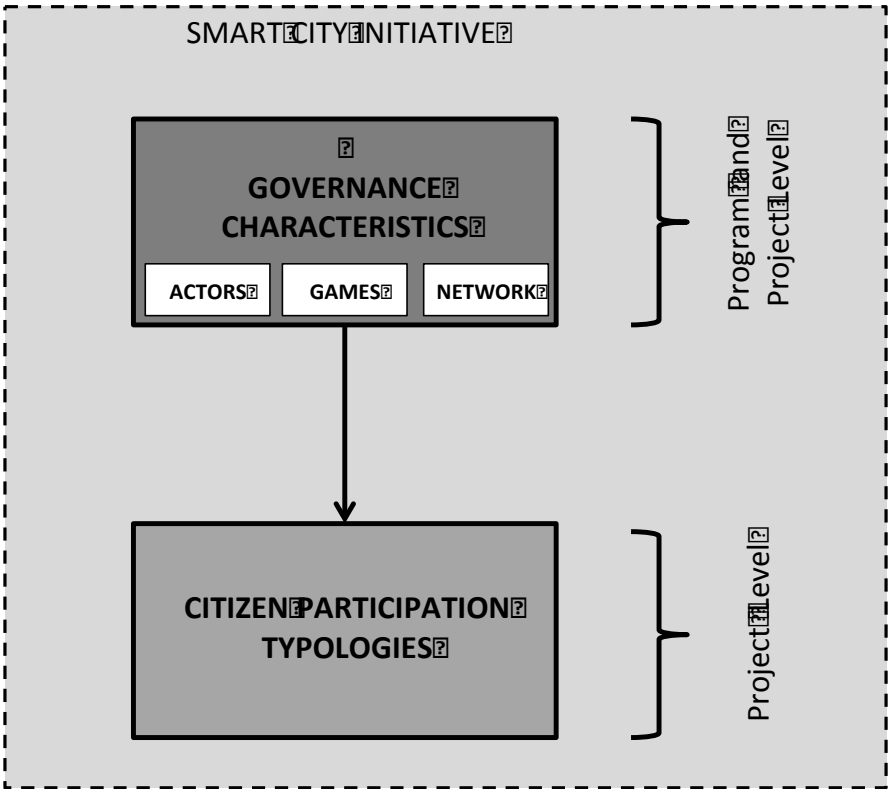
2.4.3 Citizen participation in Smart Cities

In this section we link the concepts discussed in the previous sections to smart cities. According to many observers, citizens and local communities have a passive role in those urban policies, being end-users of services without being involved in the decision-making or implementation process. In particular, it has been observed that most smart city Initiatives originate from a partnership between the public and private sectors, or more rarely by the public sector only. This is often the case as communities' initiatives lack the financial and knowledge capital to reach city-level scales. It is also believed that such initiatives, rather than inclusive, can increase social and cultural polarization (Hollands, 2008). Only citizens or communities possessing the adequate skills can take advantage of the economic growth generated by smart city initiatives. This is especially the case with often-marginalized groups such as uneducated immigrants and the elderly. The non-creative class is thus excluded from any of the aforementioned advantages. However, while this can be true in practice, it is not possible to exclude the potential improvement of citizen involvement in decision-making that can be generated by "progressive smart cities" (Hollands, 2008). It is a matter of recognizing that alone the introduction of ICT into city development cannot renovate and develop a city. It can be used as an instrument to empower people and increase the opportunities of interaction and to create urban communities. Also, the use of the term "smart" can have a normative connotation, seemingly to distinguish good and bad cities (Vanolo, 2014). Coupled with the phenomenon of city labelling, this view can partially explain the proliferation of smart city initiatives. However, the adjective "smart", should rather intend a city being user-friendly and adaptive to feedback (Nam and Pardo, 2011). As we have seen, a number of different interpretations have been given to the concept of smart city. Several definitions are available in the literature, posing different emphasis on the various components that a smart city should possess.

2.5 Conceptual Framework

In this section we will present the conceptual framework, linking together the concepts and theories presented in the previous sections of this chapter.

Figure 5 - Conceptual Framework



As shown in previous sections, a smart city has three main dimensions: human capital, technology and institutions (governance). In this work we will focus exclusively on the latter, arguing that is it has a fundamental role in the realization of projects that enhance citizen participation. By recognizing that the realization of a smart city initiative depends from the complex interaction of actors from different spheres is, therefore, interesting to investigate its governance model. The aim of such governance model is to not only to ensure a good performance in the "Six Characteristics" of smart city, but also to enable citizens to participate in the realization of projects. The presence of technological and human capital alone are not sufficient for the realization of user-oriented projects. The governance characteristics of a smart city initiative can enable the realization of different participatory projects through the application of information and communication technology as well as of local human capabilities. Network governance is considered to be a model that enables arrangements (formal or informal rules, establishment of organizations) that create trust and thus reduce the transaction costs associated with the acquisition of technological and human capital. Therefore the governance model at initiative level is linked with the participatory orientation at project level by the fact that it enables citizens to make use of technology and human capital.

Smart city initiatives involve a wide range of actors: local governments interact with businesses, knowledge institutions and civil society organizations. The sum those actors, their networks and the arenas where decisions are taken composes the governance model.

Therefore we argue that the characteristics of the governance can have an impact and lead to different typologies of citizen participation.

Certain governance settings can lead to citizen empowerment that can thus influence the governance itself. However at the current stage this situation doesn't appear to be happening.

It is argued that the success of a smart city initiative in involving citizens not only as users of services but also in development of projects depends on the capacity of its governance model to reduce the transaction costs and therefore make best use of the human and technological capital available

A smart city initiative possesses the characteristic of being a non-finished urban development process. First, because there has not been an extensive experience and secondly as an innovation-driven process, it is rather incremental and open-ended one. It is clear to show that within this model rules and norms can and should emerge, a process can be considered to be successful if all parties have been given the chance to be involved.

The aim of the following sections is to explore which governance characteristics can allow citizen participation in the realization of projects, scaling from those enhancing the provision of information to citizens, towards socially innovative ones. We have discussed the capability of the smart city model to give incentive to citizens' participation in urban development. Moreover we argue that the presence of participatory projects is a key element in the definition of a smart city initiative.

Therefore by not only assessing a city performance regarding the "Six Characteristics" presented in Table 2, but also exploring the policy making process and analysing the active involvement of stakeholders, is possible to judge the success of a smart city initiative. In particular we will focus on the governance characteristics that allow the communities' involvement in the design and realization of innovative initiatives.

Chapter 3: Research Design and Methods

This chapter presents the methods that will be used in order to gather and analyse the information needed to answer the research question of this study. Following the review of theory presented in chapter two, the research question and sub-questions have been revised.

3.1 Revised Research Question

Which **governance characteristics** are contributing to **citizen participation** in the development of projects within the Amsterdam Smart City initiative?

Sub-research questions:

- What is the governance model of Amsterdam Smart City initiative?
- Which typologies of citizen participation are being realized within Amsterdam Smart City projects?

3.2 Operationalization: Variables, Indicators

This section is designed to allow the transition from the theory presented in chapter 2 to empirical research. The concepts presented in the conceptual framework are translated into measurable indicators. The main concepts, defined basing on theory discussed in chapter 2, are unbundled into variables. Indicators are then developed, in order to measure the variables.

Independent Variable	Governance characteristics
Dependent Variable	Citizen participation

The following tables present a summary of the definitions of the concepts of governance and citizen participation, extracted from literature discussed in chapter 2.

Table 5 - Definitions of Governance

Author	Governance definition
(Marcussen and Torfing, 2007)	"more or less deliberate attempts to govern particular policy areas through negotiated interaction between a multiplicity of actors, processes and institutions"
	"A relatively stable, horizontal articulation of interdependent, but operationally autonomous actors who interact through negotiations that take place within a relatively institutionalized community which is self-regulating within limits set by external agencies and contributes to the production of public purpose."
(Jessop, 2003)	"...the reflective self-organization of independent actors involved in complex relations of reciprocal interdependence, […] based on continuing dialogue and resource-sharing to develop mutually beneficial joint projects […]"
(Rhodes, 1997)	• Interdependence between organizations, either public, private and from the civil society. • Interactions between network members arising from necessary resource exchange and negotiation of objectives. • Existence of "game-like" interactions based on trust and with rules resulting from negotiations and agreements among actors. • Autonomy from the state, presence of an element of self-organization; the state can steer governance networks, but without a predominant position.
(Meuleman, 2008)	"…the totality of interactions, in which government, other public bodies, private sector and civil society participate, aiming at solving societal problems or creating societal opportunities."

(Jones et al., 1997)	"[…] select, persistent, and structured set of autonomous firms (as well as non-profit agencies) engaged in creating products or services based on implicit and open-ended contracts to adapt to environmental contingencies and to coordinate and safeguard exchanges."
(Klijn and Koppenjan, 2000)	• Mutual dependence of actors which leads to sustainable relations between them; • In the course of interactions, rules are formed which regulate actor behaviour; • Policy processes are complex and not entirely predictable because of the variety of actors, perceptions and strategies; • Policy is the result of complex interactions between actors who participate in concrete games in a network; • Network co-operation is not devoid of problems and needs process and conflict management, and risk reduction.

Table 6 - Definitions of Citizen Participation

Author	Citizen participation definition
(Arnstein, 1969)	"citizen participation is a categorical term for citizen power. It is the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future." Categorized in 8 levels: manipulation, therapy, informing, consultation, placation, partnership, delegated power and citizen control.
(Bishop and Davis, 2002)	• a measure of citizen involvement in decisions that might otherwise be the sole prerogative of executive government • a commitment to seeking the views of those affected by a decision • some transfer of authority from government to citizens • a transparent process, which ensures citizens are informed about policy processes.
(Moulaert and Swyngedouw, 2010) Social Innovation	• Satisfaction of human needs unconsidered by either the state or the market. • Increase of access rights, enhancement of human capabilities and empowerment of particular social groups. • Change of social relations, power structures and of modalities of governance.
(Moulaert, 2010) Social Innovation	Satisfaction of specific needs thanks to collective action

Operational definitions.

Governance: Network of interdependent actors, involved in game-like interactions.
Citizen participation: provision of information to citizens, consultation of citizens, existence of partnerships with citizens, control by citizens over decisions or presence of socially innovative practices

The following tables present the operationalization of the concepts, which will be used to analyse the information collected. Main concepts are unbundled into smaller units, the variables to be measured through indicators. The last column presents the sources that will be used to collect the information. The following framework for operationalizing governance has been developed based on Koppenjan and Klijn (2004).

Table 7 - Governance Operationalization

<table>
<tr><th>Concepts</th><th colspan="2">Variables</th><th colspan="2">Indicators</th><th>Sources</th></tr>
<tr><td rowspan="3">Actors</td><td colspan="2">Who are the involved actors</td><td colspan="2">Government; Private Firm: Knowledge Institution; Citizen organization; Mixed Type.</td><td>Secondary Data</td></tr>
<tr><td colspan="2">Reasons for involvement</td><td colspan="2">Economic; Social; Environmental; Networking</td><td>Secondary Data; Interview</td></tr>
<tr><td colspan="2">Dependencies/ Resources</td><td colspan="2">Financial Resources; Production Resources; Competencies; Knowledge; Legitimacy</td><td>Secondary Data; Interview</td></tr>
<tr><td>Games</td><td>Arenas</td><td>Central actors, Playing-grounds</td><td colspan="2">Closeness Centrality, Places for interactions</td><td>Social Network Analysis, Secondary Data, Interviews</td></tr>
<tr><td rowspan="6">Network</td><td colspan="2">Interaction frequency</td><td colspan="2">Number of Interactions
Degree Centrality</td><td>Secondary data, Social Network Analysis</td></tr>
<tr><td colspan="2">Interaction quality</td><td colspan="2">Heterogeneity of interactions</td><td>Secondary Data, Interview</td></tr>
<tr><td rowspan="4">Institutional Context</td><td rowspan="3">Formal Rules</td><td>Actors Authority</td><td>Use of Public Authority</td><td rowspan="3">Secondary Data; Interview</td></tr>
<tr><td rowspan="2">Institutional Characteristics of Interaction</td><td>Legal Frameworks</td></tr>
<tr><td>Organizational Arrangements</td></tr>
<tr><td rowspan="3">Informal Rules</td><td colspan="2">Creation of Trust</td><td rowspan="3">Secondary Data; Interview</td></tr>
<tr><td colspan="2">Information Exchange</td></tr>
<tr><td colspan="2">Outcomes Evaluation</td></tr>
</table>

The following table identifies the indicators for the various typologies of citizen participation. As discussed in section 2.4.2, throughout this work social innovation is considered as a further typology of citizen participation. The definitions used in this operationalization are drawn from Bishop and Davis (2002), Moulaert (2010), Moulaert and Swyngedouw (2010), as discussed in chapter 2.

Table 8 - Citizen participation operationalization

Concepts	Variables		Indicators	Sources
Citizen Participation (Bishop and Davis 2002; Moulaert 2010; Moulaert and Swyngedouw 2010)	Information	Provision of information from a decision maker	Mono-directional flow of information	Interviews; Secondary Data
	Consultation	Gathering of feedback that can influence decision making	Bi-directional flow of information	
	Partnership	Co-production; Co-regulation; Co-management	Presence of advisory boards Presence of co-production of services	
	Control	Direct relationship individual-policy decision	Voting	
	Social Innovation	Satisfaction of specific needs thanks to collective action	Initiative taken by citizens	
			Collective action	
		Outside Market Provision	The service is not produced by the market	
		Outside State provision	The service is not produced by the state	

3.3 Research Strategy

Choice of the research strategy:

The main focus of this research is on the governance characteristics that enable user orientation in smart city projects, more specifically within the context of the "Amsterdam Smart City" initiative. The goal of this research is an explorative one. Therefore, since the main goal will be to explore the relationship of this phenomenon in a specific context, the case study strategy is the most suitable one (Yin, 2013). The case study research strategy is suitable when analysing unique or rare settings (van Thiel, 2014), in this sense the selected case is thought to possess specific characteristics making it a distinctive one. The phenomenon to be analysed – governance of the smart city initiative – is highly embedded with the context. Moreover the researcher does not have control on events and the phenomenon cannot be separated from the context.

For time and resource constraints, a single case is selected. In particular the selected case would be of a deviant type, as it is considered to be a successful one in enabling bottom-up and user oriented initiatives. However, given the structure of the case study – one initiative collecting several projects involving various actors – there are multiple units of analysis. The case study research strategy, despite a limited external validity, presents the potential for a high internal validity, due to the use of a wide typology of data, making triangulation highly possible (van Thiel, 2014).

Therefore, in conducting this research the single embedded case study strategy is going to be adopted. The use of sub-cases allows for the creation of general patterns. The subcases are purposively selected as examples of projects that present elements of citizen participation. However such cases allow for variation of participation type among them. Moreover the phenomenon to be investigated is contemporary and will rely on multiple sources.

Case study typology

This study is structured along the analysis of four specific embedded case studies. Specific projects developed within the Amsterdam Smart City program are the embedded cases. They have been selected as they show different typologies of citizen participation. The sample is not thought to be representative of the whole program, but is specifically targeted in order to explore the governance characteristics contributing to different typologies of citizen participation. While not representative of the wide range of projects, the selected sample of embedded cases is believed to be representative of different participation typologies discussed in the previous sections. A stratified sampling technique (Jupp, 2006) has been applied to the selection of embedded case studies. In particular a quota sampling has been adopted. Citizen participation is the stratifying variable used in the selection of embedded cases. The total population, composed of 54 projects has been divided into citizen participation strata. The aim was to have a representative sample in terms of citizen participation typologies. This method has been used because of insufficient resources to conduct a census-type of study. The use of stratified sampling required the undertaking of a preliminary explorative analysis of the citizen participation variable. The population of the Amsterdam Smart City project has been divided into preliminary citizen participation categories, based on the analysis on projects available on the program portal. This allowed

the creation of a shortlist of projects based on different levels of citizen participation. The final selection has been based over availability of informants (convenience)[6].

In parallel to the collection of information on the embedded case studies (Serious Gaming, City Services Development Kit, Smart Citizen Kit and Ring-Ring) information on the overall governance of the Amsterdam Smart City program has been collected.

Limitations and Challenges:

Construct Validity – the concepts analysed such as "governance", "citizen participation" and "social innovation" tend to lack a unique definition, therefore the selection of operational measures is crucial for the validity of the research.

Internal Validity – the argument to be proved, such as governance being an important factor, might not be the exclusive explanation for the presence of citizen participation elements in projects. Other factors purposely not part of the research might also have relevance.

External Validity – the particularity of this case study is the motive behind its selection – a smart city program with bottom-up orientation. However it might limit its generalizability.

Reliability – being a study mostly based on qualitative data and about evolving projects, some issues regarding the possibility to replicate the research might arise.

As will be presented in the next chapter, the Amsterdam Smart City initiative is a large program collecting a wide variety of projects. A more comprehensive study would require additional resources.

Potential solutions:

Construct Validity – an unambiguous definition of the concepts that are used will be selected. Regarding the selection of measures, previous researches will be used as source of indicators. Moreover, multiple sources of evidence are going to be used.

Internal Validity – the use of an embedded case study design can allow to some extent pattern matching. Moreover, alternative explanations, such as the importance of other factors, will be taken into account.

External Validity – the rationale of this case study is to apply an analytical generalization, applying the results to a broader theory (van Thiel, 2014)

Reliability – the whole process will be documented; in order to solve this problem a case study protocol will be adopted. Moreover the findings presented in this research are relative to the status of the phenomenon as observed during the months of June to August 2014. The study will provide only a depiction of the current state.

General measures to increase the validity of this study are the use of multiple units of analysis and triangulation of data.

3.4 Data Collection Methods

The principal data collection method applied in the research is semi-structured interviews. The main sources of information are representatives of the organizations involved in the realization of projects. Since aim is to collect information regarding interactions among actors and their behaviours, semi-structured interviews represent an adequate method for

[6] See Annex 4 for the complete list of Amsterdam Smart City projects.

collecting information of a qualitative type. The guideline for semi-structured interviews is presented in Annex 2.

Semi-structured interviews have been conducted with key informants both for the overall program and specific projects. Semi-structured interviews are believed to be a useful method in order to collect data in the context of limited previous knowledge about the issue. Semi-structured interviews allow going in depth and acquiring knowledge from the respondents. Interviews with representatives from the major stakeholders active in the initiative allow the collection of the needed amount of information. The sample used is not, and doesn't aim to be, representative of the whole population of stakeholders, but has been selected in order to gain the most possible information from a limited number of respondents. However, the sample represents the limited number of key coordinating stakeholders.

The data has been collected primarily during the months of June and July 2014. Further data was collected at the time it became available, in August 2014. It is important to state that because of the specific nature of the phenomenon being analysed, the information collected refers to the state of Amsterdam Smart City as of summer of 2014.

The following table presents list of individuals that have been interviewed or provided information through informal meetings. Their identities are not explicitly stated in this work. Transcripts of interviews and meetings reports are available in Annex 6.

Table 9 - List of informants

Organization	Role	Remarks
Amsterdam Economic Board	Project manager for Nieuw-West area.	Overall information on ASC program
Liander	Project manager for ASC projects	Overall information on ASC program
Clicks+Links	Project manager for Serious Gaming; former researcher on resident engagement (Accenture/TU Delft)	Information on Serious Gaming project; ASC program information. Information on research.
Amsterdam Smart City	Responsible for research on Bottom-up initiatives in Amsterdam	Program level information. (informal meeting)
Ring-Ring	Founder	Information on Ring-Ring project.
Waag Society	Research Director	Information on Smart Citizen Kit and Smart City Services Development Kit projects.
MobyPark	Head of Business development	Information on MobyPark project.
TNO	Researcher on smart city projects	Information on Smart Citizen Kit research, Review of research findings.(informal meeting)

Source: author compilation

The aforementioned key informants have been selected as they are thought to be able to provide the required information, given the limited organizational and time resources available.

The review of secondary data will be used in order to triangulate the aforementioned information. Secondary data collected includes reports, presentations at conferences, newspaper articles, webpages of specialized websites as well as other researches on the

theme. This kind of data has been obtained by autonomous research as well as from the key informants. When direct contact with informants was not possible, few secondary interviews have been used. Moreover, the website of Amsterdam Smart City represents a precious source for quantitative information. Despite the fact that this work will largely make use of qualitative information and analysis methods, the addition of quantitative data represents a valuable element for increasing the reliability of the research. Quantitative information about the number and typology of actors and project will be used to generate some descriptive statistics and network analysis. A list of secondary data collected will be presented in Annex 4.

A limitation in the use of unstructured interviews would be the lack of possible generalization, as the respondents would be selected from a limited population. The selection of respondents aimed at identifying key informants possessing significant knowledge of the phenomenon. It must be clear that the information obtained from a reduced number of in-depth interviews is complemented by the review of secondary data. It has not been possible to collect information from users of the presented projects: it would have been challenging to acquire a representative sample and such task would have been beyond the scope of this research. However, a significant understanding of this aspect has been possible through the review of surveys conducted as part of other researches on the theme. Moreover, at a later stage it has been possible to conduct a review meeting with a researcher that is investigating the phenomenon.

3.5 Data Analysis Methods

The different typologies of data will be analysed with different methods. Quantitative data on projects and actors has been used for descriptive statistics and social network analysis. Social network analysis departs from the acknowledgement of the embeddedness of actors within webs of connections. This kind of analysis has been applied in social sciences to different topics such as social mobility, patents, international trade and corporate power (Scott, 1988). Social network analysis explains outcomes through the position of actors in the network structure, rather than on individual characteristics (Borgatti et al., 2009). Centrality is the most widely studied concept, allowing understanding the "structural importance or prominence of a node in the network" (Borgatti et al., 2009, p. 894). Social network data, acquired through the review of secondary data, has been analysed with the use of Ucinet, a social network analysis software. The dataset, created by the author, contains links between partners in Amsterdam Smart City projects. Links among organizations co-working on a project has been obtained through the analysis of information publicly available on amsterdamsmartcity.com website. Main centrality measures have been computed with Ucinet, complementing qualitative information. Diagrams were obtained through NetDraw. Descriptive statistics on the typologies of actors have been calculated through Excel.

Qualitative data, acquired through unstructured interviews and the review of secondary sources has been analysed using Maxqda qualitative analysis software. The use of this software has allowed the coding of the acquired information. The coding system used in the program has been largely based on the operationalization variables. The use of coding allowed detecting and reporting the presence of text fragments containing information on the indicators. The following table summarizes the number of coded segments.

Table 10 - Coded segments

Color	Parent code	Code	All Documents	Semi-Structured Interviews
		Actors	5	0
	Actors	Actors_Involved	49	9
	Actors	Reasons4Involvement	93	29
	Actors	Dependencies_Resources	50	27
		Network	1	0
	Network	Interaction_Frequency	5	1
	Network	Interaction_Quality	34	9
	Interaction_Quality	Collaboration	33	7
	Network	Formal_Rules	11	5
	Formal_Rules	Public_Authority	17	5
	Formal_Rules	Legal_Framework	17	9
	Formal_Rules	Organizational_Arrangements	30	7
	Network	Informal_Rules	19	9
	Informal_Rules	Trust	10	3
	Informal_Rules	Information_Exchange	31	7
	Informal_Rules	Outcomes_Evaluation	21	9
		Games	0	0
	Games	Arenas	11	1
		Top_Down	34	13
	Top_Down	Partnership	20	3
	Top_Down	Consultation	27	8
	Top_Down	Information	21	3
	Top_Down	Control	20	5
		Bottom_Up	31	12
	Bottom_Up	Social_Innovation	10	2
	Social_Innovation	Outside_Market	9	1
	Social_Innovation	Outside_State	8	1
	Social_Innovation	Satisfaction of a specific Need	3	1
	Social_Innovation	Collective_Action	0	0
	Social_Innovation	Citizen_Initiative	4	0
	Social_Innovation	Social_Innovation_Lexical	4	3
	Satisfaction of a specific Need	Citizen_Initiative	18	4
	Satisfaction of a specific Need	Collective_Action	12	2

Source: elaboration on MaxQda computation.

Chapter 4: Presentation of Data and Analysis

The analysis that follows will be focused on the Amsterdam Smart City (ASC) case. As discussed in the previous chapters, this case has been selected as a successful deviant one. ASC is considered to be a leading example in the field of smart cities, due to its feature of enabling significant levels of citizen's involvement in the projects, either as users, participants in the process or developers. It is important to underline that the Amsterdam Smart City is a dynamic environment, with new projects and partners constantly joining. Therefore the following information is a representation of the status at the time of data collection.

