

POLITECNICO DI MILANO

FACULTY OF ARCHITECTURE

SEDE DI PIACENZA



Smart citizens in built smart cities

Aiming to increase social interaction simultaneously

revitalize the spaces

Master's thesis

Niloofar Khalili

781454

Supervisor: **Professor Guya Grazia Maria Bertelli**

Assistant supervisor: **Professor Juan Carlos Dall'Asta**

Spring 2015

Abstract

Over the last few years, the term 'smart cities' was extremely critical topic in academic, industry, and policy debates about the distribution of new media technologies in urban settings. It is generally used to define and market technologies that make city infrastructures more efficient, and personalize the urban experience. (Greenfield and Shepard 2007)

Correspondingly At this year's Consumer Electronics Show, many of the major technology companies were falling over themselves to demonstrate their credentials in the internet of everything space. Smart homes, connected devices, and sensor technology were on display in abundance. Many delegates would have been left thinking that an intelligent, programmable world, where all objects and devices are connected, cannot be too far away. This new world will offer many exciting consumer engagement opportunities for brands that are prepared to invest in partnerships, technology solutions and importantly 'owned content'.(Joseph ,et al.,2014)

Furthermore it is obvious that technology has transformed human lifestyle, their relation to the environment they live, social communications, the way they understand spaces and themselves. Although the urban new media's purpose for making better life is undeniable but it costs weak social

interaction. So the aim is to make cities, smarter simultaneously increasing social interaction; synergism rather than antagonism.

So how digital media and culture allow citizens to engage with, organize around and act upon collective issues and engage in co-creating the social fabric and built form of the city and at the same time boost their communication and how to broaden the debate about the role of new media technologies in urban design from an infrastructural to a social point of view, or from 'city management' to 'city making.'

Table of contents

Introduction

Chapter 1

Cities in history and now

Chapter 2

Smart city

The Origins of Smart Cities

the definition of “smart city

From theory to praxis

Chapter 3

Urbanization and Ubiquity

Urban computing

urban computing sample

Smart Cities: Promise and Peril for Urban Policy

Chapter 4

Smart citizens

A Manifesto for Smart Citizens

Chapter 5 (through design)

Design smart cities

Social cities

Smart

Open

Chapter 6

Expo 2015 milano ,design intelligently,revitalize the

Space

Interactive space

Conclusion

References

Introduction

In today's cities people's everyday lives are shaped by digital media technologies such as smart cards, surveillance cameras, quasi-intelligent systems, smartphones, social media, location-based services, wireless networks, and so on. These technologies are inextricably bound up with the city's material form, social patterns, and mental experiences. As a consequence, the city has become a hybrid of the physical and the digital. This is perhaps most evident in the global north, although in emerging countries, like Indonesia and China mobile phones, wireless networks and CCTV cameras have also become a dominant feature of urban life (Castells, *et al.*, 2004; Qiu, 2007, 2009; de Lange, 2010). What does this mean for urban life and culture? And what are the implications for urban design, a discipline that has hitherto largely been concerned with the city's built form?*** recently, these topics are quite critical. For example The Center for Architecture and Situated Technologies (CAST) focuses on the evolving and growing implications of new technologies within the built environment: social, political, ecological and material.

- 1- *How is possible to engage smart citizens in smart physical spaces simultaneously boost social interaction ?***
- 2- *How the environment can go online to distribute the information like the idea of holograph and how the people can understand it independently?***
- 3- *How to deal with the existing area to design a project as a new frame related to the subject of the project to make a new actual relationship with the site and revitalize it?***

Despite the obvious implications for the built environment, architects have been largely absent from this discussion, and technologists have been limited to developing technologies that take existing architectural topographies as a given context to be augmented. The recent fascination with building envelopes consisting of large-scale programmable urban screens or corporate lobbies outfitted with so-called interactive architecture highlights the dilemma. What opportunities lie beyond the architectural surface as confectionary spectacle or the interior vestibule as glorified automatic door opener?(Greenfield and Shepard 2007)

With the research located at the intersection of architecture, new media, and computational technologies, CAST is interested in the possibilities offered by computational systems for rethinking human interaction with (and within) the built environment. Here the focus areas include learning environments, design environments, responsive architecture, and locative media. Computational technology provides both a means and a medium for this research: an operative paradigm for conceptualizing relations between people, information, and the material fabric of everyday life.

This thesis will try to provide an overview of the current trend of being smart in the physical urban context. It is divided into six main sections.

the first section will introduce concept of the city and provide historical overview about the cities aimed on the environmental aspects of the cities.

the second part take a closer look at the notion of 'smart cities' often invoked in policy and design discourses about the role of new media in the city. In this vision, the city is mainly understood as a series of infrastructures that must be managed as efficiently as possible. However, critics note that these technological imaginaries of a personalized, efficient and friction-free urbanism ignore some of the basic tenets of what it means to live in cities (Crang and Graham, 2007).

the third part is the statistics about future of smart cities and usage of devices and how these will impact on cities.

In the fourth part it is an overview of the problem discussions and possibility of being smart in smartcities ,that being smart also gives people Unfavorable outcomes.

furthermore the part fifth talks about smart citizens and their important role and how to design smart open cities to reach the idea of being smart.how can architects create opportunities to engage every citizens in the development and revitalization of smart city and increase social interaction? In the area of design in real world real time

In the last part by the Expo 2015 Milan is chosen as a case study of smart city which represents the links between communication, technology, design, urban planning and the city and profoundly it is an opportunity to present more open spaces and behavior to use the spaces

At the end it is concluded that how these ideas could make smart cities more possible and how to adopt cities with rapid pace of new technologies.

Chapter1

Cities in history and now

Cities in history and now

signs of human activity in the environment are long time into history. hunter-gatherers modified their living environment through large-scale deliberate use of fire. Farming systems emerged around 10,000 BC. Transition from nomadic way of life to settled

living demanded radical changes in the way ancient people view and use surrounding land. Emergence of settlements and necessary change in the way people gained their food and new innovative ways of food production brought dramatic change into relation between human and environment. The need to keep land productive so it could feed constantly increasing population of the villagers brought new challenges – ability to keep land productive on continuous basis, enhance soil fertility, or ability to protect crops so they could be used for the next growing season (Girardet 2008). These challenges force people to adjust their surrounding environment which often caused degradation and depletion of the resources.

Emergence of the first cities around 7,000 BC started new era of people's lifestyle. The ever growing population had to look for new ways how to supply themselves. Role of the trade grew and people were no longer depended just on their contiguous land. Invention of irrigation that came about 6,000 BC was another step toward the opportunity to improve one's life. Growing demands on living conditions had substantial environmental impact. Need for timber led to extensive deforestation; intensive irrigation led to salinization of farmland; the amount of waste become major problem connected to risks of diseases (Girardet 2008).

The rise of the Greek civilization brought new challenges to the sustainability. The success of Greek civilization was achieved at considerable environmental costs (Girardet 2008). Extensive deforestation, soil erosion as a result of deforestation or salinization as a result of irrigation need were foundations for

environmental degradation contributed to the fall of Greece empire as well as to the fall of the Rome. The Middle Ages and its cities were more sustainable than ancient Rome with their self-sufficiency and local economy.

Industrial revolution started in Britain in the 18th century. It brought new technologies that changed the way people used their environment and urban life. New energy technologies enabled to produce more and faster than ever. Large factories were usually located in the cities and people were following them with the illusion of better life. Steam engines became indispensable for pumping water into cities as it was need for industry and sewage out of them. Steam engines drove generators to create electricity, for the first time in the history people had light and cities were brightened up. Population in cities grew and so do the waste from the fabrics and inhabitants themselves. Living conditions were horrible – water and soil pollution, air pollution and smog were so extensive that life expectancy were critically low (Girardet 2008).

Today the city is the product of breathtaking innovations that emerged from industrial revolution. But these incredible innovations and changes brought problems such as overpopulation, pollution, traffic and inefficient energy consumption that became ubiquitous. Especially the cities that became workhorses of the new industrial reality had to deal with extreme environmental degradation and other problems connected with rapid and extensive development.

Some people and communities in these cities felt that the situation is unsustainable and the problems need to be addressed and solved. They started to look for alternatives that would improve living conditions in their cities. There is wide range of solutions for these environmental problems. Some of the cities focused on the more efficient energy consumption , or self-sufficient cities. Others focused on the concept of

sustainability, which is called sustainable cities. Many cities are trying to be eco-efficient or smart. lots of alternatives can be found today and each is focused on the specific aspects of urban life (Tabačková, K., 2013).

Chapter2

Smart city

The Origins of Smart Cities

the definition of “smart city

From theory to praxis

Smart city

It is very hard to name the most aching problems in the cities. Every city is unique and as such it has to deal with unique set of problems. Cities try to react and solve these problems for very long time and they created several very interesting alternatives and approaches to these problems. In this respect it may be said that great step forward came with the shift from an industrial to an information society. New opportunities information technologies offer to today society are vast. The amount of information to be accessed is endless; possibilities to use these information and technologies for human benefit also; new technologies are still emerge people can make their life in cities, and not only in cities, as comfortable as they could imagine. However constantly rising urban population, pressure on the urban areas in form of constantly rising demands on resources, waste management, desire for better life, and also pressing issues like food supplies, pollution or emerging fuel crisis led to pressing need for alternatives, for transformation of current state to something more satisfactory and more sustainable, to something smarter (Tabačková, K., 2013). Problems connected to urban environment were often been solved through creativity, human potential and capital, cooperation and congruence between the stakeholders, and bright scientific ideas shortly through “smart” solutions. This label should, therefore, point to clever solutions allowing modern

cities to prosper, by means of quantitative and qualitative improvements in productivity.

the label “smart city” is came from early 1990s and at this time it is closely connected to the concept of Information and Communication Technologies (ICT) (Caragliu et al. 2011). But what is this “smart city”? There is lot of confusion what comprises this concept, because almost every city uses information technologies in some way today, so this concept cannot be defined just on the information technologies (IT) basis, or it can? Richard Holland (2008) argues that cities too often declare that they are “smart” however they fail to define what it means, or in offering any evidence to support these proclamations.

Images of the digital city, intelligent city, high-tech districts, and neighborhoods of smart communities abound may be observed (Allwinkle & Cruickshank 2011); knowledge cities focused on education, digital, or cyber cities, driven primarily by investments from ICT, or eco-cities specialized on environmental sustainability (Murray et al.2011); all these cities fail to articulate what it means, or what they mean by proclaiming to be “smart” and they cannot be considered as “smart city” by partial innovations or changes. (Allwinkle & Cruickshank 2011).

for instance Today, ICTs are spreading into the streets — as mobile devices carried by inhabitants, into vehicles, into buildings, and infrastructure networks. This is creating new opportunities for greater efficiency and precise control in urban management. To date, much of the discussion of “smart cities” has focused on this shift. (Peirce et al .2013)

Validity of any city’s claim to be smart has to be based in more diversified framework than just usage of information and communication technologies, smart cities are not just the top-down creations of industrial engineers, or even the designs of technocratic public officials — citizens and entrepreneurs are playing a major role in their evolution***

The Origins of Smart Cities

“No invention has been more timely than the telephone. It arrived at the exact period when it was needed for the organization of great cities and the unification of nations.”
—Herbet Casson, The History of the Telephone, 1910

This historic migration of information and communications technologies out of homes, offices, and factories into the streets will play out against the backdrop of the greatest period of city building humanity may ever know. But we are now predominantly urban and in the next century will become almost exclusively so.

“[T]he world population will reach a landmark in 2008,” United Nations demographers declared in 2007, “For the first time in history the urban population will equal the rural population of the world.(World Urbanization Prospects: 2007)By 2050, nearly 70 percent of humanity will live in cities.(World Urbanization Prospects: 2011) More speculative projections suggest as many as 90 percent could by 2100. (Lincoln Institute of Land Policy,2012).

Dispersal of existing metropolitan populations continues in the United States and Europe, despite counter-currents of urban revitalization (which is occurring at densities far below historic averages). Already largely urbanized, Brazil will spend the 21st century rebuilding its vast squatter cities, the *favelas*. In sub-Saharan Africa, where 62 percent of city dwellers live in slums, the urban population is projected to double in population in the next decade alone (though this rate is increasingly the subject of debate) (Clos,et al., 2011)

As much as these trends make it compulsory to look to the future, when forecasting, it is critical to look back before looking ahead. As urbanization paradigms for the next 100 years is under consideration, then, it is useful to look back as far. It is difficult to understate the importance of ICTs in enabling the first

great wave of urbanization in the late 1800s. Steam power may have started the industrial revolution, but information technology saved it from collapsing under its own weight.

In the United States, just keeping track of the population and the economy overwhelmed the federal government by the 1880s. The decennial Census, mandated by the U.S. Constitution, was proving too vast and complex to tabulate by hand. In 1887, as the even larger 1890 count loomed, clerks in Washington finally completed the analysis of the previous one.

This crisis of counting was a governance problem that strongly parallels the contemporary problems of cities in the global south. And ironically, it is a story about the role of private industry in inventing and marketing technologies to address urban problems, and the risks of that approach. This is the creation story of IBM, the most aggressive proponent of smart cities today. (Peirce et al .2013)

The first Census began on Monday, August 2, 1790. (Census. 1790)By 1793,the hand-tabulated results were in. In 56 pages, Return of the Whole Number of Persons Within The Several Districts of the United States described a nation of villagers and farmers barely 1 in 20 Americans lived in cities and towns in 1790.

In New York City, already the nation's largest settlement, a mere 32,328 persons resided. This pattern would hold for decades. As late as 1840, the share of the nation's population that was urban was still just 10.8 percent. The Industrial Revolution would change all that.