This chapter will be organized as follows: section 4.1 presents overview of the Amsterdam Smart City program, its development so far and current features, making use of some quantitative data. Section 4.2 is composed of four sub sections presenting the selected sub-cases, both their individual governance model and outcomes in terms of citizen participation typology are identified; the sub cases are Serious Gaming – City-Zen, Smart City Service Development Kit, Smart Citizen Kit, Ring-Ring and Moby Park. Section 4.3 is composed of an analysis of the governance model of the Amsterdam Smart City program, drawing from the sub-cases experience.

4.1 Case study description

4.1.1 Overview of the Amsterdam Smart City platform

The Amsterdam Smart City initiative can be considered a two-tier organization. The first tier, from now onwards called "Program Level" is the result of the interaction of a limited number of actors – called founding partners - that have the responsibility for the overall development of the initiative. The founding partners are responsible for its funding and management. The second tier is the "Project Level", in which the involved actors interact in order to implement projects. These projects are developed either autonomously by other partners or in collaboration with one of the founding partners. The relationship between the governance model – either at program or project level – and the different typologies of citizen participation at project level, will be examined in the following sections. The projects that have been developed by ASC partners are categorized according to five themes:

- **Living,** aiming at increasing energy efficiency in residential buildings, in order to contribute to the reduction in overall CO2 emissions.
- **Working**, focusing on innovative practices with regard to the work environment, either through sustainable buildings or new modes of working.
- **Mobility**, finding innovative ways to reduce CO2 emissions originating from transport.
- **Public Facilities**, focusing on improving the sustainability of public services, through the implementation of new technologies or new organizational models.
- **Open Data**, aiming at making publicly available raw data from governments, to be used to increase the transparency and produce new services.

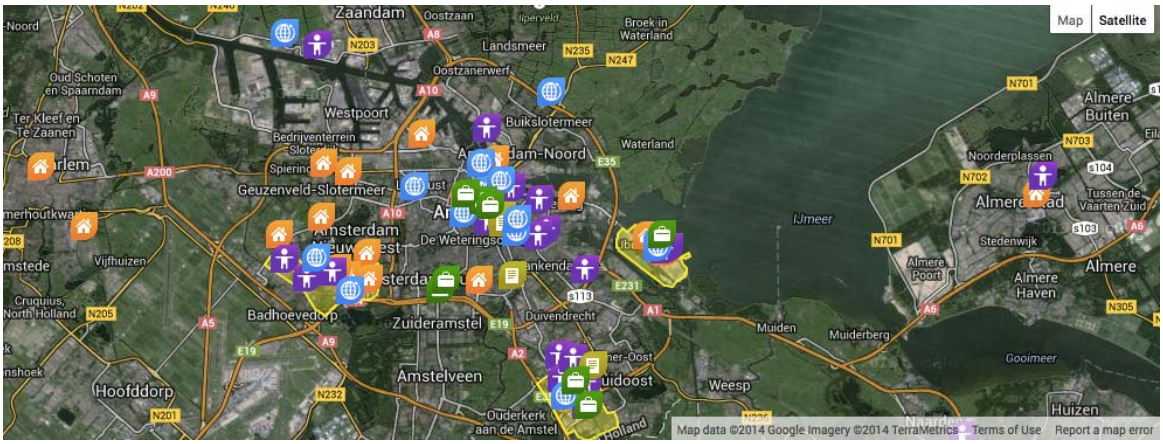
Moreover, the Amsterdam Smart City initiative has selected three main areas within the city, to be used as urban living labs to experiment pilot projects, each with a specific focus:

- **Nieuw-West**, a mostly residential area, offering a good representation of an average Amsterdam neighbourhood. Initiatives are mostly aiming at the development of new energy production and consumption models, making use of the Smart Grid deployed in the area.

- **Zuidoost,** an area characterized by the presence of large commercial and recreational estates, offering the possibility to easily scale up the projects.
- **IJburg**, a recent expansion of the city on reclaimed land, presents the possibility to experiment projects that make use of the fast fibre optic connection available.

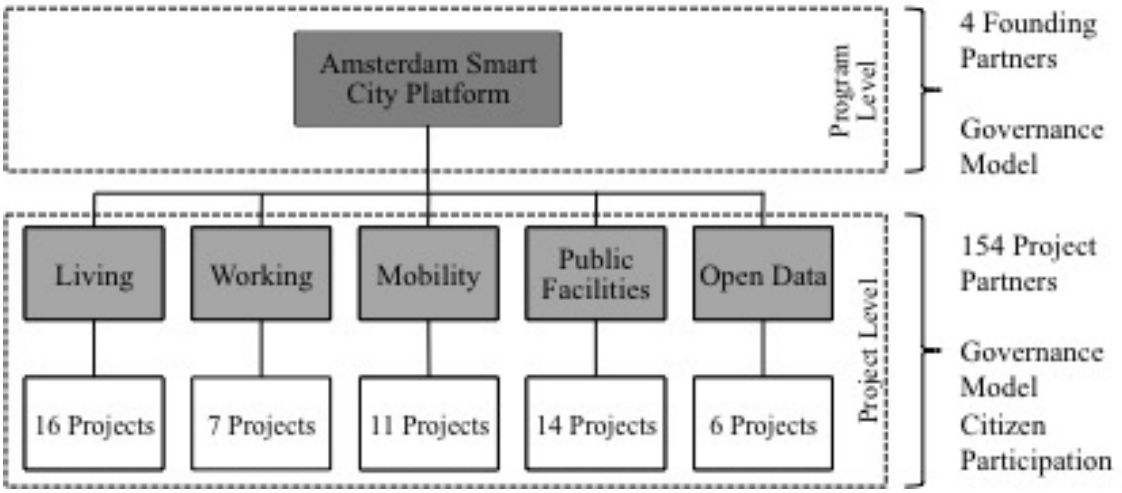
ASC projects are not limited to the aforementioned areas, as many have been developed elsewhere, including in neighbouring cities such as Almere, Haarlem and Zaanstad.

Figure 6 - Map of ASC projects and focus areas



Source: www.amsterdamsmartcity.com

Figure 7 - ASC structure



Source: author elaboration.

4.1.2 Origins and development

According to Ger Baron, the current Chief Technology Officer of the city of Amsterdam and one of the initiators of Amsterdam Smart City program, in the 17th Century, during the Dutch Golden age, Amsterdam was already smart city (van Rijn and Baron 2012; Baron 2013). The construction of the Hendrick de Keyser Exchange in 1611 (Petram 2011) allowed an easier exchange of a great amount of trade information, contributing to the city growth as one of the wealthiest of its time. If we consider the quality and quantity of information exchange as one of the key elements characterizing smart cities is possible to trace back the origins of Amsterdam Smart City in the 17th century.

The "modern" Amsterdam Smart City originated in 2007 as the city started to consider proposals from technology companies to improve municipal procedures through Internet of Things (IoT) implementations. As simultaneously there was the recognition of a need for upgrading IT infrastructure and electricity infrastructure, it was decided to focus on the creation of platforms that allowed the implementation of IoT projects.

Amsterdam Smart City was initiated in 2009 as a collaboration between Amsterdam Innovation Motor (AIM) and grid operator Liander. This collaboration also involved a close connection with the municipality of Amsterdam. The Amsterdam Innovation Motor (since 2013 merged into the Amsterdam Economic Board) was a foundation aiming at strengthening the city's role as a leading actor in the knowledge-based economy. Funded by local governments, universities and enterprises it promoted innovation by stimulating cooperation among different partners and facilitating activities in knowledge-based sectors. Liander is the main operator for the electrical grid in the Amsterdam area, with both the North-Holland province and Amsterdam municipality being significant shareholders of the parent company Alliander (9.16% each). Those two partners worked closely with the municipality of Amsterdam, being both a major shareholder and a key partner for the implementation of projects. The municipality of Amsterdam itself developed an ambitious program called the New Amsterdam Climate, aiming at going beyond European Union's 20-20-20 climate targets. The city of Amsterdam set the goals to have climate-impact neutral municipal organizations by 2015, achieve 20% use of renewable energy by 2025 and 40% reduction of CO2 emissions by 2025 compared to 1990. The city of Amsterdam sought the ASC as initiative that could help reaching those targets by experimenting both innovative solutions and collaborative models. Therefore, initially smart city projects had a strong focus on energy efficiency. The first round of ASC program ran from 2009 until 2011. During this period 16 pilot projects were developed, the main goal of this first phase was to test both technical solutions and forms of collaboration. As an initial phase the primary focus was on showcasing projects that carried potential for scaling up, contributing to energy efficiency and therefore to the city climate goals. During the first phase of the program 71 different partners have been involved, showing a wide variation in terms of typology. Beside the founding partners AEB (the current denomination of AIM), Liander and departments of the municipality of Amsterdam, the program involved technology providers (both large international corporates and locally based ones), consultancy firms, network platforms, universities and knowledge institutions, utilities and infrastructure companies, real estate corporations and building owners. Among those a prominent role was taken by Accenture, acting a consultant to the platform and TNO (Netherlands Organisation for Applied Scientific Research) with the role of assessing the impact of the projects in terms of CO2 reduction and the potential for scaling up. During the first three years, the program focused on experimenting collaborative models among organizations and provide accessible data to end users. Citizens' role was mainly that of end users of the solutions being experimenting, with

limited active role, except for the notable case of the retailers led initiative of Klimaatstraat (Climate Street).

The second phase of ASC program runs over the period 2012-2014 and saw some major changes. The focus shifted towards the creation of scalable models, with the objective of allowing users to take actions. The telecommunication company KPN, the main landline and mobile operator in the Netherlands, joined the program as a founding member in 2011. In particular, through its partner Reggefiber (Fibre Optic provider), KPN invested in the city telecommunication infrastructure. This element was crucial allowing ASC program to diversify the range of its operations, not solely focusing on energy efficiency, but also on internet-related applications. The collaboration with KPN represented one of the expected results of the first phase of the program: showcasing the possibility for partnerships and the creation of business models that could attract new partners and investors. ASC envisages the implementation of infrastructures that enable the development of new project and services: Smart Energy Grids, Fibre to the Home and Open data. Those infrastructures enable the implementation of innovations by different parties. In the meanwhile, the second phase of the program had a wider number of goals:

- Stronger attention towards citizens' involvement and bottom-up initiatives.
- Scaling up or replication of projects initiated during the first period.
- Development of new projects with the creation of new partnerships, thus widening the number of partners.
- Diversification of the thematic areas, with the experimentation of internet-related activities.

Those activities also involved a greater contribution of Amsterdam municipality, both as financier and as an actor directly participating in the realization of projects, in particular due to the attention to Open Data themes. Moreover, since 2013 Amsterdam Innovation Motor (AIM) merged into a new organization, Amsterdam Economic Board (AEB). This organization acts as an advisory board to the Amsterdam Metropolitan Area in the fields of economic policy and innovation. Funded by triple-helix partners (Government, Industry and Knowledge Institution), it aims at strengthening the city economic position, with a specific focus to innovation. AEB fulfils its mission by stimulating partnerships and collaboration among its members. It also provides a connection to both its local and international affiliated corporations. ASC program presents strong links in particular with AEB ICT/e-science cluster. The platform achieved a considerable growth in terms of partners involved, diversification and number of project. The current state of ASC will be presented in the section 4.1.3.

The second phase of the program is due to be concluded at the end of 2014. During interviews with key informants, it became evident the existence of a commitment to continue the experience. As of July 2014, the author acknowledges the presence of on-going discussions among members of the steering committee (AEB, Liander, KPN, Amsterdam Municipality) about the future strategies of Amsterdam Smart City. Key informant from some of the funding partners stated that there is an interest in widening the collaboration to new partners. Also is evident the interest of ASC in a strategy shift towards support of bottom-up initiatives developed by residents, including non-technology related ones. Those elements will be discussed more in detail in the following sections.

4.1.3 Current Status: projects descriptive statistics and social network analysis.

The program consists of 54 projects, involving 143 partners (155 if we consider the different departments of Amsterdam municipality as separate entities). It represents a considerable growth from the 16 projects and 71 partners involved at the end of first phase in 2011.

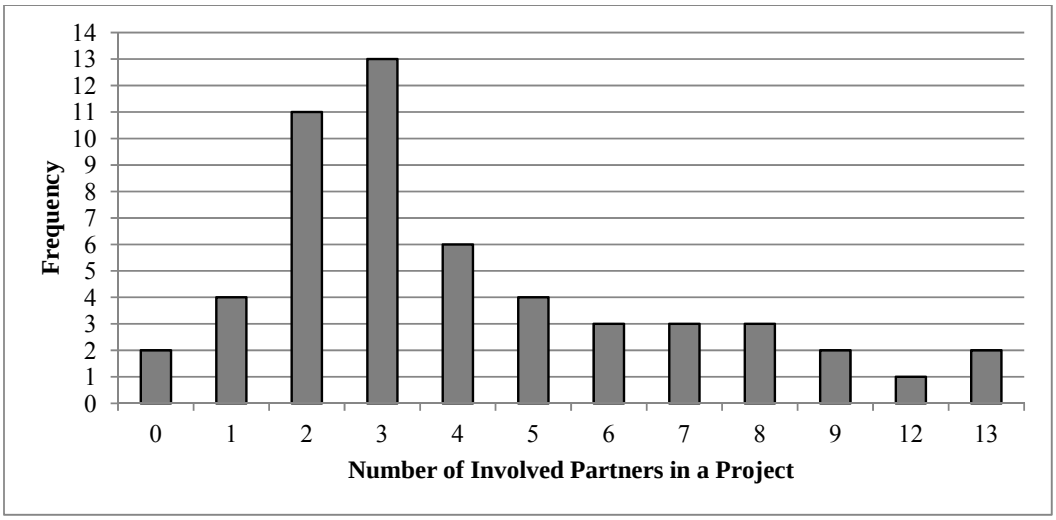
Table 11. - Number of projects per theme

Theme	Number of projects	Share
Living	16	29,6%
Working	11	20,4%
Mobility	6	11,1%
Public Facilities	14	25,9%
Open Data	7	13,0%
Total	**54**	**100%**

Source: computed from www.amsterdamsmartcity.com

In the majority of cases, projects are realized by more than one partner: as it is possible to observe in the data representation below just four projects are delivered by an individual partner[7]. More than half of the projects are developed by partnerships composed of three or more actors. Moreover there are three examples of projects that are delivered by 12 actors or more. A detailed overview of the projects and actors will be presented in the Annex 3.

Figure 8. - Frequencies of Number of Partners per Project



Source: computed from www.amsterdamsmartcity.com

Partners differ a lot among each other, in term of intensity of their involvement, typology and number of relationship established among each other.

Regarding the intensity of the involvement, a possible measure is the number of projects each partner is involved in. The vast majority (95 out of 155 partners) is involved only in one project. This is in line with the experimental approach of ASC: the aim to experiment not

[7] Two projects fall in the category "0 Involved Partners". This fact is explained as one is a student research, that has later been developed in an another autonomous project (not included in the population at the time of data collection) and the other an umbrella project collecting three more specific projects.

only new solutions but also new collaborative models. It is probably the case that partners, especially smaller ones, join the program on a project basis. For partners themselves ASC is an experimentation of new partnerships. The following table provides a summary of the overall involvement intensity of the different partners. The number of projects each partner is involved in is available in Annex 3.

Table 12 - Involvement intensity of all ASC partners[8]

N. of projects involved in	0	1	2	3	4	5	6	7	8	26
Frequency	26	95	17	5	3	5	1	1	1	1

Source: computed from www.amsterdamsmartcity.com

Furthermore, ASC partners can be categorized according to their typology: whether they are a private company, a governmental organization, a knowledge institution, a citizen organization or of a mixed type. In this respect, we can observe that the large majority of ASC partners are private companies. However within this category a high diversity can be found, ranging from large multinational corporations (e.g. Accenture, Cisco, IBM) to medium sized ones (e.g. Mastervolt, Plugwise, Quby) and local businesses. Public organizations represent also an important share if we account for its diversity[9]. Worth mentioning is the presence of some organizations that do not fit in any of the typical categories, as often represent the result of partnerships among actors belonging to different realms. The Amsterdam Economic Board represents the most prominent case.

Table 13 - Categories of ASC partners

Organization Category	Number	Share
Private	100	65%
Government	24	15%
Knowledge	11	7%
Citizen	10	6%
Mixed	10	6%

Source: author's analysis.

While in this section some quantitative data has been presented, the following one will report qualitative information, in the focus will shift from the Amsterdam Smart City program as a whole to more specific cases.

Amsterdam Smart City, by working together in projects has created a thick network of relationships among the various partners. If the participation in the same project as is considered as the creation of a tie among any given pair of actors, it is possible to create such network of relationships. Figure 9 shows a graphical representation of ASC network. The nodes represent the different actors (the detail of the codes used is available in the appendix), with colours codes representing the organization category (blue = private, red = government, orange = knowledge, green = citizen, pink = mixed) while the node size is the total number of

[8] The fact that 26 ASC partners are not involved in any project is explained by the fact of either being network organizations or consultants not directly involved in any specific project.

[9] Different departments and administrative subdivisions (Districts or *Stadsteels*) of Amsterdam municipality are considered separately.

projects each actor is involved in. The thickness of the connecting lines represents the recurrence of relationships – i.e. the thicker the line, more times the two actors have partnered in a project. From the analysis of figure and of some basic network indicators is possible to gain a better understanding of the set of interactions within ASC.

Most of the linkages have value 1, meaning the two connected actors engaged in a one-off relationship. However, there are some noticeable differences: the founding partners (aem, lia, gam, kpn) and few other actors such as Cisco (cis), Amsterdam University and its energy department (uva, cva) and Hogeschool van Amsterdam (hva) present thicker connections, representing recurring relationships. Starting from the assumption that repeated interactions are a good indicator for positive collaborations, is then possible to state that trust has been created among some actors. In particular is evident the preeminent role of Liander in this network, even if the municipality of Amsterdam is considered a unique actor (gam) by summing together all its departments and subdivisions. Most of the actors belong to the main component of the network, however some belong to separate components that do not present linkages with the rest.

By looking at some indicators network indicators, it is possible to establish who are the most important actors in a network. The following table will present some centrality measures obtained with Ucinet software from the database of actors and projects. For this case the most relevant indicators are degree centrality and closeness centrality. Degree centrality is a measure of how active an actor is. It represents an index of the exposure to the flows across a network. Therefore, it can be interpreted as an opportunity to influence and to be influenced directly. Closeness centrality is a measure of how quickly an actor can interact with all others. Closeness centrality can be interpreted as a measure of how rapidly an actor is exposed to what is flowing in the network. In the case of information, it determines which actors can be more quickly exposed to information. In ASC case, Liander is the key actor in the network, ranking first in both measures. Amsterdam Municipality also has a relevant role (if considered as a unique actor), while surprisingly the role of the other founding partners – KPN and AEB – appears to be less relevant according to this analysis. In the case of the Amsterdam Economic Board this can be explained by the fact that its role is more the one of a consultant than executor of projects. This analysis accounts only for formal relations – being partner in a project – but does not include more informal ones that as we will see in the following sections often have a prominent role. On the other side KPN, as an infrastructure provider has focused so far on a limited number of interventions, also due to its more recent involvement in the program.

The rankings in both indicators present a similar pattern, and it is worth highlighting some actors: University of Amsterdam (uva) and its energy department (cev) are present among the top five, underlining the importance of knowledge institutions.

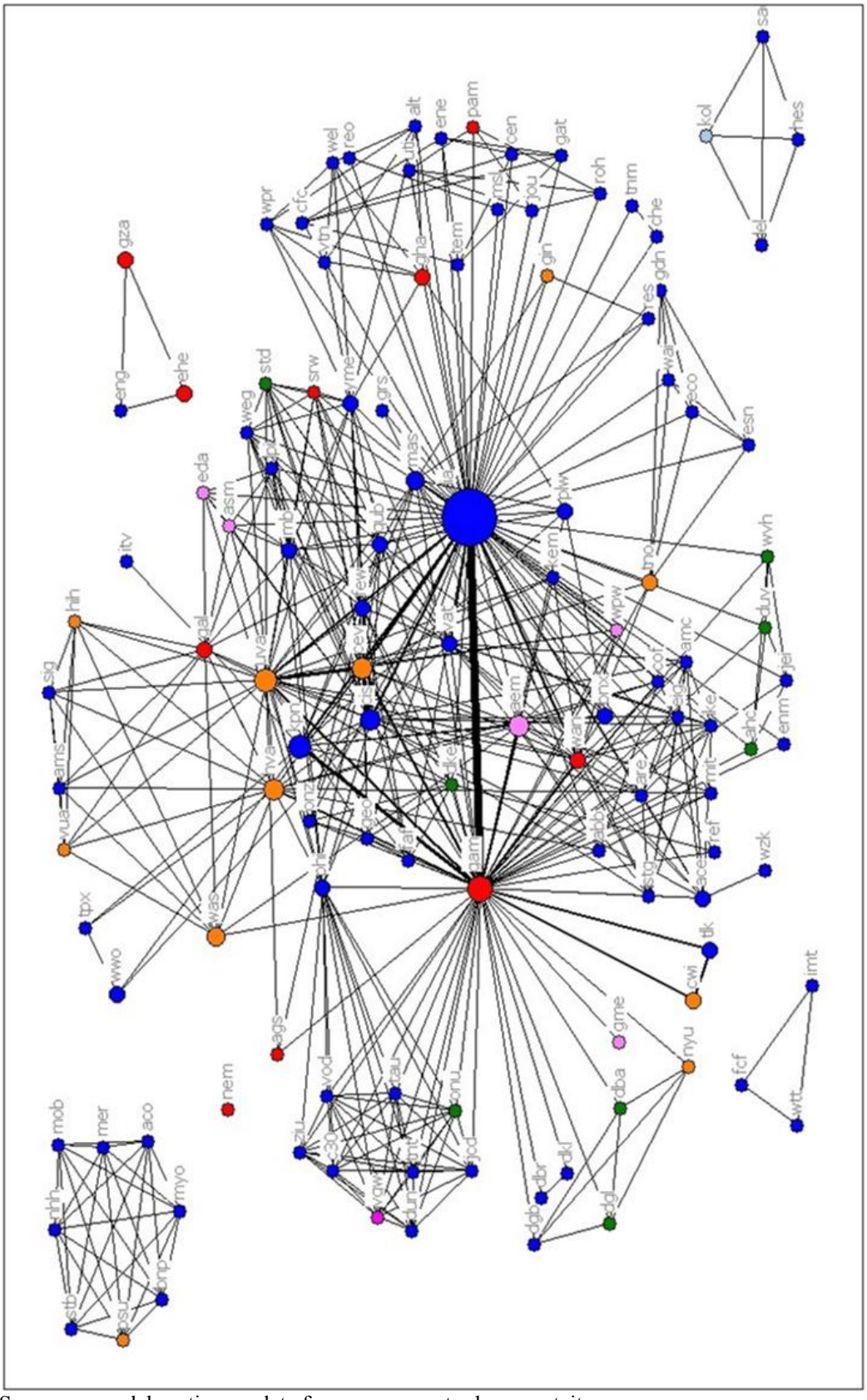
Table 14. - Centrality measures for selected[10] ASC partners

Partner	Code	Degree	Closeness		
Liander	lia	60,169	4,941		
Amsterdam Municipality	gam	48,305	4,913		
Amsterdam University	uva	24,576	4,852		
Cisco	cis	22,881	4,852		
Philips			phi	19,492	4,84
KPN			kpn	16,949	4,836
Hogeschool van Amsterdam			hva	14,407	4,828
Accenture			ace	14,407	4,83
Almere Municipality			gal	13,559	4,791
Mastervolt			mas	13,559	4,828
Centre for Energy Studies - UvA			cva	13,559	4,826
Vattenfall			vat	13,559	4,808
Ymere			yme	12,712	4,826
Quby			qby	11,864	4,818
Amsterdam Economic Board			aem	11,864	4,805
Waternet			wat	11,864	4,824
Far West			fwe	10,169	4,812
IBM			ibm	9,322	4,81
Slimmer Reizen in West			srw	9,322	4,781
Stichting Doen			std	9,322	4,781

Source: own elaboration on data from www.amsterdamsmartcity.com

[10] Top 20 partners by degree centrality.

Figure 9 - The network of ASC program



Source: own elaboration on data from www.amsterdamsmartcity.com

4.2 The governance model of Amsterdam Smart City

Drawing from the analysis of information about the overall program, as well as from the specific project that will be analysed in section 4.3, it is possible to identify the general characteristics of the governance model of ASC.