From just 2 million townfolk in 1840, the United States' urban population grew to over 50 million in 1920, when they outnumbered farmers for the first time.(Population: 1790 to 1990)

As the country grew, the Census grew in scale. In 1790, fewer than 4 million persons were found. By the tenth count in 1880, the population has swelled to 50 million. The scope of data gathered on each person expanded dramatically as well. A major expansion in the 1880 Census designed to improve understanding of immigration also included a massive commercial survey of the new industrial economy. While the 1870 Census reported back in just three volumes, the 1880 report contained 22 and took seven years to compile, even with a three-fold increase in the workforce to over 1,500 clerks.(Census 1880)

The 1890 Census was shaping up to be a catastrophe, despite plans for even more staff in Washington. There were fears that

the “1890 figures would be obsolete before they could be completely analyzed.”(Beniger 1986)

The crisis at the Census was a manifestation of what sociologist James Beniger has called “the control revolution” of the late 19th century, a time when “innovations in information-processing and communications technologies lagged behind those of energy and its application to manufacturing and transportation.” (Beniger 1986)

Essentially, cities were growing faster than government could measure them. Similar logistical problems plagued railroads, shipping lines, and manufacturers.

For the Census, the solution was a primitive breed of mechanical computers. After seeing the looming crisis, in the 1880s a former Census clerk named Herman Hollerith developed a mechanical tabulating machine to speed the count up. Able to rapidly read and record survey responses encoded on paper punch cards, the machines revolutionized the Census. Using the machines, the raw 1890 population count of over 60 million people was completed in just six weeks. Hollerith boasted that the Census could now process a stack of forms the height of the Washington Monument in a single day. (Beniger 1986)The full

tabulation was completed in 1892, five years faster than the previous one.

Hollerith's mechanical tabulator, born of the need to measure cities of unprecedented scale, set the stage for a far greater transformation. The company he formed, which after a number of mergers emerged as the prosaically named Computing Tabulating Recording Company, would pursue an ever-expanding market for information processing Throughout the next century and beyond. Governments, railroads, and shipping Companies collapsing under the weight of their own massiveness and speed were eager customers. And in 1924, the company took a new name: International Business Machines.

The parallels between then and now are striking — booming cities spinning out of control, and the application of new technology to measure and control them. Consider Rio de Janeiro, for instance, a city described as recently as 2004 by one U.S. defense intellectual as “feral.” (Norton R J 2004). Today, Rio is embracing a diverse array of information and communication technologies for law enforcement and urban management to re-assert government authority in preparation for 2016 Olympic Games. But this latter-day control revolution is not limited to the Global South. It is proving a powerful band-aid

for the fiscally-challenged cities of the Global North. As Mayor Michael Bloomberg of New York is known to say “if you can’t measure it, you can’t manage it.”

Most striking about this trend is that the business model for urban informatics has not changed in more than a century. Rather than sell, Hollerith leased his machines and charged per card counted. Today, the company he created has centered its strategy on selling cities metered services delivered over a global cloud computing infrastructure. (Peirce et al .2013)

The definition of “smart city

So, what is the definition of “smart city”? Discussions in academic literature of relevant theory or frameworks are few and it seems that academics lag behind practice of how different cities are moving toward new concept or how and why some of them define themselves as “smart”. It may be observed that practice besides it often remains fragmented still generally outstrips any discussion in academic literature capable of generalization (Lee et al. 2013). Let’s start with definition by Giffinger et al. (2007) that is widely used across literature that deals with “smart city” concept. This definition is based on the broad range of characteristics and approach to these specific features is evaluation of them regarding a forward-looking

development on the basis of a combination of local circumstances and activities carried out by politics, business, and the inhabitants.

The term smart city is understood as a certain ability of the city and it is not focusing on the specific aspects; the specification of certain characteristics is crucial. Giffinger et al. identifies several fields of activity that are in relation with “smart city” concept:

industry, education, participation, technical infrastructure, various ‘soft factors’ The ‘Smart city’ is therefore a city well performing in a forward looking way with regards to specific six characteristics and build on the “smart” combination of endowments and activities of self-decisive, independent and aware citizens

Specific characteristic defining “smart city” are: economy, people, governance, mobility, environment and smart living . For the formation of these six characteristics it is necessary to develop a transparent and simple hierarchic structure. “Smart city” is defined by six characteristics, they are defined by 31 factors, which identifies main characteristics and these factors are defined by 74 indicators.

This hierarchic structure assures that if we identify city as “Smart” it will possess the same characteristics as other cities

identified by the same process. However we cannot base this definition on the present state, this identification should be considered in further research that builds on time-series data .

Moe Thuzar bases his definition of the “Smart city” from Giffingers work. He defines “Smart city” as city “that have a high quality of life; those that pursue sustainable economic development through investments in human and social capital, and traditional and modern communications infrastructure (transport and information communication technology); and manage natural resources through participatory policies. “Smart cities” should also be sustainable, converging economic, social, and environmental goals.” (Thuzar 2011). Other scholars define city being smart, when investments in human and social capital and traditional transportation and modern technologies (ICT) and their infrastructure power sustainable economic development and high quality of life, with self-possessed management of natural resources, through participatory governance (Caragliu et al. 2009).

Some authors like Gartner (2012) place their interest into intelligent exchange of information that flow between many different subsystems. This information are analyzed and translated into citizen and commercial services. The city will react on the information flow to make this wider ecosystem

more resource efficient and sustainable. This exchange of information is based on the smart governance operating network designed for sustainable cities (Lee et al. 2013). Lee summarizes his definition of the “smart city” as follows: “Smart cities are envisioned as creating a better, more sustainable city, in which people’s quality of life is higher, their environment more livable and their economic prospects longer.” Probably the most famous academic work about smart cities wrote Robert Holland (2008) in his article “Will the Real Smart City Stand Up? Creative, Progressive, or Just Entrepreneurial?” He raised an objection that cities use “smart” tag intentionally so they could rebrand themselves and be more modern and desirable. Holland argues that cities should understand and gain knowledge of how development towards being “smart(er)” could help them. His definition of the “smart city” is following:

“...are territories with a high capacity for learning and innovation, which is built-in to the creativity of their population, their institutions of knowledge creation and their digital infrastructure for communication”. [and are concerned] with people and the human capital side of the equation, rather than

blindly believing that IT itself can automatically transform and improve cities.” (Holland 2008).

“Smart city” “creates a real shift in the balance of power between the use of information technology by business, government, communities and ordinary people who live in cities” (Holland 2008); so it is not just the technologies, smart business, or smart education that creates and distinguish “smart city” from other cities, the particular characteristics and pieces of the whole are those important.

Most of the authors use these characteristics, or they are patterned on them. Barrionuevo et al. (2012) use concept of five types of capital: economic (GDP, sector strength, international transactions, foreign investment); human (talent, innovation, creativity, education); social (traditions, habits, religions, families); environmental (energy policies, waste and water management, landscape); institutional (civic engagement, administrative authority, elections). In their article they define these types of capital as “the lifeblood of the modern urban system ... nurture through strategies targeting innovation, social cohesion, sustainability and connectivity.”

it may be found that some of the characteristics and types of capital are interconnected (economy, governance, people, and environment) however Barrionuevo’s concept is more oriented to the human factor, which remains crucial to urban development; they end their article with statement that without

participatory, intelligent, and provocative society, any strategy is doomed to failure, regardless of how well-intentioned it may be

Caragliu et al. (2011) review the literature about “smart cities” and they offer six characteristics that seem to be quite common for this concept.

(1) usage of networked infrastructure for improving economic and political efficiency and enable social, cultural, and urban development.

(2) principal stress on business-led urban development.

(3) achievement of social inclusion of various urban residents in public services.

(4) focus on the principal role of high-tech and creative industries in long-run urban growth.

(5) intensive and constant attention to the role of social and relational capital in urban development.

(6) social and environmental sustainability as major strategic component of smart cities .

However they partially agree with Holland and his opinion on “smart city” concept as fuzzy one. They offer above mentioned characteristics as most commonly occurring in the academic writings and they present these characteristics especially points 5 and 6 as very promising research objects for the future urban research .

European Union set a goal in form of energy and climate objectives at local level. This Initiative will support cities and regions towards reduction of greenhouse gas emissions through sustainable use and production of energy. This will require systemic approaches and organizational innovation, encompassing energy efficiency, low carbon technologies and the smart management of supply and demand. In particular, measures on buildings, local energy networks and transport would be the main components of the Initiative (European Commission 2013).

This initiative is closely connected with other EUs initiatives – European Smart Cities, which are theoretically based in Giffinger's methodology (Anonymous[1]2010) and Smart cities and Communities, which brings together cities, industry and citizens to improve urban life through more sustainable integrated solutions (European Commission 2013). These initiatives are focusing on the new technologies and therefore we cannot be surprised to find technology giants such as IBM, or SIEMENS to be participating in this area. IBM is very active in this area and offers picture of the future where smarter cities will drive sustainable economic growth through smart technologies (Smarter cities 2013).

From theory to praxis

Theory of smart cities did not give the satisfaction of what smart city really is, how it should look like or what should be expected from the city that is labeled as smart. With the prognosis of more than six billion people will live in urban areas by 2050 (Girardet 2008) it seems that there is no other option but rely on “smart” urban solutions, to ensure that people in these cities will have “good life” through optimized economic activity, energy consumption, and livable and pleasant environment. The need for smart urban solutions has never been greater.

Probably the most important aspect of the city’s infrastructure is transportation and transportation is the most common that is being adjusted and adapted for the smart future of the city. Especially European cities have to deal with daily traffic jams, because these cities were not built for ever more increasing amount of cars.

Therefore transportation plays critical role in urban design and form nowadays. The physical structure and spatial arrangements of a city and its surroundings are highly influenced by transportation infrastructures. Adjustment of structure and its spatial arrangements strongly influence city’s life – personal and employment related travel patterns,

generation of economic opportunities, increase or decrease of people's sense of community; and it has also potential

to improve the quality of living and efficiency in an urban area (DeCorla-Souza; Agarwal; Rabinovitch; Crane in Pinderhughes 2004).

Some examples:

Zurich is Switzerland's biggest city and was several times voted as the city with the best quality of life in the world. Excluding its great economic potential and its orientation of smart technologies; Zurich is unique for one of the world's most enlightened transport policies (Girardet 2008: 147). Citizens rejected construction of subway network in the referenda and parliamentary resolution confirmed that priority should be given to public transport. Zurich's transportation systems is based on excellent coordination of transport services and special tickets offers, wide range of high-quality services, introduction of "zone buses[10]", very important feature of the whole system is that priority is often given to trams and buses on the traffic lights on the other hand parking and waiting restrictions were introduced on general traffic. Long term plans were successful and from 1984 to 1992 the number of people using public transport increased by almost 40 %, as well as very

ambitious plan that all citizens should live no more than 300 meters away from a tramway stop stands at no less than 96 % achieved

Also there is integrated transport policy in Vienna, which is giving the non-motorized transport priority – public transport, cycling and walking (Girardet 2008). Transportation is closely connected to the urban planning and therefore Vienna is trying to find flexible traffic solutions with changing urban reality. Vienna placed emphasis on new mobility concepts and scenarios. Car sharing or car-free housing are no longer exceptions – Vienna built its car-free residential complex back in 1999 and it proved its worth. The future is in networked mobility, where digital mobility assistants[11] will point us in the right direction with the full range of public and private transport modes to plan our routes with (Smart City Wien 2010).

Another innovative approach may be seen in Finnish city Turku where they besides other actions towards “smart” Turku want to introduce shared use of cars (Turku, official web pages, 2013).

Malmö, Sweden, is using also smart technologies so it is an example in “Smart city” concept as well. Malmö has highly-developed mobility system, with approximately 490km of cycling routes[12], more than 40,000 of passengers in public

transport[13], or the aim of 100 % green car fleet for public transportation system[14] (Malmö, Official web pages 2012).

But probably the most famous transportation system is in Danish capital city – Copenhagen. Transformation of the Danish capital started approximately 40 years ago when urban planner Jan Gehl started research about urban space. He found out that cities are more adjusted to the cars than to the people and proposed changes that would return city to the people[15] through 40 years a total of

100,000 square meters of inner city that had been dedicated to motorized transport was returned back to people as traffic-free space (Girardet 2008). Mobility management today integrates diverse mode of transportation while considering climate and environmental concerns. Nowadays information, technical solutions and smart devices can affect the traveler's mind-set and choice of vehicle before the trip begins and Copenhagen has lot of alternatives to offer. Urban planners there introduced widespread bicycle culture long time ago. Besides providing a more habitable city, reduced carbon emissions and air pollution in the city, the shift from cars to bicycles also saves time and money (State of Green 2011).

The goal is to create network of bicycle lanes through whole Copenhagen and connect it to wider cycling network. Through campaigns like 'Bike to work' city inspires citizens to use bicycles instead of cars, this is supported through expansion of bicycle lanes, bicycle parking facilities and bicycle bridges. This phenomenon was even named :Copenhagenization. Urban planners from all over the world copenhagenize their cities, make them more bicycle-friendly[16] (State of Green 2011a).

Other environmental aspects are not so clearly defined and not so forward-thinking as transportation systems in "smart cities". Implementation of smart solutions for energy is quite widespread also. In 2012 Vienna thrown first community-funded solar power plant.