4.2.1 Actors

The largest investors in ASC, the telecommunication company KPN and the electric grid operator Liander, as recalled by Amsterdam Municipality CTO (Chief Technology Officer) (Cisco 2014), respectively had an interest in speeding up the broadband network and to improve their energy grid. Therefore they realized that such an investment would have a larger impact if they thought of the users. As the city CTO recalls, AEB and the partners took the approach of having the city as a platform, supporting citywide applications by different partners. In the current setting different actors are implementing projects that make use of the available infrastructure, thus creating scalable solutions. Therefore the ASC platform role is to coordinate innovation projects. In this sense AEB objectives include bringing partners together in order to share knowledge.

Each of the founding partners brings together financial resources, specific know-how and a shared team of 12 people dedicated to the ASC platform. Facilitation of collaborations is the key element of Amsterdam Smart City, as recalled by a project manager of AEB,

"We actually believe that only by working together and stepping out of your own role you can reach something. [...] If you really want to innovate, you need to work together, probably with people with different perspectives."

Each partner has different reasons for engaging in those activities, but there is a feeling for a genuine interest in experimenting new typologies of partnership. While it started with a strong focus on CO2 reduction, different partners brought diverse perspectives and objectives, from social to economic ones. The overall goals of the partnership are to test and experiment collaboration models and innovations and assess their outcomes and potential scalability. According to van Rijn and Baron (2012), different partners have different roles and incentives.

"There is a difference between partners with a long-term incentive (infrastructure partners), midterm incentive (strategic partners) and short-term goals like SME's. Involvement of the government is essential: it provides trust, open data, long-term commitment and policy and leadership. As it should"

As Amsterdam CTO recalls, the ASC has few criteria to select projects, they should:

- improve the quality of life
- be technologically feasible
- be innovative
- be resource-efficient and contributing to CO2 emissions reduction.

In particular, the latter criterion is seen as a key motivation to link project goals to overall city goals.

As will be evident in the subcases presented in section 4.3, the actors involved in each project have different motivations for participating and contribute to the partnership with specific resources. It is quite clear that none of the project would have been delivered by one of the involved actors alone, as each of them contributes with some key resource. With regards to the four funding partners, it appears that AEB possesses networking resources, allowing the expansion of the platform by involving new companies and the knowledge institutions that

are part of AEB. The infrastructure providers Liander and KPN possess the know-how on implementation of large projects. Amsterdam Municipality provides political sponsorship in particular regarding the contribution of ASC to the city environmental targets. Moreover as stated by a key informant, all founding partners financially support the Amsterdam Smart City program through the payment of a membership fee and in kind by devoting staff members.

4.2.2 Games

The generation of collaborative interactions among partners is both one of the goals of the Amsterdam Smart City program and the main method for delivering solutions. Through ASC different partners are able to open dialogue and try to find shared goals among organizations.

Social network analysis, shown in section 4.1.3 provides insights on the arenas where actors are engaged in the interactions. The next section (4.2.3) will identify the characteristics of the interactions. The analysis the position of partners through social network analysis can be a useful tool for identifying the central actors and thus the arenas composed of "sets of actors, with organisational arrangements where decisions are being taken." It is clear that actors with the stronger position in the network, like Liander and Amsterdam Municipality, are also engaged in strong mutual relationships. Around those actors, therefore, originates the main arena where decisions are held. In fact, the four founding partners have a central role as members of ASC steering committee. Therefore, most of the projects involve at least one of them. Also as providers of human capital to the platform, they tend to receive information about all partnerships being realized. As it is also clear from the graph in Figure 9, there appear to be few cases of ASC project that are established without a direct or indirect link to the main actors of the platform. Moreover, different external source have recognized the importance of ASC as a platform allowing interactions and thus a place for decisions.

"What is apparent is that Amsterdam Smart City has functioned as a platform and an inspiration for small and medium enterprises in the search for sustainable options, and this alone makes for a good foundation for a broad change in the way of thinking about city development." (Danish Architecture Centre 2014)

Platforms such as Amsterdam Smart City represent a useful intermediary between city government and other actors such as companies and knowledge organizations. They help bringing actors from different sphere on the same level, rather than in a vendor-customer relationship. It represents also a breaking point with government driven programs. A recent study commissioned by the European Parliament has recognized that

"The creation of a central office that acts as the go-between for Smart City ideas and initiatives drawing in diverse stakeholders is of vital importance (see Amsterdam (the Netherlands) Smart City platform)" (Manville et al. 2014, p. 87).

The newly formed Amsterdam Institute for Advanced Metropolitan Solutions (AMS) will represent a new space for the realization of interactions. This new institution, opened in June 2014, is the result of collaboration among Dutch universities (TU Delft and Wageningen UR), MIT and TNO. It involves an extensive number of both local and international corporations such as Accenture, IBM, Cisco, KPN, Shell, Waternet, Alliander and ESA; as well as Amsterdam Smart City itself, Waag Society and City of Boston. As recognized by AEB interviewed representative, this institution can be considered as an outcome of collaborations started within ASC, as well as a new player that "*will probably change the playing field a bit*".

4.2.3 Networks

The interactions among actors being developed within ASC present a variety both in quantitative and qualitative terms. While it has been observed that a vast majority of ASC partners are private organizations, interactions being developed present a good variation in qualitative terms: it is common to have research institutions and public bodies involved in projects. It is evident that interacting with partners from different sectors – with different goals – results in heterogeneous interactions. In particular one of the goals of the program is to experiment innovative collaborative models among actors that hardly ever worked together before. As Baron (2013, p.100) recognizes, this is one of the biggest challenges ASC aims to overcome:

"How can a housing agency work together with a global IT company? How can an innovative SME in energy efficiency collaborate with a more traditional water company? Different company cultures aren't always that easy to align".

One of the principles behind Amsterdam Smart City program is "quadruple helix model" involving citizens with government, companies and universities, as stressed by interviewees from Liander and AEB. However, as also the data presented in section 4.1.3 shows[11], private institutions have a leading role. Moreover residents not affiliated to the few citizen organization appear to be not adequately represented. Cohen (2014) has defined ASC collaboration platform as a 5P model: Public-Private-People-Professor Partnership. However the relative weight of each of the components is appears not to be balanced. Moreover the "people" component, assumes different roles, as will be presented in detail in section 4.3.

According to Amsterdam Municipality CTO, Amsterdam Smart City *"is a complex system of different parties, which has a strong local focus as well"* (van Beurden 2011, p. 20).

Different typologies of rules, both of formal and informal kind, are necessary to shape such interactions. Amsterdam Municipality, despite its role as founding partner of the program does not make extensive use of public authority in order to bring forward ASC projects. However, especially in the first phase of the program, the strong focus of projects on CO2 emissions reduction was in line with a local government's political goal. This has allowed a greater involvement of the public actor and was key in finding a shared objective that brought different organizations together. As recognized by the representative from Liander, the local government has "become more a stakeholder within the process than leading the process."

One tangible action undertaken by Amsterdam Municipality has been the creation in March 2014 of a CTO (Chief Technological Officer) position among its administration. Moreover this position has been taken by Ger Baron, who has been previously heavily involved in the ASC program through his role within the Amsterdam Innovation Motor. In the end the local government acts more as a political sponsor than through the application of public authority.

Legal frameworks, as it has been observed in the selected subcases, have a key role in regulating interactions among partners. It has been observed that such contracts are important for a clear assignment of roles and tasks, as well as for the establishment of time frameworks for their realization. It appears to be a relationship between the number of partners involved and the available financial resources on one side, and the complexity of legal frameworks on

[11] See in particular Tables 13 and 14: actors belonging different categories are represented but the most active one remain large private corporations and knowledge institutions. Citizen organizations appear to retain a marginal role.

the other. A common framework is the creation of consortia among different partners, especially in the cases involving external funding, for examples EU grants. Involving more partners is often necessary but creates challenges for cooperation, the presence of clear structures and clear responsibilities are essential for all partners. Not surprisingly the interviewed representative of ASC shares the same ideas: *"Of course if there is more money involved, people would like to organize it a bit stricter."* Therefore the signing of clear collaboration agreements is a very important tool (Amsterdam Smart City 2011). Similar principles are also shared by Manville et al. (2014). More experimental settings require less stringent legal agreements.

The establishment of organizational arrangements among partners for the realization of a project has rarely occurred, with the notable exception of AMS. At the program level, a more structured team has been formed: interestingly, despite working together at shared locations, human resources remain are staff members of the respective organizations. As it emerged from interviews, sharing working space is a fundamental tool for improving communication and mutual knowledge.

Also, so-called informal rules represent an important element for shaping the way partners work together. ASC is strongly based upon collaboration among actors, that means using a different mind-set from the one the organizations might be used to, as Jannis van Zanten of Amsterdam Climate and Energy Office stated, *"You must have the courage to do things together. And that is more than just signing a contract: you must really set to work with each other"* (van Beurden 2011, p. 48). Within such arrangements, information exchange settings are of key importance. Co-working represents a good method for enhancing information transmission and according to the interviewee from Liander, the same applies for high-level discussion among founding partners in the steering committee, that are engaged in frequent meetings (every six to eight weeks). ASC setting allows good information exchange across different organizations, as they can communicate also bypassing partners representatives at the platform. However each organization retains a certain amount of control over sensible information to be shared. In general, thanks to the strong emphasis of the program on open data, organizations that retain vast amounts of information are encouraged to share it.

Assessment of project outcomes is a complex element, compared to the initial phases of the program, when project outcomes where evaluated mainly by the reduction of CO2 emissions. Currently projects have a wider spectrum of goals, including the experimentation of collaborative models. Regarding the evaluation of collaboration, there is often the application of a trial and error method: recurrent collaborations among partners are interpreted as a symptom of positive experiences in earlier relationships. Actors that did not experience positive collaborations are less likely to partner again in the future.

"You must have an instrument for measuring progress. These are not just the conventional road maps normally used by businesses. Smart Cities is about an innovation platform with special dynamics, where things change rapidly"
"By measuring, you build a business case for the investing parties. Constant feedback is an important part of a step-by-step plan: is it technically feasible, is it socially feasible, is it scalable?" Ger Baron in (van Beurden 2011, pp. 21-22)

Finally, trust among actors is considered to be a key element for guaranteeing collaboration in project realization. This is clearly recognized by the interviewed Liander representative.

"There is a high level [of trust], and I think it's necessary, of intrinsic motivation and trust, which has to be part of a collaboration like this. I think that is an important part of working closely together on societal challenges as well."

ASC itself is recognized to have become a familiar entity for its current partners and interested ones, it plays the role of a trusted consultant that provides possibility to create matches across actors and accelerate initiatives.

4.3 Governance and Citizen Participation in ASC projects

In this section, the result of the qualitative analysis on governance and citizen participation in Amsterdam Smart City projects will be presented. ASC works as a two-tier organization, both the characteristics of governance and different typologies of citizen participation will also be analysed at project level. It is not possible to consider program and project level as two disjointed elements. First actors that are involved in the program level (Liander, AEB, KPN and Amsterdam Municipality) are also actively working as project partners. Secondly the decisions taken at program level have a direct influence on the projects in terms of choice of partners and governance models. To gather a better understanding of the phenomenon, four different subcases will be analysed more in-depth. The four cases will be discussed separately in order to identify different combinations of governance-citizen participation. The four cases have been selected as they are representative of the different typologies of citizen participation present in Amsterdam Smart City. The four embedded cases offer a significant range of variety, from those organized around from transnational networks to neighbourhood level ones, from those involving large international corporations to those originating around residents or local NGOs.

Table 15 - The embedded sub-cases

Serious Gaming – City Zen	City Services Development Kit	Smart Citizen Kit	Ring-Ring
Part of a larger EU-funded project on energy with transnational working group. Targeting a specific area in the city. Objective of enhancing the awareness of residents on energy efficiency.	Transnational project aiming at the standardization of municipal data. Engagement with municipality and with developers to realize applications that make use of open data.	Experimental project aiming at involving citizens in environmental measurements. Residents as active producers of environmental measurements.	Neighbourhood-level project aiming at enhancing the use of bicycles for commuting. Engagement with local government, local business and residents.
Low level of citizen participation currently observed. Participatory activity started by private companies.	Participation of developers' community in application elaboration. Citizen provided with new applications and access to data. Participation initiated by intermediary organization.	Citizens actively engaged in the co-production of a service. Realization of dialogue with official agencies. Participation initiated by intermediary organization.	Project originating from a resident, making use of local knowledge and connections. Creation of a local on-line community of bicycle users.

Source: author compilation

4.3.1 Serious Gaming – City-Zen

City-Zen is a European project aiming at the creation of urban living labs where innovative solutions regarding energy are experimented. It is being jointly developed in the French city of Grenoble and in Amsterdam Nieuw-West. This district, one of the three focus areas within ASC, is a representative sample of Amsterdam and presents high-energy consumption. Liander has been investing in the deployment of a smart grid, servicing approximately one-quarter of the 40.000 households of the district. This infrastructure allows the experimentation of a variety of solutions related to energy efficiency and distributed electricity production. A project – Serious Gaming - has been developed with the aim of increase population awareness and interest in energy-related projects such as smart street lighting, distributed energy storage, distributed heat generation and electric vehicles connection to the grid. According to Serious Gaming project manager, the ultimate goal of the Serious Gaming activity is to "influence the decision people make on their energy usage" and to stimulate energy savings in a more interactive way through the game.

Actors

The deployment of solutions related to City-Zen in Amsterdam involves a great number of actors, currently 13, from various fields: knowledge partners like TU Delft and Amsterdam University; technology providers like Mastervolt, Waternet, DNV-GL, Sol Calor, Daikin and Clicks and Links; program partners as Amsterdam Municipality, Amsterdam Economic Board and Liander; project coordinator VITO. City-Zen project will run until 2018; it has a budget of over € 40 million, half of which comes from EU funding, while the rest is coming from project partners. Those actors are either academic institutions, private companies, public and mixed organizations. On the other side, the Serious Gaming activity involves fewer organizations. Serious Gaming originated as a graduation project from TU Delft masters student. During a placement with Accenture he conducted a qualitative and quantitative research commissioned by ASC in order to assess citizens' attitudes towards different potential smart city solutions. The outcomes of this research allowed the development of a prototype for a gaming activity that would bring together Smart Solutions and people's ideas. In the end, the concept of the game has been developed in order to concentrate on energy use issues and included in the City-Zen project through the involvement of the UK-based software development company Clicks and Links. The different actors share different goals with regards to this project. Liander is working on this typology of projects involving citizens to a greater extent as it recognizes a shift in its role in society. From just being a provider of electric transmission infrastructure, it has been realized that such infrastructure can have an enabling role for local initiatives. People and companies are increasing their awareness of the possibility of solutions that would enable a greater control over energy production and consumption. As stated by a project manager of Liander that is directly involved with Amsterdam Smart City:

"[…] you see a changing role in society when you look at infrastructure. Infrastructure is an enabler. The vision or mission of Alliander [parent company of Liander] *is what we say we try to facilitate and open energy infrastructure. And also facilitate transition towards a more sustainable energy use. And I think also with ASC is an example of how we can stimulate the community."*

The changing role of infrastructure providers such as Liander is clear also shared by the project manager from AEB responsible for projects in *Nieuw-West* area.

"There are more people that locally producing their energy and that influences us, so we need to understand how they are doing it, why they are doing it, when they are doing it and

things like that. Our role is more like an enabler. So they are really trying to enable people to make their own smart energy choices."

Therefore it was decided that the City-Zen project should include an activity directed at involving citizens and raising their awareness on energy efficiency measures. The creator of the game and of the research on citizen awareness of smart solution is now working for the ICT company Clicks and Links (C+L), closely coordinating the development with Amsterdam Smart City and Liander. However, the C+L project manager of Serious Gaming their interest in this activity goes beyond the City-Zen project, aiming at the development of a product, to be possibly used in different settings.

Within the Serious Gaming activity, the three main actors (C+L, Liander, AEB) have different roles and resources. C+L provides the technical knowledge, as well as good knowledge of the area, Liander mainly information and data on energy consumption, while AEB provides a connection with the local community.

Table 16 - Actors in Serious Gaming project

Actors	Project Involvement Motivations	Resources
Amsterdam Economic Board	Experimentation of new partnerships among actors. Engagement of different partners.	Connection to residents and local initiatives
Liander	Experimentation with of new forms of interaction with end users.	Energy consumption data; Connection with other partners
Clicks+Links (ex-TU Delft student)	Development of a new product. Involvement in large project (new collaboration).	Knowledge of the area Technical Knowledge

Source: author compilation

Games

In this project two main arenas for decision-making can be identified:

First, one where different project partners take decisions regarding the overall City-Zen project. This arena concerns the European level and is subject to the management of a project coordinator (VITO) that strictly control the fulfilment of tasks by partners. As the representative from C+L stated, project coordinators do so as in "they depend on a lot of things [from project partners] in order to get their deliverable, which is to finish the project in time". All project partners are involved in this arena, including C+L head office in the UK. Decisions are subject to formal rules and must fulfil the requirements agreed in the consortium agreement. As stated by Serious Gaming project manager:

"Officially there is a portal website, with all the partners where you can post questions and those sort of things, but for the real formal administration, we have to fill in forms and discuss dependencies and deadlines".

Secondly, interactions regarding the Serious Gaming activity take place in Amsterdam and involve a more limited number of actors. Decisions taken there generally regard day-to-day operations. Such interactions are facilitated by arrangements such as the sharing of office space and frequent meetings among parties. Organizational arrangements have lead to easy information exchange among actors. Also the limited number of partners facilitates decision-making at this level. As recognized by the representative of Clicks and Links:

"But what is way more interesting for us is the fact that I work for Clicks and Links but I am here with ASC, working closely together with [ASC project manager for Nieuw West] and whoever else works on this project, so for me is really easy. So yesterday I just went to Arnhem, talked to some people from Liander to get some data for the game, so that's way more informal and is way easier for me to discuss the project."

Networks

Information exchange and agreements on strategies is facilitated by a constant personal contact among the project managers of the three different actors. In practice, despite belonging to different organization, they often work in a shared office space, increasing mutual knowledge and facilitating communication. As the project manager from C+L stated:

"I mostly interact with Liander and the AEB […] is responsible for quite a bit of the deployment work of the project in Amsterdam. So that's another thing that is important for us. We can design a game, but how we get it to the people, how we get people to test it. So that's also part of the work of AEB."

However, having a large group of partners working together, especially in cases where large external funding are being used, requires a high degree of standardization of procedures. This is particularly the case when there are not frequent personal interactions with some partners. Moreover, as reported by all three actors, this large project also involves the use of quite specific contractual arrangements. These agreements go beyond the usual forms of cooperation but, while requiring a more strict allocation of tasks and a more formal kind of information exchange (standardized reports, updates on digital platform), they help the setting of clear deadlines and specific goals. Also they help to clearly evaluate each partner contribution to the project.

Interactions with residents were limited to a field and online survey, leading to the acknowledgement of a very limited interest in energy efficiency - or with his own words: *"Is zero, people don't care at all about energy savings, energy is a commodity, people think is really boring. But that's why we try to come up with this game, to make it fun"*.

Citizen Participation

The typology of citizen participation present in this project is "information". The project, although in an interactive way, creates a mono-directional flow of information on energy efficiency from decision-makers – the energy companies – to residents. The citizen participation typology that is present in this project is not originating from residents. As it was said, energy efficiency is not seen as a priority by residents, but is rather imposed to their agenda by the project partners. At the current state, the Serious Gaming activity can be interpreted as an innovative way for decision makers to provide information. Residents are receivers of information about energy efficiency from the project management. The game stimulates the use of this information, which flows in a mono-directional way. Eventually residents could take an active role and activate partnerships for co-production, but such elements are not presently happening. Moreover it despite the initiatives relies on insights from citizens, they were provided in an unstructured way, as part of an academic research.

The lack of a sense of community is the principal issue encountered during the field study conducted prior to the conceptualization of the game. This element is being taken into consideration in the development of the game, which also aims to connect people by playing together. Currently, citizens have the possibility to participate in the testing of the game. However, different channels are necessary if stronger citizen involvement is sought. Moreover, possibilities to establish bi-directional information flows are limited by legal

requirements. As stated by the developer, privacy issues limit the ability to use generated data.

Despite the nature of the project, higher levels of residents' involvement in energy decision-making is not an objective. Therefore it does not present features control-type citizen participation. The answer of C+L representative to the question whether this project can influence this theme has been:

"Not the decision-making. The game is supposed to influence the decision they make themselves, on their energy usage, so it's supposed to inspire them to use the empty roofs on their houses, to install solar panels, or to maybe put some more clothes in the laundry machine, so not to waste energy, or to turn off lights."

Public bodies do not appear to take a steering role in this setting, as also the task of stimulate citizen participation is left to private partners. Despite Liander as a project partner shows an interest in integrating citizens in the process, difficulties in this relationship are evident. This is possibly explained by the presence of a certain distance between citizens and project partners. As the project manager from Liander recognizes, it is important to try strategies to increase the weight of citizen initiatives in among the collection of actors.

"[…] you should give them [citizen initiatives] a very good position within the group as well. You see some collaborations between very large corporates and bottom up initiatives, sometimes they are not on the same level when discussing or choosing which direction to go. You have to set the right level or the right type of collaboration, type of trust among each other to continue working."

With a wider vision on the whole program the program manager for C+L in is graduation report recognizes that:

"Residents' participation is essential to accomplish the energy transition revolution and support ASC in their main objective of becoming the smartest city in the world. Furthermore, an increased awareness in the legion of Smart Grid possibilities will translate into an increase in bottom-up initiatives. The aim of this is to facilitate the transition from current technology-push to more desirable demand-pull market conditions."

4.3.2 City Service Development Kit

City Service Development Kit (CitySDK) is a project being developed by a consortium composed of 23 of partners across Europe. This consortium includes local governments (among which Amsterdam Municipality), private companies, development and expert organizations (including Waag Society), network organizations and universities and research institutes (Amsterdam University of Applied Sciences/Hogeschool van Amsterdam). The overall goal of this project is to help cities to open data in a standardized way, providing software developers tools needed to develop applications that can be shared across cities. The strong interest on open data derives from the fact that through the development and diffusion of new data analytics there is a more widespread capacity of accessing and analysing data, outside the sphere of governments or corporations. This project allows the creation of standardized protocols for open data: it can be interpreted as an open infrastructure on which developers can create specific applications that address different urban issues.

Actors

This project requires collaboration with different actors across cities in Europe; in Amsterdam the two leading actors are Waag Society – an independent organization which aim is to make technology more accessible to people – and the local government. In particular the main focus is on issues about mobility, therefore as was said by the research

director of Waag Society, it is key to involve the specific department of the municipal government responsible for mobility. Local governments have a double role: on one side they can provide the raw information and on the other they must be able to listen to what people do with the developed data.

The aim of this project is to bring together and benefit for both local governments' officials and development communities. As it is said in the Digital Social Innovation interim report, CitySDK:

"enables them to work together, solving the cities problems by employing the vast amount of development talent that is typically not affiliated with large IT companies. Furthermore, it enhances capacity building and strengthens the Smart Citizen – citizens that know and use technology and use it to further their own goals, and that of society" (Bria 2014, p.79).

As stated by the research director of Waag Society – representing the developers community – the four main reasons for cities to open data are: transparency as a political goal; efficiency as different departments can harmonize their information; a large stress on innovation driven by the willingness to generate economic value for small and large companies and thus revenues for local governments; and lastly they can help improve what he calls the *leefklimaat*[12]. There is a clear interest on open data platforms as a way to stimulate local economies (Bria 2014), and that is also evident when looking at the funding structure.

The overall CitySDK project has a budget of € 3.4 million, of which 50% comes from the European Commission within the ICT Policy Support Programme of the Competitiveness and Innovation Framework Programme, while the rest comes from local and national funding. In the Amsterdam case the local funding is provided by the Municipality, the Creative Industries Fund NL and Creative Commons Netherlands. Waag Society provides the technical knowledge and a good link with both local and international communities of developers.

Table 17 - Actors in City SDK

Actors	Project Involvement Motivations	Resources
Amsterdam Municipality	Transparency Efficiency – harmonization of data Economic growth through innovation	Raw Data Audience to harmonized data
Waag Society	Interest in open data Collaboration with European partners Bridging gap technology-people	Technical Knowledge Link with developer community (local/international)

Source: author compilation

Games

Similarly to the case presented in the previous section, decision and interactions in this project occur on two arenas:

First, partners across Europe that form part of the consortium are required to exchange information and codes. This is of striking importance, as one of the goals of the project is to create interoperability. As seen this activities are done mainly through digital communication. The consortium involves 23 actors from 9 countries and as recognized by Waag Society

[12] Dutch for "living climate" or "social environment"

research director, pairs of cities needed to collaborate in order to create e harmonized interfaces.