Power plant was opened on the site of the Donaustadt power plant in the north of Vienna, with 2.100 photovoltaic modules and an output of 500 kilowatt peak (kWp). The energy is served into the Vienna power grid and delivers solar power for approximately 200 local households (Smart City Wien [2010]a). Photovoltaic is not the only alternative energy resource Vienna has introduced, high-tech and high quality incinerator was launched back in 2006, back then it was the best one in Europe. Effectiveness is approximately 35 % and it produces 155,000 MWh per year, 145,000 MWh of energy and it is able to supply

48,000 of households with electricity and district heating for 12,000 flats[17] (Sedláček 2012). However Vienna is still working on better solutions for its energy efficiency and new technologies are announced with almost firm periodicity. All of these alternative energy resources and new technologies are aimed on reduction of CO₂ emissions and reduction of dependency from fossil fuels.

The Danish power grid is set up to prioritize renewable energy instead of fossil fuels. Denmark is country where priority is set on renewable alternatives and diversification of resources. Focus is on wind energy and Denmark is leading country in this respect and world leading producer of wind turbines. Varying weather conditions may cause fluctuation of production from 0 to more than 4,100 MW in just a few hours. To balance these fluctuations, Denmark has access to other production facilities such as the hydro-based Nordic system and the thermal power-based system south of the country (State of Green 2011b). However wind energy is not the only solution Denmark is counting on. The goal is as efficient usage of energy in housing and in production as possible. Between the most desired arrangements are reduction of CO₂ and energy consumption of the buildings, we may find some very innovative solutions in Copenhagen or in Aarhus.

Reduction of the energy consumption is probably the most common goal for “smart cities”. For example Barcelona’s “Smart City program” where from seven strategic initiatives three are about energy – Smart lightning; Smart energy; District heating and cooling (Climate Leadership Awards 2012). Luxemburg as another smart city bet on the application of low-energy standards – passive houses renovations and building houses in passive standards; employment and development of renewable energy application of effective technologies on public houses or lighting; district heating and alternative heating system; or consultations for citizens (Anonymous[2] 2012).

Technologies and new innovations are in the spotlight nowadays. Concept of “smart city” is relying on them as we could see in the previous section. Aim on the innovative technologies that would lead to smarter future is main focus in IBM, it has special program for smart cities[18].It is shown that mainly technological innovation oriented on the adjustment of transportation systems, energy efficiency or the environmentally responsible growth.

For example project in association with Boulder city to enhance Xcel Energy's distribution system and employ various smart grid technologies (Smarter Cities Challenge 2011). In Knoxville the city asked IBM to develop a roadmap to improve coordination

between utilities and the city, based on better data and effective governance.

The strategy is also expected to help affect greenhouse gas emissions by reducing energy use (Smarter Cities Challenge 2011a). Or in Milwaukee IBM cooperate with the city on plan for expanding aquaponics industry and how it could have a positive impact on the City's food supply, industry, health, and growth (Smarter Cities Challenge 2011b).

Building on the high-technology ,there are lot of good examples and praxis all over the world.Electric cars are constantly gaining more popularity, European Union set goal to build wide network for alternative fuels such as electricity, hydrogen, or natural gas across the Europe. In Norwegian Oslo or Toronto in Canada they usef these cars. However technologies may be used for environmental purposes such as waste management. Through recycling and subsequent use of waste the landfill from waste was reduced to minimum in Copenhagen; Vienna has also very sophisticated system of waste management; and we may find highly-developed waste management aimed on separate collection schemes, recycling banks or campaigns encouraging citizens to compost in Lyon (The Cities of Tomorrow 2012).

Here as an example for smart solutions for water usage through Vancouver, where city tries to reduce per capita water consumption by 33% from 2006 levels (320 liters a day). It has also introduced an array of measures to limit use of bottled water – reduction of solid waste. Over the next five years, water rates will increase by 50% to recover the cost of water-quality initiatives (The Cities of Tomorrow 2012a). Other solutions may be found in Stockholm where were build two wastewater treatment plants on high-tech level that are reducing source pollution to the minimum (The Cities of Tomorrow 2012b).

The concept of “Smart city” is maybe not very clear however initiatives and solutions toward more sustainable and smarter living in cities are very popular and cities start to realize that their activities have to consider possible future consequences. There are lot of definitions and lot of methodic that try to set what “smart city” really looks like. Popularity of this concept limits any efforts for narrowing this concept down.[19]

Chapter3

Urbanization and Ubiquity

Urban computing

urban computing sample

Smart Cities: Promise and Peril for Urban Policy

Urbanization and Ubiquity

“In the lifetimes of our children, the urbanization project will be completed. We will have built the system of cities that their descendants will live with forever.”—Paul Romer, economist

Over 120 years after Hollerith’s tabulator rendered the United States’ (and soon thereafter Europe’s) unprecedented urban masses governable, information technology is again being harnessed to power another “control revolution” that rivals the one in the late 19th century described by (Beniger 1986)

Since the late 1980s, computer scientists and engineers have been researching ways of embedding computational intelligence into the built environment. Looking beyond the model of personal computing, which placed the computer in the foreground of the attention, “ubiquitous” computing as computer scientists call it takes into account the social dimension of human environments and allows computers themselves to vanish into the background. No longer solely virtual, human interaction with and through computers becomes socially integrated and spatially contingent, as everyday objects and spaces are linked through networked computing (Greenfield and Shepard 2007)

Urbanization and the spread of digital sensing, computing, and communications into every corner of the built and human

environment — “ubiquitous computing” — are perhaps the two most important forces shaping the 21st century. Both will play out over the next century, by the end of which the network of cities globally will be largely in place, and the ubiquity of information technology will be complete. During that process, these two trends will deeply influence each other’s course. (Key Global Telecom Indicators for the World Telecommunication Service Sector) belief that the ubiquitous and pervasive computing technologies that human-computer interface (HCI) researchers had been discussing for around twenty years could no longer be dismissed as a matter of conjecture. They were, instead, already starting to appear in everyday life, as building systems and public infrastructures, but above all as consumer products—what, after all, could be more ubiquitous than the mobile phone? And, it was self-evident that this broad array of networked, embedded, post-desktop computing devices couldn’t possibly not have a radically transformative effect on everything was understood as urbanism, on the physical form of the city and on metropolitan experience both. (Greenfield and Shepard 2007)

Just by crossing over the symbolic halfway point in global urbanization around 2008-09, the spread of ICTs reached milestones of its own. In 2008, the number of mobile broadband subscribers surpassed the number of fixed lines for the first time. By freeing us to gather where we want, mobile networks

are a catalyst for density — the most robust cellular networks are those that blanket stadiums in bandwidth. But they are also the substrate of sprawl, connecting cars to the cloud. They are our metropolitan nervous system, our most critical infrastructure. Even as our roads and bridges crumble, the wireless industry pumps \$20 billion a year into the towers that blanket U.S. cities with bandwidth. Mobile phones are the most successful consumer electronic device of all time. Some 6 billion are in service around the globe, three-quarters in the Global South. (Key Global Telecom Indicators for the World telecommunication Service Sector) In just a few years, it will be rare for a human being to live without one.

Today, 5 billion connected things (i.e. devices) cohabit the network with 5 billion people, projected to rise to some 25 billion devices over the next decade. (The Internet of Things.2011) The torrent of readings engendered by this Internet of Things will drown out the entire human web. Businesses, governments, and even citizens will tap this pool of observations to understand the world, predict, and react. This “big data,” as it is known, will be an imminent force that pervades and sustains our urban world. It is no coincidence that these trends are playing out in parallel. As we have seen from history, they are deeply entwined. Urbanization and ubiquity reinforce each other. Each

time cities increase, advances in information technology have kept pace to manage their ever-expanding complexity.

A century ago, some of the first urban telegraph networks were put in place by police departments. They permitted city governments to scale services to match unprecedented size and complexity of industrial cities. (Tarr, J)Today, technology also makes it possible Era,” (Journal of Urban History 1987). to actually govern cities of previously unthinkable size 5, 10, or even 20 million people. Cities employ a broad array of digital systems to expand control over transportation, energy, and water networks and track social and economic shifts in real-time.

This symbiosis is visible at the individual level as well, as consumer technologies like smart phones increase people’s ability to make a livelihood and manage business, family, and community affairs in rapid, highly-coordinated ways. Largely without commentary by urban scholars, our entire civilization is switching from a rigid choreography of scheduled events to a tele-swarm of constantly re-calibrated rendezvous. With their days and nights increasingly stretched across the megalopolis, urbanites have turned to these gadgets to keep it all synchronized.

Urban computing

It was certainly anticipated, at the very least, that this turn toward information processing in the environment was going to affect the ways in which we use and understand walls, windows, doors, sidewalks, streets, intersections, parks, markets, and playgrounds. As for the specifics, and as to what would happen when all of these granular components of the city interacted with and built on one another, Would it involve building-sized display screens? Geotagging? Mobile social networking? Municipal WiFi? Augmented reality? Embedded RFID tags? Intelligent infrastructure? Yes All of that and in fact all of that,all at once. This, of course, is only part of what is meant by “urban computing” and at that, the more interesting part is exploring how people respond to, adopt, and understand these technical conditions, and appropriate them for their own uses.(Greenfield and Shepard 2007)

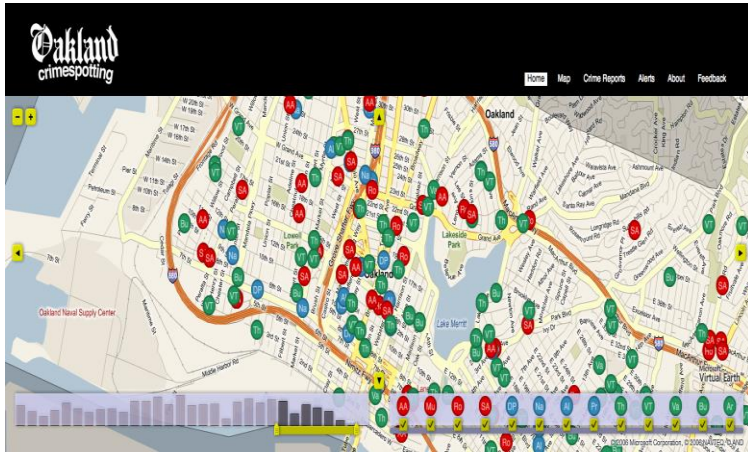
Adam greenfield in his book defined “Ambient informatics” which is one of the essential part of smartness as “a state in which information is freely available at the point in space and time someone requires it, generally to support a specific decision.” (Greenfield 2006).Maybe it’s easiest simply to describe it as information detached from the Web’s creaky armature of pages, sites, feeds, and browsers, and set free instead in the wider world to be accessed when, how, and where people wants it: persistently and effortlessly available, just there, like the air.(Greenfield and Shepard 2007)

urban computing sample

Stamen Design's Oakland Crimespotting is an example, a transitional mode for urban computing that is not ambient. This is an attractive hack that imports Oakland Police Department crime data into a Google Maps mash-up, and does so not haphazard but with a honestly high degree of appealing polish. The importance of Oakland Crime spotting is that it makes transparent something that absolutely shapes both the affective experience of being in the city and the choices people make there: the actuality of street crime intrigue reported incidents on a map and returning that knowledge to them. But it must be said that its impact is somewhat limited by the fact of its output being limited to a PC, or at best a smartphone, screen.

Because geographically-organized data like this cries out for a direct mapping back to the locations in question. How much more powerful and actionable will things like Crime spotting be when they're ambient—when the information about a place comes to people when they are in that place? When, instead of shaded circles on a screen, they experience the output as a rising tone in their headphones, as a tickle in their shoe or a sudden wash of yellow over the view through their glasses, as they are actually walking through the streets of

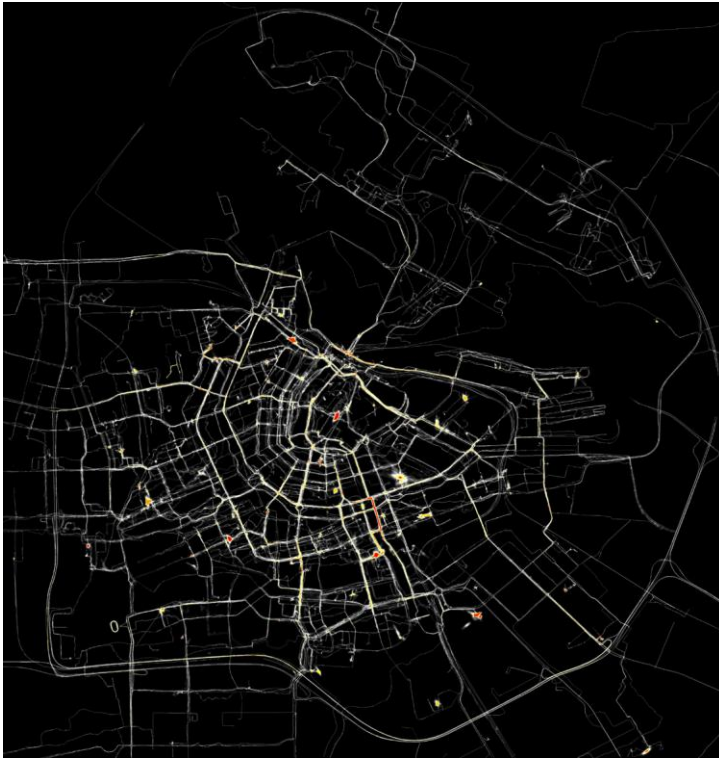
Oakland?(Greenfield and Shepard 2007)



1. oakland crimespotting. <http://oakland.crimespotting.org>. courtesy of stamen design

2.Amsterdam Real Time

Amsterdam Real Time: From october 3 to december 1, 2002, approximately sixty amsterdam residents were equipped with gps tracer units that recorded each individual's movement through the city.the data was sent in real time to an exhibition space,where it was visualized as a series of lines. over time, these lines drew a map of amsterdam that was based on the movements of people rather than streets or blocks of houses



2. Amsterdam real time , 2002. Esther Polak, Jeroen Kee and Waag Society .

<http://realtime.waag.org/>

“Read/write urbanism” is, frankly, jargon, but it’s a pretty neat piece of jargon. It’s Kevin’s way of recounting what is novel about urban life under the condition of ambient informatics, the idea that the city’s users are no longer sure to experience passively the territory through which they move but have been empowered to inscribe their subjectivities in the city itself...that

those subjectivities can be attached in place and responded to by those who come after.

So the passage through, the use of, or the investment in this place leaves a tangible informational trace, which can either be gathered up and acted upon individually in the aggregate as in Esther Polak

and Jeroen Kee's early Amsterdam Realtime [2] and the wide variety of GPS mapping projects which followed it, to cite just one tendency.

And again, this is just how people are going to experience metropolitan life moving forward. (Greenfield and Shepard 2007)

these examples have been referred to by others as "locative media"—a form of media art that deploys mobile technologies in mapping bits of media and information to a particular place or location.

These projects share a common interest in altering how people locate and orient themselves within cities, and subsequently navigate through them.

Traditionally, architecture and urban design have served to provide the cues by which this occurs. Kevin Lynch's *The Image of the City*, a common reference for many locative media

theorists and practitioners, attempted to distill a syntax through which a mental map of the city is formed over time through habitual interactions with things like paths, districts, edges, landmarks, and nodes.

Now, location-based services like Google Maps on a mobile phone may be great for finding a restaurant nearby, but they operate on the scale of individual patterns of movement. What about information that has the potential to affect larger patterns of movement and activity within the city?

3 iSEE manhattan:

The Institute for Applied Autonomy's project "iSEE" [3], which provides a web-based interface to a map of the locations of surveillance cameras in Manhattan.

Using this interface, visitors can map a route from point A to point B that follows a "path of least surveillance."

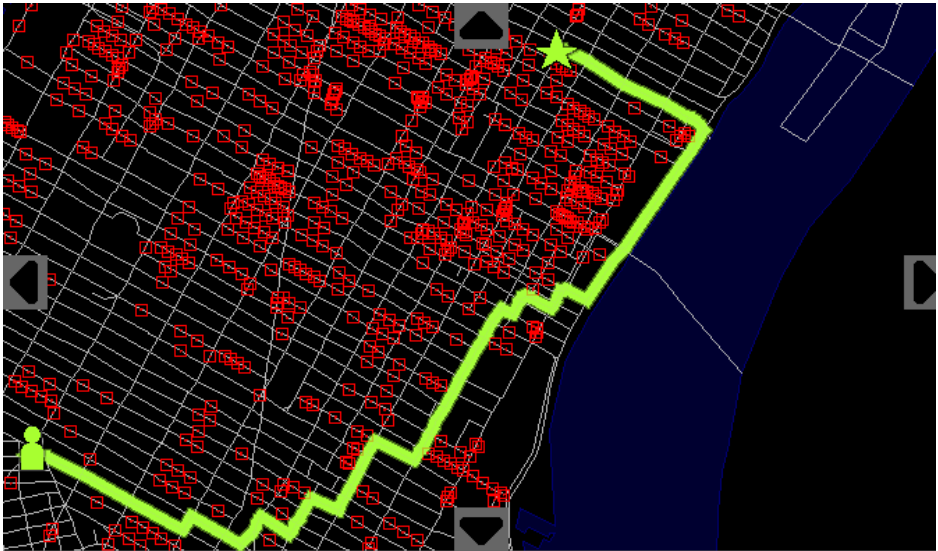
What's interesting here is that the interface makes visible relatively invisible forces within the city (not unlike Crimespotting), and potentially alters patterns of movement not of a single individual seeking a near-term goal . but of a larger constituency sharing concerns for privacy in contemporary public space.

other opportunities (and dilemmas) exist for urban computing

at the scale of infrastructure that, shape “both the affective experience of being in the city and the choices people make there”.

here is an ad appearing on the side of New York City buses at the moment. Referring to an earlier ad asking citizens to dial a police hotline if they witnessed suspicious objects or behavior on the city’s mass transit system, the copy reads, “Last year, 1,944 New Yorkers saw something and said something.”now ads like that will be updated in real time fed by data gathered from the mesh of available sensors in the environment—and that this is inflect people feelings in some pretty significant ways, much more intimately and profoundly than contemporary advertising does.

In this map the green line indicates the path of least surveillance between the chosen origin and destination. by privileging privacy over expediency, the system has a tendency to generate long circuitous paths, introducing the traveler to an unexpected, previously invisible, topology of their city.



3. i see m anhattan. c our tesy of t he i nstitute for a pplied a utonomy .
invisible, topology of their city.

Smart Cities: Promise and Peril for Urban Policy

While there are significant regional and localized differences in the kinds of technologies, the speed of diffusion and the impacts of their interaction with local social, economic, and institutional capacities, cities are grappling with rapid and simultaneous urban and technological change. Yet the promise and peril of these technologies for developing so-called “smart cities” — places where information technology is deliberately used to improve city operations and management, enable innovation in public services and governance, and increasingly to improve long-range planning — are often deeply misunderstood by urban planners and policymakers. (Peirce et al. 2013)

This part provides a broad overview of the ICTs of smart cities. But more importantly, it identifies the actors behind these massive investments in public and private systems and explains their motivations. Here the focus is not on the specific merits of any particular approach, nor to provide a comprehensive inventory of interventions. Rather, the aim is to illustrate how rapid technological change in cities is shaping new political, economic and social synergies and conflicts, and the impacts they have, and identify some strategies for anticipating and exploiting or mitigating these as they emerge.

A useful starting point for decoding the process of producing smart cities is to look at their problem-solving potential. Urbanization and ubiquity provide the broad historic context for the emergence of smart cities as a distinct typology. But the short-term context of a global economic recession and the ascendance of cities as leading advocates for and practitioners of voluntary systems of global governance is a better explanation for their role as a strategy. These shifts have focused local leaders on a search for pragmatic frameworks for action. Technology-enabled solutions, partly because of their effectiveness but also partly because of their novelty, have become particularly appealing. What distinguishes “smart cities” from all those earlier technology-derived labels is their emphasis

on problem-solving. As the FIREBALL authors put it, “the smart city is the engine of transformation, a generator of solutions for wicked problems.”(Schaffers et al)

1. The personalized and efficient city

Urban media technologies stimulate a profound personalization of city life on spatial, social, and mental levels

[1]. For example, on the spatial level GPS-enabled devices and navigation software enable quick familiarization with unknown terrain. On location-based platforms users check-in at particular locales, quickly grasp what is there and build up personal relationships with places (like becoming ‘mayor’). Developments of what is known as the Internet of Things, or Ambient Intelligence, allow the automation of physical environments to respond to individual preferences.

[2]. On the social level, mobile communications allow people to continually keep in touch with their in-group (Licoppe, 2004; Ito, 2005), imagine a sense of nearness and intimacy

[3].solidify established relationships with friends and family at the expense of weak ties and strangers.

[4]. On the mental level, mobile devices with their multimedia capabilities allow people to create highly idiosyncratic images of the city.

[5]. Listening to music on one's mobile device for example generates — in the words of one of Michael Bull's respondents — the "illusion of omnipotence" .

[6]. These media thus foster an individualized 'sense of place', a feeling of being part and in control of a situation (Meyrowitz, 1985).

The push towards an efficient and personalized city is institutionalized on a much larger scale in smart city policies (Mitchell, 1999; Mitchell, 2006; Hollands, 2008; Allwinkle and Cruickshank, 2011; Ratti and Townsend, 2011; Chourabi, et al., 2012).

[7]. Municipalities form alliances with technology companies and knowledge institutions with the aim to organize urban processes efficiently (for a recent research/policy agenda see Batty, et al., 2012).

Sensor and network technologies estimate and optimize energy and water supplies, transport and logistics, air and environmental value. The hope is that this improves the quality of life and that it helps to confrontation some of the big future challenges that cities face. Companies that work on smart city strategies include IBM (<http://www.ibm.com/thesmartercity>), CISCO (http://www.cisco.com/web/strategy/smart_connected_communities.html), General Electric (<http://www.gereports.com>), AT&T (<http://www.corp.att.com/stateandlocal/>), Microsoft and Philips.

Examples of actual 'smart cities' include towns built from scratch like New Songdo in South Korea (<http://www.songdo.com>) and Masdar in the United Arab Emirates (<http://masdarcity.ae>), but more often existing cities that are made 'smarter', like the Amsterdam Smart City project in the Netherlands (<http://amsterdamsmartcity.com>).

2. Critique

the omnipresence of new media in an urban context has come under criticism along three broad lines. (de Lange and de Waal, 2012a),

First, observers note that way finding devices, location-based services, digital signage, and customer loyalty cards transform the cities into consumer-optimized zones, while simultaneously producing exclusionary practices of 'social sorting' (Crang and Graham, 2007; Shepard, 2011; de Waal, 2012a, 2013).

Second, omnipresent cameras with face and gait recognition software, RFID-based access cards, smart meters, connected databases, and mobile network positioning, push cities toward

revived 'big brother' scenarios of pervasive institutional control and surveillance (Crang and Graham, 2007; Greenfield and Shepard, 2007; Lyon, 2009). Third, mobile screens, portable

audio devices and untethered online access to one's familiar inner circle enable people to retreat from public life into privatized tele-cocoons, bubbles or capsules (Cauter, 2004; Habuchi, 2005; Bull, 2005; Ito, et al., 2009). In these scenarios city dwellers no longer engage with strangers around them. There is a lack of space for spontaneous encounters and public life, and a general lack of involvement with the immediate environment.

Additionally, 'smart city' developments take the technology lab as the starting point. The actual city is seen as the last and most difficult hurdle in successive phases of 'deployment' or 'roll-out', rather than the sole place where experiment truly proves its value. Smart city projects typically consist of a 'triple helix' of government, knowledge production (e.g., universities) and industry. Such consortia often ignore the role of citizens as equally important agents. At best citizens in smart city policies are allowed to provide feedback somewhere in the design process, although oftentimes they figure as 'end-users' instead of being engaged in the early stages of co-creation.

Artists and media activists have used these same media technologies to question and subvert the logic of the three Cs of consumption, control, and capsularization (de Lange and de Waal, 2012b) and approach urbanites as citizens rather than as consumers or end-users. This often happens through ludic interventions that hark back to Situationist legacies

of *dérive* and *detournement* (Debord, 1958; Chang and Goodman, 2006; Charitos, et al., 2008; de Waal, 2012b). While such criticisms are certainly valuable, many remain highly temporary and stick to an oppositional politics. How can we use the potential strengths of urban technologies to help forge more durable 'project identities' [8]?

an alternative take is needed on urban design with digital technologies that focuses on the active role of citizens and uses the city itself as the test bed for experiments. (de Lange and de Waal 2013)

What happens when mobile and pervasive technologies are used to subtract this information from the physical world, reducing rather than adding to the visual field of the street?

very easily see traveling to any but the most familiar and local destinations becoming a matter of the cues which is already known from in-car GPS systems, or Yahoo! driving directions, or Hopstop, merely rendered ambient: "Turn left HERE." "Get on THIS TRAIN." Maybe the train car that aligns with the proper exit at the destination stop even lights up or something.

So what happens when all that crashes as it surely will from time to time? this is not surprising about information technology,

that every so often it simply goes down, for arbitrary, occult reasons. What happens when a generation of people are used to following these ambient cues around, and the cues go away? Is the city still legible, in the Lynchian sense, to those people? Or have they lost the ability to discern the locational and navigational cues that have been part of the way we make cities practically since time out of mind?

one dilemma has to do with the extent to which people's habitual interactions with and through these technologies potentially alter their patterns of behavior. In this case their ability to navigate physical space without their being aware that it is happening.

Here as an example is a story in the British media about a school field trip gone bad. Apparently, the bus driver typed in "Hampton Court" in his GPS sat-nav system, but rather than being directed to the popular tourist destination, they wound up at a cul-de-sac in north London bearing the same name. Stories like this are becoming more common these days.

It can be happened that one could use GPS to get lost. It can be the same name for two different addresses in two totally different directions. Seriously, the fact that the driver didn't sense that something is wrong before pulling into the wrong address does raise concerns regarding the flipside of these technologies.

this latter is a critical project. A key motivation of the “Architecture and Situated Technologies” symposium was to explore how architects and technologists might occupy the imaginary of technological development in order to influence its impact on the urban environment. To the extent that media conglomerates and federal agencies are responsible for developing and deploying these new technologies, it can be expected to see new practices for consumption, surveillance, and control gain momentum.

The current power struggle over file-sharing, copy-protection, and regulation of the wireless spectrum highlights the dilemma. To what degree will people using these technologies be empowered to share, participate, and create? To what degree will their power be limited to consumption? What new forms of surveillance and control are emerging?

In essence, what happening here is that the previously sovereign social and material environment of actuality, with its almost boundless ability to press claims for attention on the “user,” is losing a great deal of this primacy, because at any given time people are no longer merely “next to” the person they are sharing a table with. they are also next to the people who happen to be co-present with them in whatever shared presence artifact they are using. In some cases, indeed, depending on people’s feelings for the person they are dining

with, they are going to be closer to them than they to the person a few inches away from them.

if architects saw this phenomenon as an opportunity (rather than a dilemma to be re-sisted, a threat to disciplinary autonomy) then it would open new sites of practice to the architectural imagination. By studying the complex set of spatial practices people engage with (and through) computing in urban environments, architects would be better positioned to ascertain which aspects of the built environment are truly relevant today, and which need to be completely reimagined. In this regard, David Greene's "Log Plug" [14] was truly visionary. To what degree, for example, have we moved beyond a psychogeography of the "attractions of the terrain", to a schizogeography of nodes and networks? One might even go so far to ask: to what extent have mobile and pervasive computing actually begun to supplant the autonomy of traditional architectural practice as the technology of space-making?