Second, project institutions such as Waag, local programmers and city government departments benefit from more direct typologies of arenas. As seen, public events, workshops and competitions are important opportunities for different parties to increase mutual knowledge and share goals. Those activities allowed Waag to keep the contact with the so-called "hackers" or citizen-experts. Working together with such actors is key for Waag Society: *"I mean if we loose that then there is no point for us. Those principles of openness, fair play, sharing and human scale, we are not in a position or willing to let them go"*.

Networks

In the development of this project – which ran from January 2012 to June 2014 – a variety of forms of engagement with developers' communities have been developed, including: workshops (Mobility Workshop in August 2012), apps challenges, a Hackathon (event in which programmers collaborate on software projects) in June 2013. This kind of project also involved a transnational form of collaboration with different project partners across Europe. While relationships with different partners in a European project involve a certain degree of formal requirements, through the formation of a consortium, the fact that it required partners to work closely for extensive periods of time helped mutual knowledge, possibly leading to future close collaborations (Bria 2014). This aspect is currently being developed through the setting up a self-standing organization, as the director of Waag Society stated. This entity will be responsible for the legacy of the project and will aim to reach out to other cities. Also new spin-off companies will be responsible for implementing the projects.

The realization of this project requires interactions between two organizations belonging to different spheres, in this case public bodies and an independent research institution. One of the goals of CitySDK, beyond the realization of the project is to "create a profound change in the way that cities and developer communities are able to work together to create new services and products using open data." (Bria 2014, p.79).

Information interchange across international partners is done through digital technologies: e-mails, video conferences and Google docs are tools used for communication, while Github allows code and specifications sharing (Bria 2014).

In order to be developed, this project requires high levels of information exchange with the public administration. As recalled by Waag Society research director, local governments "*are in fact very interested themselves in improving their efficiency and they see that opening data either within the boundaries of the city hall or outside is helping them"*.

Citizen Participation

In this project two typologies of citizen participation are present. First, CitySDK aims to enhancing local capabilities and linking existing local knowledge to societal needs. The engagement with local developers' community results in a co-production of a service, thus configuring a "partnership" typology of citizen participation. Secondly, beyond the goal of allowing the experts in the communities to develop applications, these applications can be used by residents as services to improve their quality of life. The use of such application allows a better mono-directional flow of information from public authorities or private service providers to citizens. This element characterizes a "information" typology of citizen participation.

Specific applications developed in Amsterdam include (Waag Society n.d.):

- Developers website CitySDK API: citysdk.waag.org
- Data visualization based on available (live) mobility and other data European cities: OpenData Globe
- Map of all buildings in The Netherlands shaded according to year of construction: Buildings
- Web app Public Transport departure times in your immediate vicinity (real-time where available): Now
- Interactive agricultural map showing crops in The Netherlands
- A demonstration of queries and results in the CitySDK mobility API
- CityDashboard Amsterdam.

The latter project, City Dashboard, is an experimental visualization of different types of data, providing a constant snapshot of the city in terms of transport, air quality, census data, cultural activities, and social media trends. This application, in principle works acts as an information transmission platform from different sources - municipal statistics, environmental agencies, public transport companies, social media and citizen themselves – to the residents. However it is not only a one-way transmission of information: although still in an experimental way citizen are involved in the production of environmental data (through the Smart Citizen Kit that will be presented in the following section) and through the trends of the most common topics on social media (Twitter).

As recognized by Waag Society, CitySDK provides an alternative to the large ICT companies-driven approach to development and implementation of innovation in cities.

"This approach has limitations. I think there are two opposing forces, one is the turnkey approach: "Hey we have a problem and money and you infrastructure provider make it" and the other is that there is awareness mostly individuals that this way is costing lots of money and in the end not serving the interests of the people that well."

CitySDK combines two typologies of citizen participation. On one side through the apps developed it contributes to the provision of mono-directional information. Citizens can receive better quality information from different actors (public transport, cultural events, social media trends, environmental agencies, statistical offices). On the other side the main goal of CitySDK is to engage with local citizens to enable them develop those app. Due to the technical complexity of such activities, this partnership is limited to the community of citizen-experts. However if we consider this second aspect, there is a partnership-type of citizen participation. This because citizens co-produce a service, making use of the standardized data provided by CitySDK.

4.3.3 Smart Citizen Kit

Smart Citizen Kit is a project aiming at the creation of bottom up environmental measures through the distribution of sensors kit to citizens. As recalled by the research director of Waag Society, the idea to work with distributed sensors and bottom-up measurements had been in the agenda of the organization for at least five years, they couldn't access the right technology and funding until the fall of 2013. In the summer of 2013 it occurred that both the director of Waag Society and a program manager of ASC were in Barcelona and saw the Smart Citizen Kit that had been developed by Fab Lab Barcelona and the Association of Visual Artists from Catalonia. ASC was interested in experimenting new technology and connections with official bodies in the field of environmental measures. Therefore they took some months to negotiate their respective roles that ultimately were to give support and mobilize citizens from the side of Waag and to interface with local government and co-fund.

In September 2013, the creator of the kit from Fab Lab Barcelona was invited to a meeting with city officials in order to present the potentiality of the Smart Citizen Kit. It was followed by a call for interested participants was launched through local press, in the end more than 150 citizens responded, among which 100 participants were selected, according to their motivation – they were required to provide a motivation letter – and geographical distribution across the city. In February 2014 an initial meeting with more technically expert participants was held, followed to some adjustments done in house by Waag Society on the kits purchased from Fab Lab Barcelona. Interestingly the kit itself is based on an "Open Hardware" electronic system called Arduino. The kit was then fitted with sensors measuring toxic combustion gases (CO and NO2), temperature and relative humidity, light intensity and noise. The kit connects to local Wi-Fi networks, allowing constant transmission of data and is protected from external elements by a simple enclosure. The kit makes use of affordable hardware and sensors, worth approximately € 150 for each kit. Moreover a website allows a constant live monitoring of all the measurements being generated by participants.

Actors

Officially this project has been realized through collaboration between Waag Society and AEB, however during the course of the project official bodies were involved, providing advice and information on an informal basis. The air quality bureau of GGD (Local Public Health Service) provided technical advice and invited participants to measure their measuring systems. RIVM, (National Institute for Public Health and the Environment) involved also thanks to a participant networking activity, provided advice on measurement strategies and on ways to interpret results. Representatives from TNO (Netherlands Organisation for Applied Scientific Research), while professionally motivated participated in personal capacity. In particular a researcher provided was interested in investigating Smart Citizen Kit as an example of bottom up smart city project. As recognized by Waag Society, besides providing a part of funding (the other co-funder is the Creative Industries Stimulation Fund) AEB had a key role in facilitating connection with official bodies.

The program was officially launched for all participants in March 2014. However due to a variety of issues out of the 100 selected participants only 70 were able to work with the kit over the period March-June 2014. In this program citizens were the focal point, as it had a double goal, one of technical and another of social experimentation. The two main questions that this pilot project aimed to answer were:

"Can you use the Smart Citizen Kit affordable electronics and sensors, to collect data in your immediate environment?"

"Is consciousness linking to behavioural changes that have positive impact on the environment? Does that change your behaviour or feelings towards your immediate environment? Take more responsibility? Shifts the relationship between you as a citizen and official bodies RIVM, GGD and the KNMI? The relationship is optimized or shapes citizens be more active just an obstacle?"(Waag Society 2014)

According to a TNO researcher and Waag Society, citizens participating in the project were mainly motivated by environmental, technological or social reasons.

Table 18 - Actors in Smart Citizen Kit project

Actors	Project Involvement Motivations	Resources
Amsterdam Economic Board	Experiment outcomes of citizens' engagement in environmental measures. Experiment engagement with official organizations	Financial Resources Connection to official authorities. Interface to the City
Waag Society	Social use of technology. Education to technology. Experimentation with distributed sensors.	Technical Knowledge Program management Citizen engagement
Smart Citizens (Participants)	Interest in: Technology, Environment, Community.	Local environment knowledge; Motivation
RIVM, GGD (public agencies)	Potential for collaboration with different actors. Increase in reach. Defence of own role.	Environmental measurements know-how.

Source: author compilation

Games

Key decisions regarding the management of the pilot project were restricted to the interaction between AEB and Waag Society. Within the pilot none of the remaining actors were concretely engaged in the project management. Those two actors also provided contact with the manufacturer of the kit. However Fab Lab Barcelona appeared not to be a decision maker in this project but rather acted exclusively as a supplier.

The interactions among project management – mainly Waag Society – and citizens were established both in-person and through digital technologies. The realization of workshops and informative meetings (at least six reported sessions over the period January to July 2014 (Waag Society 2014)) represented occasions to acquire mutual knowledge and engage official bodies. Representatives from TNO, RIVM and GGD participated in those meetings that allowed them to establish contacts with citizens and strengthen relationships with the program management.

Such informal sessions are thought to have contributed to the realization of a successful outcome of the project, despite technical issues.

Networks

Overall the setting of this program was relatively informal and helped by personal knowledge among different parties. In practice a project manager from AEB and one from Waag act as a steering committee, while a small team from Waag is responsible of the day-to-day operations, including a helpdesk for the users of the kit. As stated by the representative from Waag Society, this project involved the application of a contract among the two partners, stating each one's role, tasks and what to do in case of disagreements, in this case it has been said to be a "lightweight contract", also because of the involvement of a limited number of partners.

Official bodies were not involved on the basis of any obligation but as it has been said from a representative of Waag Society it has been "very wise from them to engage with citizens in this way".

This project has been subject of a good monitoring and evaluation of outcomes, both because of its experimental nature and thanks to the informal involvement of a research institute such as TNO. According to Waag Society research director, when they realized that the quality of the sensors data in all fields but sound measurements was very poor and unsuitable for comparisons, the project turned to be on understanding

"how the air quality is measured, what this means, how the structures in the local government were, and to build a community of people that are interested in this field. These results stay. In the end event we had 70 people committed in going on."

Moreover while the data itself proved not to be accurate enough to assess whether such program could lead to behavioural changes, it allowed the establishment of dialogue among different organizations, potentially leading to further collaborations on successive projects. As a result Waag is pursuing three ways forwards to continue working in this project: one is the formation of a consortium partnership within ASC with other knowledge institutions and the local health authority, another is working within EU funded program and finally to engage with large companies.

Citizen Participation

The involvement of citizens in the active production of a service previously monopolized by public agencies is an indicator for the "partnership" typology of citizen participation. Also the objective of this project is to create a bi-directional flow of information from public agencies to citizens and from citizens to public agencies. Therefore, also the "consultation" typology is present, although to a lesser extent due to the technical difficulties encountered. Technology still represents a significant barrier to the successful implementation of such programs, as recognized by the representative of Waag Society: out of the three main citizens' motivations to join such project – technology, environment and community – the first represents a necessary requirement to be able to produce relevant data. Waag Societies acknowledges that a significant step forward would be to increase the engagement of citizens in the design of the kits:

"Our organization is advocating technological empowerment and civic technology, using technology for civic goals […] and we hope that people engage in that, but in practice there is just a small number of people in the population that are actually willing and able to go deep enough for meaningful things. I think there is a huge role for education and institutions like ours and governments to help bridge that gap, because is like illiteracy. When our society is getting more technologically infused and you are not into technology at all is like if you cannot read or write."

In some cases, especially in those heavily involving technology, is difficult to have initiatives originated from citizens. She recognized that such initiatives generate a good level of interest from the citizen side and that official bodies realized that have to learn how to deal with them. In particular, GGD and RIVM had different reactions, the latter being more open about citizen participation, while the first presented more concerns regarding the lack of accuracy potentially leading to wrong conclusions.
According to the research, the participants had two main end-users of the information generated through the kits: one just to have a better individual perception of their surroundings, the other to try to challenge public authorities in order to generate better policies.

Participants were invited to fill in an ex-ante and ex-post evaluation survey conducted by Waag Society. It turned out that the strongest motivation for participants to engage was the possibility to measure environmental qualities of their living environment; technology and community oriented motivation proved to be less strong. It was clear since the beginning that this project would be of an experimental kind with the possibility of limited reliability of results. However most of respondents were interested in establish a dialogue with official bodies based on the results obtained.

Because of technical difficulties, of the two main goals of the project, the generation of a participatory process of environmental measurement and citizens empowerment in the creation of better urban environmental measures, only the first has been partly accomplish. However this is in line with the overall aim of an organization such as Waag Society, in the words of its research director "*I advocate that people take the time to get a little bit familiar with the technical aspects, so that they are able to better interpret what is coming out of this."*

In the end the participants in the program, the "Smart Citizens" themselves can act as a bridge between technical and non-technical people, and in the long run seek to solve environmental problems trough innovative solutions.

One of the most interesting outcomes of Smart Citizen Kit is the creation of informal partnerships among official bodies, intermediaries and citizens. Citizens participating in the project aimed to contribute to better environmental measures. Even if official environmental agencies were not supposed to take part in the SCK project, they opened for a dialogue with citizens by attending informative workshops. In a sense this is in line with

This project presents features of a partnership typology of citizen participation. Citizens are co-producers of a service, in this case collection and sharing of environmental measurements, which is usually monopolized by public bodies. Also, as SCK allows a bi-directional flow of information, it has some characteristics of a consultation type of citizen participation. However this element was partially hindered by technical difficulties arisen during the deployment. Smart Citizen Kits where not able to provide data of acceptable quality, therefore limiting the possibility of exchange and comparison of information with official environmental agencies.

4.3.4 Ring-Ring and Moby Park

Ring-Ring is a project realized in the neighbourhood of IJburg in Amsterdam with the goal of stimulating cycling as a mean of transport and increase the awareness of its positive effects among the users. IJburg is a recent development of the city, located in an island reclaimed at the end of 1990s, in Amsterdam East (*Amsterdam Oost*). While not properly a suburb, the fact of having just two access routes and being situated outside Amsterdam ring road has resulted in giving its residents the perception of being located at a distance from the rest of the city. The project has started in June 2013, and the pilot phase officially ended one year later. It consists of the realization of a mobile phone application that automatically – i.e. without the need for the user to activate it manually – measures the kilometres being cycled by the users. The amount of kilometres, called *FietsKilometers (Fkm)* or bicycle-miles similarly to airlines' fidelity schemes, is then added to the users' personal account for a number of applications. First of all, the Fkms can be exchanged for discounts in local retailers; the concept being that the commercial activities could benefit from being localized through the App. Secondly, the local community would benefit as local district administration has decided to allocate funding to some projects when the total cycling kilometres generated in and out the neighbourhood would reach a certain target. Third from possible deals with health insurances (not yet implemented) offering discounts to client showing the adoption of

healthy lifestyles such as cycling. Finally, the environment and people themselves would benefit from reduced congestion and healthier lifestyles.

Actors

The concept of the project was created by a resident of IJburg, one of the focus areas of ASC. It originated from a personal un-satisfaction with the excessive use of motorized transport in the area, resulting in congestion and unhealthy lifestyles. By realizing that commuting to work in downtown Amsterdam by bike was a feasible option that brought along a number of advantages, the initiator of the project resolved to develop a manner to encourage her fellow residents to adopt such lifestyle.

"It was born on the bicycle. We moved to Ijburg from the city centre in 2009 and I was looking for a way to get to my work that was in the centre, […] at a certain point I did cycle and then I felt happier in my life […] and that was when the idea actually got born in my head."

"I am a person that likes to trial and error, so I want to do things and then through feedback every time to change the idea. […] So I think that in 2011 I wrote my sort of vision document."

The concept originated by an individual with a necessity but soon realized that through collaboration with other people and organizations it would become possible to realize it. Syntens, an organization now incorporated with Amsterdam Chamber of Commerce, provided advice in terms of structuring the project and stating clearer objectives. For example it suggested to work with smartphones instead than with specific GPS devices, in order to have an easier and wider reach. A local newspaper is involved in the communication part, by publishing monthly articles on stories of cyclists in the area. That was made possible also through the involvement of the local district administration (*Stadsteel Oost*); they provide some funding for the management of the project, as well as for the realization of some initiatives in exchange when local cyclists reach mileage targets. Other organizations had a consulting role, including David Kloet, a landscape architect and *De Gezonde Stad* (the healthy city), an organization promoting environmentally friendly lifestyles. Interestingly, a local software developer, that possessed the technological knowledge in such mobile programming having worked on it for a EU program, decided to liberally collaborate to the project, developing the application based on the Ring-Ring concept. However there are divergent long-term goals with this partner: while the Ring-Ring founder has a purely social and environmental goal, the APP developer aims at creating a business model out of it. While the Ring-Ring founder aims at the creation of local communities of cyclists, the developer from Locatienet would like to scale up, selling the product across the country. Interestingly, ASC and AEB had a very limited role in this project, despite the implementation of a number of projects in the IJburg district, they did not support actively the project, but only including it in the list of smart projects. But as stated by Ring-Ring founder the most important actor in this project are those using it, people that have the "bicycle heart". Moreover, local retailers have been involved providing discounts in exchange for Fkm; at this point, however, it has not been possible to establish partnerships with health insurances and larger companies.

Table 19 - Actors in Ring-Ring project

Actors	Project Involvement Motivations	Resources
Ring-Ring Creator	Environmental improvement Community building	Concept; Personal work;
Locatienet	Application of knowledge Establishment of business	Technical Knowledge
Stadsteel Oost	Community building	Financial resources; Legitimacy.
David Kloet, Syntens (consultants)	Personal acquaintance with creator	Know-how on urban projects
ASC, Fietsersbond	Sharing of goals	Networking

Source: author compilation

Games

The arena where decisions and interactions regarding this project have occurred presents specific location characteristics: most of the involved actors are directly connected to the IJburg area. The stronger relationships were those based on sharing the location of residence, and thus the same issue regarding vehicles congestion. Relationships that do not present this feature, such as those with institutional actors like ASC and Fietsersbond, less frequent and did not have an impact on the project comparable to others.

Networks

This project has been developed without the setting of any legal frameworks regulating relationships among actors. Even if it is recognized by the initiator of Ring-Ring that the decision of not applying legal frameworks might not have been "wise", it depended by the fact that such frameworks would not have been suitable in a trial-and-error type project. The only action that has been done in this sense is the registration of the trademark in Benelux. However this has resulted in some frictions with the developer of the technological side, as the concept is harder to protect than the actual technology used. Therefore both actors think to have the lead in the project, but the concept side and the technology one both need each other. Also, at the current moment, Ring-Ring is not a registered organization.

The relationships with public authorities have been based on less stringent requirements, the local municipality agreed to fund the project despite not being a registered organization. The only element of public authority has been that through the Fietsersbond (Dutch cyclists union), it was possible to place the concept of the pilot program in Green Deal Fiets, an official policy document on cycling commuting, from the Dutch Ministry of Infrastructure. Most of relationships with different actors were based on personal acquaintance, especially at neighbourhood level. This represents a significant element, because the orientation towards community building at neighbourhood level is part of the goals of the project.

The absence of formal rules regulating the relationships among partners is interpreted as the presence of high level of trust; this is particularly interesting as it applied also to the relationship with public bodies.

The initiator was able to get acquainted autonomously with all the parties that are contributing to the realization of the project; moreover the interaction involved a variety of actors from different sectors, private, public and not for profit. When moving towards a larger

realization, it would be beneficial to partner to larger corporations and with higher tier of governments, like overall municipal bodies. Companies can support this project as part of their corporate social responsibility strategies, while municipal governments can obtain data on cyclists flows, helping better planning and higher numbers of bike users contribute to the attainment of emission reduction goals.

Citizen Participation

Ring-Ring appears to have most of the characteristics of socially innovative project. First of all it is an initiative originating from a citizen, in face of a common issue such as the one of traffic congestion. Despite not being the result of a collective action, but of an isolated individual, it still presents a strong community focus. Successful engagement with local actors such as retailers and district administration are representative of a community-oriented vision. Moreover one of the goals of the project is to create a community feeling among users of the application. The possibility to visualize fellow residents performance and to create challenges is, according to the founder, an attractive element for users.

This project has currently ended its pilot phase, although the application is still active, but is working towards a further development. Interestingly, despite being based in one of the focus areas of ASC, this project appears to have received limited support and was not related to the use of the infrastructure deployed in the district. The fact that local administration finances community initiatives in exchange for bicycle miles generated in the area is another element that helps the development of a stronger local bicycle oriented-community.

In particular, it appears that the engagement with local partners at neighbourhood level where higher levels of trust can be generated facilitated the emergence of informal relationships allowing experimentation through trial and error.

Although other similar tracking systems for cyclists exist, they don't present the same technical and community-oriented features of Ring-Ring, which can be considered as a project that responds to a need otherwise unsatisfied by either public or private initiatives.

MobyPark project

Another relevant example of a participatory initiative within ASC is represented by MobyPark. This project, originally developed in Paris, has been active in Amsterdam since October 2013. It consist in a platform to rent private parking spaces across the city, making possible reservations through a mobile application, thus reducing idle times for drivers looking for available spaces. Moreover any owner of a parking space, individual citizens or companies, can register and make its space available for rent. Thus it operates on the basis of "sharing economy" principles. Although profit oriented, the organization charges a commission on the fee paid by users to rent the space, it represents an example of a smart city initiative originating by a small organization partnering with other actors. Interestingly, also this initiative has received limited support from AEB and ASC. However is worth saying that although an Amsterdam-based start-up accelerator supported them, a motivation behind the expansion was also the availability of good technological infrastructure. As the representative from the company said, Amsterdam represented a good opportunity, as the high level of technology and the wide diffusion of connected smartphones made easier the expansion there. As said they have received support fro ASC in terms of networking, but wished a stronger one as the platform could help them connect with other partners and they feel that their service can contribute to the CO2 emissions reduction targets of the city. As in Amsterdam they tend to work with partners owing large amounts of parking spaces, such as hotels and private companies, networking with other actors would prove highly beneficial. Partners have the benefit of charging parking fees as well as obtaining some promotion.

According to Moby Park head of business development, some of the elements provided by the accelerator, StartupBootcamp, such as knowledge of the local market and initial financing could have been also provided by AEB.

Being commercially oriented and originating by a company rather than from a community or an individual citizen, is more difficult to categorize MobyPark with the typologies of citizen participation used in this work. However it can be seen as a deviant form of social innovation, as a small organization originates it, opposed to government or corporation driven initiatives. Despite that, some features of MobyPark are hard to conciliate with the concept of social innovation, namely the operation outside market

4.4 The contribution of governance to citizen participation

In the previous section governance characteristics of both the program and projects have been described. As it was possible to observe from the collection of projects presented in 4.3, the overall governance settings of the program and the specific one of each project lead to different typologies of citizen participation. Even within a sample of citizen-oriented projects, is possible to trace significant differences in terms of citizen participation. As an overall trend, it appears that at the current state the while citizen participation occurs in different forms at project level, the ASC program is not actively pursuing it[13]. The following table provides a condensed summary of the findings, by showing the most relevant governance characteristics and the associated typologies of citizen participation.

Table 20 - The contribution of governance to citizen participation.

Program Governance	Project Governance	Citizen Participation
Actors: difference between founding partners and project partners. Partners from different sectors. Games: ASC as an arena for decisions, led by founding partners. Networks: organization co-working, frequent contacts leads to knowledge and trust; different types of collaborations.	**Serious Gaming**: legal framework, outcomes evaluation schemes. Frequent interactions in subset of actors helping information exchange.	Information
	CitySDK: legal framework, virtual contacts. Activities to engage local developers.	Information (Partnership)
	SCK: lightweight legal framework. Interaction with external organization. Continuous interaction with citizens	Partnership (Consultation)
	Ring-Ring: lack of legal frameworks, neighbourhood level interactions.	Social Innovation

Source: author compilation

[13] It emerged that ASC is currently mapping bottom-up initiatives in the city that correspond to the five themes of the program. This research is being conducted as a better knowledge of the field can allow ASC to establish supportive actions/projects.

Serious Gaming and similarly CitySDK present governance models based on interaction among large sets of actors. Such interactions are regulated by clear rules set up by legal frameworks. Some specific activities involve closer and most frequent interactions among project members. Both projects have clear frameworks for evaluating the outcomes, through ex-ante defined criteria. These projects have both a local and an international component. Clearly, local operations with more frequent contacts result in higher levels of knowledge and trust. This facilitates information transmission. However both project have limited levels of interactions with citizens. Both project operate at a distance from citizens and limit their engagement to the provision of information. Therefore they both present the lowest typology of citizen participation. However, CitySDK has another component that can be designated as partnership, although this element of co-production of the service is limited to the engagement with a restricted community of citizen experts. CitySDK level citizen participation is therefore more intense.

Smart Citizen Kit, is a project operating at city level, with limited interaction with external supplier. It is characterized by the presence of more simple legal agreement, also as it is more limited both in terms of timeframe and financial involvement of partners. Moreover it has experimental features, allowing an ex-post evaluation and the possibility to involve new partners. Citizens had a more active role, also due to the characteristics of one of the organizations involved: Waag Society that acted as an intermediary between local public agencies and citizens. The smaller size of the project was thus allowing more frequent interactions between partners and allowed a shift of objectives, once some challenges were encountered.

Ring-Ring, is a project that was more limited in scope, operating at neighbourhood level, and was developed as a result of mutual acquaintances among partners. That allowed the development without the establishment of legal frameworks and evaluation schemes. The local district administration acted as a partner facilitating the execution of the project. Also, this project lacked ex-ante established goals. Moreover, there was a general openness towards the engagement of new partners, such as business, along the development of the project. Those element are coupled with characteristics of social innovation. Ring-Ring aims to tackle a social issue, traffic congestion, and although it was ideated by an individual, required collaboration in order to be implemented.

For a program of such size, the governance system appears to be flexible and one of the characteristics is the fact that is open towards experimental settings. It does not replicate other projects and solutions already implemented in other cities, but rather aims at being a frontrunner both in terms of technology and typologies of partnerships. Despite it is developed around a core of key program partners, it aims at expanding the number of partners working on individual projects. Moreover, although Liander is the most heavily involved partner, at least four key actors share responsibilities for the management of the program. The testing of new collaboration models pursued by the program allows the involvement of actors outside the restricted group of large technology providers. Moreover, there appear not to be present stringent requirements in order to join ASC as a project partner. Despite the fact that the arena of ASC program appears to remain dominated by the founding partners and few other recurring partners, there is the space for smaller organization join individual projects. For example, this allowed Clicks and Links to establish a staff position dedicated to the Serious Gaming project, directly working in contact with ASC staff. Also, in other cases ASC acts as a networking agent, allowing organizations to interact more easily among each other. This is particularly the case in relationships among actors belonging to different spheres. An example is represented by the CitySDK and SCK projects where Waag Society appears to have benefited of facilitated collaboration with public organizations. Even in cases where the

support of ASC has been more limited, like for Ring-Ring and MobyPark, the simple fact that they joined as project partners can be interpreted as a sign of advantages obtained by linking to ASC.

Therefore there appears to be a link between program and project governance, especially in terms of experimentation. ASC program does not require specific governance settings to its projects; it actually stimulates new partnerships among actors. This can also explain the significant variation in terms of project governance that has been observed.

At project level there appears to be a positive correlation between project size – in terms of number of partners involved and financial resources needed – and the presence of more formal rules and arrangements governing the interactions. This is also explained by the transnational nature of such projects (Serious Gaming and CitySDK) in terms of funding sources and partners. Such aspect makes personal interactions more difficult and thus limits the establishment of high levels of mutual knowledge, information exchange and trust. Localized and smaller-sized projects take more experimental forms, not requiring a high level of formal rules to regulate interactions. External funding, on one side fosters innovation, but on the other side limits active citizen participation as standardized procedures and administrative tasks increase the level of project complexity. The number of partners involved in a project is a main indicator of complexity. The participation of large numbers of partners means that each one is providing some resource that is needed for the complete execution of the project. The difference in partners' size and typology is also a major factor affecting complexity. Heterogeneous partnerships, including small and large companies and public actors require more clear frameworks to share task and benefits among members. Diversity in location, for example in EU funded projects such as Serious Gaming and CitySDK, is also affecting complexity. Formal ways to transmit information among partners are needed. On the other side, location sharing also allows informal opportunities for information exchange.

Such characteristics require forms of governance that include the setting of ex-ante objectives, division of tasks and establishment of deadlines. More limited number of partners is favouring frequent direct contacts. Frequent contacts allow the establishment of trust among actors. High levels of mutual trust are then coupled with less stringent organizational, legal and evaluation settings.

Larger and more structured projects present evident outcome and partner contribution evaluation schemes. Such methods are usually based on specific ex-ante established targets. Smaller projects do not show such systems and are more open towards ex-post satisfaction evaluations, typical of network governance models. This element is clearly visible in SCK project: it was not deemed a failure despite the fact that it could not accomplish good environmental measures. Alternative objectives might be achieved – in this case the creation of community of interested citizens and involvement with official health authorities – if we do not consider solely ex-ante goals.

As seen, citizen participation differed significantly across the examined projects: as a general remark, larger projects (Serious Gaming and CitySDK) tend to limit the citizen participation to information level. Citizen participation is limited to the provision of more and better quality information, through a mono-directional flow originating from governments and corporations. Citizens have limited possibilities to take initiatives, or are limited to experts-citizens as in CitySDK. In those cases citizens are not initiators of the project, on the contrary are subjects to be stimulated. Smaller projects such as Smart Citizen Kit allow a greater level of direct engagement of residents. This project belongs to the partnership-type of citizen

participation, allowing citizens to collaborate with public authorities to the production of a service.

On the other side socially innovative projects are those that are started by individuals or small businesses. These cases, Ring-Ring and to lesser extent MobyPark, represent a bottom-up typology of citizen participation.

The projects with information-typology of citizen participation are characterized by more formal rules, in particular those regarding outcomes evaluation. An active role of citizens, combined with an experimental nature of the program is not allowed by larger and more structured projects do not allow. Citizen role is difficult to frame within projects that possess structured governance models. Moreover a relative distance from market or state service provision schemes characterizes social innovation, making relationships with large corporations difficult, at least in initial phases. The presence of large number of partners reduces the scope of the activity of each actor, making experimentation more difficult. It appears that the presence of organizations such as Waag that create a link between "institutional" actors (corporations, public bodies, academia) play a crucial role in stimulating active participation. On one side, such organizations appear to possess the know-how in dealing with communities; on the other they bridge between the more formal requirements that project management requires and more informal arrangements that enable active citizen participation[14]. The tasks performed by such organizations as facilitators of citizen participation can be understood within the framework of a progressive withdrawal of the public sector from the provision of goods and services. Citizens have the possibility to fill those gaps but often require a support that can be also provided by non-governmental, or even private, organizations.

From the evidence presented in this chapter it is possible to highlight the presence of a trade-off in citizen participation: larger and more complex smart city projects, like Serious Gaming and CitySDK might lead to higher impact in terms of technological innovation, but are characterized by governance models presenting more formalized relationships and evaluation schemes. Moreover they involve to a greater extent large organizations, also at international level. This results in citizen participation limited to information typology, not initiated by individuals. On the other side, more flexible and informal governance models facilitate either partnerships between individuals and public bodies or smaller grassroots projects originating outside market and government schemes. Such governance does not involve structured evaluation models allowing for the emergence of unexpected and innovative results.

[14] Also a TNO researcher investigating smart city projects such as SCK met during the research has reported this argument.

Chapter 5: Conclusions and recommendations

5.1 Purpose of the study

This study aimed to identify the governance factors of a smart city program that contribute to citizen participation. In particular it aimed to understand links existing between the governance model adopted at smart city program level, the governance of different projects and on their citizen participation typology. In this sense Amsterdam Smart City has been selected as a successfully deviant case. ASC is considered to be one of the leading examples smart city programs in Europe and to present a specific orientation towards participatory initiatives.

This research analysed the governance characteristics of the overall program, together with the specific governance models adopted in individual projects characterized by different citizen participation typologies. This two-tier analysis reflects the structure of the case being studied. In particular the focused on specific embedded sub-cases representing different governance-citizen participation settings present among ASC projects. The following projects were subject to an in-depth analysis of their governance model and their contribution to the realization of different citizen participation outcomes: Serious Gaming – City Zen, City Service Development Kit, Smart Citizen Kit, Ring-Ring and MobyPark.

The study was based on the status of the ASC program, based on information available during the period June-August 2014. However, Amsterdam Smart City is a dynamic program and the information presented is subject to changes. This evidence is particularly relevant as it is a representation of the program at a moment where its second phase is nearly concluded and new discussions regarding the future are starting.

In this research the focus was solely on the governance factors as drivers that contribute to citizen participation in smart city projects. The analysis of other relevant factors such as infrastructure and human capital were beyond the scope of this study. It is acknowledged that even in a relatively homogeneous urban setting such as the Amsterdam case, infrastructure and knowledge endowments might present significant differences. Such elements represent explanatory factors for the presence of higher levels of citizen participation in smart city initiatives. Higher levels of education can facilitate citizen participation in technologically complex projects. Good ICT infrastructure is a fundamental element in allowing citizens and companies to develop internet-based projects.

Moreover, this study is focused on a specific case with a limited number of embedded subcases. Generalization of the findings to other settings must be done with caution: even in cities with comparable levels of socio-economic development and factor endowments, the governance characteristics differ substantially. Governance can be influenced by local politics, organizational and legal arrangements. This research allowed a better understanding of less frequently explored aspects of smart cities: their governance and the participation of citizens. It has been possible to highlight that a smart city program's governance influence the selection of partners and projects, and that different governance characteristics at project level are associated with different outcomes in terms of citizen participation. As shown, smart city projects often are the result of transnational collaboration, particularly at European level. In this sense the findings of this research can be generalized, as similar settings are increasingly found across Europe.

This research aims to link governance characteristics, analysed using a network governance framework, to citizen participation and social innovation. Those frameworks are applied to Smart Cities, which represent a specific and relatively new model of urban development.

Both those theories, despite having been widely used in the analysis of urban phenomena, have not found wide application to the smart cities model. Looking at smart cities governance aspects is relatively uncommon, as most studies focus on technological and human capital aspects. Finally, citizen participation phenomena in smart cities have received less attention compared to economic, technological and environmental ones.

5.2 Answering the research questions

Governance

The analysis of the governance of Amsterdam Smart City has lead to the conclusion that different governance models co-exist.

First, there is program level governance, where a more limited number of partners interact. It is characterized by interaction among different categories of partners. Despite a prominent role of private organizations, ASC platform facilitates relationships with public organizations. Moreover, public bodies do not appear to be taking the leadership. Within ASC program, the leadership is shared by the four founding partners, which operate a horizontally organized setting. At this level, relationships among partners are facilitated by frequent interactions and co-working arrangements. The realization of collaboration is one of the objectives of the program, together with more quantifiable contribution to emission reductions goals. ASC does not present ex-ante goals to be achieved. Therefore, Amsterdam Smart City program presents characteristics of network model of governance such as those identified by Klijn and Koppenjan (2007):

- Relationships among partners are characterized by the presence of interdependencies.
- The interaction process allows the exchange of information and resources among actors.
- The realization of collective actions is an indicator for successful governance
- Project management has a mediator role and allows the building of networks, facilitating interactions.

Secondly, different typologies of governance are present at project level. As discussed in chapter 4, there appears to be a trade-off between the size of project and the formality level of relationships among actors. Complex interactions among large numbers of actors appear to be closely linked to the requirement of more formal rules and outcome evaluation schemes. This is particularly a requirement of consortiums settings involving external funding and in general the sharing of sensible assets such as financial resources and specific knowledge. Moreover, despite the presence of more formal settings, a centralized decision making system is present in none of the analysed projects. When involved, governmental actors, act as a partner, and not as a decision maker (Meuleman 2008). Interestingly, program governance allows the co-existence of diverse models of project governance. Despite the differences observed, it appears that program governance has an influence on project governance: it support experimentation in terms of organizational arrangements and fosters partnerships among diverse actors. ASC does not require project to establish a particular form of partnership. Different project governance models co-exist, some with clear legal frameworks and formal rules regulating interactions among partners, and others mostly based on informal rules and trust among partners.

Citizen Participation

ASC allows for different typologies of citizen participation, spanning from provision of information to social innovative ones.

In most of the cases, residents do not take the initiative, but are invited to participate by either private or public actors, that are the initiators of projects. It appears that larger projects are limited to "information" and "consultation" (Bishop and Davis 2002; Arnstein 1969) typologies of citizen participation. These kinds of participation typologies are limited the presence of flows of information between decision-makers and citizens. The difference between the two typologies depends in whether such flows are either mono or bi-directional. Such flows of information, although important, are not directly affecting the relative position of citizens in decision making-processes.

In other cases, the key role of facilitators of citizen initiatives such as that identified in Bakker et al. (2012), has been underlined. The "middle ground" organizations take the function of stimulating active citizen participation. Their role is fundamental, especially in cases where technology is an important feature of projects. The "partnership" typology of citizen participation occurs when residents are actively involved in the co-production of services.

Characteristics of the "social innovation" typology of citizen participation, such as the satisfaction of specific needs thanks to collective action outside either market or state provision (Moulaert 2010; Moulaert and Swyngedouw 2010), have been observed in one of the embedded subcases. This typology of citizen participation represents an "higher" level, as citizens, either as individuals or through the formation of groups, are the initiators of projects.

Governance and Citizen Participation

The aforementioned analysis allows answering the main research question of this study.

One of the governance characteristics that contribute to a larger extent to citizen participation appears to be the adoption of ex-post satisfaction criteria to assess projects outcomes. Large and complex projects are characterized by clear ex-ante set goals. Projects with governance models that include preliminary goal setting leave less room for the flexibility required by stronger citizen participation. On the other side, projects which governance permits re-adjustments of goals are characterized by partnership or socially innovative typologies of citizen participation. Ex-post satisfaction, both regarding the outcome of a process and the interactions developed is the main criteria used by network governance models. Moreover, the focus on the creation of collaborative models allows the experimentation of innovative partnerships, including some with informal settings. Such projects, therefore allow more active models of citizen participation.

The current governance model allows interactions among diverse actors with different goals, including "middle ground" organizations. It has been observed the availability of a space for organizations representing civil society to be actively involved. Middle ground organization play a fundamental in order to engage communities, especially in technologically complex projects.

Partnerships for the realization of projects are required as interdependencies among actors are present. As seen, partnerships often require the presence of organizations that possess either the expertise or a direct link with citizens. In the cases of projects characterized by more structured models of governance, such organizations tend to be present, providing a link to local residents.

5.3 Contribution to theory

This research has been based on network governance theory, which has proved to be a suitable tool for analysing such complex phenomena. Application of network governance frameworks to smart cities governance is particularly adequate when such program involve large number of partners without the presence of a central coordinating actor.

It appears that smart city models such as the one analysed in this work go beyond the prototypical PPP concepts. Current settings rarely are limited to partnerships between public and private organizations. In some cases public actors are not involved, non-governmental organizations and knowledge institutions may play an important role, different relationships involve large international firms with small local businesses and citizens themselves have an increasingly active role. Higher numbers and higher variety of partners increase the complexity level. Therefore, different frameworks are needed to analyse urban development programs that do not involve solely private and public actors.

Some aspects of citizen participation theory have appeared to be out-dated. Urban development is not anymore exclusively government-led. As observed in this case study, different decision-making processes in urban settings also involve private actors, knowledge institutions and civil society organization. The bottom side of the relationship is not only formed by individual citizens and communities but should also consider local economic activities. Also, the role of intermediary organizations further adds a layer to relationships between citizen decision-makers. It is necessary to consider the increased complexity brought by the presence of different typologies of actors in in urban development.

Moreover, technological innovation creates new ways of citizen involvement in urban development. The role of technology as an enabler for citizen participation has not been widely explored yet.

This study provides a contribution to the literature on smart cities by looking beyond the more common focus on the contribution of technology and human capital to economic performance of cities. This study has allowed a better understanding of the dynamics of the governance of smart city programs leading to different typologies of citizen participation.

It has been observed that in contemporary settings, citizen participation goes beyond the dyadic relationship citizens-government. First of all, governments are not the only decision makers, but often are accompanied or substituted by private or knowledge institutions. The application of network governance theory is complementing citizen participation as it allows a better understanding of the "playing ground" where citizens can participate. Secondly, the role of middle-ground organizations adds an important tier to citizen participation, reducing the distance between decision makers and citizens. Moreover, this role of facilitators, particularly in technologically intensive fields, is not only performed by public organizations. Finally, for better understanding of citizen participation is important to acknowledge that decision makers are not a monolithic entity, but are often composed of different elements or actors. Therefore, the actors' characteristics, and where and how their interactions occur – in short the governance – affects citizen participation.

5.4 Suggestions for further research

This research opens possibilities for further research in this topic. Based on the findings of this study, it can be concluded that a new analytical frameworks for citizen participation in complex settings need to be developed and tested on specific case studies.

Moreover, it would be interesting to apply the network governance framework to different cases across Europe. A research including a wider spectrum of cases studies could lead to more generalizable conclusions.

A more extensive research can be conducted also within the selected case study. Given its dynamic character, a rounds model could be applied upon the conclusion of the current phase of ASC program.

Furthermore, the current research has been restricted to a limited selection of embedded sub-cases. A study with a wider scope would provide more robust insights, but requires an extensive use of research resources.

An experimental approach to further research could be leading to the implementation of similar governance models to diverse urban settings, in order to further test the relevance of governance models for participatory smart city developments.

As knowledge and technology play a key role in smart city project, further research could focus more in depth on the information exchange processes. Governance models have a strong impact on information exchange and can impact the possibility for partnership to foster the diffusion of knowledge.

Within a context of a wide variety of examples of smart city programs, it would be an addition to explore the role of decentralization of governance on citizen participation. Different cases might show the different levels at which governance occurs, further studies can address this topic.

5.5 Policy recommendations

The development of policy recommendations does not represent the principal objective of this study, which serves an academic purpose. However some of the insights gained through this research can prove useful for the development and management of participatory smart city programs.

- As also recognized by other studies (Manville et al. 2014), the creation of smart city platforms is an useful tool for both the coordination of different initiatives and the involvement of different actors. Cities willing to invest in smart city program should consider setting up platforms that facilitate interactions among partners and in particular with public bodies.
- Smart city programs should not focus exclusively on short-term results; innovative projects often require trial and error processes and should not put under excessive pressure regarding goals attainment. Higher levels of citizen participation have been identified where project governance does not emphasize the attainment of formal goals as a main evaluation criterion.

The involvement of “middle-ground” organizations into smart city program appears to play a key role both in “scaling down” large corporate-driven projects and to “scale-up” grassroots initiatives. When technology plays a core role, intermediaries provide a link between experts and less technology-aware citizens.

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Annex 1 – Research Time Scheduling.

	September Week 25	October Week 26	November Week 27	December Week 28	January Week 29	February Week 30	March Week 31	April Week 32	May Week 33	June Week 34	July Week 35	August Week 36	September Week 37
IHS Events											Draft Submission	Final Submission	Thesis Defense
Preparatory Work	Interview Design	Interview Adjustment			Fieldwork Review	Codiing Preparation	RMT3	RMT3					
Interviews Meetings	Moby Park		Amsterdam Economic Board; Ring Ring; CAPS Conference	Liander; Clicks and Links		Waag Society			TNO				
Information collection	Secondary Data	Secondary Data	Secondary Data	Secondary Data			Secondary Data						
Information Elaboration		Project Database Creation	Interview Transcription	Interview Transcription			Interview Transcription						
Data Analysis						Qualitative Data Coding	Qualitative Data Coding	Qualitative Data Coding	Quantitative Data Analysis				
Thesis Writing	Ch. 3 Adjustments	Ch. 3 Adjustments					Chapter 4 Outline		Chapter 4 Writing	Chapter 4 Writing			

Annex 2 – Research Instruments – Interview Guide

Name of organization:

Name and surname of interviewee:

Role within the organization:

Date and Place of the interview:

1. How long your organization has been involved in this project?
2. How many people are working on it?
3. Which other organizations are involved?
4. Has the number of organizations involved changed over time? How it evolved?
5. Can you tell me how this project originated?
6. How it developed?
7. What is the main reason behind your involvement in this project?
8. What you think are the main reason behind your partners' involvement in this project?
9. Which resources your organization is providing?
10. In your opinion, which resources your partner organizations are providing?
11. Among the organizations involved, do you think any of them disposes and makes uses of public authority?
12. Have legal frameworks been implemented in your relationship with your partners?
13. Have organizational arrangements been implemented in your relationship with your partners?
14. How other partners have been selected?
15. Does your organization have any arrangement that enables the exchange of information with other partners?
16. How your organization evaluates the project outcome?
17. Are arrangements in place to evaluate contribution of the actors involved in the project?
18. How frequently does your organization interact with other organizations?
19. Would your organization have you been able to develop this project autonomously?
20. Which elements was your organization missing?
21. Who provided you those?
22. Are citizen allowed to influence the decision-making process? If yes how?
23. What is the use of the information provided by citizens?
24. How are decision-makers communicating with citizens?
25. Can citizens be involved in the design/realization of the project?

Annex 3 – ASC partners list

ASC Partner List as of 03/07/2014 - 1/4			
g=government, p=private, k=knolwedge, c=citizen org., m=mixed			
Name	**Code**	**Number of projects**	**Organization Typology**
amsterdam economic board	aem	5	m
Gemeente Amsterdam	gam	8	g
kpn	kpn	7	p
Liander	lia	26	p
ABB	abb	1	p
Accenture	ace	2	p
ACCOR	aco	1	p
AEB	aeb	0	g
ALTERA	alt	1	p
AMC	amc	1	p
AMSTA	ams	1	p
Amsterdam elektrisch	ael	0	g
Amsterdamse Federatie van Woningcorporaties	afw	0	p
Amsterdam ArenA	are	1	p
Athena HC	ahc	1	c
Athlon	ath	0	p
BENEXT	bnx	2	p
BNP Paribas	bnp	1	p
Centrum voor Energie Vraagstukken - UvA	cev	5	k
Centrum Wiskunde en Informatica	cwi	3	k
Ceramic Fuel Cells Limited	cfc	1	p
Chess	che	1	p
Cisco	cis	5	p
Gemeente Almere	gal	2	g
Cofely	cof	1	p
cool endeavour	cen	1	p
David Kloet	dkl	1	p
De Balie	dba	1	c
de groene bocht	dgb	1	p
de Key	dke	1	c
DGBC lab	dgl	1	c
Duncker	dun	1	p
Ecofys	eco	1	p
Eigenhaard	eig	1	p
Elspec	els	0	p
Eneco	ene	1	p
Energiemissie	enm	1	p
Energygo	eng	0	p
esri Nederland	esn	1	p
Fair Climate Fund	fcf	1	p

ASC Partner List as of 03/07/2014 - 2/4

g=government, p=private, k=knolwedge, c=citizen org., m=mixed

Name	Code	Number of projects	Organization Typology
Far West	few	2	p
Favela Fabric	faf	1	p
Fifthplay	fip	0	p
GasTerra	gat	1	p
Gemeente Amsterdam Programmabureau Klimaat en Energie	gam_pke	2	g
Gemeente Amsterdam Dienst Advies en Onderzoek	gam_dao	1	g
Gemeente Amsterdam Dienst Economische zaken	gam_dez	2	g
Gemeente Amsterdam Dienst Infrastructuur Verkeer en Vervoer	gam_div	3	g
Gemeente Amsterdam Dienst Ruimtelijke Ordening	gam_dro	2	g
Gemeente Amsterdam Dienst Zuidas	gam_dz	1	g
Gemeente Amsterdam Programmabureau Luchtkwaliteit	gam_pl	1	g
Gemeente Amsterdam Stadsdeel Centrum	gam_sc	1	g
Gemeente Amsterdam Stadsdeel Nieuw West	gam_snw	5	g
Gemeente Amsterdam Stadsdeel Oost	gam_so	4	g
Gemeente Amsterdam Stadsdeel West	gam_sw	0	g
Gemeente Amsterdam Stadsdeel Zuidoost	gam_sz	1	g
Gemeente Haarlem	gha	2	g
Gemeente Zaandam	gza	2	g
GEO (Green Energy Options)	geo	1	p
Geodan	gdn	1	p
Green Spread	grs	1	p
Greenitnet	gin	1	k
HeatSavr	hes	1	p
Hogeschool InHolland	hih	1	k
Hogeschool van Amsterdam	hva	5	k
IBM	imb	2	p
IJBURGTV	itv	1	p
IKEA	ike	1	p
Imtech	imt	1	p
Jaap Eden Ijsbanen	jei	1	p
JCDecaux	jcd	1	p
Joulz	jou	1	p
KEMA	kem	1	p
Kolibri	kol	1	p
LedLease	lel	1	p
LivingPlanIT	lpi	1	p
Mastervolt	mas	4	p
Mercure	mer	1	p
Mitsubishi Motors	mit	1	p
MobyPark	mob	1	p
Movares	mov	0	p
MSL	msl	1	p