It is noticeable that there have been some significant changes under the condition of ambient informatics, If paying careful attention to the way in which people physically address space now, Some things persist, of course: as long as there are vertical gravity loads, anyway, people will occasionally need places to sit and rest their weary bones, and so forth. But have a look at this rather telling mosaic .



This is the drunken-seeming meander of a woman speaking on a mobile phone. This behavior is recognizable. It's a dead give away that the person is immersed in a condition of, at best, ambivalent adjacency. The woman in this photo is absolutely not responding to the spatial circumstances around her, except as boundary constraints of the crudest order. She's surely making space, but her choices in doing so are guided by other logics than those that have governed urban form throughout history, the conditions that undergird people's understanding of walls, doors, thoroughfares, intersections, and such. If anything can rightly be called "schizo-geography," it's this.

The mobile phone is just the beginning. This goes back to information that inflects the larger patterns of activity in the city, when people can readily visualize basins of attraction and repulsion overlaid onto the actual economic attractors, crime

hotspots, conditions of enhanced or disrupted pedestrian flow. It can be obvious that these are things which will increasingly become—be made—explicit, and they'll be the aspects that drive large-scale choice. Not just on the basis of proximity, but of preference of propinquity.

And there's no way to see that not coming into conflict with what architecture has always held to be its sovereign imperative, that of authoring space. not going to as depressingly far as, say, Martin Pawley, in his Terminal Architecture—where he rather gleefully posits a world of utterly atomized individuals humping around a blasted and unloved landscape in the networked life-support pods of their aptly-named “terminals.” But Adam green field talk about

formal beauty, certainly, and even traditional humanist concerns with proportion and texture begin to fade into the background compared with the qualities that make a space amenable to networked use.

Urban computing and architecture

urban computing creates both a crisis and an opportunity for architecture. On the one hand, of course, it weakens fatally the privileged argument and position of architectural autonomy. the impact on metropolitan experience will

somewhat resemble that of what is very unfortunately called Web 2.0 in the internet space.

On the other hand, it opens up a vastly expanded role for interpreters of these conditions, creators of frameworks. authors of “beautiful seams.” It will likely require a certain egolessness that has hitherto seemed in short supply in architecture, but those practitioners who are able to achieve it will be able to supply the users of the spaces they design with moments of profound beauty and connection.

For example, because people carry a mobile phone, the reasoning goes, always reachable and therefore tethered by the social imperative to answer the phone. The fact that mobile phones need to be used by someone for something to have agency is somehow left out of the picture. It’s as if voicemail and vibrate mode and all of the intricate practices and protocols have been developed for their tactical use in particular social situations didn’t exist!

So there is some wonderfully absurd design proposals for spaces out-fitted with GSM signal blockers presented as a strategy to reclaim a sense of autonomy and privacy in urban public space! Talk about using an RPG to kill a fly...

it’s important to recognize that technological agency is contingent on its use within a given context toward an explicit goal. Take the iPod, for example. Michael Bull has studied how people use these devices to mitigate contingency in everyday

life. On one level, the iPod enables people to personalize the experience of the contemporary city with their own music collection. On the bus, in the park at lunch, while shopping in the deli—the city becomes a film for which you compose the soundtrack.

In Japan, the mobile phone (or keitai) has been described by Kenichi Fujimoto as a personal “territory machine” capable of transforming any space a subway train seat, a grocery store aisle, a street corner into one’s own room and personal paradise. Mobile phones there are used less often for voice communications than for asynchronic exchanges of text and images between close circles of friends or associates exchanges which interject new forms of privacy within otherwise public domains.

So while traditional notions of so-called “cyberspace” promised to unlock people from the limitations of offline relationships and geographic constraints, keitai space flows in and out of ordinary, everyday activities, constantly shifting between virtual and actual realms. Mobile phones in this case are less discrete material interfaces to networked information spaces than they are techno-social performances, in that they enact new relations between people and spaces. What’s interesting is not that urban space itself is changed but more that new hybrid spaces are performed/enacted through habits of mobile phone use. They also provide gradients of privacy in public places, affording the listener certain exceptions to conventions for social interaction within the public domain. Donning a pair of earbuds grants a certain amount of social license, enabling one to move through the city without neces-

sarily getting too involved, and absolving one from some responsibility to respond to what's happening around them. Some people use earbuds to deflect unwanted attention, finding it easier to avoid responding because they look already occupied. Faced with two people on the sidewalk, we will ask the one without earbuds for directions to the nearest subway entrance. In the same way, removing earbuds when talking to someone pays the speaker a compliment. So in effect, the iPod becomes a tool for organizing space, time, and the boundaries around the body in public space

Chapter4

Smart citizens

A Manifesto for Smart Citizens

Without engaging citizens about the role of technology in their cities and its impact on the way in which they will travel, live, eat, play and study, the Smart City vision will fail. If cities truly want to gain the benefits of technologies in society, then they need to start a discussion with their citizens about how this technology might impact their lives. Citizens have the right to know where technology will be applied in their cities and asked what they think the correct balance is? A Smart City, therefore, starts with Smart Citizens who are asked their opinions and engaged in the process of deciding how they are used. (Mulligan 2013)

Cities have always raised particular issues for technologists and researchers. But today, more so than ever, a transformation is taking place in how the cities work. Cities are being laced with sensors, in the form of personal devices and technology embedded in the environment, imbuing physical space with real-time behavioural data. A digital landscape overlays the physical world and is expanding to offer ever-richer experiences. In the cities of the future, computing isn't just with the people; it surrounds them, and it uses the context of their environment to enable them in more natural, yet powerful ways. (Smyth 2013) Back in 2008, when the Smart City movement was taking its first steps, Robert G. Hollands asked for 'the real smart city to stand up'. (Hollands 2008)

Since then, there has been an intense and ongoing debate around this subject, as well as a number of projects self-proclaiming their 'smartness'. Great steps have been taken in some leading cities to explore how digital innovation will be turned into public service improvements. But still the same question exists: how do citizens get involved as active agents of this digital urban revolution?

Here first consider how cities are described in presentations and commercial brochures. Often, the same common perspective is used - the view from above. When an urban system is viewed in this way, only infrastructures and urban form are visible - these renders do not depict people (and the complexity of social interactions) – Smart Cities, therefore, become a matter of managing infrastructures, designing cities from scratch and building an illusory feeling that everything can be under control. A city seems to be just a layout of streets, whilst what happens there remains hidden. This focus is sensible, useful and feasible, but only for certain urban issues concerning infrastructure and utility. In a networked society, citizens demand to play a more active and meaningful role. (Fernandez 2013)

what do citizens want? Do citizens wish to have a balance between technology and the ability to be anonymous in a big

city, are they willing to have a slightly less 'connected' journey to experience serendipity in their lives once in a while? Do they want perfectly constructed lives, or are they happy for spaces to be left between technologies to allow the profoundly human elements of life to emerge, the messy ones, the events are never planned, the friends are never thought will be made,

seems that while 'Smart Cities' are a hot topic within academic and business circles, few cities have truly embraced the vision. Despite the promises of ever increasing efficiency, streamlined urban planning, better transport and cheaper public services, many have yet to even implement basic Smart City technology.

the research in Sustainable Society Network+ at Imperial College, London 1 shows that Smart Cities are not really understood outside of specialist circles. Conceptually, they are difficult to understand and technically they are complex and costly to implement. Every day citizens, from teenagers through to retirees often see these technologies as irrelevant to their lives. Focusing solely on technology with cities creates new forms of digital divide and overlooks the fact that despite technology, political and economic inequalities will persist. Many smart city visions take a technology deterministic view, overlooking that often a non-technical solution would be a better option (Mulligan 2013)

Some of the greatest impacts of network culture are at city scale. The opening up of public data sets and the roll out of a grid of high bandwidth connectivity can transform the public realm and the way people live and interact in urban areas. People are increasingly able to digitally search and interrogate the city. Social tools can be layered over the city, giving real time access to information about the things and people that surround , helping to connect in new ways. Much of the data that relates to people's everyday lives - transport, housing, pollution - is held by city government and agencies.

The notion of the Smart Citizen is an important contribution to an urgent debate on the future of cities. An industry is growing up around a vision of the 'Smart City', predicted to be worth more than \$20 billion in annual market value by 2020. (Pike Research Report, "Smart Cities" (2013)

The idea of the Smart Citizen has been proposed by thinkers such as Dan Hill - presenting a keynote address at the FutureEverything Summit in March 2013 - to shift the debate towards the most important dimension of cities, the people who live,work and create within them. (Anonymous [3]2013)

On the one hand there is the view that Smart City design should allow for the disruptive ways in which people use technology.

But there is also a stronger claim here, namely that citizens can, and should, play a leading role in conceiving, designing, building, maintaining the cities of the future. (Hemment and Townsend 2013)

The notion of the Smart Citizen as a co-creator draws on a rich intellectual backdrop in both technology design and urban design. Digital culture has given rise to a collaborative code ethic, and there has been a trend towards applying thinking and methods from open source software development to other domains.

These ideas resonate with a tradition in urban planning that was first articulated by Patrick Geddes at the turn of the 20th century, and was wielded by Jane Jacobs in the 1960s as she demanded that city planning institutions make space for the voice and views of citizens.

(Jacobs 1961)

the central challenge here is to flesh out the meaning of citizenship in a Smart City. What new kinds of roles and identities are emerging? What can, and should, be done by individuals and small groups to leverage new technology to address urban and global challenges and opportunities? What does all this mean for governance? Most importantly - and this

is the challenge is issued to the contributors - how can opportunities be created to engage every citizen in the development and revitalisation of the Smart City?

Cities around the world are hitting the same impasse.

No one has so far found a way to intelligently bring together the big technology platforms offered by global corporations, with local technology projects and the interests of citizens. focusing on the central place of citizens in smart city design certainly can open up new possibilities for alignment and progress heretofore unseen.

(Hemment and townsend 2013)

Contrasting the Smart City paradigm is one that places emphasis on the Smart Citizen rather than on smart technologies. Shifting the focus from technology and the city to the role citizens might play in shaping the urban environment, this bottom-up, distributed approach aims to directly connect people living in cities with information about their local environment, engage them in urban planning, policy and development processes, and solicit their participation in reporting conditions and taking action to affect positive change.

Network technologies afford forms of organisation that make possible citizenled initiatives capable of competing with the

traditional planning mechanisms of municipal governments. By focusing on people – not technology as the primary actors within the system, this approach aspires to foster new forms of participatory planning and governance, where social and cultural factors are emphasised over proprietary high-tech solutions with big price tags.

Focusing on Smart Citizens would appear to be a compelling alternative to the technocratic determinism of the Smart City model. The agility of bottom-up and distributed strategies enables affecting change rapidly at far lower costs than large-scale urban infrastructure projects. Yet challenges at the level of policy and regulation arise when one attempts to scale local solutions to larger urban systems, where interoperability between different systems and the development of open standards for sharing data between them become paramount. But who are Smart Citizens. Does leveraging social media and networked information systems really broaden participation, or merely provide another platform for proactive citizens already more likely to engage within the community? What barriers to entry - cultural appropriateness, technological fluency are embedded in the design and implementation of these citizen led initiatives? What are the incentives to opt-in? What new and unlikely citizens might be brought to the table, and how might they be engaged?

Finally, what it means to call a city or its citizens “smart” in the first place. The term “smart” has been popularized by marketing executives of large technology companies, and it is hard to argue with their logic: who would want to live in a “dumb” city, or to be a “dumb” citizen? Embedded within the popular notion of the word “smart” is the idea that the optimisations and efficiencies these technologies promise will inevitably make for a better life.

Maybe, maybe not, or at least: neither always nor everywhere, and rarely for everyone. As Bruce Sterling comments in a response to Dan Hill’s essay *On the smart city*; Or, a ‘manifesto’ for smart citizens instead. (anonymous[3] 2013)

*“After reading this I feel that I understand myself better: I like *other people’s* cities. I like cities where I’m not an eager, engaged, canny urban participant, where I’m not “smart” and certainly not a “citizen,” and where the infrastructures and the policies are mysterious to me. Preferably, even the explanations should be in a language I can’t read. So I’m maximizing my “inefficiency.” I do it because it’s so enlivening and stimulating, and I can’t be the only one with that approach to urbanism. Presumably there’s some kind of class of us: flaneuring, deriving, situationist smart-city dropouts. A really “smart city” would probably build zones of some kind for us: the maximum-inefficiency anti-smart bohemia.” (Bruce 2013)*

Unfortunately Sterling's call for a temporary autonomous zone for smart city dropouts ultimately leads to the Smart City ghetto. In the end, both the Smart City and the Smart Citizen result in the same rhetorical paralysis. Change seldom arises from purely top-down or bottom-up systems and processes, and pitching each paradigm in opposition to the other simply refies their shortcomings.

The more successful integrations, exchanges, and entanglements between technology and urban life will most likely take shape though far more subtle and nuanced hybrids than these paradigmatic polemics promise. (Shepard and Simeti 2012)

The 20th Century history of urban planning is replete with grand visions of vast, idealised cities. One of the most original thinkers was Patrick Geddes (1854-1932). Geddes' approach to citymaking derived from the bottom-up, from individual actions.

His writings and speeches argued that only full citizen participation in addressing urban problems would work. He believed that the mass urbanisation of the late 19th Century had disconnected people from their own history. In order to participate effectively, citizens had to learn the history of the city-region. To teach them, he Built a civic immersion center, the

Outlook Tower in Edinburgh, Scotland, where his massive survey of the surrounding metropolis was put on display. Geddes was showing people that if they gained understanding of the city as a complex system, the ways in which they might directly and locally contribute to its revitalisation would be clear. (Townsend 2013)

There are hints that this process is happening in cities today. In the United States, a mounting body of evidence suggests that the better part of an entire generation of youth are saying no to automobiles and suburban sprawl in favor of smart phones and transit-based urban living. A compelling narrative about autodependency, environmental and individual health, and diversity and culture has firmly taken root. An understanding of the complex demands of the big picture is driving individual action, just as Geddes hoped a new paradigm for city-building is taking over. Information technology is the primary enabler of the schemes for smart cities.

As people needed to understand the dynamics of sprawl to understand their own role in mitigating it, they need to understand the unintended consequences of digitalisation to avert similar mistakes. (Townsend 2013)

In Geddes' day, the urban world was being reshaped to a great degree by disruptive technologies - steam power, electricity,

telephones and telegraphs - were large-scale and highly centralised. And so, giving the individual the knowledge and tools to assess and respond to big external forces made sense.

The urban revolution is experienced today is playing out in the opposite direction. Today, it is the rewiring of how people interact with each other, not the imposition of command-and-control systems from above, that is driving change. If Geddes were alive today instead of looking at the city to understand the city, we start by knowing ourselves - because the nature of the urban individual, and their role in urban dynamics is changing because of technology

For Geddes, full civic participation in city building was merely a duty, its goal to incrementally repair the city. It wouldn't be met without every last person pitching in. Today, grassroots efforts to reshape cities are actually trying to change the ways things work at a local level, amongst people, to create new (healthier, greener) systems. They are about change and reform, not just aggregation. People's duty as citizens is not to understand the lay of the land, but the process by which new kinds of interactions at the small scale add up to emergent large-scale phenomena of revitalization. (Townsend 2013)

Critical Design offers an approach to the study of potential paradigms of interaction in the urban environment. It positions design as a catalyst or incitement for thought rather than the appearance of complete solutions. Here it is a means of opening dialogues. The method centres on the design of perceptible future circumstances that humanise the future and reveal needs, values and priorities. For example, the approach has been applied to discover energy production New Mumbai, (Revell, "New Mumbai" <http://www.tobiasrevell.com/New-Mumbai>): patterns of habitation SingleTown and consumption Corner Convenience. (Near Future Laboratory, "Corner Convenience" 2012) :<http://nearfuturelaboratory.com/2012/03/04/corner-conveniencenear-future-designfiction/>)

These scenarios scaffold dialogue and aim open up new possibilities that are grounded in humanity.

While Critical Design has the potential to be forward looking in a way that is not possible by restricting research to observations of current practices, it also places the burden of translation of the subsequent dialogue on the designer. This should not be a surprise, as it is after all the role of the designer to point ahead to the future. But this possible bottleneck of interpretation could limit the potential of the approach to offer new insights that will ultimately mature into design facts. It will be through this necessary step of interpretation that people will better understand their own condition and so gain the necessary insight to inform the emergent objects and environments that will characterise the near and more distant future. (Smyth 2013)

Scale and perspective determine what people see and how they see it. From the street level, the intersection of urban life and technology raises issues, fields of knowledge, possibilities and consequences. All of this seems to be irrelevant in the smart city visions dominating the current landscape. They are unable to address meaning in terms of citizenship, politics, conflict, public space, etc, - permanent elements of collective life that remain beyond technological sophistication. Pursuing a future of cities based on the aspiration to predict a whole city will, at some point, need to confront the unexpected the thing that makes life amazing and is part of the real cities people are living in today.

The smart city becomes real when people can deal with open technologies to build their own public infrastructure for environmental monitoring Air Quality

Egg:<http://airqualityegg.com/>

or share a community network of wireless connections.

Guifi.net: <http://guifi.net/>

The smart city promises make sense only when citizens become makers and crowdsource manufacturing for the needs of their neighbourhood. Hundreds of cities are making public data open; making it possible for developers, civic hackers and activists to reuse it and thus, broaden public information with new transparency tools.

The smart city becomes an arena for smart citizens when people are engaging using available, locally provided, digital tools. Smart cities are what happens in the intersection of urbanism and art exploration through digital media facades .
Connecting Cities: <http://www.connectingcities.net/>
and other kind of critical thinking interventions in public space
Urban Prototyping: <http://urbanprototyping.org/>
in which citizens engage, build, organise, create and share a common platform the cities.

All these examples illustrate what the renders can not: a growing number of people working in real places, with real problems, to build real solutions, with the technologies people have in their hands. The

transformative power of this opportunity is still in its infancy. The way citizens engage in the development of smart cities starts by acknowledging what is already going on. There is too much focus on yet-to-come promises based on infrastructures and solutions, oriented to solve only government efficiency needs. (Fernandez 2013)

New technologies to collect, document, analyse and visualise information about the built space, its use and its management

enable citizens to challenge their governments based on a new quality of evidence.(Schechtner 2013)

People need Smart Citizens, but they also need absurd, playful, angry, emotional, intellectual, poetic, and kinetic citizens. If people want “every citizen” to contribute, they must create compelling engagement opportunities. Making the absurd, the fun, the visionary, or the poetic part of “official” civic life may sound paradoxical, but if done properly, they could see their communities and their lives improve in measurable and immeasurable ways. (Dunagan 2013)

Smart City technologies should not be viewed as a discussion belonging to people with advanced degrees in engineering, science or mathematics, but rather as technologies that are now sufficiently

accessible to the average everyday person on the street. As things like Raspberry Pi, Arduino and 3D printing continue to develop, these technologies are available to a broad range of citizens.

The education and engagement of these citizens must be provided so that they can become the Smart Citizens needed to decide how to implement these concepts in their everyday lives. Properly managed, such technologies can help citizens create resilient environments, local economies and communities. Poorly managed, these technologies can cause damage and unexpected consequences to the social, economic and natural structures.

A robust debate between corporates, citizens, NGOs, academics, city leaders and technologists is required to push the smart city debate forward and fulfill its promise of a balance between environment, economy and the citizenry. (Mulligan 2013)

It's not that cities shouldn't manage the infrastructure using these new tools: it's just that there is more to cities than this. Cities are not made in order to make buildings and infrastructure. Cities are planned in order to come together, to create commerce, culture, conviviality, and the very notion of living in cities itself. Buildings, vehicles and infrastructure are mere enablers, not drivers. They are a side-effect, a by-product, of people and culture. The city is its people. This is not efficient, but it is good. (Hill 2013)

Citizens will begin to gain the ability to affect their environment in new ways, using city services the way they would use a digital application in an online environment. Transportation systems, lighting systems, public media hardware like active signage and sound-systems will become objects available for activation, control, and coordination by tools and services that citizens use in their everyday lives. Through collaborative interaction with such tools, users of public spaces can organize them for specific temporary functions and even begin to 'perform' space together.

So instead of the Smart City, it should be more preoccupied with Smart Citizens. As it happens, engaged and active citizens are all around , using social media and related technologies to organise and act, rapidly and effectively.

this activity is throughout Occupy Everywhere, the Arab Spring, the Madrid manifestations and the UK riots, as well as the numerous subsequent urban protests. And running along parallel tracks, there is similar patterns underpinning the explosion in urban crowdsourcing and crowdfunding platforms over the last few years.

Both are predicated on the idea that citizens want to engage in their city; that implicitly, citizens are best-placed to notice,

suggest, aggregate and drive a certain kind of urban intervention.

Equally, there is nothing intrinsically democratic or publicly accountable about social media. Crowdsourcing systems, by their very nature, will rarely enable a systemic change. They create a tapestry of one-offs and events, but will rarely generate city-wide services or infrastructure.

One inspiration is Hans Monderman's "shared space" traffic system, which removes most if not all signage from intersections, instead relying on engaged human interaction, individuals working instinctively within a wider "civic" framework. The system is safer than traditional intersections, wherein we effectively outsource decision-making to traffic lights. It relies on smart, engaged, aware and active citizens, rather than the passive systems that smart city visions are often predicated upon.

If that metaphor is taken into the design of new civic platforms, activism might become something more akin to plain old urban activity, in which many if not all citizens are more deeply woven into the fabric of their city's decision-making.

As well as a new urban hardware and software, it's in this interface between engaged citizens and engaged government that its real promise may lie introducing genuine efficacy and verve into the way the public sector works, reducing the cost of government massively whilst increasing its positive impact, rebuilding a meaningful civic interface with citizens.

(Hill 2013)

A Manifesto for Smart Citizens

(Kresin 2013)

citizens of all cities, take the fate of the places they live in into their own hands. They care about the buildings and the parks, the shops, the schools, the roads and the trees. But above all, they care about the quality of the life they live in their cities.

Quality that arises from the casual interactions, uncalled for encounters, the craze and the booze and the loves they lost and found. They know that their lives are interconnected, and what they do here will impact the outcomes over there. While they can never predict the eventual effect of their actions, they take full responsibility to make this world a better place.

Therefore, they refuse to be consumers, client and informants only, and reclaim agency towards the processes, algorithms and systems that shape their world. They need to know how

decisions are made, they need to have the information that is at hand; they need to have direct access to the people in power, and be involved in the crafting of laws and procedures that they grapple with every day.

Fortunately, they have appropriated the tools to connect at the touch of a button, organise ourselves, make their voices heard. They know how to measure themselves and their environment, to visualise and analyse the data, to come to conclusions and take action. they have continuous access to the best of learning in the world, to powerful phones and laptops and software, and to home-grown labs that help them make the things that others won't.

Furthermore they were inspired by such diverse examples as the 1% club, Avaaz, Kickstarter, Couchsurfing, Change by Us, and many, many more.

people are ready. But, as yet, the government is not. It was shaped in the 18th Century, but increasingly struggles with 21st Century problems it cannot solve. It lost touch with its citizens and is less and less equipped to provide the services and security it pledged to offer. While it tries to build 'Smart Cities' that reinforce or strengthen the status quo- that was responsible

for the problems in the first place - it loses sight of the most valuable resource it can tap into: the Smart Citizen.

Smart Citizens:

1. Take responsibility for the place they live, work and love in;
2. Value access over ownership, contribution over power;
3. Ask forgiveness, not permission;
4. Know where they can get the tools, knowledge and support they need;
5. Value empathy, dialogue and trust;
6. Appropriate technology, rather than accept it as is;
7. Help the people that struggle with smart stuff;
8. Ask questions, then more questions, before they come up with answers;
9. Actively take part in design efforts to come up with better solutions;
10. Work agile, prototype early, test quickly and know when to start over;
11. Will not stop in the face of huge barriers;
12. Unremittingly share their knowledge and their learning, because this is where true value comes from.

All over the world, smart citizens take action. they self-organise, form cooperations, share resources and take back full responsibility for the care of their children and elderly. they pop

up restaurants, harvest renewable energy, maintain urban gardens, build temporary structures and nurture compassion and trust. people kick-start the products and services they care about, repair and upcycle, or learn how to manufacture things ourselves. they have even coined new currencies in response to events that recently shook their comfortable world, but were never solved by the powers that be.

To get the people ready for the 21st Century, they have to redefine what “government” actually means. “We ARE our government.” Without them, there is nobody there. As it takes a village to raise a child, it takes people to craft a society. Yes, it can be done; it was done before. And with the help of new technologies it is easier than

ever. So the people actively set out to build truly smart cities, with smart citizens at their helms, and together become the change that they want to see.

Chapter5

Design smart cities

Social cities

Smart

open

Social cities

Another tale — still under construction — has recently risen to the fore. In this vision, urban technologies engage and empower people to become active in shaping their urban environment, to forge relationships with their city and other people, and to collaboratively address shared urban issues (Paulos, et al., 2008; Foth, et al., 2011; de Lange and de Waal, 2012b).

The focus in these discussions is on ‘social cities’ rather than on ‘smart cities’. It explores how digital media technologies can enable people to act as co-creators of livable and lively cities. This narrative is inspired by the body of literature that describes profound shifts in the balance between production and consumption: from professional amateur to wisdom of the crowd, from do-it-yourself culture to the hacker ethic (Himanen, 2001; Leadbeater and Miller, 2004; Benkler and Nissenbaum, 2006; Shirky, 2008; Rheingold, 2012). Central is the question how collaborative principles and participatory ethics from online culture can be ported to the urban realm in order to coordinate collective action and help solve some of the urgent complex issues that cities are facing. (de Lange and de Waal 2013)

There is much discussion about cities becoming smarter, but becoming smarter is only part of what should be aiming to

achieve. Cities need to change in many ways to accommodate the influx of people during the 21st century.

Fortunately there's a revolution occurring in how urban spaces are conceived, created, and inhabited. This revolution is much less about the physical matter of cities – the parks, roads, and apartments - and much more about how the city and its inhabitants communicate with each other. This shift touches traditional planning, design, and governance fields, among others, and is propelled forward by an explosion of digital technology and data. This movement is gaining steam but its potential is still largely unrealized. It can make cities more equitable and extraordinary. There should be careful attention or it can also scar our societies with deep divisions

Smart

Smart city initiatives have often been associated with large-scale centralized technologies provided by private industry for a government's benefit. IBM's Smart Cities brand typifies this conception. However, this is only a fraction of the ways in which cities are utilizing technology and data to become more nimble, precise, and effective.