ASC Partner List as of 03/07/2014 - 3/4

g=government, p=private, k=knolwedge, c=citizen org., m=mixed

Name	Code	Number of projects	Organization Typology
MyOrder	myo	1	p
NEMO	nem	1	g
NH Hotels	nhh	1	p
Nyenrode University	nyu	1	k
Ondernemersvereniging Utrechtsestraat	onu	1	c
Onze Amsterdam Noord Energie	one	0	c
Onzo	onz	1	p
P-NUTS	pnu	0	c
Paris Sorbonne	psu	1	k
PHILIPS	phi	2	p
Plugwise	plw	2	p
Port of Amsterdam	pam	1	g
PUREWTR	pwt	0	p
Quby	qub	2	p
Qurrent	qur	0	p
Rabobank	rab	0	p
Readon	reo	1	p
Reggefiber	ref	1	p
Slimmer Reizen in West	srw	1	g
Resourcefully	res	1	p
Royal Haskoning	roh	1	p
SIGRA	sig	1	p
Sportfondsenbad Amsterdam Oost	sao	1	p
Stadgenoot	stg	1	p
Startup Bootcamp	stb	1	p
Stichting Doen	std	1	c
Duurzam Vereningen	duv	1	c
Tauw	tau	1	p
Tempus	tem	1	p
the new motion	tnm	1	p
TNO	tno	2	k
TNT	tnt	1	p
TPEX	tpx	1	p
Traffic Link	tlk	3	p
Trinité	tri	0	p
Universiteit van Amsterdam	uva	6	k
Utiliq	uti	1	p
van Gansewinkel	vgw	1	p
Van Ieperengroep (Dura)	vig	0	p
Vattenfall	vat	3	p
Verkeeradvies	ver	0	p
Vodafone	vod	1	p

ASC Partner List as of 03/07/2014 - 4/4

g=government, p=private, k=knolwedge, c=citizen org., m=mixed

Name	Code	Number of projects	Organization Typology
Vrije Universiteit van Amsterdam	vua	1	k
VVE Tuinwijk Noord	vtn	1	p
WAAG society	was	4	k
Waifer	wai	1	p
Watch-E	wae	0	p
waternet	wan	3	g
wattcher	wtt	1	p
WeGo	weg	1	p
Westpoort Warmte	wpw	1	m
Wij Zijn Koel	wzk	1	p
Woningcorporatie ELAN	wel	1	p
Woningcorporatie PRE Wonen	wpr	1	p
WV-HEDW	wvh	1	c
Ymere	yme	2	p
Ziut	ziu	1	p
AgentschapNL	ags	1	g
Almere Smart Society	asm	1	m
Betronic Solutions	bet	0	p
C30 Projectbureau	c30	1	p
CrowdBEAT	cwb	0	m
De Brug	dbr	1	p
DuurzaamBedrijfsleven.n	dbe	0	p
e-harbours electric	ehe	2	g
Economic Development Board Almere	eda	1	m
Green Business Club	gbc	0	p
Green IT	git	0	m
Green Metropole	gme	1	m
Milieu Centraal	mce	0	p
Nieuw-West Open	now	0	m
Nudge	nud	0	m
W-work	wwo	2	p

Annex 4 – ASC project list

ASC Project List as of 03/07/2014 – 1/2

NP=Non Participatory; L=Low; M=Medium; SI=Social Innovation

Name	Code	Category	Number of Partners	Participation Level
Almere Smart Society	l01	Living	8	NP
Amsterdam Free Wifi	p01	Public Facilities	3	NP
AmsterdamOpent.nl	o01	Open Data	2	M
Apps for Amsterdam	o02	Open Data	2	M
Climate Street	p02	Public Facilities	13	SI
E-harbours - Innovative energy contract	p03	Public Facilities	2	N
E-harbours - ReloadIT	m01	Mobility	2	NP
Energy Atlas	o03	Open Data	5	L
Energy Management Haarlem	l02	Living	3	L
Flexible Street Lighting	p04	Public Facilities	2	NP
Fuel Cell Technology	w01	Working	6	NP
Geuzenveld	l03	Living	9	M
Health-Lab	p05	Public Facilities	8	L
Ijburg - Fiber to the home	l04	Living	4	NP
Ijburg - Smart Work	w02	Working	4	L
Ijburg - Wijk TV	p06	Public Facilities	2	L
Ijburg: YOU decide!	l05	Living	3	M
IRIS	w03	Working	5	L
ITO	w04	Working	2	NP
Moet je Watt	m02	Mobility	3	NP
Monumental Building	w05	Working	5	NP
Municipal Building	w06	Working	3	NP
Nieuw-West - Beautiful, Smart…	l06	Living	1	M
Nieuw-West - Smar Students	l07	Living	1	M
Nieuw-West - City Zen	l08	Living	9	L
Nieuw-West - Energy storage	l09	Living	3	NP
Nieuw-West - Serious Gaming	**l10**	**Living**	**0**	**L**
Nieuw-West - Sloten Windmill	p06	Public Facilities	7	L
Nieuw-West - Smart Grid	p07	Public Facilities	3	NP
Nieuw-West - Vehicle2Grid	m03	Mobility	7	NP
PICO - Tool project for Innovative Communication and Design	o04	Open Data	6	L
PLAYDECIDE Smart City Game at Nemo	p08	Public Facilities	1	L
Ring-Ring	**m04**	**Mobility**	**3**	**SI**
Ship to Grid	m05	Mobility	5	NP
Smart Challenge	l11	Living	3	L
Smart Citizen Kit	**o05**	**Open Data**	**2**	**M**
Smart CitySDK	**o06**	**Open Data**	**4**	**M**
Smart Electric Energy Boat	l12	Living	4	NP
Smart Parking	m06	Mobility	8	SI
Smart School Contest	p09	Public Facilities	3	L
Smart Sports Parks	p10	Public Facilities	6	M
Smart Traffic Management	m07	Mobility	0	NP
Swimming Pools	p11	Public Facilities	4	NP

ASC Project List as of 03/07/2014 – 2/2				
NP=Non Participatory; L=Low; M=Medium; SI=Social Innovation				
Name	**Code**	**Category**	**Number of Partners**	**Participation Level**
The digital road authority - Air quality	m08	Mobility	3	L
The digital road authority - Incident management	m09	Mobility	3	L
The digital road authority - Traffic flow Ijburg	m10	Mobility	3	L
The Green Canals	l13	Living	2	L
The Smart Home	l14	Living	1	NP
TPEX	w07	Working	2	L
Watt for Watt	l15	Living	7	L
WEGO	m11	Mobility	2	SI
West Orange	l16	Living	12	L
Zuid Oost - Laws and Regulations	p12	Public Facilities	4	M
Zuid Oost - Energetic Zuidoost	p13	Public Facilities	13	NP

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Annex 6 – Interviews Transcriptions and meeting reports.

Name of organization: Amsterdam Economic Board

Role within the organization: Nieuw West Project Manager

Date and Place of the interview: Amsterdam Economic Board, 2014-06-30

1. How long your organization has been involved in this project?

The ASC program has funding until the end of this year, it might probably go through, but they are talking now in which way we will go through, so maybe the goals will be more specific once that's a bit clearer. On city level there are Co2 reduction goals, and that's quite a clear goal we want to contribute to, but there are also other goals that you might see in a smart city, to be more inclusive, to have tourists visit our city in a way they work nicely together with the people living here, that's especially in city center is a big issue. But also traffic jams and things like that. I don't think goals are really defined, but if we wouldn't contribute to these kind of goals, we would be probably doing something wrong.

2. How many people are working on it?

10-12

3. How do you get in contact with new actors?

Especially on local level, what we do is to try to connect with all these local groups and organizations that are in our districts or in our neighbourhoods, so for instance at one place there is an artist that does all these things at a local scale, involves the local people with it. So we are not going to connect with all these local people individually, as we via via him we can address all these groups and connect them. Also we can hear what they are working on, so it might be that they are doing a nice festival, that are talking about big things in life, like unemployment or health or whatever, and we see whether we can connect our network to help them get their projects off the ground.

4. What you think are the main reason behind your partners' involvement in this project?

Well Liander is a nice example, because they are quite clear about it. They say "our role in the old days was to be the grid provider, we had the monopoly, people could only connect to our grids and we really didn't need to bother with them". They say " that's changing, because there are more people that locally producing their energy and that influences us, so we need to understand how they are doing it, why they are doing it, when they are doing it and things like that. Our role is more like an enabler." So they are really trying to enable people to make their own smart energy choices. It could be that they start their own local energy corporation, but also it could be something completely different. So one of the projects they are involved with in the Nieuw-West area is the social innovation workshops where we basically sit together with local people, trying to get ideas off the ground. One of the things they are talking about is safety and the atmosphere in the neighbourhood, how lights might influence it. So they are part of that aswell. They are really into it because they want to understand how this works. It's a new world for many of us and for them also, and they (Liander ndr) are finding their new role. If they understand it better, they can plan their investments better.

5. Regarding resources, is there a clear division between what each partner is providing? Is there a division of roles?

We actually believe that only by working together and stepping out of your own role you can reach something. If you look at Nature's magazine from time ago there was one article and one author, now on any article there are many authors beneath it. If you really want to innovate, you need to work together, probably with people with different perspectives. You cannot say that knowledge institutions are there just to provide knowledge or to find knowledge; they have a bigger role than that. And the same goes for companies and governments. And the same goes for citizens as well, because their role is changing as well. (5. 23)

6. Among the organizations involved, do you think any of them disposes and makes uses of public authority?

Well, if you talk, for instance, to people in the climate and energy program of the city they say "we have two things, the carrot and the stick. We need both". One of their successful things is actually the stick, when they force companies to invest in measures that they can get back within 5 years. So, for instance the LED light bulbs. And this really has a big influence on the Co2 emissions of the city. But you need the carrot as well, you need to share your ideas with people, be open to what is happening in the city as well. So it's really both ways.

7. Have legal frameworks been implemented in your relationship with your partners?

Sometimes there are, for instance we have this vehicle to grid project, which is really a consortium, so there is a consortium agreement. They applied for grants to TKI, a dutch grant, so there is grant agreement, so is really quite well defined how they work together.

In other projects it might be much less clear, sometimes they make a letter of understanding, sometimes they don't even do that. It really depends on the subject but also on what it determines for the partners involved. So for instance in this Vehicle to Grid, it has to do with intellectual property and stuff like that, so you want to have this well arranged and it's asking for quite a lot of investment by the partners to really do something, to really find out how it might work. Of course if there is more money involved, people would like to organize it a bit stricter. Those subsidies, whether it's a EU subsidy or a local national subsidy, it really helps to bring the consortium together, and to set a project plan etc.

8. Have organizational arrangements been implemented in your relationship with your partners?

One of the things that is happening in Amsterdam now is that the Amsterdam Institute of Metropolitan Solutions (AMS) is being launched, so it's a small university aiming at finding solutions for urban problems. So this is a new player in the field and will probably change the playing field a bit. [TU Delft, University of Waageningen and MIT, working together with other industry partners: TNO].

9. Are arrangements in place to evaluate contribution of the actors involved in the project?

When there is a consortium that is probably easier because they have the rules that are set in the consortium agreement, so if somebody doesn't apply, you can shut them out, at least if you find somebody that can do the same within your project. And I think that that proves really in the "eating of the pudding" so if the project has been successful people might want to work together again in a new project. But if somebody is basically not contributing or whenever, the wish to work together in a new project is probably less as well. I think that is the short cycle of projects that helps to find collaborations that really work.

Notes:

10-12 people are currently working for ASC. Founding partners are sharing resources, mainly by putting together people.

One of the goals is to have a quadruple helix model, involving citizens with government, companies and universities. Since technology is available, but is "on the shelf" ASC aims to engage citizens in the use and create a urban living lab. One of the examples is the experimentation of energy display systems done by Eneco.

The different test areas are:

South-East (Zuid-Oost) , where large companies such as Ikea, Amsterdam Arena are involved.

Ijburg, where projects related with the use of fast internet are being developed, especially thanks to the availability of a fiber network.

New West (Nieuw-West), where the Smart grid is being tested with application related to the use of electricity. This neighbourhood is not a newly built area, but is a settlement that has existed for decades. The aim is to change something that is already existing and then try to replicate and scale the solutions implemented.

The main issue is to balance local activities, linked to the characteristics of an area and the idea to make them replicable and scalable.

Example of budget monitoring, that started in Zuid-Oost, allowing citizens to understand government budgeting. The aim is to try to solve the mismatch between the needs of the citizens and where the resources are allocated (budgetmonitoring.nl); they train citizen to be able to talk with the government.

ASC works as an enabler, bringing different partners together.

Name of organization: Alliander

Role within the organization: Project Manager

Date and Place of the interview: 10-07-2014; De Groene Bocht, Keizersgracht 452, Amsterdam

ORGANIZATION

1. Can you tell me how the involvement of Liander in ASC originated?

It started five or six years back, it started with the idea of how could collaboration actually help innovation, to put in that way. And so it was more like a sort of test case. that's at least what I think, I am here from March, but I know about the history and I read the documents, the initial starting documents of ASC, and first was only a collaboration between Liander and Amsterdam Innovation Motor [AIM], and AIM is now part of, it is actually fully part of AEB, but together they actually decided to see how can we can work collectively on innovation, on different kinds of projects, to stimulate innovation.

2. What was the original funding of the initiative? How it changed?

It was the same way as it is now, it was funded by the program partners.

So each new program partner added more financial resources? Yes, and they still have. They have a yearly fee that they pay in kind and financially. So, for example me and I have a colleague from the municipality of Amsterdam, a colleague from KpN. And they are fully listed on KpN paylist or Alliander paylist, so that's the in kind. Actually I am working here full time for ASC.

3. What are ASC organizational arrangements? Are there legal arrangements in practice?

No, actually it was set up as a project structure, so it is a big project within the AEB, there is an agreement, so there are some documents, there is a letter of intent and others. I don't think it's a really legal document, is more or less..., and I think it wouldn't suit as well, because it doesn't fit the idea of Smart City and the program we are in. So in the organizational structure there is the Steering committee that comes together every 6 or 8 weeks or something, to see what the vision is. And also steering if we are going to the right direction. And they help with new projects, with the business development part.

4. Is it comprised of Municipality, KPN, Alliander and AEB?

Yes.

5. How many people are working on it?

10-12

6. How other partners have been selected?

I don't know, I am not sure. I have an idea, but that's my idea. I think it makes sense that when you start a project like this, you don't directly start from within the municipality, so it makes sense to have an an innovation platform, or smart city initiative, in which you try to develop all kind of projects for the city, together with the city, but is not a city driven program, so that's a good distinction. But we do see, and I think they saw that the municipality also has a goal with ASC, and with the city itself, trough wich ASC is a nice way of how to solve several challenges within the city. And then they became partners aswell. The other party, KpN, seems as a logical partner, because they are also one of the infrastructure partners, within the city, especially for fiber opticts, and you see that the infrastructure firms can have more an enabling position, if you look at smart cities. Two things are very important, that's connectivity, and to have connectivity you always have to have a very good grid, and to be able to have different kinds of solutions like electrical vehicles charging or whatsoever, been put into the grid.

7. What is the main reason behind your involvement in this project?
That's again, I have to guess, but I think actually the main reason why we are actually now still participating, is that you see a changing role in society when you look at infrastructure. Infrastructure is an enabler. In the vision or mission of alliander is what we say we try to facilitate and open energy infrastructure. And also facilitate transition towards a more sustainable energy use. And I think also with ASC is an example of how we can stimulate the community, because the focus has become more towards the community. In the beginning it was a little more or less focused on community, but more on business to business and more on larger corporates, but now the focus is on activate communities, we try to involve them and also we actually, Annalies mentioned you, we have few projects in which we let the community depend what types of projects and what the subject of the different projects will be. Which will actually add to their neighbourhood. So that's social innovation. And you see that there is a changing role in society if you look at municipalities, on one hand they are investing in the

city, on behalf of the taxpayers, and on the other they have to cut investments or to introduce different types of savings due to budget deficits or whatsoever. And they have to try...they were always very top down organized, they have now to try, due to their budget deficits and everything there is more of a powerful source, in which they now have more to facilitate the community, to let the community solve different kinds of problems. And also the second trend is I think that there is more of prosumer thing coming up. Where consumers are more active, they speak up way more, and they can initiate, and they have tons and tons of power if they organize themselves. But that has to come from within them. And that's something that you have to facilitate, and that's something that the government still has to adjust to.

8. Are they also changing their mindset by being used to collaborate with other non government institutions?

They become more a stakeholder within the process, than leading the process.

9. What you think are the main reason behind your partners' (Geemente, KpN, AEB) involvement in this project?

We all have our own stakes. For the AEB, I think, they are representing, they are more of an organization between the large business sector which is available in Amsterdam and the Municipality, it's a very good combination, and also the knowledge institutions. And I thought their main goal is economic growth and jobs creation. So it makes sense that they become part of, and they can add in a tremendous way by using their network, that is very extensive. The municipality, they have CO2 reduction and also facilitation of the community. Through this they can also be more frontrunners when it comes to new development. So this helps them to initiate new kind of projects, which lay somewhere out of their governance scope. And for KpN I think, is interesting to see what fiber optics can do for the city and to have good connection with the stakeholders in the city and also it helps Kpn if fiber optics is installed in the city it helps them to have all different kind of services, concerning privacy, data measuring...that they can benefit and add. It all becomes part of the bigger goal, the smart city goal.

10. Which resources your organization is providing?

We have some pilot projects that come from within our company, we have a group of energy consultants, which are specialized in all different kind of areas, CO2, heat etc. We have group of innovative project managers who actually does all different types of projects concerning energy saving and some of these projects come to Adam because of ASC is here, and provides an easy way into the government and into the city itself, and because we have a more or less N-W, Z-O and IJburg that's more or less areas that they specifically target. It also helps if you know all the local stakeholders and it's easier to lead projects there. So there are different types of projects, Vehicle to Grid is one of them that comes to N-W, energy savings also in N-W Geuzenveld, they have done. Energy storage, we are now working on. For the project City-Zen there is more a formal setting, legal settings?

Yes because it is an Europan project, so there is a large subsidy attached, and therefore, is a more or less a 5 years project, you have to have evaluations and a lot of reports to be written and updates to be given. So that's a far more formal form of cooperation. It has to be so. I think there are 24 or 26 partners involved, and 32-40 mill involved.

11. Are there other projects that use this kind of legal frameworks or usually are more loose kind of collaboration?

I think there is not much with very strict legal frameworks. There are several projects we initiated, but they don't involve legal frameworks. It's memorandum of understanding, letters of cooperation, letters of intents, those kind of things. That's more common. Or can be a contract, for example that we are hired or we are involved in several types of projects, that we are actively organizing But then it's a contract between municipality and alliander or whatsoever, and then the whole group. There is a high level, and I think it's necessary, of intrinsic motivation and trust, which has to be part of a collaboration like this. I think that is an important part of working closely together on societal challenges aswell.

INTERACTIONS

12. Among the organizations involved, do you think any of them disposes and makes uses of public authority?

I can imagnine, that's what I heard yesterday [from the steering committee meeting], before Alliander was more seen as one of the contractors of the city, and I think more and more you see it's changing through this kind of collaborations, there are more than this, than just smart cities, there are different types of collaborations you see

it changing continuously and more working together on finding different types of solutions, than one is the leading part and the other one is just assolving something. So there is less friction and there is more cooperation between the partners.

We do touch upon several public regulations and laws and etc. but is not from within the process or within the organization ASC is and the process that we do, but it can be done through, for example the Smart Lighting project that we have, different kind of projects, sometimes new technology, you have to have some licenses to have something installed somewhere, and then you touch upon public regulation, but not in the sense of organizing the platform itself.

13. How do you exchange information with partner organizations?

It works good, if you look for example at the project for the enegy maps that we have for Adam now. It's throgh this collaboration that there is a lot of information exchanged between the partners, between the government and the municipality, different partners and alliander, and this helps, at least now there is a project. (amsterdam.maps.nl) there are different maps, whith electricity, gas, co2, and also energy potential is mapped so for geotermal, PV, wind. and actually. you can download all the data and use for yourself. That's a part of information exchange. On the other hand, I think on a higher level, so what's the goal we want with smart city, what's the goal we want in Adam etc. At that type of level there is a lot of exchange as well. For example with the whole smart meter there is information exchange. So I think there are a lot of things exchanged, especially concerning the investment agenda. Then again Alliander is 7000 people so you can imagine that there is a lot of information I don't know about, that is exchanged as well. For example for open data, one of my colleagues from Alliander is in contact with one of my colleagues with ASC, and sometimes I hear an update and sometimes I don't. Everyone has their own responsibility, their own team, their own subjects they are working and if there is a friction or there's a decision to me made, whether we should really exchange some types of informations data etc., then there would be a meeting or whatsoever within Alliander, and then you see there is a group formed and they will discuss what is possible and what isn't. But otherwise is pretty flexible, I think.

14. Have conflict among partners occurred?

I don't think there are many conflicts, at least not in what I have seen so far.

15. Are arrangements in place to evaluate contribution of the actors involved in a project?

Yes, but it's very difficult to measure. We do measure different types of things. We measure CO2, the level we saved, we measure job creation, economic impact, investments ratios, number of partners involved, partners added. But those are all different types of data in which you do not measure how good you are actually doing, or how good you are doing as a smart city, but that's a very difficult things to grasp, for example you have to measure why you choose a certain project and why you do it, it's based on the relationship on the different kind of partners, on how open they are to introduce other partners aswell, beacause smart cities is about working together, about cooperation, about collectively working towards a common goal, and all with their own goals attached as well. But you have to allign somehow the large group of partners to work collectively. And I think that's the main goal of smart cities, wheter is done trhough technology, whether is done trhough sharing economy or circular economy. Smart city thing is how do you allign all the different stakeholders. And create a working environment.

Is it possible to imagine other partners' goals and evaluate wheter through that they are contributing to your [organization] goals with what they are doing?

That's the difficult thing, I think if you look at it. But that's different if you look at the SC program than from several projects that we do. Because within projects you can easier evaluate wheter certain targets are met. And I think it's starts at the beginning by extensively discussing what everyone own goal is within the project. But that's something different from within the program: you are on a differet scale, different level of collaboration, of working. Within projects there is and there are goals. I don't prefer to do it like in the story of chinese employees satisfaction, measured wheter they come back after chinese new year.So throughout the process of doing several projects, you have to grasp those evaluation moments, whetere everyone is still on track, whetere everyoone goals are met and discuss it extensively

EXTRA

16. How is ASC, and specifically your organization, supporting citizen participation?

Alliander I think is one of the partners for citizens, supporting through investments in the grid and smartification. For example vehicle to grid solution, energy storage, we are involved in different kinds of projects for the citizens.

17. How is ASC, and specifically your organization, supporting bottom up initiatives?

We actually just started, we always tried to be very open to bottom up initiatives as well. Right now [ASC researcher on citizen initiatives] a colleague of mine is also doing an extensive research on what types of bottom up initiatives are there in the city, so very broad. There are a lot of different organizations we have extensive database of bottom up initiatives. We try to work together with them. And then what I want to know is what their need is, what are the challenges they face and what are their needs. And then you know what type of role you can play for bottom up initiative. But for the moment just having the database and having the looks and feels of different bottom up initiatives you more easily attach them. We are now working on circularity in the Zuidas. And you have to use bottom up initiatives, if you want to create a local economy. If they aren't there, they will be there in a couple of years. If they are there let's use them because they have a very active. And you should give them a very good position within the group as well. You see some collaborations between very large corporates and bottom up initiatives , sometimes they are not on the same level of discussing or choosing which direction to go. You have to set the right level of the right type of collaboration, type of trust among each other to continue working. So I believe in the 4 O. In dutch it's the government, the bottom up organizations, business and knowledge institutions. And I believe that you face several challenges within the city and if you have these challenges and you have them written down, and you have more or less scoped them, you can see how can you involve all the stakeholders to actually come up with the right solutions to work. And I think if you look at the smart city, that's what a smart city platform should do.

18. Would your organization have you been able to develop the ASC initiative autonomously?

I think it could have happened elsewhere as well, but I think for the fact that Amsterdam is a creative city. There is a lot of openess, I shouldn't say opennes, but is part of the creativity as well. But they are also open for innovation, for changes and there is a lot of dynamics within the city. Also the municipality of Amsterdam is one of the shareholders of Alliander, so that helps as well. So it's about the urban development, the urban dynamics that are here. It becomes very interesting to look how this can work as a smart city.

19. What is the long term plan of ASC. What is the role of Liander in making it possible?

I think the vision is more on how we are going to work together. At least my perception is that we more and more gonna look at what are the challenges of the city, that can be set from within the municipality, from within knowledge institutions, business, but especially the users of the city, not just the citizens. And you come up with all different kinds of...like the biking issues, congestion, air quality, probably those types of projects. We just have to come to somehow a kind of funnel. In which we collectively choose, I think we have to, not everyone is fond of choosing. I think you have to choose like more or less a couple of concepts or subjects that you wanna tackle, and start working on. And from that the quadruple helix model. You have to see where is the energy already, is there a bottom up initiative, which is now in the east, which can be perfectly be used and the concept we can scale up or replicate elsewhere in the city. To really start the ongoing and the transition. And also a second thing it's about doing, you have to initiate projects and start doing. Not only thinking about it or writing about it. You start doing and goes then step by step. By doing you show a little bit of transition, which ignites a broader, creates the road towards a larger part of innovation, which then will create another opening for an even larger innovative movement. So I can't tell you yet which topics we will choose, we will focus on, but for sure we are always active in trying to grow these living labs, trying to get these mechanisms in order that people start more working together, organizing locally, because that's the transition you already see within the NL. There are more and more groups trying and willing to organize more things locally. I think that's a great way. [0:37:08 about from local to global and balance 0:38:10]

20. About the use of specific areas, are there initiatives that are ripe to be expanded in other areas?

We have one concept, is small but very interesting. Is called the smart sport parks. But there are so many more aspects, because you reach 70000 (???) members to which show how the club is active in saving money, with sustainable energy solutions. The 2nd part is how can you, looking at the trend of things becoming more community focused, also virtually, or as member of a sport club, all the social networks. Sport clubs can play a perfect role on that. With homework for children, having a teacher at the sport club. The use of the sport club during mornings, so it becomes more a community building. This concept is ready and it can be replicated to other facility and there is a huge outreach of people. 60-70% of people are active in sports and within them 1/5 participate in sport clubs. It has a direct benefit, because it saves costs.

29. Do you think changes would be needed to achieve the long term goals?

Yes add new partners. It has to be within smart city, we have worked now for 3 years with the same partners I think is good if we sign new partners and we get new partners involved. That's what we are actively working on. One of our colleagues is doing business development. She is working on the new partners, to get them involved.

30. What are the time limits?

3 years ago they set up the program for 3 years, so the time frame limit for ASC 2.0 is actually until the end of this year. That's why the debate is now.

Smart grid. What is the citizen awareness of this project?

We discussed it with one of our experts on smart grids, last weeks. It depends on how you explain the smart grid. It can mean many different types of things, can also be when you do fault localization, so you can very easiliy solve hickups within the network much faster than what we do now. This is also smart grid. It's just done by sensoring. Another form of smart grid is demand response, trying to see virtually when you have peak demand there is a higher price....you can stimulate people to really use their energy during the times of the day when there is a lower energy price. That's also involving a smart grid. The other ones is to try to stabilize your grid try to see if you can manage....[not relevant].

It helps it's a selling factor.

Name of organization: Clicks and Links

Role within the organization: Project Manager Gaming

Date and Place of the interview: 10-07-2014; De Groene Bocht, Keizersgracht 452, Amsterdam

Introduction on field research.

I did 2 things, the quantitative and qualitative parts and the quantitative part was the online questionnaire, where i took the SC wheel, the 6 different aspects and tried to find 2 examples for each of the categories, and asked them about those things.

The goal was to find out how people are located in the different levels, either they are not interested at all, and you never going to reach them, or they are interested but something is wrong and something needs to change, so how can you get those to be interested. So I found in existing literature this research method that I copy and pasted, so I asked people about those different categories and in different questions, about satisfaction "I think this Smart solution would improve my life", Involvement "I think that the problem being solved is important", the Status Quo " I am currently satisfied with status quo" and "I think the problem should be solved in another way". Then there is a formula, an algorithm, that uses these answers to calculate a score and to determine people in which category they are.

You see for example a division between users and non users, so you see that most people are non users, so you see for example for Verbeter de Buurt (improve the neighbourhood) people who haven't used think it's a really great idea, while for example the citizen participation one is pretty low, so people are a bit sceptical about civilian participation being a real solution.

These projects were proposals or some were already working?

I think all of them existed, maybe not in Adam, and I portrayed them all in the same way. Some of them were active in the area, like the civilian participation, the municipality had them creating the vision for NW for 2020. They organized meetings and workshops. Most of the projects are unknown to people, but that's because they are pretty new things.

How did you contact the respondents?

I just took 5 ipads and went on the streets. I used that for my thesis and went on to design a game.

Is it the same that is being developed now?

Well, it has been used as an inspiration, for this new game, but the scope is a little bit different, because here the scope was to generate bottom up ideas, the scope now is to really reduce energy consumption. So thats a different product. We used the insights we got from this, for example we concluded also from the qualitative interviews that the few key problems that exist in NW which are like the perceptions of safety, trash in the street, but most of all the lack of sense of community. So people really lived their life, they do their job, they come home, close the door and don't even know their neighbours and they are a bit frustrated by that, and they would like some opportunities to get to know their neighbours. With the design of the concept we tried to play into that and to create a community.

Have the results of this questionnaire being used to decide the projects to be developed in the area?

No, I think it more leads to the conclusion of the 4 issues I talked about. The qualitative and quantitative together leads to this conclusion, and that has been used to get insight about the NW area and what kind of things we should be focusing on. So it wasn't directly leading to we need to do these projects, but it sort of defines the vision for what we now we want to do in NW.

The fact that I was assigned to do this it means that they were already focusing on bottom up initiative. For example what's interesting in these conclusions there is nothing about energy consumption or the fact that we need solar power on the roof or something, so apparently people in NW they really don't care about. That was a focus of the work of ASC, to have people put solar panels on their roof, but apparently people just don't care, so you need another angle, you need to address safety.

1. How long your organization has been involved in this project (serious gaming)?

I was involved with my graduation project for Accenture, from 03/13 to 12/13 with ASC as well and then I started to work for clicksandlinks in march. That's the moment when C+L started to work with ASC.

2. How many people are working on it?

Yes, I am the only one here in Adam, the rest in the UK, most in Manchester and some in Newcastle, they work with me and we have skype meetings to discuss the project and I fly there some times to do workshops.

3. Which other organizations are involved?

The serious gaming is part of a much bigger project, a European funded project, City-Zen and there are 28 partners involved. So it is just a small part of the project. We are just a small companies so it's one of the biggest projects we do.

5. Can you tell me how this project originated?

It was in the description of works of the European project, so there was that we need a game, to reach people. You write some numbers in this proposals and then you need to make a game. I think it is an ongoing trend to look at gaming as a solution for this kind of motivation problems, to engage people through gaming. Its a sort of trend, you hear more and more.

It is computer based but is important to make the translation between the virtual world and the real world, so I look at it as a layer on top of the real world, that's virtual. Otherwise it's just a computer game that you play (on the toilet). But I would like to really get people to go out in the real world and to meet other players as well, to connect to them. So that's like to tap into the community feeling. So if you play this game, you are not just playing the game yourself, you are part of this community that you can also meet and hang out with, meet with friends. It's mostly based on smartphones.

7. What is the main reason behind your organization involvement in this project?

Now the funding is from European founding, but the goal for my company is to create a product out of this, that's repeatable in other situations as well. Because now we are doing something for the city of Adam and Grenoble but in the end we would like to have a product that we could sell to other cities as well.

We are targeting young people, we now targeted 18-25, but we are open to lower it.

10. In your opinion, which resources your partner organizations are providing? [see n.20]

12. Have legal frameworks been implemented in your relationship with your partners?

[Consortium agreement for City-Zen]

14. How other partners have been selected?

A couple of companies set up the project proposal for EU, and then they contact other they know.

15. Does your organization have any arrangement that enables the exchange of information with other partners?

Officially there is a portal website, with all the partners where you can post questions and those sort of things, but for the real formal administration, we have to fill in forms and discuss dependencies and deadlines. But what is way more interesting for us is the fact that I work for C+L but I am here with ASC, working closely together with [AEB Project Manager] and whoever else works on this project, so for me is really easy. So yesterday I just went to Arnhem, talked to some people from Liander to get some data for the game, so that's way more informal and is way easier for me to discuss the project.

16. How your organization evaluates the project outcome?

It's formal, it makes sense to have it.

17. Are arrangements in place to evaluate contribution of the actors involved in the project?

There is a formal filling of forms. Yes there are discussions every now and then with all the consortium partners.

18. How frequently does your organization interact with other organizations?

I mostly interact with Liander and the AEB/Smart Cities, with [AEB Project Manager] mainly. AEB is responsible for quite a bit of the deployment work of the project in Amstedam. So that's another thing that is important for us. We can design a game, but how we get it to the people, how we get pople to test it. So that's also part of the work of AEB.

20. Which elements was your organization missing?

Data Liander, Contact with people AEB. Funding EU

21. Who provided you those? Conflicts?

For us the dependency of our part of the project isn't that big for other people, so we don't have to rely on a lot of different people, just Liander for the data sources. But it looks everything is going to be ok there. We are just a small piece of this. I noticed for example that partners that coordinate this project, like VITO [???] an belgian partner. They are a lot more strict making sure that everyone fills in their forms and that the deadlines are correct. Because they depend on a lot of things in order to get their deliverables, which is to finish the project in time.

22. What is the project timeframe?

Officially in the description of works it states that in y3 there needs to be a game, because is part of the end-work. The big part of the work is refurbishment of the houses and installing different technical elements in the building. And in the end the work is deployment, so get people to play games and create awareness. But our schedule is a lot earlier than that. We are finishing off the concept now and hope to have a final design of the game this summer. And then start programming and coming up with the first prototype that we can be able to test with people by the end of this year. And then we are going to run into a lot of problems, things that are not working. Citizen Participation

22. Are citizen allowed to influence the policy making process? How?

Not the decision-making. The game is supposed to influence the decision they make themselves, on their energy usage, so it's supposed to inspire them to use the empty roofs on their houses, to install solar panels, or to maybe put some more clothes in the laundry machine, so not to waste energy, or to turn off lights.

23. What is the use of the information provided by citizens? Is the game collecting data from users?

Yes but you need to be very careful with that, because there are privacy issues. We don't want to screw people over. What's interesting is that by playing you are going to be compared to anonymous other people, so they can tell you, if you use twice as much as energy, and try to understand why.

24. How decision makers are communicating with citizens?

Ware trying very hard, its' a difficult process. ASC used to work on a very top down way. Because it was founded by some companies and the municipality, so that's top-down, is how it works. But they are focusing very hard on becoming bottomup. So companies like Liander is pretty strong in a social innovation strategy now. They are working hard on it, but is a very different process from what they were used to. It's a difficult thing.

25. Can citizen be involved in the design/production of services?

Extras: From research Assignment to serious gaming project. Use of data for thesis? Awareness of ASC projects to general public?

Most of people don't know about ASC in my experience. But that's not necessarily our goal to be known. We just want people to be smart about the decisions they make, think in smart ways, reduce waste...Is it something we are working on like, we have blog posts on popular websites in NW about what we do. We work a lot with students from Hogeschool v Adam. Which in turn work with residents, interview residents and do projects there, to make people more aware.

I think that the most smart ideas already make sense, you don't need to explain them, you just see them and you think of why we have being doing things differently. That's the way I hope people will pick those things up.

The awareness in energy savings and energy production?

Is zero, people don't care at all about energy savings, energy is a commodity, people think is really boring. But that's why we try to come up with this game, to make it fun. Energy is going to be just a small part of the game, the main part is playing this game. We are thinking of a premium strategy. You can play for free but if you want to be better you have to pay. In our concept, instead of paying it will be saving energy, so you can play the game, but if you want to be better you need to save energy. We are hoping that will small things you can do a lot of things. How to improve it? People take energy for granted, you don't see the difference between green energy and coal energy. I think it will be very hard to reduce energy consumption if you focus on things like saving money, because if you really influence your life, you can save few hundred euros a year. For the future, with energy prices rising, the difference will be even less. People will be disappointed by how much money they saved, but that shouldn't be the key factor. It should be common sense.

Name of organization: Ring-Ring

Role within the organization: Founder

Date and Place of the interview: 04-07-2014; Ijburg Amsterdam

1. How long your organization has been involved in this project?
It was born on the bicycle. We moved to Ijburg from the city center in 2009 and I was looking for a way to get to my work that was in the center, and my old neighbor(hood?) said "you can easily go by bicycle" and I said "No way, that's 30 minutes every day, home and backwards 30 minutes, that's way too long.". But at a certain point I did cycle and then I felt happier in my life. It was like "Wow, that's really amazing.". You can cycle through the park, and every season you have yellow, purple flowers and so on; so you really sort have the nature in your system, no cars, and the bridge and so on…, so I don't know, something interesting felt over me. And that was when the idea actually got born in my head, because I have 4 young children, in school here in Ijburg and what you see is that a lot of parents bring their children by car. So you read the newspaper, and all the people write about obesity of children and so on, and that everybody brings their children with a car. So it's that people need to move, because otherwise….The food is already a big problem, people eat bad, processed food only, almost, because they don't have time, and they bring their children by car, so that they don't learn how to move. And I was cycling, and I was thinking, well this is amazing, because the cycling never came up as one of the solutions. That was in 2010 and I started thinking, riding my bicycle, and I do work as a supervisor at the financial authority. And we have a behavioural way of looking at how do banks and financial corporations behave like the law is supposed to be. So (is) together with that mix, that Ring-Ring project slowly started in my head. And I am a person that likes to trial and error, so I want to do things and then through feedback every time change the idea. So in 2011, someone said to me " You have to write down what you want ." So I think that in 2011 I wrote my sort of vision document and I met, I started on twitter and so on and so on. So that was the actual beginning of the plan. But in 2013 we really started the pilot.

2. How many people are working on it?
Well, lots of people are helping me with network: the smart city, the fietsersbond, the Geemente (Municipality), because they give a little funding, to help the idea. But it's also lot of people that have the "bicycle heart", sort to say.

Regarding the App, how did you do that? Did you develop it on your own?

Well, this is my idea, and somebody that lives in Ijburg, has the technique that measures automatically how you move. It was a big project from the EU, and he developed the technique further on his own. So accidentally he lived on Ijburg so he said "Ok, I want to help you without money". So he did the app, based on my idea. It is a little example: I want to build a community, he wants to sell the app to different parts of the country. So he has a different business model than I have, in the end. **Well, you actually joined forces.** Yes, we did joined forces, based on a different endpoint. But he did help me make the idea reality, which is really worthwhile, because you can show people ideas, that are nice, but when you have a prototype, you can also show people that it works in a way. (05:28)

3. Which other organizations are involved?
Exactly, that organization [Syntens], doesn't exist anymore, someone said to me the other day "Wow, lots of people are working!". This Syntens, that's the person that came here and in the beginning, when I had my idea, he did a lot of effort making it more easy in parts. The idea is very big, very at a high level, but to make it easy for people to understand it, he helped me figure out. Because, at the beginning I was talking about a GPS device on a bicycle, and he said "Well, why don't you use a smartphone, because every ingredient is on a smartphone". So he looked for target groups and so on. So this person here from Syntens, is now the Kamer voor Koophandel, it doesn't exists anymore but it's incorporated in the Kamer voor Koophandel. They helped me moving forward. The Fietsersbond, they placed in green deal Fiets, (see document) from the Minister of Infrastructure. So this pilot is written in an official document, for the government. But then it's sort of strange, because they do that with ANWB and Bowegendereil, and all big corporations, but they do not really help them. So either they don't know what to do or are afraid from competition or it's like "Yeah, nice idea but, not for us". I don't know, so they are a sort of interesting paradox between people and organizations, and about society as a whole, and because I am not interested in a money thing, I mean, this is pure intrinsic for me, it happened because it's good for the earth, for the children and for nature. So money is not the driver for me but for other companies probably it is. So there is something strange. This newspaper, [de Brug] but that's because of the funding of the Stadsteel, they wrote very nice articles about bicycling so every month, they had a story of a bicycler, and they helped also the project. He is an architect, an urban architect, so he also wrote a thesis about economic value of the nature in the country, also for big companies, for examples to choose the Netherlands to put their headquarters instead,

for example, of London, because it's huge and when you have a family with children and you have to go with the metro for an hour to in and outside the city. And here in the Netherlands, you have the green heart. [...]. De Gezonde Stad [the healthy city] is in Amsterdam, I mean they got money but now because everything is going downwards, they don't get money anymore, so they have to find out their own business model, but they are protecting the nature in Amsterdam, and trying to make Adam even more green that what already is. So of course they are into this project.

And they [Locatienet] built the App and they have the technology. And Amsterdam Smart City, they are at IJburg very active, because it was a new area and this fits perfectly in their sort of street (WAY?, MODEL?), but they are not very active by helping this project. You have to do everything by yourself. So it's on their website, and you found it on their website, and you found it there, so it's a good thing. But it's not like they do a lot for you. I mean, I don't know if I can expect that, but I had hoped that at a certain point they could have some more impact. For example KPN is one of the partners of Smart City, and you need a Smartphone with the data, so a lot of bicyclers don't have a smartphone yet, especially of my age, they don't need it. But that can be a nice start for them, to improve their customers or whatever. And if you have a big party, that's my opinion, you need some mass to really make it big. It needs to be expanded, otherwise it stays a sort of a simple initiative from IJburg, from a civilian, but my plan is a lot bigger than that. But maybe it's too new for people, so they do not really understand the benefit.

I understand that ASC works more as a networking organization, were they able to put you in contact with others institutions?

No, they really didn't. And in a way I think is kind of sad, I don't know what's the reason, actually, I have to ask that. I don't know where they are anyway. Because they were here in the IJburg College (??). But know I don't know where they are located anymore. So I do not hear a lot from them. By the way, that's not completely true I think now because of them we are working on a new subsidy and to help this plan. But it's lot of contact persons and so on and so on. But maybe I am too negative, I don't know. Sometimes you have to wait, and it's silent and then something is happening. But for me things could go a little bit faster.

4. Has the number of organizations involved changed over time? How it evolved?

Well, I added some, but all the organizations that were sympathic to the idea, I put them on the website. But nobody, except the Geemente gave money for it, only network and visibility.

5. Among the organizations involved, do you think any of them disposes and makes uses of public authority?

No, them (the municipality) were really friendly and they even gave me sort of the money without being an organization. So normally I have to become an organization and then they can get some money. But they said no, it's fine, we trust you and you get some money. So now the regulation is that I only have to fill in a form, where I spend all the money.

6. Have legal frameworks been implemented in your relationship with your partners?

No nothing, it's interesting, but I don't know if it's wise. But that's the trial and error factor. I mean if you don't know what to expect, what do you have to agree upon.

7. Have organizational arrangements been implemented in your relationship with your partners?

Not yet.

8. How other partners have been selected?

9. Does your organization have any arrangement that enables the exchange of information with other partners?

10. How your organization evaluates the project outcome?

It depends how you look at it, actually what I did I put the name into the Benelux (the registration mark). So I put my idea into a legal office. But that's very hard to protect: ideas are ideas. And ideas are nothing without technology, in this case. But technology can't live without ideas as well. So it's a bit of...the person of the technique thinks he has the lead, and I think I have the lead with the idea. But actually we both have the lead because we cannot do it without each other. That's interesting.

11. Which elements was your organization missing?

From the idea to start everything was there, but during the pilot I would have had some things changed on the application and there I missed a lot of things, to improve during a one year pilot. But because there was nothing on paper and there were no agreements and there was no money for the developer, actually. Nothing changed there. I had to be satisfied of the first model. And that's what it is.

When is the pilot period ending?

It ended officially last week, it was a year active, and still until the 1st of September people can do something with their cycle miles but that's the year pilot, and now we have to see.

So you are not sure of continuing?

For me I am sure, but then I need money to hire people and to make a good app, and to build a business, actually. But I do have also my job and my family, so I don't know exactly.

What are your plans for the future?

I would love to build a world wide community where everyone has its local advantages, so if your father that lives in Milan, if he cycles, he can be part of the community like facebook, and linkedin and instgram. And all those kind of communities. It's actually the same but then oriented for the bicycle. And, for example, Milan can also make a group and do something with all the bicycle miles in the city. So they say ok, if we have 1.000.000, we do something for the city. So that you can locally grow.

How does it work? The fietskilometers can be transformed in a currency?

The four parties in society that benefit from cyclemiles, and could do something back money worthwhile. And exchanging by the actual cyclemiles.

That are employers, big employers in my idea, because you get back vital, productive, air quality and congestion. So you help the area.

Local governments, that benefits also from the health and place making, local economy and social interaction. So they can give something back.

And retailers, the term o2o, it's online to offline, so location based you can cycle and you know that there is a shop that you never knew that was there but because you see on your smartphone, is easy for you to go there and to exchange your cycle miles and the shop owner can give its own advantage to you.

For the health insurance you can get a discount, you pay a lower price than other people because you exchange your cycle miles. But's that on a debate, because lots of people are against it.

It's interesting that you had this idea to promote cycling here in Amsterdam. That is know as a symbol of cycling. Did you have the impression that things could be improved?

It's mainly because of IJburg, we are a little bit outside the ring, but it's called Amsterdam, people do not feel they are in Adam, because we are a little bit stretched out of the center, but this area is build not with cars as priority but with cars as minority, but what you see is that a lot of people have 2 cars and do everything with their cars because in their brain, they think that they are far away from Adam. But if you start cycling we are not that far away from Amsterdam, is a mental thing. And it's interesting the subjectivity of how people experience time. Because they think 30 min ride takes a lot of time, but if you consider your health and going with the car, for example, is only double that time. It takes longer, but what are 30 minutes out of 24 hours? And we have a lot of congestion. And car arguments. And I am active here at all initiatives from other people. That want to make IJburg nice area. So a lot of other people inspired me to begin this idea actually. Because they have a dream for a mustaine?? and other things.

I presented my idea on an event and shared it with other people. So its the energy from other people that inspired me to do the same. And we have a lot of bicyclists but it's a blind spot, we do not appreciate anymore what we have.

Actually what I try to do here is that when every sort of piece in the society takes responsibility for a healthier future, then is very easy to do that, and actually that only person who can change things us by ourselves, but with a little help of others, you can really make it bigger.

Are you trying to engage with corporations?

But the app is not really ready for that, so what I notice is that in my head everything is all clear. But to communicate the idea so that everybody understands it...A lot of people think that we already have a lot of cyclists so we do not have to pay attention to them, so you see little change. And not everybody has the right smartphone, so maybe it has some limitations. And people of employers do not want to take the risk of being the first doing that.

The university, for example could start. People have to see it and then start to understand it better.

Name of organization: Waag Society

Role within the organization: Research Director

Date and Place of the interview: 25/07/14 - Huis de Pinto, Amsterdam

Why the projects Smart Citizen Kit, Apps for Amsterdam, City SERVICES DEVELOPMENT KIT and Health Lab are linked with AMSTERDAM SMART CITY?

Our main goal is to develop technology for social innovation, to help people express themselves, link to each other and to reflect and to share. We do so since 1994. Always our focus is on appropriating technology, we think that technology is something that is very wide, of course and it's developing at a very fast pace and what we want to do is appropriate it, understand it and make people able to use it. We do it in 2 main ways. One in helping people in developing their own technology, and helping people to be part of developing processes. We do that in 30/40 projects each year. It's a wide range from very small interventions to 4-5 years programs, where we do design research. The project that you allude to, 3 of them are in the future internet domain, the other in healthcare. We see that to be able to change something in the city, we have to reach out to the parties that are reaching lot of people. And for some it means that we partner with the health institute, for others with schools, cultural institutes. And when we want to do things in terms of living labs or using citizens, in the sense of citizens being citizens as opposed to consumers. Then AMSTERDAM SMART CITY is a nice partner. And that is why we do it in some projects but there are many other projects where we don't do that. AMSTERDAM SMART CITY has the Smart City metaphor to guide their actions and it means using technology to change the flows that are happening in society and also involving civic hackers in city processes and in 3 of these projects is what we do. So Smart Citizen Kit is trying to implement alternative bottom up sensors systems for environmental quality data and we do that with the citizens, for the citizens and AMSTERDAM SMART CITY is a logical partner because they aim for the same things. APPs for Amsterdam is a project where we try to open the data that the city has for developers and citizens to use, either for democratic or innovation proposes. So they have access to city data so they [AMSTERDAM SMART CITY] is the right organization to partner with. The City SERVICES DEVELOPMENT KIT, we try to open data, by building a platform that makes it easier for developers to make applications that can scale to other cities. There we need the city as a partner, for the people they can reach, although there is a overlap. We need them as a conduit to the city hall because they have to influence the people to open data or to be open for the data that we gather from the SMART CITIZEN KIT, and we need them as a co-funder.