For example, the collision of location aware devices, denser urbanization, and transportation planning are pushing personal automobiles towards relics of the 20th century. As a result, for most urban residents cars will become pure status symbols, providing limited utility when compared with alternatives.



Car2GO, Car sharing a Austin (Texas). October 2011 (fonte Denis Bocquet, flickr)

In many cities there are a handful of car services that use smart phones to give an exact arrival time and will pick you up in a matter of minutes from anywhere in the city (*Uber, Lyft, Sidecar*). In addition, many cities have hourly car, scooter and bike rentals (*Zipcar, Car2go, Scoot, Citi Bike*); real time public transit information (*Next Bus*); and an increased desire for bike and pedestrian mobility (*WalkScore*).

A diverse ecosystem is forming giving many viable transportation choices to individuals. The changes in urban

transportation describe just one of the many shifts occurring throughout cities. Businesses, governments, NGOs, and individuals are transforming themselves to provide and receive city services in a digitally enabled world.

Strengthening relationships between these actors through the quick and accurate transfer of information is good for individuals, organizations, and the networks they are a part of.

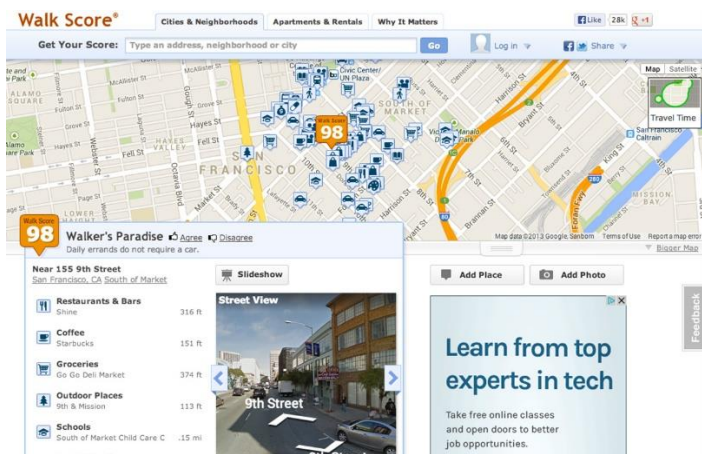


Municipal Bike Rental (source: Shinya Suzuki, flickr)

Open

Smart isn't the only concept that should aspire to when discussing the future of cities— open is just as critical. When

saying open It means the legal, political, business, and technological infrastructure that allows people, and in particular governments and citizens, to share information and data with little to no friction . This applies to both digital information as well as the digital tools used to process this information. Innovation and growth often occurs when people come in contact with new experiences and ideas that they can modify and appropriate. This has historically been a strength of cities due to their cosmopolitan nature – as indicated through correlations of patents and GDP. And this asset should be embraced even more in the digital era.



Walk Score

However, in order to reach its full value, open must mean open to all. This touches upon the divide that has formed between the digital haves and have-nots. Without the necessary

tools to access open data and information, it is in fact closed or at best only partially open. By limiting the number of people that have access to technology and thus information, we are limiting the possible ideas and innovations that could enrich our society. Some may consider smart phones and computers luxuries, but they are in fact necessary to participate in the conversations of a modern digitally literate society

Similar to democracy, openness is never finished, but instead an ongoing process. Simply decreeing that systems and information are now “open” and assuming that innovation or transparency immediately follows is a simplistic approach.

Cultivating openness requires well-managed tools, regulations, and processes in addition to cultivating a general cultural outlook.



Open Data (fonte Open Knowledge Foundation, flickr)

Design

So how might people get to smarter more open cities? design thinking is needed to use - which is the ability to solve problems by synthesizing disparate elements and ideas skillfully, beautifully, and empathetically. Design thinking crafts most of the daily experiences and gives higher-level purpose, relationships, and meaning to the objects somebody touches, the environments citizens inhabit, and the processes people participate in. It is often interdisciplinary.

Design thinking has the ability to synthesize and match the explosion of digital tools with complex real world problems. These problems are sometimes referred to as wicked problems for their lack of clear boundaries or ideal solutions. Making progress on them will truly make the cities smarter. In addition design thinking has the ability to push the society towards more open cities because it can consider why in addition to how when used to problem solve. to make cities more open – and reap the benefits that that openness creates . there is the need to be able to ask both of these questions.



Computer Classes on a Bus (source: Rotary Club of Nagpur, flickr)

It is, however, important to make a distinction between design thinking and the professions will be placed under the umbrella of design. Many professionals besides those designers can and do engage in design thinking - for example policy makers, entrepreneurs, engineers, and planners. And in many instances people who called designers end up being little more than widget makers (which significantly underutilizes their skills!). The point being that the approach, not the title, is important.

Solving the cities' problems in the 21st century won't come from singular answers, but instead pluralistic, networked, and ongoing approaches, such as the new transportation solutions mentioned earlier. Cities should be designed where effective

communication rather than control is prioritized. If that happens, the smart open cities that is needed can exist

Reed Duecy-Gibbs is a designer and urbanist as well as a former Fulbright Scholar and co-founder of OpenUrban, a non-profit web platform for sharing information on urban development. He is currently a fellow at Code for America in San Francisco.



Conversation (Felipe Cabrera, flickr)

http://www.domusweb.it/en/oped/2013/07/25/designing_smart_opencities.html

Chapter6

Expo 2015 milano ,design intelligently,revitalize the

Space

Expo represents the links between communication, technology, design, urban planning and the city. smart cities, is not core to the project of Expo although it does seem to represent an increasingly important theme for telecommunications companies.

if the base is not on technology but on the needs that must be met by technology. Then society has moved on from the need to communicate, i.e. transmit simple words, to a far broader concept which is that of digital life – in which communicating is just one of the components – and even the concept of communicating has been greatly extended.

It has already changed to include the sharing of pictures, photographs and videos. It is no longer just communicating but putting the emotions out there for others. That is why we say “communicating is sharing”. In this sense, expanding the space for needs that can be satisfied by digital technologies finds its natural complement in daily life.

On the one hand, telecommunications is extending its reach to the world of entertainment and the enriched communications world but the production world is also expanding its space with all the cloud-computing technologies.

In terms of the living dimension, the package of solutions that can be used to improve the quality of life and, therefore, the surrounding environment, urban , has totally changed.

In this sense, the domestic environment is the first part of the Expo collaboration.

Big data is one of the components in this digital Expo and one that is important when seen within a broader picture. There is tend to use the concept of Big data as a means to conduct customer profiling and using the huge quantity of data that can be analysed for better business opportunities.

The Expo will say something very different: Big data can be placed at the service of a better, more sustainable and more intelligent world that is closer to the needs of its citizens. The use of Big data is fundamental. It enables to extrapolate real trends, some of which may not be very clear, and this can be used in total anonymity to build patterns that will improve the reference environment, which may be the city, the home, the purchasing experience perhaps or even the control of the environment and territory

The change is very natural because it is not a technological change but a sociological one.

There is still fundamental question:

How can architecture take part in making open smart cities?

As it was said in previous chapter, Design thinking is the key- which is the ability to solve problems by synthesizing disparate elements and ideas proficiently, beautifully, and thoughtfully. and It is often interdisciplinary.

Architecture can engage in design thinking by preparing and qualifying the spaces where explosion of digital tools synthesis and matches with complex real world problems.

Here there is a good opportunity as it comes above :Expo 2015 Milano ,which is the most appropriate time to make city and citizens smart and profoundly it is an opportunity to present more open spaces and behavior to use the spaces, amplify social interaction during expo and after that.

For the solution we need a “MODULE” which can transform in respect of the context, that present and consequently recreate the urban spaces and lead to increase social interaction. Here I supposed ‘Open Spaces’ which I categorized them like this:

A: non places, hidden places, forgotten places ,brown fields (each of these has its subdivision)

B: transportation stops

C: active and passive public spaces

D:urban facades which make our horizons view in particular daily image.

So the“MODULE” will be put in the open spaces by respect of the identity of the place.for example we can consider a neutral shape or volume that can transform in different spaces as an urban façade ,urban furniture, station or even a structure to go inside but all with the same color or comes from same volume. imagine a cube which can be a place to go inside or a bench to sit or one of its face as urban façade or screen ...)

The “MODULE” identity is “social service point” that supply technological services such as recharging and paying for mobile devices, info tourism, info mobility, info commerce (e.g. on the shopping streets), civic registry services (e.g. e-government) and video surveillance services (e.g. SOS columns)and more focusing on social events like organized physical activities ,movies, social gathering, forum for voting, classes ,games in the spaces.

Telecom Italia, Global Service Partner of Expo Milano 2015 Editorial Domus SpA have already made competition for digital ideas of expo also municipality have tried to prepare the whole city for this big fair. Which are mostly constructed in well known areas and public spaces.

I choose one link through the city with historical or social or cultural background then find the nodes and choose one type of open spaces which I previously supposed and try to recreate it and put efficient shape of the “MODULE” there.

About its outcomes ;

When information-technical systems are designed so that they're modular and self-describing, people will be empowered to disassemble them, learn how they work, and go about making their own things and find a way to use it for their own benefit.

Pilot and further research, VURB believes that citizens will continue to gain the ability to affect their environment in new ways, using city services the way they would use a digital application in an online environment. Transportation systems, lighting systems, public media hardware like active signage and sound-systems will become objects available for activation, control, and coordination by tools and services that citizens use in their everyday lives.

Engagement starts with education and public debate. For instance London's Open Institute is one example, which is

providing a unique space for citizens come together and discuss, learn and understand not just the role of the new technologies but also how they impact different parts of society - from open economics, open politics to open corporates. here we can consider something not just a building to gather ,but a point to evolve and act.

It is the best time for hidden places ,non places,to be recognized, recreate and revitalize by permanent citizens (inhabitant)and temporary ones (people who come to the city for the Expo).

creating a sense of community within a specific place. “Localism” is a word that reverberates through all communications policy. It’s seen as a public good. There has been an interest to make sure that that broadband has civic, cultural, and economic benefits within a specific area of the universe; to make sure that the locally owned coffee shop can compete with Starbucks or finding a way to use code-space to create venues for local music. For example, music from a live local band in one venue can be shared with another neighborhood venue that doesn’t have live music.

Here we can make this opportunity to involve other part of Milan rather than the Expo site also all around of Italy and

World to know what happens In the Expo In the same time for instance, besides the nodes we consider in the city we can put a “MODULE” with the same literature in the main piazza of small cities around..

The potential of media façades and urban screens can be reconsidered in the light of the critical debate around Smart Cities and Smart Citizens. In such a reframing, they can be viewed as platforms and membranes between the physical and the digital worlds. They can provide new interfaces for human interaction and trigger new forms of participation, engagement and bottom-to-top activism.

This was a part of Connecting Cities and Its Citizens Through Artistic Urban Media Scenarios which talks about media projects which already examined that we can use them as a “MODULE” in open spaces.

references

ABSTRACT AND CHAPTER 1

Greenfield, A., Shepard, M., 2007. "Urban computing and its discontents," Situated Technologies Pamphlet Series, at:http://www.situatedtechnologies.net/files/ST1-Urban_Computing.pdf, accessed 4 September 2013.

Joseph, F., 2014. CEO. Performics ,Tan, L., Consumer Insights Director. Collison, T., Global Communications Director. ZenithOptimedi, "The Mobile of Everything: What does a Hyper-Connected World Mean for the Smartphone?," At:<http://www.zenithoptimediaww.com/mobileofeverything/#p=1> accessed 13 May 2014

Castells, M., Fernandez–Ardevol, M., Linchuan Qiu, J., Sey, A., 2004. The mobile communication society: "A cross-cultural analysis of available evidence on the social uses of wireless communication technology," Annenberg Research Network on International Communication, University of Southern California, at <http://arnic.info/workshop04/MCS.pdf>, accessed 4 september 2014.

Crang, M., Graham, S., 2007. "Sentient cities: Ambient intelligence and the politics of urban space," Information, Communication & Society, volume 10, number 6, pp. 789–817.at: <http://dx.doi.org/10.1080/13691180701750991>, accessed 4 september 2014.

Girardet, H., 2008: Cities, People, Planet: Urban Development and Climate Change. West Sussex, John Wiley & Sons, Ltd.

CHAPTER 2

Tabačková, K., 2013. "Is there sustainable urban future? Alternative cities." Masarykova University. Katedra environmentálních studií at: https://is.muni.cz/th/273690/fss_m_b1/Tabackova_273690.pdf accessed 13 June 2014.

Caragliu, A., Del Bo, CH., Nijkaml, P., 2011. "Smart cities in Europe." Journal of Urban Technology, Vol.: 18, No.: 2, pp.: 65-82.

Allwinkle, S., Cruickshank, P. 2011." Creating Smart-er Cities": An Overview. Journal of Urban Technology, Vol.: 18, No.: 2, pp. 1-16.

Murray, A., Minevich, M., Abdoullaev, A., 2011. "Being Smart about Smart Cities.

KMWorld." at: www.kmworld.com

Peirce, N., Freed, A., Townsend, A., 2013. "Urban Futures An Atlantic Perspective."

“World Urbanization Prospects: The 2007 Revision,” United Nations, Feb. 26, 2008.

“World Urbanization Prospects: The 2011 Revision,” United Nations, Mar. 2012.

“Global population forecast in The 2010 Revision of World”.Population Prospects and urbanization forecast of 70-80 percent in Shlomo Angel, Planet of Cities, Lincoln Institute of Land Policy, Sep. 2012.

Slum population: State of the World’s Cities 2012/2013: Prosperity of Cities, World

Urban Forum Edition, UN-HABITAT, 100. Population projection: remarks by Clos, J., Director UN-HABITAT, “Smart Cities: An Opportunity for Liveable Cities,” Smart Cities Expo 2011, speech, Barcelona, Spain, Nov. 29, 2011.

1790 Census: “Census of Population and Housing,” U.S Bureau of the Census, [at:ht t p:
//www.census.gov/prod/www/abs/decennial/1790.html](http://www.census.gov/prod/www/abs/decennial/1790.html).

Beniger, J. R, The Control Revolution: “Technological and Economic Origins of the Information Society”, 1986, Harvard University Press.

Norton R J. 2004“Feral cities,”
<http://www.usnwc.edu/getattachment/9a5bddeb-e16e-48fc-b21a-22515e79aaa9/Feral-Cities>.

Lee, J. H., Hancock, M. G., Hu, M., 2013: Towards an Effective Framework for Building Smart Cities: Lessons from Seoul and San Francisco. Technological Forecasting & Social Change at: <http://dx.doi.org/10.1016/j.techfore.2013.08.033>.

Thuzar, M., 2011: Urbanization in Southeast Asia: “Developing Smart Cities For The Future?” Regional Economic Outlook.

Caragliu, A., Del Bo, C., Nijkamp, P., 2009: “Smart Cities in Europe. Proceedings of the 3rd Central European Conference in Regional Science”. Košice, Slovak Republic, at: http://www.cers.tuke.sk/cers2009/PDF/01_03_Nijkamp.pdf,

Holland, R., 2008: “Will the Real Smart City Stand Up?” Creative, Progressive, or just Entrepreneurial? City, Vol.: 12, No.: 3, pp.: 302-320.

Barrionuevo, J. M., Berrone, P., Ricart, J. E., 2012: “Smart Cities, Sustainable Progress.”Expert Insight, Third Quarter, Issue 14, pp. 50-57.

Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Mlanovi, N., Meijers, E., 2007: Smart Cities: "Ranking of European Medium-sized Cities." Centre of Regional Science (SRF) Vienna University of Technology, Vienna, Austria.

Anonymous [1], 2010. "The Smart City Model. European Smart Cities". at: <http://www.smart-cities.eu/model.html>. accessed 10.11.2013.

European Commission, 2013: European Initiative on Smart Cities. Strategic Energy

Technologies Information System (SETIS), at: <https://setis.ec.europa.eu/set-plan-implementation/technology-roadmaps/european-initiative-smart-cities>

Smarter Cities, 2013. at: http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/.

Smart City Wien, 2010a: Citizens' Solar Power Plants: solar energy for everyone."

Smart City Wien, at: <https://smartcity.wien.at/site/en/projekte/umwelt-klimaschutz/buergerinnen-solarkraftwerk/>

Turku, official web pages, 2013: Aiming for an intelligent and environmentally friendly Turku. Turku, official web pages, at:<http://www.turku.fi/public/default.aspx?contentid=469842&nodeid=11976>.

State of Green, 2011: Cycling: the Fast Way forward. State of Green, official web pages, at:<http://stateofgreen.com/en/Profiles/City-of-Copenhagen/Solutions/CYCLING--THE-FAST-WAY-FORWARD---Two-wheels-versus>

State of Green, 2011a: Sustainable transportation. State of Green, official web pages, at:<http://stateofgreen.com/en/focus/sustainable-transportation>

Malmö, 2012: "Mobility in Malmö." Malmö, Official web pages, at:<http://malmo.se/English/Sustainable-City-Development/Mobility.html>

Climate Leadership Awards 2012, 2013: Barcelona, Barcelona Smart City. Climate Leadership Awards, official web site, at:<http://cityclimateleadershipawards.com/barcelona-barcelona-smart-city/>

Anonymous [2] 2012: Energie et effets climatiques. Ville de Luxembourg, official web

at: <https://smartcity.wien.at/site/en/projekte/umwelt-klimaschutz/burgerinnen-solarkraftwerk/>

Smarter Cities Challenge, 2011b: Milwaukee, United States. Smarter Cities

Challenge, official web site, at: http://smartercitieschallenge.org/city_milwaukee_wi.html

The Cities of Tomorrow, 2012: Greater Lyon. The Cities of Tomorrow, official web site,

at: <http://www.thecitiesoftomorrow.com/sustainable-cities/lyon>.

The Cities of Tomorrow, 2012b: Stockholm. The Cities of Tomorrow, official web

site, at: [: http://www.thecitiesoftomorrow.com/sustainable-cities/stokholm](http://www.thecitiesoftomorrow.com/sustainable-cities/stokholm).

CHAPTER 3

Green, A., field 2006 “Everyware: The Dawning Age of Ubiquitous Computing.”

Amsterdam real time , 2002.Polak, E., Kee, J.,and Waag society .<http://realtime.waag.org/>

Schaffers, H., Komninos, N., Pallot, M., 2012, "Smart Cities as Innovation Systems Sustained by the Future Internet," URENIO Research Unit, p6.

Licoppe, C., 2004. "'Connected' presence: The emergence of a new repertoire for managing social relationships in a changing communication technoscape," *Environment and Planning D: Society and Space*, volume 22, number 1, pp. 135–156.at: <http://dx.doi.org/10.1068/d323t>, accessed 4 september 2014.

Meyrowitz, J., 1985. *No sense of place: "The impact of electronic media on social behavior"*. New York: Oxford University Press.

Mitchell, W J., 1999. *E-topia: "Urban life, Jim — but not as we know it"*. Cambridge, Mass.: MIT Press.

Mitchell, W J., 2006. "Smart City 2020," *Metropolis* (April), <http://www.metropolismag.com/April-2006/Smart-City-2020/>, accessed 5 November 2013.

Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J R ., Mellouli, S., Nahon, K., A. Pardo, T ., and Jochen Scholl, H., 2012. "Understanding smart cities: An integrative framework," *HICSS '12: Proceedings of the 2012 45th Hawaii International Conference on System Sciences*, pp. 2,289–

2,297.at: <http://dx.doi.org/10.1109/HICSS.2012.615>, accessed 5 November 2013.

Ratti, R., Townsend, A., 2011. "The social nexus," Scientific American, volume 305 (September), at: <http://dx.doi.org/10.1038/scientificamerican0911-42>, accessed 5 November 2013.

Batty, M., Axhausen, K., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., Ouzounis, G., Portugali, Y., 2012. "Smart cities of the future," European Physical Journal Special Topics, volume 214, number 1, pp. 481–518.at: <http://dx.doi.org/10.1140/epjst/e2012-01703-3>, accessed 5 November 2013.

<http://www.ibm.com/thesmartercity>),

http://www.cisco.com/web/strategy/smart_connected_communities.html)

General Electric (<http://www.gereports.com>), AT&T (<http://www.corp.att.com/stateandlocal/>), Microsoft and Philips.

<http://www.songdo.com>)

<http://masdarcity.ae>),

<http://amsterdamsmartcity.com>).

de Lange, M., de Waal, M., 2012a. "Ownership in the hybrid city", at <http://virtueelplatform.nl/english/news/ownership-in-the-hybrid-city/>, accessed 5 November 2013

Lyon, D., 2009. "Identifying citizens: ID cards as surveillance". Cambridge: Polity.

de Cauter, L., 2004. "The capsular civilization: On the city in the age of fear". Rotterdam: NAI Publishers.

Habuchi, I., 2005. "Accelerating reflexivity," In: Ito, M., Matsuda, M., Okabe, D., (editors). *Personal, portable, pedestrian: Mobile phones in Japanese life*. Cambridge, Mass.: MIT Press, pp. 165–182.

Bull, M., 2005. "The intimate sounds of urban experience: An auditory epistemology of everyday mobility," In: Kristóf Nyíri, J., (editor). *A sense of place: The global and the local in mobile communication*. Vienna: Passagen Verlag, pp. 169–178.

Ito, M., 2005. "Intimate visual co–presence," 2005 Ubiquitous Computing Conference (Tokyo), at: <http://www.itofisher.com/mito/archives/ito.ubicomp05.pdf>, accessed 5 November 2013.

Debord, G., 1958. "Theory of the Dérive," *Internationale Situationiste*, number 2,

at: <http://www.cddc.vt.edu/sionline/si/theory.html>, accessed 5 November 2013.

Chang, M., Goodman, E., 2006. "Asphalt games: Enacting place through locative media," *Leonardo*, volume 14, number 3, at: <http://www.leoalmanac.org/wp-content/uploads/2012/07/Asphalt-Games-Enacting-Place-Through-Locative-Media-Vol-14-No-3-July-2006-Leonardo-Electronic-Almanac.pdf>, accessed 5 November 2013.

Charitos, D., Paraskevopoulou, O., Rizopoulos, C., 2008. "Location-specific art practices that challenge the traditional conception of mapping," *Artnodes*, number 8, at: http://www.uoc.edu/artnodes/8/dt/eng/paraskevopoulou_charitos_rizopoulos.html, accessed 5 November 2013.

de Waal, M., 2012b. "The ideas and ideals in urban media," In: Foth, M., Forlano, L., Satchell, C., Gibbs, M., (editors). *From social butterfly to engaged citizen: Urban informatics, social media, ubiquitous computing, and mobile technology to support citizen engagement*. Cambridge, Mass.: MIT Press, pp. 5–20.

de Waal, M., 2013. "The city as interface: How new media are changing the city." Rotterdam: NAI Uitgevers/Publishers Stichting.

de lange, M., de Waal, M., 2013. "Owning the city: new media and citizen engagement in urban design."

CHAPTER 4

Mulligan, C., 2013 “Citizen Engagement in Smart Cities” future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Smyth, M., 2013 Critical Design: A Mirror of the Human Condition in the Smart City ” ” future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Fernandez, M., 2013 “Smart Cities of the Future? ” ” future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Hill, D., 2013 “Smart Citizens Make Smart Cities” ” future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Hill, D., 2013 “ ‘manifesto’ for smart citizens” ” future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Hemmet, D., Townsend, A., 2013 "Here Come The Smart Citizens" " future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Jacobs, J., 1961 "The Death and Life of Great American Cities" Random.

Anonymous [3] . An unauthorized companion to Dan Hill's seminal essay: "the smart city;Or, a 'manifesto'for smart citizens instead"at:<http://www.cityofsound.com/blog/2013/02/on-the-smart-city-a-call-for-smart-citizens-instead.html> accessed 10 August 2014.

Sterling, B., "Hill, D., 'On the smart city; Or, a 'manifesto' for smart citizens instead,' Beyond the Beyond,Wired ,2013" at : http://www.wired.com/beyond_the_beyond/2013/02/dan-hill-essay-on-the-smart-city-or-a-manifesto-for-smart-citizens-instead/(last) accessed at 10 August 2014.

Shepard, M., Simeti, A., 2012 "What's so smart about the Smart Citizen?" " future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Townsend, A., 2013 "To Know Thy City, Know Thyself" " future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Revell, T., 2012, "New Mumbai" at: <http://www.tobiasrevell.com/New-Mumbai> accessed 4. september. 2014.

Near Future Laboratory, "Corner Convenience" 2012 at : <http://nearfuturelaboratory.com/2012/03/04/corner-conveniencenear-future-designfiction/>) accessed 4. september. 2014.

Egg: <http://airqualityegg.com/> accessed 4. september. 2014.

Guifi.net: <http://guifi.net/> accessed 4. september. 2014.

<http://www.connectingcities.net/> accessed 4. september. 2014.

Urban Prototyping: <http://urbanprototyping.org/> accessed 4. september. 2014.

Schechtner, K., 2013 "internal Activists – Catalysts For Smartness All Around." " future everything publication smart citizens edited by Hemmet, D., Twonsend, A., 2013.

Dunagan, J., 2013 “The Power of Civic Imagination” future everything publication smart citizens edited by Drew hemmet ,Anthony twonsend 2013.

Kresin, F., 2013 “A Manifesto for Smart Citizens” future everything publication smart citizens edited by Drew hemmet ,Anthony twonsend 2013.

CHAPTER 5/6 Paulos, E., Honicky, R J., HookeR, B., 2008. “Citizen science: Enabling participatory urbanism,” In: Foth, M., (editor), 2009. Handbook of research on urban informatics: The practice and promise of the real–time city. Hershey, Pa.: Information Science Reference.at: <http://dx.doi.org/10.4018/978-1-60566-152-0.ch028>, accessed 5 september 2014.

Foth, M., Forlano, L., Satchell, C., Gibbs, M., (editors), 2011. “From social butterfly to engaged citizen: Urban informatics, social media, ubiquitous computing, and mobile technology to support citizen engagement”. Cambridge, Mass.: MIT Press.

Himanen, P., 2001. “The hacker ethic, and the spirit of the information age”. New York: Random House.

Leadbeater, C., and Miller, P., 2004. "The pro-am revolution: How enthusiasts are changing our economy and society". London: Demos.

Benkler, Y., Nissenbaum, H., 2006. "Commons-based peer production and virtue," Journal of Political Philosophy volume 14, number 4, pp. 394–419. at: <http://dx.doi.org/10.1111/j.1467-9760.2006.00235.x>, accessed 5 september 2014.

Shirky, C., 2008. "Here comes everybody: The power of organizing without organizations". New York: Penguin Press.

Rheingold, H., 2012. Net smart:" How to thrive online." Cambridge, Mass.: MIT Press.

http://www.domusweb.it/en/op-ed/2013/07/25/designing_smart_opencities.html accessed 10 August 2014

Code for America: <http://www.codeforamerica.org/> accessed 10 August 2014..