Smart Citizen Kit

Is this project is running in parallel in Barcelona?

Almost, we use the SMART CITIZEN KIT that was developed in Barcelona; in Barcelona they have so far concentrated in making a workable small piece of open source technology, that helps gather air quality data. What we have been doing is try to see how you can mobilize people to actually use it. We are partners but we focus on a different aspect.

How long your organization has been involved in this project?

The idea started 1 year ago, when our director and program manager for AMSTERDAM SMART CITY were in Barcelona and they saw this kit. This resonated in a much earlier idea that started 5 years ago, where we started to think what we can do with bottom up measurements. But that was too early, there were no sensors, funding was harder to acquire, so we didn't pursue it and when they saw this kit it all fell together. It took few months to negotiate how to work in it, also to negotiate different roles. We have the role to give support and to mobilize people and they have the role to interface with the local government and to co-fund.

How many people are working on it?

Five, just part-time is a very small project for us.

Which other organizations are involved?

AEB, Fablab Barcelona, FutureEverything that is an innovation festival in Manchester that after us started a smaller but similar pilot (25 kits).

What you think are the main reason behind your partners' involvement in this project?

AEB is an interface to the city, to some of the citizens, although we did it directly by working with a local newspaper, and it's providing co-funding.

Which resources your organization is providing?

The technological part is done here, but the building of the kit was done in BARCELONA, we fixed certain small parts that were easy to break. We made a case, we provided guidelines for use, a helpdesk, timeslots for people to get their kits, advanced program: a kick-off event, smaller events targeting different aspects and an event discussing the results. Also the visualization of the sound data.

What is the timeframe of this project?

We started thinking 1 year ago, we negotiated it over autumn and we really started in November 2013. The project officially ended in June 2014. It ends with a lot of lessons learned and few ideas for follow up projects that are targeting certain aspects. The first project is finished but the program is about how to use low cost sensors and people as sensors, to get a a better understanding of the surrounding, to enable them to have a better dialogue with themselves and the city officials, that's the main purpose, empowerment. After the project people had the chance to acquire their kit for a discounted price and some of them did and are still online.

Among the organizations involved, do you think any of them disposes and makes uses of public authority?

I don't think there is an obligation from the side of the municipality, but is very wise from them to engage with citizens in this way. We position ourselves in this project as intermediaries, we have another person researching us and they say its a form of middle-ground. You have the upper-ground, that is the official bodies and people that can scale, the big companies. There is the lower ground and that is where artists, scientists, civic activists whatever people who want to change things are. But they have a hard time talking to each other directly. We specialize ourselves in trying to understand and we very much sympathize with this lower ground, because we come from the art world ourselves but we also try to find way to involve the upper grounds, because we need them to make meaningful impacts. I don't think they [municipality] have an obligation but you see that this lower ground or these people themselves are getting more powerful everyday, because of the technology, knowledge sharing, easy ways that they can group themselves around issues that matter and official bodies must be able to engage with them on equal terms and for that project like SMART CITIZEN KIT is a demonstrator or pilot in setting up this new kind of dialogues. Is wise because this is happening anyways and by engaging in this play, the official bodies can have experience in how to do this and this should be done way more.

So are public bodies realizing this change?

Yes, yesterday I talked to the CTO for the city of Amsterdam [Ger Baron] that used to work at AMSTERDAM SMART CITY/Amsterdam Economic Board, and he is very well aware of the importance of this thing and if we have several people in the official bodies that are realizing this, there are some more of those advocates but especially with a CTO like this, we see it happening more. There is a new big institute called AMS and their primary focus is on understanding and ameliorating the urban flows and our role in the consortium is to always stress and push the need for citizen involvement. For all these sides the interest is building up, I feel is a good time for us and for citizens in general.

Have legal frameworks been implemented in your relationship with your partners?

We tend to work with contracts that specify who does what, who communicates, who owns results, who pays for what and what to do when there is a disagreement. We have lightweight contracts - this is a lightweight one - and we have very heavyweight ones when we work in consortia with 10-20-25 partners, is different.

Have organizational arrangements been implemented in your relationship with your partners?

We have that in a sense that Saskia Muller [AMSTERDAM SMART CITY program manager] she is also doing some work in the project, that's the same for me, I'm research director of Waag Society so I oversee a lot of projects and at the same time I am very involved in this one, and if there is work to be done, we do it. In some project there is more, we have the open data exchange project that is with VU Amsterdam, UvA, AEB and there is a shared team that meets every Thursday. That's not the case with this one but it could have been done.

Does your organization have any arrangement that enables the exchange of information with other partners?

We have an unofficial steering committee that is Saskia Muller and me. And we have a team that is headed by one of my colleagues, then there is a sub team. So our project leader Christina does the day-to-day operation, and then if things need to be discussed I get in contact with Saskia. She also is in contact with her directly, even if there is not the same levelling in practice it works very well.

Would your organization have you been able to develop this project autonomously?

Yes, we would have been able, but we are independent, not funded research institute so we have 20% funding secured, but the rest is in project money, so we need funding for our activities and the quickest and easiest way to fund this project was by this methodology, that's one. The second is that interfacing with city officials, in this case the GGD, the healthcare department, might have been more difficult. There is a networking effect both in involving people and spreading the results for outcomes.

How was the selection of citizens participants done?

We did a outreach by a local newspaper Het Parool, over 100 people registered, and Saskia Muller and Christine choose the people from that based on commitment, spread throughout the city and few other criteria. And those people were selected and invited to the 1st kick-off meeting.

How was the assistance from the program to the participants?

First we tested the kit ourselves. Then we tested the part of how easy is to set up, to make it waterproof, how to connected to WiFi system. Based on that we made the case, a handbook, kick-off event, install parties, inviting people to get their kit and get their grips on it. We had a helpdesk, reachable by email, we even had a secondary support network, with people in the big group willing to help others and going to their home.

Which you think is the use that has been done and will be done of this information?

What turned out is that the quality of the sensor data in all but sound is very poor. Is because the sensors are cheap and low quality. Based on the feedback from the official body, it's so poor that is very hard to say anything. We see that there are 3 main reasons to participate in this pilot. One is that people are interested in technology; one is that people are interested in participation and doing joint projects, and one is that people are interested in the climate. We found that you need to have at least the technical insights or affinity or interest in technology. If people are only interested in participation or only climate, without technology, then it turned out to be very difficult to get the kit online, even with all the help. That is the first part. Then the actual climate data is very poor. And it was even poorer than we expected to be. We thought the kit to be level 2, so by now all the child diseases would be out to the system, but it was not the case. It means that first it turned into a project on understand better how the air quality is measured, what this means how the structures in the local government were, and to build a community of people that are interested in this field. These results stay. In the end event we had 70 people committed in going on. I believe that in the near future sensors will become cheaper, better, and the problems that we had now, technology will vanish. And this means that if the government wants it or not, people will start with this bottom up sensors networks that will actually be very accurate. And they will challenge the government. I think, I hope that by having these interfaces like ours that will be for the benefit of the city and the city officials. And if not it will be rather violent because people would go to churches and we are more an harmonic institute. We would like to help shape that. We are working on 3 follow up projects. What happened is that we have a strong network of TNO, TU Delft, Wageningen UR, Local Health Authority, AMSTERDAM SMART CITY and us. Right now I am trying to set up a consortium partnership to have a next step. Then there is a EU program, CAPS I think that setting up a follow-up project there will have a chance. And we are talking to some big companies that are interested in this field. So there are 3 ways forward.

How it would be possible to engage people that are not technologically aware?

Is easy, most people are able to work with their phones and you see them becoming gradually more powerful, I think that these sensors will be built in any device we have. Like cameras in the phone. It will be the same with google glasses, smart-watches. Telephones of the future, even fridges will have sensor data, so it will happen anyway. What I advocate is that people take the time to get a little bit familiar with the technical aspects, so that they are able to better interpret what is coming out of this.

On the side of engagement of big companies, how it would work, what can be their advantage in getting involved?

One advantage is that they want to know more about everything and this is an easy way to get to know more about everything. Another less cynical reason is that they want to add value, and based on this date you can come out with all kind of new services. Services making air quality better, alternative modes of transport, use existing infrastructure in an smarter way, you can give people consultancy on how to live more healthy life, so there is a huge number of business opportunities and we are advocating is that there is open source, open content alternative to those, but it would be unrealistic not to see that there are also companies that could make a profit.

You think is possible to engage people in the design of the kit?

That would be very nice. Is one of the things we would like to stress. Our organization is advocating technological empowerment and civic technology, using technology for civic goals. So this means that the open part of it is an important thing, and we hope that people engage in that, but in practice there is just a small

number of people in the population that are actually willing and able to go deep enough for meaningful things. I think there is a huge role for education and institutions like ours and governments to help bridge that gap, because is like an analphabetism. When our society is getting more technologically infused and you are not into technology at all is like if you cannot read or write.

You think that this project can help the communication relationship between citizens and governments?

I think this is one of the main purposes. What we try to do is to diminish the information gap. We think that if the citizens become more aware of anything you cannot see, then eventual dialogue that they can have can be better. Because now is an expert enclosed system, we try to open the system. It is also very important that if we get eventually more and better quality data, then the official measurements can be enchanced as well, so it will also lead to better decision-making. I think that's the main purpose, and so far it's very encouraging. By the way of working with AMSTERDAM SMART CITY, they are very open to this, otherwise they would not participate, and now by way of this project we consider this follow-up, together with the local health department who does the official measurements for the city, is actually at the core of the system. So yes, I think it happened.

It happened that citizens by realizing the real data, they challenge some policies or decisions?

No, this is the weak part of the project, because then to be able to engage in that you need better quality data. And that's the weak part of the whole first trial. What I do know however is that for a similar project - it was called "Open Data Exchange" - which is the successor to Apps for Amsterdam, the government found out that the way they clear the street of snow and ice are not efficient, and thereby they were able to change the routes that these cars take, so there you have real effects. We see lots of interest from the people working in mobility to get better real time fuse of how mobility actually is working, they are very interested in that. Ground sourcing data, using better data sources, sharing data with other departments and you would see the same there. Our project SMART CITIZEN KIT was participation awareness project and the next ones will be more about accuracy, then you need the official businesses on board, because they know how to measure well.

City Services Development Kit

If I understand correctly this project is linked with the Smart Citizen Kit but started earlier?

Yes, it started much earlier and is about harmonizing data protocols and the way that you describe data. So that's actually a project to bottom-up look how the data that one city is using could be made comparable to data that another city is using, and also making a small technical layer on top of the existing databases that will harmonize the interface. This means that as a developer you can make an application that can works in Amsterdam by a click on a button you can make it work in Helsinki. And that was not the case, so that's what we do with the City Services Development Kit.

In this project also the municipality is involved, is it just the provider of data?

Yes, but also we chose, not only us because this is a project with 23 partners, a large project, 3 different domains: tourism, participation and mobility. Two cities collaborated to make harmonized interfaces. So if you do something about mobility, then the mobility department should be involved. If you do something about participation, the department that is responsible for fixing holes in streets, for example, they should be involved. Because otherwise there is nobody listening to the participation data. So I think was key to work with the local governments. We did the mobility part and there we build a system called "City Services Development Kit linked data suite", and that helps link all the data on objects in the city in a uniform format.

So the municipality is an interface in both ways, providing data and also responding to the information?

Respond but also providing insights. Is not citizens against the city. Is a citizens with the city. There is a lot of expertise that is necessary to tap into and also to get engagement.

Did the municipality also provide financing for this project?

Yes, it is a EU project, but it was 50% funded project and municipality provided some of the co-funding.

Also the Hogeschool is involved?

Yes, they were involved in the tourism part. Because they did an experiment where they put a sensor for one of the big museums to measure the queue.

How do you judge the participation and the use of these applications?

Actually it is an interesting step because this is the part where the project will end and the standing organization will start. What we do is that we make a separate entity that will be responsible for the legacy of the project and also reach out to other cities to get involved and Waag Society, together with the spin-off companies, new companies they will be responsible for selling, not only that, because it is open source, but to implementing the things and we will be responsible for the development. This is what we do more often, to start a company.

What you think are the main reason behind your partners' involvement in this project, opening their data?

Interesting question, in general I think everybody agrees there are 4 reasons for open data: one is enhancing transparency – this is a political thing; then is enhancing efficiency - and this is because cities with a complicated set of departments, can gain a lot when they harmonize and share data – they are in fact very interested themselves in improving their efficiency and they see that opening data either within the boundaries of the city hall or outside is helping them; then there is a large stress on innovation – this means how to stimulate small and large companies making value that then will give value to citizens but also give back value by way of taxes; and then there is the fourth that is like "leefklimaat", for example by the way of the smart citizen kit project, could help cities become more livable. In each of these projects the focus is a little bit different but the underlying reference structure is always the same. In this case every city of this scale is interested in solving logistics and mobility problems. Like I heard that each year 50000 kms in the city are just made by cars looking for places to park. So if you can make that more efficient, then it's a lot better for local environment. Then there is one more goal in this specific case because the city also wants an interface with other cities that are doing likewise things because of sharing knowledge and expertise; and program like these facilitate that.

Do you think it is also a way for cities to move away from multinationals-led smart city model?

Yes, that's a good point. I think there are two opposing forces, one is the turnkey approach: "Hey we have a problem and money and you infrastructure provider make it" and the other is that there is awareness mostly individuals that this way is costing lots of money and in the end not serving the interests of the people that well. I agree with you that projects like city SDK is starting bottom-up and also dealing with open source. So you avoid vendor lock-in.

Do you think there is potential for conflict or frictions between the two ways of looking at smart city projects?

I think that there are potential conflicts, I mean is fine to do pilots and experiments, because you can find out many things and you don't influence the big scale. Because as soon as you go to the big scale, I mean being able to provide fresh drinking water, to 800.000 citizens of Amsterdam, it's hard to do that bottom-up, open-source in a sense. At least I think it can be done because all of the main core infrastructure of the internet is based on open source projects, but I see there also benefits to scale and to be able to have a company that you can say "Hey you have to do this". So as soon as form the small pilots you go to the large implementation, there is this tension. Personally I think it can be done, with the bottom-up methodologies you can provide big results, but many people are not convinced. As in one of the followups to Smart Citizen Kit involving big companies I don't think it's a problem, is a challenge to find the way to work with them, harnessing their strengths but not forgoing your own credibility for the "hackers". I mean if we loose that then there is no point for us. Those principles of openness and fariplay and sharing and human scale, we are not in a position or willing to let them go. We have to find a way to accommodate that. The smart citizen kits for example started in Fablab Barcelona, now the main proponent is doing his PhD at Intel. So you see immediately that there is an interest in big companies to grasp this. It's interesting and you have to find a way to make it work.

What is the timeframe of this project?

Our Amsterdam based implementation, that was a project is gone. The program is still wide open, but also the technological development for the kit is wide open and going strong.

APPs for Amsterdam.

We had this competition twice and not last year. We had first APPs for Amsterdam, then APPs for Noth Holland, then APPs for Netherlands, then APPs for Amsterdam 2, now we have APPs for Europe. Personally I think that I am not totally interested in APPs, I am interested in tools, so that people can build APPs, interested in data, algorithms, impacts for citizens and APPs such as have been a way to mobilize attention, because they have attached open data, entrepreneurship, innovation, citizenship, they are something you can grasp, it's almost physical, but the stakes are much higher. I am not sure the forefront of innovation is in apps contests.

Which were the resources provided by the Amsterdam Economic Board?

Funding, attention, providing data, judgements of the winners.

There is a plan to run this again, there is a role if are targeted at solving certain solutions, so from open APPs contests you could go to civic challenges, where you involve lots of people working together to solve a specific challenge and I believe in it. But the format should be tweaked.

I think there is a role for accelerators, a role for competitions in the sense that these good examples can have a podium that will attract more attention, more users, more funding and rewarding the people. The only think is that us as an innovation agency we should look for new ways to engage, for example the "Code for Europe", that should be in the list, is a fellowship where talented programmers are matched with cities departments to have a kind of well paid internship for few months so they not only try to solve the problem, but they try to infuse the city or the body with new ways of thinking including the technological view, that they often lack. We have been doing that, also in European program, also in the municipality of Amsterdam and we had 3 fellows last year, 3 again this year, that we help when they need help. This is a very successful instance; we bring together this technology knowledge in a context that normally lacks that.

This is also a collaboration with the municipality of Amsterdam.

Name of organization: MobyPark

Role within the organization: Head of Business Development

Date and Place of the interview: Hilton Hotel Rotterdam, 2014-06-20

1. **How long your organization has been involved in this project?**

We have been active in Amsterdam since October 2013, but we started our operations in December 2013

2. **How many people are working on it?**

Less than 10

3. **Which other organizations are involved?**

Startup-bootcamp; hotels (Mercure, Accor, NH Hotels)

4. **Has the number of organizations involved changed over time? How it evolved?**

We try to involve more partners that have parking spots as well as individuals. In Amsterdam we largely rely on companies parking places.

5. **Can you tell me how this project originated?**

The project originated in Paris between August and October 2012, within an initiative for start-ups (incubator sponsored by Orange telephone company). In Amsterdam the project stared as we were invited to an accelerator (Startup Bootcamp) that provided technical and business training, financial support (pizza-money €15.000) and contacts.

6. **How it developed?**

The platform was already operating in France, but we saw the opportunity offered by Startup Bootcamp in Amsterdam. It was focused on contactless technology.

7. **What is the main reason behind your involvement in this project?**

We saw this opportunity in Amsterdam, where technology is also highly developed and it would be easier to expand there. We also see Holland as a test bed for our company. In general we believe in the share economy, so we works a bit like Air BnB. We put in contact who has a parking space that is not using and who needs it. Moreover thanks the possibility of reserving the space, people don't need to waste time and money driving around looking for a parking spot, but they can straight go to it. This has a potential good effect on traffic congestion and on CO2 emission. In fact we would like to study more in depth the contribution that we can bring to CO2 reduction. We are looking for somebody that can support this research. It can be an interesting way to promote our service in new cities. We know that we cannot fully eliminate cars from cities. Cars are useful if you are a family with children and public transport can be expensive too. We aim to reduce the wasted time spent in cars looking for parking that can be booked in advance.

8. **What you think are the main reason behind your partners' involvement in this project?**

Depends, Hotels and providers of parking space seek mostly a financial advantage. In particular we work with hotels and that besides that can diversify their business, have a larger number of people passing by their venues and this is a promotion for their activity. People park the car and exit through the Hotel, they can check it out and maybe stop by for a coffee or a drink.

9. **Which resources your organization is providing?**

We provide the connection between who is offering the space and who needs it. We do it through our website and our app. For providers of larger parking spaces we also provide a device that allows park users to enter the space by typing a code on a keypad. In order to attend startup bootcamp we had to give them some shares of our company. Our technology (app/website) is developed in France.

10. **In your opinion, which resources your partner organizations are providing?**

We received a lot of support from Startup Bootcamp, we were invited to attend their accelerator. And besides financial support for the beginning they provided training and **marketing** capabilities. Other partners like hotels provide parking space that is not used. From the Amsterdam smart City organization we received more a networking support, but we are interested in collaborating with other projects. We wish that they can support data gathering on savings in C02 emissions that our company can realize.

11. Have legal frameworks been implemented in your relationship with your partners?

Yes we have signed contracts with providers of space. Our business model is commission-based and we keep a share of every parking fee that is charged.

12. Have organizational arrangements been implemented in your relationship with your partners?

Not relevant.

13. How other partners have been selected?

We seek for opportunities and we constantly seek for companies that can provide parking spaces.

14. Does your organization have any arrangement that enables the exchange of information with other partners?

Our technology works in that way: we exchange information from providers to customers.

15. Would your organization have you been able to develop this project autonomously?

Not to this extent.

16. Which elements was your organization missing?

We lacked knowledge of the local market, finance and training.

17. Who provided you those?

Startup Bootcamp.

Note:

They are looking for a research in the CO2 emissions saving that they can realize. He wanted to meet me as I might support him this way. They might need a dutch speaker. They might connect me with Vivianne from Amsterdam Smart City.

They are active and want to expand in Rotterdam and den Haag.

In France 90% of parking space is provided by individuals, in NL 70% by companies.

Name of organization: Amsterdam Smart City

Role within the organization: researcher on citizen initiatives

Date and Place of the interview: 10-07-2014; De Groene Bocht, Keizersgracht 452, Amsterdam

Report of the meeting.

[ASC researcher on citizen initiatives] is conducting a research on bottom up initiatives in the city of Amsterdam.

As the ASC programme is trying to move from a companies driven, top-down approach towards involving more extensively the citizens and already existing initiatives.

She is mapping all the grassroots initiatives active in Amsterdam that can be linked to the themes of ASC (Living, Mobility, Working, Data).

The idea is to look both for citizen driven initiatives, linked to the community and socially innovation but also possibly extending to commercial initiatives that are small scale and might be "philosophy driven".

The concept is to look beyond technology-related initiatives. Technology can be an enabler of more bottom up initiatives that can transform the city.

Therefore there is still a debate whether to include only citizen initiatives or also social entrepreneurs and start ups.

She is favourable to include a wider spectrum of activities, beyond citizen or community, but also looking at more commercially oriented ones that might be philosophy driven. A very interesting point is that they might have nothing to do with technology, but they tackle the same themes/issues as ASC projects.

This research is to have a clearer picture of what is already happening and then to see what ASC can do.

It seems to prove that ASC is moving beyond the companies led, technology oriented smart city model, towards one that is inclusive and actually built on already existing activities.

[ASC researcher on citizen initiatives] was interested in my categorization of citizen participation as she is trying to perform a similar task but with initiatives outside the current ASC projects.

For her the starting point is that those initiatives should fall in one of the ASC themes.

An example of what she is doing is given by the website dezwijger.nl

Her assignment has just started and they are still discussing the direction that will take and the use of the information that will be made [also depending on ASC strategy – see steering committee meeting]; she aims to finish her assessment by end of September.

Name of organization: TNO, University Twente

Role within the organization: intern, research on Smart Cities and participation

Date and Place of the interview: 13-08-2014. Stadt Koffyhuis, Delft

Report of the meeting.

The interviewee is a master student in Philosophy of Science, Technology and Society (PSTS) at Universiteit Twente. She is also doing an internship at TNO.

Her thesis focuses is on Smart Cities and the role of technology in allowing citizen participation, from a bottom up or top down perspective.

She is focusing on two case studies: a project in Haarlem aiming at the creation of sense of community through the use of technology initiated by the police department and Smart Citizen Kit in Amsterdam.

Regarding the latter, she has been following the project since april and has been interacting with a number of stakeholders from: ASC, Waag Society, RIVM, GGD and participants.

She has attended to two of the meetings with participants, gathering feedback from them. The interesting point from her is the fact that some people, despite the technical problems were enthusiastic and willing to continue their involvement. Also the fact that around 35 out of the total 70 participants were attending the meetings is an element worth considering. The profile of the participants can be roughly described as a group of young highly educated males (under 40) with interest in technology, a group of more elderly males (above 50) with an interest in environmental measurements in their neighbourhood and a group of woman with some technical knowledge in the sector of environmental measurements. As a result, participants had two different goals: one was to use the participation as an individual activity to gain a better understanding of the environmental qualities of their living area, the other was to gain information that could be used to challenge authorities for better policies.

She also interviewed members of RIVM, that proved to be quite open towards this kind of citizen participation; however it might not represent the view of the whole organization but just of some more "progressive people".

Representatives of GGD were less open, they had a more technical point of view as the measurements required to be more accurate to allow to draw conclusions. In particular they were worried of giving too much "power" to citizens to present their own findings if they were not correct or not comparable with official ones.

ASC saw this project as a 1st pilot within a larger process: they want to experiment in order to see what people can do when provided with measurement instruments, if it's possible to work together with official organizations.

In this sense is interesting to see that SCK stimulated the interest of official organizations that are interested in collaborating with further developments of the program.

The SCK is quite interesting as a case because it can be seen either as a top down or bottom up project. It is clear that it has not been initiated by citizens, but on the other side is somehow challenging the official positions. Citizens had the opportunities to experiment with new technology and some where interested and bought the kit afterwards in order to continue to experiment and try to upgrade it. Also it's interesting to see that this initiative created a good level of interest, with many respondents.

This project is basically to be seen as a test un order to see whether it might foster new things in the field of citizen involvement in environmental measurements through the use of technology.